

DIVIDEND POLICY, SHARE PRICE AND RETURN:

A STUDY ON THE JOHANNESBURG STOCK EXCHANGE

Thesis presented to the

DEPARTMENT OF ACCOUNTING

UNIVERSITY OF CAPE TOWN

in fulfilment of the requirements for the degree of

Master of Commerce

by

N. R. SEALY

September 1985

The University of Cape Town has been given the right to reproduce this thesis in whole or in part. Copyright is held by the author.

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

ABSTRACT

This thesis consists of an empirical investigation into the effects of firms' dividend policies on the prices of and returns realised on their ordinary shares listed on the Johannesburg Stock Exchange. A review of published theories as to whether the dividend policy of a firm ought to affect its value revealed that, under conditions approximating perfect capital markets, no dividend influence should be expected. Because of the wide range of market imperfections and their non uniform effect in the preferences they create amongst shareholders no consensus as to their aggregate influence on security returns exists. The writer's review of studies conducted by other researchers on overseas markets indicated no dividend effect.

The main empirical investigation conducted by the writer into the effects of dividend policy on the value of a firm made use of cross sectional regression techniques and an expanded ex post form of the capital asset pricing model. The results of this test indicated a negative dividend preference by investors which is more likely to have resulted from the heavier taxation of dividends than capital gains, than from a dividend aversion in a perfect capital markets situation.

The implication of these findings is that investors experiencing heavier taxation on dividend income than on capital gains may generally ignore the dividend policies of prospective investees, while all other investors

stand to gain by biasing their investment selection toward high payout shares. In favouring certain payout ratios adequate regard must, however, be given to maintaining an adequately diversified portfolio.

The test results further imply that firms may increase their value by reducing the dividend payout and accordingly, with capital requirements met from internal sources, reducing the amount of new capital raised through equity issues.

ACKNOWLEDGEMENTS

A number of people have made a significant contribution to this project. I am particularly grateful to Alan Stewart for computational assistance. Rory Knight has supervised this thesis, provided certain of the data and has helped and advised me, for which I am grateful.

Financial support was received from the Human Sciences Research Council and from the accounting firm Peat Marwick Mitchell & Co.

TABLE OF CONTENTS

	<u>Page No.</u>
ABSTRACT	(i)
ACKNOWLEDGEMENTS	(iii)
TABLE OF CONTENTS	(iv)
LIST OF FIGURES	(vi)
LIST OF TABLES	(vii)
CHAPTER ONE: INTRODUCTION	1
CHAPTER TWO: THEORETICAL BACKGROUND	7
2.1 PORTFOLIO THEORY	7
2.2 THE CAPITAL ASSET PRICING MODEL	8
2.3 PERFECT AND EFFICIENT CAPITAL MARKETS	10
2.4 EFFICIENT CAPITAL MARKETS AND THE CAPITAL ASSET PRICING MODEL	13
2.5 THE EMPIRICAL MARKET LINE	15
2.6 A CRITICISM OF THE APPROACH	16
2.7 SUMMARY	18
CHAPTER THREE: REVIEW OF THEORETICAL ARGUMENTS	20
CHAPTER FOUR: REVIEW OF PREVIOUS EMPIRICAL STUDIES	41
CHAPTER FIVE: A PRELIMINARY INVESTIGATION	73
5.1 INTRODUCTION	73
5.2 RATIONALE	73
5.3 METHOD	74
5.3.1 The Market Model	74
5.3.2 The Abnormal Performance Index Technique	78
5.3.3 Dividend Groupings	79
5.4 DATA	80
5.5 HYPOTHESIS	81
5.6 TEST RESULTS AND INTERPRETATION	82
5.6.1 Dividend Groups Based on Payout Ratios	85
5.6.2 Dividend Groups Based on Dividend Yields	88
5.7 LIMITATIONS OF THE STUDY	91
5.7.1 Model Specification	91
5.7.2 Selection Bias	91
5.8 CONCLUSIONS	92

CHAPTER SIX:	CROSS SECTIONAL REGRESSION STUDY INTO THE EFFECTS OF DIVIDEND POLICY ON THE VALUE OF A FIRM	95
6.1	INTRODUCTION	95
6.2	REVIEW OF PREVIOUS RESEARCH	96
6.3	DATA	103
6.4	METHOD	104
6.4.1	Rationale	104
6.4.2	Cross Sectional Regression Study	105
6.5	HYPOTHESES	121
6.6	TEST RESULTS AND INTERPRETATION	122
6.6.1	Results of Cross Sectional Regressions	122
6.6.2	Comparison of the Results Achieved Using the Two Methods	134
6.6.3	Clientele Effects	135
6.6.4	The Information Content of Dividends	140
6.7	POSSIBLE BIASING INFLUENCES	140
6.7.1	The Interrelationship of Investment and Dividend Decisions	140
6.7.2	Share Prices and Returns	146
6.7.3	Payout Ratios and Dividend Yields	147
6.8	DISCUSSION ON CURRENT DIVIDEND PRACTICE	150
6.9	CONCLUSION	153
CHAPTER SEVEN:	CONCLUSIONS	156
APPENDIX		161
REFERENCES		165

LIST OF FIGURES

Figure No.

Page No.

2.1	THE SECURITY MARKET LINE	10
4.1	GRAPH OF PRICE EARNINGS RATIO VS PAYOUT RATIO	46
5.1	API SCORES - ALLOCATION TO DIVIDEND GROUPS BASED ON PAYOUT RATIO	84
5.2	API SCORES - ALLOCATION TO DIVIDEND GROUPS BASED ON DIVIDEND YIELD	90
6.1	ESTIMATION PERIODS FOR PORTFOLIO CHARACTERISTICS FOR 1977 TEST PERIOD	108
6.2	ESTIMATION PERIODS FOR PORTFOLIO CHARACTERISTICS FOR FULL TEST PERIOD	115

LIST OF TABLES

Table No.

Page No.

3.1	THE RATES OF TAXATION ATTACHING TO DIVIDENDS AND CAPITAL GAINS AS INFLUENCED BY INVESTOR TAX PROFILES	35
4.1	CROSS SECTIONAL REGRESSION RESULTS - EQUATION $P_t = \hat{a} + \hat{b}D_t + \hat{c}R_t$	52
4.2	CROSS SECTIONAL REGRESSION RESULTS - EQUATION $P_t = \hat{a} + \hat{b}D_t + \hat{c}R_t^n$	55
4.3	ESTIMATES OF Y_1 - REGRESSION EQUATION $R_j = \hat{Y}_0 + [R_m - \hat{Y}_0]\hat{\beta}_j + \hat{Y}_1 (\delta_j - \delta_m)/\delta_m + \hat{E}_j$	58
4.4	CROSS SECTIONAL REGRESSION RESULTS - EQUATION $R_i - R_f = \hat{a} + \hat{b}\hat{\beta}_i + \hat{c}(\delta_i - R_f) + \hat{E}_i$	64
4.5	CROSS SECTIONAL REGRESSION RESULTS - REGRESSION EQUATION $R_i - R_f = \hat{a} + \hat{b}\hat{\beta}_i + \hat{c}(\delta_i - R_f) + \hat{E}_i$	66
4.6	MONTHLY API STATISTICS	69
5.1	ABNORMAL PERFORMANCE INDEX STATISTICS OF DIVIDEND PAYOUT GROUPS RELATIVE TO DATE OF FINAL EARNINGS AND DIVIDEND ANNOUNCEMENT	83
5.2	ABNORMAL PERFORMANCE INDEX STATISTICS OF DIVIDEND YIELD GROUPS RELATIVE TO DATE OF FINAL EARNINGS AND DIVIDEND ANNOUNCEMENT	89
6.1	SUMMARY OF THE RESULTS FOR THE REGRESSION $R_{pt} = \hat{Y}_{0t} + \hat{Y}_{1t}\hat{\beta}_{p,t-1} + \hat{Y}_{2t}\hat{\beta}_{p,t-1}^2 + \hat{Y}_{3t}\hat{S}_{p,t-1} + \hat{E}_{pt}$	99
6.2	REGRESSION SUMMARY	120
6.3	CROSS SECTIONAL REGRESSION RESULTS	123
6.4	CROSS SECTIONAL REGRESSION RESULTS	128
6.5	AVERAGE REGRESSION COEFFICIENTS FOR THE DIVIDEND YIELD TERMS OVER THE PERIOD JANUARY 1977 TO NOVEMBER 1980 WITH 1979 EXCLUDED	133

CHAPTER ONE

INTRODUCTION

This thesis consists of an empirical investigation into the effects of dividend policy on the value of and the return realized on ordinary shares of firms listed on the Johannesburg Stock Exchange. Previous studies by Friend and Puckett (1), Black and Scholes (2) and Litzenberger and Ramaswamy (3), yielding conflicting results, have been confined to American equity markets. The writer is unaware of any published works documenting similar tests carried out locally, although a review of the dividend setting process in South Africa has been conducted by Seneque and Gourley (4). Furthermore, work on the information content of dividend announcements of firms listed on the Johannesburg Stock Exchange has been performed by Knight and Affleck-Graves (5).

The empirical technique employed in the main investigation of this thesis involves the use of cross sectional regression techniques using an expanded form of the capital asset pricing model (6). This approach is similar to that taken by the latter two American Studies.

Current research in this area is conducted within the framework of a now generally accepted dividend irrelevance theory under conditions of perfect capital markets proposed by Miller and Modigliani (7). Noted dividend effects are therefore more likely to have arisen from market imperfections, particularly the difference in the effective rates of taxation levied on dividend income and capital gains, than from a dividend influence in a perfect capital markets situation.

The question of the influence of dividend policy on the value of a firm has wide economic significance. This influence is possibly most keenly felt by financial managers and investors. Financial managers may be faced with the decision of the maintenance of a regular dividend stream or a number of profitable investment opportunities, complicated by the availability of relatively more expensive external equity financing permitting both these options. New equity issues are more expensive than retained earnings since there may be significant costs associated with the former. The use of the more expensive financing or the compromising of investment plans to satisfy an incorrectly perceived dividend preference can negatively affect the value of the firm as could the non fulfilment of a genuine dividend preference.

For investors the impact of the dividend policies of prospective investees on the selection of investments requires consideration. A genuine dividend preference may lead to shares in firms distributing a low proportion of earnings being bid up in the hope of a change in dividend policy. While the established irrelevance of dividend policy would focus investors' attention on other factors such as the profitability of investees investments and the quality of their management. Indeed Black and Scholes contend that in the absence of sophisticated selection procedures attempts to bias portfolios toward either high or low yield stocks may lead to sub optimal portfolio diversification (8).

At this stage it may be well to state the problem to be addressed in this study. The hypothesis being tested is that the dividend policy of a firm affects the market value of, and the return realised on, its equity

against the alternative hypothesis that the dividend policy does not affect the market value of, and the return realized on, the equity of a firm. It is necessary to include both market value and realized return in the statement of the problem. This is done to exclude from the discussion two otherwise identical firms, one following a generous dividend policy and the other a low payout policy. In the absence of any dividend influence, the returns realised on the shares of these two firms would be the same but the per share price would differ reflecting the undistributed profits retained by the low payout firm.

A further case where dividend policy affects the share price and realized return in a different way is the case in which the level of dividend distribution is postulated to affect the value of a firm and where each dividend level is associated with a particular value. During periods where no change in dividend policy occurs the return realized will be influenced by non dividend factors only and therefore, for that period, no difference in the return on shares of otherwise identical high and low payout firms will be observed.

For the purposes of this study dividend policy is defined as the decision to distribute a certain proportion of a firm's earnings such that the investment decisions are not influenced by the amount to be paid in dividends. This envisages a situation where management make independent decisions regarding the amount of funds to be appropriated for investment and dividend requirements, with shortfalls to be raised through share issues from time to time. It may be argued that in South Africa a forced association between the investment and dividend decisions arises where

the inflow of cash exceeds that which is required for these two uses of funds. In this situation the decision not to distribute surplus cash results in that money being retained and automatically reinvested. This situation differs from that prevailing in the United States where firms are permitted to utilize surplus cash resources to repurchase their shares. The repurchase results in a receipt by shareholders which may be classified as a capital gain for tax purposes, with the transaction viewed as a negative share issue.

This balancing of cash flow through the use of external equity financing is not an annual procedure but is used intermittently to attain a desired long term capital structure. It may therefore be argued that firms with surplus cash flow will resort less to external equity financing, thus balancing their cash flow over a longer period while maintaining their desired dividend and investment plans.

The empirical relationship between the investment and dividend decisions is discussed in Chapter Six.

Apart from testing the impact of dividend policy on the value of a firm this thesis fits squarely within the broader problem of ascertaining whether financing decisions in general affect the value of a firm firstly under conditions of perfect capital markets and secondly upon the introduction of market imperfections such as taxes and transaction costs. It is therefore possible that the results of this thesis may provide corroborative evidence in these other areas of concern in finance.

The tests and the discussion documented in this thesis are directed at ascertaining whether the level of dividend payout influences the value of a firm and if so in which direction. Should an effect be noted this thesis will not address the problem of an optimal dividend policy or the interrelationship between the dividend decision and other decisions critical to the value of a firm. These problems would obviously be of great practical interest. The empirical techniques necessary to identify such an optimal payout would be vastly more complex than those used in this study but would provide a fascinating field for research.

The remainder of this thesis is divided into six chapters. Chapter Two introduces necessary background for subsequent discussion and tests. Theories covering the operation of capital markets and the pricing of assets in such markets are considered together with the empirical difficulties associated with tests of such theories. Chapter Three considers arguments proposed by a number of writers as to whether dividend policy ought to affect the value of a firm. The position both with and without various market imperfections is discussed. Chapter Four reviews the more important research by other writers into the problem addressed in this study. Chapter Five documents a preliminary empirical study undertaken by the writer into the effects of dividend policy on the value of a firm. Chapter Six records a further investigation using cross sectional regression techniques. This approach circumvents certain conceptual limitations of the approach used in the first test. Chapter Seven concludes the thesis with a discussion of the implications of the test results for both investors and financial managers.

FOOTNOTES TO CHAPTER ONE

- (1) Friend, I., Puckett, M., 'Dividends and Stock Prices', American Economic Review. September 1964. pp 656 - 682.
- (2) Black, F., Scholes, M., 'The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns', Journal of Financial Economics. May 1974. pp 1 - 22.
- (3) Litzenberger, R., Ramaswamy, K., 'The Effect of Personal Taxes and Dividends on Capital Asset Prices : Theory and Empirical Evidence', Journal of Financial Economics. June 1979. pp 163 - 196.
- (4) Seneque, P.J.C., Gourley, B.M., 'Dividend Policy and Practice in South Africa', The Investment Analysts Journal. June 1983. pp 35 - 39.
- (5) Knight, R.F., Affleck-Graves, J.F., 'The Information Content of Dividends incremental to the information content of earnings: The South African Experience', Unpublished Research Paper, University of Cape Town. January 1984.
- (6) The capital asset pricing model is introduced and discussed in Chapter Two.
- (7) Miller, M., Modigliani, F., 'Dividend Policy, Growth, and the Valuation of Shares', Journal of Business. October 1961. pp 411 - 433.
- (8) Black, F., Scholes, M., op cit.

CHAPTER TWO

THEORETICAL BACKGROUND

This Chapter provides the theoretical background necessary to undertake the empirical study documented in Chapter Six. It also introduces criticism concerning the proposed methodology as well as a defence which justifies its use in this thesis.

2.1 PORTFOLIO THEORY

Portfolio theory dictates that in almost all cases investors seeking to maximize their wealth and minimize their risk will hold a combination of assets rather than a single asset. The reason for this is that an investor holding a single asset may almost always increase his expected return or decrease his expected risk by diversifying his investment. The benefits of diversification arise from imperfect co-movement of the expected returns on securities. Stated differently, changes in the expected returns on a particular share may be partly offset by unassociated variances in the returns of other shares in the portfolio. The reduction in the level of risk achieved by adding a security to a portfolio depends on the direction of variability of expected return on that share relative to others in the portfolio. The degree of co-movement is expressed by the co-variance of returns between two securities. The use of this phenomenon allows the construction of what

are known as efficient portfolios where the expected return on a portfolio is maximized for a given risk level or where the risk level is minimized for a given return. Investors are therefore able to construct portfolios to meet their risk and return preferences. As portfolio construction is undertaken on the basis of expected risk and return levels it should be stressed that a portfolio may be perceived as efficient from an anticipatory (ex ante) perspective, while an after the fact (ex post) evaluation of performance may show it to be sub-optimal.

2.2 THE CAPITAL ASSET PRICING MODEL

The capital asset pricing model (CAPM) is a model for the pricing of assets as components of efficient portfolios(1). In other words it suggests a return on an asset commensurate with that portion of its risk which is unavoidable through diversification in an efficient portfolio. The CAPM is, inter alia, directly based on the following assumptions:

- (i) Investors are risk averse individuals who seek to maximize their wealth at the end of each period,
- (ii) Investors have homogeneous expectations about asset returns which have a joint normal distribution,
- (iii) There exists a risk free rate such that investors may borrow or lend unlimited amounts at that rate,
- (iv) The quantities of assets are fixed (2).

Other necessary conditions are introduced below.

While these conditions are unlikely to be exactly met it seems that they are sufficiently close to reality to allow the operation of the model.

In its ex ante form the CAPM may be specified as follows:

$$E(\tilde{R}_{it}) = R_f + [E(\tilde{R}_{mt}) - R_f] \beta_i$$

Where: $E(\tilde{R}_{it})$ = The expected return on share i during period t ,

$E(\tilde{R}_{mt})$ = The expected return on the market during period t ,

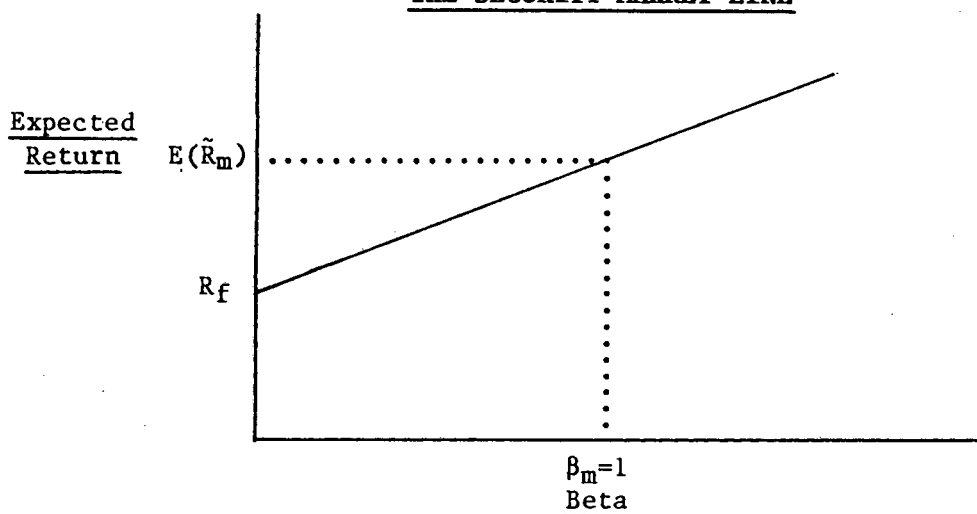
R_f = The risk free rate of interest,

β_i = The beta of share i , defined as the covariance between the return on share i and the market return divided by the variance of the return on the market, $[\text{Cov}(R_i, R_m) / \text{Var}(R_m)]$.

Briefly in intuitive terms the CAPM values assets at the risk free rate plus a premium commensurate with its risk. The price of risk is the difference between the expected market return and the risk free rate $[E(\tilde{R}_m) - R_f]$ and the quantity of risk is given by β which is a measure of the share's sensitivity to changes in the return on the market. The CAPM again in its ex ante form may be plotted as the security market line as shown in Figure 2.1

FIGURE 2.1

THE SECURITY MARKET LINE



The point plotted represents the expected return on the market which would have a beta of 1. From an ex ante perspective all securities must plot along the security market line.

2.3 PERFECT AND EFFICIENT CAPITAL MARKETS

At this stage it would be convenient to introduce the concept of a perfect capital market which is characterised by the following conditions:

- (i) Markets are frictionless in that there are no transaction costs or taxes and that all assets are perfectly divisible and marketable. Furthermore no regulations exist which constrain trading on that market.
- (ii) There is perfect competition in product and securities markets. In product markets this means that all producers supply goods and services at minimum average cost, and in securities markets it means that all participants are price takers.

- (iii) Markets are informationally efficient in that information is costless and is received simultaneously by all individuals.
- (iv) All investors are rational and seek to maximize their expected utility (3).

In view of these conditions few markets can be expected to be perfect. The less restrictive notion of an efficient capital market where security prices fully and instantaneously reflect all relevant price sensitive information allows the concept of a perfect capital market to be operationalized. The concept of an efficient capital market is less demanding in that it permits market imperfections and costly information but restricts the pricing inefficiencies resulting from these factors to the approximate amount of the tax or transaction cost or the cost of obtaining, processing and acting on restricted information. Monopolies and other factors inhibiting free trading are also permitted but the value of the resultant advantages and disadvantages accruing to various firms are required to be fully and instantaneously reflected in the prices of those firms' securities.

Copeland and Weston divide capital market efficiency into allocational and operational efficiency (4). Allocational efficiency is achieved where the risk adjusted marginal rates of return for borrowers and lenders are equated. Where this occurs the market has rationed capital by means of an equilibrium interest rate and has allocated the available funds such that the most profitable investment projects are undertaken. Operational efficiency results where the allocation of funds from lenders

to borrowers is achieved by market agents with the lowest possible transaction costs.

Three forms of informational market efficiency have been proposed by Fama while relating this hypothesis to actual trading conditions (5). These are:

- (i) Weak form efficiency. In this situation it is proposed that no investor is able to earn returns consistently superior to those available on the market portfolio through basing investment decisions on historical price data.
- (ii) Semistrong form efficiency. In this situation it is proposed that no investor is able to earn returns consistently superior to those available on the market portfolio through basing investment decisions on either historical price data or other publicly available information.
- (iii) Strong form efficiency. In this situation it is proposed that irrespective of what information any investor has access to he is unable to earn returns consistently superior to those available on the market.

The concept of an efficient capital market introduced in this section has significant implications for the construction of efficient portfolios and for the CAPM.

2.4 EFFICIENT CAPITAL MARKETS AND THE CAPITAL ASSET PRICING MODEL

In an efficient capital market prices of assets have incorporated all relevant price sensitive information. Asset prices are therefore good predictors of value. This is of significance when the construction of truly efficient portfolios is considered, since any price sensitive information not reflected in asset prices implies a disequilibrium in the return on individual assets and inefficient portfolio construction. The compiling of portfolios would be inefficient because investors' expectations concerning the return on individual shares and the covariance of returns between shares would be incorrect because the full information set would not be available to them. To extend this line of reasoning if it is assumed that investors act so as to maximize their return and minimize their variance of return they will construct portfolios which are efficient relative to the information set which is available to them. As the market portfolio is the sum of all individual investors' portfolios any inefficiency in the latter, arising from inefficient capital markets, is reflected in the market portfolio. Consequently the return on the market portfolio would not reflect the current true complete information set.

As noted the CAPM prices assets at the risk free rate of return plus a premium commensurate with that portion of its risk which is unavoidable through diversification. Understandably this risk premium is the product of the price of risk and the quantity of risk. The price of risk is given by the term $[E(\tilde{R}_m) - R_f]$, being the difference between the expected market return and the risk free rate during any period. Asset prices

suggested by the CAPM are therefore influenced by the expected return on the market. Consequently should the capital market be inefficient the expected returns predicted by the CAPM would be incorrect because the expected return on the market would be distorted relative to the true information set.

Beaver has, however, presented a further definition of an efficient market where, stated in a non rigorous form, a market is said to be efficient in respect to certain information if security prices behave as if that information is incorporated into prices (6). Beaver notes a number of situations outlined in research papers of earlier writers which may give rise to this position. Among them is a paper by Grossman which considers a universe of uninformed investors, each in possession of partially correct information (7). The incorrect portions of investors' information sets tend to be uncorrelated and therefore approximately sum to zero over the market. The final result is security market prices which are better predictors of value than the assessment of any individual. The extension of inefficiencies in investor portfolios (these may, however, be eliminated by investors recognising market prices as optimal predictors of security values) to such inefficiencies in the market portfolio may therefore not be justified.

This form of market efficiency has certain attractive attributes (8). The most significant of these are firstly that heterogeneous beliefs and information sets amongst investors are permitted. Secondly markets may be viewed as efficient with respect to specific information sets which avoids the arbitrarily determined forms of efficiency outlined in the previous section.

Subject to Beaver's argument the relative efficiency of a capital market is a necessary condition for the efficiency of the market portfolio which in turn must be seen as a joint hypothesis with the CAPM. The prerequisites for a perfect capital market, suitably relaxed such that they imply an efficient capital market, must therefore be added to the assumptions on which the CAPM is based.

2.5 THE EMPIRICAL MARKET LINE

The discussion thus far has considered the CAPM only in its anticipatory (ex ante) form. To permit empirical testing it requires restating so that actual data rather than expected values may be used. In its ex post form, which is derived from the ex ante form, it is known as the empirical market line. The transformation from the ex ante to the ex post form requires that the returns on a security are normally distributed and follow a fair game, which requires that over a large number of observations actual and expected values coincide. The empirical market line may be written as:

$$R_{it} = \hat{Y}_{0t} + \hat{Y}_{1t}\beta_i + \hat{E}_{it} \quad (2.1)$$

Where :

- R_{it} = The return on share i during period t ,
- $\hat{Y}_{0t}, \hat{Y}_{1t}$ = Respectively the estimated intercept and slope of the empirical market line,
- β_i = The beta of share i ,
- \hat{E}_{it} = A residual term.

