CAPITAL MARKET THEORY AND INSTITUTIONAL INVESTORS

by

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IV- DECLARATION

V. ABSTRACT

1. In this study 118 unit trusts are examined for the period 1966-1975, the two sub-periods: 1966/70 and 1971/75 in the light of Capital Market Theory;

2. The Efficient Market Hypothesis states that returns are generated by a "fair game" process, which amplified by the Capital Asset Pricing Model, implies a risk-free return and a risk-premium proportional to the covariance of the portfolio (or asset) to the market portfolio;

3. Since 1945, the proportion of equity, preference shares and ordinary shares and commercial loans held by investing institutions has grown remarkably. In testing unit trust portfolios, the actual behaviour in the market against a benchmark alternative is examined. The theoretical alternative assumes no investment judgement was used to select portfolios.

4. The initial tests using correlation analysis fail to indicate any evidence of consistent continuity of performance. There was evidence of state dependent behaviour where unit trusts would rank similarly given consistent market conditions and dis-similarly given changed market conditions;

5. When introducing the risk-adjusted benchmark, the performance statistics indicated that unit trust managers were unable to generate consistent above-average results, though there was some evidence that both good and bad performance tended to persist between the two sub-periods 1966/70 and 1971/75;

6. It was noted that the trusts underwent considerable changes in their market risk exposure, as measured by beta, the latter sub-period seeing a large reduction in risk;

7. The individual categories of trusts had different performance results with the income group achieving greater returns for a given level of risk, while the specialized group achieved lower returns for given risk;

8. In considering the factors that may affect the performance of the unit trust portfolios, on the whole while some tests gave results which were statistically significant, the conclusion is that most of the supposed effects on performance, if they do operate are hardly significant enough individually to explain the great differences in outturn;

9. A multi-variate analysis of the factors relating to performance found that a strong management factor was responsible for the differences in return for the period analysed. However, the large qualitative element of the analysis precludes its future predictive value;

10. A discriminant analysis of the unit trusts found that 50 percent, using whatever combination of independent variables, were correctly classified. This result indicates that it appears many unit trusts do not conform to the qualitative lables which are given in their own literature and reported in the press or the Unit Trust Yearbook.

VI. NOTES, DEFINITIONS & ABREVIATIONS USED

In addition to the usual mathematical symbols, the following are used:-

P_j	£ and pence price for any security or unit trust unit;
D_j	divident receivable for any security or unit trust unit;
$E(\ )$	the expected value operator;
$\wedge$ / $'$	an observed variable;
$\sim$	a tilde, means a stochastic variable;
$\sigma^2_{\tilde{R}_j}$	or: $VAR(\tilde{R}_j)$ variance of stochastic variable j;
$\sigma_{\tilde{R}_j}$	standard deviation of stochastic variable j;
$\sigma_{j',k}$	or: $COV(\tilde{R}_j, \tilde{R}_k)$ the covariance of variables j and k;
$p_{j',k}$	or: $CORR(\tilde{R}_j, \tilde{R}_k)$ the correlation of variables j and k;

In the tables of results, starting in Chapter Eight, and subsequently, the following abreviations are used for the regression equation results:-

ANOVA	the analysis of variance;
DF	degrees of freedom;
SS	the sum of squares;
MS	mean sum of squares;
F	the F-statistic is a test of the significance of the interaction of the equation.

E.G. for $n_1=9$, $n_2=12$ degrees of freedom,

0.05 requires an F statistic of 2.80 or more;

0.01 requires an F statistic of 4.39 or more.

1.0 INTRODUCTION

This thesis is concerned with the performance of United Kingdom unit trust portfolios in the period 1966 to 1975, 10 years. It analyses all the Department of Trade authorized trusts extant on December 31st. 1965.

In research the role of theory per se hardly requires defense, theory can provide a deeper understanding of any subject, relationships are observed, inconsistent ideas are exposed and new horizons revealed. The purpose of research is to further an understanding of the processes governing observable phenomena as a valuable and eventually fruitfull increase in human knowledge.

The amount of research carried out in the UK on the stockmarket and its related aspects has been minimal, reflecting the lack of interest by the financial community and, until recently, the absence of any readily available data source. The research that has been carried out has however pointed up significant differences between the UK and other markets, notably the New York Stock Exchange which has been much researched.

In the USA the research findings of academics calling into question many empirical practices formely carried out based on tradition and folklore, has caused a revolution in the conduct and behaviour of practitioners. They have been forced to modify their methods and to adopt more modern techniques sanctioned by emprical research.

The research based on UK data suggests that further work is worth undertaking since, in what has come to light, there is some evidence of market inefficiencies. This may be attributable to the market structure, or to certain behaviour on the part of investors. However, it is difficult to believe that investors are genuinely naive or indifferent as regards their investment and market behaviour characteristics.

It is within this context of ongoing debate and research that this thesis is written.

This dissertation is designed to answer two questions about the characteristics and nature of institutional investors in the capital market; and which are to a degree interrelated issues.

One is the question of market efficiency. Any test of performance is also a test of the "information efficiency" of the market.

Two is the question of the performance of institutional portfolios. Institutions now provide the principal means of saving by the individual and institutions are the principal investors in the Stock Exchange through superannuation funds, life assurance funds, investment trusts and unit trust equity portfolios.

Institutional performance will be tested through the medium of unit trusts which have become the main vehicle for voluntary investment in equities by individuals. Table 1A shows the growth of the unit trust movement over the period in question.

Reasons for investing through institutions as opposed to owning a private portfolio are:-

1. expert investment advice;
2. diversification of portfolio risk;

YEAR	NUMBER OF TRUSTS	VALUE £M	YEAR	NUMBER OF TRUSTS	VALUE £M
1961	42	236.6	1969	206	1,412.0
1962	54	272.5	1970	221	1,397,7
1963	70	371.2	1971	262	1,991.2
1964	105	428.9	1972[2]	269	2,647.5
1965	121[1]	521.9	1973	321	2,060.4
1966	138	581.8	1974	358	1,310.8
1967	156	853.7	1975	355	2,512.4
1968	176	1,482.4	1976	369	2,275.0

Number of Department of Trade Authorized Unit Trusts in Existence at December 31st of Each Year With the Aggregate Market Value of the Funds.

1- The study includes 118 out of the 121, two exempt (tax-free) trusts excluded, plus one which terminated in 1966.

2- After 1972 the exempt funds are no longer included in the Market Valuation for the funds.

Source - Financial Statistics and the Unit Trust Year Book of various dates.

TABLE 1.A

The Number of Unit Trusts and their Aggregate Portfolios at Year End from 1961.

3. convenience of securities management;
4. economy of book-keeping activities;
5. differing requirements as to portfolio objectives;
6. tax advantages.

In analysing performance one has to take into account the following:-

a). risk: differing risk levels of the portfolios must be explicitly allowed for;
b). timescale: the investment horizon of individual must be considered;
c). income requirements: the tax treatment of Capital Gains versus Income and stability of revenue;
d). resources, research efforts and economies of scale;
e). timing: making decisions as regards investments and liquidity of the portfolio.

A critical assumption of this work relates to the behaviour of security prices, that these "fully reflect" available information. Chapter Two discusses the Efficient Market Model and summarizes evidence for the UK market. Chapter Three is a brief summary of the Capital Asset Pricing Model and its derivation. This normative model will be the benchmark for the analysis of unit trust portfolio performance in Chapters 8, 9 and Ten.

Following on from the chapters discussing theory are three chapters concerned with analysing the enviroment within which unit trust operate. Chapter Four gives the UK picture for investing institutions and their market impact. Then the particular constraints and construction of investment trusts and unit trusts are given in Chapter 5. There follows a chapter on the tests of trust performance both for the USA and work on UK portfolios. Chapter Seven gives the research methodology adopted in this study.

Chapters 8, 9 and 10 are concerned with the results of the tests. In Chapter Eight, performance is considered against the market on a risk-adjusted basis. As a group trusts managements had a neutral market performance, but individual categories of trusts deviated from this pattern. Chapter Nine analyses various characteristics of the trusts to determine whether they contribute towards differing performance related scores. On the whole, while some of the individual tests of characteristics produced results which are statistically significant, the conclusion is that most of the effects, traditionally supposed to influence performance, are hardly significant enough by themselves to explain the great differences in performance results. These differences must be explained by random factors or exogenous variables which were not included. Chapter 11 uses discriminant analysis to test fund categories. It may be that while trust managements are willing to make use of the convenient labels grouping trust types, these labels do not reflect differences which can be detected using the available data.

In the last chapter a brief series of implications for investors and the unit trust industry are discussed based on the results from the results in the study.

2.0 THE INFORMATION EFFICIENT CAPITAL MARKET

Capital markets are the means of allocating the nation's savings to finance long term investments by reconciling the demand and supply of capital assets. Because of their high marginal liquidity, the ability to change an asset into money and vice versa -- at a moment's notice; the capital market is theoretically an efficient allocator of resources at their "intrinsic' value.

The price at which a security sells can be deemed to be the discounted present value of the stream of future income (capital gain and dividends) which will accrue to the security over its future life.

$$\text{Security Present Price} = \frac{E(D_1 + CG_1)}{(1 + r)} + \frac{E(D_2 + CG_2)}{(1 + r)^2} + \ldots$$

$$\ldots + \frac{E(D_n + CG_n)}{(1 + r)^n} \qquad (2.1)$$

$(1 + r)$ is the discount rate applicable to the security.

The problem is the estimation of the security's intrinsic value which, based on future, discounted expectations, changes constantly with the arrival of new information bearing on the security's prospects. In consequence the price at which a security (reflecting part or whole of an underlying asset) is bought and sold varies over time and from transaction to transaction as information flows are "reflected" in the discounted, present worth. It is these changes in price which determine the degree of efficiency in a market. If the price change "reflects" the arrival of new information such that the possibility of profit on the price changes is limited to that of the market as a whole then the market can be considered to be information-efficient. If it is possible to profit on anticipating changes in price in a manner above the market's average compounding rate through superior analysis or information, then the market is inefficient. The efficiency of the market, or its lack, is important in the allocation of savings in the most efficient manner possible and to the benefit of society as a whole.

If the market is information-inefficient, then research and fundamental analysis and technical trading rules (the use of charts and mechanicaltrading rules) will be profitable activities for some investors. Nor will the examination for equilibrium risk-return combinations over the long term prove a worthwhile pursuit, since there will be no logical ordering of risk premiums for risk bearing, and priviledged information groups will achieve above average returns.

2.1 Information-Efficiency As a FAIR GAME Model*

It is useful to think of any system in terms of its theoretical equilibrium position. Market equilibrium can be stated in terms of a security's expected return, conditional on the security's risk, and is described by:-

$$E(P_{j,\,t+1}/\$_t) = (1 + E(r_{j,\,t+1})/\$_t)\, P_{j,\,t} \qquad (2.2)$$

where \$ is a symbol for the information reflected in the price P at time t. $\$_t$ is fully utilized in determining the equilibrium price at t+1.

There are three forms of the information $\$_t$ that can determine the price at t+1.: past price change histories (the weak form of the information-efficient market theory) historically generally available information (semi-strong form of the theory), and all information (the strong model form). The three forms differ in terms of the degree of information content dictating market efficiency. In the weak form. for instance, only past price behaviour is reflected in prices, other non-price information is deemed not to affect prices.

The implication that conditions of market equilibrium can be stated in terms of expected returns with the information $\$_t$ "fully reflected" in the price rules out the possibility of a trading rule based on the information $\$_t$ generating above-average returns.

If:

$$x_{j,\,t+1} = r_{j,\,t+1} - E(r_{j,\,t+1}/\$_t) \qquad (2.3)$$

is the excess return for security j in the period t+1 and where:

$$E(x_{j,\,t+1}/\$_t) = 0 \qquad (2.4)$$

the expected conditional value of $x_{j,\,t+1}$ for the information is zero, then the sequence $x_{j,\,t}$ (where t = 1, 2, 3..., n) will be a "fair game" for the information set $\$_t$. The term $x_{j,\,t+1}$ is the excess market return for security j at time t+1 above market equilibrium conditions. In Chapter 7 this excess market return will expanded into a benchmark measure using Jensen's alpha (α_j) and delta (δ_j) performance measures.

The same trading rule applies to portfolio decision making. If:

$$K(\$_t) = (K_1\$_t,\ K_2\$_t,\ K_3\$_t, \ldots\ldots, K_n\$_t) \qquad (2.5)$$

is a trading system based on the information $\$_t$, where $K_j\$_t$ is the amount available for security j at time t to be invested in all n available securities, then the excess market return is:-

$$V_{t+1} = \sum_{j=1}^{n} K_j(\$_t) r_{j,t+1} - E(r_{j,t+1}/\$_t) \qquad (2.6)$$

with the expectation that:-

$$E(V_{t+1}/\$_t) = \sum_{j=1}^{n} K_j(\$_t) E(x_{j,t+1}/\$_t) = 0 \qquad (2.7)$$

2.2 The Random Walk

The random walk model is a special case of the "fair game" model outlined above. The model states that successive period price changes are serially independent and have an identical distribution. Consequently, the best estimate of tomorrow's price is today's price. The usual form of the model states that the conditional and marginal probability distributions are identical ($f(r_{j,t+1}/\$_t) = f(r_{j,t+1})$), or:-

$$P_{t+1} = P_t + \tilde{e}_{t+1} \qquad (2.8)$$

where $\tilde{e}_{t+1}$ is an independently distributed random variable with $E(\tilde{e}_{t+1}) = 0$; and $COV(\tilde{e}_t, \tilde{e}_{t+s}) = 0$, for states where $s \neq 0$.

2.3 The Sub-Martingale Model

If for the "fair game" model of equation (2.1)

$$E(P_{j,t+1}/\$_t) = (1 + E(r_{j,t+1}/\$_t))P_{j,t} \qquad (2.1)$$

the RHS expected return is zero, or above:-

$$E(r_{j,t+1}/\$_t) = 0 \qquad (2.9)$$

then the price sequence for $P_{j,t}$ $(t = 1, 2, 3, \ldots n)$, follows a sub-martingale sequence with the expected price in period t+1 being the same or higher than the price at time t. The implication of this form of the model is that a Buy-and-Hold policy for all periods t+1 will outperform a trading policy based on any information $\$_t$ at time t. In inflationary times, i.e. during an upward trend in general prices, this condition is more likely than a "fair game" model.

2.4 Requirements for Market Efficiency

1. That there be no transaction costs in trading securities;
2. that all available information is costlessly available to all market participants;
3. that all participants agree on the implications of current information on security prices and future prices and the distributions of price changes for all securities;
4. there are a large number of market participants.

These conditions are sufficient for market efficiency. Real markets depart from these requirements, tests of the "fair game" model and its two special cases determine whether real life departures from these conditions inhibit the efficiency of the market. Below are details of empirical results based on UK market data.

2.5 Evidence For The United Kingdom

2.5.1 Weak Form Tests

UK research has duplicated the pattern started in the US with tests being initially of the weak form of the efficient market hypothesis. Conclusions are less straightforward, there is some debate with some studies accepting an approximately random walk type of efficient market, and those studies refuting the random walk theory. (Unfortunately the terminology is loose, the random walk tests are usually implied tests of the "fair game" model.) Since the random walk is a specific kind of "fair game" this may not refute market efficiency, but this will point against the efficiency of the market since random walk tests can be interpreted as tests of the fair game model. Some evidence presented in the appendix to this chapter suggests the distribution of share price returns may change over time. This will affect the statistical tests used in assessing efficiency.

Serial Correlation of Price Changes is the standard series independency test. Research by DRYDEN (1970) on 15 stocks found 5 possessed a serial correlation for the one day lag of greater than 0.123. Despite these high correlations Dryden accepted that the random walk model was a passable description of share price behaviour. BREALEY (1970) in his study of the FT Actuaries All Share Index obtained a serial-correlation of 0.219 (Dryden's results on the FT Industrials -- part of the All Share Index -- was 0.287). These results were higher than expected, even though indices have a higher correlation than the individual securities making the index. Brealey therefore used a "New Index" for 1968 to eliminate any averaging tendency due to the non-simultaneous collection of prices in the FT Actuaries Indices. This New Index had a serial correlation of only 0.19, compared to 0.32 for the All Share Index over the same period. For a weekly series of data CUNNINGHAM (1973), using the FT Ordinary Share Index (30 shares) from mid-1935 to the end of 1969 obtained correlations of one week: 0.091; two weeks 0.242; and four weeks 0.222. He also tested an auto-regressive model for 1, 2, and 4 week changes with only moderate success; but he did detect enough deviation from market efficiency to formulate an investment decision rule.

Work by SOLNIK (1973) on European stock prices compared US to European results on eight national exchanges. The UK selection consisted of 40 stocks, from March 1966 to April 1971 using daily data. He found that the cross sectional distribution of coefficients for the UK was much flatter than the US control, with fatter tails, the random walk model predicting a bell-shaped distribution. Violations of this prediction were more apparent than on Wall Street (see FAMA (1970)), a fact he attributed to:-

1. slow prices adjustment to new information;
2. thinness of the market in individual securities.

Overall he accepted the random walk as a fair description of share price behaviour.

Filter Tests are a much stronger means of determining the independency of price changes. The basic filter rule is that when a stock rises by x% buy and hold until it should fall x% from a subsequent high at which point sell and simultaneously go short until it rises the x% from a subsequent low. One of the advantages of filter tests is that they can determine the economic significance of departures from a "fair game".

DRYDEN (1970) found his filter tests on 3 indices returned less than a corresponding buy-and-hold strategy. He detected that the average length of short transactions was approximately $\frac{2}{3}$ of the average length of all transactions and that the ratio of long days to short days was greater than unity. Two conclusions emerged: that there was evidence of trends and dependence in price changes, with the long only filters returning above the buy-and-hold policy, though after transaction costs were taken into account, this was nullified. Dryden's study of individual securities, more significant than work on indices, supported the efficient market hypothesis.

Runs testing is a means of examining if the price changes by sign (++-+-, etcetera) are in any way predictable over short periods in a fashion filter tests and serial correlations would not detect. It is also a non-parametric test, making no assumption about the distribution of price changes. Dryden (1970) in his runs test on the 15 securities used two filter methods: the first calculated K, the actual number of runs in the sample, and compared it to the expected number. He found less than the expected number, indicating more reversals in price changes than there should have been. (See NIEDERHOFFER & OSBORNE (1966) for an institutional explanation of this phenomenon for the US.) However, Dryden's test suffered from the instability of K as a statistic. The second, preferred, method using the results of (R - M/M) found a 10% discrepancy between the expected number of runs and the actual number. A similar test by KEMP & REID (1971) for a 51 day period on 51 securities found that 5 individual shares had non-random behaviour.

Transition Probabilities were used by Dryden and also by T.M. RYAN (1973) to establish whether a series behaved in a random manner. If the series is random, then all transition probabilities should be similar. Both authors found they had non-random matrices; and Ryan concluded that there was some form of relative strength in price movements causing this result.

Other Tests have been carried out based on the premise that the above tests are too weak statistically-speaking to detect the patterns of fluctuations in price changes. The Kemp & Reid study (1971) is interesting in that their article is a treatise attacking supporters of the random walk hypothesis. Using a carefully stratefied, random cross-sectional sample of stocks available from the back pages of the Financial Times, they tested for randomness over a period of 51 observations, a period of 5 Stock Echange accounts. Using a number of non-parametric tests and therefore making no assumptions about the price generating mechanisms involved, they carried out a runs test, the Wallis-Moore cycles test, up-and-down runs test and the Wald-Wolformitz auto-correlation test. They concluded that 80% of the sample was significantly non-random. In removing all the "no changes" in prices from the data, still 50% were found to be non-random. They conclude that: "...whichever set of assumptions one operates on, the results are an obvious caution to those who would hold up the random walk hypothesis as a relatively universal empirical phenomenon."

In making their tests Kemp and Reic have not taken account of two problems, which reduce the validity of their conclusions. First, no account of the effect of non-trading was made. Second, their sample size is small for non-parametric tests of low power.

More tests of the random walk were carried out by BENJAMIN & GIRMES (1975) on a large sample of UK stocks: 543 daily listed prices for 600 days, October 1968 to April 1971, and also three 200 day sub-periods. Using the number of superior vortices technique and the index of maximum distance technique, the authors examined for the degree of randomness. Only 27% were definitely random in behaviour, a further 55% were indeterminate, 18% were non-random. Testing the theory of company size against observed share price behaviour, they found a weak positive relationship implying a non-trading effect.

Of the 543 securities analysed in the second test, 30% had a genuine random walk, 20 percent deviated from randomness significantly, a further 50% were indeterminate. Thirteen out of the 543 were non-random on both tests.

Another Benjamin & Girmes paper (1975) takes the same data through further tests using spectral analysis or as they term it: periodogram analysis. Spectral analysis is a technique for examining time series processes by means of their non-linear qualities. The characteristics of a wave can be judged by its amplitude and its length. Share prices do not move in waves, but it is a convenient shorthand description for the non-linear dependencies which may feature in the data set. However, the imposition of varying dependencies upon each other creates a distortion due to the complicated interaction of the waves upon each other. Spectral analysis attempts to distinguish the various waves (non-linear dependencies) and thus show the entire "spectral" paramters of the series. A random series should have no discernible waves (see Granger & Morgenstern (1970)). Periodogram analysis involves attaching weights to different waves of varying length. If the price series is random, then the waves should have equal weights. It is possible to set significance levels for the periodogram test, and the authors found that at the 0.05 significance level 4% of their sample were non-random, and 70% were of mixed character.

A further paper by the above authors on the random walk theory found that different statistical tests gave different results about the prevalence of randomness. Their paper is concerned with the probability application of maximum and strictly larger term theories and the apparent deviation from the expected frequencies of a random series. The test was on 484 securities over 5 non-overlapping one year periods using daily share price data. These two tests found heavily against randomness with only 6% and 5% of stocks analysed showing random behaviour. An attempt was made to relate the size of the company to the observed non-randomness which gave a positive result. One major problem in analysing this result is the unknown effect of non-trading on the test results. It would appear to be quite considerable.

2.5.2 Semi-Strong Form Tests

In order that the market to be semi-strong information efficient, there should be no lags in the dissemination of information. There has been comparatively little research on the semi-strong form model due to the necessity of correlating share price behaviour to information of a price sensitive nature. BREALEY (1970) attempted to test the reaction of the FT All-Share Index to the monthly balance of trade figures, and the prevalence of a market cycle to coincide with the account period. There was some evidence in favour of a market cycle created by the account: the index rising at the opening of the account, but little evidence of a fall at the account's close. The trade figures test suggested that the market took more than one day to digest their information content. Despite the difficulties of using an index to gauge reaction, the sluggish response may indicate that the market may not be totally efficient in the semi-strong case.

Further evidence of the slow market reaction to information flows comes from FIRTH (1975) when examining the impact of disclosures of large holdings in quoted firms. The information imput behind such a large holding is that the acquiror of the holding either:-

i. has priviledged information on the outlook of the security in question; or,

ii. wants to ultimately acquire the firm at some future point, with the concommitant offer to shareholders and even, perhaps, a takeover battle.

However, one may question the validity of using large investment holdings to test the market's efficiency since the exact meaning of an investment holding is far from clear.

More rigorous work by FITZGERALD (1973, 1975) sought to measure the impact of brokers's reports on the market. His tests were both of the semi-strong and strong form of the efficient market model. His results are confusing, but he claims that: "...There is no evidence that the overall brokerage or media recommendation portfolios can consistently produce returns greater than the market portfolio," and he adds a little further on: "On our results it would appear that the UK market is significantly less efficient in the semi-strong sense than the US market."

FIRTH (1976) tested the impact of earnings announcements on firms in similar industries. Not surprisingly the announcement of earnings caused an immediate re-evaluation of the expectations for earnings for closely competing firms, to the extent of some 50 to 80 percent of the announcing firm's price change. This is strong evidence in favour of a "sector effect" and market learning, but hardly refutes the efficiency hypothesis.

FRANKS, BROYLES & HECHT (1978) in a study of merger activity in the brewery industry, after carefully adjusting for non-trading effects, measured net gains in mergers for acquiree and acquiror respectively. They found most of the gains accrued to the acquiree, a result in support of the semi-strong form of the market efficiency hypothesis.

2.5.3. Strong Form Market Efficiency Tests

The strong form tests imply that insiders and those with access to priviledged information are not in a position to profit from their knowledge. Given the concern by legislators, both in the USA and in the UK, about insider trading, one should expect the market to be inefficient in the strong form model. Evidence by FITZGERALD (1973) on the profit attributable to stockbrokers buying stocks which their investment departments are recommending shows some ability to generate insider profits: profits that are significant even after taking into account transaction costs. In his research he identified different categories of brokerage houses. It was his "unethical group" which traded most in securities pre-recommendation on its own behalf.

2.6 Trust Performance as a Strong Form Test

Trust funds are generally managed by professional managers with considerable research resources and market contacts at their disposal to analyse investment opportunities, and consequently are able to make superior choices than an individual acting on his own. If fund managers are able to outperform a simple policy of random investment at equal risk, then it is a refutation of the strong form market efficiency model.

Manager's superior ability may take the following forms in beating a mechanistic policy:-

1. The choice of industry to invest in. At various stages in the business cycle different industries benefit most. Correct identification of industry effects will cause the portfolio to beat a market wide performance measure;

2. the correct choice of company within an industry. Some companies through better management and policy do better than others within the same economic conditions;

3. market timing: the purchase and sale of securities in line with market turns.

In an imperfect market superior ability should yield superior returns, even allowing for transaction costs.

2.7 Summary

Mixed evidence in favour of the information-efficiency hypothesis concerning the UK market has been presented. It is however, important to mention a few weaknesses of some of the tests.

It is important to bear in mind that the majority of the tests have been carried out using daily price data. The use of daily data is perhaps unfortunate in that it fails to capture intra-day trading activity. But more important is to understand the effect of non-trading in some thinly marketed securities. The Benjamin and Girmes tests, for instance, weakly support the contention that larger companies with their heavily traded securities seem to generate the fair-game model.

Even if the market appears to be inefficient in the observed ex-post data, it may not be possible to trade by it, the thinness of the market may, in the statistical tests, give the appearance of inefficiency which would disappear if trading were attempted. Also there is no clear means of testing the true economic significance of departures from randomness, except with filter tests.

By studying the performance of unit trust portfolios on can establish whether the observed departures from

from fair-game efficiency possess any economic significance.

Notes:

* For a further discussion on the Efficient Market model see FAMA (1970).

AVERAGE PERFORMANCE OF THE MARKET DURING PERIODS
OF GOOD AND BAD TRADE FIGURES

Day Relative to Announcement	Good Trade Figures	Bad Trade Figures
D -4	-0.053%	+0.144%
D -3	+0.117	+0.021
D -2	+0.048	+0.100
D -1	+0.159	-0.178
D	+0.106	-0.049
D +1	+0.035	-0.188
D +2	-0.102	-0.018
D +3	-0.162	-0.073
D +4	-0.167	+0.161
D +5	-0.119	+0.080
D +6	+0.006	+0.055
D +7	+0.195	-0.014
D +8	-0.022	-0.040
D +9	+0.354	+0.071

Taken from R.A.Brealey (1970) Table 10.

TABLE 2.A

APPENDIX TO CHAPTER TWO

THE DISTRIBUTION OF SHARE PRICE RETURNS

The initial research into share price behaviour assumed that the distribution from which the prices changes came approximated a normal or a log-normal distribution. A large number of natural stochastic processes have normal distributions, thus to assume on simple tests giving negative results that the share price distribution was normal, was not unreasonable.

Because researchers used logarithms of price changes, or price relatives, the log-normal distribution was preferred as a description. The problem with the normal distribution is that the price of a security is bounded on the downside by a change to zero, but is unbounded on the upside, and therefore the distribution will be skewed to the right. The use of the log-normal distribution solves this; and also removes the apparent differences in variability due to different price levels for individual securities. A one pence change on a 10 pence stock is not the same as a 1 pence change on a £1 stock (first noted by MOORE (1962)). Furthermore, there is a problem of trend in both the means and variances; again, the use of logs removes or limits the importance of this non-uniformity in the original price series.

Note that the logarithmic transformation is not the only possible change ALEXANDER (1961) used percentage changes as a perfectly viable, and perhaps preferable alternative. Percentage changes of less than 15% are virtually equal to the natural log change, so the difference over small increments is slight.

Empirical evidence from the USA, COOTNER (1962)

MOORE (1962) and FAMA (1965) found evidence of larger tails than expected in a normal distribution, leading eventually to the postulation that the price generating mechanism conformed to some non-normal type. UK evidence, where it exists, has a similar degree of excess in the tails, with pronounced lepto-kurtotic distributions. (The frequency distribution being more peaked than the normal distribution and having longer, fatter tails.) Both Brealey (1970) and Dryden have analysed the distribution functions for indices.

The above observations are consistent with a random walk with barriers (see COOTNER (1962)) and the mixing of distributions drawn from different populations. PRESS (1967) postulated a "Compound Events Model" price generating mechanism to explain the non-normality of price changes. He indicated that the price mechanism is composed of 4 factors:

1. the initial price;
2. a linear combination of price changes particular to the individual security (we may later see this as non-systematic or residual risk);
3. a linear combination of price changes correlated to the market (this is the systematic risk factor);
4. and random factors representative of "Brownian Motion".

FAMA & MANDELBROT (1963, 1965, 1967) and ROLL (1970) have argued for a price generating mechanism from a class of distributions called Stable Paretian, of which the normal distribution is a special case. The stable-paretean model has proved the most serious alternative to the normality hypothesis. Four parameters describe the stable distribution:

α the characteristic exponent, a measure of the height of the extreme tail areas of the distribution;

β an index of skewness;

γ a scale parameter;

δ a location paramter.

If α equals one, then the data is drawn from a Cauchy distribution; if the α exponent equals 2, then it is a normal distribution. Only the normal, or Gaussian distribution has a second, or higher moments, such that the γ, or scale parameter, equals $\frac{1}{2}\sigma^2$, where σ^2 is the distribution's variance. When α is less than 2, the variance does not exist, and analytical solutions to γ only exist in specific cases; with α equal to one (the Cauchy distribution) γ equals the semi-interquartile range. Evidence from the USA on security price change distributions indicates that α takes on a value from 1.7 to 1.9.

The fact that the price generating mechanism may be a stable paretean process will cast doubt on the validity of results from parametric statistical techniques. However, the use of the stable class of distributions has many computational dis-advantages: infinite variances means that much conventional statistical theory is inadmissable; the frequency function is not precisely known; estimation models of the parameters are, as yet, not very satisfactory; and that each value of α requires a different probability table.

Researchers faced with the above technical problems have sought to take the stable class into account in their research. JENSEN (1969) used conventional techniques with a caveat about the possible effects of non-normal distributions. SHARPE (1971) compared standard regression with a mean-absolute alternative, and came to the conclusion that there was virtually no difference in practice. KAPLAN & ROLL (1972) explicity allowed for stable distributions in their conclusions.

From the above discussion it appears that the share price generating mechanism may be of some non-normal type, where the characteristic exponent is somewhere between 1.2 and 1.9. It was impossible to test the data in this study to determine the alpha value, due to the very large data samples required to obtain accurate estimates of α.

In the results set out in later chapters, the significance of the stable-paretean class of distributions if is less than 2.0 concerns the validity of statistical procedures based on the assumption of normality. For the short time periods, as used in this study, the distribution of share-price changes appears to conform to a normal distribution, but as the time span increases there appears to be increasing non-stationarity in the underlying parameters.

This non-stationarity is consistent both with a stable class of distribution, and with the contaminated normal hypothesis. In practice the assumption that security returns are generated from a normal distribution will not adversely affect the results.

DISTRIBUTION OF PRICE CHANGES IN STANDARDIZED FORM COMPARED TO THE NORMAL DISTRIBUTION. THE CAPITAL GOODS INDEX DAILY JANUARY 1963 TO APRIL 1967.