It is this ex post form of the CAPM which, with the addition of a dividend yield term, is to be used for the study using cross sectional regression techniques which is documented in Chapter Six.

The empirical market line has certain inherent features which suit it for use in empirical studies. Among these are that unlike the ex ante form of the CAPM it does not require that the term \hat{Y}_{0t} approximates the risk free interest rate or that any of the parameter estimates remain constant over time.

2.6 A CRITICISM OF THE APPROACH

Roll has presented cogent criticism concerning the use of the empirical market line in tests of the applicability of the CAPM (9).

His first criticism implies that the matching of data to the empirical market line in an effort to derive the estimates \hat{Y}_{0t} and \hat{Y}_{1t} in equation 2.1 constitutes an incomplete test of the CAPM. Roll asserts that any test of the CAPM must simultaneously test the efficiency of the market portfolio as these are joint hypotheses. Mayers and Rice in offering a defence of this approach acknowledge that a definitive test of the CAPM would require this simultaneous test (10). They, however, point out that the determination and measurement of returns realized on the true market portfolio is not possible because it would include assets other than listed securities. Mayers and Rice therefore propose the use of an untested market index for tests of the CAPM. The basis for their

recommendation is that in the absence of a quantifiable return on a tested efficient market portfolio the alternative of an ordinary market index would still provide useful test results. This is supported by the argument that in the absence of significant market imperfections, rational return maximizing risk averse investors would construct efficient portfolios for themselves. As the market portfolio is simply the sum of all individual portfolios, it is not unlikely that the market portfolio would be approximately efficient.

The remainder of Roll's criticism relates to the ex post assessment of security performance. Roll argues that should the index used to generate returns be ex ante efficient, then assuming the applicability of the CAPM, on average zero or statistically insignificant residuals would be noted. Roll further argues the converse that should the CAPM apply any statistically significant residuals from the empirical market line, over a large number of observations, imply ex ante inefficiency of the market index used. The association between this criticism and the study in Chapter Six arises because in terms of Roll's criticism an inefficient index distorts the allocation of the return on a security between the terms $\hat{Y}_{1t}\beta_i$ and \hat{E}_{it} in equation 2.1. This being so, as well as the regression coefficients of the beta term being distorted, we may expect that bias in the residual term may affect the regression coefficients of the dividend yield term.

Mayers and Rice, however, defend the evaluation of security performance using the empirical market line (11). Where the return on an ex ante efficient market index is used in such a test, the implied correct assessment of the probability distribution of returns by investors would lead to almost perfect foresight which would result in insignificant residuals being noted. They therefore propose the usefulness of the above test in a market where diverse investor expectations produce a structure of security prices reflecting varying opinions. The probability distribution of returns assessed by this market may differ from that which ultimately occurs. This difference between expected and actual occurrence would permit investors who correctly perceived the ultimate probability distribution of returns to plot above the empirical market line. Mayers and Rice acknowledge that this scenario would result in the market index being ex post inefficient which strictly would void the applicability of the CAPM. They, however, argue that this approach permits the use of the CAPM for the analysis of security performance.

2.7 SUMMARY

This Chapter has introduced the CAPM both in its ex ante form and in its ex post form, the empirical market line, which is to serve as the basis for the test to be carried out in Chapter Six. It has also raised criticism by Roll concerning its use in such tests. Although these criticisms have been defended by Mayers and Rice they constitute a possible though unlikely source of material distortion of the test results.

FOOTNOTES TO CHAPTER TWO

- (1) The capital asset pricing model was first proposed by Sharpe. Sharpe, W.F., 'Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk', Journal of Finance. September 1964. pp 425 - 442.
- (2) Copeland, T.E., Weston, J.F., Financial Theory and Corporate Policy, Second Edition, Los Angeles: Addison Wesley, 1982. pp 186.
- (3) Copeland, T.E., Weston, J.F., op cit. pp 286.
- (4) Copeland, T.E., Weston, J.F., op cit. pp 286 - 7.
- (5) As reported in Copeland, T.E., Weston, J.F., op cit. pp 287.
- (6) Beaver, W., 'Market Efficiency', The Accounting Review. January 1981 pp 23 - 37.
- (7) Grossman, S., 'On the Efficiency of Competitive Stock Markets Where Traders Have Diverse Information', Journal of Finance. May 1976. pp 573 - 585.
- (8) Beaver, W., op cit.
- (9) Roll, R., 'A Critique of the Asset Pricing Theory's Tests', Journal of Financial Economics. March 1977. pp 129 - 176.
- (10) Mayers, D., Rice, E., 'Measuring Portfolio Performance and the Empirical Content of Asset Pricing Models', Journal of Financial Economics. March 1979. pp 3 - 28.
- (11) Mayers, D., Rice, E., op cit.

CHAPTER THREE

REVIEW OF THEORETICAL ARGUMENTS

The purpose of this chapter is to document and make comment on arguments presented by other researchers as to whether the dividend policy of a firm ought to affect its value. The discussion does not consider empirical studies but rather depends on normative, deductive reasoning.

Tests to ascertain whether financial policy decisions affect the value of a firm usually require that a valuation model be developed in terms of which these decisions may be assessed. To remain comprehensible, such valuation models by necessity usually make considerable simplifying assumptions concerning growth patterns and financing of firms, investor behaviour and institutional factors in capital markets. Often the effect of making these assumptions is to severely curtail the realism of the model. Choice of the particular model, however, is not considered critical as Miller and Modigliani argue that, properly developed, these alternative approaches to valuation reconcile(1). In considering valuation models more general theories which as far as possible, abstract from such restrictive assumptions must therefore be seen as more powerful.

It is not intended to review earlier basic texts which propose valuation models under very restrictive conditions. This discussion will begin

with a review of an argument, proposed by Miller and Modigliani, to the effect that under conditions of uncertainty the dividend policy of a firm is not a determinant of its value(2). The argument does not make significant assumptions concerning the processes used by investors to value shares and is therefore general in nature. Miller and Modigliani state:

"For even without a full fledged theory of what does determine market value under uncertainty we can show that dividend policy at least is not one of the determinants".

The assumptions on which their analysis is based include perfect capital markets. Although unrealistic this simplifies the initial analysis and provides a base from which to progress. Two further concepts, imputed rationality and symmetric market rationality are then introduced. The condition of imputed rationality requires from every trader the assumption of rational behaviour on the part of every other trader. The condition of symmetric market rationality involves rational behaviour on the part of each trader and the assumption by each trader of the rationality of the market. These assumptions limit investors behaviour to rational actions which, while a departure from actual conditions, is not considered to detract significantly from the value of the conclusion. It will also be shown that these assumptions may be partially relaxed without affecting the result.

The analysis proceeds by assuming two identical firms similar in all respects other than the possible dividend during the current period.

Thus:

$$\bar{X}_1(t) = \bar{X}_2(t) \quad t = 0 \dots \infty$$

$$\bar{I}_1(t) = \bar{I}_2(t) \quad t = 0 \dots \infty$$

$$\bar{D}_1(t) = \bar{D}_2(t) \quad t = 1 \dots \infty$$

Where: $\bar{X}_i(t)$ = The total net profit of firm i during period t ,

$\bar{I}_i(t)$ = The change in holding of physical assets by firm i during period t ,

$\bar{D}_i(t)$ = The total dividend paid by firm i during period t .

Bars above variables indicate currently unknown values (viewed from the beginning of period 0) to be extracted from probability distributions.

The return to shareholders in firm 1 during period 0, $\bar{R}_1(0)$ may be written as:

$$\bar{R}_1(0) = \bar{D}_1(0) + \bar{V}_1(1) - \bar{m}_1(1) \bar{p}_1(1) \quad (3.1)$$

Where: $\bar{V}_i(1)$ = The value of firm i at the beginning of period 1,

$\bar{m}_i(t+1)$ = The number of shares in firm i , issued during period t at the ex dividend closing price for period t , $\bar{p}_i(t+1)$.

Using the accounting identity:

$$\bar{m}_1(1) \bar{p}_1(1) = \bar{I}_1(0) - (\bar{X}_1(0) - \bar{D}_1(0)) \quad (3.2)$$

which is substituted into equation 3.1 we get:

$$\bar{R}_1(0) = \bar{X}_1(0) - \bar{I}_1(0) + \bar{V}_1(1) \quad (3.3)$$

A similar formula may be developed for $\bar{R}_2(0)$. In comparing $\bar{R}_1(0)$ and $\bar{R}_2(0)$ we note that by assumption $\bar{X}_1(0) = \bar{X}_2(0)$ and $\bar{I}_1(0) = \bar{I}_2(0)$. By invoking symmetric market rationality $\bar{V}_1(1) = \bar{V}_2(1)$, because they depend only on occurrences after the beginning of period 1 which by assumption are identical for the two firms. For the purpose of this analysis it has been assumed by Miller and Modigliani that the dividend and investment decisions of firms are independent and therefore that the difference in gross investment between the two firms, which had arisen out of the difference in payout in period 0, had been neutralized by a share issue. Because the determinants of $\bar{R}_1(0)$ and $\bar{R}_2(0)$ are equal, they must be equal and consequently $\bar{V}_1(0) = \bar{V}_2(0)$. Therefore the value of a firm at the start of any period is shown to be invariant with respect to dividends paid during that period.

The analysis may then be extended to a situation where dividend payments are allowed to vary in period 1 as well as in period 0. The only avenue by which period 1 dividends may affect $\bar{V}_1(0)$ is through $\bar{V}_1(1)$. But as already shown the value of a firm as of the beginning of any period is unaffected by distributions made during that period. Consequently $\bar{V}_1(1)$ is unaffected by period 1 distributions. Again $\bar{V}_1(1)$ and $\bar{V}_2(1)$ must be equal despite differences in payout in both periods 0 and 1. Therefore $\bar{V}_1(0)$ and $\bar{V}_2(0)$ must be equal. By continuing this argument it may be shown that the value of a firm as at any point in time is unaffected by future dividend payments.

As discussed the strength of this analysis is its generality whereby it circumvents most limiting factors attaching to other analyses. Miller and Modigliani point out that their analysis implicitly assumes that all external financing is provided by equity issues. Their analysis therefore requires an extension to ascertain whether the existence of debt financing would alter the conclusion. To do so requires that two further terms be added to the right hand side of equation 3.1. The first would reflect that part of the return received by way of interest while the second would reflect the reduction in the return to shareholders by the amount of debt issued. Similarly the amount of debt raised would be added to the left hand side of equation 3.2 while the variable reflecting interest payments would be deducted from the right hand side in the same manner as the dividend variable. On substituting equation 3.2 into 3.1 these two variables would set off leaving equation 3.3 unchanged. The dividend invariance proposition is therefore upheld despite the possibility of debt financing.

The assumption of symmetric market rationality, necessary for the above conclusion, may be seen as excessively restrictive as it precludes irrational behaviour undertaken to benefit from irrational behaviour on the part of other investors. Brennan has shown that substantially the same conclusion may be reached from a weaker set of assumptions which he terms the independence of irrelevant information(3). These assumptions (modified by the writer) are:

- (i) Investors are rational in preferring more wealth to less and in being indifferent to the form in which increments are received,
- (ii) Shares are valued only on the basis of their future prospects,
- (iii) At least some investors with sufficient resources to influence market prices are aware of assumption (ii).

Under these assumptions certain of the investors would perceive that the current value of the two firms in the Miller and Modigliani analysis should be the same. Consequently they would arbitrage away any difference in value. The Miller and Modigliani analysis has therefore become fairly robust and for dividend policy to affect the value of a firm under conditions of uncertainty and perfect capital markets one of the following conditions is implied:

- (i) Investors are not rational, or
- (ii) Stock prices depend at least partly on past events, or
- (iii) There are no investors with significant resources who understand the security valuation process(4).

In conclusion it may be said that this analysis, under the stated assumption of perfect capital markets, is generally regarded as conclusive.

Another analysis as to whether payout policy affects the value of a firm has been conducted by Gordon (5). Gordon has argued, predominantly on an intuitive basis, that a corporation's cost of capital is an increasing function of the rate of growth in its dividend. Because this growth rate is partially dependent on the retention rate (dividend policy) an association between a firm's cost of capital and hence its value and its dividend policy is implied.

Under the direct assumptions that investors value securities on the basis of anticipated dividend streams, the expectation of no new equity financing, a stable debt to equity ratio, the retention of a constant fraction of earnings, b , and that the company earns a fixed rate of return, r , on its investments, Gordon shows that the value of a firm may be written as:

$$P_0 = \frac{Y_0(1-b)}{k - br} \quad (3.4)$$

Where: P_0 = The price of a share at the end of period 0,

Y_0 = The earnings of period 0 attributable to one share,

k = The rate at which the company's future dividends are discounted.

Under the stated assumptions the value of a share is therefore given by the current dividend divided by the difference between the discount rate and the growth rate of the dividend.

Because shares are valued on the basis of expectations, Gordon argues that it is not critical that his assumptions are realized but rather that investors expect them to be realized. While this does insulate his argument, investors' perceptions of the profitability of firms do vary and this must represent a weakness in his model.

If we assume that k and r are independent of b , the effect on price of varying the payout ratio may be displayed by differentiating P_0 with respect to b .

$$\frac{\partial P_0}{\partial b} = \frac{(r - k) Y_0}{(k - rb)^2} \quad (3.5)$$

It immediately becomes obvious that setting the rate of return on investment, r , equal to the discount rate, k , neutralizes the effect on the share price of a change in the retention ratio. By setting r above or below k the effect on share price of differing retentions is displayed. However, the response of the share price to a change in retention is not due to the change in payout itself but rather to the profitability of the incremental investment. Stated differently, because the possibility of external financing has, by assumption, been excluded from this analysis the investment and dividend decisions have become interrelated. Recall the definition of dividend policy which is the decision to distribute a certain proportion of earnings such that the investment decisions are not influenced by the amount to be paid in dividends.

The analysis is continued by by restating equation 3.4 as follows:

$$\frac{Y_0(1 - b)}{P_0} = k - br \quad (3.6)$$

The left hand side of this equation is the dividend yield. Gordon notes that an assumption of k being independent of b and r may not be realistic as very high profitability would imply a negative dividend yield. On intuitive grounds he advocates that the discount rate k may well be an increasing function of the growth rate. It is argued that as the growth rate rises investors would accept a lower yield, but the required yield would be expected to fall by less than the increase in growth thus implying a rising discount rate, k .

In reality a negative value for $(k - br)$ seems unlikely for a number of reasons. Firstly, as Gordon notes firms with very high rates of profitability may be expected to use external financing thereby violating one of the original assumptions. Secondly where extraordinary profitability has prompted the use of external financing, this together with high earnings retention is likely to lead to a fall in r , the rate of profitability, thereby stabilising br . Thirdly by excluding the possibility of external financing the growth rate in the dividend is maintained at br . However, should the model be expanded to allow equity issues the growth in per share dividends would probably fall.

Therefore by relaxing the assumptions on which Gordon's analysis is based such that actual market conditions are allowed, the basis for his proposition that k should be an increasing function of b_r , namely that b_r might exceed k thus implying a negative dividend yield, appears to fall away.

Gordon continues his analysis by offering reasons why one might expect the discount factor k to be an increasing function of the growth rate in dividends, b_r , and hence the retention rate, b (6). Gordon considers a firm that is expected to earn a constant amount in perpetuity, Y_0 , which will all be distributed. Furthermore the firm is expected to use no external financing. The firm's value, being the discounted future receipts, may then be given as:

$$P_0 = \frac{Y_0}{(1+k)} + \frac{Y_0}{(1+k)^2} + \frac{Y_0}{(1+k)^3} + \dots + \frac{Y_0}{(1+k)^t} + \dots \quad (3.7)$$

Should the firm then decide to retain its first period earnings under the expectation of earning a rate of return, k , its value may now be given as:

$$P_0 = \frac{0}{(1+k)} + \frac{(1+k)Y_0}{(1+k)^2} + \frac{(1+k)Y_0}{(1+k)^3} + \dots + \frac{(1+k)Y_0}{(1+k)^t} + \dots \quad (3.8)$$

By setting the rate of return on the incremental investment to k Gordon has left the value of the firm unaffected by the retention. He notes that by setting the rate of return on the new investment to a rate different to k the firm's value is altered. The reason for the change is, however, the profitability of the investment and not the change in payout.

Two assumptions are then made to continue the argument. These are that investors are risk averse and secondly that prospective cash receipts become less certain as the expected date of receipt becomes more distant. On the basis of these assumptions Gordon argues that it is not unreasonable to expect investors to discount future dividend streams at increasing rates for progressively more distant expected dividends. Equation 3.7 is therefore stated as follows:

$$P_0 = \frac{Y_0}{(1+k_1)} + \frac{Y_0}{(1+k_2)^2} + \frac{Y_0}{(1+k_3)^3} + \dots + \frac{Y_0}{(1+k_t)^t} + \dots \quad (3.9)$$

The constant discount factor, k , in equation 3.7 is seen as an average of the discount rates k_1 , k_2 , k_3 in equation 3.9 such that discounting the dividend stream using k or the series k_1 , k_2 , k_3 would yield the same result for P_0 . By replacing the constant discount factor in equation 3.8 by the factors dependent on the time period we get:

$$P'_0 = \frac{0}{(1+k_1)} + \frac{(1+k) Y_0}{(1+k_2)^2} + \frac{(1+k) Y_0}{(1+k_3)^3} + \dots + \frac{(1+k) Y_0}{(1+k_t)^t} + \dots (3.10)$$

Where $P'_0 < P_0$.

Current dividends have been foregone in favour of larger subsequent payments which Gordon argues should be discounted at a higher rate to recognize their uncertainty. On this basis he argues that the dividend policy influences the value of the firm.

It has been argued by Miller and Modigliani, in particular, that Gordon's analysis confuses the effects of dividend and investment policy (7). On an intuitive basis this may be demonstrated by considering a firm whose constitution allows it only to invest in bank deposits paying a fixed interest rate. This is assumed to be a risk free asset. If this firm's earnings are represented by equation 3.10 there would seem to be no reason for proposing an increasing discount rate because distant receipts are as assured as current receipts. Stated differently, it is the writers opinion that the reason for Gordon proposing increasing discount rates is the uncertainty as to whether the investment will generate the expected cash flow rather than as to whether the cash will be distributed or retained. Furthermore, without the restrictive assumption of excluding new equity financing a financial manager would be in a position to alter the dividend receipts of shareholders between periods by the use of share issues.

In his analysis Gordon has relied on setting the rate of return on investment, r , equal to the discount factor, k , to prevent changes in the gross amount of investment, arising from changes in payout, from altering the value of the firm. In the context of Gordons argument Brennan(8) has shown that the change in the value of a firm implied by a change in retention is given by:

$$\sum_{t=1}^{\infty} \frac{\Delta I_t}{(1+k_t)^t} \left(-1 + r \sum_{y=1}^{\infty} \frac{1}{(1+k_{t+y})^y} \right)$$

The only instance in which this expression will equal zero is when all the k_t are equal and where r is equal to k . Therefore time dependent discount rates imply a change in the gross amount of investment in the context of Gordon's argument, which is shown to attribute to dividend policy changes in the value of a firm arising from changes in investment.

The discussion has considered two analyses, both abstracted from market imperfections. The Miller and Modigliani analysis is based on assumptions concerning the rationality of investors behaviour and a traditional arbitrage argument. Gordon's argument is based on a model of the value of a firm and is considerably less general than that of Miller and Modigliani. The reason for this is that firstly it is restrictive in terms of the assumptions which it uses and secondly, as observed by Brennan, it specifically assumes that investors discount expected future dividends while Miller and Modigliani make no such assumption (9).

To summarize the discussion so far it may be said that under conditions of uncertainty, rational investor behaviour and no market imperfections dividend policy is unlikely to affect the value of a firm.

It is generally accepted that the existence of capital market imperfections such as taxes and transaction costs may create a legitimate preference for certain payout ratios by various classes of shareholders. Because of the multitude of imperfections and the sometimes conflicting biases they may imply there exists no consensus as to the aggregate effect on share prices of these factors. There is, however, general agreement that the difference in taxation rates applicable to dividend income and capital gains is potentially the strongest biasing factor.

Brennan was the first researcher to incorporate this difference into a pricing theory which was accomplished by amending the CAPM such that the before tax return on a share was partly dependent on its dividend yield(10). This model was developed under the assumptions of proportional rather than progressive taxation, certain dividends and unlimited borrowing at a riskless rate of interest. Brennan's analysis represents a new approach to the examination of the effects of different shareholder tax structures on the value of a firm. While Brennan has developed a market valuation principle, previous work in this area has been directed toward manipulating a firm's financial policies to optimize the net return to a given set of shareholders with diverse tax positions. It has been argued that the emphasis of this earlier work has been misplaced because it does not recognise the opportunity for

investors to trade securities and thereby influence prices according to aggregate market expectations rather than by the preferences of a fixed set of investors(11).

This modified before tax CAPM may be stated in the ex ante form as follows:

$$E(\tilde{R}_i) = R_f + H \text{Cov}(R_i, R_m) + T(E(\tilde{\delta}_i) - R_f)$$

- Where: $E(\tilde{R}_i)$ = The expected return on security i,
 R_f = The risk free rate of return,
 H = $[E(\tilde{R}_m) - R_f] - T [E(\tilde{\delta}_m) - R_f]$,
 $E(\tilde{R}_m)$ = The expected return on the market portfolio,
 T = The effective excess market wide marginal rate of tax on dividends over that levied on capital gains, being $(T_d - T_g)/(1 - T_g)$,
 T_d, T_g = Respectively the weighted averages of investors' marginal tax rates on dividends and capital gains, where the weights depend on investors' marginal rates of substitution between expected return and variance of return,
 $E(\tilde{\delta}_i), E(\tilde{\delta}_m)$ = Respectively the expected dividend yields on security i and on the market portfolio.

If as is likely to occur, it is assumed that the term T is greater than zero, then this equation implies that dividends are undesirable and that the securities of dividend paying firms must offer a premium of $T(E(\tilde{\delta}_i) - R_f)$ to compensate for the taxation disadvantage.

INVESTOR TAX STATUS	FORM OF RECEIPT	
	DIVIDEND	REALIZED CAPITAL GAIN
Close Corporation (Not a sharedealer)	Taxable at a rate of 50% after deduction of an allowance of 33 1/3%. Subsequent distributions to members are tax free	Not taxable. Subsequent distributions to members are tax free.
Close Corporation (Sharedealer)	The position is the same as where the close corporation is not classified as a sharedealer for taxation purposes	Fully taxable at a rate of 50%. Subsequent distributions to members are tax free.
Long term insurance* (company/mutual)	40% of both dividends and capital gains are deemed to be taxable income. This is then taxed at a rate of approximately 69% of deemed taxable income.	

* - The redistribution by these bodies of dividends and realized capital gains received may be taxable in the hands of the recipients depending on their tax status and the form of the redistribution.

It should be noted that the effective rate of taxation on capital gains is considerably less than that depicted in the table as shareholders are in a position to defer the tax through realising the investment only a considerable time after the gain has occurred.

On examining the table it is evident that individual investors will have distinct payout preferences, which are dependent on their tax status. It is also evident that the current taxation structure is unlikely to cause a market wide preference for particular payout ratios.

Miller and Modigliani point out that the existence of these payout preferences is a necessary but not a sufficient condition for shares of any particular payout group to realize consistently superior returns(13).

The reasoning leading to their proposed clientele effect is as follows:

"If for example, the frequency distribution of corporate payout ratios happened to correspond exactly with the distribution of investor preferences for payout ratios, then the existence of these preferences would clearly lead ultimately to a situation whose implications were different in no fundamental respect from the perfect market case. Each corporation would tend to attract to itself a "clientele" consisting of those preferring its particular payout ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm."

The implication of a perfectly operating clientele effect for a firm selecting its dividend policy is that in a state of market equilibrium one dividend policy is as good as another. The reason for this is that any firm that could have increased its value by meeting the unsatisfied needs of any clientele group would already have done so. Accordingly any new firm will be faced with investors who already have the choice of all possible payout policies and who thus are unlikely to pay a premium for the dividend stream of the new firm.

Miller and Modigliani further note that the demand for and supply of shares in a particular payout range need not coincide(14). The reason for this is that, in the absence of a universally desired payout ratio at either end of the dividend spectrum, investors are able to construct portfolios with required payout ratios using appropriate combinations of individual securities.

The implication of a clientele effect is therefore that investors bias their investment decisions so as to minimize the costs arising from market imperfections. Whether or not they are willing or able to act in this manner is dependent on a variety of factors and the identification of any aggregate market wide effect becomes an empirical issue. Such a test in regard to the difference in effective tax rates applicable to dividend income and capital gains was conducted by Litzenberger and Rawaswamy and is reported in Chapter Four (15).

While the approaches to valuation which have been discussed have generally been couched in terms of valuation models, existing patterns of dividend payout may be explained by relatively recently developed agency theory, rather than by capital market imperfections. Rozeff has argued that with the separation of management and ownership in most large corporations, managements are in a position to advance their own interests over those of the shareholders(16). Consequently it would be logical for shareholders not involved in the management of firms to take action which would result in managements' actions being monitored. Such action might include encouraging higher dividend payments which would require firms to resort to new equity financing more often than would otherwise be the case. Frequent share issues would result in close scrutiny of firms by new suppliers of capital which would encourage better management performance. The use of new equity financing is, however, relatively more expensive than the retention of earnings since transaction costs are incurred. Consequently an optimal payout ratio might be suggested whereby transaction costs on new equity issues are

minimized for an appropriate level of market scrutiny of management. While an extremely elegant theory, which appears to coincide with current dividend practice, the writer doubts that absentee shareholders make conscious decisions in favour of generous dividend policies with the express purpose of precipitating closer observation of managements by market agents.

This chapter has provided an overview of various arguments as to whether the dividend policy of a firm ought to affect its value. While it is generally accepted that under conditions of perfect capital markets dividend policy is unlikely to affect the value of a firm, we are unsure as to the influence of market imperfections on security returns. Miller and Modigliani have provided a cogent argument as to why security returns should be independent of all but the most powerful of imperfections. The difference in rates of taxation applicable to dividend income and capital gains is probably of sufficient strength to introduce such a bias. In view of the current diverse taxation structure the resolution of this issue is an empirical question.

FOOTNOTES TO CHAPTER THREE

- (1) Miller, M., Modigliani, F., 'Dividend Policy, Growth and the Valuation of Shares', Journal of Business. October 1961. pp 414.
- (2) Miller, M., Modigliani, F., op cit. pp 426 - 430.
- (3) Brennan, M., 'A Note on Dividend Irrelevance and the Gordon Valuation Model', Journal of Finance. December 1971. pp 1115-1123.
- (4) Brennan, M., 'A Note on Dividend Irrelevance and the Gordon Valuation Model', Journal of Finance. December 1971. pp 1121.
- (5) Gordon, M., 'The Savings, Investment and Valuation of a Corporation', Review of Economics and Statistics. February 1962. pp 37-51.
- (6) Gordon, M., Optimal Investment and Financing Policy, Journal of Finance. May 1963. pp 264-272.
- (7) Miller, M., Modigliani, F., op cit. pp 425.
- (8) Brennan, M., 'A Note on Dividend Irrelevance and the Gordon Valuation Model', Journal of Finance. December 1971. pp 1119.
- (9) Brennan, M., 'A Note on Dividend Irrelevance and the Gordon Valuation Model', Journal of Finance. December 1971. pp 1117.
- (10) Brennan, M., 'Taxes, Market Valuation and Corporate Financial Policy', National Tax Journal. December 1970. pp 417-427.
- (11) Brennan, M., 1970, op cit. pp 419.
- (12) Litzenger, R., Ramaswamy, K., 'The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence', Journal of Financial Economics. June 1979. pp 163-196.
- (13) Miller, M., Modigliani, F., op cit. pp 431.
- (14) Miller, M., Modigliani, F., op cit. pp 431.
- (15) Litzenger, R., Ramaswamy, K., op cit.
- (16) Rozeff, M., 'Growth, Beta and Agency Costs as Determinants of Dividend Payout Ratios', Working Paper series no 81-11. University of Iowa. June 1981. As reported by Copeland, T., E., Weston, J., F., Financial Theory and Corporate Policy, Second Edition. Los Angeles: Addison Wesley, 1982. pp 495-6.

CHAPTER FOUR

REVIEW OF PREVIOUS EMPIRICAL STUDIES

The objective of this chapter is to present a summary and discussion of previous research undertaken by other writers. The sequence in which the research is reported will highlight the evolution of the empirical procedures employed. However, the review will cover only certain central studies and is not exhaustive.

Unfortunately the survey is generally confined to tests conducted on American equity markets as the volume of published works documenting local tests is limited.

Prior to discussing the valuation aspects of dividend policy a brief outline of the dividend setting process would be appropriate. These comments constitute the main conclusions of a paper by John Lintner documenting a series of interviews on dividend policy with senior financial officers of large American companies (1). The companies selected for analysis were well established companies listed on a stock exchange and may be broadly classified as industrial as opposed to financial or mining companies. The 28 companies selected were chosen for the wide range of characteristics which are known to or may be expected to exert significant influence on the dividend decision.

Throughout Lintner's analysis it is apparent that the dominant concern of those setting the dividend is the expectations of shareholders. The managements felt that shareholders valued a consistent and increasing

dividend and that erratic policies were less favoured. It is also apparent that managements regard the constancy and trend in dividend payments as being critical to shareholders in their assessment of the performance and prospects of the firm. Managements further perceive a communication problem with shareholders in respect of unusual or unexpected dividend changes. These beliefs manifest themselves in the dividend decision.

Lintner reported that the first consideration in the dividend setting process was whether a change in the existing rate was justified. Once a change had been decided on it was considered as a percentage of the existing dividend rather than deciding on an appropriate distribution level based on current earnings. Managements felt obliged to distribute to shareholders a portion of any permanent increase in earnings. The reason for this is that considering the high level of publicity accorded earnings figures managements feared a negative shareholder reaction should part of these not be distributed. It was this obligation coupled with managements reluctance to cut dividends in poor years that has led to the pattern of dividends adjusting to an increased level of earnings over a number of years rather than immediately. It was further observed that should allowance be made for the gradual adjustment of dividends to earnings the majority of companies exhibited a relatively constant payout ratio. Accordingly the change in the dividend in any particular period may be stated as follows:

$$\Delta D_{it} = A_i + C_i (E_{it}r_i - D_{i(t-1)}) + U_{it}$$

Where: ΔD_{it} = The change in the dividend on share i paid in period t relative to the previous period,

- $D_i(t-1)$ = The dividend paid on share i during period $t-1$,
- C_i, r_i = The speed of adjustment and target payout ratios respectively for share i . These factors are relatively constant over time,
- E_{it} = The per share earnings of share i during period t ,
- A_i = A firm specific constant, either zero or positive, reflecting managements' reluctance to cut dividends in poor years,
- U_{it} = A term reflecting the difference between the actual and expected dividend change.

As implied by the above equation a firm already distributing its targeted proportion of profits and experiencing static earnings will have zero or a very low change in payout. This in fact seemed to be the case even where some other factor suggested the desirability of a change. Thus it was observed that earnings most of all provided the stimulus for a change in the dividend.

Related to the above is the possible conflict between viable investment projects and the maintenance of the trend in dividends. Lintner notes that the established target payout and speed of adjustment ratios normally result from formalizing previous ad hoc decisions into a set policy. These decisions were usually reached taking into consideration the company's expected investment, working capital and funds flow requirements. Accordingly standard investment requirements could be met as well as satisfying the current dividend expectations of shareholders.

However, where companies were presented with many profitable investment projects these would be financed as far as possible with internal resources, with managements preferring to strain liquidity rather than alter the dividend. Where potential investments exceeded the internal financing capacity, the interviews revealed that projects were re-evaluated with a view to utilizing external financing. Where merited the external financing was arranged and the project undertaken. If company policy disallowed the use of external financing the projects were abandoned or rescheduled. Thus it may be said that managements generally attach sufficient importance to established dividend policies to prefer rescheduling or abandoning investment projects to disappointing the dividend expectations of shareholders.

A similar, though more limited, survey has been performed on South African firms by Seneque and Gourley (2). Their findings are substantially in accordance with the results of Lintner's analysis.

To conclude this section on the dividend setting process the main points may be summarized as follows:

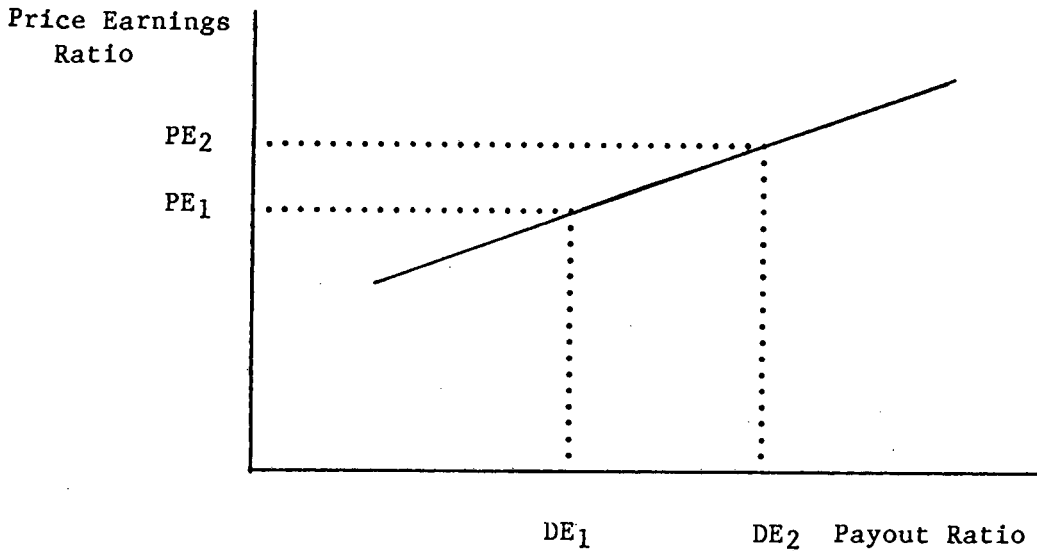
- (i) The primary consideration in setting the dividend is whether or not the existing rate should be changed,
- (ii) The stimulus for a change in the dividend is generally provided by changes in earnings,

- (iii) The majority of companies exhibit a relatively constant target payout ratio and speed of adjustment ratio,
- (iv) The maintenance of an established dividend policy generally takes precedence over liquidity and investment considerations.

To serve as an introduction to the review of the various empirical procedures it would be useful to consider an intuitively appealing test where price earnings ratios are regressed against dividend payout ratios, defined as the sum of the latest final and interim dividends divided by the per share earnings. A typical result of such a study is shown graphically in Figure 4.1.

FIGURE 4.1

GRAPH OF PRICE EARNINGS RATIO VS PAYOUT RATIO



A strong positive association between payout and price earnings ratio is normally observed. In some cases this has led earlier researchers to assert that an increase in payout from DE_1 to DE_2 would result in the capitalization rate for the firm's earnings increasing from PE_1 to PE_2 .

Unfortunately this argument is open to a number of criticisms. Firstly the earnings per share is represented in both terms in this study. Consequently the regression is equivalent to a regression of share price on dividend per share. As shares on which large absolute dividends are paid are likely to have correspondingly high earnings, it may be argued that these high per share prices reflect the high earnings rather than the dividend. It is the writer's opinion that this is a major factor

influencing the strong correlation coefficient. The point is that caution must be exercised where share prices are used in these tests. The studies undertaken by the writer have used returns on shares rather than share prices.

Secondly one may argue that the risk attaching to an investment in a share may induce an association between payout and price earnings ratios (3). Risky firms, through uncertainty regarding their future cash flow, are likely to distribute a lower proportion of their earnings than less risky firms. The earnings of risky firms are also likely to be capitalized at a higher rate than less risky firms. Consequently risky firms will probably be characterized by both low payout and low price earnings ratios. In view of this it is necessary to control for the risk associated with an investment when performing such tests. The cross sectional regression study reported in Chapter Six uses an amended empirical market line to identify any impact of dividend policy on the value of a firm. The inclusion of a beta factor in the equation will prevent any distortion of the test results through a risk induced association between the dependent and independent regression variables.

A third factor which may induce a co-movement between payout and price earnings ratios where no true correlation exists is temporary fluctuations in earnings (4). Consider a firm experiencing temporarily depressed earnings. Because management anticipate a return to a higher level of profitability neither the dividend nor the share price fall in proportion to the earnings. Consequently a high payout ratio and a high

price earnings ratio result. The opposite situation would be expected where a firm experienced temporarily inflated earnings. This problem arises from poor research design in that the earnings per share figure has been included in both variables. The approach adopted in Chapter Six avoids this.

In view of these criticisms little confidence may be attached to the research results obtained and a more sophisticated approach to the problem is obviously required. Nevertheless the above discussion has served to introduce empirical procedures and has highlighted certain basic difficulties.

A significant contributing factor to the widespread belief that a generous dividend payout positively influences the value of a firm are the results of numerous cross sectional regression studies using an equation similar to the following (5):

$$P_{it} = \hat{a} + \hat{b} D_{it} + \hat{c} R_{it} + \hat{E}_{it} \quad (4.1)$$

Where: P_{it} = The price of a share in company i at the end of period t ,

D_{it} = The dividend paid on a share in company i during period t ,

R_{it} = The undistributed portion of period t earnings on a share in company i ,

$\hat{a}, \hat{b}, \hat{c}$ = Coefficients arising from the regression,
 \hat{E}_{it} = An error term.

Significantly larger values for the coefficient \hat{b} than for \hat{c} have traditionally been observed. The resultant conclusion of a dividend effect has, however, been criticised with the view proposed that the construction of the regression equation creates a spurious association between share price and dividend payout. These comments constitute the main points of a criticism by Friend and Puckett of standard cross sectional regression investigations of the kind under discussion (6).

As with the previous form of test undertaken, inadequate provision for controlling risk has been made in equation 4.1. An upward bias of the dividend coefficient reflecting the risk induced co-movement between payout and price may therefore be expected.

Further the regression equation requires the addition of a variable to reflect each firm's growth pattern. Firms with strong growth patterns would be characterized by relatively higher per share prices and the larger retentions necessary to finance the growth. Should the growth be financed from external sources rather than retentions the relationship between retentions and the growth rate, and consequently the share price would be affected. The estimate \hat{c} would accordingly be artificially low. In other circumstances it is possible that the omission of an external financing variable may inflate the estimate \hat{c} . The point is that regression equations require adequate variables to prevent the distortion of regression results from the correlation of actual and omitted variables.

Two further related problems may also be responsible for a suppressed regression coefficient of the retained earnings variable. The first point relates to short run variations in income which, because of their temporary nature, are not fully reflected in dividend payments and the share price. As these variations are reflected in the retained earnings variable its associated regression coefficient is likely to be biased downward. This point is essentially the same as that discussed in relation to the first investigation.

The second earnings related problem is that of income measurement. As dividends can be accurately measured, while earnings by their nature are estimates, the cross sectional regression coefficients for earnings will be artificially reduced as the estimates of its associated variable are subject to error. No simple solution to this problem is apparent as differing revenue recognition principles are applicable to various industries. In addition the effects of different judgements inside a uniform set of accounting policies would largely frustrate efforts to standardize earnings. Due to these problems the test documented in Chapter Six has avoided the use of earnings data.

The way in which cross sectional regression studies are set up define which variables are independent and which is dependent. The results of these studies, however, in no way demonstrate causality. Friend and Puckett point out that high price earnings ratios may induce managements

to rely more heavily on share issues. With capital requirements satisfied from external sources a higher payout ratio results. Thus high price earnings ratios may be seen as a cause rather than the result of a liberal distribution policy. Regression equation 4.1 does not recognize this reciprocal effect and consequently dividend regression coefficients may be biased upward.

This concludes Friend and Puckett's criticism of previous work undertaken. The following section documents a series of cross sectional regressions undertaken by them using various techniques intended to avoid the problems already discussed. The tests are based on a constant data set which permits a comparison of the results achieved using the various equations. The information set consists of 10 samples each with data from 20 companies. The ten samples represent five industry groups each over the years 1956 and 1958. These years were chosen because the former was a boom year with share prices levelling off after strong growth while the latter was a year of economic depression but with relatively strong share prices.

The results of the first cross sectional regression carried out using regression equation 4.1 are reported in table 4.1. Its purpose is to serve as a basis for comparison with the results of subsequent more complex regressions.

TABLE 4.1

CROSS SECTIONAL REGRESSION RESULTS

EQUATION $P_t = \hat{a} + \hat{b}D_t + \hat{c}R_t$

INDUSTRY	YEAR	AVERAGE REGRESSION COEFFICIENT		
		\hat{a}	\hat{b}	\hat{c}
Chemicals	1956	-,86	29.94	2.91
	1958	-5,29	27.72	13.15
Electronics	1956	7.32	7.27	17.87
	1958	8.53	13.56	26.85
Electric Utilities	1956	,85	13.86	14.91
	1958	1.11	14.29	18.54
Foods	1956	,78	15.56	5.23
	1958	1,50	17.73	4.35
Steel	1956	-2.28	17.60	2.45
	1958	8.55	15.23	5.98

Other than for chemicals, which was considered a growth industry during the time the test was carried out, the results indicate a dividend preference in the case of stable industries and a preference for retained earnings in growth industries. Roughly equivalent importance is, however, attached to dividends and retained earnings in the case of electric utilities. It is the writer's opinion that the noted preferences at least partly represent the differences between the profitability of firms' investments and the rates of return available to investors.

The following test carried out by Friend and Puckett used the same equation as in the previous test with a further term added, i.e. the earnings to price ratio lagged by one period. This term is added because it is assumed that the aggregate effect of all firm specific factors, such as risk and growth patterns, are reflected in the firm's

capitalisation rate. The use of market estimates of the value of these firm specific factors is extremely useful as it circumvents measurement problems which would be encountered if other methods were to be employed (7). The writer does not favour this approach to neutralizing firm specific effects for two reasons. Firstly, the measurement of earnings and their short term fluctuations may distort the earnings to price ratio, thus influencing the regression results (8). Secondly, Friend and Puckett introduce the use of this variable on the assumption that payout levels do not influence the capitalization rate. Should the amount of the dividend influence the capitalization rate, one independent regression variable influences another. This co-movement would reduce the regression coefficient of the dividend yield term. The results of this study have not been separately reported here as they differ little from those arising from the previous test.

Friend and Puckett then repeat the previous test after having allowed for any effect of share price on dividend payout. Little change in the regression results was noted and it was concluded that the effect of share price on dividend payout was probably not a serious biasing factor in the original tests.

Friend and Puckett subsequently carried out various other cross sectional regression studies. All except one included either the share price lagged one period or the earnings to price ratio as an independent variable. For reasons already stated use of these variables may distort the regression coefficients of the dividend term and consequently these studies are not reported or discussed here.

The problem of short run earnings fluctuations may be successfully approached by replacing the retained earnings variable in equation 4.1 by a normalized value. Instead of using averaging techniques Friend and Puckett favoured the use of market generated information. The assumptions made in using this approach are, firstly, that short run earnings movements do not distort the dividend price ratio. Secondly, such earnings fluctuations are assumed to sum to zero over the full sample in any period. Price earnings ratios of individual firms are, however, altered by the earnings changes. With the subscripts i , k and t denoting the i th firm, the k th sample and time period t , it was postulated that fluctuations in the time series trend $(E/P)_{it}/(E/P)_{kt}$ were caused solely by short run earnings disturbances as $(E/P)_{kt}$ is by definition free of such effects. The following linear modeling of the trend was undertaken:

$$(E/P)_{it}/(E/P)_{kt} = \hat{a}_i + \hat{b}_{it} + \hat{E}_{it}$$

Normalised retained earnings were then calculated as follows, with the superscript n denoting a normalized value:

$$R^n_{it} = [(\hat{a}_i + \hat{b}_{it}) \cdot (E/P)_{kt} \cdot P_{it}] - D_{it}$$

The results of these regressions are presented in Table 4.2.

TABLE 4.2

CROSS SECTIONAL REGRESSION RESULTS

EQUATION $P_t = \hat{a} + \hat{b} D_t + \hat{c}R_t^n$

INDUSTRY	YEAR	AVERAGE REGRESSION COEFFICIENT		
		\hat{a}	\hat{b}	\hat{c}
Chemicals	1956	-6.37	27.84	10.96
	1958	-5.87	25.78	18.82
Foods	1956	3.00	15.11	3.83
	1958	2.20	15.96	4.91
Steels	1956	0.34	15.36	4.85
	1958	6.11	14.37	8.24

The results of this regression study reveal a less marked preference of dividends although they still dominate. Friend and Puckett therefore conclude that in general it seems that dividends may well be more highly valued in stable industries while the retention of earnings appears to dominate in the noted case of a growth industry. However, they have not demonstrated that the general conclusion reached by prior researchers, namely that the value of a firm is influenced by the level of dividend distribution, is incorrect.

The study by Friend and Puckett was an early attempt to determine the effect of dividend policy on the value of a firm. It is the writer's opinion that no suitable means was found to control for firm specific factors such as growth patterns and risk. Consequently the continued dominance of dividends over retained earnings in certain industry categories is not assured until this problem is resolved.

Black and Scholes in a later study using the subsequently developed CAPM reinvestigated this issue (9). Their test is markedly more sophisticated because the study is performed within the context of a valuation model whereas the Friend and Puckett study tested the direct association between two variables. Use of this model is, however, subject to Roll's critique and it further assumes that the CAPM is the model used to price assets on Stock exchanges (10). Roll's critique is discussed in Chapter Two. Fama and MacBeth have provided evidence of the applicability of the CAPM to the New York Stock Exchange on data from which the Black and Scholes study was performed (11).

The Black and Scholes study involved the use of procedures equivalent to cross sectional regression techniques using data over the period 1936 to 1966 which had been grouped into portfolios. The form of the regression equation was:

$$R_j = \hat{Y}_0 + (R_m - \hat{Y}_0)\hat{\beta}_j + \hat{Y}_1(\delta_j - \delta_m)/\delta_m + \hat{E}_j$$

- Where:
- R_j = The return on the j th portfolio,
 - \hat{Y}_0 = Coefficient arising from the regression which should equal the risk free interest rate,
 - R_m = The return on the market portfolio,
 - $\hat{\beta}_j$ = The beta of the j th portfolio,
 - \hat{Y}_1 = A coefficient arising from the regression which demonstrates the effect of dividend yield on the before tax return on securities,

δ_j, δ_m = Respectively the dividend yield on the j th portfolio and the market over the year prior to that in which the test was conducted,

\hat{E}_j = An error term.

The use of the ex post form of the CAPM in this study avoids the problems associated with income measurement and fluctuations in income which were discussed in the review of work by Friend and Puckett. Furthermore a beta term has been added to control for risk. The positive risk induced association between payout and share price arising in the Friend and Puckett study is further controlled for by Black and Scholes through the construction of the cross sectional regression equation (12). Low risk shares traditionally sell at relatively high prices thus offering low returns. Use of these security returns rather than security prices as the dependent variable in the cross sectional regression equation therefore avoids this coincidental co-movement between independent and dependent variables.

The possibility of the test results being influenced by growth patterns does not arise as the specific relationship between the retention of earnings and share price is not addressed.

The estimates for the term Y_1 , being the monthly excess return, for the full test period and for a number of sub-periods are shown in Table 4.3.

TABLE 4.3

ESTIMATES OF \hat{Y}_1

REGRESSION EQUATION $R_j = \hat{Y}_0 + [R_m - \hat{Y}_0]\hat{\beta}_j + \hat{Y}_1(\delta_j - \delta_m)/\delta_m + \hat{E}_j$

TEST INTERVAL	\hat{Y}_1
1936 - 66	0,0009
1947 - 66	0,0009
1936 - 46	0,0011
1947 - 56	0,0002
1957 - 66	0,0016
1940 - 45	0,0018

The results over the full test period show a value for \hat{Y}_1 of approximately 1% per year which is not statistically significant. None of the results for any of the sub-periods are significant on a statistical basis. Black and Scholes consequently concluded that dividend yield does not materially impact the before tax rate of return on a security. Because \hat{Y}_1 was insignificantly different from zero it was argued that its true value may be zero or even negative and consequently investors are unaware of the direction of any effect of dividend policy on before tax security returns. For this reason it was proposed that tax exempt investors may ignore the dividend policy of prospective investees when making investment decisions. The analysis was then extended to cover a situation where capital receipts are tax exempt and where dividend receipts are taxed at a rate of 50%. Black and Scholes then estimated the term Y_1 on an after tax basis by deducting 50% of the average dividend yield of the full sample from the before tax average estimate of Y_1 . Because the resultant term was insignificantly different from zero they concluded that even investors experiencing a high marginal

tax rate may ignore dividend yield in maximizing their return on a portfolio. They then proposed that because it is not possible to identify any significant effect of dividend yield on security returns, investors are likely to ignore yield when constructing portfolios. Consequently, because we are unable to identify any dividend effect, dividend yield loses its ability to affect security returns even if it is an actual determinant of value.

Two further arguments were presented for investors ignoring the dividend policy of prospective investees. Firstly biasing portfolios toward either high or low yield shares increases transaction costs as adjustments to portfolios are required as companies alter their dividend policies. Secondly Black and Scholes argue that the introduction of a dividend yield constraint on portfolio construction diverts effort from attaining adequate investment diversification. Thus it was finally concluded that investors in any tax bracket may ignore the dividend policy of firms in whom they are considering an investment.

The implication of the test results for companies is that their dividend policy is unlikely to have an effect on the value of their shares. Consequently large capital requirements could be most economically met by reducing the payout.

The writer disagrees with the interpretation of the Black and Scholes test results in the case of non tax exempt investors. It is submitted that if dividend yield is demonstrated to have no significant impact on the before tax return on a security then investors who are subject to heavier taxation on dividends (capital gains) than capital gains

(dividends) are able to maximize their individual return by holding shares offering a low (high) dividend yield. This biasing of individual portfolios does not imply a disequilibrium in the demand and supply of shares exhibiting particular yields because certain investors would prefer high yield shares and others low yield shares and the supply of shares at each payout level would be expected to adjust to the demand. Consequently while investors are able to adjust their after tax return by selecting investments suited to their tax profile, any firm contemplating a particular dividend policy would be faced by shareholders who already have a complete range of dividend alternatives. Therefore firms are unlikely to increase their value by manipulating their dividend policy. Finally, it is the writer's opinion that the Black and Scholes analysis implies that non tax exempt investors stand to gain by altering their portfolios to accommodate their tax status. It is, however, acknowledged that in favouring certain yields further effort is required to maintain an optimally diversified portfolio.

In this regard it has been argued by Long that at any given level of expected portfolio return investors are unable to alter the form of their return between dividends and capital gains without reducing the efficiency of the portfolio diversification (13). By allowing the risk and expected return to vary efficient portfolios may, however, be constructed at varying dividend yields. Furthermore, adjusting the dividend yields of portfolios may still be beneficial in view of the sometimes substantial difference in effective taxation rates on dividend income and capital gains. By using fairly sophisticated selection techniques it is also possible to significantly change a portfolio's dividend yield without inducing too large a change in its risk level.

The Black and Scholes study has been criticised as to the efficiency of the statistical procedures employed (14). The most significant of these criticisms is that a loss of precision resulted from grouping stocks into portfolios and that data for individual securities would have yielded superior results. The tests are usually conducted on shares in portfolios rather than on individual shares so that errors arising in the estimation of betas may be offset, resulting in accurate estimates for portfolios. The statistical procedures necessary to achieve accurate estimates of beta for individual shares are, however, fairly complex.