Standard Deviation Intervals	Left Hand Tail	Right Hand Tail	Total	Normal	Actual + or -
0.50	0.22	0.2609091	0.4809091	.3829249	+
1.00	0.13	0.1663636	0.2963636	.2997645	-
1.50	0.0545455	0.0709091	0.1254545	.1836961	-
2.00	0.0236364	0.0227273	0.0463636	.1881141	-
2.50	0.02	0.0054545	0.0254545	.0330809	-
3.00	0.0045455	0.0036364	0.0081818	.0097195	-
3.50	0.0036364	0.0009091	0.0045455	.0022345	+
4.00	0.0036364	0.0018182	0.0054545	.0004019	+
4.50	0.0018182	0.0009091	0.0027273	.0000565	+
5.00	0.0009091	0.0009091	0.0018182	.0000062	+
+5.00	0.0018182	0.0009091	0.0027273	.0000006	+

From Dryden (1970) Table 3A

COMPARISON OF FREQUENCY DISTRIBUTION WITH UNIT-NORMAL FOR SELECTED YEARS. FT ACTUARIES ALL SHARE INDEX DAILY

Standard Deviation Intervals	Unit Normal	1963	1965	1962-1968
0.50	38.5	40.54	43.53	50.30
1.00	68.26	74.80	75.69	78.13
1.50	86.64	86.22	89.80	90.32
2.00	95.45	93.70	94.12	95.13
2.50	98.76	98.43	96.47	97.30
3.00	99.73	99.61	98.43	98.44
4.00	99.99	99.61	100.00	99.70
5.00	99.99994	100.00	100.00	99.82
+5.00	100.00006			100.18
Number of Observations		254	255	1,664

From Brealey (1970) Table 3

TABLE 2.B

3.0 THE CAPITAL ASSET PRICING MODEL

Capital Market Theory concerns the decisions of investors in assessing and implementing alternative investment choices when faced with uncertain outcomes. Chapter Two discussed the Efficient Market Model and the way information was "reflected" in the prices of securities. The Capital Asset Pricing Model is a risk-adjusted version of the Efficient Market Model, where an explicit differentiation of return and risk is made. The chapter will detail the equilibrium conditions of market theory.

3.1 Markowitz Mean-Variance Model

MARKOWITZ (1952) noted that the rules for ordering uncertain prospects using the maximisation of discounted future returns failed to allow for the observed fact of portfolio diversification. His contribution to portfolio theory, and indirectly to the Capital Asset Pricing Model was to provide a rational justification for this noted fact. Pre-Markowitz, the accepted way of obtaining the highest expected return was to invest in the security with the highest expected return. Markowitz showed that in a risk-averse world, the investor by surrendering a certain amount of future expected return could achieve a very much greater certainty of achieveing a given return just so long as all securities were not perfectly correlated. The Markowitz portfolio objective is to obtain the maximum expected return for a given level of risk, or a minimum risk for a given level of return.

The expected value of a future random variable is the sum of the weighted probabilities of the dispersion of future returns:

$$E(\tilde{R}) = p_1(\tilde{R}_1) + p_2(\tilde{R}_2) + \ldots\ldots + p_n(\tilde{R}_n) \qquad (3.1)$$

The variance of the expected return is:-

$$VAR(\tilde{R}) = p_1(\tilde{R}_1 - E(\tilde{R}))^2 + p_2(\tilde{R}_2 - E(\tilde{R}))^2 + \ldots\ldots$$
$$\ldots + p_n(\tilde{R}_n - E(\tilde{R}))^2 \qquad (3.2)$$

In the Markowitz model the mean expected value and the variance (or its derivative the standard deviation) are used.

The measure of interaction between any two variables is the covariance:-

$$COV(\tilde{R}_j, \tilde{R}_k) = E(\tilde{R}_j - E(\tilde{R}_j))(\tilde{R}_k - E(\tilde{R}_k)) \qquad (3.3)$$

For the portfolio extension of the two asset case, the expected portfolio return is:-

$$E(\tilde{R}_p) = \sum_{j=1}^{n} \tilde{R}_j X_j \qquad (3.4)$$

subject to:-

$$\sum_{j=1}^{n} X_j = 1 \qquad (3.5)$$

where X_j is the fraction of wealth invested in security j. The portfolio weighted expected return is the weighted sum of the individual weighted returns, where the appropriate X_j proportions of asset j are determined by the investor.

Portfolio variance is determined by:-

$$VAR(\tilde{R}_p) = \sum_{j=1}^{n} \sum_{k=1}^{n} COV(\tilde{R}_j, \tilde{R}_k) X_j X_k \qquad (3.6)$$

This allows the computation of all possible expected return/variance (E-V) combinations. The E-V feasibility region is illustrated in Figure 3.1. The E-V frontier can be found by testing the portfolios for E-V efficiency.

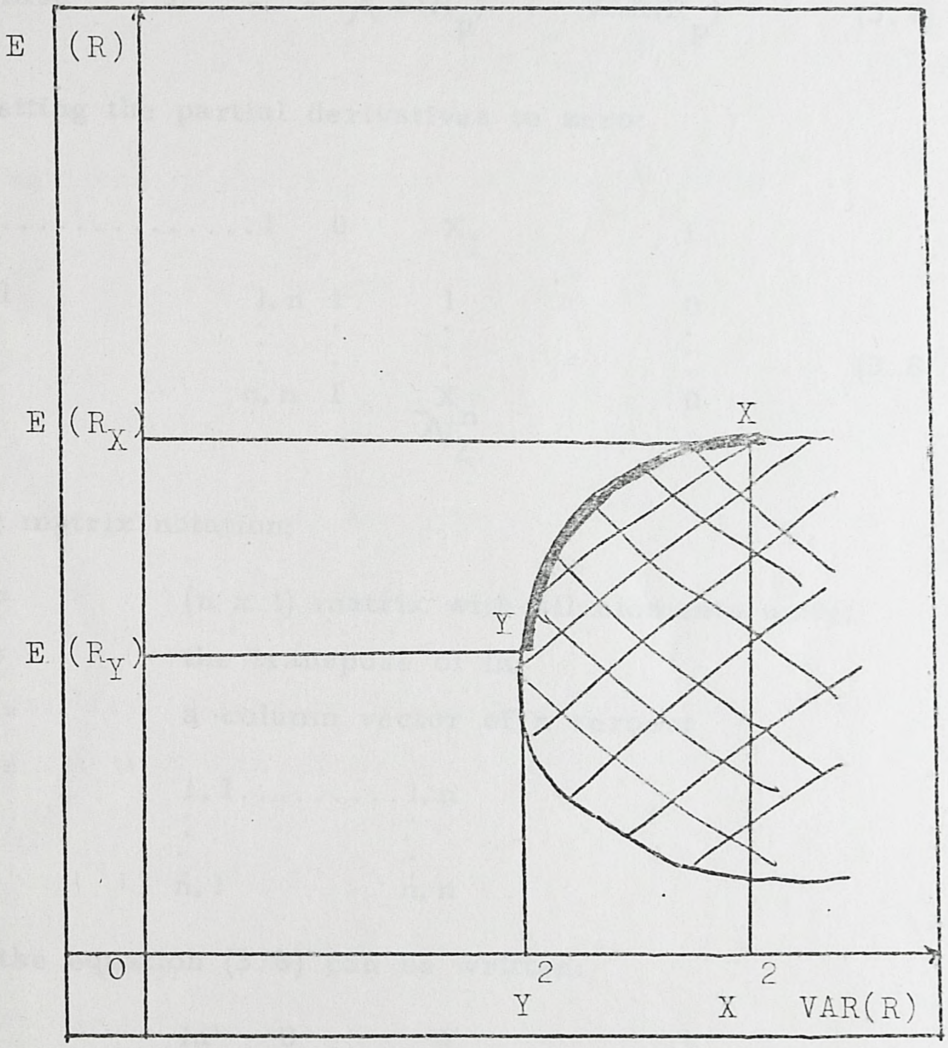


FIGURE 3.1

The E-V Feasibility Region with the Efficient Frontier Y-X Delineated.

The efficiency criterion is conditional upon the reasonableness of operating solely in terms of means and variances of expected returns.

The objective is to minimise the portfolio variance for a given rate of return. By introducing a Lagrange undetermined multiplier λ we can differentiate.

$$\text{Minimise} \qquad Z = -\lambda E(\tilde{R}_p) + VAR(\tilde{R}_p) \qquad (3.7)$$

By setting the partial derivatives to zero:

$$\begin{matrix} 1 & \cdots & 1 & 0 \\ 1,1 & & 1,n & 1 \\ \vdots & & \vdots & \vdots \\ n,1 & & n,n & 1 \end{matrix} \quad \begin{matrix} X_1 \\ 1 \\ \vdots \\ X_n \\ \lambda/2 \end{matrix} = \begin{matrix} 1 \\ 0 \\ \vdots \\ 0 \end{matrix} \qquad (3.8)$$

Using matrix notation:

In = (n x 1) matrix with all elements unity;

In' = the transpose of In;

On = a column vector of n zeroes;

$$\Sigma = \begin{matrix} 1,1 & \cdots & 1,n \\ \vdots & & \vdots \\ n,1 & & n,n \end{matrix}$$

Then the equation (3.8) can be written:

$$\begin{matrix} In' & 0 \\ \Sigma & In \end{matrix} \quad \begin{matrix} W \\ \lambda/2 \end{matrix} = \begin{matrix} 1 \\ On \end{matrix} \qquad (3.9)$$

and where the inverse matrix exists, on re-writing we obtain:-

$$\begin{matrix} W \\ \lambda/2 \end{matrix} \quad \begin{matrix} In' & 0 \\ \Sigma & In \end{matrix}^{-1} \quad \begin{matrix} 1 \\ On \end{matrix} \qquad (3.10)$$

Writing this inverse matrix as:

$$\begin{matrix} A & B \\ C & D \end{matrix}$$

We have:-

$$\begin{matrix} In'A & In'B \\ \lesseqgtr A + In\,C & \lesseqgtr B + In\,D \end{matrix} = \begin{matrix} 1\,0\ldots\ldots0 \\ 0\,1\ldots\ldots0 \\ \vdots \\ 0\,0\ldots\ldots1 \end{matrix} \qquad (3.11)$$

Thus $\lesseqgtr A + In\,C$ equals On. i.e. $A = -\lesseqgtr^{-1} In\,C$ and $In'A = 1$. Therefore $C = -(In' \lesseqgtr^{-1} In)^{-1}$ and finally,

$$\begin{aligned} W &= A \\ &= (\lesseqgtr^{-1} In)(In' \lesseqgtr^{-1} In)^{-1} \end{aligned} \qquad (3.12)$$

The variance of the minimum variance portfolio:-

$$\begin{aligned} VAR(\tilde{R}_p)_{min} &= W' \lesseqgtr W \\ &= (\lesseqgtr^{-1} In(In' \lesseqgtr^{-1} In)^{-1})'(\lesseqgtr^{-1} In(In' \lesseqgtr^{-1} In^{-1})) \end{aligned}$$

Using the symmetrical properties of $\lesseqgtr^{-1}$ this reduces to

$$= (In' \lesseqgtr^{-1} In)^{-1}$$

With the true values of $\lesseqgtr$ unknown, using estimates of $\hat{\lesseqgtr}$ so that, the calculated value of $\hat{W}$ is:-

$$\hat{W} = (\hat{\lesseqgtr}^{-1} In)(In' \hat{\lesseqgtr}^{-1} In)^{-1}$$

$$VAR(\hat{\tilde{R}}_p)_{min} = (In' \hat{\lesseqgtr}^{-1} In)^{-1}.$$

Actual choices of E-V efficient portfolios will be made according to the individual investor's indifference curve preferences. TOBIN (1958) has shown these can be regarded as loci of constant, expected-utility which summarise the investor's preference between returns and risks, and generally will be upward sloping, indicating a risk averse preference. Given the opportunity to invest in any number of efficient portfolios, the investor will choose that portfolio which maximizes:-

$$E(U) = \sum_{j=1}^{k} p_j U_j$$

where p_j is the probability of portfolio j will give the investor wealth W_k and $U_{.j}$ is the utility associated with wealth W_k along the investor's utility curve. This utility choice is true under two assumptions:

a. that the utility function is concave and quadratic;

b. it is concave, and that the investor has assigned the probability distribution such that the returns on all portfolios differ at their greatest by a location and scale parameter only.

There is one test of the Markowitz model on UK data. HOOD (1970) applied the model to the performance and diversification of unit trusts. It necessitated a simulation test requiring detailed knowledge of the possible stock population, and a means for judging portfolio utility. His analysis made use of indices as surrogate stocks, and attempted to simulate each trust under different assumptions. He used a "superior" algorithm to Markowitz's, but note that even with this the size of the matrix computations for $\hat{\sum}$ the covariance matrix is $n(n - 1)/2$.

Hood was forced by the nature of the Markowitz model and the availability of data to analyse only a small fraction of the available unit trust portfolios. By making the simplified, but non-critical assumptions as used in the Capital Asset Pricing Model, we will be able to analyse all available unit trusts. Hood had only sufficient data to analyse 29 trusts out of a possible totality of 121.

3.2 Capital Asset Pricing Theory

SHARPE (1964) and LINTNER (1965) developed an equilibrium condition for capital markets under uncertainty. Both their models owe much to Markowitz, extending his analysis, and in the process much simplifying the calculations involved. This Capital Asset Pricing Model (CAPM) provides a theoretical framework for portfolio performance analysis.

Additional assumptions are required as to investor behaviour, to make the transition from the mean-variance portfolio selection model to an equilibrium state for assets under conditions of uncertainty:-

1. The Separation Theorem: this states that the optimal proportionate composition of the stock portfolio is independent of the fraction of gross wealth investment in risk securities to the total investor's wealth. I.e. the optimal security portfolio is invariant to the investor's fraction of his wealth in securities as against other risk-free investments. Consequently, the determination of the optimal portfolio and the attaining of the highest indifference curve are made independently of each other;
2. All investors are single period, risk-averse, expected utility of terminal wealth maximisers, and choose among alternative portfolios solely on the basis of mean and variance, or standard deviation, of returns;
3. All investors can borrow and lend unlimited amounts of an exogenously given risk-free asset with a certain return (R_f), and that in equilibrium, the sum of borrowing equals the sum of lending;

4. All investors have identical, subjective estimates of means, variances, and covariances of returns, and they all agree concerning the optimal combination of risky assets;

5. All assets are freely divisible, of limited liability and perfectly liquid;

6. There are no taxes or transaction costs;

7. The quantities of assets are given;

8. All investors are price takers;

9. There is a given uniform investment period for all investors.

The Efficient Market Model equation of chapter Two:

$$E(\tilde{P}_{j,\,t+1}/\$_t) \;=\; (1 + E(\tilde{r}_{j,\,t+1})/\$_t)\;P_{j,\,t} \qquad (2.2)$$

provides the basis of the asset pricing model equation. Re-writing the above equation in terms of rates of return and adding in an explicit term for risk gives:-

$$E(\tilde{R}_{j,\,t+1}/\$_t) \;=\; E(\tilde{R}_{j,\,t+1})/\Theta_{j,\,t}) \qquad (3.1)$$

where $\Theta_{j,\,t}$ is an undefined risk term, and $\$_t$ is the information at time t. Given that all investors agree on the conditional value of information, the conditional value can be dropped.

What is required is a definition of the risk coefficient Θ_j for the individual asset or portfolio. Given a choice between the investment in a risk portfolio R_p with variance $VAR(R_p)$ and the risk-free asset R_f his ratio of investment in risk securities will w and in certain returns $(1 - w)$:

$$E(\tilde{R}_i) \;=\; (1 - w)\;\tilde{R}_f \;+\; w\tilde{R}_p \qquad (3.2)$$

and the risk he bears will be:-

$$\mathrm{VAR}(\tilde{R}_{i,p}) \quad = \quad 0 \quad + \quad w\,\mathrm{VAR}(\tilde{R}_p) \tag{3.3}$$

His reward for bearing risk will be:-

$$\frac{\tilde{R}_p \; - \; R_f}{\mathrm{VAR}(R_p)} \quad = \quad \lambda \tag{3.4}$$

This is the individual's "market opportunity line". Given a free portfolio choice R_p and the risk-free asset, his objective is to maximize this λ ratio.

Let h_i be the ratio of investment in the i^{th} stock to all stocks. For any set of values h_i will have an expected return portfolio:-

$$E(\tilde{R}_p) \quad = \quad \sum_i h_i \, E(R_i) \tag{3.5}$$

(Note that $(1 - h_i)$ equals the function in R_f.); and the expected excess return:-

$$E(\tilde{R}^*_p) \; = \; E(\tilde{R}_p) \; - \; R_f \; = \; \sum_i h_i(E(\tilde{R}_i) - R_f) \tag{3.6}$$

$$= \; \sum_i h_i(E(\tilde{R}^*_i))$$

The standard deviation of portfolio return, or excess return is:-

$$\sigma_{R^*_p} \; = \; \sigma_{R_p} \; = \sqrt{\sum_{i=1}^{m} h_i^2 \;\; \sigma_i^2 \; + \; 2 \sum_{i=1}^{m} \sum_{j=1}^{m} h_i h_j \;\; \sigma_{ij}} \tag{3.7}$$

Substituting the above two equations (3.6, 3.7) into , we have the ratio which investors seek to maximize:-

$$= \frac{E(\tilde{R}_p) \; - \; R_f}{\sigma_{R_p}}$$

$$= \frac{E(\tilde{R}^*_p)}{\sigma_{R^*_p}}$$

$$= \frac{\sum_{i=1}^{m} h_i \, E(\tilde{R}^*_p)}{\sqrt{\sum_{i=1}^{m} h_i^2 \, \sigma_i^2 + 2 \sum_{i=1}^{m} \sum_{j=1}^{m} h_i h_j \, \sigma_{ij}}}$$

Investors seek the unconstrained maximum value for λ. To obtain this divide the solution through to get the fractional holding h^*_i which maximizes λ under the constraint $\sum h^*_i$ equals one ($\alpha . R_M$).

$$E(\tilde{R}_p) = \sum h_i^* \; E(\tilde{R}_i) + (1 - \sum h^*_i) \, R_f \tag{3.8}$$

$$= E(\tilde{R}_M) + (1 - \quad) \, R_f \tag{3.9}$$

$$\sigma_{\tilde{R}_p} = \left(\sum_i \sum_j h^*_i \, h^*_j \; COV(\tilde{R}_i, \tilde{R}_k) \right)^{\frac{1}{2}} \tag{3.10}$$

$$= \alpha \, \sigma_{\tilde{R}_M}$$

Taking the investor's utlity function $U(E(\tilde{R}_p) \; \sigma_{R_p} \quad)$

at the optimum, the derivative rate of change in utility is zero, so $h_i = h^*_i$ for all i.

$$\frac{dU}{dE(\tilde{R}_p)} \cdot \frac{dE(\tilde{R}_p)}{dh_i} + \frac{dU}{d\,\sigma_{\tilde{R}_p}} \cdot \frac{d\,\sigma_{\tilde{R}_p}}{dh_i} = 0 \tag{3.11}$$

The equilibrium investor preference:-

$- (dU/d \; \sigma_{\tilde{R}_p}) \; / \; (dU/dE(\tilde{R}_p)$ must equal λ.

We therefore have:-

$$\frac{dE(\tilde{R}_p)}{dh_i} = \lambda \; \frac{d\,\sigma_{\tilde{R}_p}}{dh_i} \tag{3.12}$$

Substituting we obtain:-

$$E(\tilde{R}_i) - R_f = \lambda \frac{COV(\tilde{R}_i, \tilde{R}_M)}{\sigma_{\tilde{R}_M}} \tag{3.13}$$

At the optimum:-

$$\frac{d\,\sigma_{\tilde{R}_p}}{dh_i} = \sum_k h^*_k \frac{CO\,V(\tilde{R}_i, \tilde{R}_M)}{\sigma_{\tilde{R}_M}} \tag{3.14}$$

$$= \frac{COV(\tilde{R}_i \;\sum_k h^*_k \tilde{R}_k)}{\sigma_{\tilde{R}_M}} \tag{3.15}$$

$$= \frac{COV(\tilde{R}_i, \tilde{R}_M)}{\sigma_{\tilde{R}_M}} \tag{3.16}$$

Remembering that $\sum_k h^*_k \tilde{R}_k$ equals $\alpha \tilde{R}_M$. Solving for (3.13) gives:-

$$E(\tilde{R}_i) = R_f + \lambda \frac{COV(R_i, R_M)}{\sigma_{R_M}} \tag{3.17}$$

Consequently the risk appropriate to an individual asset is its covariance with the market ($COV(\tilde{R}_i, \tilde{R}_M)$), and not its own risk which can be eliminated by diversification.

The covariance of asset i and the market is proportional to the marginal impact of the i^{th} asset on the variance of the market portfolio.

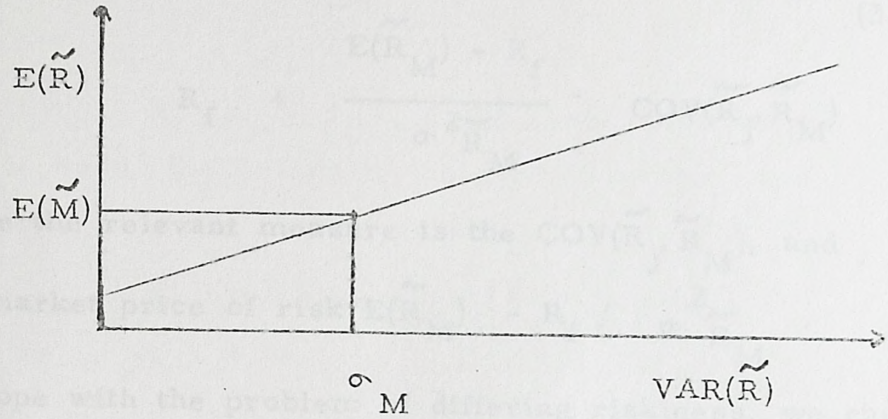
$$\frac{d\,\sigma_{\tilde{R}_M}}{dX_i} = \frac{COV(\tilde{R}_i, \tilde{R}_M)}{\sigma_{\tilde{R}_M}} \tag{3.18}$$

where X_i is the weight of asset i in the market portfolio.

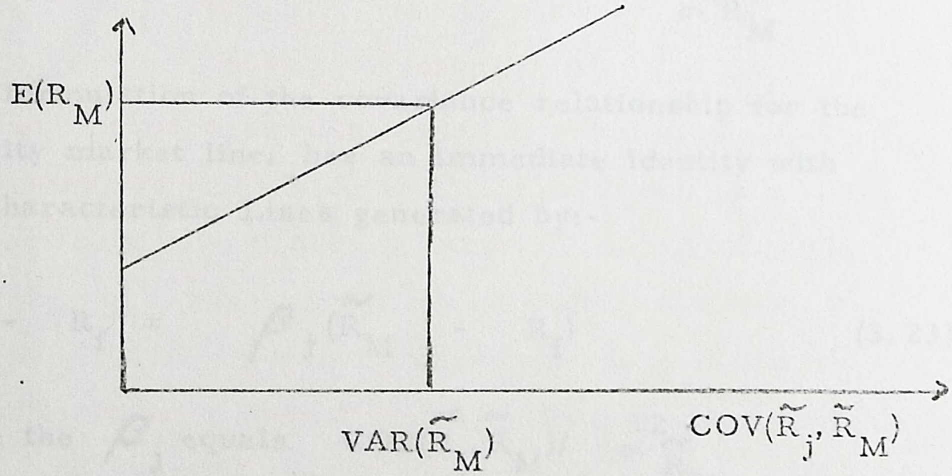
Re-writing equation one in terms of the above, we have the fact that $E(\tilde{R}_i)$ is linearly related to its marginal contributions to the total risk in the market $\sigma_{\tilde{R}_M}$.

In equilibrium, efficient portfolios will be linearly related to the expected market return $E(\tilde{R}_M)$.

$$E(\tilde{R}_p) = R_f + \lambda \, \sigma_{\tilde{R}_p}$$



This risk-return relationship for efficient portfolios in the risk-return plane does not hold for securities or in-efficient portfolios since the appropriate risk measure for these latter is their covariance ($COV(\tilde{R}_j, \tilde{R}_M)$) to the market portfolio. This relationship is the Security Market Line.



$$E(\tilde{R}_j) = \tilde{R}_f + \frac{E(\tilde{R}_M) - R_f}{\sigma^2_{\tilde{R}_M}} \cdot COV(\tilde{R}_j, \tilde{R}_M)$$

3.2.1. The Concept of Systematic Risk.

The expected return $E(\tilde{R}_j)$ will be a function of its covariance of returns to the market:-

$$E(\tilde{R}_j) \;/\; E(\tilde{R}_M), COV(\tilde{R}_j, \tilde{R}_M) =$$

$$R_f + \frac{E(\tilde{R}_M) - R_f}{\sigma^2_{\tilde{R}_M}} \cdot COV(\tilde{R}_j, \tilde{R}_M) \qquad (3.21)$$

where the relevant measure is the $COV(\tilde{R}_j, \tilde{R}_M)$, and the market price of risk $E(\tilde{R}_M) - R_f \;/\; \sigma^2_{\tilde{R}_M}$.

To cope with the problem of differing riskiness, we can normalise equation (3.21) by re-writing as:-

$$E(\tilde{R}_j)/E(\tilde{R}_M).\frac{COV(\tilde{R}_j, \tilde{R}_M)}{\sigma^2_{\tilde{R}_M}} =$$

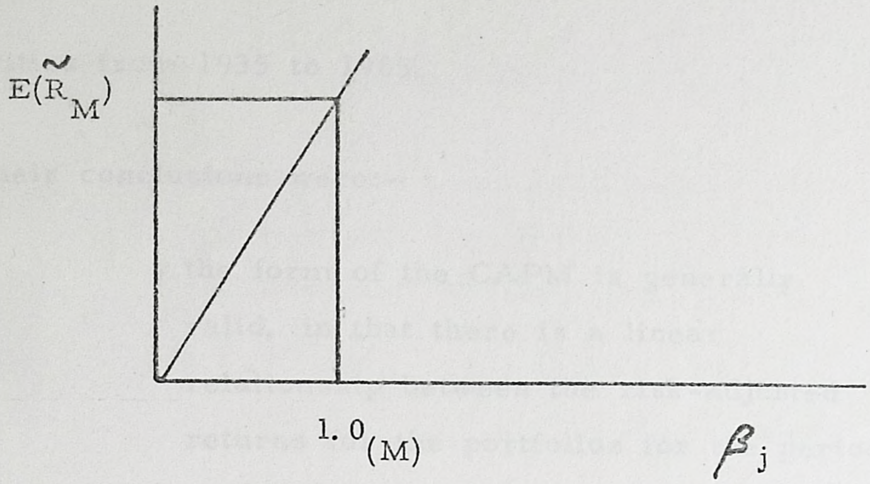
$$R_f + (E(\tilde{R}_M) - R_f).\frac{COV(\tilde{R}_j, \tilde{R}_M)}{\sigma^2_{\tilde{R}_M}} \qquad (3.22)$$

This formulation of the covariance relationship for the security market line, has an immediate identity with the Characteristic Lines generated by:-

$$\tilde{R}_j - R_f = \beta_j (\tilde{R}_M - R_f) \qquad (3.23)$$

where the β_j equals $COV(\tilde{R}_j, \tilde{R}_M) / \sigma^2_{\tilde{R}_M}$.

The beta factor β can be regarded as a normalised covariance with the market on a scale from 0 to 1.0 (the market) and beyond.



with $E(\tilde{R}_j) - R_f = \beta_j E(\tilde{R}_M) - R_f$, such that when beta is zero, the return is the risk free rate, and beta one, it is the market return.

$$\beta = 0, \quad \text{then} \quad E(\tilde{R}_j) = R_f;$$
$$\beta = 1, \quad E(\tilde{R}_j) = E(\tilde{R}_M).$$

This is the systematic risk of a security, or portfolio, and defines the relative riskiness of the security to the market portfolio.

3.3 Tests of the Capital Asset Pricing Model

There have been too many studies examining the implications of the CAPM to detail them all here. The various tests have gradually increased in significance and range of study. The first empirical analysis was SHARPE (1965) in which he examined the risk-return characteristics of mutual funds. Other researchers then went on to examine the hypothesis for managed funds, notably JENSEN (1968, 1969), and studies were made of the hypothesis using individual securities and random portfolios.

A most complete study of the CAPM hypothesis was undertaken by BLACK, JENSEN & SCHOLES (1973) in a time series analysis during which they examined all NYSE securities from 1935 to 1965.

Their conclusions were:-

i. the form of the CAPM is generally valid, in that there is a linear relationship between the risk-adjusted returns for the portfolios for the periods analysed;

ii. the intercept of the CAPM equation is not equal to the observed risk-free rate, but to some risk-free portfolio with zero covariance to the market portfolio.

As a result, they postulated a generalised form of the CAPM, in which the assumption of riskless borrowing is relaxed, and that a two-factor model results:-

$$E(\tilde{R}_j) = E(\tilde{R}_z) + \beta_j E(\tilde{R}_M - \tilde{R}_z) \qquad (3.24)$$

which is equation 26 in their study.

3.4 Empirical Use of the CAPM in this Study

In the study of unit trust portfolios, the risk-free assumption of the CAPM will be maintained, as the model, in this form, is adequate for the shorter time periods of this analysis.

Following SMITH & TITO (1969), various formulations of the regression equations for the estimates of the relevant parameters: $\hat{\tilde{R}}_j$, $\hat{\tilde{R}}_M$ and $\hat{\beta}_j$ were made. These are summarized for all trusts for the period 1966-1975 in Table 3.A.

Three different regression equations were calculated:-

i. $\tilde{R}_j = \tilde{A}_j + \tilde{\beta}_j \tilde{R}_M$ (3.25)

assumes that the relationship is linear, and was used by TREYNOR (1965) in obtaining his "characteristic lines";

ii. $(\tilde{R}_j - R_f) = \tilde{\alpha}_j + \tilde{\beta}_j(\tilde{R}_M - R_f)$ (3.25)

follows the usage by JENSEN (1968);

iii. $\tilde{R}_j = y_j R_f + \tilde{\beta}_j \tilde{R}_M$ (3.26)

makes use of the risk-free rate as an explicit variable.

The estimates of the systematic risk coefficient beta were very similar for all three formulations. Because the equation (3.25) gave slightly higher estimates and coefficients of determination R^2, this formulation is to be preferred.

To test the validity of the CAPM, following the Black, Jensen & Scholes approach in their 1973 article, a cross-sectional regression was made to the data to obtain CAPM outcomes. This cross-sectional analysis is summarized in Table 3.B.

The first notable point is that the regression fit as determined by the R^2 coefficient of determination is very low ($R^2 = 0.07034$). Nevertheless, the regression coefficients, as tested by the T-statistics at the 0.05 level, indicate significant coefficients for both the slope and intercept of the model.

The calculated quarterly risk-free return under-estimated the actual risk-free return by 0.0286 per annum, nearly 3 percent. The actual risk-premium was over-estimated by half a percent per annum.