In their study Black and Scholes used the ex post version of the CAPM with a further dividend yield term added. The CAPM was, however, developed under the assumption of zero market imperfections such as personal or corporate taxes, a condition which is obviously not realized. Accordingly an extension of the existing pricing theory is required to accommodate these factors. Brennan was the first researcher to develop an amended form of the CAPM which offers a before tax return commensurate both with a security's systematic risk and its dividend yield (15). Brennan argues that the before tax return on a share is proportional with both its systematic risk and the effective excess market wide marginal rate of tax on dividends over that levied on capital gains. His work in this area has been discussed in the previous chapter.

Investors may be in a position to remove or substantially reduce the effect of taxation on dividends by selecting shares and a level of gearing appropriate to their tax profile. Should investors be successful in this regard then the term in the Brennan analysis giving the effective excess taxation on dividends would approximate zero. Institutional

factors may, however, affect the ability of investors to act in this manner and whether or not they are successful is an empirical issue.

This question has been investigated by Litzenberger and Ramaswamy (16) who test the following amended form of the CAPM which is similar to that proposed by Brennan:

$$R_i - R_f = \hat{a} + \hat{b}\hat{\beta}_i + \hat{c}(\delta_i - R_f) + \hat{E}_i$$

Where: $\hat{a}, \hat{b}, \hat{c}$ = Coefficients arising from the test,

\hat{E}_i = An error term.

Other terms as used above.

The study was carried out on data covering the period 1963 to 1977.

There are certain features of the methodology which are unique to this test. Firstly monthly individual security data rather than data relating to shares in portfolios was used. The required accuracy of beta estimates for individual shares is attained by adjusting each estimate by a factor proportional to the standard deviation of the residual arising from the regression of the security return on the market index whereby the beta estimate was obtained.

Previous studies have generally used a dividend yield estimate calculated by dividing the sum of all dividends paid on a share over any particular year by the price at the year end. These estimates are normally recalculated annually. Litzenberger and Ramaswamy argue that such

dividend yield estimates are inaccurate because, inter alia, they overstate the true yield during months when a share does not go ex-dividend (17).

To provide more meaningful dividend yield estimates a different procedure was adopted. Where a share did not go ex-dividend during a particular month or where it went ex-dividend in relation to a non recurring payout announced during that month the dividend yield was set to zero. Where a share went ex dividend in relation to a dividend announced in a prior month the yield for the current month was set using the dividend declared and the share price at the end of the preceding month. Finally, where a share went ex dividend in relation to a recurring dividend announced during the current month the yield was calculated using the price at the end of the preceding month and the recurring dividend paid a year previously.

The reason for this aspect of research design is firstly that it recognises actual changes in the dividend yield from month to month. A further advantage is that the dividend yield estimate only uses information that is available to investors as at the beginning of each test period.

The average regression coefficients and t statistics derived from this study are reported in Table 4.4.

TABLE 4.4

CROSS SECTIONAL REGRESSION RESULTS

EQUATION $R_i - R_f = \hat{a} + \hat{b}\hat{\beta}_i + \hat{c}(\delta_i - R_f) + \hat{E}_i$

		INDEPENDENT REGRESSION VARIABLE		
		\hat{a}	\hat{b}	\hat{c}
Average Regression Coefficient		,00616	,00268	,227
t Statistic		4,37	1,51	6,33

On the basis of these results Litzenberger and Ramaswamy concluded that there is a strong positive association between before tax returns and estimates of systematic risk and dividend yield. The implication is that because of the relatively heavy taxation attracted by dividends, shareholders prefer to receive their return on investment by way of capital appreciation rather than dividend income.

Miller and Scholes have subsequently criticised the procedure used in this study to control for the information content of dividends(18). As was evident from the review of Lintner's work on the dividend setting process firms follow a process of dividend stabilization with the payout increasing in response to higher earnings (19). Furthermore, because of managements extreme reluctance to reduce dividends, an increase in payout

is made only when it is considered sustainable. Because shareholders recognize this dividend setting procedure it is likely that they would interpret an increase in dividends as a management perception of permanently higher earnings. It may also be argued that as well as implying the permanency of current earnings increases higher dividends may reflect a management perception of future earnings increases. Many commentators have therefore observed that dividends have the potential to convey information concerning a firm's earnings and hence its value.

This has been a frustrating factor in research because a positive association between dividend payout and the return realized on a security may be expected, not because the dividend influences value directly, but rather because it conveys information critical to the valuation process. Adequate research design requires that empirical procedures ensure the separation of the effects on value of dividend policy and the information content of dividends. It is with this aspect of the Litzenberger and Ramaswamy research design that Miller and Scholes take issue.

Using the same regression equation as Litzenberger and Ramaswamy and data over the period 1940 to 1978 Miller and Scholes performed a number of cross sectional regression studies using various methods to calculate dividend yields. These were first calculated as in the Litzenberger and Ramaswamy study and secondly, amongst other methods used, all items in the first sample were excluded where a share went ex-dividend in the same month that the dividend was announced. The results of these tests are shown in Table 4.5.

TABLE 4.5

CROSS SECTIONAL REGRESSION RESULTS

REGRESSION EQUATION $R_i - R_f = \hat{a} + \hat{b}\hat{\beta}_i + c(\hat{\delta}_i - R_f) + \hat{E}_i$

		INDEPENDENT REGRESSION VARIABLE		
		\hat{a}	\hat{b}	\hat{c}
Dividend Yields Calculated as in L & R Study	Average Regression Coefficient	,0065	,0022	,1794
	t Statistic	4.9	1.4	6.1
Share excluded where announce- ment and ex divi- dend date fall in same month	Average Regression Coefficient	,0043	,0035	,0135
	t Statistic	2.5	2.2	0.1

Because the average regression coefficient of the dividend yield term in the second equation is presumed to be free of the effects of price sensitive information contained in dividend announcements, it is considered a stronger result than the outcome of the first test. In view of the fall in the average regression coefficient of the dividend yield term on conducting the second form of the test it was concluded that, despite the existence of different rates of taxation on dividends and capital gains, the dividend yield of a security does not appear to significantly influence the return realized on a share.

Although not central to the valuation controversy a brief record of previous research to identify any price sensitive information contained in dividend announcements would be informative. The best acknowledged

of these studies is by Watts (20) conducted on data covering a period 1945 to 1968 held on tapes of the CRSP (21).

The hypothesis tested is that the change in dividends carries information relevant to the pricing of shares that is not contained in earnings announcements. To allow testing one must split the change in current payout between, firstly that which would be expected given the change in current earnings and other known factors influencing value and secondly unexpected changes. It is these unexpected changes in payout which are tested to ascertain any correlation with future earnings changes.

A difficulty with studies of this kind is that an observed relationship between current unexpected dividend changes and future earnings changes does not necessarily imply that the former precipitated the subsequent earnings change. The reason for this is that managements' perceptions of improved future earnings may be reflected elsewhere prior to or simultaneously with unexpected dividend changes. Furthermore it is possible that the reflection of managements' positive expectations in non dividend areas may allow better prediction of future earnings than is possible by using unexpected current dividend changes. Should this be the case an association may still be observed between current unexpected dividend changes and future earnings changes, but there is no causal relationship between the two. Consequently should an effect be noted the best conclusion permitted is that the behaviour of earnings and stock prices is consistent with there being information content in dividend announcements but this is not proved. Should no effect be observed a

conclusion as to there being no information content is, however, allowed. Even where no causality exists a positive association between current unexpected dividend changes and future earnings changes is sufficient to distort test results as in the Litzenberger and Ramaswamy study.

The question of the information content of dividends only becomes of significance where it is demonstrated that it would allow someone in sole possession of that information to earn excess returns. Watts addresses this issue.

The empirical approach makes use of the abnormal performance index (API) technique introduced in Chapter Five. The residuals, of the 310 firms in the sample, which were derived using the market model were allocated to two API groups on the basis of the sign of an empirically derived forecast error, \hat{Z}_{it} , which is the difference between the actual change in dividend and that predicted by a dividend model. The model is an adaption by Fama and Babiak (22) of that first proposed by Lintner (23) and is stated as follows:

$$D_{it} = \hat{\psi}_{i0}D_{it-1} + \hat{\psi}_{i1}E_{it} + \hat{\psi}_{i2}E_{it-1} + \hat{Z}_{it}$$

Where: \hat{Z}_{it} = The unexpected change relative to the previous period in dividend on share i in period t ,

E_{it} = The earnings attributable to share i during period t ,

$\hat{\psi}_{i0}, \hat{\psi}_{i1}, \hat{\psi}_{i2}$ = Weightings given to independent variables in modelling the change in dividend on share i .

Other term as used above.

The API technique results are presented in Table 4.6. They are shown over an extended period of time and are disclosed relative to the final month of the financial year. The reason for this form of disclosure is that because the critical information may be available through sources other than dividend announcements we are unsure as to in which month it is impounded into security returns.

TABLE 4.6

MONTHLY API STATISTICS

<u>Month Relative to Last Month of Financial Year</u>	<u>Cumulative API Results</u>	
	<u>$\bar{Z}_{it} > 0$</u>	<u>$\bar{Z}_{it} < 0$</u>
-11	0.996	0.995
-10	0.998	0.997
- 9	1.003	1.002
- 8	1.002	1.002
- 7	1.004	1.001
- 6	1.004	0.999
- 5	1.003	1.000
- 4	1.001	0.999
- 3	1.000	0.997
- 2	1.003	1.001
- 1	1.006	1.001
0	1.009	1.002
1	1.003	0.996
2	1.005	0.999
3	1.010	1.005
4	1.011	1.004
5	1.011	1.004
6	1.012	1.003
7	1.011	1.003
8	1.010	1.001
9	1.007	1.000
10	1.011	1.002
11	1.012	1.006
12	1.014	1.006

Because the differences in the API scores indicate that transaction costs incurred in trading on this information would exceed the realized profit Watts concluded that the information was trivial.

The explanation offered for this was that current unexpected dividend changes reflecting future earnings estimates are diluted by a firm's speed of adjustment ratio and its payout ratio to the extent that it is indistinguishable from the estimation error.

A result similar to that of Watts was obtained by Knight and Affleck-Graves in a study performed on data from the Johannesburg Stock Exchange (24).

This Chapter has reviewed central empirical studies concerning the impact of dividend policy on the value of a firm. The overall conclusion reached has been that despite the presence of market imperfections dividend yield appears to exert insignificant influence on the before tax return realized on a security.

FOOTNOTES TO CHAPTER FOUR

- (1) Lintner, J., 'Distribution of Incomes of Corporations Among Dividends, Retained Earnings and Taxes', American Economic Review. May 1956. pp 97 - 113.
- (2) Seneque, P.J.C., Gourley, B.M., 'Dividend Policy and Practice in South Africa', The Investment Analysts Journal. June 1983. pp 35-39.
- (3) Brealey, R., Myers, S., Principles of Corporate Finance, McGraw Hill, New York, 1981. pp 337.
- (4) Brealy, R., Myers, S., op cit. pp 336.
- (5) Friend, I., Puckett, M., 'Dividends and Stock Prices', American Economic Review. September 1964. pp 656-682.
- (6) Friend, I., Puckett, M., op cit.
- (7) Friend, I., Puckett, M., op cit. pp 665 - 6.
- (8) Friend, I., Puckett, M., op cit. pp 670.
- (9) Black, F., Scholes, M., 'The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns', Journal of Financial Economics. May 1974. pp 1-22.
- (10) Roll, R., 'A Critique of the Asset Pricing Theory's Tests', Journal of Financial Economics. March 1977. pp 126-176.
- (11) Fama, E., MacBeth, J., 'Risk, Return and Equilibrium: Empirical Tests', Journal of Political Economy. May/June 1983. pp 607-636.
- (12) Black, F., Scholes, M., op cit.
- (13) Long, J. Jr., 'Efficient Portfolio Choice with Differential Taxation of Dividends and Capital Gains', Journal of Financial Economics. August 1977. pp 25 - 54.
- (14) Rosenberg, B., Marathe, V., 'Tests of the Capital Asset Pricing Hypothesis', Research in Finance. January 1979. pp 115-223.
- (15) Brennan, M.J., 'Taxes, Market Valuation and Corporate Financial Policy', National Tax Journal. December 1970. pp 417-427.
- (16) Litzenberger, R., Ramaswamy, K., 'The Effect of Personal Taxes and Dividends on Capital Asset Prices : Theory and Empirical Evidence'. Journal of Financial Economics. June 1979. pp 163-196.
- (17) Litzenberger, R., Ramaswamy, K., op cit. pp 165.

FOOTNOTES TO CHAPTER FOUR (Continued)

- (18) Miller, M., Scholes, M., 'Dividends and Taxes : Some Empirical Evidence' forthcoming The Journal of Political Economy - As reported by Copeland, T.E., Weston, J.F., Financial Theory and Corporate Policy, Second Edition. Los Angeles : Addison Wesley, 1982. pp 517.
- (19) Lintner, J., op cit.
- (20) Watts, R., 'The Information Content of Dividends', Journal of Business. April 1973. pp 191-211.
- (21) Centre for Research in Security Prices, University of Chicago.
- (22) Fama, E., Babiak, H., 'Dividend Policy : An Empirical Analysis', Journal of the American Statistical Association. December 1968. pp 1132-61.
- (23) Lintner, J., op cit.
- (24) Knight, R.F., Affleck-Graves, J.F., 'The Information Content of Dividends Incremental to the Information Content of Earnings: The South African Experience', Unpublished Research Paper, University of Cape Town. January 1984.

CHAPTER FIVE

A PRELIMINARY INVESTIGATION

5.1 INTRODUCTION

This chapter documents a preliminary investigation conducted by the writer into the effects of dividend policy on the value of a firm. It also serves to introduce and discuss empirical techniques appropriate to the kind of investigation under discussion.

5.2 RATIONALE

It would be of interest to investors to identify any systematic effect of firms' dividend policies on the returns realised on their securities. This study will therefore observe the returns on portfolios of shares compiled according to their payout policies. The portfolios are constructed as of the date of firms' final earnings and dividend announcements because it is at this time that their dividend characteristics are established. The post announcement returns are then observed to identify any influence of firms' dividend policies on the returns realised on their securities.

It is, however, possible that a firm's dividend policy is associated with other factors critical to its valuation, such as risk. To be able to attribute to dividend policy any noted superior performance of a dividend group, requires that the returns realised on a security be adjusted to recognise the risk associated with that investment. This is achieved through a technique which removes from returns that portion attributable to market influences, leaving risk adjusted returns to be used in the analysis.

It is these post announcement, risk adjusted returns accumulated into portfolios on the basis of their dividend characteristics which would be observed by investors with a view to identifying an association between dividend policy and return.

5.3 METHOD

5.3.1 The Market Model

Changes in the return earned on a share result from changes in expectations concerning that share's future prospects. Changes in such expectations derive from the release of previously unknown price sensitive information which, emanating from a large number of sources, has varying impact ranging from that having an economy wide impact to that relating to specific firms.

The market model proposed by Markowitz allows the separation of the return earned on a security into those returns resulting from market wide influences and those resulting from firm specific events (1). These two factors are termed systematic and unsystematic components respectively. The firm specific or unsystematic portion of the return on a security constitute the 'residuals' of the market model which is specified as follows:

$$R_{it} = a_i + \beta_i R_{mt} + E_{it}$$

Where: R_{it} = The return on share i during period t,
 R_{mt} = The return on the market during period t,
 E_{it} = The unsystematic return on share i during period t,
 a_i, β_i = The y axis intercept and the slope coefficient
peculiar to share i.

It is the behaviour of these residuals which is analysed to identify any effect that dividend policy of a firm may exert on its value. The approach taken is to estimate the described residuals directly by regressing the return earned on a specific share i during period t against the market index for the corresponding interval. The technique used is that of ordinary least squares regression with the equation specified as follows:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \hat{E}_{it}$$

Where: $\hat{\alpha}_i, \hat{\beta}_i$ = The estimates of the y axis intercept and slope co-efficient resulting from the regression. These estimates are peculiar to share i,

\hat{E}_{it} = An estimate of the unsystematic return on share i during period t,

$$R_{it} = \text{Log}_e \left(\frac{P_{it} + D_{it}}{P_{it-1}} \right)$$

D_{it} = The dividend paid on share i during period t,

P_{it} = The price of share i at the end of period t, adjusted for share splits and capitalisation issues during that period,

P_{it-1} = The price of share i at the end of period t-1, adjusted as in P_{it} above,

R_{mt} = The return on the market during period t.

The ordinary least squares method requires that the following assumptions are met:

- (a) $E(\hat{E}_{it}) = 0$ for all t
- (b) $\sigma(\hat{E}_{it}; \hat{E}_{it'}) = 0$ for all $t \neq t'$
- (c) $\sigma^2(\hat{E}_{it}) = \sigma_i^2$ for all t
- (d) $\sigma(R_{mt}; \hat{E}_{it}) = 0$ for all t.

The first condition requires the expected value of the residual to be zero in each period, whilst the second condition requires that there be no autocorrelation between the observed residuals. These conditions are likely to be met as empirical tests undertaken both locally and on the New York Stock Exchange reveal adherence to these assumptions (2). Tests on the data used indicated no auto-correlation (3). These first two conditions concern matching the regression line to the data and do not take a position on market efficiency.

The assumption of a constant variance contained in the third condition may not be completely fulfilled as empirical work has indicated observable departure from this condition (4). It is not, however, considered a critical weakness.

The requirement of the fourth condition that the return on the market and the unsystematic return on a particular share are independent during any period could be frustrated by the following :

- (i) The return on share i being included in the market index, or
- (ii) Industry characteristics may induce an association between these two terms (5).

Both of these effects are unlikely as a particular share would account for only a small percentage of the return on the market index, if included at all. Further, empirical work carried out in a South African context indicates that industry effects have a negligible influence on the return realised on a share (6).

The ordinary least squares technique was used to compute weekly residuals for a number of shares listed on the Johannesburg Stock Exchange.

5.3.2 The Abnormal Performance Index Technique

Having established the residuals to be used in the study, the method of their analysis should now be considered. The method used employs a technique known as the abnormal performance index (API). A point in the price history of the share, in this case the date of the final earnings and dividend announcement, is designated as period 0 and the sequences of residuals of different firms and those of the same firm over different time periods are aligned on this point. This technique yields a return, resulting from firm specific factors, on an equally weighted investment in each of the shares in the sample. The API technique allows the observation of the post announcement behaviour of the combined residuals of the firms sampled. The profits and losses represented by the residuals are regarded as abnormal since they represent an excess return or loss after allowing for the risk associated with that investment.

The abnormal performance index is calculated as follows :

$$API_w = \frac{1}{N} \sum_{n=1}^N \sum_{k=0}^W (1 + \hat{E}_{nk})$$

Where: N = The number of simultaneous final earnings and dividend announcements selected,

\hat{E}_{ink} = The residual of share i in week k subsequent to the n th announcement sampled.

The aligning of the sequences of residuals of different time periods and different firms on the announcement date is a positive feature of the technique as it minimises the effect of firm and time period specific abnormalities in the residuals.

An examination of the behaviour of the residuals surrounding the announcement date revealed that they were strongly positive over the entire sample (7). To counter the effects of this the announcement date for the purposes of the test was advanced by two weeks.

5.3.3 Dividend Groupings

The abnormal performance measured by the index if aggregated over the entire market would sum to nil. It therefore becomes necessary to differentiate the sample into a number of groups based on some dividend criteria and to calculate the API in respect of each of the groups, thus displaying any superior returns attributable to a particular dividend characteristic.

On this basis the post announcement residuals were classified into three groups based on the payout ratio publicised in the announcement. The payout ratio was calculated by dividing the sum of the latest interim and final dividends by the earnings per share.

The cut off points between the groups were arbitrarily decided. Payout ratios equal to or below 40% were classified as low payout ratios and those equal to or greater than 60% being classified as high payout ratios. Distributions of between 40% and 60% were allocated to the intermediate group.

Distortion of these results may be introduced by the diversity in the accounting treatments used to calculate the earnings per share figures. Should the varying accounting treatments used overstate some firms 'true' earnings while understating others, distortion would be introduced as the high and low payout shares would be distributed among the three groups. Alternatively should there be a consistent bias in earnings in both magnitude and direction no distortion would result. This seems improbable as even if there is a predominance of under or overstatement, the magnitude cannot be expected to be constant between firms. Thus some element of distortion is probable. For this reason the above API calculation was repeated with the allocation between groups decided on the basis of dividend yield. This yield was calculated by dividing the sum of the latest interim and final dividends by the share price at the end of the week during which the announcement was made.

5.4 DATA

The data for use in this study covers a period of 404 weeks (approximately eight years) beginning on 26 January 1973. The market index used was the Rand Daily Mail (RDM) Index.

The sample used for analysis, where the allocation to dividend groups was based on payout, comprised 248 simultaneous final earnings and dividend announcements during the above period. The selection criteria resulted in the number of announcements allocated to the low, intermediate and high payout groups being 91, 124 and 33 respectively. The composition of these groups is shown in Appendix One.

For the second test 231 announcements were apportioned again into three groups to obtain, as far as possible, an equal number in each group. This resulted in groups of 77 (dividend yields equal to or below seven percent), 81 (dividend yields from seven and a half percent to nine and a half percent) and 73 (dividend yields equal to or greater than ten percent). For the purposes of the apportionment the dividend yields were rounded to the nearest one half percent. The allocation between the dividend yield groups is shown in Appendix One.

Information concerning the dates of the announcements was obtained by questionnaire from firms (8).

5.5 HYPOTHESIS

The hypothesis to be tested using the methodology outlined is:

$$H : API_{lt} = API_{mt} = API_{ht}$$

as against the alternative hypothesis:

$$H' : API_{lt} \neq API_{mt} \neq API_{ht}$$

(Or that the API score for any one dividend group differs from that of any other).

The subscripts l, m and h indicate low, medium and high dividend payout or dividend yield groups. The subscript t denotes time period t.

5.6 TEST RESULTS AND INTERPRETATION

The results of the two abnormal performance index tests are presented both in tabular form and graphically as shown below.

Allocation to Dividend Group based on :	API Results Presented in Table :	API Results Presented in Figure :
Payout Ratio	5.1	5.1
Dividend Yield	5.2	5.2

When interpreting these results it should be remembered that the indices reported are calculated from the end of the week subsequent to that in which the final earnings and dividend announcement was made. As already discussed, this was done to minimise the distortion introduced by the strongly positive API results in the period immediately surrounding the announcement date. The comparison of the performance achieved by each of the groups is not significantly affected as the influence of the positive residuals is relatively uniform across the full sample.

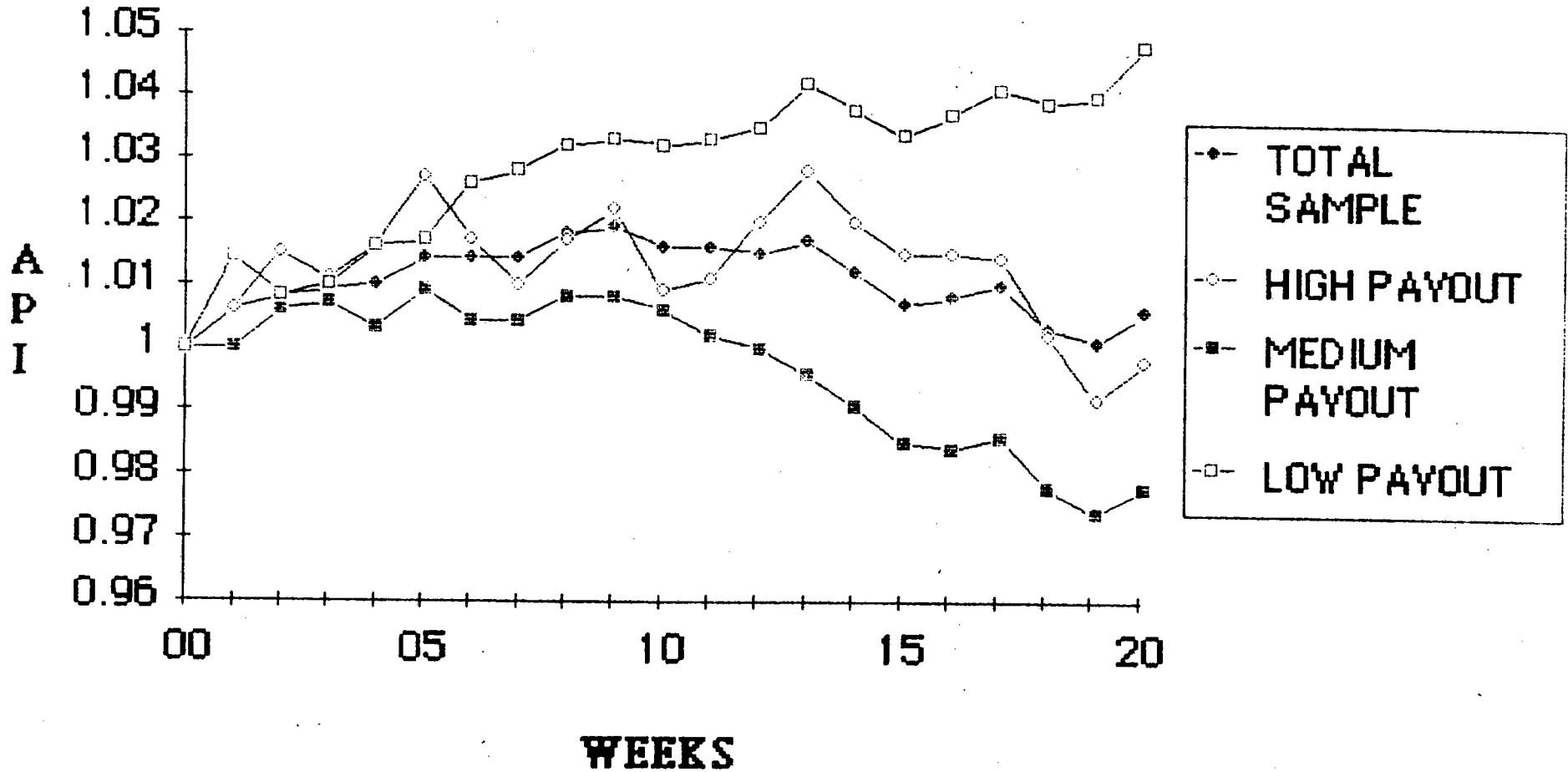
The results have been reported for a period of only 20 weeks as at this stage forthcoming interim dividends would alter the dividend characteristics of the groups.

TABLE 5.1ABNORMAL PERFORMANCE INDEX STATISTICS OF DIVIDEND PAYOUT GROUPS
RELATIVE TO DATE OF FINAL EARNINGS AND DIVIDEND ANNOUNCEMENT

<u>Week Number</u>	<u>Week Relative to Announcement Date</u>	<u>Cumulative API Score</u>			
		<u>Total Sample</u>	<u>High Payout</u>	<u>Medium Payout</u>	<u>Low Payout</u>
1	+2	1,006	1,006	1,000	1,014
2	+3	1,008	1,015	1,006	1,008
3	+4	1,009	1,011	1,007	1,010
4	+5	1,010	1,016	1,003	1,016
5	+6	1,014	1,027	1,009	1,017
6	+7	1,014	1,017	1,004	1,026
7	+8	1,014	1,010	1,004	1,028
8	+9	1,018	1,017	1,008	1,032
9	+10	1,019	1,022	1,008	1,033
10	+11	1,016	1,009	1,006	1,032
11	+12	1,016	1,011	1,002	1,033
12	+13	1,015	1,020	1,000	1,035
13	+14	1,017	1,028	,996	1,042
14	+15	1,012	1,020	,991	1,038
15	+16	1,007	1,015	,985	1,034
16	+17	1,008	1,015	,984	1,037
17	+18	1,010	1,014	,986	1,041
18	+19	1,003	1,002	,978	1,039
19	+20	1,001	,992	,974	1,040
20	+21	1,006	,998	,978	1,048

FIGURE 5.1.

API SCORES ALLOCATION TO DIVIDEND GROUPS BASED ON PAYOUT RATIO.



5.6.1 Dividend Groups Based on Payout Ratios

Turning to the analysis carried out based on the payout ratios, no clear pattern of returns based on payout emerges. An interesting feature is the increasing divergence of the abnormal returns attributable to the three payout groups. At week 20 the cumulative API of the low payout group exceeds that of the high payout group by 5,0% (API : 1,048 vs .998). A difference of 5,0% is significantly in excess of the transaction costs incurred in acquiring and subsequently disposing of a shareholding. The impression of a dividend effect given by the divergence of the API scores does not appear warranted when one examines the ranking of the eventual results. Although the low payout group dominates the high payout group for the last 14 of the 20 weeks, the API scores of the high payout group exceed those of the intermediate group throughout the 20 week period. Thus the existence of a dividend effect appears doubtful.

The test undertaken is a preliminary attempt to identify changes in the returns earned on a share in the period subsequent to an earnings and dividend announcement, where the alteration in the returns earned is related to the firms payout ratio or dividend yield. As the API results are measured relative to a specific public announcement any dividend effect may be expected to manifest itself shortly after the announcement. In interpreting the API scores more significance should

therefore be allocated to scores close to the announcement date and less weight given to more distant results. More distant API scores may be expected to be influenced by later information releases having a bearing on expected dividend levels. Accordingly, with the passing of time, the three groups become less representative of their original payout characteristics. On examining table 5.1 one can see that the high and low payout groups produce largely similar results for the first six weeks. Only from week 6 does the low payout group achieve consistently higher cumulative API results. In view of this the existence of a negative dividend preference seems uncertain.

However, one should note that neither the high nor the intermediate payout group exhibit any clear direction during the first nine weeks while the low payout group, apart from a 0.6% reversal during week 2, has consistently positive API results during this period. The consistency of the low payout group API scores may indicate a weak negative dividend preference. Any such preference would be weak as, notwithstanding the lack of direction of the API scores of the high payout group, this group's results are indistinguishably different from those of the low payout group until week 6. Furthermore, due to the erratic results of the high payout group the cumulative difference between the results of the two groups does not always exceed the transaction costs to be incurred in acquiring and subsequently disposing of a shareholding.

Should the superior performance of the low payout group be indicative of a negative dividend preference then the time period over which the prices of the shares in this group adjust to their higher level requires comment. The API results of this group for each week (except week 2) are consistently positive for a period of nine weeks, after which the curve temporarily flattens out. Should there be a dividend effect the relatively extended period over which the share prices of the low payout group adjust is not consistent with an efficient market.

In conclusion it may be said that the lack of direction of the API results of the high and intermediate payout groups in conjunction with the insignificant difference between the API results of the three groups until week 7 make the existence of any dividend effect doubtful. The only evidence noted in support of a negative dividend preference was the positive API results for the low payout group for eight of the first nine weeks, but the cumulative advantage of this group does not always exceed the transaction costs of acquiring and disposing of those shares.

On the basis of the above test the existence of a dividend effect appears unlikely. This tentative conclusion may require re-evaluation in the light of the following test.

The null hypothesis of their being no dividend influence is therefore accepted.

5.6.2 Dividend Groups Based on Dividend Yields

As documented a test substantially the same as the above was conducted with the allocation to dividend groups undertaken on the basis of dividend yields rather than payout ratios.

On conducting the latter form of the API test, it is noted that the low dividend yield group does not outperform the other groups over the post announcement 20 week period examined. The low yield group is dominated by the high yield group for a number of weeks but the cumulative API results for these groups over the full test period are insignificantly different. As in the previous test the intermediate group underperforms the other two groups. None of the API results of the groups exhibit any clear direction and after the initial five week period the cumulative difference between the groups is small. Overall, no positive or negative dividend preference is indicated.

In conclusion it may be said that the results of the second API test reinforce those of the first, with there being very little evidence for a positive or negative dividend preference. The null hypothesis is therefore accepted.

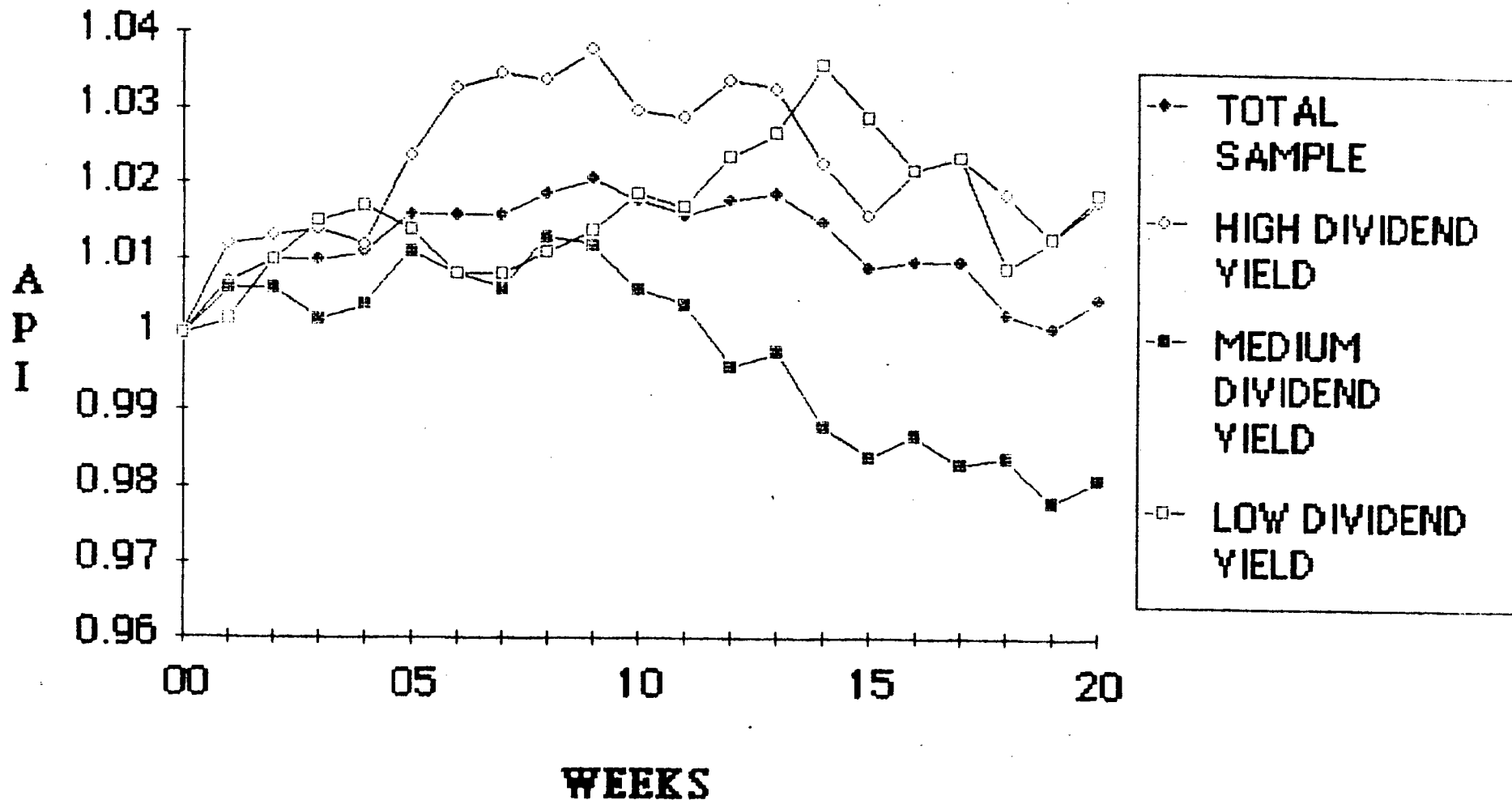
TABLE 5.2

ABNORMAL PERFORMANCE INDEX STATISTICS OF DIVIDEND YIELD GROUPS
RELATIVE TO DATE OF FINAL EARNINGS AND DIVIDEND ANNOUNCEMENT

<u>Week</u> <u>Number</u>	<u>Week</u> <u>Relative to</u> <u>Announcement</u> <u>Date</u>	<u>Total</u> <u>Sample</u>	<u>Cumulative API Score</u>		
			<u>High</u> <u>Dividend</u> <u>Yield</u>	<u>Medium</u> <u>Dividend</u> <u>Yield</u>	<u>Low</u> <u>Dividend</u> <u>Yield</u>
1	+2	1,007	1,012	1,006	1,002
2	+3	1,010	1,013	1,006	1,010
3	+4	1,010	1,014	1,002	1,015
4	+5	1,011	1,012	1,004	1,017
5	+6	1,016	1,024	1,011	1,014
6	+7	1,016	1,033	1,008	1,008
7	+8	1,016	1,035	1,006	1,008
8	+9	1,019	1,034	1,013	1,011
9	+10	1,021	1,038	1,012	1,014
10	+11	1,018	1,030	1,006	1,019
11	+12	1,016	1,029	1,004	1,017
12	+13	1,018	1,034	,996	1,024
13	+14	1,019	1,033	,998	1,027
14	+15	1,015	1,023	,988	1,036
15	+16	1,009	1,016	,984	1,029
16	+17	1,010	1,022	,987	1,022
17	+18	1,010	1,024	,983	1,024
18	+19	1,003	1,019	,984	1,009
19	+20	1,001	1,013	,978	1,013
20	+21	1,005	1,018	,981	1,019

FIGURE 5.2.

API SCORES-ALLOCATION TO DIVIDEND GROUPS BASED ON DIVIDEND YIELD.



5.7 LIMITATIONS OF THE STUDY

5.7.1 Model Specification

The objective of this chapter has been to identify any dividend influence on the value of a firm. To achieve this objective returns on portfolios of shares exhibiting different payout patterns were examined. To avoid any possible influence on the test results of an association between firms' payout policies and their risk characteristics the market model was used to adjust the security returns. It must therefore be accepted that the test results are conditional upon the correct specification of the market model as a means for adjusting security returns for risk.

It may, however, be argued that any misspecification of the market model may not imply significant distortion of the final result of the API test. The reason for this is that it is the relative API scores of the payout and dividend yield groups that is of importance rather than the absolute level. Therefore it is possible that the results of this test may be fairly robust despite any misspecification of the model used.

5.7.2 Selection Bias

A further constraining factor, common with the use of the API technique in an information content setting, is what has become known as a post

selection bias (9). In the context of this study, it may be argued that the dividend payout reflects the economic position of the underlying company and accordingly the dividend groups are characterised both by certain payout patterns and by firms of a particular economic standing. This may bias the test results.

In conducting their cross sectional regression studies, which have been reported in Chapter Four, Friend and Puckett recognised this problem through the inclusion of a dividend supply function in their regression equation (10).

The conceptual limitation discussed above relates to the validity of the residuals used whereas this point relates to the association between the hypothesis tested and the observed residuals.

5.8 CONCLUSIONS

As stated, the purpose of this chapter is to identify any systematic influence of firms' dividend policies on the returns realised on their securities. The initial form of the test undertaken revealed some evidence, though not conclusive, for a negative dividend preference on the part of shareholders. On repeating the test, having altered the basis on which securities were allocated to dividend groups, this evidence disappeared leading to an overall conclusion of there being insufficient evidence for a dividend effect. The null hypothesis of there being no dividend effect was therefore accepted.

Certain limitations of the study were then highlighted and consequently the results achieved must be seen as informative yet of insufficient strength to support a conclusion alone. Should further empirical tests employing more rigorous procedures indicate a similar result, then the results of the tests documented in this chapter may be seen as useful corroborative evidence.

FOOTNOTES TO CHAPTER FIVE

- (1) Markowitz, H.M., Portfolio Selection: Efficient diversification of Investment, Yale University Press, New Haven, 1959.
- (2) Affleck-Graves, J.F., Money, A.H., 'A note on the Random Walk Model and South African Share Prices'. The South African Journal of Economics. 1974. Vol. 43. pp 382 - 388.

Fama, E., Fisher, L., Jensen, M. and Roll, R., 'The Adjustment of Stock Prices to New Information', International Economic Review. February 1969. pp 1 - 21.
- (3) The Durbin Watson test was applied to the residual estimates of each share by Knight. See Knight (1983).
- (4) Affleck-Graves, J.F., 'The Application of Multivariate Statistical Techniques in the Analysis of Stock Market Data', Unpublished Ph.D. Thesis, University of Cape Town. 1977.
- (5) Knight, R.F., 'The Association Between Published Accounting Data and the Behaviour of Share Prices', Unpublished Ph. D, University of Cape Town. 1983. pp 87.
- (6) Visser, F., Affleck-Graves, J.F., 'A Factor Analysis of Shares Listed on the J.S.E'. Technical Report No. STM 10, The Department of Mathematical Statistics, University of Cape Town. 1982.
- (7) Knight, R.F., 1983 op cit. pp 275.
- (8) Knight, R.F., 1983 op cit. pp 110.
- (9) Sunder, S., 'Relationship Between Accounting Changes and Stock Prices: Problems of Measurement and some Empirical Evidence', Empirical Research in Accounting: Selected Studies. 1973. pp 1 - 48.
- (10) Friend, I., Puckett, M., 'Dividends and Stock Prices', American Economic Review. September 1964. pp 656 - 682.

CHAPTER SIX

CROSS SECTIONAL REGRESSION STUDY INTO THE EFFECTS OF

DIVIDEND POLICY ON THE VALUE OF A FIRM

6.1 INTRODUCTION

This chapter documents a further empirical investigation, conducted by the writer, into the effects of dividend policy on the value of a firm. The procedures to be adopted are more suited to this kind of study than those discussed in the previous chapter. Consequently it is hoped that these more complex techniques may allow stronger conclusions to be drawn than was possible in the preceding test.

The test to be undertaken is a cross sectional regression study with the equation based on the ex post form of the CAPM introduced in Chapter Two. A further term has been added to test for the significance of dividend yield in the valuation process. An evaluation of the regression coefficients of this variable will permit a conclusion as to the existence of any dividend influence on the value of a firm.

6.2 REVIEW OF PREVIOUS RESEARCH

The regression equation used in this study is a modification of that first proposed by Fama and MacBeth for use in testing the applicability of the CAPM in the explanation of returns realised on shares listed on the New York Stock Exchange(1). For this reason and because of the possible interpretative background that may be provided by the results of their study it is felt that a review of their paper would be appropriate.

The three testable implications of the CAPM identified by Fama and MacBeth, which became the hypotheses tested, were the following:

- (i) The relationship between the expected return on a security and its risk in any efficient portfolio is linear;
- (ii) That β_i is a complete measure of the risk of security i in an efficient portfolio;
- (iii) In a market of risk averse investors higher risk should be associated with higher expected return.

The regression equation used took the following form:

$$R_{pt} = \hat{Y}_{0t} + \hat{Y}_{1t}\hat{\beta}_{p,t-1} + \hat{Y}_{2t}\hat{\beta}_{p,t-1}^2 + \hat{Y}_{3t}\hat{S}_p + \hat{E}_{pt} \quad (6.1)$$

- Where:
- R_{pt} = The return on portfolio p during period t,
 - $\hat{\beta}_{pt}$ = An estimate of the beta of portfolio p during period t,
 - \hat{S}_p = The standard deviation of the residuals of individual securities derived using the market model averaged to form portfolio estimates,
 - $\hat{Y}_{0t}, \hat{Y}_{1t}, \hat{Y}_{2t}, \hat{Y}_{3t}$ = The coefficients resulting from the above regression,
 - \hat{E}_{pt} = An error term.

The variable $\hat{\beta}_p^2$ is included to test the linearity of the relationship between the observed beta estimates and the measured return.

Hypothesis (i) would require that $E(\hat{Y}_{2t}) = 0$.

The variable \hat{S}_p tests the completeness of $\hat{\beta}_p$ as a risk measure.

Hypothesis (ii) would require that $E(\hat{Y}_{3t}) = 0$.

The coefficient \hat{Y}_{1t} measures the premium attached to risk in the pricing of assets. Hypothesis (iii) which posits a positive risk return trade off requires that $E(\hat{Y}_{1t}) > 0$.

Finally, the residual term \hat{E}_{pt} is assumed to exhibit a mean of zero and to be independent of the other variables.

The assumption of weak form market efficiency, being a necessary condition for the operation of the CAPM, in conjunction with hypotheses (i) and (ii) requires the values of the terms \hat{Y}_{2t} , \hat{Y}_{3t} and \hat{E}_{pt} be a fair game, with an expected value of zero.

Further hypothesis (iii) together with the above assumption requires that the result of $E(\hat{Y}_{1t}) - [E(\tilde{R}_m) - R_f]$ be a fair game also with an expected value of zero. The fair game property states that over a large number of observations expected and realized values must coincide.

The data used in the study were monthly percentage returns of all shares listed on the New York Stock Exchange from January 1926 to June 1968.

The securities were allocated to 20 portfolios on the basis of decreasing beta estimates. Portfolio betas are then re-estimated using fresh data as described in the study undertaken by the writer. This aspect of research design has been closely followed by the writer for reasons detailed below. The remainder of the test is undertaken using shares in portfolios rather than individual shares.

The monthly data used for the test consisted of annual beta estimates and estimates of the standard deviation of residuals for individual securities re-averaged by portfolio each month to allow for delistings. As shown in regression equation 6.1 the portfolio return for the month subsequent to that used for the estimation of portfolio variables was regressed against those estimates of the variables. This lag effect is

introduced to test the association between current risk estimates and subsequent returns.

Salient regression results are shown in Table 6.1. The mean regression coefficients and the resultant t statistics are shown only for the full test period of 1935 to 1968. The reported t statistics have been calculated on the same basis as those done by the writer. The method of their calculation is reported below.

TABLE 6.1

SUMMARY OF RESULTS FOR THE REGRESSION

$$R_{pt} = \hat{Y}_0t + \hat{Y}_1t\hat{\beta}_{p,t-1} + \hat{Y}_2t\hat{\beta}_{p,t-1}^2 + \hat{Y}_3t\hat{S}_{p,t-1} + \hat{\epsilon}_{pt}$$

REGRES- SION NUMBER	MEAN REGRESSION COEFFICIENTS				t STATISTIC			
	\hat{Y}_0	\hat{Y}_1	\hat{Y}_2	\hat{Y}_3	T(\hat{Y}_0)	T(\hat{Y}_1)	T(\hat{Y}_2)	T(\hat{Y}_3)
1	,0061	,0085	*	*	3,4 ^x	2,57 ^x	*	*
2	,0049	,0105	-,0008	*	1,92 ^x	1,79 ^x	-,29	*
3	,0054	,0072	*	,0198	2,10 ^x	2,20 ^x	*	,46
4	,0020	,0114	-,0026	,0516	,55	1,85 ^x	-,86	1,11

* regression suppressed

^x significant at the 5% confidence level

Despite statistically non significant t-test results for a number of the sub-periods, which have not been reported in this thesis, the overall results confirm the hypotheses tested.

Fama and MacBeth conclude that given the approximate efficiency of their proxy for the market portfolio, the average returns realized on common stocks on the New York Stock Exchange are consistent with stocks being priced in terms of the CAPM.

As noted by Fama and MacBeth their conclusion is dependent on the efficiency of the market portfolio. This problem is known as Roll's critique and has been dealt with in Chapter Two (2). Roll's criticism concerning the joint hypotheses of the CAPM and the efficiency of the market portfolio applies both to this study and to the Hawawini investigation reported below together with the study undertaken by the writer.

A further study which is of interest is that undertaken by Hawawini, Michel and Viallet on the Paris Stock Exchange over the period June 1969 to May 1971(3).

The research design is largely based on the work of Fama and MacBeth already reported. Modifications to the regression equation included a variable giving the variance of the total return on the portfolio (σ^2_p), a term giving the skewness of the distribution of returns on the portfolio (Sk_p) and a term giving the unsystematic risk of the portfolio (\hat{s}_p).

The regression equation thus becomes:

$$R_{pt} = \hat{Y}_{0t} + \hat{Y}_{1t}\hat{\beta}_{p,t-1} + \hat{Y}_{2t}\hat{\beta}^2_{p,t-1} + \hat{Y}_{3t}\hat{s}_{p,t-1} + \hat{Y}_{4t}\sigma^2_{p,t-1} + \hat{Y}_{5t}Sk_{p,t-1} + \hat{E}_{pt} \quad (6.2)$$

The terms used are described above.

The hypotheses tested were:

- (i) The relationship between a security's expected return and its systematic risk is linear; i.e. $E(\hat{Y}_{2t}) = 0$,
- (ii) Investors are compensated only for bearing systematic risk. It is argued that unsystematic risk may be relatively cheaply removed by diversification; i.e. $E(\hat{Y}_{3t}) = 0$,
- (iii) The risk return trade off is positive; i.e. $E(\hat{Y}_{1t}) > 0$,
- (iv) Investors view the distribution of securities' returns as symmetrical; i.e. $E(\hat{Y}_{5t}) = 0$,
- (v) The opportunity exists for each investor to borrow or lend unrestricted amounts at a risk free rate; i.e. $E(\hat{Y}_{0t}) = R_f$,
- (vi) Investors may not at all times seek to construct efficient portfolios with unsystematic risk minimized through diversification; i.e. $E(\hat{Y}_{4t}) > 0$.

To test these hypotheses a number of cross sectional regressions, as shown in equation 6.2, were carried out with one or more of the variables suppressed in each case.

Again the shares were allocated to portfolios on the basis of decreasing beta estimates with the betas recalculated annually.

However, portfolio returns were calculated on a weekly basis as opposed to monthly. This approach combined with the low trading volumes on the Paris Stock Exchange gives rise to the so called 'intervalling effect' whereby beta estimates of poorly traded shares are biased downwards. A method of reducing this bias involves using monthly rather than weekly returns in the estimation of betas.

As expected the results of the tests indicated that hypotheses (i), (ii) and (iv) all hold, while no evidence to support hypothesis (vi) was found. Hypotheses (i), (ii) and (iii) were tested by Fama and MacBeth (see above) on the New York Stock Exchange where they were found to hold.

Surprisingly hypothesis (iii) did not hold. No t statistic for the entire decade tested was presented, but in all of the four years in which the t statistic was significant, the risk return association was negative. A further result of the regression, possibly connected with the rejection of hypothesis (iii), was that the constant term in the regression, \hat{Y}_{0t} , exhibited on average higher values than the risk free rate (R_f) for which it served as a proxy. The possible connection arises in that the coefficient of β in the ex ante form of the CAPM is given by $[E(\tilde{R}_m) - R_f]$, therefore high regression values for \hat{Y}_{0t} may result in $[E(\tilde{R}_m) - R_f]$ being negative. This result implies a relative undervaluation of risky assets and consequent overvaluation of risk free assets. Such a temporary imbalance is acceptable within the framework of the CAPM as while from an ex ante perspective a higher return is required on the market (in view of the risk) than on the risk free asset, the fair

game property of \hat{Y}_{1t} already discussed would permit, on a temporary basis, a negative return for bearing risk. This negative return, however, persists over the period 1970 to 1972 inclusive and appears again in 1978. It is the continuity of this phenomenon that leads to the rejection of hypothesis (iii).

The authors offer two explanations for their findings. Firstly, they note the institutional dominance of the Paris Stock Exchange and argue the inflexibility of institutional holdings where large volumes of shares are not easily acquired or disposed of. This is very similar to the South African position and the results of this research will be borne in mind when interpreting the results of local research. Secondly they argue that the stock exchange represents only a small portion of available investment alternatives and that a true test of the CAPM would need to embrace all investment alternatives.