TABLE 3.A(1)

UNIT TRUST REGRESSION RESULTS 1966-1975

		$\tilde{R}_j = \hat{A}_j + \hat{\beta}_j \tilde{R}_M$			$(\tilde{R}_j - \tilde{R}_f) = \hat{\alpha}_j + \hat{\beta}_j(\tilde{R}_M - \tilde{R}_f)$			$\tilde{R}_j = \hat{\gamma}_j \tilde{R}_f + \hat{\beta}_j \tilde{R}_M$		
Trust Number	Trust Type	A_j	β_j	R^2	α_j	β_j	R^2	γ_j	β_j	R^2
1	G	.00888	.68385	.85545	.00309	.68556	.85732	.38809	.68840	.85330
2	G	.00768	.73432	.85524	.00281	.73785	.85712	.30834	.73862	.85335
3	G	.00939	.65601	.87370	.00308	.66070	.87430	.36457	.66143	.86974
4	G	.00875	.63773	.75647	.00211	.64205	.75999	.36159	.64250	.75382
5	G	.00851	.74355	.88517	.00381	.74740	.88630	.32831	.74850	.88256
6	I	.01626	.63896	.77325	.00965	.64378	.77619	.71253	.64727	.76584
7	S	.01203	.50369	.43015	.00294	.50762	.43741	.60950	.50872	.42938
8	G	.00077	.67476	.74931	-.00520	.68037	.75262	-.13226	.67738	.74978
9	C	-.00110	.64520	.76487	-.00761	.65025	.76790	-.18124	.64643	.76584
10	I	.02410	.64451	.39368	.01757	.65352	.40219	.86907	.65934	.37943
11	G	-.00106	.88332	.93776	-.00320	.88559	.93855	-.12972	.88390	.93806
12	G	.00398	.71557	.92358	-.00122	.71648	.92592	.27830	.71620	.92468
13	I	.00598	.82812	.91216	.00283	.82963	.91353	.29478	.83074	.91190
14	G	-.00374	.84196	.95845	-.00663	.84312	.95915	-.18331	.84031	.95834
15	G	.00809	.82360	.86366	.00485	.82583	.86566	.36261	.82762	.86256
16	G	.00639	.54377	.63113	-.00198	.55040	.63621	.15350	.54874	.62775
17	C	.01144	.41780	.36678	.00078	.42354	.37530	.51699	.42344	.36331
18	I	.01765	.59094	.78404	.01016	.59589	.78659	.79739	.59964	.77521
19	G	.00217	.64263	.83487	-.00437	.64496	.83826	.13957	.64315	.83511
20	S	.00952	.51424	.50187	.00061	.52259	.50924	.22774	.52165	.49517
21	G	.00329	.83737	.95281	.00032	.83719	.95404	.25051	.83763	.95362
22	C	.00734	.96042	.94914	.00662	.95964	.94985	.43350	.96267	.94987
23	I	.00407	.86984	.92354	.00169	.86799	.92511	.36910	.86935	.92553
24	S	.01028	.48334	.47217	.00082	.48766	.47980	.50894	.48781	.47105
25	G	.00705	.78841	.90859	.00319	.78836	.91071	.45539	.79005	.91045
26	C	.00801	.70226	.85519	.00256	.70410	.85797	.43568	.70522	.85562
27	S	-.01958	.41011	.23276	-.03041	.42167	.24275	-1.37826	.40710	.25378
28	G	.00690	.90390	.90488	.00514	.90644	.90628	.24864	.90815	.90351
29	S	.00618	.88723	.89550	.00410	.89300	.89698	.03694	.89354	.89339
30	I	.00657	.89834	.83851	.00470	.90045	.84089	.25850	.90208	.83755

TABLE 3.A (2)

Trust Number	Trust Type	A_j	β_j	R^2	α_j	β_j	R^2	γ_j	β_j	R^2
31	I	.00927	.85230	.82594	.00657	.85252	.82837	.52309	.85546	.82671
32	G	.00967	.71793	.82745	.00450	.72108	.83000	.43769	.72268	.82559
33	G	.00707	.82044	.88518	.00377	.82442	.88656	.21336	.82535	.88302
34	G	.01209	.68056	.77940	.00623	.68509	.78239	.49914	.68715	.77481
35	G	.00904	.81685	.91441	.00568	.82009	.91532	.35683	.82200	.91203
36	I	.01467	.73337	.85065	.00978	.73635	.85282	.69328	.74018	.84754
37	G	.00717	.71521	.86097	.00196	.71702	.86357	.38887	.71787	.86128
38	S	.00227	.55963	.57096	-.00581	.56586	.57727	-.03911	.56265	.57055
39	G	-.01399	.62322	.65935	-.02090	.62922	.66426	-.87696	.61962	.66642
40	I	.00383	.55461	.57135	-.00434	.56171	.57760	-.00715	.55892	.57001
41	S	-.00844	.69023	.71436	-.01413	.69615	.71845	-.62189	.68931	.71950
42	S	-.01391	.76394	.82244	-.01824	.76761	.82494	-.80451	.75946	.82539
43	S	.00134	.34638	.20576	-.01064	.35510	.21464	-.13059	.34961	.20613
44	S	-.00733	.73941	.73148	-.01211	.74462	.73546	-.54814	.73872	.73516
45	S	.00442	.83143	.83715	.00134	.83215	.83957	.25865	.83282	.83744
46	C	.00725	.88942	.88736	.00522	.89155	.88902	.29606	.89342	.88622
47	S	.02700	.43405	.41070	.01663	.44005	.41910	1.28122	.44652	.39669
48	G	.00612	.86572	.87821	.00365	.86902	.87996	.18332	.86999	.87676
49	S	.00588	.84084	.77996	.00296	.84443	.78328	.16624	.84508	.77862
50	C	.00148	.64155	.67540	-.00510	.64725	.68008	-.08605	.64433	.67544
51	S	.01339	.44153	.40467	.00316	.44639	.41284	.65421	.44746	.40229
52	I	.01427	.79295	.86725	.01048	.79492	.86930	.70411	.79919	.86569
53	I	.01167	.75014	.85084	.00710	.75104	.85362	.65234	.75421	.85225
54	I	.00484	.68638	.86791	-.00090	.68743	.87121	.32667	.68731	.86931
55	S	-.00222	.87971	.86743	-.00443	.88121	.86937	-.14322	.87919	.86757
56	S	-.00045	.53251	.31965	-.00903	.54008	.32767	-.24023	.53525	.32080
57	S	.00454	.78562	.84582	-.00848	.79137	.84759	-.45828	.78679	.84959
58	S	.00034	.77809	.89350	-.00373	.78133	.89476	-.06619	.77935	.89361
59	I	.01210	.72420	.89780	.00705	.72623	.89966	.62128	.72915	.89732
60	S	.00629	.56111	.76208	-.00176	.56688	.76440	.18957	.56548	.75893
61	G	-.00125	.74548	.75075	-.00593	.75191	.75438	-.31265	.74831	.75301
62	C	.00435	.71225	.77234	-.00093	.71609	.77565	.13219	.71526	.77140

TABLE 3.A (3)

Trust Number	Trust Type	A_j	β_j	R^2	α_j	β_j	R^2	γ_j	β_j	R^2
61	G	-.00125	.74548	.75075	-.00593	.75191	.75438	-.31265	.74831	.75301
62	C	.00435	.71225	.77234	-.00093	.71609	.77565	.13219	.71526	.77140
63	S	-.00121	.79641	.81234	-.00496	.80387	.81495	-.39176	.80035	.81578
64	C	.00554	.56295	.64252	-.00248	.56972	.64739	.09399	.56778	.63979
65	C	.00840	.61380	.66264	.00132	.61888	.66761	.31177	.61885	.65960
66	G	-.00106	.71519	.86812	-.00629	.72145	.86837	-.27950	.71779	.37040
67	S	.00951	.59847	.56167	.00215	.60483	.56811	.30264	.60487	.55726
68	S	.02040	.19323	.04163	.00561	.20371	.04634	.80267	.20488	.03168
69	C	.01163	.63056	.74870	.00486	.63612	.75184	.44000	.63744	.74270
70	I	.01249	.70046	.79371	.00700	.70394	.79677	.57000	.70654	.79072
71	S	-.00657	.47379	.31454	-.01620	.47885	.32181	-.38141	.47169	.31522
72	G	.00097	.71346	.80037	-.00430	.71990	.80251	-.18646	.71703	.80128
73	G	.00434	.71051	.75678	-.00098	.71653	.76006	.00923	.71516	.75539
74	I	.01423	.55744	.67436	.00611	.56346	.67876	.57872	.56531	.66578
75	S	-.00854	.76514	.67740	-.01287	.77509	.68328	-.88948	.76770	.68966
76	C	.00234	.55953	.66394	-.00574	.56651	.66817	-.07799	.56315	.66360
77	G	.00293	.67859	.82217	-.00296	.68363	.82399	.00807	.68171	.82142
78	G	.00330	.64101	.83191	-.00328	.64569	.83357	.06459	.64378	.83097
79	G	.00129	.48589	.66697	-.00815	.49555	.66789	-.25009	.49066	.66990
80	G	.00864	.47464	.63609	-.00098	.47997	.64193	.37282	.47914	.63275
81	C	.00627	.69160	.78551	.00061	.69656	.78828	.17581	.69614	.78325
82	C	.00561	.64292	.71626	-.00093	.64641	.72069	.24723	.64577	.71548
83	S	-.00495	.76855	.81874	-.00920	.77301	.82120	-.39859	.76847	.82101
84	G	.00079	.75600	.85489	-.00369	.76154	.85622	-.16324	.75907	.85556
85	S	.01306	.74660	.72849	.00841	.75199	.73255	.46981	.75465	.72269
86	C	-.00782	.71559	.78985	-.01304	.72176	.79234	-.61630	.71528	.79571
87	I	.00100	.60415	.72642	-.00624	.60680	.73139	.07938	.60418	.72655
88	S	-.00043	.35184	.62367	-.01229	.35587	.63552	.04275	.35080	.62379
89	C	-.00188	.80515	.82009	-.00546	.80853	.82271	-.19864	.80575	.82077
90	I	.00112	.85394	.82352	-.00156	.85577	.82607	.01908	.85492	.82316

TABLE 3.A (4)

Trust Number	Trust Type	A_j	β_j	R^2	α_j	β_j	R^2	γ_j	β_j	R^2
91	G	-.00397	.79661	.90553	-.00769	.79697	.90746	-.12952	.79398	.90485
92	S	.02101	.36513	.13673	.00936	.37618	.14457	.72330	.37851	.12407
93	G	.00075	.86278	.93501	-.00176	.86467	.93589	-.00680	.86370	.93498
94	G	.00110	.86293	.94281	-.00142	.86497	.94353	.00220	.86411	.94274
95	I	.01032	.81170	.92172	.00686	.81425	.92267	.46258	.81683	.91976
96	G	-.00232	.89204	.94532	-.00431	.89531	.94587	-.25379	.89290	.94638
97	S"	.00793	.55190	.60999	-.00029	.55868	.61552	.21950	.55768	.60552
98	S" *	-.00485	.99913	.96136	-.00486	.99874	.96188	-.22291	.99679	.96110
99	I"	.01415	.72999	.82516	.00921	.73319	.82770	.65603	.73673	.82185
100	G"	.01070	.70354	.76238	.00527	.70741	.76586	.45593	.70918	.75944
101	G" *	-.00724	.97832	.97132	-.00763	.97775	.97173	-.32372	.97471	.97062
102	S" *	-.00802	1.00308	.96732	-.00796	1.00209	.96772	-.35091	.99897	.96640
103	G"	.00631	.67361	.75462	.00034	.67599	.75866	.33153	.67610	.75463
104	G" *	-.00037	.86327	.94115	-.00287	.86513	.94193	-.06227	.86370	.94123
105	S" *	-.00615	1.01294	.95807	-.00592	1.01314	.95869	-.32812	1.01059	.95814
106	I"	.00258	.90341	.88980	.00080	.90519	.89143	.07302	.90526	.88955
107	G"	-.00145	.72211	.75458	-.00656	.72902	.75791	-.33906	.72508	.75741
108	G"	-.00287	.71240	.74072	-.00815	.71937	.74430	-.41022	.71476	.74453
109	G"	-.00114	.74485	.73528	-.00583	.75140	.73924	-.31315	.74781	.73752
110	G"	-.00054	.74035	.75980	-.00532	.74726	.76317	-.30147	.74381	.76204
111	S	.00436	.64323	.75876	-.00219	.64982	.76130	.00895	.64791	.75704
112	S	.00518	.66691	.74320	-.00094	.67292	.74651	.07176	.67164	.74115
113	S	.00319	.70813	.75622	-.00217	.71382	.75954	-.02879	.71203	.75548
114	S	.00513	.69421	.67941	-.00048	.69935	.68414	.10668	.69842	.67787
115	G" *	.00640	.91226	.87168	.00481	.91030	.87328	.47413	.91293	.87379
116	S"	.00244	.72729	.77235	-.00255	.72854	.77605	.19224	.72768	.77289
117	G"	-.00239	.74566	.84758	-.00706	.75120	.84901	-.31968	.74733	.84994
118	G"	-.00102	.75947	.85558	-.00544	.76500	-.25607	-.25607	.76179	.85724

" - means derived from the trust name. * - trust is reinvested in "the market".

TABLE 3B

THE CAPITAL ASSET PRICING MODEL CROSS-SECTIONAL REGRESSIONS
1966-1975
UK UNIT TRUSTS GENERAL, INCOME, AND GROWTH, N = 68.

A)- Total Return Model

$$\sum_{j=1}^{40} \hat{R}_j = y_o + y_1 \hat{\beta}_j + e_j$$

$$.44502 \quad .58453 \qquad R^2 = .07034$$
$$(2,3222) \quad (2.2346) \text{ T-statistic}$$

B)- Average Quarterly Return Model

$$\hat{\bar{R}}_j = y_o + y_1 \hat{\beta}_j + e_j$$

$$.01113 \quad .01461 \qquad R^2 = .07034$$
$$(2.3222) \quad (2.2346)$$

where $y_o = R_f$ for quarterly data

and $y_1 = R_M - R_f$

the actual values for 1966-1975 were

$$\hat{R}_f = .01827$$

$$\hat{R}_M - \hat{R}_f = .01409$$

C)- Quadratic Model

$$\hat{\bar{R}}_j = y_o + y_1 \hat{\beta}_j + y_2 \hat{\beta}_j^2 + u_j$$

$$.01068 \quad .01590 \quad -.0090$$
$$(.4598) \quad (.2415) \quad (-.0196) \qquad R^2 = .07034$$

D)- Alpha Model

$$\hat{\alpha}_j = y_o + y_1 \hat{\beta}_j + e_j$$

$$-.00594 \quad .00862 \qquad R^2 = .02538$$
$$(-1.2329) \quad (1.3111)$$

TABLE 3.C

RESULTS OF CROSS-SECTIONAL REGRESSION ON

US Securities (JACOBS (1971))	REGRESSION RESULTS			THEORETICAL VALUES	
563 securities	$R_j = y_0 + y_1 {}_j + u_j$				
1950 - 1965	y_0	y_1	R^2	$y_0 = 0$	$y_1 = R_M - R_f$
Monthly	0.70	0.30 (0.06)	0.03	0	0.8
Yearly	6.7	6.7 (0.53)	0.21	0	10.8
US Portfolios (BLACK, JENSEN & SCHOLES (1973))					
10 portfolios which average 75 securities per per portfolio	$R_p = y_0 + y_1 {}_p + u_p$			$y_0 = R_f$	$y_1 = R_M - R_f$
	y_0	y_1	R^2		
1931 - 1965					
Monthly	0.519 (0.05)	1.08 (0.05)	0.90	0.16	1.42
Data From This Study	y_o	y_1	R^2	$y_0 = R_f$	$y_1 = R_M - R_f$
68 unit trust portfolios					
Quarterly 1966 - 1975	1.113 (0.026)	1.461 (0.033)	0.0734	1.827	1.409

Figures in brackets are standard errors of the samples; rates are in percent per period.

In Table 3.C, the results are shown in comparison with two US studies, first one by Jacobs using individual securities, and then the Black, Jensen & Scholes results. Both these results indicate:-

i. the intercept (Y_0) is not exactly equal to the risk-free rate (R_f) as estimated from their data; and

ii. the cross-sectional correlation varies from as low as 0.03 to as high as 0.90. (This may well correspond with the techniques used to generate portfolios; as well as the time periods selected for the data.)

A scatter plot of the trust returns against the systematic risk estimates gives a picture as shown in Figure 3.2. The trusts do not lie on a line connecting the risk-free return with that of the market (M); the line R_fMQ on the diagram. This was predicted by the low coefficient of determination in the cross-sectional regressions.

To test for heterogeneity, the residuals for the cross-sectional regression were plotted. There was no evidence that the variance increased along with systematic risk, or that there was auto-correlation in the residuals. (Figure 3.3).

To test for a "missing" variable in the cross-sectional risk equation a quadratic model was used. The addition of a squared term to the systematic risk did not significantly increase the value of the regression. The new term had a negative sign, which would imply a diminishing effect with increased beta.

The relationship between the performance measure alpha ($\hat{\alpha}_j$) and systematic risk was tested in equation D

THE "SECURITY MARKET LINE" IN U.K.
(Capital Asset Pricing Model). 1966-1975

Unit Trusts, N = 68, Excluding Specialized Trusts

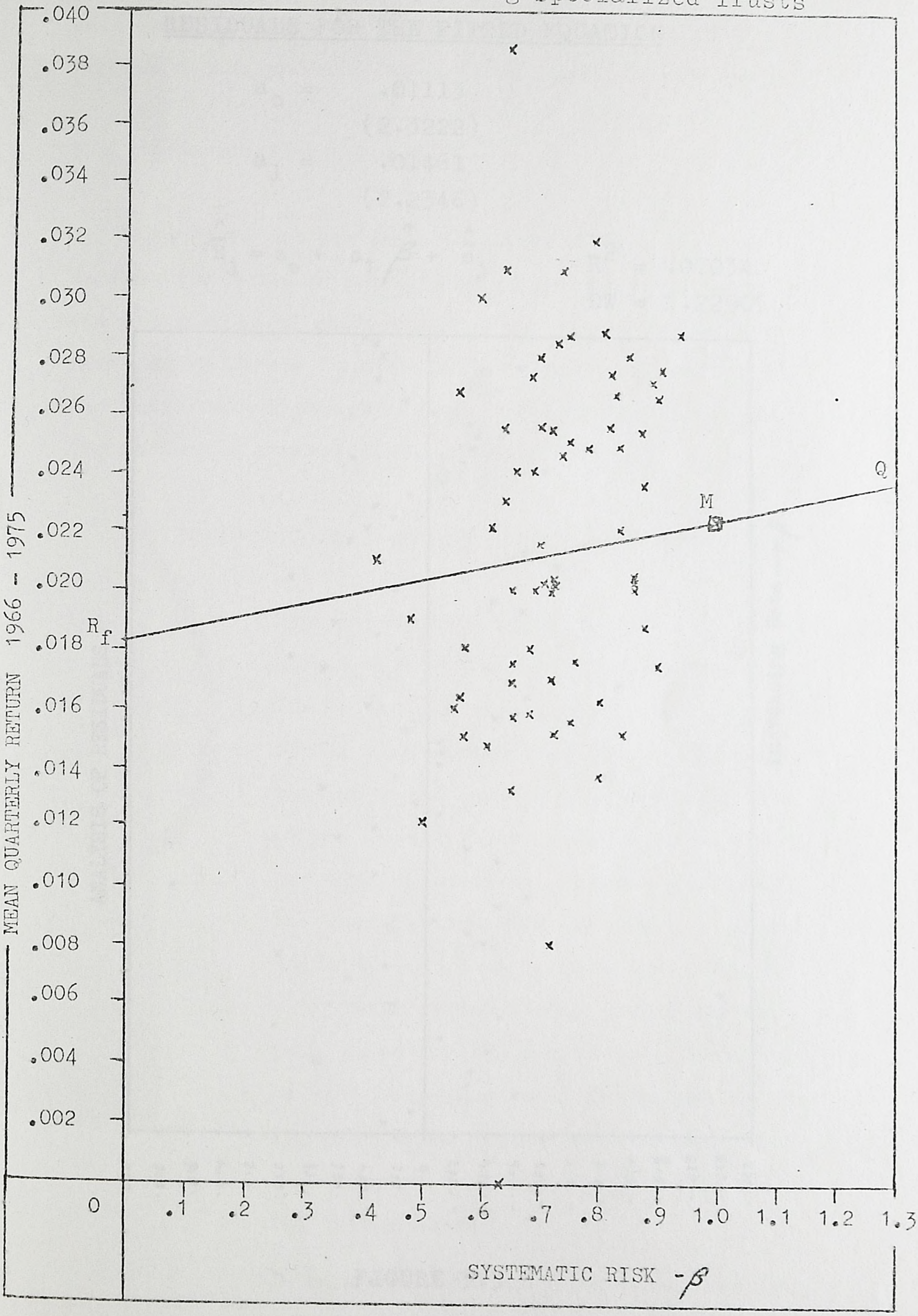


FIGURE 3.2

RESIDUALS FOR THE FITTED EQUATION

$$a_o = .01113$$
$$(2.3222)$$
$$a_1 = .01461$$
$$(2.2346)$$

$$\hat{R}_j = a_o + a_1 \hat{\beta} + \hat{\tilde{e}}_j \qquad R^2 = .07034$$
$$DW = 2.22905$$

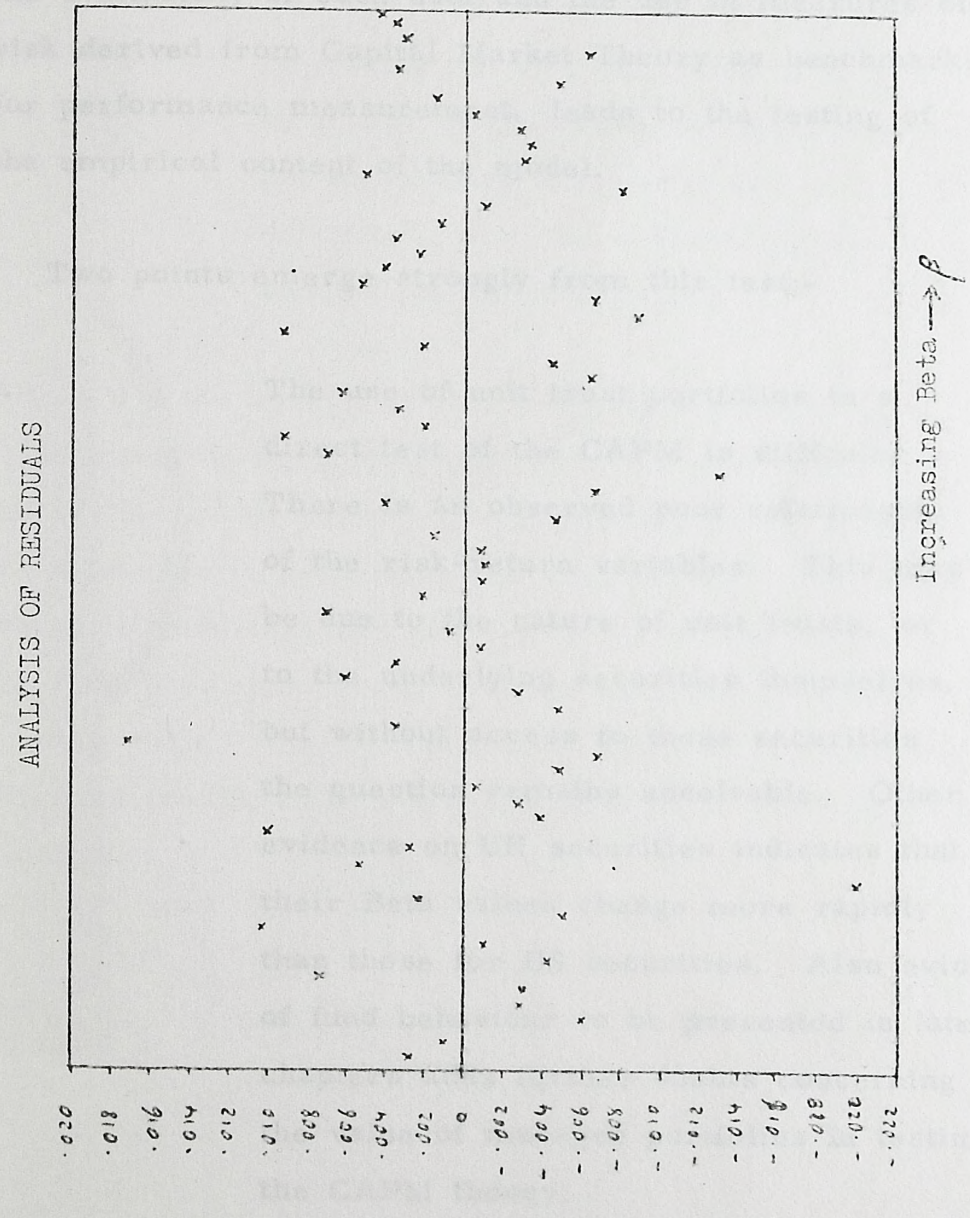


FIGURE 3.3

(Table 3.B). There was little relationship between the two measures, though there was a positive slope to the regression. This relationship between the performance measures and systematic risk will be further discussed in relation to unit trust performance.

3.4.3 Conclusions

While it is not the main intention of this study to analyse the value of the CAPM using unit trust data, the availability of such data and the use of measures of risk derived from Capital Market Theory as benchmarks for performance measurement, leads to the testing of the empirical content of the model.

Two points emerge strongly from this test:-

1. The use of unit trust portfolios in a direct test of the CAPM is difficult. There is an observed poor relationship of the risk-return variables. This may be due to the nature of unit trusts, or to the underlying securities themselves, but without access to these securities the question remains unsolvable. Other evidence on UK securities indicates that their Beta values change more rapidly than those for US securities. Also evidence of fund behaviour to be presented in later chapters adds further doubts concerning the value of managed portfolios in testing the CAPM theory;

2. In analysing the cross-sectional results (Tables 3.B and 3.C), the value of the risk-return slope regression estimate is close to that of the actual outcome. This

is not true for the risk-free rate which was under-estimated. One can put forward a number of reasons for the model under-estimating the risk-free rate, but the most likely one is that as Black, Jensen & Scholes put forward, there is in fact not a risk-free rate but a zero-covariance portfolio or riskless assets (in terms of the market portfolio). This portfolio is not a risk-free portfolio of assets because of possible macro-economic uncertainties.

In pricing the risk-free rate of return by means of the cross-sectional regression, the inflationary component was under-estimated, thus the difference between the results and the regression.

So while the results of this analysis indicate a weak relationship between risk and return as predicted by the CAPM this relationship is weak because of the nature of the data used in estimating the coefficients. It is for others to undertake the exhaustive test of the CAPM using UK securities data on the lines of the Black, Jensen & Scholes work. We can be content with the fact that the observed coefficients in our test behave as the model predicts.

4.0 INVESTING INSTITUTIONS

This chapter looks at the various equity investing institutions and places them in context. In particular insurance funds, pension funds and investment and unit trusts will be examined.

There is a considerable problem in terms of data available for institutions. Little information is published at the individual fund level, and the gross statistics only give a general view. In subsequent chapters a closer analysis will be made of unit trusts. This chapter delineates the broad enviroment within which they operate.

The ownership of common stock in the UK has been characterised by a very significant long term decline in the role of the private investor and the growth of investing institutions. This switch to financial intermediaries is also a phenomenon in the United States' capital market. The growth of US open-ended investment companies, mutual funds, has paralled that of unit trusts in this country.

In Table 4.A the flow of funds for the personal sector is shown. Here the heading "Acquisitions of Financial Assets", based on broad groupings, indicate that during the period individuals were net disposers of company and overseas securities during every year of this study 1966 to 1975. On the other hand, the acquisition of financial intermediaries is equally striking: pension fund and insurance company policies increased from just over a £1 bn in 1964 to £5.4 bn in 1976, an increase not only due to the effects of inflation, but also a desire for better policies. Over this period, the investment in unit trusts was £1.5 bn; the total assets of units under management rose from £400 m to £2.3 bn. Other institutions have

TABLE 4.A (1)

FLOW OF FUNDS (PERSONAL SECTOR)

£m	1964	1965	1966	1967	1968	1969	1970	1971
SAVING	1,975	2,097	2,444	2,370	2,363	2,561	3,122	3,289
Net Capital Transfers	-199	-157	-156	-170	-233	-397	-358	-324
Capital Expenditure	-1,057	-1,137	-1,140	-1,267	-1,482	-1,379	-1,497	-2,165
FINANCIAL SURPLUS	719	803	1,148	933	648	785	1,267	800
BORROWING								
House Purchase	-742	-679	-768	-982	-980	-858	-1,246	-1,835
Bank Borrowing (A)	-184	27	60	-138	-38	77	-59	-576
Hire Purchase Debt	-78	-118	112	17	-23	31	-43	-191
Other (B)			-40	-16	-79	-130	-91	-32
	-1,004	-770	-636	-1,119	-1,120	-880	-1,439	-2,634
AQUISITION OF FINANCIAL ASSETS								
Life Ass. & Pensions	1,140	1,173	1,241	1,372	1,508	1,507	1,735	1,930
Government Stocks	-62	-80	-19	-217	-245	77	-201	451
Company & Overseas Secs	-567	-663	-464	-590	-697	-528	-881	-1,338
Unit Trust Units	77	59	105	84	258	186	89	46
Bank Deposits & Cash	588	624	393	803	592	378	935	1,060
Building Societies	501	657	726	1,090	762	890	1,484	1,961
National Savings			-202	-43	-91	-224	-51	371
Local Authority Debt			236	159	157	237	-93	-215
Other	377	311	202	175	229	103	184	279
	2,054	2,061	2,218	2,833	2,473	2,626	3,201	4,545
Identified Financial Transactions	1,050	1,291	1,582	1,714	1,353	1,746	1,762	1,911
Unidentified	-331	-488	-434	-781	-705	-961	-495	-1,111

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(A)-Other than for house purchase.
(B)-Including accruals adjustments and trade credit received from public corporations.

TABLE 4.A (2)

FLOW OF FUNDS (PERSONAL SECTOR)

£m	1972	1973	1974	1975	1976
SAVING	4,513	5,910	8,473	10,378	
Net Capital Transfers	-371	-321	-313	-371	
Capital Expenditure	-2,796	-3,099	-2,952	-3,707	
	1,346	2,490	5,208	6,300	
BORROWING					
House Purchase	-2,779	-2,831	-2,278	-3,704	
Bank Borrowing (A)	-1,927	-1,027	-24	446	
Hire Purchase Debt	-253	-183	66	-57	
Other (B)	-33	-272	-247	-56	
	-4,992	-4,313	-2,483	-3,371	
AQUISITION OF FINANCIAL ASSETS					
Life Ass. & Pensions	2,603	3,093	3,490	4,331	
Government Stocks	-15	732	588	959	
Company & Overseas Secs	-1,469	-2,232	-1,217	-1,364	
Unit Trust Units	203	162	25	113	
Bank Deposits & Cash	2,007	3,616	3,327	329	
Building Societies	2,139	2,188	2,017	4,165	
National Savings	459	102	-17	423	
Local Authority Debt	-92	355	772	-180	
Other	326	87	-15	200	
	6,161	8,103	8,970	8,976	
Identified Financial Transactions	1,169	3,790	6,487	5,605	
Unidentified	177	-1,300	-1,279	695	

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(A)-Other than for house purchase

(B)-Including accruals adjustments and trade credit received from public corporations.

increased their levels, notably bank deposits and building societies: a reflection of higher interest rates and risk-averse behaviour.

The use to which the inflow of funds has been put is shown in Table 4. B. The government sector and banks have been excluded. There has been a very large increase in the flow of funds to the financial sector. The lower half of the table shows where the funds were invested. The tremendous inflow of funds has generated an insatiable appetite for investments. Acquisitions of stock more than absorbed the disposals made by individuals. Stocks, gilt-edged securities and loans for house purchase account for the bulk in the increase in assets.

Tables 4. C through 4. F give the percentage asset distribution of the four types of investing institution. (The tables are made "compatible" with the tables to be found in FRIEND, BLUME & CROCKETT (1970) for US data.) Both pension funds and insurance companies place a considerable proportion of their assets in unmarketable investments. The loan, preference and common stock proportions of their assets has remained fairly constant. A similar picture is presented by insurance companies: liquid assets have risen as a percentage, equity remained fairly constant and government stock holding has varied up and down. The investment trusts had little governme nt stock and tended to invest the bulk of their funds in equities, a large proportion of which were overseas securities. Unit trust portfolios followed investment trusts in that their principal investments were equities. They have also kept a cash balance, low in the sixties but rising in the seventies as a hedge against uncertainty.