In view of this explanation offered and the positive results of the other hypotheses tested the authors concluded that insufficient evidence exists for the rejection of the hypothesis that the pricing of common stocks on the Paris Stock Exchange conforms to the CAPM.

6.3 DATA

The data for the test undertaken by the writer are weekly returns on the shares of 107 firms listed on the Johannesburg Stock Exchange over a period of 404 weeks beginning on 26 January 1973.

6.4 METHOD

6.4.1 Rationale

The CAPM is a model of market equilibrium under conditions of risk. Under the assumption that an asset is a constituent of an efficient portfolio, it therefore seeks to equate the risk of an investment in that asset with the expected return. Should the CAPM be the process by which assets are priced in markets and should the assumptions on which it is based hold then the suggested returns on an asset may be seen as complete or equilibrium returns as they recognise its systematic risk, which in terms of the CAPM is the only factor explaining the differences in expected returns between assets.

Because it is a valuation model the CAPM in its ex post form provides a convenient means for assessing the returns on an asset relative to an empirically derived estimate of its risk. By adding further independent variables their impact on risk adjusted security returns may be assessed; although by its construction the CAPM suggests that these factors have no influence on return. The CAPM is, however, based on a set of fairly strict assumptions and to the extent that any of these are not realised, further factors critical to the valuation of a security may be introduced.

The tests documented in this chapter are limited simultaneous tests of the CAPM. The tests are limited because no terms are included that might test the significance of risk measures other than β in the valuation

process. Further, neither the linearity of the risk return trade off nor investors' perceptions of the distributions of securities' returns are tested, as it is felt that these aspects fall outside the scope of the original hypothesis.

The ex post form of the CAPM introduced in Chapter Two, the empirical market line, is therefore, with the addition of a dividend yield variable, considered an appropriate means of testing the impact of firms' dividend policies on the returns realised on their securities.

6.4.2 Cross Sectional Regression Study

The empirical procedures employed in this study are fairly complex and for this reason they will be introduced in a series of steps. Where considered appropriate, diagrams will be used.

STEP ONE - THE FORM OF THE PROBLEM

The objective of this study is to test, using cross sectional regression techniques, the impact of firms' dividend yields on the returns realised on their securities. This implies a regression equation of the following form:

$$R_{it} = \hat{Y}_{0t} + \hat{Y}_{1t} \hat{\beta}_{i,t-1} + \hat{Y}_{2t} \hat{D}_{i,t-1} + \hat{E}_{it} \quad (6.3)$$

Where: R_{it} = The return on a security i during period t ,

$\hat{\beta}_{i,t-1}$ = An estimate of the beta of share i during period $t-1$,

$\hat{D}_{i,t-1}$ = The dividend yield of share i at the end of period $t-1$,

$\hat{Y}_{0t}, \hat{Y}_{1t}, \hat{Y}_{2t}$ = Coefficients estimated from the regression,

\hat{E}_{it} = An error term.

It therefore becomes necessary to obtain dividend yield and beta estimates together with measurements of security returns so that concurrent observations on various securities may be used to estimate the regression coefficients.

It should be noted that the research design employed tests the association between current security characteristics and future returns. Accordingly the security returns are extracted from the calendar year subsequent to that from which the security characteristics were drawn.

STEP TWO - PORTFOLIO FORMATION

Tests of this kind are, however, normally undertaken using shares in portfolios rather than individual shares (4). The reason is that beta estimates are subject to measurement error. By grouping shares into portfolios these estimation errors are largely offset. This results in portfolio beta estimates being more reliable than the estimates pertaining to the individual securities.

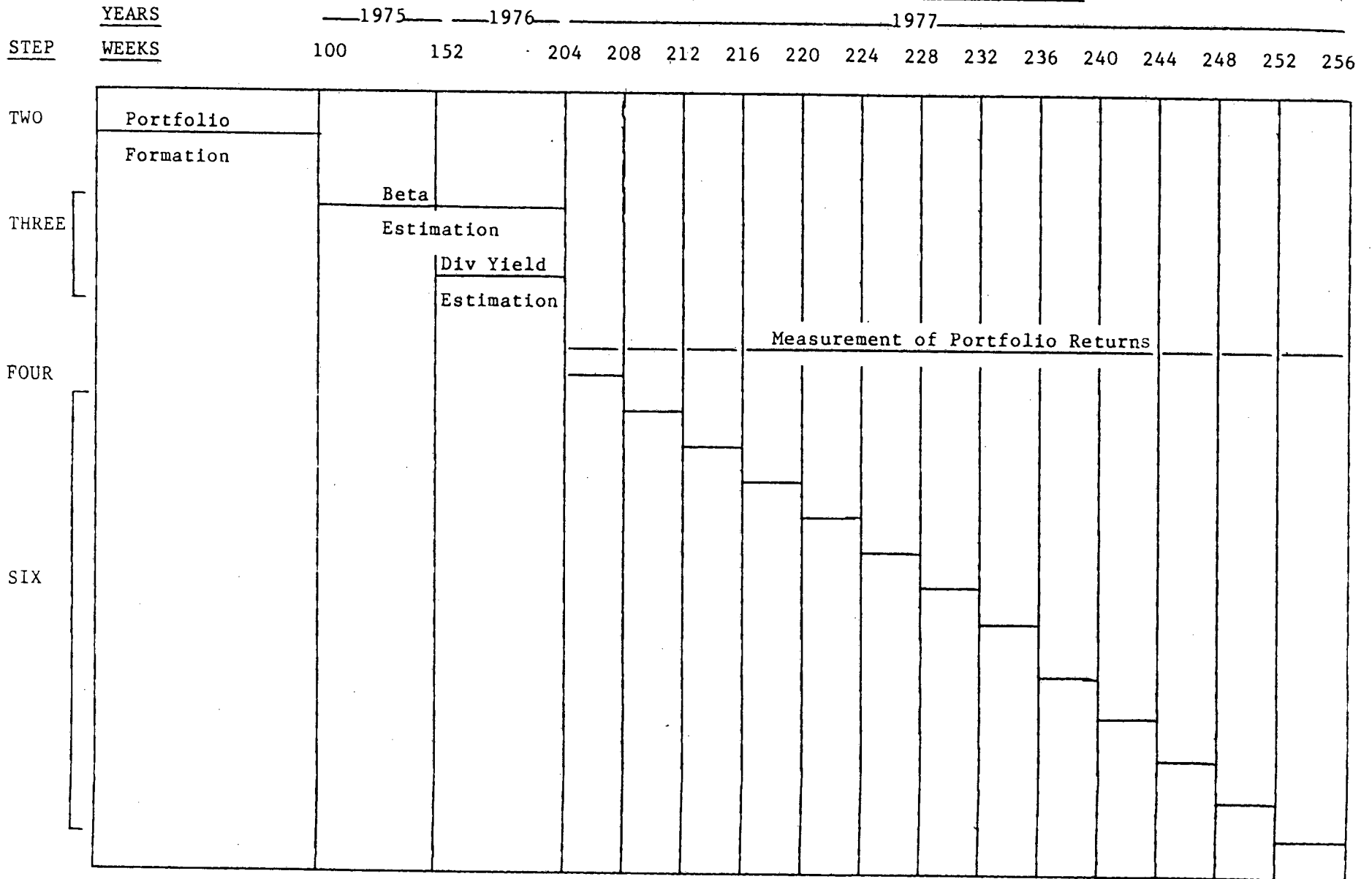
The first step in the formation of portfolios involves the estimation of a beta for each security. This was achieved through the use of Markowitz's market model whereby weekly security returns for the first 100 weeks of data were regressed against the corresponding returns on the Rand Daily Mail (RDM) index (5). Shares were then assigned to ten portfolios on the basis of decreasing beta estimates such that the first and last portfolios had thirteen and fourteen shares respectively while the other eight portfolios each had ten shares. The rest of this test is then conducted using these shares in portfolios rather than individual securities. The composition of these portfolios remains constant over the entire test. The securities used and the portfolios to which they have been allocated are shown in Appendix One.

This portfolio formation period has been demonstrated graphically on a time scale in Figure 6.1.

The accumulation of shares into portfolios based on decreasing beta estimates raises a further problem in that research by Blume indicates that beta estimates for high risk securities tend to be overstated while those for low risk securities tend to be understated (6). Grouping shares on the basis of decreasing betas results in the portfolios exhibiting biases similar to those of their constituent shares. This problem is to some extent alleviated by the annual re-estimation of portfolio betas. As the security betas within each portfolio gradually change over time their estimation errors become random and the desired offsetting effect occurs.

FIGURE 6.1

ESTIMATION PERIODS FOR PORTFOLIO CHARACTERISTICS FOR 1977 TEST PERIOD



It is necessary to allocate shares to portfolios on the basis of decreasing beta estimates so that these portfolios will display a wide range of betas similar to those displayed by securities.

A series of cross-sectional regressions will be carried out using equations similar to equation 6.3. Each regression will have ten observations being concurrent measurements of the regression variables taken on the ten portfolios.

STEP THREE - ESTIMATION OF RISK AND DIVIDEND CHARACTERISTICS

The following step involves the estimation of risk and dividend characteristics for each of the portfolios. These are to serve as the independent variables in the cross sectional regressions. The discussion will initially be framed in terms of the data requirements for one regression calculation with the explanation subsequently expanded to present the full test.

Bearing in mind that the investigation is now framed in terms of shares in portfolios rather than individual shares, regression equation 6.3 may be written as :

$$R_{pt} = \hat{Y}_{0t} + \hat{Y}_{1t}\hat{\beta}_{p,t-1} + \hat{Y}_{2t}\hat{D}_{p,t-1} + \hat{E}_{pt} \quad (6.4)$$

Where the subscript p is read as denoting portfolio p.

The first regression will require concurrent beta estimate and dividend yield observations from each of the 10 portfolios.

These portfolio estimates were derived by taking a simple average of the measurements for the individual securities.

Individual security beta estimates were calculated by means of the market model whereby weekly security returns were regressed against the weekly returns on the RDM index. This was performed over the 104 week (2 year) interval from week 101 to week 204 inclusive. The period over which the ten portfolio beta estimates have been made for the first regression is shown in Figure 6.1.

Dividend yields for each share were then calculated for the year 1976. This was done by dividing the sum of the final and interim dividends paid, in respect of the financial year end falling within 1976, by the share price at the end of the eleventh week subsequent to the end of the financial year. Eleven weeks after the year end is approximately two and a half months by which time it is assumed that the final earnings and dividend information had been released.

It is acknowledged that this method of estimation of dividend yields is somewhat arbitrary, but it is submitted that there is no reason to suspect that any significant distortion of test results will arise out of this procedure. The period over which the ten portfolio dividend yields have been estimated for the first regression is shown in Figure 6.1.

This concludes the data for the independent variables for one regression calculation with ten observations.

STEP FOUR - CALCULATION OF PORTFOLIO RETURNS

Measurements of concurrent returns are required for each of the ten portfolios for use as the dependent variable in the regression. The required portfolio returns are calculated by averaging the returns for the individual securities. For the purposes of this test, portfolio returns are calculated over four week periods.

To conduct the first regression a return for each of the ten portfolios is calculated in the manner described over the interval from week 205 to 208 inclusive. The estimation period is shown in Figure 6.1.

STEP FIVE - STATEMENT OF CROSS SECTIONAL REGRESSION EQUATIONS

The regression equations used were :

$$R_{pt} = \hat{\xi}_{0t} + \hat{\xi}_{1t}\hat{\beta}_{p,t-1}^w + \hat{e}_{pt} \quad (\text{regression equation one})$$

$$R_{pt} = \hat{Y}_{0t} + \hat{Y}_{1t}\hat{\beta}_{p,t-1}^w + \hat{Y}_{2t}\hat{D}_{p,t-1} + \hat{e}_{pt} \quad (\text{regression equation two})$$

$$R_{pt} = \hat{\theta}_{0t} + \hat{\theta}_{1t}\hat{D}_{p,t-1} + \hat{e}_{pt} \quad (\text{regression equation three})$$

Where: \hat{Y}_{0t} , \hat{Y}_{1t} , \hat{Y}_{2t} , $\hat{\xi}_{0t}$,

$\hat{\xi}_{1t}$, $\hat{\theta}_{0t}$, $\hat{\theta}_{1t}$

= Coefficients arising from the regression.

It is noted that the estimation of betas undertaken in step three involved the regression of weekly security returns against the weekly returns on the RDM Index. As weekly data has been used the resultant beta estimates are marked with a superscript w.

The other terms used in these equations have been explained above.

STEP SIX - EXECUTION OF REGRESSIONS

The first regression, using regression equation two, with concurrent observations from each of the ten portfolios was then conducted. This yielded one set of regression co-efficients. The regressions were calculated using a set of computer programmes known as BMDP 1R (7).

Ten further concurrent portfolio returns were then calculated, as set out above, over the interval from week 209 to week 212. Using precisely the same estimates of the independent variables a further regression with ten observations was carried out.

This procedure is carried out thirteen times in all using the same estimates of independent variables with the ten concurrent portfolio returns being measured over successive four week periods. This is shown graphically in Figure 6.1.

The thirteen consecutive four week periods over which the portfolio returns have been measured corresponds to the calendar year 1977.

Thus as is evident from Figure 6.1, the returns realised on the portfolios during 1977 have been regressed on beta estimates calculated over 1975 and 1976 and dividend yield estimates calculated over 1976. This has resulted in thirteen sets of regression coefficients.

The full procedure outlined in this step was then repeated using regression equations one and three.

STEP SEVEN - SIGNIFICANCE TESTS OF REGRESSION COEFFICIENTS

The 13 coefficients, in respect of each variable, resulting from the above regressions have been tested for significance by means of the t-test, specified as follows:

$$t \text{ statistic} = \frac{\frac{1}{N} \sum_{i=1}^N A_i}{\frac{\text{var}}{N}}$$

Where: N = The number of observations,

A_i = The individual observations,

$$X = \frac{1}{N} \sum_{i=1}^N A_i,$$

$$\text{VAR} = \left[\sum_{i=1}^N (A_i - X)^2 \right] / (N-1).$$

A t statistic greater than the figure extracted from the appropriate table at N-1 degrees of freedom and the chosen confidence level indicates that the factor represented by the coefficient may be viewed as a determinant of the value of a firm or as being correlated with a determinant of a firm's value.

STEP EIGHT - EXTENSION OF CROSS SECTIONAL REGRESSIONS

As stated in section 6.3 the full data set for this study comprises weekly returns over a 404 week period for 107 firms listed on the Johannesburg Stock Exchange. This is shown diagrammatically on a time scale in Figure 6.2 on which the tests documented on Figure 6.1 have been shown.

Noting that the composition of the portfolios remains constant the procedures in steps three to seven were then repeated after having advanced the time scale by one year. This gave rise to another thirteen regression coefficients covering the calendar year 1978 for each variable which were tested for significance by means of the t-test.

The repetition of steps three to seven was performed a third and fourth time, each after advancing the time scale by a further year. As the portfolio returns are measured over 4 week intervals (see step four) and since the full data set covers only 44 weeks of 1980, the fourth iteration produced only eleven regression coefficients. These last two sets of regression results correspond to the calendar years 1979 and 1980 respectively.

The period over which the independent variables and the portfolio returns have been measured for the extension of the regression procedures is shown in Figure 6.2.

t statistics were calculated on the results of the extended regression procedures according to the formula set out in step seven. Furthermore, t statistics for each variable over the full test period from the beginning of 1977 to week 44 of 1980 were calculated.

STEP NINE - BACKGROUND TO A FURTHER TEST

As discussed below, for a number of the sub-periods and for the entire test span the average regression coefficients of the beta term were negative. The implications of this result are contrary to our expectations. Consider equation 6.3 where, with a negative value for \hat{Y}_{1t} , increasingly positive values for $\hat{\beta}_{i,t-1}$ would, with other factors held constant, imply corresponding decreases in R_{it} . Therefore higher risk investments appear to offer lower returns.

This research result was noted whether the portfolio returns were regressed on the beta estimates only or on the beta and dividend yield estimates. Although unusual this result has been obtained by other researchers (8).

The negative coefficients for the beta term may be attributable to the 'intervalling effect' noted in the Hawawini study. This effect arises where the trading volume on a share over a period is low resulting in the return on that share not reflecting market wide factors. Accordingly the beta, being a measure of the shares responsiveness to market wide factors, is biased downwards. Efforts to minimize the 'intervalling effect' centre on ensuring that the trading volume of shares giving rise to the portfolio return to be regressed on the selected index, is sufficient to ensure that the portfolio return is as far as possible reflective of market wide influences. Therefore as mentioned above increasing the interval over which portfolio betas are to be measured is a method of achieving this.

STEP TEN - RE-ESTIMATION OF PORTFOLIO BETAS

To minimise the influence of the 'intervalling effect' on the regression results, the full regression test (steps three to eight) was repeated after having re-estimated the portfolio betas.

Portfolio betas were originally calculated in step three by averaging estimates for individual securities. Beta estimates for individual securities were calculated by regressing weekly security returns against weekly returns on the RDM index over the years 1975 and 1976 as shown in figure 6.1.

The portfolio betas were first re-estimated by regressing portfolio returns measured over four week periods against the returns measured on the RDM index for similar intervals. This estimation was again made over 1975 and 1976 to provide data for the first thirteen regressions.

Portfolio betas were then calculated using a further method. Instead of regressing portfolio returns measured over four week periods against the return on the RDM index, these returns were regressed on an index representing a simple average of the returns on the 107 selected firms. This latter index is known as the internal index.

The possibility of excluding the returns on a particular portfolio from the internal index when regressing the returns on that portfolio against the internal index was considered. In view of the extension of empirical procedures required this was not pursued although this would provide an interesting area for future research.

Beta estimates for the previous test derived using the RDM index are a measure of the sensitivity of individual security returns relative to the returns on the market. The weighted average of the beta estimates for all securities traded on a market would approximate one. However, as only 107 firms were sampled, the weighted average of their beta estimates is likely to be different from one. This may result in distortion of the average regression coefficients of the beta term. Portfolio betas estimated using the internal index, however, represent a measure of sensitivity of the portfolio's return relative to the changes in the return of the shares of the 107 selected firms. The average of any ten concurrent portfolio beta estimates derived using the internal index would approximate one. Use of the internal index would therefore remove this possible bias.

STEP ELEVEN - RE-STATEMENT OF CROSS-SECTIONAL REGRESSION EQUATIONS

As a result of the re-estimation of the beta terms using the two methods outlined, the following restatement of the regression equations is required:

$$R_{pt} = \hat{\phi}_{0t} + \hat{\phi}_{1t} \hat{\beta}_{p,t-1}^m + \hat{\phi}_{2t} \hat{D}_{p,t-1} + \hat{E}_{pt} \text{ (regression equation four)}$$

$$R_{pt} = \hat{\delta}_{0t} + \hat{\delta}_{1t} \hat{\beta}_{p,t-1}^m + \hat{E}_{pt} \text{ (regression equation five)}$$

$$R_{pt} = \hat{T}_{0t} + \hat{T}_{1t} \hat{\beta}_{p,t-1}^{mi} + \hat{T}_{2t} \hat{D}_{p,t-1} + \hat{E}_{pt} \text{ (regression equation six)}$$

$$R_{pt} = \hat{\omega}_{0t} + \hat{\omega}_{1t} \hat{\beta}_{p,t-1}^{mi} + \hat{E}_{pt} \text{ (regression equation seven)}$$

Where: $\hat{\beta}_{p,t-1}^m$ = The beta of portfolio p estimated during period t-1
using monthly data and the RDM index,

$\hat{\beta}_{p,t-1}^{mi}$ = The beta of portfolio p estimated during period t-1
using monthly data and the internal index,

$\hat{\phi}_{0t}, \hat{\phi}_{1t}, \hat{\phi}_{2t},$

$\hat{\delta}_{0t}, \hat{\delta}_{1t}, \hat{T}_{0t},$

$\hat{T}_{1t}, \hat{T}_{2t}, \hat{\omega}_{0t},$

$\hat{\omega}_{1t}$ = Coefficients estimated from the regressions.

Other terms as used above.

Before proceeding with the regression results table 6.2 is presented which summarises the regression equations used and the method of calculation of the variables.

TABLE 6.2
REGRESSION SUMMARY

Regression Equation	Dependent Variable	Independent Variables	Method of Calculation of Independent Variable		Result Reported in Table	
			Beta Estimate	Dividend Yield Estimate		
ONE	Portfolio Returns Calculated Over Four Week Intervals	$\hat{\beta}^w$	Regression of weekly security returns on return on RDM Index over two year interval. Security estimates averaged to form portfolio estimates.	N/A	6.3	
TWO		$\hat{\beta}^w$ \hat{D}		Total dividends paid in respect of financial year end falling within any calendar year divided by share price at the end of the eleventh week subsequent to the financial year end.		
THREE		\hat{D}	N/A	As for regression equation two		
FOUR		Week Intervals	$\hat{\beta}^m$ \hat{D}	Regression of monthly portfolio returns on return on RDM Index over two year interval.	As for regression equation two	6.4
FIVE			$\hat{\beta}^m$		N/A	
SIX			$\hat{\beta}^{mi}$ \hat{D}	Regression of monthly portfolio returns on return on internal index over two year interval.	As for regression equation two	
SEVEN			$\hat{\beta}^{mi}$		N/A	

6.5. HYPOTHESES

The hypotheses to be tested using the procedures outlined above are:

(i) That there exists a positive risk-return tradeoff on securities;

i.e.,

$$H : E(\hat{\xi}_{1t}), E(\hat{Y}_{1t}), E(\hat{\phi}_{1t}), E(\hat{\delta}_{1t}), E(\hat{T}_{1t}), E(\hat{\omega}_{1t}) > 0.$$

as against the alternative hypothesis;

$$H' : E(\hat{\xi}_{1t}), E(\hat{Y}_{1t}), E(\hat{\phi}_{1t}), E(\hat{\delta}_{1t}), E(\hat{T}_{1t}), E(\hat{\omega}_{1t}) \leq 0.$$

(See regression equations one, two, four, five, six and seven.)

(ii) That the dividend yield of a security does not influence the return realised on that security; i.e.,

$$H : E(\hat{Y}_{2t}), E(\hat{\theta}_{1t}), E(\hat{\phi}_{2t}), E(\hat{T}_{2t}) = 0.$$

as against the alternative hypothesis;

$$H' : E(\hat{Y}_{2t}), E(\hat{\theta}_{1t}), E(\hat{\phi}_{2t}), E(\hat{T}_{2t}) \neq 0.$$

(See regression equations two, three, four and six.)

6.6. TEST RESULTS AND INTERPRETATION

6.6.1 Results of Cross Sectional Regressions

We now consider the outcome of the cross sectional regressions. The results of the regressions using the first three equations are shown in Table 6.3. Average regression coefficients and their t statistics are reported individually for 1977, 1978, 1979 and the first 44 weeks of 1980. The average regression coefficients for the full test period and the associated t statistics are also reported.

TABLE 6.3

CROSS SECTIONAL REGRESSION RESULTS

		Regression Equation One	Regression Equation Two	Regression Equation Three	
		INDEPENDENT REGRESSION VARIABLE			
Regression Interval		Beta [$\hat{\beta}^w$]	Beta [$\hat{\beta}^w$]	Dividend Yield[D]	Dividend Yield[D]
1977	Average Regression Coefficient	,00260	,00450	,17217	,15742
	t Statistic	,27412	,49903	1,09302	,94983
1978	Average Regression Coefficient	-,01216	-,01262	,03054	-,06803
	t Statistic	-1,04860	-1,03566	,20877	-,47319
1979	Average Regression Coefficient	,01438	,0109	,52205	,58892
	t Statistic	,97609	,70169	1,73518	2,18384*
44 weeks of 1980	Average Regression Coefficient	-,01036	-,00408	,20960	,23010
	t Statistic	-,41383	-,17744	,87170	,75417
Full test period	Average Regression Coefficient	-,00102	-,00037	,23545	,23106
	t Statistic	-,12852	-,04774	2,10492*	2,11167*

*Statistically significant at the 5% confidence level.

As discussed the regression using regression equation one is based on the ex post version of the CAPM and is a limited test of that model. Therefore, should the original fair game assumption hold, the regression coefficients of beta should on average represent the 'price' of risk being the difference between the market return and the return on the risk free asset ($R_m - R_f$). Further, in terms of the CAPM one would expect this term to be positive, implying a positive risk return trade off. Turning to the results of this regression we note negative coefficients for beta during the second and fourth subperiods and for the entire test period. The obvious explanation that the CAPM prices assets on the basis of expected returns and that the model tolerates discrepancies between expected and realized values does not seem adequate when one notes the extended period of the negative risk return trade off. In this situation one would expect riskier assets to be bid down so that the risk return equilibrium is restored. It should be noted, however, that the average regression coefficient of beta for the full test period is only just negative and in terms of the t-test result, is insignificantly different from zero. The actual premium offered for bearing risk may therefore be zero or marginally positive, but in any event it is not likely to be significant on a statistical basis.

Turning to the results arising from the use of regression equation two the position in regard to beta is similar to that noted in regression one. Again none of the t statistics for the subperiods or for the entire test period are statistically significant at the 5% confidence level.

It is interesting to compare the beta regression coefficients arising from the use of regression equation one and regression equation two. Except in the second subperiod these vary materially between the two sets of results. Despite this the broad pattern between the two is preserved in that none of the beta regression coefficients is significant and the magnitude of the coefficients and their sign is the same throughout. This implies that little distortion of the regression coefficients for beta arises through the introduction of a dividend yield term.

Therefore, the limited test of the CAPM has shown that the postulated positive risk return trade off is not in evidence. One should remember, however, that the beta estimates used in this study were derived from weekly data which renders them open to bias from the 'intervalling effect'. The validity of these regression coefficients is therefore not assured.