TABLE 4.B (1)

FLOW OF FUNDS: FINANCIAL INSTITUTIONS OTHER THAN BANKS

£m	1964[1]	1965	1966	1967	1968	1969	1970	1971
INCREASE IN FINANCIAL LIABILITIES								
Life Ass. & Pension Funds	-1,084	-1,166	-1,198	-1,250	-1,603	-1,535	-1,755	-1,950
Building Societies	-724	-654	-727	-1,107	-757	-895	-1,481	-2,030
Other Deposits		-267	-222	-66	-104	-161	-219	-282
Capital Issues	-84	-36	-106	-67	-132	-95	-55	-169
Unit Trust Units	-77	-59	-105	-84	-258	-186	-89	-46
Other (A)	-76	-65	46	-54	-37	23	-80	-418
TOTAL	-2,045	-2,247	-2,312	-2,628	-2,891	-1,605	-3,679	-4,895
INCREASE IN FINANCIAL ASSETS								
Short Term Assets (B)	18[1]	132	181	152	125	227	483	28
Government Stock	102	241	122	518[2]	44	276	320	1,394
Company & Overseas								
Securities: Ordinary	787	316	403	484[2]	720	372	624	952
Debentures		338	395	283[2]	294	291	180	201
Other					-21	0		
Loans for House Purchase	599	550	728	842	865	1,124	1,589	2,217
Long Term to Local Authority	188	254	153	139	59	78	76	143
Hire Purchse Claims	127	83	-72	-30	6	-21	47	140
Other Lending	226	203	214	128	188	156	217	-12
TOTAL	2,047	2,117	2,124	2,486	2,373	2,205	3,076	4,368
Net Identified Transactions	3	-130	-288	-142	-518	600	-603	-527

A-Borrowing from banks and central government, together with identified sales of property to overseas residents. B-Bank deposits, tax reserve certificates, tax deposit accounts, certificates of tax deposit, Treasury Bills & local authority temporary debt. C-Net of borrowing not included in "other" liabilities. 1-Not strictly comparable with subsequent years. 2-Excluding Steel securities transactions to government stock.

TABLE 4.B (2)

FLOW OF FUNDS: FINANCIAL INSTITUTIONS OTHER THAN BANKS

£m	1972	1973	1974	1975	1976
INCREASE IN FINANCIAL LIABILITIES					
Life Ass. & Pension Funds	-2,455	-2,817	-3,490	-4,331	
Building Societies	-2,187	-2,100	-1,989	-4,168	
Other Deposits	-258	-274	-188	-429	
Capital Issues	-439	-61	-95	-323	
Unit Trust Units	-203	-156	-25	-113	
Other (A)	-1,029	-834	-475	-453	
TOTAL	-6,571	-6,242	-6,262	-8,911	
INCREASE IN FINANCIAL ASSETS					
Short Term Assets (B)	969	1,239	2,201	-448	
Government Stocks	418	688	309	3,358	
Company & Overseas					
Securities: Ordinary	1,779	414	-293	1,959	
Debentures	250	98	-4	137	
Other					
Loans for House Purchase	2,217	2,120	1,610	2,835	
Long Term to Local Authority	143	113	344	877	
Hire Purchase Claims	163	166	-60	-8	
Other Lending (C)	164	470	593	208	
TOTAL	6,103	5,308	4,700	8,918	
Net Identified Transactions	-468	-934	-1,562	7	

A-Borrowing from banks and central government, together with identified sales of property to overseas residents. B-Bank deposits, tax reserve certificates, tax deposit accounts, certificates of tax deposit, Treasury Bills & local authority temporary debt. C-Net of borrowing not included in "other" liabilities.

DISTRIBUTION OF SUPERANNUATION FUND ASSETS
(ALL TYPES)

Year	Cash or Equivalent (A) %	Govt. Stock %	Corp. Bonds %	Pref. Stock %	Ord. & Def. %	Mortgages & Loans %	Other %
1962	1.6	38.9	10.5	2.1	35.1	6.3	5.5
1963	1.5	33.6	11.4	2.2	40.0	6.0	5.4
1964	2.5	31.2	12.0	2.0	40.5	5.8	6.1
1965	(2.2)	(29.1)	(12.7)	(1.8)	(41.9)	(5.8)	(6.4)
1966	2.3	28.1	14.7	1.3	40.3	5.6	7.1
1967	1.9	25.7	13.5	1.0	63.3	4.8	10.2
1968	1.8	20.2	12.1	.7	52.7	4.0	8.5
1969	2.0	19.0	12.7	.6	50.7	4.0	11.0
1970	3.5	18.0	13.1	.5	49.5	3.5	12.0
1971	2.0	16.3	11.8	.3	56.1	2.6	10.9
1972	3.0	13.2	10.1	.3	60.1	2.2	11.1
1973	5.7	14.2	9.6	.4	51.7	2.6	15.8
1974	14.0	16.2	8.1	.4	36.6	2.7	22.0
1975	8.7	16.9		55.5		1.8	17.5

A- Cash or equivalent = Cash & Balances with Banks, Treasury Bills, Local Authority Temporary Debt, Other Financial Institutions' Debt, Other minus Balances to Stockbrokers.

Figures for 1975 do not distinguish Bonds, Stocks and Ordinary by category.

Based on Bank of England Statistics and Financial Statistics

TABLE 4.C

TABLE 4.C

SUPERANNUATION FUNDS (ALL TYPES)

£m	1962	1963	1964	1965	1966	1967	1968	1969
Net Current Assets	62	70	119	(117)	122	119	136	147
Government Stock	1,032	1,023	979	(984)	951	1,061	983	897
Local Authorities Stock	509	533	534	(547)	539	539	525	507
Company Securities								
Loan	417	527	582	(670)	780	843	906	940
Preference	84	103	95	(95)	67	62	56	42
Ordinary & Deferred	1,389	1,854	1,964	(2,205)	2,133	2,817	3,943	3,745
Overseas Govt. & Secs.	77	81	71	(64)	52	59	53	52
Mortgages & Loans	249	279	283	304	298	305	296	299
Local Auth. M.I.T.	18	34	42	(51)	59	67	95	120
Property Unit Trusts						20	51	80
Land, Property & Ground Rents	110	125	165	198	253	310	418	532
Other	11	9	17	(22)	14	24	20	29
TOTAL FINANCIAL ASSETS	3,958	4,638	4,851	(5,257)	5,297	6,226	7,482	7,390

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TABLE 4.C

SUPERANNUATION FUNDS (ALL TYPES)

£m	1970	1971	1972	1973	1974	1975	1976	1977
Net Current Assets	269	205	358	622	1,298	1,199		
Government Stock	921	1,222	1,195	1,176	1,156	2,008		
Local Authorities Stock	480	411	384	361	341	323		
Company Securities								
Loan	1,017	1,177	1,205	1,039	748	7,649		
Preference	38	30	34	46	33			
Ordinary & Deferred	3,848	5,612	7,171	5,615	3,385			
Unit Trust Units					5	9		
Overseas Govt. & Secs.	38	35	28	25	20	40		
Mortgages & Loans	274	260	267	279	245	254		
Local Auth. M.I.T.	114	117	179	173	136	76		
Property Unit Trusts	118	138	201	233	254	307		
Land, Property & Ground Rents	641	770	889	1,236	1,588	1,914		
Other	21	29	27	47	34	70		
TOTAL FINANCIAL ASSETS	7,779	10,006	11,938	10,852	9,243	13,785		
Long Term Borrowing					-36	-64		

DISTRIBUTION OF INSURANCE COMPANY ASSETS
(COMBINED FUNDS)

Year	Cash or Equivalent (A) %	Govt. Stock %	Corp. Bonds %	Pref. Stock %	Ord. & Def. %	Mortgages & Loans %	Other %
1962	1.4	30.0	12.8	4.8	20.4	15.4	14.9
1963	1.4	29.4	13.4	4.7	20.6	15.5	14.9
1964	1.6	28.2	14.4	4.4	21.2	15.7	14.6
1965	1.2	27.2	15.3	4.3	20.7	16.3	15.0
1966	1.2	25.6	16.4	4.0	20.8	16.7	15.4
1967	1.5	27.0	16.7	3.2	20.0	16.0	15.6
1968	1.4	25.9	16.6	2.6	22.4	15.8	15.3
1969	1.7	25.2	16.1	2.3	22.8	16.0	15.8
1970	2.6	23.8	15.4	2.1	23.6	15.7	16.8
1971	2.0	24.8	14.8	1.8	24.2	14.7	17.6
1972	2.9	23.0	14.0	1.6	27.0	13.4	17.7
1973	5.0	22.3	12.2	1.4	25.1	12.6	21.5
1974	8.3	22.5	11.2	1.3	20.7	13.0	23.1
1975	6.3	25.7	10.0	1.1	21.6	11.5	23.8

A- Cash or Equivalent = Cash & Balances with Banks, Cash & Balances at other Financial Institutions, Treasury Bills, Local Authority Temporary Debt, Other Short Term Assets and Overseas Short Term Assets.

TABLE 4.D

TABLE 4.D

INSURANCE COMPANIES (COMBINED FUNDS)

£m	1962	1963	1964	1965	1966	1967	1968	1969
Net Current Assets	106	120	146	122	123	180	188	246
Government Stock	1,953	2,084	2,188	2,262	2,297	2,762	2,961	3,152
Local Authority Stock	357	388	391	418	416	422	445	432
Company Securities								
Loan	981	1,128	1,313	1,513	1,735	1,972	2,184	2,290
Preference	371	395	399	424	426	375	347	327
Ordinary & Deferred	1,572	1,732	1,933	2,046	2,199	2,358	2,943	3,238
Overseas Govt. & Secs.	112	115	119	111	106	131	139	123
Mortgages & Loans								
UK:	1,160	1,274	1,403	1,577	1,742	1,860	2,053	2,237
Overseas	21	23	26	26	25	30	32	37
Land, Property & Ground Rents	730	795	851	952	1,084	1,211	1,349	1,539
Other	39	43	49	69	63	55	5	22
Agents' Balances	263	300	312	346	382	444	519	560
TOTAL FINANCIAL ASSETS	7,689	8,397	9,132	9,866	10,596	11,802	13,164	14,201

Financial Statistics

TABLE 4.D

INSURANCE COMPANIES (COMBINED FUNDS)

£m	1970	1971	1972	1973	1974	1975	1976	1977
Net Current Assets	399	349	551	1,150	2,019	1,768		
Government Stock	3,263	3,829	4,104	4,682	4,877	6,498		
Local Authority Stock	419	405	389	424	590	678		
Company Securities								
Loan	2,386	2,533	2,670	2,801	2,720	2,783		
Preference	318	312	308	313	311	316		
Ordinary & Deferred	3,645	4,141	5,148	5,751	5,051	6,025		
Unit Trust Units	35	66	106	415	447	455		
Overseas Govt. & Secs.	124	127	132	141	138	175		
Mortgages & Loans								
UK:	2,385	2,468	2,505	2,821	3,109	3,199		
Overseas	39	48	48	57	53			
Land Property & Ground Rent	1,797	2,125	2,354	3,378	3,904	4,787		
Other				10	23	6		
Agents' Advances	642	696	785	975	1,115	1,202		
TOTAL FINANCIAL ASSETS	15,452	17,100	19,101	22,918	24,357	27,891		

Financial Statistics

DISTRIBUTION OF INVESTMENT TRUST ASSETS

Year	Cash or Equivalent (A) %	Government Stock %	Bonds %	Preference Shares %	Ordinary & Deferred (B) %	(C)
1961	1.5	1.4	1.1	3.4	92.4	31.0
1962	.9	2.9	1.2	3.6	90.9	29.4
1963	.3	1.5	1.7	3.0	92.0	30.1
1964	1.6	.9	1.7	3.0	90.9	35.1
1965	2.2	1.6	1.9	2.9	89.7	34.6
1966	3.1	1.9	2.1	4.0	87.7	32.8
1967	2.2	1.4	1.6	3.7	89.6	35.6
1968	1.7	.6	2.0	2.7	89.9	35.1
1969	3.5	1.6	3.3	2.6	87.7	32.5
1970	4.1	1.3	3.7	2.2	87.1	31.9
1971	1.6	1.9	4.3	2.0	89.3	26.9
1972	2.5	.9	4.8	1.3	89.9	33.9
1973	8.2	1.5	4.7	1.6	81.5	34.8
1974	16.2	3.5	5.7	1.7	68.3	36.8
1975	5.7	3.1	5.1	1.2	81.7	35.7
1976	5.4	2.9	5.4	1.2	84.5	40.8

A- Cash or equivalent = Cash & Bank Balances, Sterling Certificates of Deposit, Short Term Lending to Other Financial Institutions, Treasury Bills, Local Authority Temporary Debt, Other Short Term Assets in the UK and Overseas, minus Bank Overdrafts & Advances, Other UK and Overseas Borrowing.

B- Total Ordinary Holding, including Overseas.

C- Overseas Contribution to Assets.

TABLE 4.E

TABLE 4.E

INVESTMENT TRUSTS

£m	1961	1962	1963	1964	1965	1966	1967	1968
Net Current Assets	34.8	22.0	7.2	46.8	67.6	93.5	89.3	105.5
UNITED KINGDOM								
Government Stocks	27.3	62.3	37.5	19.8	43.1	51.5	52.9	35.2
Local Authority Securities	.4	3.0	2.2	1.1	3.7	2.9	2.0	.9
Companies: Quoted								
Loan	10.3	15.3	20.3	17.0	17.0	22.3	29.8	58.5
Preference	68.7	76.9	78.5	78.0	79.7	108.1	131.5	124.3
Ordinary & Deferred	1,356.4	1,390.9	1,747.6	1,603.6	1,715.5	1,613.9	2,155.7	3,309.7
Other			12.5	9.6	16.5	18.2	8.8	6.2
Unquoted Loan	4.7	5.0	6.4	11.1	14.0	8.0	7.4	7.7
Preference	5.0	4.8	3.9	5.6	5.8	5.5	5.6	9.6
Ordinary & Deferred	37.7	43.3	12.5	9.6	16.5	18.2	8.8	6.2
OVERSEAS								
Government & Municipal Loans	4.0	3.0	3.0	3.9	2.7	3.3	2.7	2.2
Company Securities								
Loan	8.8	8.0	8.9	10.9	10.7	13.1	17.1	37.7
Preference	2.5	2.6	2.6	2.1	4.1	6.1	12.6	29.9
Ordinary & Deferred	702.7	687.2	857.6	1,012.8	1,086.8	980.3	1,430.0	2,119.1
Other			1.0	1.3	1.4	1.6	.1	7.6
TOTAL ASSETS	2,269.1	2,334.3	2,846.9	2,889.6	3,144.1	2,993.4	4,012.9	6,046.4

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TABLE 4.E

£m	1969	1970	1971	1972	1973	1974	1975	1976
Net Current Assets	169.6	184.9	91.2	187.9	478.5	611.5	322.6	318.3
UNITED KINGDOM								
Government Stocks	77.2	56.2	105.0	63.5	66.2	82.2	160.9	162.7
Local Authority Securities	.6	.9	1.3	1.8	22.3	25.2	10.0	6.1
Companies: Quoted								
Loan	75.8	72.5	113.1	166.7	114.9	50.9	76.6	82.1
Preference	90.0	70.6	80.2	66.0	56.9	36.8	46.6	46.3
Ordinary & Deferred	2,670.6	2,461.5	3,547.0	4,085.0	2,643.6	1,187.0	2,623.8	2,503.5
Other	34.0	16.7	42.1	82.9	71.6	78.2	83.2	80.2
Unquoted Loan	15.3	16.8	19.7	14.6	11.9	17.3	23.5	16.0
Preference	8.9	6.6	10.2	10.3	10.6	7.8	8.4	7.3
Ordinary & Deferred	34.0	16.7	42.1	82.9	71.6	78.2	83.2	80.2
OVERSEAS								
Government & Municipal loans	1.3	1.1	.9	1.0	1.3	23.5	7.4	4.3
Company Securities								
Loan	34.4	34.7	44.9	61.1	49.0	40.9	65.9	83.0
Preference	26.6	21.1	23.7	19.9	23.0	21.0	15.7	18.7
Ordinary & Deferred	1,593.3	1,423.3	1,544.9	2,519.6	2,022.5	1,385.2	2,038.5	2,416.3
Other	28.6	22.9	29.2	28.8	22.3	29.4	37.4	54.3
TOTAL ASSETS	4,902.2	4,469.2	5,750.0	7,439.6	5,814.5	3,768.1	5,704.7	5,918.0

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DISTRIBUTION OF UNIT TRUST ASSETS

Year	Cash or Equivalent (A) %	Government Stock %	Bonds	Preference Shares %	Ordinary & Deferred %
1961	1.5	1.4	0.0	1.3	96.8
1962	1.4	1.7	.3	2.4	94.2
1963	1.8	.8	.7	3.5	93.3
1964	2.8	.8	.6	4.0	91.7
1965	2.2	1.1	.7	3.6	92.4
1966	2.8	1.4	.8	3.6	91.4
1967	2.2	.6	.9	3.6	92.7
1968	2.4	.3	1.3	1.5	94.6
1969	3.5	1.4	2.1	1.5	91.5
1970	5.4	2.0	1.6	1.6	93.5
1971	3.7	1.0	1.9	1.2	92.1
1972	8.9	.2	2.8	1.2	86.9
1973	15.9	.4	1.6	1.6	80.5
1974	28.1	2.0	1.3	1.7	66.9
1975	10.1	1.1	.9	1.5	86.4
1976	13.5	1.3	.9	1.8	82.5

A- Cash or equivalent = Cash & Bank Balances, Sterling Certificates of Deposit, Short Term Lending to Other Financial Institutions, Treasury Bills, Local Authority Temporary Debt, Other Short Term Assets in the UK and Overseas, minus Bank Overdrafts & Advances, Other UK and Overseas Borrowing.

TABLE 4.F

TABLE 4.F

UNIT TRUSTS

£m	1961	1962	1963	1964	1965	1966	1967	1968
Net Current Assets	3.2	3.6	6.2	11.3	10.8	15.3	17.1	45.8
UNITED KINGDOM								
Government & Government Backed Securities	2.6	3.7	2.4	2.7	5.2	6.2	4.7	4.5
Local Authority Securities	.2	.5	.2	.3	.3	1.3	.2	.6
Quoted Companies								
Loans	.1	.7	2.3	2.5	3.2	4.2	6.5	24.1
Preference	2.7	6.0	12.1	16.3	17.6	19.4	27.9	26.9
Ordinary & Deferred	198.3	225.8	300.3	336.5	420.0	452.7	664.2	1,686.4
OVERSEAS								
Government & Municipal Loans	.2	.2	.3	.2	.2	.1	.1	.3
Company Securities								
Loans			.1	.1	.3	.7	.6	.7
Preference	.1	.1	.1	.1	.3	.6	.4	.2
Ordinary & Deferred	14.7	16.5	26.5	35.6	42.3	52.6	65.7	119.3
TOTAL ASSETS	220.0	257.1	350.4	405.6	500.1	553.0	787.5	1,908.9

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TABLE 4.F

UNIT TRUSTS

£m	1969	1970	1971	1972	1973	1974	1975	1976
Net Current Assets	47.3	70.4	72.3	227.3	332.5	395.0	255.6	340.6
UNITED KINGDOM								
Government & Government Backed Securities	18.1	25.7	18.8	4.5	7.5	22.0	23.2	29.2
Local Authority Securities	.3	.1			.3	3.7	3.4	2.0
Quoted Companies								
Loan	26.2	32.4	28.7	52.7	30.5	11.3	17.8	18.1
Preference	20.0	17.5	23.9	30.4	32.1	23.9	38.9	44.9
Ordinary & Deferred	1,095.3	1,033.9	1,635.3	1,891.9	1,388.5	704.1	1,803.0	1,619.0
OVERSEAS								
Government & Municipal Loans	.1			.1	.2	2.3	1.2	1.1
Company Securities								
Loan	2.1	2.3	9.5	18.2	4.3	6.9	5.8	4.5
Preference	.7	2.8	.4	.3	1.3	.6	.1	.2
Ordinary & Deferred	134.2	130.4	163.8	327.6	299.4	235.3	392.1	457.8
TOTAL ASSETS	1,344.3	1,315.5	1,952.7	2,552.9	2,096.6	1,405.2	2,541.1	2,517.5

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The combined effects of these four investing institutions upon the capital market cannot be acurately gauged. But the figures can provide a rough indication of the market impact of their portfolios. Table 4.G gives an estimate of the percentages held by the institutions of the following categories of securities:-

1. The percentage of company loan stock held by the institutions. The figures for the insurance companies are based on their book value estimates and consequently tend to under-estimate the true level of their holdings. Loan stock is held by insurance and pension funds, investment and unit trusts tend to eschew fixed interest securities;

2. The percentage of preference shares held. In this category, the various institutions combined hold about two-thirds of the outstanding shares. Again, between the institutions, it is the insurance companies which hold the bulk of securities;

3. The ownership of ordinary and deferred shares. This is the category of holdings where other sources have provided estimates (DOBBINS (1974, 1977) and also TRADE & INDUSTRY (1977)) to confirm the accuracy of the rough and ready method of estimating percentages. Apart from the insurance companies, where no allowance was made for the fact that their portfolios are reported at book value, thus under-estimating their true market share; the results tally within a few percentage points.

   The results indicate that by 1970 the four investing institutions held 40 percent of common stocks. Furthermore their ownership was on a rising trend. This is a fact much commented upon, that the capital market is increasingly a market for institutions. It was estimated that the unit trusts, as a group, held between 2.8 and 3.8 percent of outstanding equities in the years 1968-1975. While not in the same class of holding as insurance and pension funds, their ownership was certainly signficant;

TABLE 4.G

INSTITUTIONAL HOLDING OF COMPANY LIABILITIES

%	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
LOAN STOCK										
Unit Trusts[1]	0.0	0.0	.1	.1	.1	.1	.1	.5	.6	.6
Investment Trusts[1]	.6	.6	.7	.6	.5	.5	.6	1.2	1.6	1.4
Insurance Companies[2]		40.2	38.6	44.9	48.2	38.1	39.7	44.1	49.0	45.7
Superannuation Funds[1]		17.1	18.0	19.9	(21.4)	17.1	17.0	18.3	20.1	19.5
PREFERENCE SHARES										
Unit Trusts[1]	.2	.3	.6	.9	1.0	1.2	1.8	2.1	2.0	2.4
Investment Trusts[1]	4.3	4.2	4.3	4.3	4.5	6.6	8.5	9.6	9.0	9.6
Insurance Companies[2]		20.2	21.4	22.0	23.6	26.0	24.0	26.9	32.8	42.9
Superannuation Funds[1]		4.6	5.6	5.2	(5.3)	4.1	4.0	4.3	4.2	5.1

UK Companies Only.
1- At Market Value
2- At Book Value

TABLE 4.G

INSTITUTIONAL HOLDING OF COMPANY LIABILITIES

%	1971	1972	1973	1974	1975	1976	1977
LOAN STOCK							
Unit Trusts[1]	.5	.9	.6	.3	.4		
Investment Trusts[1]	1.8	2.7	2.2	1.3	1.7		
Insurance Companies[2]	40.0	43.7	52.9	71.8	61.8		
Superannuation Funds[1]	18.6	19.7	19.6	19.7			
PREFERENCE SHARES							
Unit Trusts[1]	2.6	3.9	5.2	4.8	6.5		
Investment Trusts[1]	8.8	8.5	9.3	7.4	7.8		
Insurance Companies[2]	34.2	39.8	50.9	62.3	52.7		
Superannuation Funds[1]	3.3	4.4	7.5	6.6			

Uk Companies Only.
1- At Market Value
2- At Book Value

TABLE 4.G

INSTITUTIONAL HOLDING OF COMPANY LIABILITIES

%	1971	1972	1973	1974	1975	1976	1977
ORDINARY & DEFERRED							
Unit Trusts[1]	3.5	3.4	2.8	3.2	3.8		
Investment Trusts[1]	7.5	7.3	5.3	5.4	5.6		
Insurance Companies[2]	8.7	9.1	11.4	23.2	12.8		
Superannuation Funds[1]	11.9	12.7	11.2	15.5			
TOTAL MARKET[3]							
Unit Trusts[1]	3.1	3.1	2.6	2.8	3.6		
Investment Trusts[1]	6.9	6.8	5.0	4.9	5.3		
Insurance Companies[2]	12.8	12.9	15.8	31.0	17.5		
Superannuation Funds[1]	12.5	13.3	11.9	16.0	14.7		

UK Companies only.
1- At Market Value.
2- At Book Value.
3- Excludes Government Stock and Overseas Companies quoted on the Stock Exchange.

TABLE 4.G

INSTITUTIONAL HOLDING OF COMPANY LIABILITIES

%	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
ORDINARY & DEFERRED										
Unit Trusts[1]	1.0	.9	1.0	1.2	1.3	1.7	1.8	3.6	2.7	3.1
Investment Trusts[1]	7.2	5.8	5.7	5.5	5.5	6.2	6.2	7.2	6.6	7.4
Insurance Companies[2]		6.6	5.7	6.6	6.5	8.5	6.8	6.4	8.0	11.0
Superannuation Funds[1]		5.8	6.1	6.7	(7.0)	8.2	8.1	8.5	9.3	11.6
TOTAL MARKET[3]										
Unit Trusts[1]	.8	.8	.9	1.0	1.2	1.5	1.6	3.3	2.5	2.7
Investment Trusts[1]	5.9	5.2	5.2	5.0	5.0	5.6	5.6	6.7	6.2	6.6
Insurance Companies[2]		10.3	9.2	10.7	10.9	14.0	11.4	10.4	12.7	16.2
Superannuation Funds[1]		6.7	7.0	7.8	(8.2)	9.6	9.0	9.3	10.3	12.5

UK Companies Only.
1- At Market Value
2- At Book Value
3- Excludes Government Stock and Overseas Companies quoted on the Stock Exchange.

4. A figure for the total market was also arrived at to estimate the combined holdings by institutions of all categories of company securities. Again, the combined ownership shows a rising trend.

While these figures are in no sense accurate, being merely rough compilations of balance sheet data and gross market values, they do give some indication of the impact of institutions on the capital market. It is evident that the market has a large, and rising institutional investor element, if not dominated by prefessionally managed portfolios.

From the background picture in this chapter it will be clear that most institutions have large percentages of non-quoted investments in their portfolios.

Unit trusts, though by 1975 in considerable numbers, are but one of these groups and control probably not more than about 4 percent of institutionally held ordinary and deferred equities.

The reasons for studying unit trusts rests on:-

1. They attract, and are attractive to voluntary savers;
2. They are principally equity investors, and their portfolios are made up of risk investments;
3. There is considerable publicly available information on individual trusts.

In the next chapter, the analysis of unit trusts is examined in more detail as to their method of operations, market effects and organisation structure.

5.0 INVESTMENT AND UNIT TRUSTS

Of the various institutional investors discussed in the previous chapter, only two categories provide sufficient published information to permit a comprehensive analysis of individual portfolios. These are Investment Trusts, which are companies with securities as their assets; and Unit Trusts, which are pooled funds owned by individuals where the particular shares, or units, are directly related to the trust portfolio.

5.1 Investment Trusts

The history of investment trusts goes back to the nineteenth century; they first made their appearance after the 1862 Companies Act introduced limited liability for joint-stock enterprises. Investment trusts are joint-stock companies, and their stock may be traded on the Stock Exchange just like any other company. The word trust is a misnomer since they are companies: they have a fixed capital base, hence the American name for them: closed-end investment companies (open-end investment companies are mutual funds, or unit trusts), and can do all the things companies are permitted to do, such as gearing-up by borrowing at fixed interest by the issue of debenture and loan stock.

Until there is a new capital issue of share of the investment trust, shares can only be acquired by purchasing stock from existing holders, hence the investment trust's Asset Value and stock price may diverge quite considerably, with the price standing at a discount or even a premium. Discounts of up to 40 percent of the underlying value of securities have been noted.

Stock dividends are paid on the shares from the income of the underlying securities and, being a financial intermediary, special tax provisions apply. A proportion of the income is re-invested. Tax rules insist that a minimum of 85 percent of dividend income is distributed. Management charges range from a tenth to half of one percent of the company's asset value and is charged against income.

The company management seeks to maximize its income over the long term, it does not distribute Capital Gains profits from the realization of investments. The principal impetus behind investment trust development in the 19th. Century was in overseas investments. Even today there is a considerable foreign element in their trust portfolios (see Table 5.E). New funds were founded in 1972 with the object of investing in Japan. The number of investment trusts contrasts with the USA where they are on the decline against the advantages and popularity of mutual funds. (However, there is still on-going dis-satisfaction in the UK concerning the fact that share prices of investment trusts are most often at a discount to asset values; some commentators have called for investment trusts to become unitized to "realise the discounts.)

The problem of measuring the rate of return on investment trusts stems from this discount on asset values.

To measure management ability, it is necessary to measure the changes in asset values of the underlying portfolio. To do this for investment trusts, one has to take into account problems presented by debt redemption and fluctuating borrowing levels. Performance measurement in this case may be regarded as a special case of measuring company performance where the "assets" rather than plant and equipment are other firms' stocks and debentures. There are also data difficulties in obtaining the required information on the composition of individual investment trusts at the required period and sufficient detail to compute the rate of return.

Readily available is the traded market value of the investment trust stock, but using this measure one is obtaining market expectations about its management's ability. The fluctuating discount/premium will interfere in the analysis and affect the performance of individual trusts if any general market re-appraisal took place during the period.

In addition BROUDREAUX (1973) suggests that the discount/premium is related to the uncertainty surrounding a trust. The more a trust alters its portfolio, the higher can be its discount. A trust aiming for higher returns may, in fact, reduce its market share by adopting a higher level of portfolio turnover.

Consequently, the analyst faces major problems in assessing performance; this is without even considering how to incorporate the major overseas component of their portfolios.

5.2 Unit Trusts

The problems discussed above relating to the analysis of investment trusts are not present when looking at unit trust portfolios due to the unit method of accounting. Each unit is an exact fraction of the value of the underlying portfolio after accounting for the cost of new investment.

The first unit trust was established in 1931. The trust method is based on a partnership between a

SUMMARY OF THE PRINCIPAL FEATURES
OF UNIT AND INVESTMENT TRUSTS

Feature	Investment Trust	Unit Trust
Form	Limited liability company	Laid down under Trust deed
Parties	Shareholders and directors	Managers, trustees and unit-holders
Life of Trust	Perpetual	Usually 25 years but subject to renewal
Law Governing	Companies Acts	Prevention of Fraud (Investment) Act, 1968 and DoT regulations
Capital	Fixed--the trust may issue all types of shares	Variable, new units may be created
Marketability	Shares quoted on the Stock Exchange	Provided by the managers willingness to repurchase units Some quoted on S.E.
Control	Directors and shareholders (according to the Articles of Association)	Managers, subject to the DoT regulations and the Trustee's duties
Vesting of the Portfolio	In the company	In the trustees
Accounts	Balance sheet and profit and loss account	Published accounts limited to the Managers' affairs in relation to the trust
Audit	By shareholder's auditor, duly qualified	By auditor approved by the trustees
Financial Policy	May vary in accordance with the Articles of Association, e.g. retention of income, investment in property or abroad	Varied, but normally includes full distribution of income
Taxation	Treated as a company but with provisions 85% of income must be distributed.	Governed by special regulations

TABLE 5.A

management company, itself governed by Company Law, and a trustee company by initiating a trust deed in which the unit holders (investors) are the beneficiaries. The principal considerations at present governing the creation and ordering of trusts is the Prevention of Frauds (Investments) Act, 1958 and enforced by the Department of Trade (DoT). Before a trust can tender to the public it has to be authorised by the DoT, under the provisions of Section 17 of the above Act. The three principal requirements are:-

i. the trust deed must satisfy the DoT over the first schedule of the Act;

ii. that the trustee and management companies are independent of each other; and

iii. the trustee must have an issued share capital of not less than £$\frac{1}{2}$m.

The method for valuing units has to be such that their value goes unchanged despite an increase or decrease in the numbers of units issued, the DoT formulates specific rules.

Take for example the market valuation of a trust at £5 m with 10 m units outstanding, giving a value per unit of 50 pence. To preserve the value of existing units any additional units must be sold at a price to cover the new investment. This is defined as:-

> "The managers shall not quote or sell units at a price exceeding by more than the authorized adjustment the make-up price arrived at by taking the value of the underlying securities relating thereto at the time of the quotation or sale, plus fiscal and purchase charges and preliminary service charge and all other property accumulated to the trust and dividing by the value of such units. The value of the underlying securities of the trust shall be calculated on the lowest market dealing offered price on a recognised stock exchange."

DoT Requirements under the First Schedule of the Prevention of Fraud (Investments) Act, 1958

The DoT authorized spread between the offer and bid prices can be as large as $12\frac{1}{2}$ to $13\frac{1}{2}$ percent. In practice the spread is usually in the 5 to 8 percent region, depending on the type of trust (It is commonly higher for trusts with a high overseas content to the portfolio.) Appendix Two gives the percentage spread on the offer-bid prices annually for the trusts in this study.

To pay for the running of the trust and investment management, the management company may make a charge against the trust income. This charge is in two parts: an initial charge on the purchase of new units (fixed at 5% maximum of the value of units purchased); and a yearly charge. Both charges must be balanced so that the total of both does not exceed 13.25 percent over a period of 20 years. (Details of the charges made by individual trusts in this study can be found in Appendix Four.)

There are three groups of trusts as regards charges in this study. First, there was the no-load funds which recoup all their management expenses on an annual basis; second, were the low initial charge group (1 to 3 percent) usually due to direct selling to investors; and third, a group of trusts making the maximum charge allowed by law.

A further source of managemeent company revenue above the 13.25 percent is the management's right to "round off" the buying or selling price by 1.25 pence or 1% whichever is the smaller.

XYZ TRUST LTD

Net Asset Value Approach	
Value of securities in fund at the lowest market dealing prices	£5,000,000
Number of Outstanding Trust Units	10m
NAV per Unit	50.0p
Offer Price	
Value of securities in fund at lowest market dealing prices	£5,000,000
	p.
On 10 million units this represents a value per unit of	50.000
Add stamp duty (1%)	0.500
Add brokerage & Contract stamp	0.625
Add unit trust instrument duty ($\frac{1}{4}$%)	0.125
	51.250
Add accrued income (£20,000)	0.200
	51.450
Add initial charge (5%)	2.572
	54.022
Add rounding off (1% = 0.540p.)	0.478
Offer Price per unit of XYZ trust	54.500
Bid Price	
Value of securities in the fund at highest market dealing prices	£4,900,000
	p.
On 10 million units this represents a value per unit of	49.000
Add accrued income (£20,000)	0.200
	49.200
Subtract brokerage and contract stamp	0.615
	48.585
Subtract rounding off (1% = 0.486p.)	0.085
Bid Price per unit of XYZ trust	48.500

TABLE 5.B

Since the unit trust management acts as a market maker in the trust units, the ability to redeem shares for sellers and create units for buyers; by matching sales and redemptions, without incuring the underlying transaction costs, adds an untold element to the management company's profits.

5.2.1 Investments

The first unit trust was constituted with a fixed portfolio of investments. Nowadays, it is much more likely that trust managers will be given great flexibility as to what securities, and how they invest money entrusted to them. Unit trust managers see themselves as "money managers", not just equity managers.

The DoT lays down only a few rules about the nature of unit trust investments:-

i. Not more than 5% of the value of the trust portfolio may be invested in any one security (sometimes this may be increased to 7.5%, but this is rare);

ii. trust portfolios are not allowed to hold more than 10 percent of the equity of any company;

iii. not more than 5% of the portfolio may be invested in "restricted investments", usually defined as investments which are not quoted on a recognised stock exchange.

5.2.2 Income

The income a trust received from its assets may be of three kinds: franked, unfranked investment income and capital gains. The franked income has already been assessed for tax purposes, the only issue to determine is whether the witheld tax is at the correct rate. Unfranked income has to be assessed for tax purposes. The Inland Revenue has an agreed scheme for unit trusts since they are financial intermediaries. They may put through to the unit holders all tax credits. This is done at the prevailing standard rate of income tax. Individuals have to calculate whether they are liable to any higher rate surcharges on this portion of their income.

5.2.3 Capital Gains

There are special provisions governing the Capital Gains liabilities of unit trusts. Trusts have to pay capital gains at half the normal rate (15% instead of 30%), but the principle seems to have arisen that unit trusts pay half the standard rate of income tax on their gains.

The effect of such capital gains liability is to act as a deterent on dealings. In terms of a trust's performance, capital gains can be treated as a dealing cost. The trust managers, when seeking to improve the trust's performance, have to increase the rate of return on a new investment by a break-even factor:-

$$BEF = \frac{1}{(1 - L)}$$

where L is the existing liability on the shares as a ratio of the share price. With a tax liability of 15% the BEF is 1.18. Rates of portfolio turnover are given in Table 5.D for the unit trust industry.

5.2.4 Types of Unit Trust Funds

To satisfy the differing needs of investors different types of funds have been created. Most of these trust types differ in the means by which returns are achieved since income and capital gains are taxed at different rates. The UK types of trust do not correspond to the American categories in terms of investment policy.

Exempt funds, as their name suggests, are funds which pay no taxes and are open to tax-exempt investors such as charities. No funds of this type are considered in this study.

Offshore funds are funds situated in low taxes areas, and are generally not open to the public to invest in since they are not authorized by the DoT. None are analysed in this study.

General funds aim at a mixture of income and capital gains through investment in a variety of equity and some fixed income issues. A typical set of investment aims is:-

> TYPE OF FUND: General. The fund invests primarily in UK equities and aims to achieve a balance between capital growth and a reasonable level of income. (Barbican Investment Fund).

Growth funds seek to maximise growth of the portfolio, sometimes at the expense of income flows:-

> TYPE OF FUND: Growth. A spread of UK industrial and commercial ordinary shares and holdings in companies overseas with above average prospects of capital appreciation.
> (Hill Samuel Capital Trust).

Income funds aim to provide a steady flow of income at a level generally above that for general type trusts:-

> TYPE OF FUND: Income. Investment is principally in equities with a small proportion in preference shares. High

immediate income with prospects of long term capital appreciation. (Target Income Fund).

Specialist funds are a heterogeneous group of trusts either investing in particular industries, in a particular geographical area, or in any other sphere where the performance of a section of the market is the dominating influence on performance.

TYPE OF FUND: Specialist. The aim of the trust is to provide capital appreciation, together with a growing income, through investment in companies connected with raw materials, commodities, mines and metal users.
(Allied Metals, Minerals and Commodities Trust).

Bond funds are unit trusts investing primarily in the gilt-edge market and offering a balanced selection of issues along the yield curve. None were in existence at the time of this analysis.

Evidence suggests that the unit trust portfolios at any point in time for the various categories analysed in this study, with the possible exception of the specialist group, are for the individual management groups remarkably similar. A later chapter will discuss this management group effect. The similarity of portfolios was true, also, to a lesser extent across management groups.

This contrasts with the practice of US mutual funds where the different fund labels (growth funds, growth-income funds, income-growth funds and income-growth-stability funds) correspond, at least at the management group level, to different risk-return profiles.

Some empirical work on fund performance, both in the US and for the UK will be presented in the next chapter.

6.0 EVIDENCE OF TRUSTS' PERFORMANCE

It was the tremendous expansion of the role of the institutional investor in the capital market that prompted academics to look into their performance and their impact on the market. This investigation was encouraged by the parallel development of an appropriate theory for behaviour under conditions of uncertainty (i.e. the theory of portfolio selection and capital market theory). Initial research has concentrated on the US, and where managed portfolios are concerned particularly, mutual fund industry. The methods of assessing performance have increased in depth and sophistication and have also turned to examine related issues, such as size and performance, the impact of cash inflows, turnover rates, and market impact of institutional portfolios.

6.1. Research on US Data

It was the watchdog agency the Securities and Exchange Commission (SEC) which brought forth the first major study of the impact of mutual funds. In the report, prepared by FRIEND, BROWN, HERMAN & VICKERS (1962) of the Wharton School of Finance and Commerce, they found that overall mutual fund performance against a market wide index was neutral. The authors made several observations concerning mutual fund behaviour:-

i. there was a reduction in fund liquidity as portfolio size increased;

ii. turnover was inversely related to size;

iii. broker-affiliated funds had higher rates of turnover;

iv. above average performance was totally random;

v. there was no relationship of trust performance and turnover.

They concluded:-

> "When adjustments are made for this composition (the disparity of portfolio structure and that of the market), the average performance of the funds did not differ appreciably from what would have been achieved by an unmanaged portfolio with the same division among asset types."

In a later paper following from the above, FRIEND & VICKERS (1965) returned to the question of fund performance. Again they found no evidence to indicate superior management in their sample, or on the basis of other people's work:-

> "We conclude, therefore, that there is still no evidence--either in our new or old tests, or in the tests so far carried out by others--that mutual fund performance is any better than that realizable by random or mechanical selection of stock issues."

The implication was that managers did not possess investment foresight, and that much of the market activity funds carried out was without reward. TREYNOR & MAZUY (1966) tested the fund managers' ability, using "characteristic lines", and found no evidence that funds could anticipate market conditions. SHARPE (1966) analysed a sample of funds for a ten-year period using a reward to variability ratio which allowed an absolute ranking of fund portfolios taking risk (as measured by variance in returns) directly into account:-

> "While it may be dangerous to generalize from the results found during one ten-year period, it appears that the average fund manager selects a portfolio at least as good as the Dow-Jones Industrials, but that the results actually obtained by the holder of mutual fund shares (after the costs associated with the operations of the fund have been deducted) fall somewhat short of those from the Dow-Jones portfolio."

These results were criticized by HOROWITZ (1966) on the grounds that the reward-to-variability ratio was unable to furnish conclusive criteria for evaluating performance and failed to make distinctions between funds within a a common risk-return profile. Once the different fund objectives were taken into account, then the performance was no worse than an objective-based comparative index. WEST (1968) also criticized Sharpe's results due to the unique time-period selected, and the methodological difficulties involved in moving from the ex-ante CAPM to the ex-post measurement of performance. SHARPE (1968) replied that his test was proof of the existence of his risk-return model, in the sense that higher returns were earned for increased risks taken; and that the measurement of risk-adjusted performance is an ex-post concept his reward-to-variability ratio suitably captured.

The Friend & Vickers (1965) article had been criticized by COHEN & POGUE (1967) leading to a series of exchanges in the lierature over what constituted "good performance". The arguement by FRIEND & VICKERS (1968) about the inferiority of managed portfolios and the counter-arguements by COHEN & POGUE (1968) show how emotionally charged the issue of performance can be.

JENSEN (1968) carried out a major analysis of fund performance using mutual funds over 20 years: 1945 to 1964. He found that the funds did not perform noticeably better than the market. In his paper on the CAPM, JENSEN (1969) re-evaluated his sample of mutual fund portfolios using a risk-adjusted measure of performance. His further conclusions supported his original results:-

> "If we assume that the Capital Asset Pricing Model is valid, then the empirical estimates of fund performance indicate that fund portfolios were "inferior" after deducting all management expenses and brokerage commissions generated in trading activity...
>
> In addition, when all management expenses and commissions were added back to the fund returns and the average cash balance of the funds was assumed to earn the riskless rate, the fund portfolios appeared to be just

> neutral. Thus it appears that on average the resources spent by the funds in attempting to forecast security prices do not yield higher portfolio returns than those which could have been earned by equivalent risk portfolios selected by (a) random selection policies, or (b) by combining investments in the market portfolio and government bonds."

MAINS (1977) criticized Jensen's work for his methodological approach which:-

i. understated mutual fund rates of return, and consequently the measures of excess return; and

ii. introduced errors in his analysis by maintaining systematic risk as a constant measure over time.

In re-working the analysis, Mains found that on a gross-returns basis, the monthly data for the second half of Jensen's analysis period, showed almost 80 percent of the mutual funds had positive performance measures with an overall annual average of 1.07 percent. Thus, using gross returns, the sample of mutual funds earned, on average 10.7% more (continuously compounded) than portfolios constructed by combining investment in the market portfolio and government bonds with the same level of systematic risk for the 10 year period.

On much the same lines as Sharpe's work, GENTRY & PIKE (1970) made an analysis with data from insurance company portfolios. Their evidence was very similar to Sharpe's, the principal difference being in the goodness-of-fit of the risk-return relationship. SPITZ (1970) tried to measure the performance impact of cash inflows. His results indicate a slight positive relationship, but suffer from the small size of the sample used: 10 funds without a front-end load, 10 loaded funds. CARLSON (1970) in his study of mutual fund performance in the period 1948 - 1967 was critical of Jensen's conclusions. His main conclusions were:-

1. there was empirical support for the risk-return postulates of the CAPM;
2. evidence in favour of superior performance depended on (a). the time period chosen, and (b). the market proxy used (the FRIEND, BLUME & CROCKETT book on the NYSE and institutional investors gives different performance results depending on whether a capitalization weighted or an equally weighted market proxy is used);
3. indices of managed portfolios grouped by "broad" investment objectives accounted for the greatest degree of variability;
4. past performance had no predictive value;
5. size and expense ratios are not related to risk-adjusted performance, though for the period studied, cash inflows did seem to affect performance;
6. the no-load funds seemed to have above-average performance for the period 1958 - 1967.

FRIEND, BLUME & CROCKETT (1970) wrote the second Wharton School study of mutual fund performance, a much expanded continuation to the 1962 study. In this second work, the performance of funds in the 1960's was examined closely. Monthly returns for mutual funds from 1960 to 1968 on all available trust portfolios were calculated. They concluded that:-

> "Our evidence on the investment performance of mutual funds in 1960 - 1968, analysed as a whole, and by major groups, is mixed. The funds have not generally matched the performance of equally distributed random investments in the New York Stock Exchange

stock. However, they have fully matched the performance of proportionally distributed random investments in NYSE stock, and high risk funds--which include the performance funds--have surpassed such random performance, especially in 1964 to 1968."

"The findings indicating the absense of any consistent relationships between the characteristics of mutual funds and their investment performance suggest that there may not be any consistent relationship between performance for a given fund in different periods of time. This suggestion seems to be confirmed by the statistically insignificant negative correlations between the mean rates of return of the same funds in the 1960/4 and the 1964/8 periods for all funds in a given risk class. This finding does not necessarily mean, however, that there may not be individual funds which have outperformed the market in a larger number of time periods than may be attributed to chance, rather, with the available data and statistical procedures it is not feasible to be certain about the existence of such superior performers."

The findings were that mutual funds, though ultimately unable to outperform the market, provided other, socially useful, services. R.A. LEVY (1971) pointed out some of the paradoxes inherent in the Wharton study: he called it comparing oranges to lemons. The principal discrepancy was the use of the equally distributed random investments as a suitable benchmark against which to measure performance. On the capitalization weighted measure of performance funds did much better, and after taking into account this difference of outcome, important in a real world of limited capitalizations Levy comes out in favour of the managed fund over the random portfolio.

ARDITTI (1971) in a paper on Sharpe's approach in the mean-variance study (1966) points up the fact that the inclusion of the third moment of the distribution of returns in the analysis alters the observed performance from "inferior" to neutral. There was a positive skewness in the portfolio returns indicating a smaller area under the curve on the downside. Further evidence on the skewness of mutual funds is offered by SIMONSON (1971) in examining their speculative behaviour. He argued that mutual fund managers were taking quite considerable speculative risks, based on his evidence of skewness of fund returns, but he did not relate this to performance.

Given that the evidence in favour of the performance of mutual funds is contradictory, some rationale for their popularity must be sought. LEVY & SARNAT (1972) pointed out the difficulty of any alternative to mutual fund investment. A direct investment in the market portfolio is not feasible to the individual investor, who thus buys mutual fund shares.

Overseas evidence on the performance of mutual funds was provided by MACDONALD (1973) for French trusts. Interestingly enough it was the French part of their portfolios which generated above-average returns, the world portfolio being neutral in performance. The domestic success suggested access to insider information on the part of managements: a fact put down to banks' conflict of interest in managing equities and commercial loans in the same company. A. FARBER (1975) carried out a test on internationally diversified portfolios which found that trust managements did not outperform the naive benchmark alternative of investment in the market portfolio and the risk-free asset.

MACDONALD (1974) made an objectives-based study of mutual funds in which categories seemed to be well behaved in that fund types followed definite and continuing risk-return strategies, but that overall their performance was "neutral" on a risk-adjusted basis. GUPTA (1974) apparently found a contradictory result in that his mutual funds outperformed the indices on whichever criteria was selected.

JOY & PORTER (1974) made use of stochastic dominance tests on the mutual fund sample used by Sharpe (1966). They found that the sample was decidedly inferior on the analysis, not fund featured using first degree stochastic dominance, 6 funds outperformed on the second degree test, and 9 on the third degree analysis.

LEVITZ (1974) in his mutual fund study found that there was a positive risk-return relationship, but that there was not a very high degree of consistency throughout the range of market risk and that the middle range (at around beta 1.0) was nearly random. He criticized the use of risk-adjusted measures of performance as an absolute yardstick for performance measurement since the results were not consistent.

Performance analyses have been carried out on other investment vehicles, SMITH & SHULMAN (1976) examined Equity Real Estate Investment Trusts; KIM (1976) College Endowment Funds; and GRANT (1976) Canadian mutual funds. Across the samples and time periods analysed, none of the above authors found consistent above-average performance, while they did notice considerable differences in the spread of performances over time.

An in depth analysis by CHRISTNER & STOVER (1976) sought to find the contributing factors to the apparent negative performance for institutional portfolios. They examined three aspects of such portfolios for the five year period 1969 - 1973: stock selection, investment timing and portfolio diversification. Using two samples of securities, an institutionally favoured group and a control group of randomly selected stocks, they found that on the whole the portfolios were efficiently selected and well diversified, but suffered from bad market timing. Some form of macro-economic analysis, in the authors' opinion, would have had considerablely improved portfolio performances.

A study of pension and profit-sharing portfolios by BEEBONER & BERGSTROM (1977) which are unaffected by the timing of cash flows found considerable stability of performance in the better-than-average and the worse-than-average portfolios over their two periods. They concluded:-

> "The equity group with the highest t-statistic of alpha in the five-year selection period continued to outrank the bottom group in the subsequent period. Of all the statistical characteristics and measures analysed, only differing sales turnover provided a possible explanation for the difference in performance. Our preliminary tests indicated, however, that sales turnover was not the sole cause of the difference."

6.2 Research on UK Data

Many advanced techniques have been applied to the assessment of performance in the US. Most of the tests described above have used some formulation of the CAPM to generate risk-adjusted measures of performance. Additional data on rates for turnover and expenses have been used to explain the differences in outcome between individual trust portfolios. Some of these techniques have been used on UK data.

Generally, the performance of unit trusts is usually reported in terms of league tables without regard to possible differences in risks affecting the outcome (see the UNIT TRUST YEAR BOOK, produced annually, and

MONEY MANAGEMENT magazine). The lack of theory as to behaviour under conditions of uncertainty is true of SAMUELS (1968) unit trust performance analysis. His paper is very similar to the 1962 SEC commissioned study by FRIEND et al (1962), in that trust performance was measured against equivalent random portfolios. In good years, he noted, trusts did worse than random portfolios, but in poor years the trusts did better. This is the expected result if trusts have a low systematic risk, and tells us nothing about how their performance would have been measured against an equivalent-risk benchmark.

The first risk-return analysis that was carried out using UK data was by RUSSELL & TAYLOR (1968) for a five-year period on 20 unit trusts. Their mean average return and variability of return were computed and the trusts ranked according to their return to volatility ratios. The risk to return relationship was poor:-

> "There is no marked tendency for the points to cluster along a line as would be expected if acceptance of a greater volatility were to be compensated for by higher returns."

The poor relationship, whereas US studies show a good risk-return relationship, indicates one of the problems facing researchers. The goodness-of-fit obviously depends on the period analysed: both Friend and Vickers (1965) and LECLAIR (1974) had poor relationships for their US data.

But work by BRISCOE, SAMUELS & SMYTH (1969) questioned the very assumption of risk-aversion by UK investors along the lines of the CAPM, since their model failed to provide evidence of a risk-return relationship for the trusts they analysed.

In making their test where the returns of unit trusts were calculated against the risk premium, they found that their coefficients for the risk-premium were statistically insignificant. They then examined their 12 trusts based on a time determined model and found that 5 of their sample had negative trends. They argued that there time element effect caused by trends which means that one measure of risk is not suitable for all types of funds. They concluded that:-

> "This study has shown that the risk-aversion hypothesis which holds for US mutual funds must be rejected for British unit trusts. The British investor does not appear to differentiate between unit trusts on the grounds of risk. In the measurement of risk it may well be more meaningfull to take account of the existing trends in the individual average rates of return. When this procedure is adopted the expected value of the distribution of returns over time is no longer equal to the mean."

An analysis of trust performance using systematic risk, or beta, was carried out by CLARK & EVANS (1973) in which the lack of a risk-return relationship was further noticed. Notwithstanding a number of methodological problems with their paper, their conclusions are of interest. They ran regressions on 100 unit trusts as well as a large sample of investment trusts for a five year period August 1963 to August 1967. They ranked their sample to ascertain the consistency of the classification and tested its predictive power.

> "...the predictive quality of the performance rankings was not high. However, there was a small number of funds which showed consistent performance over the two periods both superior and inferior. This may not be due to any predictive qualities of the managers but rather their investment strategy in capitalizing on the inefficiency of the UK market in the pricing of risk-bearing securities."

A short article by FIRTH (1976) used the same risk-return methodology using annual returns for 72 unit trusts. His results were an acceptance of the efficient market hypothesis:-

> "There was no statistically significant evidence that unit trust managers managed to outperform the market index for their levels of risk. Thus the emphasis placed on league tables by many investors and the unit trust industry itself, is spurious. To invest in the top performers of one year will not lead to superior returns in the future: none of the unit trusts earned superior returns in relation to the market index."

It is worth mentioning a methodological difference between the above two papers: in the Firth study, the actual measure of performance for the period was used to determine whether a trust had or had not achieved a better than average performance. In the Clark & Evans paper, the predictive power of the rankings was being tested. While this power was low for the trusts in the middle of the sample, it did increase towards the extremes. In aiding investment decision making, this surely has the makings of a relative strength rule: if the trust is in the top quartile, invest for the next period, if it then falls to the middle or lower middle quartile, sell and re-invest in the top quartile again. If it remains in the top quartile, hold.

One result of the Clark & Evans study was the low correspondence between the observed returns and the systematic risk. It is worth mentioning a study by ELLIS (1974) for investment trusts which found the use of systematic risk a very un-satisfactory predictor of market performance.

RUTHERFORD (1969) carried out a rank correlation analysis of the annual performance of unit trusts and found a number of coefficients that were statistically significant, albeit small. A further paper by GURNEY (1976) updates the evidence for the following 5 years, and tests some of the unit trusts' characteristics which are held by common wisdom to influence their performance.

WARD & SAUNDERS (1976) tested the market efficiency of 49 unit trusts from 1964 to 1972 using annual rates of return continuously compounded. No trust analysed achieved a statistically significant superior rate of return:-

> "The major implications that can be drawn from this paper are 1). that the UK stock market is efficient in the sense that high risk (beta) portfolios can expect to earn higher returns than lower risk (beta) portfolios, and 2). that the sample of unit trusts examined over this period performed relatively poorly compared to the market."

A study using half-year continuously compounded returns from 1966 to 1975 by MOLES & TAYLOR (1977) produced results in accord with the Clark & Evans paper. The systematic risk to return of unit trust portfolios appeared unstructured, and performance results did not seem to be related to risk borne. The performance based on a correlation of the 1966-70 period and the 1971-75 period was 0.233. This indicated that there was some evidence of continuing management ability both of a superior and inferior nature.

In seeking to determine the ability of unit trust managements to provide above average performance as the preceeding papers indicate, we will have to provide powerful tools to cope with conflicting data results, and to determine the parameters within which such results are meaningful. Statistical significance will not be enough since the differences between meaningful results and non-significance depend on the level of probability chosen. A result at the 0.05 level, has a 1:20 significance. There are no indications that such a level is more appropriate than, say, the 0.01 hold out. If blaring differences in performance were evident, the successful investment strategies would have been imitated, thus making those very strategies redundant.

The test across two, or more, time periods has a value in that it both measures the consistency of performance; and allows a hold out test of the measures of performance.

In addition, the determinants of the performance of the trusts will also need to be examined. These components of performance will form part of the empirical results of the following chapters.

RISK-RETURN PERFORMANCE DATA FOR MUTUAL FUNDS

STUDY	Number of mutual fund portfolios analysed	Time Period	Frequency of observation	Test
Friend & Vickers (1965)	50	1958-60 - 1961-1963	Annual	Comparative performance
Sharpe (1966)	26	1953 - 1963	Annual	Mean-Variance analysis
Jensen (1968)	115 (56)	(1943 - 1964) 1953 - 1964	Annual	Regression analysis
Jensen (1969)	115	1953 - 1964	Annual	d' measure of investment selectivity
Carlson (1970)		1948 - 1967		Regression analysis
Friend, Blume & Crockett	137	1/1960 - 6/1968	Monthly	Regression analysis
MacDonald (1974)	123	1960 - 1969	Monthly	Regression analysis

TABLE 6.A

RISK-RETURN PERFORMANCE DATA FOR UNIT TRUSTS

STUDY	Number of unit trust portfolios analysed	Time Period	Frequency of observation	Test
Samuels (1968)	36	1964 - 1966	Annual	Comparative performance
Russell & Taylor (1968)	20	1962 - 1967		Mean-variance analysis
Briscoe, Samuels & Smyth	14			Mean-variance analysis
Clark & Evans (1973)	100	7/1963 - 7/1967		Regression analysis
Ward & Saunders (1976)	49	1964 - 1972	Annual	Regression analysis
Moles & Taylor (1977)	86	1966 - 1975	6 monthly	Regression analysis
Present Study	118	1966 - 1975	Quarterly	Regression analysis

TABLE 6.B

APPENDIX

TO CHAPTER 6

US MUTUAL FUNDS & UK UNIT TRUSTS

	US Mutual Funds	UK Unit Trusts
Types of Funds	Bond, Balanced (equity plus bonds), Income, Growth, Growth-Income, Income-Growth, Income-Growth-Stability. These types correspond to different risk classes, at least for management groups, if not across all groups.	Income, General, Capital, Specialized (sector, overseas, commodity, bond) The first three classes are designated for the tax treatment of returns. Specialized trusts invest where the sector effect is the predominant influence on performance.
Charges on the Fund	Initial charge (front-end loading) 8% Running charge $\frac{1}{2}$-1% per annum	Initial charge, maximum by law, 5% Annual charge, $\frac{3}{8}$% The joint charges are arranged such that both do not exceed 13$\frac{1}{4}$% over 20 years.
Law Governing	Investment Company Act, 1940; S.E.C. guidelines.	Prevention of Fraud (Investments) Act, 1958; Department of Trade regulations.
Life of Trust		20 years, after which the extension is subject to unitholders' renewal.
Valuation of Units	Net Asset Value is the basis on to which is added the loading charge, redemptions take place at NAV.	Based on an Offer-Bid spread which is based on the Net Asset Value.
Diversification	R^2 = 85%	R^2 = 75%, including the specialized trusts, 83% without.
Turnover	Data for 1968 suggests 47% per annum.	The 1966-75 decade the average is 30% per annum, for 1968 it is 27%.
Classification by Discriminant Analysis	70% correctly classified and funds "tend to do what they say they will"	It was possible to classify correctly 59%.
Risk Classes	Beta is generally predictable from year to year with some consistent high-Beta funds.	Problem of rapidly changing Beta, Beta is therefore not a good investment guide. Also Beta is generally below 1.0, funds follow a conservative investment policy.

7.0 RESEARCH METHODOLOGY

The analysis of unit trusts using the findings of Capital Market Theory involves the use of quantitative data on rates of return for trusts and the surrogate market portfolio. The first section is a description of the various data and information collected on the sample of unit trusts, while the second section outlines performance criteria based on the CAPM.

7.1 The Data

The data set used in this study is the virtually complete population of authorized unit trusts available on December 31st. 1965, as ascertained by UNITHOLDER (1966), THE TIMES and THE FINANCIAL TIMES. All trusts were included in the analysis, with the exception of three cases. It was from the three publications that both the offer and bid prices on a quarterly basis were collected for the last quoted day of the month: December, March, June and September.

Quarterly data was decided upon as a compromise between annual rates of return (2,596 items of data to be collected) and monthly rates (28,556 items). The use of quarterly rates accords with the use of Treasury Bill rates as the riskless asset (R_f). For the 118 unit trusts 9,676 items of information were collected. Dividends were added in to generate rates of return. These are gross of tax, following US research.

The MOLES & TAYLOR (1977) study makes use of net of basic rate income tax returns over the same period. The data base used in this study is much more comprehensive than that in the above paper, as a determined effort was made to track down all the trusts that went missing in the first study. A complete list of the unit trusts with the name changes many had undergone is given at the end of this chapter.

The Moles & Taylor study suffered from only having 71 percent of the total population of trusts; and one may further hypothesize that it is the trusts which do not undergo changes in management stable, or a revamping following a change of name that are the successfully managed portfolios.

To measure other aspects of unit trust performance other data was also collected. Most of this data is analysed in appendices at the end of this study. This data consisted of: trust size, sales and annual charges, investment objective, bid-offer spread, trust liquidity, number of shares held in the portfolio, and a cash inflow proxy, as well as the management group to which the trust belonged. Their influence on performance is examined in later chapters.

Of the 118 unit trusts in the study 21 (18 percent) are either merged or terminated. These warrant special treatment. Where it is known into which trust the discontinued fund was merged, then the return series was continued with the prices of that trust for the period. Where the trust is terminated or merged into a trust outside the sample, the price series is continued as the index. It was a matter of convenience which method was used: 6 trusts were continued as the index. In the forthcoming analysis, the 21 trusts of this special group can either be included, or excluded from the analysis at will.

7.1.1 Problems of Measurement.

7.1.1 Problems of Measurement

Ideally to measure the performance of the unit trusts, the net asset value on a per unit base ought to be used. However, the required figures are not generally available. Dealing prices are the figures reported in the press. This means there are tow possible sources of uncertainty concerning the exact rate of return on the underlying assets.

First, there is the problem of the price difference between the actual asset value and the offered price (following Money Management practice and other studies the offered price will be used). This difference is not as bad as it may appear to be since the offered price is, in effect, a constant ratio above the asset value with the exception of two items: accrued income and the rounding-off of inconvenient fractions.

Accrued income may be the most serious since, in calculating the rates of return, there may be a certain amount of double counting of income. The rounding-off is limited to a maximum of 1 percent at any given time, and therefore is virtually a fixed addition to the asset value. In practice the use of offer prices, if some allowance is made for the effect of accrued income, is a reliable estimate of the true asset value.

However, the second source of uncertainty in the calculation of the rates of return is due to possible shifts in valuing units from what may be termed a net expansion basis to a net contraction basis, depending on the ratio of new units to redemptions. Table 7.D illustrates this effect. The allowed spread is shown by (A), which may be up to 14 percent, but a more typical spread (due to competition between unit trusts) is shown as being less than half what is permitted. However, it is possible for a trust to go from a net-expansion basis to a net-contraction basis as illustrated in (B) without the underlying asset value unduly altering. This would be smoothed by the unit trust management in order not to have too rapid a price change for the units.

Fortunately, the majority of unit trusts have been valuing their units consistently on an offer basis since net new investment has outweighed withdrawals. See the Appendix giving details of aggregate sales of units per quarter for the unit trust industry since 1964.

In measuring rates of return, unless the final valuing date in calculating the rate of return happens to catch the unit trust on a bid basis valuation, the occasional shift from one basis to another will be accompanied by a low return during the downward shift, followed by a high return during the upward shift. Since it is virtually impossible to tell whether a particular fund is valuing on a bid or offer basis at any given time, no ready means is available for correcting this effect.