The coefficients and the resultant t statistics derived for the dividend yield terms arising from the use of regression equations two and three are generally of the same magnitude. The regression coefficients for the full test period are in both cases statistically significant at the 5% level of confidence as is the coefficient for the third subperiod where regression equation three was used.

The generally positive regression coefficients show a positive association between dividend yield and return which indicates an aversion for dividends. By observing equation 6.4 it may readily be observed why

positive regression coefficients for the dividend yield term imply a distaste for dividends. A positive value for Y_{2t} means that with other terms held constant the higher the dividend yield on a portfolio the higher the required rate of return. This implies that investors require a higher overall return on the securities of dividend paying firms to compensate for the form of return.

The noted negative dividend preference may not be conclusive in view of the non significant t-test results for three of the four sub-periods.

In any event the possible distortion of beta estimates arising through the 'intervalling effect' may be expected to disturb the regression coefficients of the dividend yield terms. Accordingly the results of this test may best be evaluated in conjunction with results of subsequent tests in which the 'intervalling effect' has been controlled for.

As discussed the preceding test was repeated using two sets of new beta estimates. In both cases monthly data were used to obtain these estimates. One set was derived using the RDM index while the other used the internal index. Use of monthly data for calculation of beta estimates minimizes the 'intervalling effect' while use of the internal index should prevent any distortion in the regression coefficients arising from incomplete sampling. The average regression coefficients

and the t statistics arising from the regressions using these amended beta estimates are reported in Table 6.4 on the same basis as in the previous test.

Comparing the values of the average regression coefficients of the beta estimates derived using monthly data as opposed to weekly data (Table 6.3 regression equation one (weekly data) and Table 6.4 regression equation five (monthly data), both using RDM index) one notes that the average regression coefficients are in all cases higher where monthly data has been used. Further the average regression coefficient over the full test period now becomes positive although it is statistically significant only at the 25% confidence level. The average regression coefficients are, however, still negative for two of the subperiods. As noted in the discussion on the previous cross sectional regression study a temporarily realized negative return for bearing risk does not necessarily lead to a rejection of the CAPM. Therefore at the 25% confidence level a positive risk return trade off as required by the CAPM is established for two of the individually reported test periods and for the full test period. The comparison of the results achieved using the different estimation intervals indicates that the beta estimates used in the first study were likely to have been biased to some extent by the 'intervalling effect'.

TABLE 6.4

CROSS SECTIONAL REGRESSION RESULTS

		Regression Equation Four	Regression Equation Five	Regression Equation Six	Regression Equation Seven		
		INDEPENDENT REGRESSION VARIABLE					
Regression Interval		Beta [$\hat{\beta}^m$]	Dividend Yield [\hat{D}]	Beta [$\hat{\beta}^{mi}$]	Dividend Yield [\hat{D}]	Beta [$\hat{\beta}^{mi}$]	
1977	Average Regression Coefficient	,00901	,15642	,00904	,00965	,14927	,01062
	T Statistic	,78631	,93907	,79199	,86037	,84628	,98279
1978	Average Regression Coefficient	-,01088	-,02545	-,01113	-,00609	-,03560	-,00659
	T Statistic	-,78521	-,18573	-,89937	-,48372	-,12418	-,52913
1979	Average Regression Coefficient	,00744	,71432	,04492	,01043	,64936	,00541
	T Statistic	,60271	2,86343*	,97478	,56719	2,32779*	,29148
44 weeks of 1980	Average Regression Coefficient	,00364	,22615	-,00309	,00105	,24162	-,00426
	T Statistic	,19031	,71030	-,16739	,07580	,79413	-,30745
Full test period	Average Regression Coefficient	,00225	,26953	,01045	,00387	,25159	,00152
	T Statistic	,32891	2,51601*	,80534	,55660	2,28228*	,21934

The average regression coefficient for beta arising from the use of regression equation seven (beta estimates derived using the internal index), reveals a marginally positive statistically non significant risk return trade off over the complete test interval. As already discussed these beta estimates result from the regression of portfolio returns against the return on the entire 107 firm sample. To the extent that the return on this sample is not representative of the market return, the beta estimates would not be true. This is a probable cause of the low average regression coefficient of the beta term.

Turning to regressions four and six where a dividend yield term has been added we note statistically non significant positive average values for the coefficients of the beta term over the full test period. We also note that the broad pattern of these regression coefficients between the two equations is similar in that for each of the separately reported test intervals the signs of the coefficients are the same and none are statistically significant.

The introduction of a dividend yield term has resulted in three of the four subsidiary intervals exhibiting positive regression coefficients for the beta term as opposed to only two where no dividend yield term was included. The remaining subsidiary interval exhibited negative regression coefficients for all variables in all four of the equations whose results are reported in Table 6.4. For this reason the results for this interval are of doubtful validity.

On the basis of the results achieved using regression equation five (Table 6.4) where beta estimates have been made using monthly data and the RDM index it may be said that in two subsidiary intervals and over the full test period a positive risk return trade off as required by the CAPM was noted. Over the full test period this relationship was statistically significant only at the 25% confidence level. Unfortunately this significance did not extend to the results achieved using regression equation four where the dividend yield term was included. The low confidence level and the existence of an observed negative coefficient for beta has been observed both on American equity markets by Schallheim and De Magistris and on the Paris Stock Exchange by Hawawini et al (9).

The explanations offered by Hawawini et al have been discussed. Briefly they argue that, with the Paris Stock Exchange dominated by institutions, changes in underlying fundamentals are not always reflected in security prices and further that low trading volumes do not permit institutional flexibility. This situation is very similar to that prevalent on the Johannesburg Stock Exchange. Secondly they note that the stock exchange is but one investment alternative and that a true test of the CAPM would require a broader spectrum of investment options. In view of this and the generally positive risk return trade off noted in the results reported in Table 6.4 we may conclude that the pricing of shares on the Johannesburg Stock Exchange is not inconsistent with the CAPM.

Finally it may be concluded that although the variety of methods used to estimate the beta variables for the regressions did not always

result in statistically significant positive regression coefficients, our null hypothesis of there being a positive risk return trade off is accepted.

The use of beta estimates based on monthly rather than weekly data has affected the period by period regression coefficients of the dividend yield term, but over the entire test period the regression coefficients achieved have remained statistically significant at the 5% level of confidence. Any bias introduced into the beta estimates by the 'intervalling effect' has therefore not fundamentally affected the regression coefficients of the dividend yield term.

The estimation of beta coefficients using the internal index rather than the RDM index has also not materially affected the regression results for the dividend yield term.

The overall significance of the dividend yield term resulting from the use of regression equations four and six is largely a result of the high value of the coefficient for 1979. During 1979 share prices on the Johannesburg Stock Exchange increased dramatically with the RDM index rising from 275 to 448, an increase of 63%. With the realized portfolio returns for 1979 being regressed against the parameters for the preceding year it is possible that the dividend yield term served as a proxy for the strong market growth during that year. Accordingly it is the writers opinion that any true dividend aversion may not be as significant as implied by the subperiod three results.

The regression coefficients of the dividend yield term during the other sub-periods indicate a positive association between dividend yield and return in two out of three cases as well as over the average of these three subperiods (reported in Table 6.5). This relationship is only significant at the 20% level of confidence indicating a weakly established distaste for dividends.

One would expect the coefficients of the dividend yield term to be fairly constant over time thus indicating a consistent effect of dividend yield on return. This was not observed.

The dividend yield variables actually used in the regressions are, however, measurements taken at a particular point in time and therefore are estimates of the actual dividend yield for any particular year. The actual dividend yield varies both with fluctuations in security prices and as dividends are declared in respect of securities and as those securities subsequently go ex-dividend. This may cause the noted variability in the regression coefficients of the dividend yield term.

Finally it may be said that the regression results for the dividend yield term probably imply, for reasons already documented, a stronger positive association between dividend yield and before tax return than is actually the case. Nevertheless a statistically significant association was observed.

TABLE 6.5

AVERAGE REGRESSION COEFFICIENTS FOR THE DIVIDEND YIELD TERMS

OVER THE PERIOD JANUARY 1977 TO NOVEMBER 1980 WITH 1979 EXCLUDED

	Table 6.4 Regression Equation Four	Table 6.4 Regression Equation Six
	INDEPENDENT REGRESSION VARIABLE	
	Dividend Yield	Dividend Yield
Average Regression Coefficient	,11325	,11177
T Statistic	,96336	,97175

Our null hypothesis of there being no influence of dividend yield on security returns is therefore rejected.

6.6.2 Comparison of Results Achieved Using the Two Methods

At this stage a comparison of the results achieved using the API technique with those arising from the cross sectional regression equations would be informative. The API technique revealed a superior performance of the low payout group where the allocation to dividend groups was undertaken on the basis of payout ratios. This result was discounted for a number of reasons including the disappearance of the noted effect where the test was repeated with the allocation to dividend groups undertaken on the basis of dividend yield. Thus an overall conclusion of no dividend effect was recorded.

The results of the cross sectional regression equations revealed a negative dividend preference. In view of the conceptual limitations attaching to the use of the API technique in a valuation context, greater significance must be accorded to the results of the cross sectional regression study and a probable overall conclusion of a positive association between dividend yield and before tax return is noted.

This result does not necessarily imply that given perfect capital markets the dividend policy of a firm will affect its value as the noted effect may result from taxes or other market imperfections, which in aggregate would induce investors to favour certain payout ratios. Should the noted dividend aversion be genuine it implies either a complete denial of the CAPM or that market imperfections are of such significance that disadvantaged securities are obliged to offer higher returns to compensate for these imperfections. In either case an amendment to the pre tax form of the CAPM is required. The reader is referred back to Chapter Three where alterations to the CAPM were proposed by Brennan in recognition of the difference in effective tax rates applicable to dividends and capital gains.

6.6.3 Clientele Effects

It is, however, possible that these market imperfections may bias individual shareholder's investment decisions in favour of certain payout ratios to a greater extent than implied by the results of the cross sectional regression tests.

The reason for this is that investors are likely to alter their investment decisions, in a manner consistent with a clientele effect, so as to minimise their costs arising from market imperfections. For example investors experiencing a high marginal rate of taxation would be expected to hold securities offering a low dividend yield.

Nevertheless a negative dividend preference was observed which, being more likely to have arisen from market imperfections than from a dividend aversion in a perfect capital markets situation, signifies investors inability or unwillingness to remove market imperfections by amending their investment policies.

It is, however, possible that a negative dividend preference such as that noted in this study is not inconsistent with a clientele effect. Should the clientele effect in fact apply in relation to different capital gains and income tax rates, investors operating under a dividend yield constraint would tend to accumulate shares at varying points on the payout spectrum depending on their tax status. Black and Scholes argue that the introduction of such a constraint in portfolio construction may divert effort from attaining adequate investment diversification and accordingly, in the absence of sophisticated estimation techniques, may result in excessive risk levels in investor portfolios (10).

Should the observed dividend aversion arise from market imperfections rather than from an aversion in a perfect capital markets situation then its existence may be justified despite the clientele effect. The reason for this is that the potential reduction in taxes possible through investment decisions being influenced by firms' dividend yields may be insufficient to offset the resultant cost of imperfect portfolio diversification.

This conclusion as to the logical co-existence of a dividend and clientele effect presumes that no other opportunities exist for the neutralization of any tax differential. Miller and Scholes in the context of American tax laws, observe the possibility of minimizing or reducing tax on dividends through a combination of borrowing and personal insurance (11). Although the range of opportunities and the extent of the relief available in South Africa is more limited, the neutralization of the tax on a limited amount of dividend income is possible. Briefly, through a combination of personal borrowing and membership of pension and retirement annuity funds shareholders are able to generate sufficient tax deductions to avoid the liability for tax on a reasonable amount of dividends. Effectively dividend income is set off against these payments on which the tax deduction in the case of pension funds is limited to the greater of R1750 or 7½% of the remuneration derived from retirement funding employment (12). The permitted deduction in respect of contributions to retirement annuity funds is the greatest of:

- (i) 15% of income received from non retirement funding employment or
- (ii) R1 750 or
- (iii) R3 500 less the amount claimed in respect of contributions to pension funds.

Subject to certain limitations the ultimate lump sum payments from these funds are tax free. Through this medium natural persons are in a position to neutralise the taxation attaching to dividend income. For this reason qualifying investors may ignore the dividend policy of a prospective investee. The noted dividend aversion, to the extent that it derives from a taxation effect, does therefore not appear to have a logical basis as in the hands of companies dividends are tax exempt while dividend receipts by natural persons may be neutralised through the medium described above. There is no difference in the effective rates of taxation of capital gains and dividends in the hands of long term insurers.

The investigation into the effects of dividend yield on stock prices by Black and Scholes on American Stock markets provides evidence in support of the clientele effect (13). In their study the coefficients for the dividend term in the pricing equation were estimated over the period 1936 to 1966 and for a number of subperiods. In each case this coefficient was found to be positive and insignificantly different from zero. One of the subperiods covered the period 1940 to 1945, during which time the rates of tax were markedly increased to finance war expenditure. This increase in the tax rates would imply a lower net return from high payout shares and a higher dividend coefficient in that study. However, this was not observed indicating that investors holding shares whose dividends were subject to the increased tax, had a nil or very low effective tax rate on such dividends. This result is consistent with a clientele effect.

A further study of interest in this regard was a test by Litzenberger and Ramaswamy who measured the effective excess marginal rate of taxation on dividends over that levied on capital gains (14). This study is reported in Chapter Four. Noting that the actual rates of taxation on dividends and capital gains differ under American tax law, their study by implication tests the success of investors' attempts to neutralise those taxes. Results of this test and an associated test of a clientele effect revealed evidence consistent with a clientele effect but also evidence of a fairly strong negative dividend preference arising from the tax differential on dividend income and capital gains. Miller and Scholes criticised the procedures used to control for the information content of dividends and noted no dividend effect on reperforming the test with suitably amended data (15).

It may therefore be said that the results of tests on American equity markets indicate the existence of clientele effects. The overall empirical result in this study of there being a positive association between dividend yield and return thus implying a distaste for dividends is not necessarily inconsistent with the normative position set out in Chapter Three, especially in view of the possibility of numerous relatively affluent individual investors whose dividend income exceeds the allowable pension and retirement annuity deductions and who therefore would have a genuine dividend aversion.

Furthermore, in view of there being no strong market wide negative dividend preference for three of the four individually reported periods and considering the payout preferences of investors, which must exist

because of their tax profiles, the results of this study are consistent with the existence of a clientele effect and other factors used for neutralising the taxation on dividends.

6.6.4 The Information Content of Dividends

A frequent criticism of previous tests where generous dividend payments have been held to positively affect the value of a firm has been that the large distribution of earnings does not of itself affect the value of a firm, but rather that these large payments are indicative of management's expectations of sound prospects for the firm. In this case, where the relationship between dividends and before tax return is positive thus implying a distaste for dividends, it may be said that over the test period no price sensitive information is conveyed by dividend payments. This is generally consistent with the findings of Watts on American equity markets reported in Chapter Four (16) and of the findings of Knight and Affleck-Graves on the Johannesburg Stock Exchange (17).

6.7. POSSIBLE BIASING INFLUENCES

6.7.1 The Interrelationship of Investment and Dividend Decisions

A further point of concern is the effect of changes in the amount of investment on the level of dividend distribution. Any such effect noted does not violate the Miller and Modigliani requirement for the value of a firm to be invariant with respect to dividend changes, namely that the investment decision be independent of the dividend decision. The point is that should dividend distributions mirror the results of independently determined investment changes it is difficult to decide whether the

aversion noted in the cross sectional regression tests results from a negative dividend preference or from investment changes which are negatively correlated with the dividend payout.

Classification as a high or low payout or yield share for use in the API technique may respectively be the result of abandoning or taking up large investment projects. Similarly the dividend yields of the portfolios used in the cross sectional regressions may also have been affected by dramatic changes in the investments of the underlying firms. In the latter case, the negative effects of such changes may not be as marked since the dividend yield of each share comprises approximately 10% of the dividend yield of a portfolio. Furthermore, should significant changes in the level of investments affect the payout ratio, the possibility of the offsetting of the investment changes of the firms in a portfolio would exert a stabilising influence on the dividend yield of that portfolio.

Nevertheless the possibility of an association between investment and dividend changes may give the impression of a dividend effect where in fact there is none.

The solution to this problem may well be found in the discussion on the dividend setting process reported above. In this discussion, on the basis of a number of interviews, Lintner reported that the maintenance of an established dividend policy generally took precedence over a satisfactory liquidity position and current feasible investment projects (18). This being so no distortion of the test results would be

expected. However, the results of Lintner's interviews are specific to American equity markets and the firms were selected for analysis according to specific characteristics rather than on a random basis. Accordingly Lintner's investigation does not allow firm conclusions to be drawn.

The dividend history of the firms used in the cross sectional regression investigations were reviewed for the period 1973 to 1980. The prevailing pattern was that of a steadily increasing trend in per share dividends with a number of firms displaying periods of static dividends. The few noted cases of reduction in the dividend occurred mostly in tandem with large earnings reversals, but these were few. Furthermore, the period 1978 to 1980 was a period of vigorous growth where many profitable investment opportunities would have arisen, yet strong dividend increases were noted.

The relatively less prosperous interval from 1975 to 1977, while producing less marked dividend increases, showed equally few reductions other than those associated with a large decline in earnings. This provides evidence in a South Africa context of the insensitivity of dividend payments to investment changes. A further useful example is that of SAPPI LTD who, despite originally budgeted capital expenditure in excess of R800 million over the period 1982 to 1985, has seen fit to maintain its dividend. It may therefore be said that, in view of the apparent limited effect of investment financing requirements on the level of dividend payments, empirical results showing a dividend effect are unlikely to be attributable to investment changes.

This conclusion is strengthened by the parallel observations of Lintner in the American situation.

The possible interpretative difficulties which would arise if the dividend decision were influenced by investment considerations is part of a broader problem concerning the causality between observed effects and identified variables. The results of cross sectional regression studies are open to attack on the grounds that the independent variable is not a determinant of the dependent variable but merely that it is correlated with a true determinant. In this study the two most significant factors critical to the valuation process and related to the payout policy are risk and the effect of changes in investment. Other than these, which have been discussed and controlled for, no further significant potential biasing factors are known to the writer.

Recent work on arbitrage pricing theory (APT), originally introduced by Ross, however, indicates the possibility of a range of factors critical to the valuation of firms' securities (19). APT may be seen as an alternative to the CAPM as a model of capital market equilibrium.

APT is based on the premise that a zero return should be earned on an 'arbitrage portfolio' exhibiting zero systematic risk and requiring no new investment. This combined with certain basic assumptions concerning investor wealth preferences, capital market efficiency and an assumption concerning the stochastic process generating asset returns yields the following pricing equation:

$$E_i = \lambda_0 + \lambda_1 b_{i1} + \lambda_2 b_{i2} + \dots + \lambda_k b_{ik}$$

Where: E_i = The expected return on asset i ,
 λ_0 = The expected return on an asset with no systematic risk,
 $\lambda_1 \dots \lambda_k$ = Factors influencing the returns on assets, which are
common to all assets under consideration,
 $b_{i1} \dots b_{ik}$ = Terms representing the sensitivity of asset returns to
factors influencing those returns.

The return on assets is therefore seen as being dependent on a variety of factors rather than only the difference between the expected return on the market portfolio and the return on the risk free asset as proposed by the CAPM.

APT does not, however, identify the factors influencing security returns and the b coefficients are therefore estimated using factor analysis. Tests of this nature conducted by Roll and Ross claim either three or four such unidentified factors (20). It is therefore possible that these factors may be correlated with the dividend payout and to the extent that they are unaccounted for through the beta term may be reflected in the regression coefficients for the dividend yield variable. This is not considered to significantly detract from the value of the conclusion of the tests conducted by the writer.

The situation where alterations in the level of investment are made to accommodate predetermined dividend plans deserves attention. The interviews conducted by John Lintner documented in Chapter Four, indicated that where external financing was limited or unavailable financial managers would generally curtail or reschedule available

investment alternatives rather than reduce the existing dividend (21). A dividend influence on investment planning may therefore be expected.

The Miller and Modigliani argument of the irrelevance of dividend policy in the determination of the value of a firm is based on the premise that investment decisions are unaffected by the dividend decision. Should such a systematic effect occur the association between dividend and investment policy may be expected to bias the test results. The reason for this is that, a change in dividend payout being a zero net present value transaction in a perfect capital market, inhibits or encourages investment decisions which have a non zero net present value.

Empirical tests of this effect have been carried out on American Stock Exchange data by Fama (22). The approach followed involved solving pairs of simultaneous cross sectional regression equations with each of the two dependent variables, the change in dividend and the change in investment, serving as explanatory variables in the other equation of the pair.

By examining the t statistics of the regression coefficients and various measures of the dispersion of the resultant prediction errors, being the difference between the actual dividend or investment change and that predicted by the cross sectional regression, Fama concluded that dividend and investment decisions appear to be independent.

Fama's findings contradict the results of Lintner's interviews unless the capital requirements of the firms in Fama's sample had been met and no trade off between dividends and investment options had arisen.

While the writer is unaware of any similar tests conducted on South African data there is no reason to assume that results of local tests would not reaffirm Fama's conclusion, particularly in view of abundant local investment capital.

The possible impact of investment decisions on the dividend payout discussed above may result in uncertainty as to whether a noted price reaction is due to the investment or dividend change. This is essentially a procedural difficulty and does not affect the validity of the test. Any noted significant impact of dividend decisions on investment decisions would, however, be expected to bias the test results for reasons noted above. This would introduce significant empirical difficulties and would remove the discussion further from the structure of the Miller and Modigliani argument (23).

Thus in conclusion it may be said that in the absence of tests on South Africa data the impact of dividend decisions on investment decisions may be a possible, though unlikely, cause of distortion of the test results.

6.7.2 Share Prices and Returns

The construction of cross sectional regression studies of the kind reported in this thesis results in the testing of the effects of firms' betas and other characteristics on the returns on their securities. A conclusion is then drawn from the results of the test as to whether the factors represented by the independent variables are determinants of the value of a firm. This conclusion does not necessarily follow from the

test as a factor may be a determinant of the value of a firm, yet the results of a cross sectional regression study may indicate no relationship between the two. In the case of the dividend yield variable let us suppose that dividend payout positively influences the value of a firm and that each level of dividend distribution is associated with a particular value of a firm. During a period in which no change in the payout policy is experienced the return on a share would be influenced only by non dividend factors and accordingly there would be no difference in return between otherwise identical high and low payout shares.

Furthermore the seven year period over which the cross sectional regression study was performed is unlikely to contain many changes in firms' payout policies because these are of a generally permanent nature having resulted from a formalization of previous ad hoc decisions.

The situation envisaged is, however, likely to be of a temporary nature as the continual re-investment of earnings by a low payout firm will increase the returns on that share and a difference in return on the shares of high and low payout firms will ultimately result in periods where no change in dividend policy occurs. Therefore this point is unlikely to create a significant distortion of test results.

6.7.3 Payout Ratios and Dividend Yields

The topic of the thesis is whether dividend policy, being the proportion of earnings distributed as measured by the payout ratio, affects the value of a firm. In the above cross sectional regressions dividend yield

has been used as a surrogate for the payout ratio. It is possible, though unlikely, that the price of a share may be substantially affected by any positive or negative dividend preference. Accordingly high and low dividend yields may not necessarily represent respectively high and low payout ratios. To test for this possibility a chi-squared test was employed. The data for the test comprised the same 231 dividend and earnings announcements used in the second API test in Chapter Five. The null and alternative hypotheses are stated as follows:

H_0 : The payout ratios and dividend yields are independent.

H_1 : The payout ratios and dividend yields are not independent.

The following contingency table was drawn up, with the expected frequencies shown in brackets in each cell:

		Dividend Yield			Row Totals
		0 - 6.9%	7.0% - 9.9%	10.0% +	
Payout Ratio	0-.3	9 (6)	6 (9)	6 (6)	21
	.31-.4	21 (18)	24 (25)	18 (20)	63
	.41-.5	19 (22)	36 (30)	21 (24)	76
	.51-.6	15 (12)	16 (17)	12 (14)	43
	.61 +	2 (8)	10 (11)	16 (9)	28
Column Totals		66	92	73	231

The test statistic, D^2 , is calculated as shown below. The terms O_i and E_i represent the observed and expected frequencies for each cell and n is the total number of observations used.

$$D^2 = \sum_{i=1}^n \frac{O_i^2}{E_i} - n$$

$$D^2 = 247.354 - 231$$

$$D^2 = 16.354$$

The chi-squared statistic at the 5% significance level with 8 degrees of freedom is:

$$\chi_8^2(0.05) = 15.507$$

As D^2 exceeds 15.507 we may reject our null hypothesis at the 5% confidence level and conclude that payout ratio and dividend yield are not independent.

Having established the co-movement of the dividend yield and payout ratio the direction of the association is of interest. The table below shows on a cumulative basis the percentage of observations in each cell of each column in the preceding contingency table:

		Dividend Yield (%)		
		0 - 6.9	7.0 - 9.9	10.0 +
Payout Ratio	0-.3	14	7	8
	.31-.4	45	33	33
	.41-.5	74	72	62
	.51-.6	97	89	78
	.61 +	100	100	100

By noting the generally decreasing percentages when moving from left to right across the table it becomes evident that high payout ratios are associated with high dividend yields and vice versa.

In view of the above it is the writer's opinion that it is acceptable to use dividend yield as a proxy for payout ratio in this study.

6.8 DISCUSSION ON CURRENT DIVIDEND PRACTICE

In view of the generally accepted irrelevance of dividends under conditions approximating perfect capital markets in the normative determination of the value of a firm, and the negative dividend preference noted during the tests carried out by the writer, the reasons for continued dividend payments by the vast majority of companies seem unclear. The arguments and tests already documented have assumed that the objective of financial management is the maximization of the value of the firm. It is possible that other factors prompt the distribution of earnings despite any negative impact on the value of a firm.