The effect of growth on performance will be discussed in the later chapters, but an indication of the probable "position" of the funds can be gleamed by referring to Appendix 5. These growth statistics indicate, approximately, whether funds were increasing their net sales or net unit redemptions.

7.1.2 The Risk-free Asset and Market Portfolio

For the surrogate riskless asset Treasury Bills were used. As a market portfolio the returns on the FT Actuaries All-Share Index was used. This has over 65o shares aggregated on a capitalization-weighted basis. This index was chosen in preference to either:-

a. the FT Index which is a geometrically weighted (and therefore downward biased) aggregation of only 30 market leading securities (somewhat arbitarily selected);

b. the FT Actuaries Industrials Index, which excludes securities from the financial sector.

The use of the widest ranging market index as a market portfolio was justified both on theoretical grounds, and also because it was evident that many trusts held a proportion of their portfolio in financial and other stocks covered by the All-Share but not the Industrials index.

On a-priori grounds neither the FT Industrials nor the FT All-Share should be unsatisfactory. These indices are market-value -weighted, arithmetic averages measuring the changing value of investments on the Stock Exchange. The FT Actuaries All-Share has about 70 percent of all UK listed securities by value, and as such, represents an excellent proxy for the market portfolio in the CAPM where each risk-bearing asset is weighted in the portfolio according to the ratio of investment of the i^{th} stock to all stocks.

The method used to calculate the rates of return is outlined in Appendix One.

7.2. Performance Measures

The CAPM model outlined in Chapter Three provides the basis for performance measures taking account of the different risks of individual portfolios.

The first measure, ALPHA, (α) was proposed by Jensen in his 1968 study of mutual fund performance and is a measure of the average excess return above the CAPM's reward for bearing risk. If we assume a reward-for-bearing risk return generating function as follows:-

$$\tilde{R}_j = \tilde{R}_f + \beta_j(\tilde{R}_M - R_f) \qquad (7.1)$$

which is equation (3.22) in chapter three, then taking the risk-free rate from both sides gives:-

$$\tilde{R}_j - R_f = \beta_j(\tilde{R}_M - R_f) \qquad (7.2)$$

In testing the model, we allow a non-zero intercept, and a residual error ($\tilde{e}_j$). such that the $E(\tilde{e}_j) = 0$, then we have (the hatches indicate observed variables):-

$$\hat{\tilde{R}}_j - \hat{R}_f = \hat{\alpha}_j + \hat{\beta}_j(\hat{\tilde{R}}_M - \hat{R}_f) + \hat{\tilde{e}}_j \qquad (7.3)$$

If the CAPM is valid, then overall the expectation is that $\hat{\alpha}_j = 0$. The term α_j is a measure of the average above equilibrium conditional conditions generated by a portfolio. Jensen used this measure to test the ability of mutual fund managers for the period 1945 to 1964.

The second measure is DELTA (δ). This is a measure of the difference between the actual returns achieved, and the CAPM model's same-risk benchmark portfolio of investment in the market portfolio and the risk-free asset over the same period. It is a measure of the selectivity of portfolio decision making by fund managers in capitalizing on non-systematic return effects.

If the returns over the actual period are generated by the following mechanism:-

$$\hat{\tilde{R}}_j = (1 - \hat{\beta}_j)R_f + \hat{\beta}_j\hat{\tilde{R}}_M + \tilde{e}_j \qquad (7.4)$$

then the expected return, conditional on the market, is:-

$$\tilde{R}_z = (1 - \hat{\beta}_j)R_f + \hat{\beta}_j\hat{\tilde{R}}_M \qquad (7.5)$$

The performance measure DELTA is the difference between the expected return, conditional on the market, and the actual return generated by the portfolio:-

$$\text{DELTA} = \tilde{R}_j - \tilde{R}_z \qquad (7.6)$$

Thus, selection of non-market effects in portfolio decision making will lead the superior manager to have a return above that which he would otherwise have obtained at the same market risk. The DELTA result may also be negative, indicating poor selection of non market effects.

The third measure is the REWARD-TO-VOLATILITY ratio. This is the risk-adjusted excess return for unit trust portfolios. It is the unit of additional return gained per unit of systematic risk. It allows an absolute ranking of all trusts regardless of their actual risk levels. This is illustrated in Figure 7.B.

$$\text{REWARD-TO-VOLATILITY} = \frac{\hat{\tilde{R}}_p - \hat{R}_f}{\hat{\beta}_p} \qquad (7.7)$$

The final measure is the EXCESS RETURN. This is merely the additional reward earned by trusts for bearing risk, without taking account of risk levels:-

$$\text{EXCESS RETURN} = \hat{\tilde{R}}_p - \hat{R}_f \qquad (7.8)$$

It lacks the sophistication of the other measures since an explicit accounting for differing risk levels is not made, but was chosen to indicate whether unit trust managements had a market timing ability. Trusts which were successfull in switching between risky securities and the risk-free asset will have a high excess return, but in doing so will change their risk exposure. A measure which, as in the other three cases, takes account of risk, may in fact, give erroneous results.

The relationship between the performance measures is best illustrated graphically. This is shown in Figure 7.3.

Excess Return is the difference between the risk-free rate and the portfolio rate of return. It takes no account of any of the risk differences in portfolios;

Reward-to-Volatility measures the excess return earned per unit of risk born, and consequently takes risk into explicit consideration in measuring the relative performance of portfolios. The better the return per unit of risk born, the better the performance of the trust. As is illustrated in Figure 7.2, it is possible for a trust to dominate another, so that an absolute ranking of unit trusts is possible based on this measure;

Jensen's Delta is the difference between the portfolio return and the market portfolio at the same level of risk.

Alpha cannot be shown as it is calculated from the regression equation used to generate betas. But it is a measure analogous to that of delta: it measures the above average returns for a portfolio, or security, not accounted for by its systematic risk level.

These measures will be used in the assessment of unit trust performance in the next chapter.

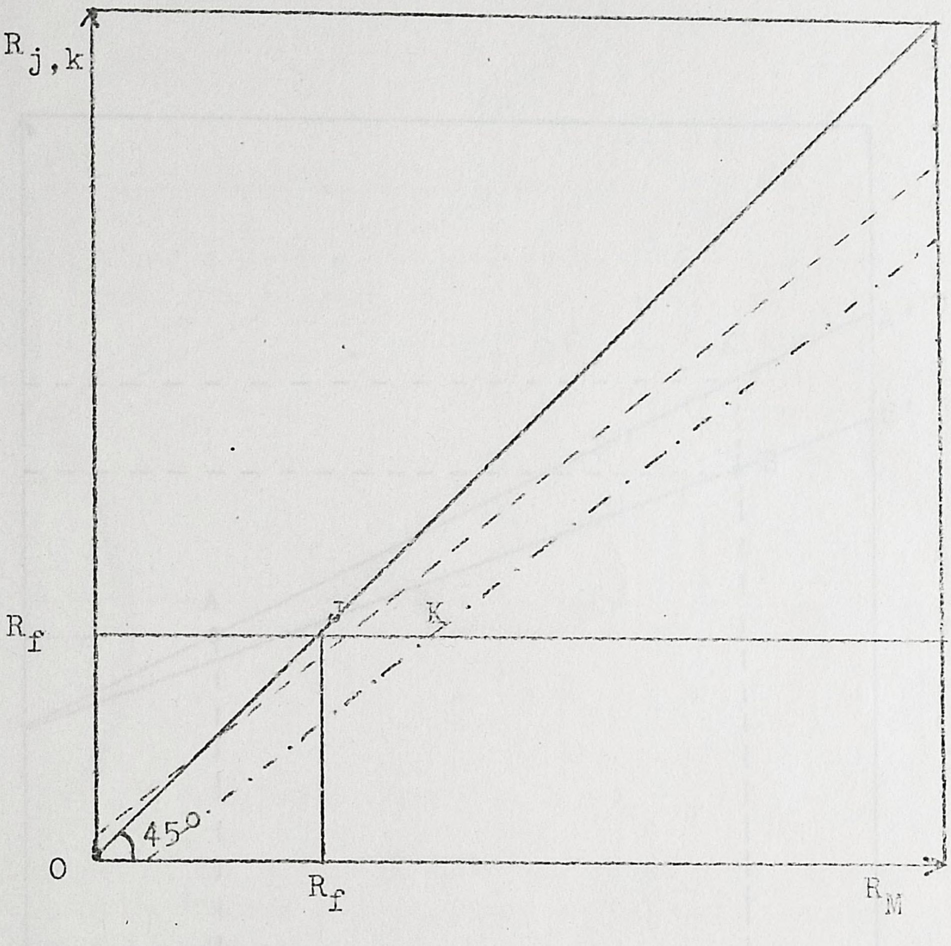


Figure 7·1

Treynor "Characteristic Lines" for
Trust Portfolios J and k.

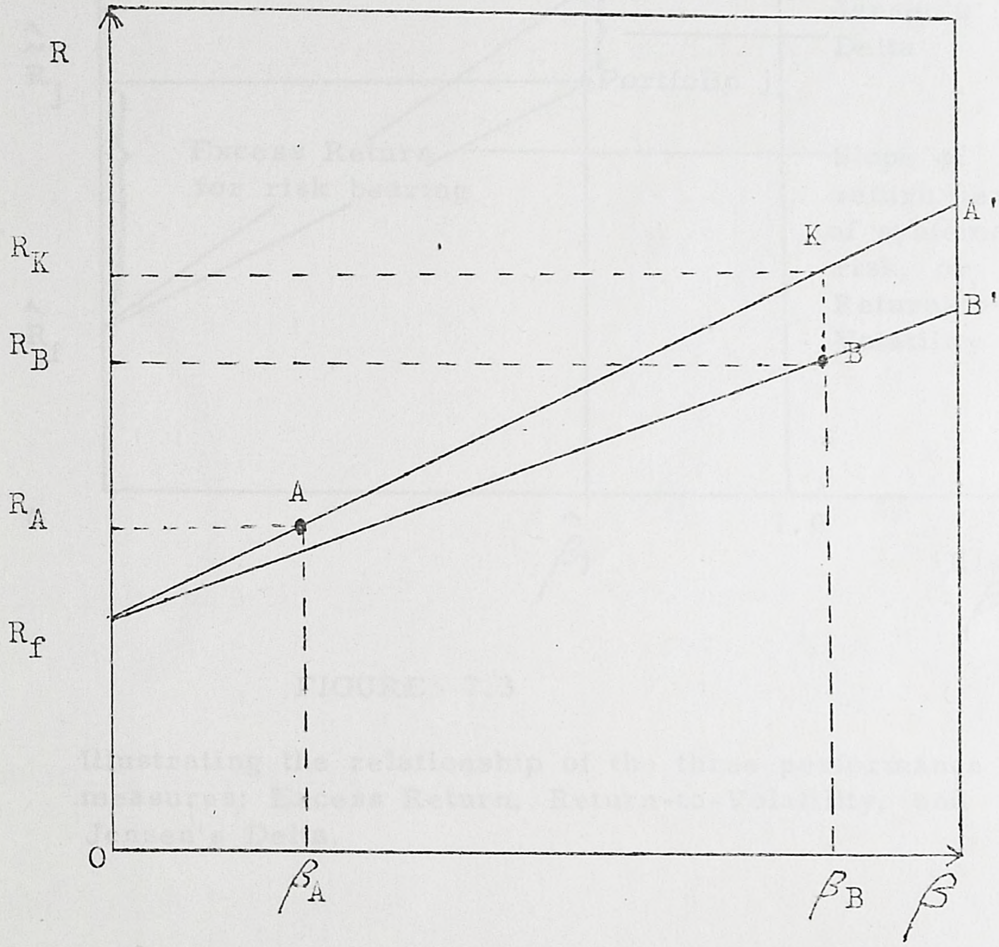


Figure 7.2

The "Reward-To-Volatility Ratio" showing the dominance of trust A to trust B by the use of a geared up trust K made up of funds borrowed at the risk-free rate and invested in fund A and with a risk equal to trust B.

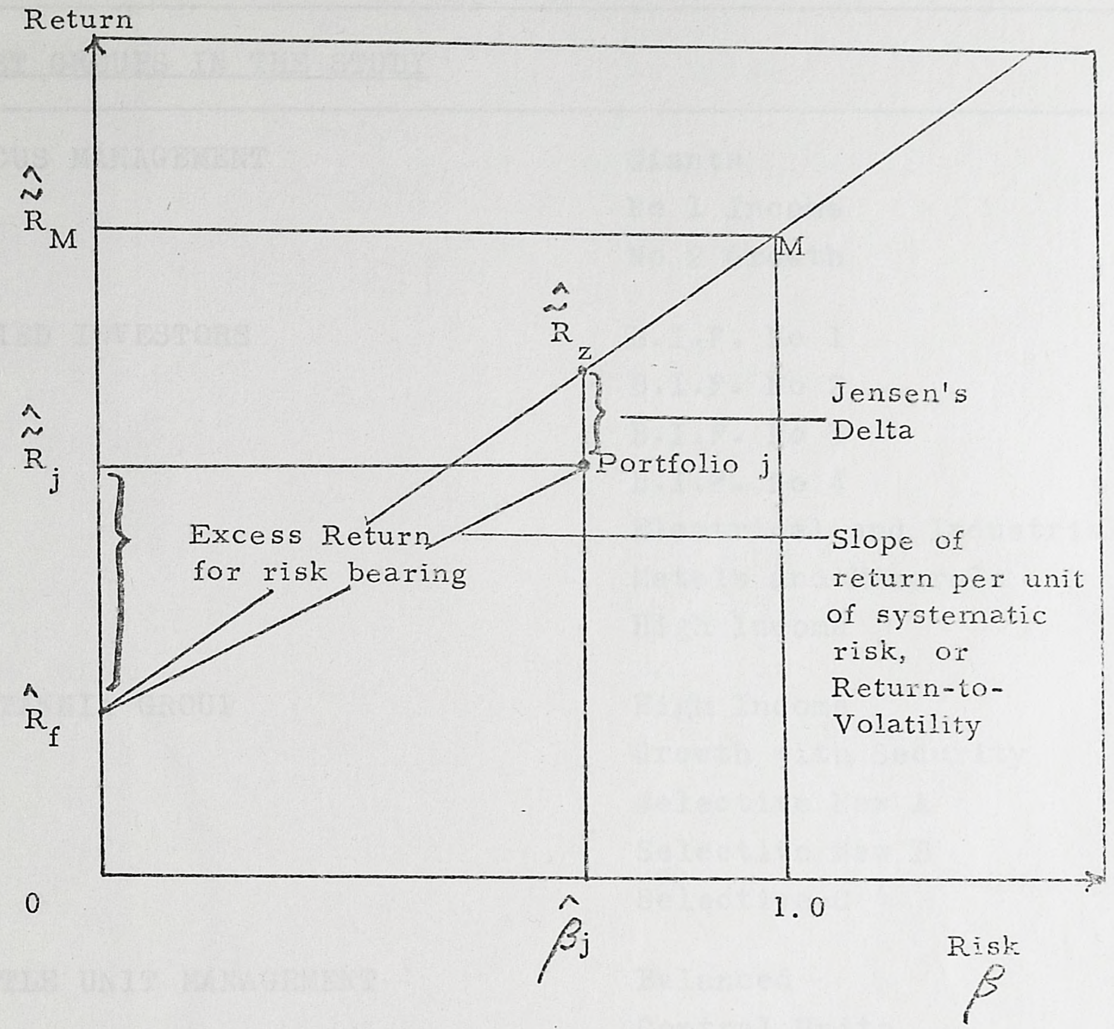


FIGURE 7.3

Illustrating the relationship of the three performance measures: Excess Return, Return-to-Volatility, and Jensen's Delta.

TABLE 7.A (1)

LIST OF MANAGEMENT GROUPS AND TRUSTS

DECEMBER 31st. 1965

TRUST GROUPS IN THE STUDY	
ABACUS MANAGEMENT	Giants
	No 1 Income
	No 2 Growth
ALLIED INVESTORS	B.I.F. No 1
	B.I.F. No 2
	B.I.F. No 3
	B.I.F. No 4
	Electrical and Industrial
	Metals and Minerals
	High Income
BRITANNIA GROUP	High Income
	Growth with Security
	Selective New A
	Selective New B
	Selective C
CASTLE UNIT MANAGEMENT	Balanced
	Central Units
	Technical Developments
COMMERCIAL MANAGEMENT	Consolidated
	Universal
COMMONWEALTH MANAGEMENT	A.E. & G.
	Commonwealth
	Invest in Leisure
	Orthodox
DILLON WALKER MANAGEMENT	Community
	Falcon
	Intrust
	Unicorn Trust
	Unicorn Income
	C.I.G.F.*

TABLE 7.A (2)

EBOR SECURITIES	Capital Accumulator
	Commodity
	Building
	High Return
	Normid
	Channel Isles*
FIRST PROVINCIAL	High Distribution
	Reserves
GOVETT J.	Stockholders
HILL SAMUEL GROUP	B.S.I.T.
	B.S.T.
	T.E.T. Capital
	T.E.T. Income
HODGE GROUP	Education
	Export Industries
	High Income
	Hodge Power
	Motorways
	Overseas
	Welsh Dragon
INTEL FUND MANAGEMENT	Intel
INVESTMENT ASSURED SECURITIES	Income Trust
JESSEL SECURITIES	City of London
	Gold & General
	London Provident
	Midland Counties
	New Issues
	North East Provident
	North West Provident
	Retirement Income
	Southern
LONDON WALL	High Income Priority
	Export Priority
	Financial Priority
	Capital Priority

TABLE 7.A (3)

	High Income Scottish
MOORGATE MANAGEMENT	Investors General
	Investors General 2nd
	Hundred
	Investors Gas
	Provident
	Security First
M.&.G.	General
	Second General
	Midland Industrial & General
	Dividend
	Trustee
	Charifund*
	Pension Equities*
	Island*
	Discretionary
	Barbican
MUTUAL TRUST MANAGEMENT	Income
	Security Plus
NATIONAL GROUP	Century
	Domestic
	NATBIFS
	National High Income
	National Consolidated
	National "D"
	Scot Units
	Shamrock
	Shield
NORTH AMERICAN UNIT MANAGEMENT	North American
PAN AUSTRALIAN MANAGEMENT	Pan Australian
	External Trust*
PRACTICAL INVESTMENT MANAGEMENT	Practical Fund
ST. MICHAEL'S SECURITIES	Israel*

TABLE 7.A (4)

S. & P.	Atlantic Bank Insurance Bank Units Trident Capital Cross Channel High Yield Income Insurance Investment Trust Scot-Yield Scotbits Scotshares
SINGER & FRIEDLANDER	Midlander
TYNDALL FUNDS	Capital Income
UNIT TRUST MANAGEMENT SERVICES	Anglian British Life Capital Growth Family Savings Overseas Preferred Income Preferred Income 2nd Property Shares Star Western & General
ULSTER HAMBRO MANAGEMENT	Ulster

* Trusts which have been excluded.

C.I.G.F. is an off-shore fund.
Channel Isles is an off-shore fund.
Charifund is a tax exempt charity fund.
External Trust is an off-shore fund.
Island is an off-shore fund.
Israel is excluded because it terminates in December 1966 providing only one year of data.

TABLE 7.A (5)

TRUST GROUPS EXCLUDED FROM THE STUDY

	Number of Trusts
Brown Shipley & Co	6
Charterhouse Japlet & Thomascon	7
Development Finance Corporation	1
Fonds Fiducumn International	1
International Growth Funds	1
Keyston Funds of Boston	2
Kleinwort Benson Agents	5
Société de Gestion pour l'Investissement Dans le Marché Commun	1
National Securities	1
Wales Unit Investment	2

These are principally offshore funds and are not licenced by the Department of Trade.

Sources Unitholder, January 1966
Financial Times, January 1, 1966
The Times, January 1, 1966.

TABLE 7.B (1)

1975 NAMES OF TRUSTS USED IN THE STUDY

Trust Number *	Trust Type	‡
1.	G	ALLIED BRITISH INDUSTRIES FLEXIBLE TRUST 2ND
2.	G	ALLIED CAPITAL was British Industrial Flexible Trust 3rd
3.	G	ALLIED ELECTRICAL & INDUSTRIAL DEVELOPMENT
4.	G	ALLIED FIRST TRUST was British Industrial Flexible Trust 1st
5.	G	ALLIED GROWTH & INCOME was British Industrial Flexible Trust 4th
6.	I	ALLIED HIGH INCOME TRUST
7.	S	ALLIED METALS, MINERALS & COMMODITIES TRUST was Metals & Minerals Trust
8.	G	ARBUTHNOT ABACUS GIANTS
9.	C	ARBUTHNOT GROWTH UNITS was Abacus Growth, Allied Number 1 Income
10.	I	ARBUTHNOT HIGH INCOME UNITS was Abacus Income, Allied Number 2 Income
11.	G	BARBICAN INVESTMENT FUND
12.	G	BRITISH LIFE UNIT TRUST, THE
13.	I	CRESCENT HIGH DISTRIBUTION FUND was First Provincial High Distribution Fund
14.	G	CRESCENT RESERVES was First Provincial Reserves
15.	G	DISCRETIONARY UNIT TRUST FUND
16.	G	GOVETT (J) STOCKHOLDERS UNIT TRUST FUND
17.	C	HENDERSON CAPITAL ACCUMULATOR was Vavasseur Capital Accumulator, Investment Assured Accumulator, Commonwealth A.E. & G.
18.	I	HENDERSON HIGH INCOME was Vavasseur High Income, Investment Assured Income Trust

TABLE 7.B (2)

Trust Number	Trust Type	
19.	G	HENDERSON INCOME & ASSET TRUST was Vavasseur Income & Asset, Orthodox, Commonwealth Orthodox
20.	S	HENDERSON INTERNATIONAL TRUST was Vavasseur International, Commonwealth, Commonwealth Commonwealth
21.	G	HILL SAMUEL BRITISH TRUST was B.S.T.
22.	C	HILL SAMUEL CAPITAL TRUST was T.E.T. Capital
23.	I	HILL SAMUEL INCOME was T.E.T. Income
24.	S	HILL SAMUEL INTERNATIONAL TRUST was B.S.I.T.
25.	G	HILL SAMUEL SECURITY TRUST was Britannia Group Growth with Security
26.	G	INTEL INVESTMENT FUND
27.	S	LAWSON AMERICAN was Ansbacher North American, North American North American
28.	G	LONDON WALL CAPITAL PRIORITY
29.	S	LONDON WALL FINANCIAL PRIORITY
30.	I	LONDON WALL HIGH INCOME PRIORITY
31.	I	M & G DIVIDEND
32.	G	M & G GENERAL
33.	G	M & G MIDLAND & GENERAL was M & G Midland, Industrial & General
34.	G	M & G SECOND GENERAL was Second M & G
35.	G	M & G TRUSTEE
36.	I	MUTUAL INCOME TRUST
37.	G	MUTUAL SECURITY PLUS

TABLE 7.B (3)

Trust Number	Trust Type	
38.	S	<u>OCEANIC FINANCIAL TRUST</u> was Hodge Export Industries
39.	G	<u>OCEANIC GENERAL</u> was Hodge Dragon Growth, Welsh Dragon
40.	I	<u>OCEANIC HIGH INCOME</u> was Hodge High Income
41.	S	<u>OCEANIC INDEX</u> was Oceanic Progressive, Hodge Progressive, Hodge Education
42.	S	<u>OCEANIC INVESTMENT TRUST UNITS</u> was Hodge Power
43.	S	<u>OCEANIC OVERSEAS</u> was Hodge Overseas
44.	S	<u>OCEANIC RECOVERY</u> was Hodge Motorways
45.	S	<u>PRACTICAL INVESTMENT FUND</u>
46.	C	<u>S & P CAPITAL ACCUMULATOR</u> was Ebor Capital Accumulator
47.	S	<u>S & P COMMODITY</u> was Ebor Commodity
48.	G	<u>S & P GENERAL</u> was Ebor General, Ebor North & Midlands
49.	S	<u>S & P PROPERTY & BUILDING</u> was Ebor Building
50.	C	<u>S & P CAPITAL UNITS</u>
51.	S	<u>S & P EUROPEAN GROWTH</u> was S & P Cross Channel
52.	I	<u>S & P HIGH RETURN</u> was Ebor High Return
53.	I	<u>S & P HIGH YIELD</u>
54.	I	<u>S & P INCOME</u>
55.	S	<u>S & P INVESTMENT TRUST UNITS</u>

TABLE 7.B (4)

Trust Number	Trust Type	
56.	S	S & P US GROWTH was S & P Atlantic
57.	S	S & P SCOTBITS
58.	S	S & P SCOTSHARES
59.	I	S & P SCOTYIELDS
60.	S	SLATER, WALKER BANKING, INSURANCE & FINANCE was National NATBIFS
61.	G	SLATER, WALKER CAPITAL GROWTH was Jessel Capital Growth, Counties, Midland Counties
62.	C	SLATER, WALKER CENTURY was National Century
63.	S	SLATER, WALKER CITY OF LONDON was Jessel City of London
64.	C	SLATER, WALKER COMMERCIAL CONSOLIDATED was Commercial Consolidated
65.	C	SLATER, WALKER CONSOLIDATED was National Consolidated
66.	G	SLATER, WALKER DOMESTIC was National Domestic
67.	S	SLATER, WALKER GLOBAL GROWTH was Jessel Global Growth, Selective Fund, Selective New "A"
68.	S	SLATER, WALKER GOLD & GENERAL was Jessel Gold & General
69.	C	SLATER, WALKER HUNDRED SECURITIES was National Hundred, Moorgate Hundred
70.	I	SLATER, WALKER INCOME TRUST was Jessel Income Trust, Retirement Income
71.	S	SLATER, WALKER INTERNATIONAL was JL International Consumer, Mallet & Wedderburn the Overseas Trust

TABLE 7.B (5)

Trust Number	Trust Type	
72.	G	SLATER, WALKER INVESTORS GENERAL was National Investors General, Moorgate Investors General
73.	G	SLATER, WALKER INVESTORS SECOND GENERAL was National Investors Second General, Moorgate Investors Second General
74.	I	SLATER, WALKER NATIONAL HIGH INCOME was National High Income
75.	S	SLATER, WALKER NEW ISSUES was Jessel New Issues
76.	C	SLATER, WALKER PROVIDENT INVESTORS TRUST was National Provident, Moorgate Provident
77.	G	SLATER, WALKER SCOTTISH was National Scots-Units
78.	G	SLATER, WALKER SECURITY FIRST was Nàtional Security First, Moorgate Security First
79.	G	SLATER, WALKER SHAMROCK was National Shamrock
80.	G	SLATER, WALKER SHIELD was National Shield
81.	C	SLATER, WALKER UNIT "D" was National Unit "D"
82.	C	SLATER, WALKER UNIVERSAL SECOND TRUST was National Universal 2nd, Commercial Universal 2nd
83.	S	TARGET COMMODITY was Target Consumer, Unit Trust Services Family Savings
84.	G	TARGET EQUITY was Unit Trust Services Star
85.	S	TARGET FINANCIAL was Unit Trust Services Property Shares
86.	C	TARGET GROWTH was Unit Trust Services Capital Growth

TABLE 7.B (6)

Trust Number	Trust Type	
87.	I	TARGET INCOME was Unit Trust Services Preferred 2nd Income
88.	S	TARGET PREFERENCE SHARE was Unit Trust Services Preferred Income
89.	C	TYNDALL CAPITAL TRUST
90.	I	TYNDALL INCOME TRUST
91.	G	ULSTER BANK GROWTH TRUST was Ulster Hambro Bank Growth Trust
92.	S	UNICORN AUSTRALIA was Southern Cross Pan Australian, Pan Australian Management Pan Australian
93.	G	UNICORN CAPITAL was Dillon Walker Unicorn Trust
94.	G	UNICORN GENERAL was Dillon Walker Community
95.	I	UNICORN INCOME
96.	G	UNICORN TRUSTEE was Dillon Walker Intrust

TABLE 7.C

TRUSTS WHICH EITHER TERMINATE OR MERGE IN THE PERIOD 1966 - 1975

Trust Number	Trust Type	
97.	S	BRITANNIA SELECTIVE B merged 1/1970 into Jessel Global Growth
98.	S	BRITANNIA SELECTIVE C name changed to Jessel Investors Growth Fund, trust terminated on 3/1971
99.	I	BRITANNIA HIGHER INCOME merged 11/1970 into Jessel Income
100.	G	CASTLE UNIT BALANCED merged 11/1969 into Jessel Income
101.	G	CASTLE UNIT CENTRAL UNITS terminated 7/1968
102.	S	CASTLE TECHNICAL DEVELOPMENTS merged 4/1970 into Jessel General
103.	G	INVEST IN LEISURE merged 9/1970 into Vavasseur Income & Asset
104.	G	FALCON merged 10/1968 into Unicorn General
105.	S	LONDON WALL EXPORT PRIORITY merged 2/1972 into London Wall Stronghold
106.	I	LONDON WALL HIGH INCOME SCOTTISH merged 2/1972 into London Wall High Income Priority
107.	G	LONDON PROVIDENT merged 10/1968 into Jessel Capital Growth
108.	G	NORTH EAST PROVIDENT merged 10/1968 into Jessel Capital Growth
109.	G	NORTH WEST PROVIDENT merged 10/1968 into Jessel Capital Growth
110.	G	SOUTHERN TRUST merged 10/1968 into Jessel Capital Growth
111.	S	S & P BANK UNITS merged into S&P Financial 12/1970

TABLE 7.C

Trust Number	Trust Type	
112.	S	S & P BANK INSURANCE merged 12/1970 into S & P Financial
113.	S	S & P TRIDENT merged 12/1970 into S & P Financial
114.	S	S & P INSURANCE UNITS merged 12/1970 into S & P Financial
115.	G	NATIONAL INVESTORS GAS terminated 5/1974
116.	S	VAVASSEUR MIDLANDER merged 9/1973 into Henderson Income & Asset
117.	G	ANGLIAN merged 12/1968 into Target Equity
118.	G	WESTERN & GENERAL merged 12/1968 into Target Equity

	Trusts 1966 - 1975	Moles & Taylor (1977)	Merge or Terminate
General Trusts	36	32	11
Income Trusts	18	18	2
Specialized Trusts	28	26	9
Capital Trusts	14	10	-

* Trust Number refers to the code allocated to each trust in this study for easy identification purposes.

‡ This is the 1975 definition from the UNIT TRUST YEARBOOK for the surviving trusts. The merged and terminated group were assessed where possible from past issues or deduced from the trust name.