Possible reasons for continuing payments may include management's perception of a dividend preference on the part of shareholders. In view of there being little logical basis for an actual dividend preference, systematic irrationality on the part of shareholders appears unlikely. Further, incorrect management perception of such a preference over an extended period seems improbable.

Financial managers may feel that the investment community would interpret a reduction in dividends as a sign of poor prospects for the company, despite announcements detailing the true reason for the reduction. Any initial negative price reaction would, however, be expected to reverse once the true reason for the reduction in the dividend had been accepted by the investment community.

Prior to the abolition of South African exchange control restrictions on non residents, liberal dividend policies of foreign owned South African companies enabled a substantial repatriation of earnings. Whilst this is a possible cause of large distributions by foreign owned firms, no reason for similar dividend policies by South African firms is implied.

The tests undertaken by the writer were conducted on data of shares traded on the Johannesburg Stock Exchange. These firms, classified as public companies for tax purposes, usually constitute the ultimate holding company for numerous subsidiaries. To avoid liability for a tax on undistributed profits, companies at each level in the group may be pressurized into paying dividends to their holding companies. This would result in an accumulation of profit in the ultimate holding company who in turn would be forced to distribute group earnings. This would, however, only occur where the amount of dividends from subsidiary companies and other receipts not subject to income tax exceed the permissible deductions. The most significant of the allowable items are a deduction of the amount expended on plant and machinery for use in a production process, and in respect of companies classified as public for tax purposes, an allowance of 50% of the amount of the before tax total

trading surplus attributable to dividends received. This construction of the tax law would permit companies with particularly large qualifying capital expenditure to avoid tax on undistributed profits and thereby eliminate this stimulus for dividend payments. It seems, however, that companies undergoing significant expansion which through the available capital allowances, presumably renders them temporarily exempt from undistributed profits tax, generally continue to pay dividends in accordance with their established policy. It therefore appears that undistributed profits tax is unlikely to be a significant motivation for the payment of dividends.

A further possible cause of consistent dividend distributions is surplus cash resources coupled with a lack of suitable investment options. Should this be the case the return on the shares of a firm is increased by regular dividend payments where shareholders are faced with more profitable investment options than those available to the company. This position is, however, unlikely to occur over an extended period. The increase in value results from the elimination of unprofitable investments rather than from the distribution of surplus cash resources. It may be argued that companies, being aware of their long term cash requirements for expansion needs, set a dividend policy which reflects their anticipated surplus cash flow. Regular simultaneous dividend payments and rights issues are, however, inconsistent with this view. Furthermore, while not all firms are likely to have cash resources in excess of expected investment requirements, the writer is unaware of any firms listed on the Johannesburg Stock Exchange which forego dividend payments to provide required investment capital.

In view of the above discussion and the negative dividend preference noted during the cross sectional regression tests the writer is unable to offer an explanation for the current widespread practice by most listed companies of relatively generous dividend payments. Consequently it is possible that some factor undetected by the writer prompts these payments.

6.9. CONCLUSION

This chapter has presented a cross sectional regression study into the effects of dividend policy on the value of a firm. It has further analyzed the results and has offered a reconciliation to the existing normative position suitably modified to meet the existing tax structure.

The resultant negative dividend preference does not reconcile with the payout policies of the vast majority of firms listed on the Johannesburg Stock Exchange. The writer investigated further possible reasons for widespread liberal dividend payments, but could find none which may suggest such a practice. In view of this it was concluded that some factor undetected by the writer may influence such payments.

FOOTNOTES TO CHAPTER SIX

- (1) Fama, E., Macbeth, J., 'Risk, Return and Equilibrium: Empirical Tests', Journal of Political Economy. May - June 1973. pp 607 -36.
- (2) Roll, R., 'A Critique of the Asset Pricing Theory's Tests, Part I: On Past and Potential Testability of the Theory', Journal of Financial Economics. March 1977. pp 129 - 176.
- (3) Hawawini, G.A., Michel, P.A., Viallet, C.J., 'An Assessment of the Risk and Return of French Common Stocks', Journal of Business Finance and Accounting. 1983. pp 333 - 350.
- (4) See Fama and MacBeth. 1973.
- (5) Markowitz, H.M., Portfolio Selection: Efficient Diversification of Investment, Yale University Press, New Haven, 1959.
- (6) Blume, M.E., 'Portfolio Theory: A Step Toward its Practical Application', Journal of Business. April 1970. pp 152 -173.
- (7) Biomedical Computer Programs, P-series, University of California.
- (8) See Hawawini et al. 1983.
- (9) Schallheim, J., De Magistris, R., 'New Estimates of the Market Parameters', Financial Management, 1980, Vol 9 No.2, pp 63.

Hawawini, G.A, Michel, P.A., Viallet, C.J., 'An Assessment of the Risk and Return of French Common Stocks', Journal of Business Finance and Accounting. 1983. pp 343.
- (10) Black, F., Scholes, M., 'The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns', Journal of Financial Economics. May 1974. pp 18.
- (11) Miller, M., Scholes, M., 'Dividends and Taxes', Journal of Financial Economics. December 1978. pp 333 -364.
- (12) The concept of retirement funding employment is to allow the determination of an equitable value for ones remuneration for the purpose of calculating deductions from taxable income for contributions made to pension and retirement annuity funds. It is formally defined in the Income Tax Act No. 58 of 1962 and may be casually defined as income and other benefits received from employment or the holding of an office in respect of which contributions are made to a pension or provident fund.
- (13) Black, F., Scholes, M., op cit.
- (14) Litzenberger, R., Ramaswamy, K., 'The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence', Journal of Financial Economics. June 1979. pp 163 - 196.

- (15) Miller, M., Scholes, M., 'Dividends and Taxes: Some Empirical Evidence', forthcoming The Journal of Political Economy - As reported by Copeland, T., E., Weston, J., F., Financial Theory and Corporate Policy, Second Edition. Los Angeles: Addison Wesley, 1982. pp 517.
- (16) Watts, R., 'The Information Content of Dividends', Journal of Business. April 1973. pp 193.
- (17) Knight, R.F., Affleck-Graves, J.F., 'The Information Content of Dividends incremental to the information content of earnings: The South African Experience', Unpublished Research Paper, University of Cape Town. January 1984.
- (18) Lintner, J., 'Distribution of Incomes of Corporations Among Dividends, Retained Earnings and Taxes', American Economic Review. May 1956. pp 105.
- (19) Ross, S.A., 'The Arbitrage Theory of Capital Asset Pricing', Journal of Economic Theory. December 1976. pp 343 - 362.
- (20) Roll, R., Ross, S.A., 'An Empirical Investigation of the Arbitrage Pricing Theory', Unpublished Manuscript Graduate School of Management, UCLA. 1979. - As reported in Reinganum, M.R., 'Arbitrage Pricing Theory: Some Empirical Results', Journal of Finance. May 1981. pp 313 - 321.
- (21) Lintner, J., op cit.
- (22) Fama, E., 'The Empirical Relationship Between the Dividend and Investment Decisions of Firms', American Economic Review. June 1974. pp 304 - 318.
- (23) Miller, M., Modigliani, F., 'Dividend Policy, Growth and the Valuation of Shares', Journal of Business. October 1961. pp 411 - 433.

CHAPTER SEVEN

CONCLUSIONS

This thesis has considered and reviewed previous published arguments and empirical work as well as documenting tests conducted by the writer as to the effects of dividend policy on the value of a firm.

The review of published theoretical arguments led to a conclusion that under conditions approximating perfect capital markets, the dividend policy of a firm is not likely to affect its value. Due to the diversity of market imperfections it is unclear to observers what the aggregate effect of such factors on security returns would be. However, in view of the difference in the rates of tax applicable to dividend income and capital gains one might suspect an overall preference for firms distributing a low proportion of their earnings.

Previous empirical studies, which have been almost exclusively American, have yielded conflicting results. However, the most rigorous of these have concluded that the dividend yield of a firm does not influence the pre-tax return realised on its securities, notwithstanding market imperfections.

An exploratory investigation by the writer indicated results consistent with these overseas analyses. The results of this test, however, yielded to the outcome of a more thorough investigation by the writer on Johannesburg Stock Exchange data which indicated a positive association between before tax return and dividend yield, which implies an overall negative dividend preference.

This test result does not permit a conclusion as to whether the noted effect arises from a dividend aversion in a perfect capital markets situation or whether it arises from market imperfections. It is submitted that the negative dividend preference is likely to have resulted from the costs accruing to investors from capital market imperfections. The reason for this is that in terms of Miller and Modiglianis' now generally accepted dividend irrelevance argument, there appears to be no logical basis for the dividend policy of a firm to influence its value under conditions of perfect capital markets. As discussed in Chapter Six the existing South African taxation structure, however, provides a plausible reason for certain investors to prefer returns on securities in the form of capital gains rather than dividends. For this reason the remaining interpretation of the test results will assume that the noted dividend aversion arose from capital market imperfections.

The implication of these findings is that investors are either unable or unwilling to reduce the taxation attracted by their dividend receipts either by altering their investment decisions so as to give rise to a clientele effect or by other means. The reason for this lack of evasive action may be that the avenues for the generation of tax deductions from

dividend income, which are normally pension and retirement annuity contributions and interest payments on borrowings used to finance the purchase of securities, are considerably more limited under South African tax legislation than under the corresponding American laws. A further reason for this may be the relative shortage of scrip and low payout shares on the Johannesburg Stock Exchange which may prevent investors acquiring their desired holdings to effect optimal portfolio construction.

A further implication of the results is that, with other factors held constant, tax exempt investors, investors paying similar rates of tax on dividend income and capital gains and investors paying a higher rate of tax on capital gains than on dividend income stand to gain by biasing their portfolios toward more generous payout shares. The amount of the prospective gain would need to be carefully evaluated against the possible reduction in portfolio diversification. Furthermore, because high payout shares appear to offer higher pre-tax returns to compensate for the heavier tax, investors paying a higher rate of tax on dividend income than on capital gains may on average ignore dividend yield in making investment decisions. The precision of the statistical techniques employed does not permit the determination of the average discount at which the shares of high payout firms sell. In view of this and the probable negligible profits to be obtained, no conclusions are reached regarding the comparison of individual investor's marginal rates of tax with this discount factor with a view to identifying profitable trading opportunities.

In favouring certain payout ratios regard must, however, be had to the impact of other market imperfections, such as transaction costs, on portfolio returns.

It was further observed that the overall negative dividend preference does not reconcile with the current general practice of regular generous dividend payments by the vast majority of companies. Despite a review of other factors which may stimulate these payments, none could be found which would explain this behaviour. In the absence of some factor unidentified by the writer it may therefore be said that firms may reduce their dividend payout to provide required funding for investment projects without it prejudicing the value of the firm. It also implies that on average, firms may increase their value by paying lower dividends and as a result reducing the amount of new outside capital raised.

Finally it may be appropriate to end this thesis with a note on aspects of the dividend policy controversy offering possible avenues for future research. The noted aggregate dividend aversion was, for reasons already set out, interpreted as having arisen from capital market imperfections rather than from a fundamental distaste for dividends. This result, unlike the findings of similar tests on American data, points to the existence of unsatisfied investor clienteles. The implication is that firms stand to increase their values by amending their dividend policies to meet the requirements of these clientele groups.

Investigations into the dividend setting process including the factors which prompt managements to persist in their existing dividend policies, despite evidence of their possible negative impact on the value of firms, would be of interest. A further area for useful research would be the degree to which investors actually manipulate their investment decisions, thus giving rise to a clientele effect, in attempts to neutralise or limit their costs arising from market imperfections such as tax differentials. Research into the institutional factors prevalent on the Johannesburg Stock Exchange or other reasons as to why investors are apparently unwilling or unable to substantially avoid the costs arising from market imperfections, would also be of great interest.

A P P E N D I X

APPENDIX ONE

SHARES AND THEIR RESPECTIVE YEAR ENDS CONSTITUTING SAMPLES

FOR API TEST BASED ON PAYOUT RATIOS (TOTAL SAMPLE 248 ITEMS)

Low Payout
(91 Items)

Amic 1979
Barlows 1974-79
Bears 1973-79
Boumat 1973-76
Carlcor 1976
Dorbyl 1974-77, 79
Edgars 1974-76
Foschini 1976-79
Frasers 1973-79
Kohler 1973-77
Malbak 1973-74, 76-79
Metkor 1976-77, 79
M & R 1973-79
Pick 'n Pay 1974-79
Protea 1974
Reunert & Lenz 1974-79
Seardel 1975-79
Stewarts & Lloyds 1974-76
Toyota 1973-75, 77-78
Woolworths 1973-78

Medium Payout
(124 Items)

AECI 1973-75, 78
Afrox 1975-79
Amic 1973-78
Anlo Alpha 1973-76
Barlows 1973
Blue Circle 1975-78
Boumat 1977, 79
Carlcor 1973-75, 78
Chemholds 1974-79
Dorbyl 1973, 78
Dunlop 1975-78
Edgars 1973, 77-79
Everite 1973-79
Fedfood 1974-77
Fedvolks 1974-77, 79
Foschini 1973-75
Gallo 1975-76
Huletts 1973-76
Kaapkunene 1975-79
Kohler 1978
Malbank 1975
Metal Box 1973-76
OK Bazaars 1973-79
Pep 1973-79
Pick 'n Pay 1973
Protea 1973, 75-79
Rennies 1973-75, 77-78
Reunert & Lenz 1973
Sentrachem 1973-79
Stewarts & Lloyds 1973-77
Toyota 1976
Trek 1974, 1976-78
Woolworths 1979

High Payout
(33 Items)

AECI 1976-77
Anglo Alpha 1977-78
Afrox 1973-74
Blue Circle 1973-74
Boumat 1978
Carlcor 1977
Dunlop 1973-74
Gallo 1974, 77-78
Huletts 1977-79
Kaapkunene 1973-74
Metal Box 1977-79
Metkor 1974-75, 78
Rennies 1976
Seardel 1973-74
Stewarts & Lloyds 1978-79
Trek 1973, 75

SHARES AND THEIR RESPECTIVE YEAR ENDS CONSTITUTING SAMPLES
FOR API TEST BASED ON DIVIDEND YIELD (TOTAL SAMPLE 231 ITEMS)

<u>Low Dividend</u> <u>Yield</u> <u>(77 Items)</u>	<u>Medium Dividend</u> <u>Yield</u> <u>(81 Items)</u>	<u>High Dividend</u> <u>Yield</u> <u>(73 Items)</u>
AECI 1973, 78	AECI 1974-77	Afrox 1974, 76
Afrox 1978-79	Afrox 1973, 75, 77	Anglo Alpha 1975-78
Amic 1973, 78	Amic 1974-77	Beares 1975 - 77
Anlo Alpha 1973	Anlo Alpha 1974	Blue Circle 1976
Barlows 1973, 78-79	Barlows 1974-77	Boumat 1976-78
Beares 1973, 79	Beares 1974, 78	Carlcor 1977
Blue Circle 1973	Blue Circle 74-75,77-78	Chemholds 1975-77
Boumat 1973	Boumat 1974-75, 79	Dorbyl 1977
Carlcor 1973-74	Carlcor 1975-76, 78	Dunlop 1974-77
Dorbyl 1973, 79	Chemholds 1978-79	Fedvolks 1977
Edgars 1973-75, 78-79	Dorbyl 1974-76, 78	Gallo 1976-77
Everite 1973, 75	Dunlop 1973, 78	Hullets 1976-79
Frasers 1973-79	Edgars 1976-77	Kaapkunene 1973-78
Gallo 1974-75, 78-79	Everite 1974, 76-79	Kohler 1974-76
Hullets 1973-74	Fedvolks 1976, 79	Malbank 1974-79
Kohler 1973, 78	Huletts 1975	Metal Box 1977
Malbank 1973	Kohler 1977	Metkor 1977-79
Metal Box 1973	Metal Box 1974-76,78-79	M & R 1976-77
M & R 1973, 75	Metkor 1974-76	Pep 1977-78
O K Bazaars 1973-76	M & R 1974, 78-79	Protea 1976-77
Pep 1973-74	OK Bazaars 1977-79	Rennies 1974, 76, 78
Pick 'n Pay 1973-79	Pep 1975-76, 79	Seardel 1974-77
Protea 1973-74	Protea 1975, 78-79	Sentrachem 1975-76
Rennies 1975	Rennies 1977	Stewarts & Lloyds 1975-77
Reunert&Lenz 73,75,78-79	Reunert&Lenz 74,76,77	Toyota 1974-76, 78
Seardel 1973	Seardel 1978-79	Trek 1974-75, 77
Sentrachem 1978-79	Sentrachem 1974,77	
Stewarts & Lloyds 1973,79	Stewarts&Lloyds 74,78	
Toyota 1977	Toyota 1973	
Woolworths 1973-79	Trek 1973, 76, 78	

CONSTITUENT SHARES FOR PORTFOLIOS

USED IN CROSS SECTIONAL REGRESSION STUDY

Portfolio I

Abercom
Boumat
ICS
Mittcot
Russells
Tiger
Rembeh
Beares
Curfin
Ellerines
Placor
Rennies
Sterns

Portfolio II

ATI
Kaapkun
M & R
SAB
Afcoll
McCarthy
SAPPI
Rengro
Woolworths
Tedelex

Portfolio III

Calan
Grinaker
Senchem
W & A
Premier
Romatex
Bonmore
Edcon
L H Marth
Nampak

Portfolio IV

AECI
Fedvolks
LTA
Lamberts
Blue Circ
S & L
Toyota
Hullet
Unisec
Wesco

Portfolio V

Barlows
Bonuskor
Protea
Nat Trading
W Hunt
OK
Safmarine
Pep
S A Druggists
Trek

Portfolio VI

Marnprod
PG
Dunlop
Metal Box
Steelmets
Greatermans
Gresham
Lefic
Carlcor
Pick 'n Pay

Portfolio VII

Amic
Afrox
Asea
Dorbyl
CNA
Frasers
Tongaat
Hiveld
Metkor
W Barends

Portfolio VIII

Malbak
Gentyre
Reunert & Lenz
Unsteel
Afr Pers
Edgars
Met Cash
Kanhym
Seardel
Asseng

Portfolio IX

Rex Trueform
SWA Fish
Adcock
Curries
Dunswart
I & J
Kohler
Cadswep
Otis
Triomf

CONSTITUENT SHARES FOR PORTFOLIOS

USED IN CROSS SECTIONAL REGRESSION STUDY

Portfolio X

Anglo Alpha
Chemhold
Everite
Ind & Comm
Aberdare
Af Cable
Claude Neon
Cullinan
Scots
Argus
Foschini
Gallo
Gubbings
Truworths

REFERENCES

Affleck-Graves, J.F., 'The Application of Multivariate Statistical Techniques in the Analysis of Stock Market Data', Unpublished Ph.D. Thesis, University of Cape Town, 1977. As reported in Knight (1983).

Affleck-Graves, J.F., Money, A.H., 'A Note on the Random Walk Model and South African Share Prices', The South African Journal of Economics. Vol. 43, 1974. pp 382 - 388.

Beaver, W.H., 'Market Efficiency', The Accounting Review. January 1981. pp 23 - 37.

Benishay, H., 'Variability in Earnings - Price Ratios of Corporate Equities', The American Economic Review. No. 1, 1961. pp 81 - 94.

Black, F., Scholes, M., 'The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns', Journal of Financial Economics. May 1974. pp 1 - 22.

Blume, M.E., 'Portfolio Theory: A Step Toward its Practical Application', Journal of Business. April 1970. pp 152 - 173.

Blume, M.E., 'Stock Returns and Dividend Yields: Some more Evidence', Review of Economics and Statistics. November 1980. pp 567 - 577.

Brealey, R., Myers, S., Principles of Corporate Finance. New York: McGraw Hill, 1981.

Brennan, M., 'Taxes, Market Valuation and Corporate Financial Policy', National Tax Journal. December 1970. pp 417 - 427.

Brennan, M., 'A Note on Dividend Irrelevance and the Gordon Valuation Model', Journal of Finance. December 1971. pp 1115 - 1121.

Copeland, T.E., Weston, J.F., Financial Theory and Corporate Policy, Second Edition. Los Angeles: Addison Wesley, 1982.

Elton, E.J., Gruber, M.J., 'Marginal Stockholders' Tax Rates and the Clientele Effect'. Review of Economics and Statistics. February 1970. pp 68 - 74.

Fama, E., 'The Empirical Relationships between the Dividend and Investment Decisions of Firms', American Economic Review. June 1974. pp 304 - 318.

Fama, E., Foundations of Finance. New York: Basic Books, 1976.

Fama, E., Babiak, H., 'Dividend Policy: An Empirical Analysis'. Journal of the American Statistical Association. December 1968. pp 1132 - 1161. 7

Fama, E., Fisher, L., Jensen, M., Roll, R., 'The Adjustment of Stock Prices to New Information', International Economic Review. February 1969. pp 1 - 21.

Fama, E., MacBeth, J.D., 'Risk Return and Equilibrium: Empirical Tests', Journal of Political Economy. May/June 1973. pp 607 - 636.

Friend, I., Puckett, M., 'Dividends and Stock Prices', American Economic Review. September 1964. pp 656 - 682.

Gordon, M., 'Dividends, Earnings and Stock Prices', Review of Economic and Statistics. May 1959. pp 99 - 105. 7
c

Gordon, M., 'The Savings, Investment and Valuation of A Corporation', Review of Economics and Statistics. February 1962. pp 37 - 51.

Gordon, M., 'Optimal Investment and Financing Policy', Journal of Finance. May 1963. pp 264 - 272.

Grossman, S., 'On the Efficiency of Competitive Stock Markets Where Traders Have Diverse Information', Journal of Finance. May 1976. pp 573 - 585.

Hawawini, G.A., Michel, P.A., Viallet, C.J., 'An Assessment of the Risk and Return of French Common Stocks', Journal of Business Finance and Accounting. 1983. pp 333 - 350.

Higgins, R., 'The Corporate Dividend - Saving Decision', Journal of Financial and Quantitative Analysis. March 1972. pp 1527 - 1541. 7
c

Knight, R.F., 'The Association Between Published Accounting Data and the Behaviour of Share Prices', Unpublished Ph.D. Thesis, University of Cape Town, 1983.

Knight, R.F., Affleck-Graves, J.F., 'The Information content of Dividends incremental to the Information content of Earnings: The South African Experience', Unpublished Research Paper, The University of Cape Town, January 1984.

Lintner, J., 'Distribution of Incomes of Corporations Among Dividends, Retained Earnings and Taxes', American Economic Review. May 1956. pp 97 - 113.

Lintner, J., 'Optimal Dividends and Corporate Growth Under Uncertainty', The Quarterly Journal of Economics. February 1964. pp 49 - 95.

Litzenberger, R., Ramaswamy, K., 'The Effect of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence', Journal of Financial Economics. June 1979. pp 163 - 196.

Long, J.Jr., 'Efficient Portfolio Choice with Differential Taxation of Dividends and Capital Gains', Journal of Financial Economics. August 1977. pp 25 - 54.

Long, J.Jr., 'The Market Valuation of Cash Dividends: A Case to Consider', Journal of Financial Economics. June/September 1978. pp 235 - 264.

Markowitz, H.M., Portfolio Selection: Efficient Diversification of Investment. New Haven: Yale University Press, 1959.

Mayers, D., Rice, E., 'Measuring Portfolio Performance and the Empirical Content of Asset Pricing Models', Journal of Financial Economics. March 1979. pp 3 - 28.

Miller, M., Modigliani, F., 'Dividend Policy, Growth and the Valuation of Shares', Journal of Business. October 1961. pp 411 - 433.

Miller, M., Scholes, M., 'Dividends and Taxes', Journal of Financial Economics. December 1978. pp 333 - 364.

Pettit, R.R., 'Taxes, Transaction Costs and the Clientele Effect of Dividends', Journal of Financial Economics. December 1977. pp 419 - 436.

Reinganum, M., 'The Arbitrage Pricing Theory: Some Empirical Results', The Journal of Finance. May 1981 b. pp 313 - 321.

Robichek, A.A., Meyers, S.L., Optimal Financing Decisions. Englewood Cliffs, N.J.,: Prentice Hall, 1965.

Roll, R., 'A Critique of the Asset Pricing Theory's Tests', Journal of Financial Economics. March 1977. pp 129 - 176.

Roll, R., 'A Reply to Mayers and Rice (1979)', Journal of Financial Economics. July 1979. pp 391 - 399.

Rosenberg, B., Marathe, V., 'Tests of the Capital Asset Pricing Hypothesis', Research in Finance. January 1979. pp 115 - 223.

Ross, S.A., 'The Arbitrage Theory of Capital Asset Pricing', Journal of Economic Theory. December 1976. pp 343 - 362.

Schallheim, J., De Magistris, R., 'New Estimates of the Market Parameters', Financial Management. Autumn 1980. pp 60 - 68.

Seneque, P.J.C., Gourley, B.M., 'Dividend Policy and Practice in South Africa', The Investment Analysts Journal. June 1983. pp 35 - 39.

Sharpe, W.F., 'Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk', Journal of Finance. September 1964. pp 425 - 442.

Sunder, S., 'Relationship Between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence', Empirical Research in Accounting: Selected Studies. 1973. pp 1 - 46.

Visser, F., Affleck-Graves, J.F., 'A Factor Analysis of Shares Listed on the Johannesburg Stock Exchange', Technical Report No. STM 10, The Department of Mathematical Statistics, University of Cape Town. 1982. As reported in Knight (1983).

Walter, J.E., 'Dividend Policies and Common Stock Prices', Journal of Finance. March 1956. pp 29 - 41.

Watts, R., 'The Information Content of Dividends', Journal of Business. April 1973. pp 191 - 211.