TABLE 7.D

TRUST STATISTICS 1966 - 1975

	Percent of Total N = 118
Trust Types	
INCOME	16.9
CAPITAL	11.9
SPECIALIZED	31.4
GENERAL	39.8
Trusts With a Name Change 1966 - 1975	31.4
Trusts With a Group Change 1966 - 1975	43.2
Management Groups in 1966	
ABACUS	2.5
ALLIED	5.9
BRITANNIA	4.2
CASTLE	2.5
COMMONWEALTH	3.4
DILLON WALKER	4.2
EBOR	4.2
HILL SAMUEL	3.4
HODGE	5.9
JESSEL	7.6
LONDON WALL	4.2
MOORGATE	5.1
M & G	4.2
NATIONAL	7.6
S & P	11.0
UNIT TRUST SERVICES	8.5
	84.4
Management Groups in 1975	
ALLIED	5.9
ARBUTHNOT	2.5
HENDERSON	3.4
HILL SAMUEL	4.2
LONDON WALL	2.5
M & G	4.2
OCEANIC	5.9
S & P	11.9
SLATER,WALKER	19.5
TARGET	5.1
UNICORN	4.2
	69.3
Percentage of Trusts Surviving in 1975	81.4

UNIT TRUST BID-OFFER SPREAD

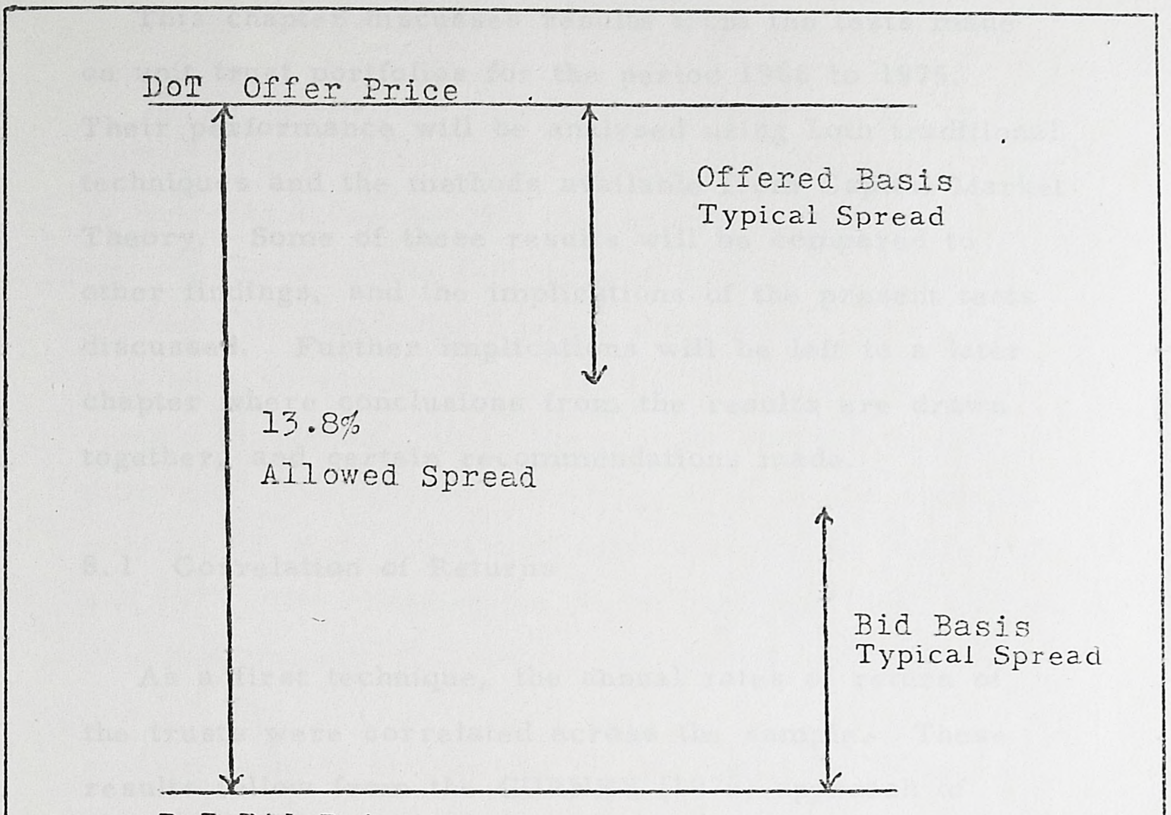


Figure 7.4

8.0 PERFORMANCE RESULTS

This chapter discusses results from the tests made on unit trust portfolios for the period 1966 to 1975. Their performance will be analysed using both traditional techniques and the methods available from Capital Market Theory. Some of these results will be compared to other findings, and the implications of the present tests discussed. Further implications will be left to a later chapter where conclusions from the results are drawn together, and certain recommendations made.

8.1 Correlation of Returns

As a first technique, the annual rates of return of the trusts were correlated across the sample. These results follow from the GURNEY (1976) approach of ranking correlation, and are shown for the period in Tables 8.A and 8.B. Both the parametric (Pearson) correlation and the non-parametric (Spearman) rank correlation were calculated. The first thing to note is the generally lower results obtained by the latter. This is in accord with SIEGEL (1956) who points out that the use of Spearman's rank correlation is such as to give a lower number of significant coefficients than a comparable parametric test. The "true" correlation probably falls somewhere between the two methods.

The results have a high number of coefficients producing significant results:-

	At the 0.05 Level	At the 0.01 Level
Pearson Test	30	19
Spearman Test	23	15

The possible total number of relations was 45. This result is in accord with the other ranking tests that have been carried out. It does appear that there is a considerable stability of rankings of returns over the period analysed. The picture is less favourable for the Spearman test as would be predicted.

These results are slightly above similar work by RUTHERFORD (1969), and Gurney. The differences may be accountable by the fact that estimating procedures were different. The returns used here are the quarterly continuously compounded rates added up for each year, they used an annual rate. Another is the use of a fixed sample throughout. Also the periods analysed are different. For instance, the year 1972 in this study is only significantly correlated with three years: 1973, 1974 and 1975. By changing the period analysed, the pattern of significant correlations can be altered.

One possible explanation for the matrix of significant correlations is some sort of state dependent performance by unit trust portfolios. Overall, it seems that the returns for any given year will be negatively correlated if those years have different market conditions; and positively correlated if market conditions are similar. In 17 out of 23 cases, the predicted behaviour just mentioned gives the correct relationship of sign to market conditions.

The correlation for two-five year periods 1966/70 and 1971/75, again the difference between a parametric and a non-parametric test is enough to make a difference between a significant and an insignificant result. It is probable that the relationship between the two-five year periods is very low. This would be true if the state dependent performance of unit trusts was a true description of their behaviour. As it is, only 6.52 percent of returns in the second period can be accounted for by returns in the first period, 1966/70. This is without taking any risk into account.

PEARSON CORRELATION OF ANNUAL RETURNS 1966 - 1975

RETURN	1966	1967	1968	1969	1970	1971	1972	1973	1974
1966	1.000								
1967	.100	1.000							
1968	.001	.351**	1.000						
1969	.150	.098	.028	1.000					
1970	-.298**	-.353**	.109	-.292**	1.000				
1971	-.407**	-.380**	.140	-.424**	.591**	1.000			
1972	.181*	-.001	.195*	.374**	-.065	-.203*	1.000		
1973	.173*	.062	-.149	.397**	-.079	-.389**	.268*	1.000	
1974	.277*	.050	-.248*	.264*	-.303**	-.516**	.330**	.502**	1.000
1975	-.180*	-.105	.171*	-.064	.414**	.514**	-.375**	-.249*	-.620**

Return 1966-1970 with Return 1971-1975

0.2553 Significance:
N=96 .006

Significance levels:-

** = 0.001 or less 19 coefficients
* = 0.05 or less (11) 30 coefficients

Number of Relationships 45 coefficients

TABLE 8.A

SPEARMAN RANK CORRELATION OF ANNUAL RETURNS 1966 - 1975

RETURN

	1966	1967	1968	1969	1970	1971	1972	1973	1974
1966	1.000								
1967	.131	1.000							
1968	-.042	.345**	1.000						
1969	.084	.075	-.017	1.000					
1970	-.285**	-.385**	.144	-.120	1.000				
1971	-.350**	-.373**	.106	-.312**	.507**	1.000			
1972	.122	-.143	.072	.029	.145	.058	1.000		
1973	.223*	-.012	-.089	.304**	.014	-.306**	.259*	1.000	
1974	.301**	.006	-.215*	.185*	-.278*	-.477**	.212*	.459**	1.000
1975	-.216*	-.072	.152	-.042	.419**	.429**	-.245*	-.149	-.569**

Return 1966-1970 with Return 1971-1975

0.1339	Significance:
N=96	.097

Significance levels:-

** = 0.001 or less	15 coefficients
* = 0.05 or less	(8) 23 coefficients
Number of Relations	45 coefficients

TABLE 8.B

SUMMARY STATISTICS FOR ANNUAL RETURNS 1966 - 1975

Year	Mean	Variance	Standard Deviation	Minimum	Maximum	Range	Number of Trusts
1966	-.035	.001	.038	-.181	.078	.258	118
1967	.276	.006	.079	.086	.475	.389	118
1968	.334	.005	.071	.013	.571	.559	118
1969	-.142	.004	.065	-.301	.246	.548	110
1970	-.053	.007	.085	-.340	.129	.469	107
1971	.343	.016	.125	-.066	.593	.659	101
1972	.207	.010	.102	-.022	.637	.659	99
1973	-.293	.007	.086	-.520	.035	.555	98
1974	-.413	.022	.150	-.683	.137	.819	96
1975	.560	.043	.206	-.318	1.004	1.322	96
1966-70	.395	.021	.145	-.006	.748	.753	107
1971-75	.402	.057	.239	-.514	.896	1.409	96
1966-75	.800	.086	.293	-.416	1.541	1.957	118
Moles & Taylor 1966-75	.671	.118	.343	-.497	1.547	2.044	86

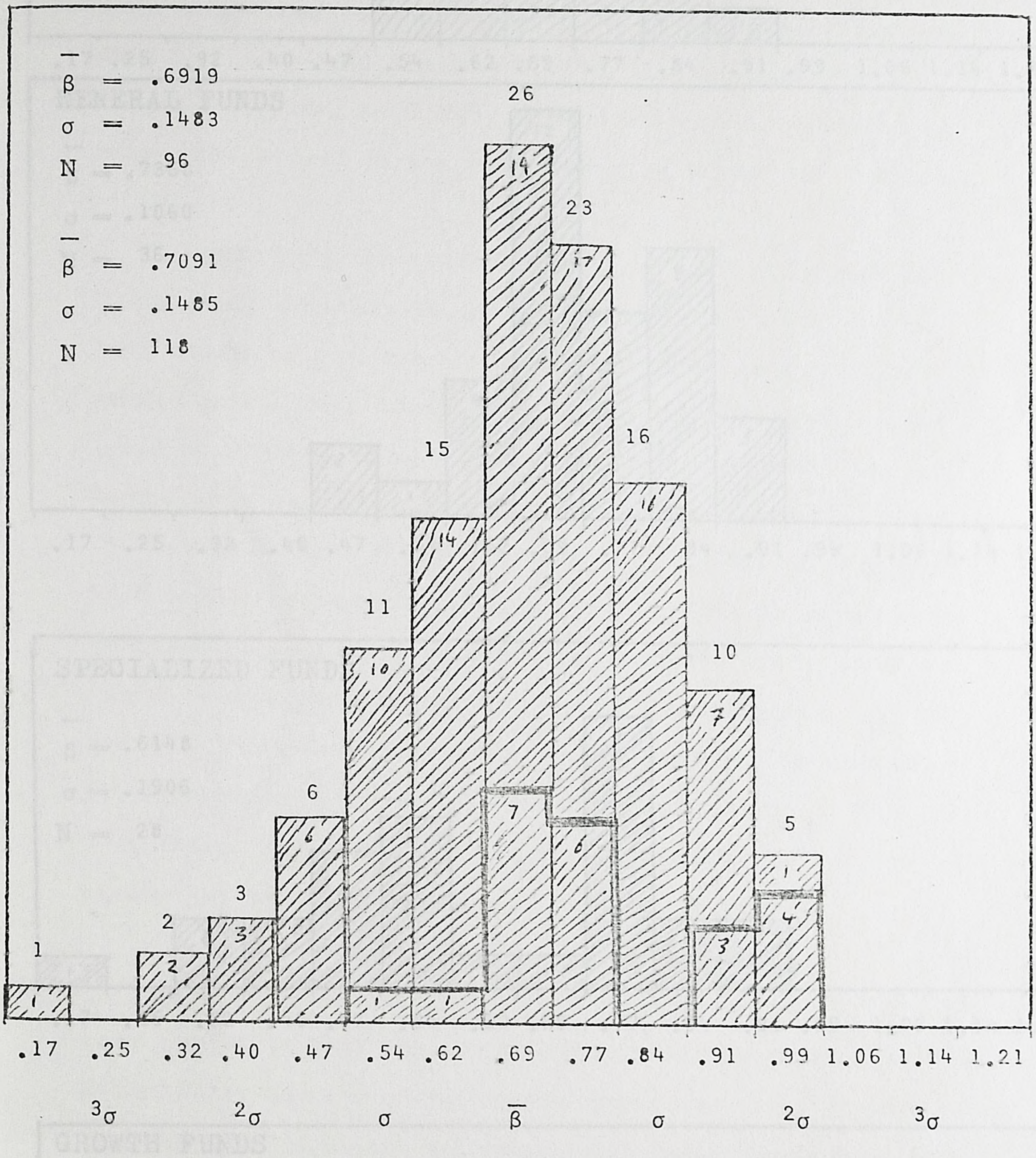
TABLE 8.C

8.2 Trusts' Risk

This section covers the characteristics of unit trust risk as measured by their systematic risk, or beta coefficient.

In Figure 8.1, the beta coefficients for the unit trusts are shown over the 10 year period. The distribution of beta is symmetric around the mean of 0.7. There are a number of trusts which fall into the low beta group: these were trusts in the specialized category investing mainly in international securities. No trust had a computed beta above the market for the period 1966-1975, this accords with other studies (see the Clark & Evans paper, for instance). Trusts tended to be risk-conservative in that their market exposure was below that of the all-equity, market portfolio. This, on examination of a number of individual portfolios, was due to the holding of a proportion of their assets in certain fixed-interest stocks and liquid investments. The impact of liquidity levels will be discussed in the next chapter. In Appendix Three the reported percentages of non-equity assets held by unit trusts over this period are given, together with the average level of liquidity, and a measure of variability in liquidity.

The beta coefficients were further broken down for the trusts according to categories, as seen in Figure 8.2. It is difficult to detect any significant differences between the betas of the trust types. The different categories of trust all seem to have much the same risk exposure, a result in contrast to the well-defined types of funds found in US research. Trusts do not categorize themselves by way of risk classes, but rather by the way they treat returns, either as capital gains, or income, or a mixture of the two. In a later study, we will analyse the trust types to determine whether there is any meaningful difference.



BETA COEFFICIENTS "SYSTEMATIC RISK"

1966-1975

(Half sigma intervals.)

Figure 8.1

DISTRIBUTION OF BETAS OF 96 TRUSTS 1966-75

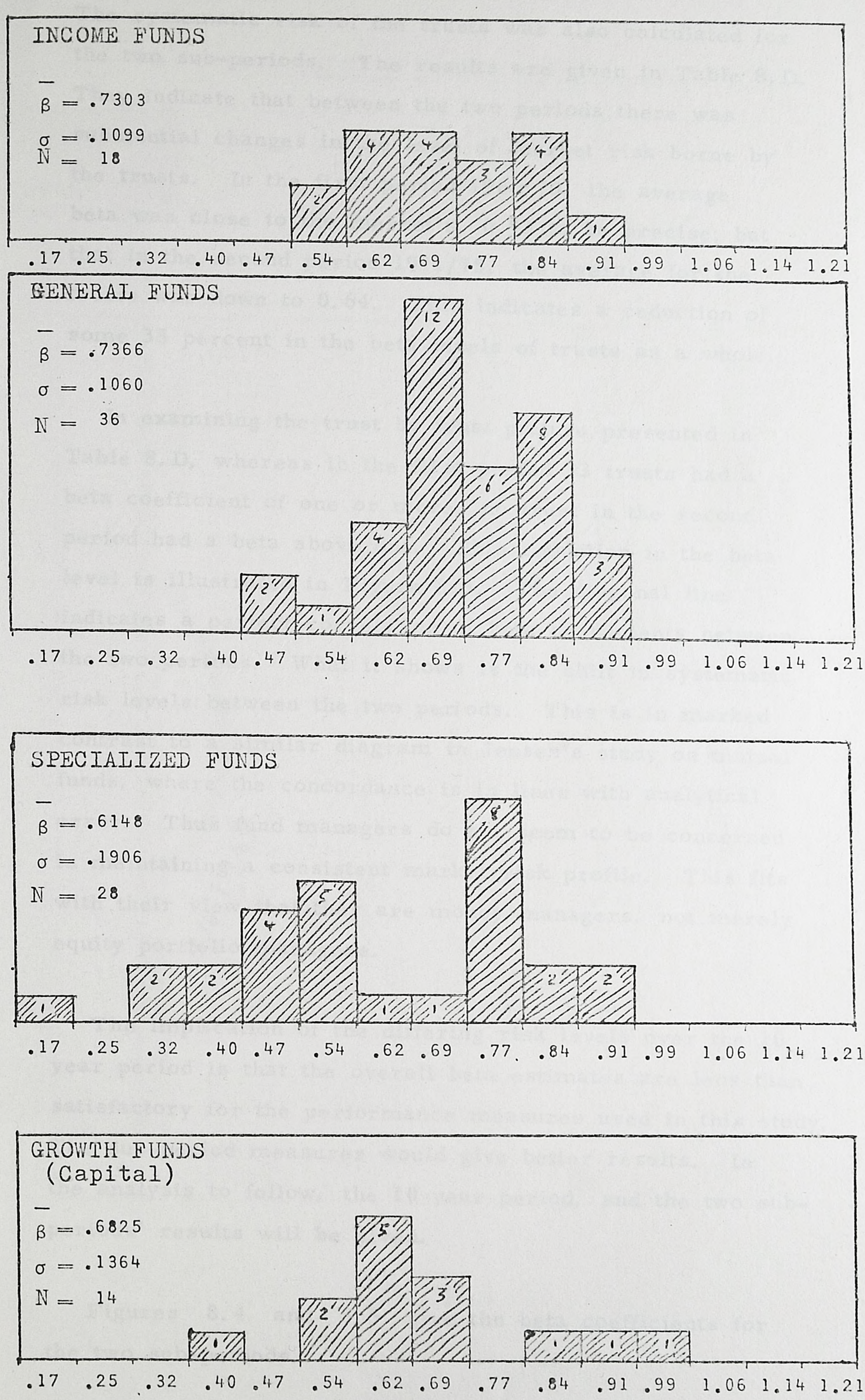


FIGURE 8.2

The systematic risk of the trusts was also calculated for the two sub-periods. The results are given in Table 8.D. They indicate that between the two periods there was substantial changes in the level of market risk borne by the trusts. In the first period 1966/70, the average beta was close to the market's, 0.93 to be precise; but that in the second period 1971/75, the average for the trusts was down to 0.64. This indicates a reduction of some 35 percent in the beta levels of trusts as a whole.

In examining the trust by trust picture presented in Table 8.D, whereas in the first period 33 trusts had a beta coefficient of one or more, no trust in the second period had a beta above one. This reduction in the beta level is illustrated in Figure 8.3. The diagonal line indicates a perfect correlation of beta coefficients between the two periods. What it shows is the shift in systematic risk levels between the two periods. This is in marked contrast to a similar diagram in Jensen's study on mutual funds, where the concordance is in lines with analytical error. Thus fund managers do not seem to be concerned in maintaining a consistent market risk profile. This fits with their view that they are money managers, not merely equity portfolio managers.

The implication of the differing risk levels over the 10 year period is that the overall beta estimates are less than satisfactory for the performance measures used in this study. The sub-period measures would give better results. In the analysis to follow, the 10 year period, and the two sub-periods' results will be given.

Figures 8.4 and 8.5 give the beta coefficients for the two sub-periods.

REGRESSION ESTIMATES FOR THE SUB-PERIODS

$$(\tilde{R}_j - \tilde{R}_f) = \alpha_j + \beta_j(\tilde{R}_M - \tilde{R}_f)$$

Trust Number	Trust Type	1966-1970 α_j	1966-1970 β_j	1966-1970 R^2	1971-1975 α_j	1971-1975 β_j	1971-1975 R^2
1	G	-.00130	.88753	.83364	.00582	.64528	.89068
2	G	.00052	.94169	.83065	.00341	.69434	.88810
3	G	.00370	.85318	.87049	.00087	.61892	.89887
4	G	-.00320	1.01833	.82764	.00432	.56201	.80826
5	G	.00177	.98370	.88401	.00389	.69681	.91454
6	I	.00147	.88093	.76232	.01587	.59454	.82191
7	S	-.00109	1.04184	.79168	.00257	.39312	.36632
8	G	-.01063	1.01195	.89422	-.00250	.61003	.74109
9	C	-.01455	.96605	.80061	-.00326	.58370	.81256
10	I	.02528	1.00801	.25355	.00693	.57494	.78441
11	G	-.00165	.89694	.92765	-.00485	.88275	.94111
12	G	-.00432	.93027	.92341	.00011	.67102	.95226
13	I	-.00661	.90870	.87057	.01161	.81489	.93435
14	G	-.00679	1.00598	.97173	-.00781	.80795	.96527
15	G	-.00150	.74776	.70090	.01185	.84430	.90721
16	G	.00667	1.02017	.81031	-.01450	.44666	.68713
17	C	-.00632	1.06438	.91221	.00259	.28674	.26113
18	I	.00068	.87403	.86430	.01734	.53811	.80903
19	G	-.00856	.85461	.84988	-.00191	.60067	.86118
20	S	-.00542	.97830	.73463	.00287	.42556	.48593
21	G	-.00068	1.01780	.96589	-.00016	.79838	.96271
22	C	.00454	1.16770	.95987	.00699	.91517	.95921
23	I	-.00741	.89354	.91256	.01059	.86474	.93405
24	S	-.00271	1.06912	.69655	-.00044	.36281	.52609
25	G	-.00037	.84401	.86845	.00628	.77721	.92416
26	G	-.00022	1.04182	.89381	.00256	.63177	.90387
27	S	-.01965	.99115	.52912	-.04587	.29583	.18440
28	G	.00250	1.06776	.81038	.00645	.87222	.95092
29	S	.01128	.99535	.87819	-.00393	.86907	.90948
30	I	-.00776	.83761	.64805	.01768	.91716	.89994
31	I	-.00556	.87349	.68215	.01853	.85102	.88069
32	G	-.00250	.99266	.97109	.00926	.66411	.81109
33	G	-.00481	.86662	.89927	.01200	.81744	.88935
34	G	-.00028	.93094	.84496	.01072	.63356	.78835
35	G	-.00189	.94687	.91282	.01221	.79457	.92580
36	I	.00506	.81263	.81071	-.01387	.72104	.86925

TABLE 8.D (1)

REGRESSION ESTIMATES FOR THE SUB-PERIODS

Trust Number	Trust Type	1966-1970 α_j	1966-1970 β_j	1966-1970 R^2	1971-1975 α_j	1971-1975 β_j	1971-1975 R^2
37	G	-.00048	.89067	.96294	.00297	.68008	.84587
38	S	-.01557	.98656	.83559	.00048	.47733	.53784
39	G	-.02090	1.14300	.84279	-.02513	.51812	.68926
40	I	-.01143	.80737	.61562	.00072	.51036	.59661
41	S	-.02107	.90395	.89102	-.00889	.65295	.68439
42	S	-.01604	1.00425	.82511	-.02239	.71588	.84997
43	S	-.01442	.85067	.52571	-.01095	.24888	.14787
44	S	-.02251	1.01005	.76771	-.00390	.68235	.75540
45	S	.00309	.94692	.81798	-.00136	.80690	.85081
46	C	.00832	1.20814	.87634	-.00049	.82232	.93341
47	S	.00666	.68087	.52677	.02461	.39047	.41130
48	G	.00399	.95895	.82120	.00258	.84949	.90007
49	S	-.00900	.84544	.64005	.01492	.84721	.83192
50	C	-.00219	1.05179	.84244	-.01134	.55904	.67572
51	S	-.00565	.70807	.43163	.00981	.39201	.45685
52	I	-.00160	.84491	.80746	.02215	.78713	.89825
53	I	-.00375	.99277	.86769	.01595	.70148	.88229
54	I	-.01343	.71150	.79886	.01144	.68536	.90680
55	S	-.00132	1.26108	.87054	-.01067	.79829	.92589
56	S	-.00574	1.16505	.52313	-.01748	.40411	.31455
57	S	-.00087	1.10706	.87050	-.01869	.72120	.88855
58	S	-.00718	.91135	.87953	-.00136	.75408	.90717
59	I	.00449	.86631	.86133	.00845	.69658	.92313
60	S	-.00166	.94348	.88131	-.00496	.48542	.80505
61	G	-.00613	.85932	.77737	-.00662	.72874	.75176
62	C	-.00359	1.03310	.88174	-.00088	.64821	.77292
63	S	.00138	.98094	.78689	-.01276	.76400	.84079
64	C	-.00068	1.07372	.86153	-.00843	.46029	.66519
65	C	-.00010	.99682	.74709	-.00038	.53751	.70258
66	G	-.00747	.89429	.87859	-.00635	.68438	.87907
67	S	-.01109	1.15208	.78492	.01087	.48980	.57395
68	S	.00443	.98919	.62593	.00032	.03415	.00155
69	C	-.00054	.85053	.82397	.00349	.59111	.74989
70	I	-.00188	.73913	.66421	.01559	.69856	.84473
71	S	-.01738	1.10889	.54179	-.02022	.34291	.31138
72	G	-.00231	.97276	.84087	-.00838	.66473	.81712
73	G	-.00214	.93666	.78117	-.00163	.66923	.77278
74	I	-.00039	.76186	.74501	.01098	.52219	.67972
75	S	-.00410	1.03876	.73645	-.02382	.71588	.69016
76	C	-.00203	.89829	.75358	-.01219	.49383	.69741

TABLE 8.D (2)

REGRESSION ESTIMATES FOR THE SUB-PERIODS

Trust Number	Trust Type	1966-1975 α_j	1966-1975 β_j	1966-1975 R^2	1971-1975 α_j	1971-1975 β_j	1971-1975 R^2
77	G	-.00773	.84375	.84409	.00049	.65020	.83125
78	G	-.00698	.76655	.81099	-.00057	.62048	.85060
79	G	-.01124	.79824	.90165	-.00755	.43087	.62863
80	G	.00091	.95083	.79278	-.00676	.37767	.75783
81	C	-.00291	.98249	.81628	.00177	.63561	.81694
82	C	-.00264	.98629	.82259	-.00203	.57335	.72980
83	S	-.01056	1.00204	.83895	-.00973	.72383	.83550
84	G	-.00307	.91505	.87392	-.00559	.72818	.86032
85	S	.01386	.83408	.44682	.00228	.73287	.89599
86	C	-.00955	1.07276	.74768	-.01943	.64498	.89658
87	I	-.01624	.24257	.24100	.00676	.68806	.85634
88	S	-.01866	.24599	.41516	-.00502	.38123	.69565
89	C	-.00070	.98122	.70669	-.01164	.76999	.88715
90	I	-.00527	.70637	.61764	.00339	.88901	.87408
91	G	-.01097	.80019	.74892	-.00444	.79709	.95192
92	S	.01383	.87476	.37842	.00078	.26725	.09520
93	G	-.00187	1.04672	.93961	-.00315	.82533	.94664
94	G	-.00382	.89951	.89088	.00070	.85810	.95758
95	I	-.00248	.92582	.87371	.01529	.79247	.94926
96	G	-.00162	.97499	.90602	-.00765	.87741	.95976
97	S	-.01420	.89335	.88324	.01087	.48980	.57395
98	S	-.00973	.99856	.82085			
99	I	.00142	.90239	.82695			
100	G	-.00550	.76084	.58185	.01559	.69856	.84473
101	G	-.01448	.88277	.85700			
102	S	-.01608	1.02115	.85854			
103	G	-.00778	.92369	.81746	.00641	.62447	.76797
104	G	-.00675	.90212	.88637	.00070	.85810	.95758
105	S	-.01487	1.10005	.89409			
106	I	-.01422	.89107	.90392	.01594	.91201	.90308
107	G	-.00650	.73029	.78690			
108	G	-.00934	.67746	.71036			
109	G	-.00590	.85629	.71129	-.00662	.72874	.75176
110	G	-.00471	.83223	.81704			
111	S	-.00202	.71330	.79916			
112	S	-.00030	.84370	.76507			
113	S	-.00444	1.07611	.89398	-.00298	.63605	.75339
114	S	-.00049	.99210	.63867			
115	G	-.00191	1.02409	.83702	.01059	.79227	.89025
116	S	-.00896	1.07975	.87045	.00097	.65420	.78635
117	G	-.00944	.86037	.82926	-.00559	.72818	.86032
118	G	-.00671	.93673	.88270			
N = 96			.92870 (.15160)			.64140 (.17710)	
N = 118			.92410 (.14590)				

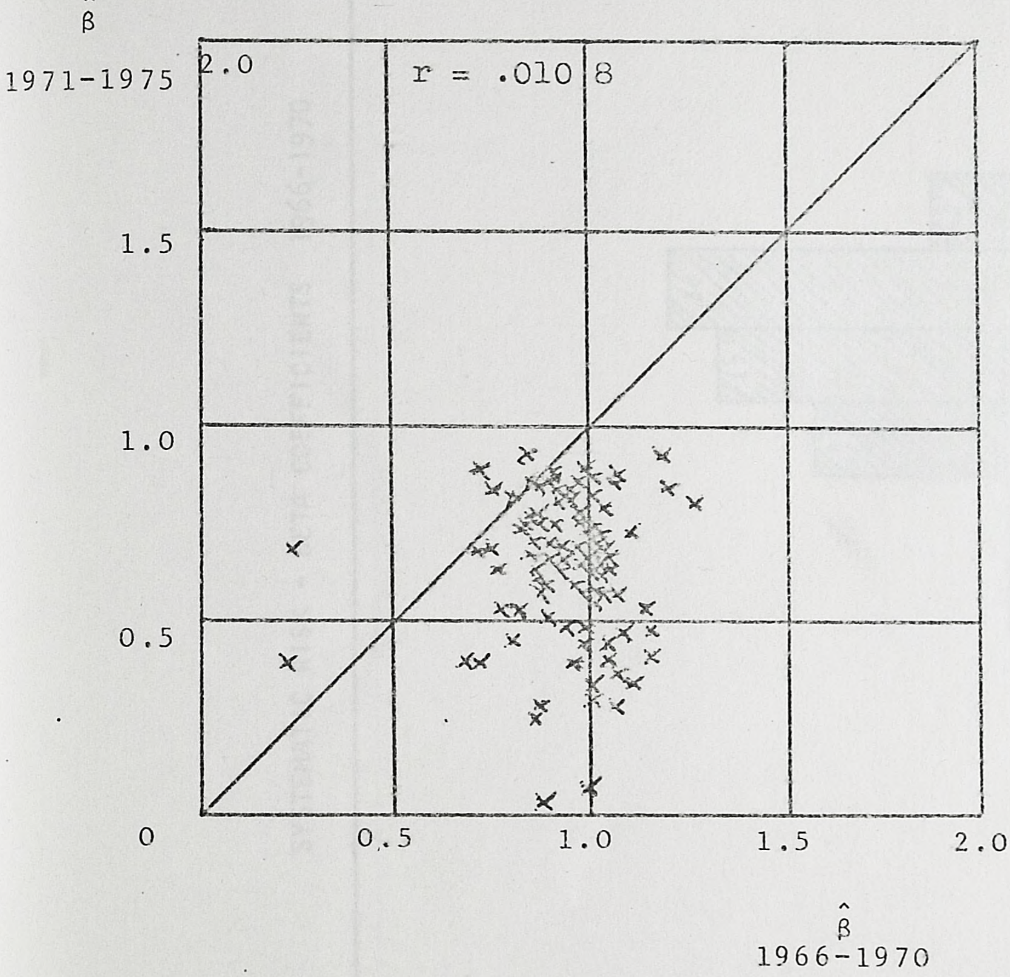
TABLE 8.D (3)

THE STABILITY OF

SYSTEMATIC RISK 1966-1970

AND

SYSTEMATIC RISK 1971-1975



<u>FIGURE 8.3</u>

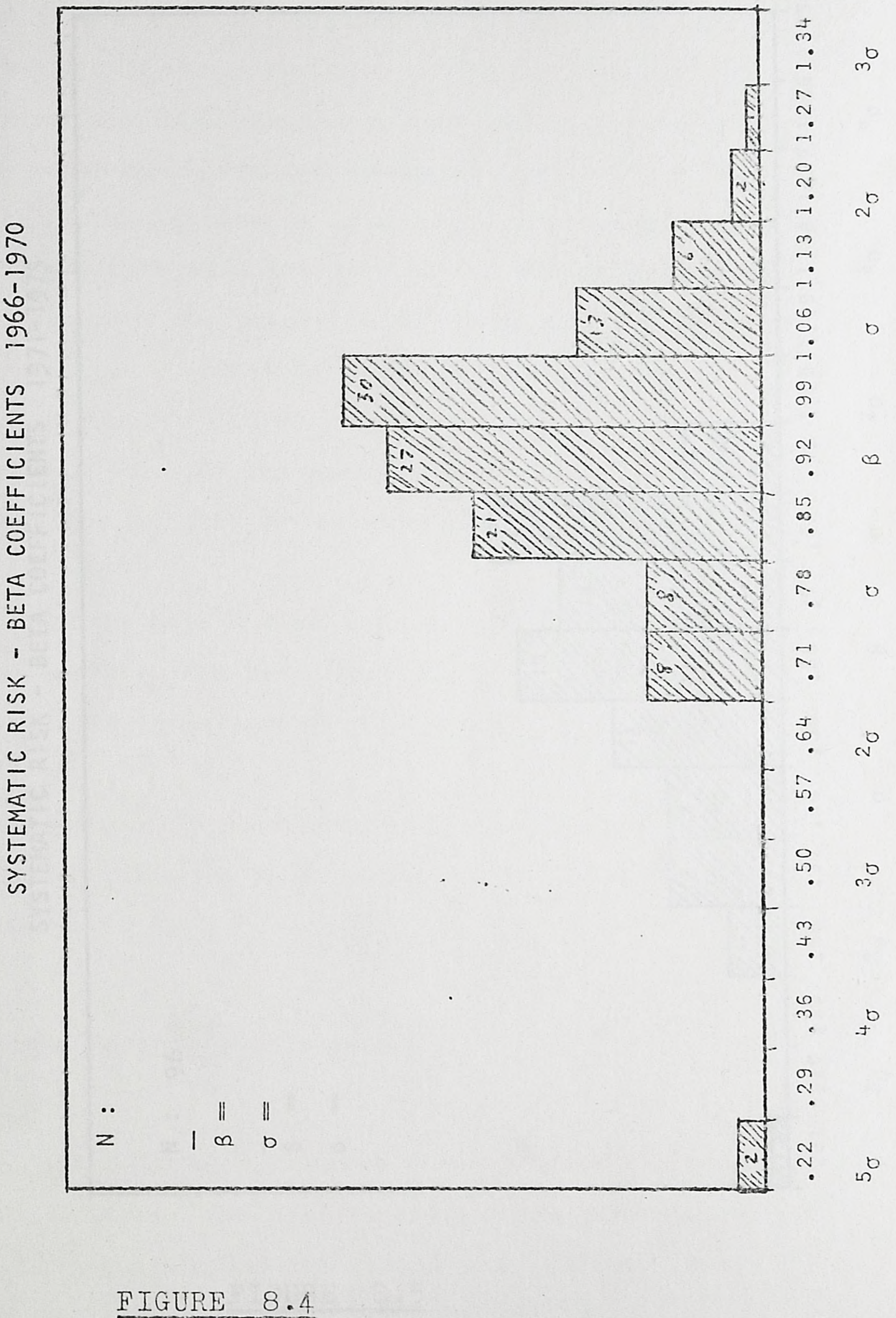

SYSTEMATIC RISK - BETA COEFFICIENTS 1966-1970
N :
$\bar{\beta}$ =
σ =
2
8
8
21
27
30
13
6
2
.22 .29 .36 .43 .50 .57 .64 .71 .78 .85 .92 .99 1.06 1.13 1.20 1.27 1.34
5σ 4σ 3σ 2σ σ β σ 2σ 3σ

FIGURE 8.4

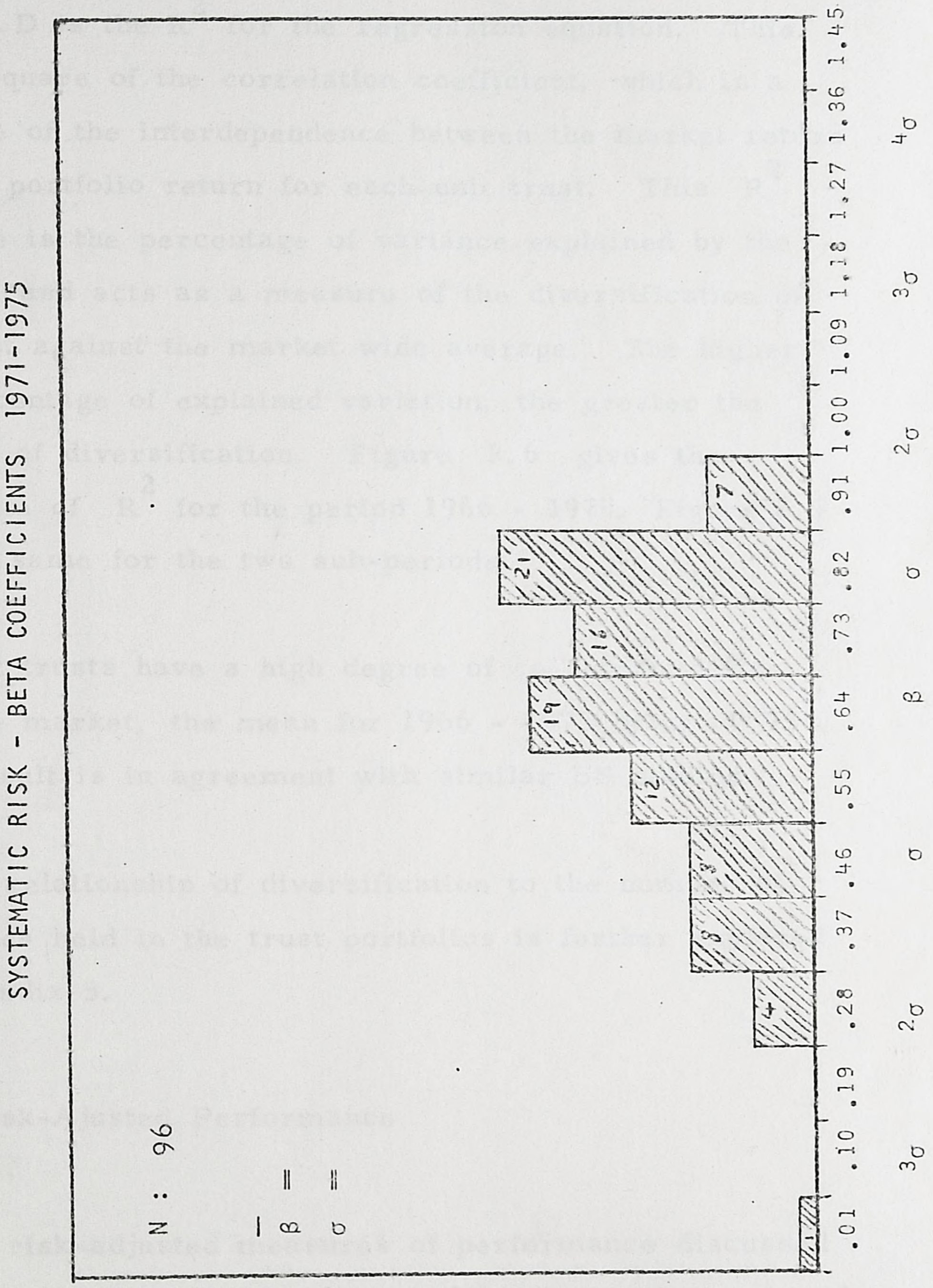

SYSTEMATIC RISK - BETA COEFFICIENTS 1971-1975
N : 96
β̄ =
σ =
1
4
8
9
12
19
16
21
7
.01 .10 .19 .28 .37 .46 .55 .64 .73 .82 .91 1.00 1.09 1.18 1.27 1.36 1.45
3σ 2σ σ β σ 2σ 3σ 4σ

FIGURE 8.5

8.3 Diversification of Trust Portfolios

Whereas in the calculation of observed beta values for the unit trust portfolios, there is a difference between the two-sub-periods, this does not extend to their portfolio diversification. One of the statistics given in Table 8.D is the R^2 for the regression equation. This is the square of the correlation coefficient, which is a measure of the interdependence between the market return and the portfolio return for each unit trust. This R^2 measure is the percentage of variance explained by the market and acts as a measure of the diversification of the trust against the market wide average. The higher the percentage of explained variation, the greater the element of diversification. Figure 8.6 gives the histogram of R^2 for the period 1966 - 1975. Figure 8.7 has the same for the two sub-periods.

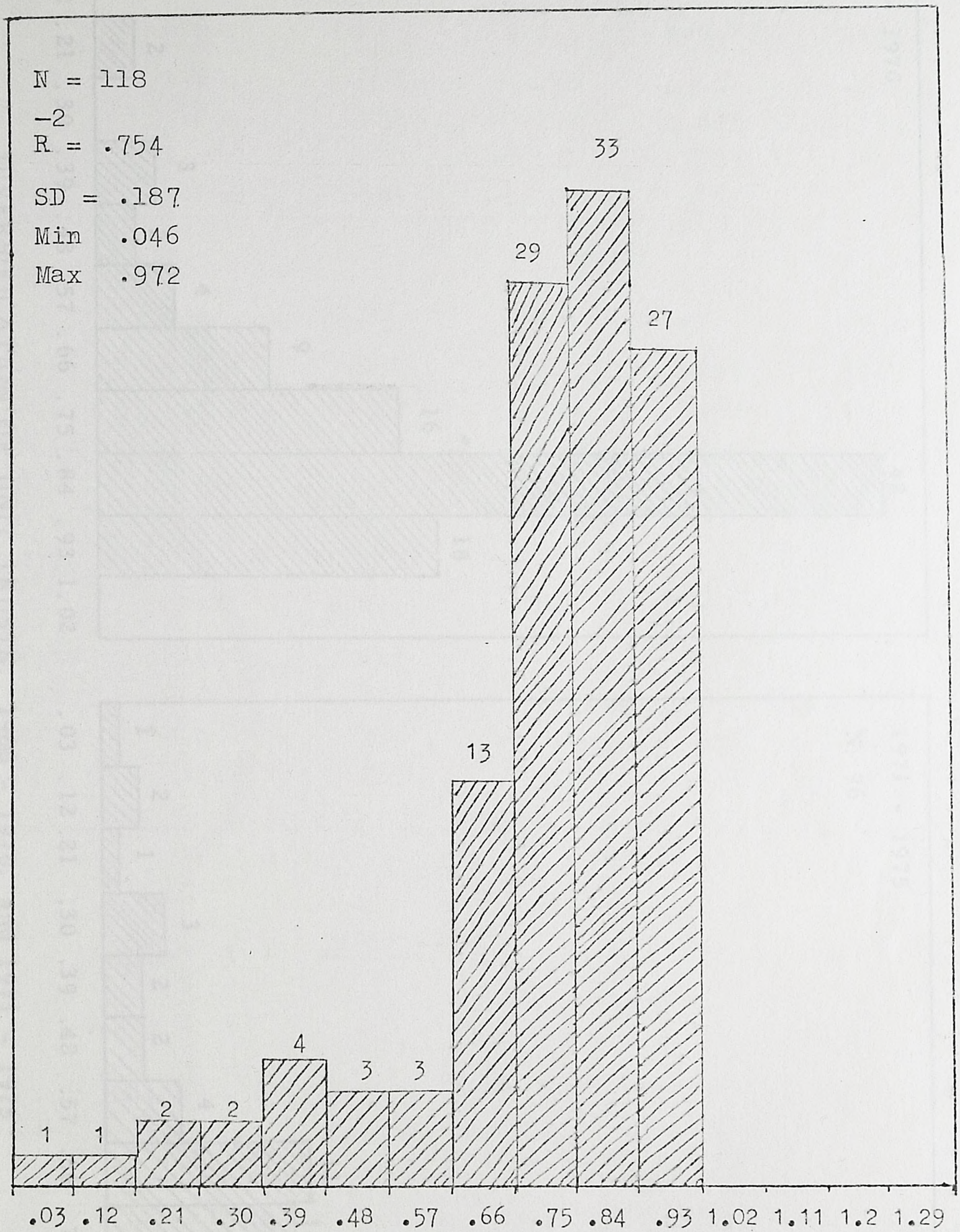
Most trusts have a high degree of co-determination with the market, the mean for 1966 - 1975 being 0.754. This result is in agreement with similar US studies.

The relationship of diversification to the number of securities held in the trust portfolios is further explored in Appendix 5.

8.4 Risk-Ajusted Performance

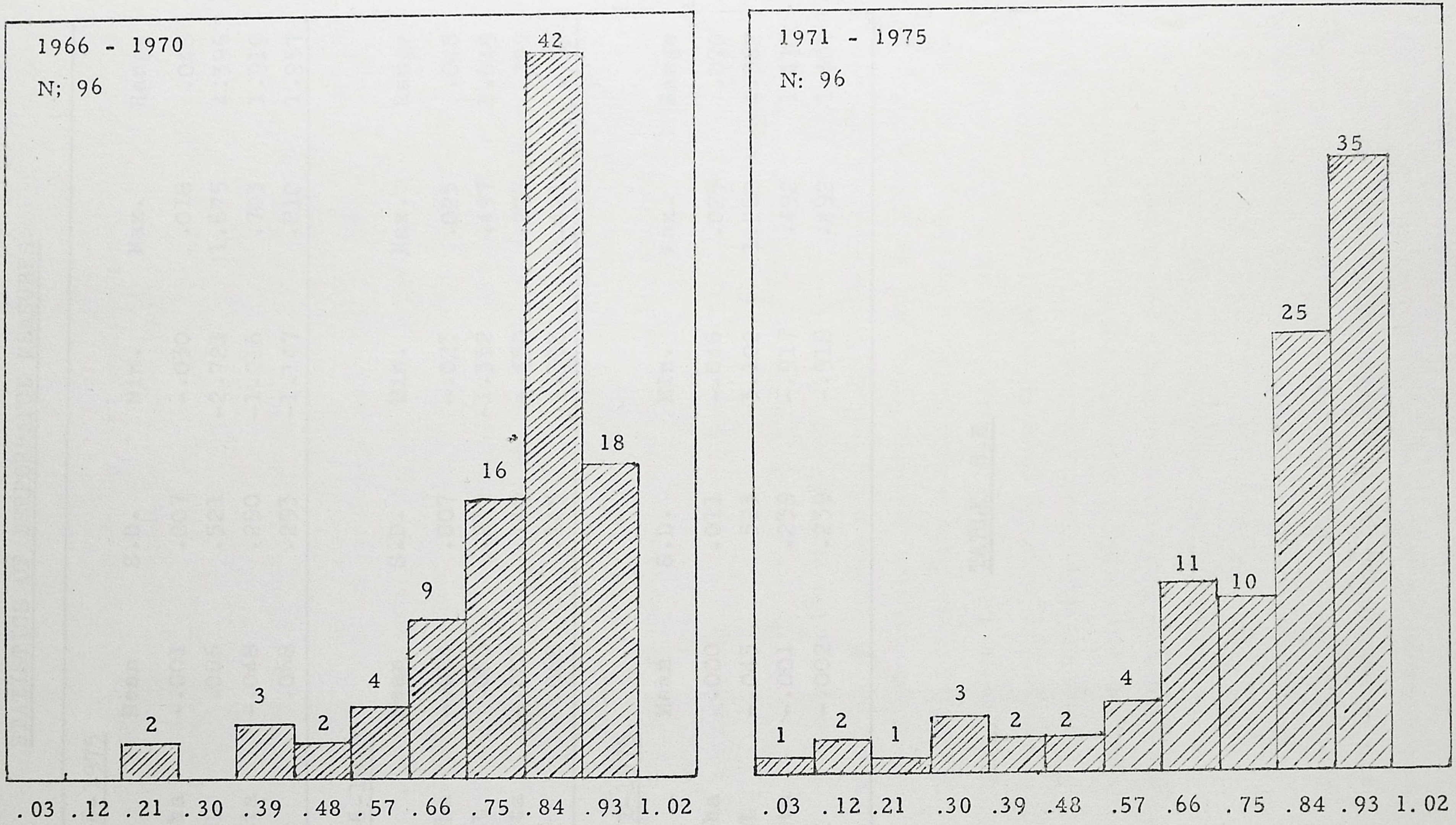
The risk-adjusted measures of performance discussed in Chapter Seven, are used to analyse the performance of the unit trust portfolios for the 10 year period: 1966 - 1975, and the two sub-periods 1966/70 and 1971/75.

Table 8.E gives summary statistics for the four measures used: Alpha, Reward-to-Volatility (RVOL), delta, and reward-for-risk (excess return) RFR. Overall



DIVERSIFICATION OF UNIT TRUSTS
COEFFICIENTS OF DETERMINATION R-SQUARED
1966 - 1975

FIGURE 8.6



DIVERSIFICATION OF UNIT TRUSTS; 1966 - 1970, and 1971 - 1975
COEFFICIENTS OF DETERMINATION R-SQUARED

<u>FIGURE 8.7</u>

STATISTICS OF PERFORMANCE MEASURES

1966-1975	Mean	S.D.	Min.	Max.	Range
Alpha	-.001	.007	-.030	.018	.048
RVOL	.086	.521	-2.721	1.675	4.396
Delta	-.048	.290	-1.216	.703	1.919
RFR	.068	.293	-1.147	.810	1.957
1966-1970	**Mean**	**S.D.**	**Min.**	**Max.**	**Range**
Alpha	-.004	.007	-.023	.025	.048
RVOL	.055	.232	-1.352	.497	1.849
Delta	-.085	.140	-.450	.277	.727
RFR	.068	.145	-.333	.421	.753
1971-1975	**Mean**	**S.D.**	**Min.**	**Max.**	**Range**
Alpha	.000	.011	-.046	.025	.070
RVOL	-.045	.523	-3.102	1.260	4.362
Delta	-.001	.239	-.917	.492	1.410
RFR	-.002	.239	-.918	.492	1.409

TABLE 8.E

during the period 1966-1975 it appears that the unit trust portfolios had a broadly neutral investment performance when adjusted for risk. Both alpha and Jensen's delta indicate that the excess return for the level of risk generated was in the region of -0.001 per quarter, 4 percent over the 10 years. This picture is not repeated for the sub-periods: in 1966/70, the trusts had negative results to the extent of about one percent per year, as against the benchmark alternative of investment in the market portfolio and the risk-free asset, adjusted to equal risk as the fund portfolio. In the second sub-period, trusts do much better against the benchmark, having an overall neutral performance, loosing a mere 0.1 percent over the 5 years. In this second period, the trusts have been in existence for at least the previous 5 years, if not more. This, rather than any improved management expertise, may account for the difference between the two periods.

In Table 8.F and 8.G, the four measures of performance discussed in the previous chapter are compared. The performance scores were tested for the ten-year period and the two 5 year periods, using both the Pearson and Spearman correlation tests. One unambiguous conclusion to be drawn from these tables is that the performance measures are virtually identical in ranking the relative performance of the trusts analysed. This is in accord with such papers as SMITH & TITO (1969), who obtained a correlation of 0.986 between RVOL and Jensen's delta, with their group of US mutual funds.

As the measures are highly correlated, in the subsequent discussion of the performance results, only one measure will be written up, since to describe the other measures would amount to duplication. Alpha will be used, but the data will be presented in the tables for all the measures.

In assessing the correlation of risk-adjusted performance measures for the two five-year sub-periods, again the differences between a parametric or non-parametric test change the results. If the former is valid, and to judge by the symmetry of the histograms for the two sub-periods, Figure 8.8, then the significance of the results is better than one percent. A 10.6 percent of risk-adjusted performance in the second sub-period is explained by a high risk-adjusted performance score for 1966/70. This is a better result than was achieved by correlating the returns for the two periods:

	Spearman Correlation	Pearson Correlation
Returns 1966/70 to 1971/75	0.1339	0.2553
Alpha 1966/70 to 1971/75	0.258	0.326

There is thus some continuity of performance, even if its extent is small in statistical terms. The high performers in the first period have a tendency to have a better-than-average performance in the second period. Likewise worse-than-average performers tend to be worse performers in the second period. This is a result which again conforms to studies based on US data where the continuity of performance, though equally slight but persistent, is established. (See Sharpe (1966), and the Smith & Tito (1969) study.)

A further test was carried out, based on a test made by Friend and Blume (1970), regressing the performance measures against the measure of risk. As in their study, the relationship was very weak. Only the risk-return equation (CAPM) gave an F-score above one, all the others were statistically non-significant, Table 8.H. This is the expected result, if the performance measure score, once adjusted for the different levels of systematic risk, now reflects only that element of the return generating

1966-1975

	Alpha	RVOL	Delta	RFR
Alpha	1.000			
RVOL	.989	1.000		
Delta	.999	.991	1.000	
RFR	.994	.988	.996	1.000

1966-1970

	Alpha	RVOL	Delta	RFR
Alpha	1.000			
RVOL	.950	1.000		
Delta	.950	.995	1.000	
RFR	.933	.989	.979	1.000

1971-1975

	Alpha	RVOL	Delta	RFR
Alpha	1.000			
RVOL	.973	1.000		
Delta	.986	.985	1.000	
RFR	.986	.985	1.000	1.000

1966-1970 to 1971-1975

1971-1975

1966-1970

	Alpha	RVOL	Delta	RFR
Alpha	.258*	.281*	.265*	.265*
RVOL	.184*	.214*	.193*	.193*
Delta	.218*	.244*	.225*	.225*
RFR	.125	.134	.155	.134

* Indicates significant at the 0.05 level

TABLE 8.G

A TEST OF THE PERFORMANCE SCORES BY SPEARMAN RANK CORRELATION OF THE PERFORMANCE MEASURES AGAINST EACH OTHER.

mechanism due to non-market, or residual factors.

8.5 Alpha

Since the performance measures are virtually the same in their ranking of performance, alpha will be used to illustrate the behaviour of these measures. What is said about alpha will be true of Jensen's delta, the reward-to-volatility ratio and the excess return. scores. The reward-for-risk, or excess return, will be something of an exception since it is one dimensional.

In selecting Alpha as a measure for discussion, one obtains two advantages:-

i. alpha is an immediately identifiable measure. It is the excess return, after adjusting for systematic risk, earned per interval period. In this case, the excess per quarter year;

ii. there is a measure, the T-score, which gives levels of significance to departures from the assumption that alpha equals zero. Thus the T-score allows the use of statistical significance levels: the other performance measures have no such ready-made tests.

In Table 8.I are given the alpha scores and the alpha T-scores for the unit trust portfolios, both for the period 1966 - 1975, and the two sub-periods. One result which emerges from the table is that the alpha scores for trusts held by the same trust management group tend to have the same signs, both for the ten-year alpha and the two five-year alphas. It is evident that some management effect influencing the performance of individual trusts exists. Further investigation of this will take place in the next chapter.

PERFORMANCE MEASURES AND RISK

1966-1975

				R^2
Return 6675 = a_0 + a_1 Beta 6675				.02462
	.58067	.30854		
		(.23549)		
ANOVA	DF	SS	MS	F
	1	.14563	.14563	1.71662
	68	5.76896	.08484	
Alpha 6675 = a_0 + a_1 Beta 6675				.00511
	-.00363	.00348		
		(.00588)		
ANOVA	DF	SS	MS	F
	1	.00002	.00002	.34929
	68	.00360	.00005	
Delta 6675 = a_0 + a_1 Beta 6675				.00555
	-.15043	.14504		
		(.23549)		
ANOVA	DF	SS	MS	F
	1	.03218	.03218	.37933
	68	5.76896	.08484	
RVOL 6675 = a_0 + a_1 Beta 6675				.00040
	-.14343	.32405		
		(.42221)		
ANOVA	DF	SS	MS	F
	1	.16065	.16065	.58907
	68	18.54473	.27272	

TABLE 8.H

A further tendency, backed up by the rank correlation of 0.258, is for the direction of the alpha sign to persist between the two sub-periods:-

		1971 - 1975	
		+	−
1966-1970	+	16	6
	−	34	40

Fifty-six trusts retain the alpha score sign in the same direction between the two-periods. This result is weakly consistent with the view that fund managers' performance tends to persist across the time intervals analysed. This may be due to:-

a. genuine above-average performance by some fund managers, and equally consistent below-average performance by others; or,

b. persistent management investment policies which affect the non-market element of portfolio return, for example: the inclusion of overseas securities in the portfolio.

Not many of the T-scores are significant at the usual levels of 0.05 and 0.01. This may be due to the small size of the samples, forty returns for the 10-year period, and 20 returns for the sub-periods. It is also likely that the method of estimation for alpha using current regression techniques and significance levels will lead to a lack of statistical significance in the results, a point made by Treynor (1976). This is because the criteria for performance do not conform to the statistical probabilities of significance tests. The cut-off at one-in-twenty, or one-in-hundred for the T-score, is such as to minimize a state-dependent performance where the actual outcome, based on ex-ante knowledge and expectations, and taking into account the real world constraints on investment behaviour, is less than the statistical cut-off point.

ALPHA SCORES* (1)

Trust Number	1966-1975 α_j	1966-1975 $T\alpha_j$	1966-1970 α_j	1966-1970 T_j	1971-1975 α_j	1971-1975 T_j
1	.00309	.47784	-.00130	-.16424	.00582	.60008
2	.00281	.40468	.00052	.06134	.00341	.32271
3	.00308	.53395	.00370	.56357	.00087	.09794
4	.00211	.25440	-.00320	-.34481	.00432	.36782
5	.00381	.61743	.00177	.24965	.00389	.42542
6	.00965	1.21209	.00147	.14988	.01587	1.33653
7	.00294	.22184	-.00109	-.10268	.00257	.11582
8	-.00520	-.57892	-.01063	-1.5317	-.00250	-.16154
9	-.00761	-.92413	-.01455	-1.5132	-.00326	-.27152
10	.01757	.95783	.02528	.73294	.00693	.53598
11	-.00320	-.61388	-.00165	-.33052	-.00485	-.51174
12	-.00122	-.26227	-.00432	-.80858	.00011	.01711
13	.00283	.48144	-.00661	-.94558	.01161	1.25351
14	-.00663	-1.6548	-.00679	-1.9852	-.00781	-1.1876
15	.00485	.64785	-.00150	-.15373	.01185	1.02278
16	-.00198	-.20662	.00667	.67739	-.01450	-1.1219
17	.00078	.06191	-.00632	-.95888	.00259	.12506
18	.01016	1.42145	.00068	.09806	.01734	1.54646
19	-.00437	-.66985	-.00856	-1.1945	-.00191	-.18454
20	.00061	.05124	-.00542	-.46185	.00287	.15289
21	.00032	.07635	-.00068	-.17865	-.00016	-.02405
22	.00662	1.30463	.00454	.95318	.00699	.91517
23	.00169	.29808	-.00741	-1.3429	.01059	1.07413
24	.00083	.07029	-.00271	-.19249	-.00044	-.03001
25	.00319	.56048	-.00037	-.05654	.00628	.65775
26	.00256	.38885	-.00022	-.03063	.00256	.29000
27	-.03041	-1.7738	-.01965	-1.0538	-.04587	-1.7188
28	.00514	.76559	.00250	.24238	.00645	.75856
29	.00410	.58809	.01128	1.52540	-.00393	-.33400
30	.00470	.52117	-.00776	-.63050	.01768	1.34781
31	.00657	.73548	-.00556	-.46737	.01853	1.37885
32	.00450	.59899	-.00250	-.73167	.00926	.67357
33	.00377	.55534	-.00481	-.83174	.01200	.97058
34	.00623	.74957	-.00028	-.03474	.01072	.76119
35	.00568	.98966	-.00189	-.32340	.01221	1.26519

* $\overline{R_j - R_f} = \alpha'_j + \beta'_j(\overline{R_M - R_f})$ $\qquad T\alpha_j = \dfrac{\alpha_j}{S.E.\alpha_j}$

TABLE 8.I

ALPHA SCORES (2)

Trust Number	1966-1975 α_j	1966-1975 $T\alpha_j$	1966-1970 α_j	1966-1970 $T\alpha_j$	1971-1975 α_j	1971-1975 $T\alpha_j$
36	.00978	1.38878	.00506	.64581	.01387	1.15659
37	.00196	.29862	-.00048	-.13764	.00297	.23817
38	-.00586	-.52101	-.01557	-1.7838	.00048	.02548
39	-.02090	-2.0294	-.02090	-2.1229	-.02513	-1.6844
40	-.00434	-.39278	-.01143	-.89855	.00072	.04003
41	-.01413	-1.4080	-.02107	-3.3421	-.00889	-.46746
42	-.01824	-2.2403	-.01604	-1.7394	-.02239	-1.7353
43	-.01064	-.68037	-.01442	-.89479	-.01095	-.42710
44	-.01211	-1.1780	-.02251	-2.0311	-.00390	-.23184
45	.00134	.15984	.00309	.34706	-.00136	-.09395
46	.00522	.71993	.00832	.91925	-.00049	-.05208
47	.01663	1.39425	.00666	.51727	.02461	1.22834
48	.00365	.49437	.00399	.44685	.00258	.21216
49	.00296	.28956	-.00900	-.71188	.01492	.91315
50	-.00510	-.49861	-.00219	-.24100	-.01134	-.68275
51	.00316	.25788	-.00565	-.34838	.00981	.53499
52	.01048	1.47701	-.00160	-.19416	.02215	1.94901
53	.00710	.99167	-.00375	-.48439	.01595	1.45150
54	-.00090	-.14748	-.01343	-1.8866	.01144	1.21399
55	-.00443	-.56296	-.00132	-.13069	-.01067	-1.1012
56	-.00903	-.50703	-.00574	-.25865	-.01748	-.68297
57	-.00848	-1.0973	-.00087	-.10176	-.01869	-1.7061
58	-.00373	-.60524	-.00718	-1.0673	-.00136	-.13141
59	.00705	1.26248	.00449	.64777	.00845	.98025
60	-.00176	-.24252	-.00166	-.24103	-.00496	-.48368
61	-.00593	-.60047	-.00613	-.66793	-.00662	-.36862
62	-.00093	-.10456	-.00359	-.47540	-.00088	-.05846
63	-.00496	-.56282	.00138	.13524	-.01276	-.89509
64	-.00248	-.25582	-.00068	-.07944	-.00843	-.60165
65	.00132	.13134	-.00010	-.00854	-.00038	-.02518
66	-.00629	-.97255	-.00747	-1.1265	-.00653	-.60010
67	.00215	.17691	-.01109	-.92174	.01087	.60049
68	.00561	.26380	.00443	.29039	.00032	.00853
69	.00456	.57733	-.00054	-.06940	.00849	.57983
70	.00700	.85528	-.00188	-.17952	.01559	1.21374
71	-.01620	-1.0126	-.01738	-.85456	-.02022	-.92462
72	-.00430	-.52273	-.00231	-.27317	-.00838	-.62090
73	-.00098	-.10534	-.00214	-.21626	-.00163	-.10471
74	.00611	.68518	-.00039	-.04375	.01098	.71423

TABLE 8.I

ALPHA SCORES (3)

Trust Number	1966-1975 α_j	1966-1975 $T\alpha_j$	1966-1970 α_j	1966-1970 $T\alpha_j$	1971-1975 α_j	1971-1975 $T\alpha_j$
75	-.01287	-1.0597	-.00410	-.33074	-.02382	-1.15785
76	-.00574	-.62433	-.00203	-.19789	-.01219	-.87335
77	-.00296	-.40720	-.00773	-1.0692	.00049	.03892
78	-.00328	-.49333	-.00698	-.94602	-.00057	-.05090
79	-.00815	-1.0132	-.01124	-2.1383	-.00755	-.53178
80	-.00098	-.11868	.00091	.09436	-.00676	-.73789
81	.00061	.07344	-.00291	-.31256	.00177	.13700
82	-.00093	-.10063	-.00264	-.28866	-.00203	-.13570
83	-.00920	-1.1079	-.01056	-1.2055	-.00973	-.70639
84	-.00369	-.51402	-.00307	-.44219	-.00559	-.44386
85	.00841	.80363	.01386	.74856	.00228	.21279
86	-.01304	-1.5333	-.00955	-.76865	-.01943	-2.06743
87	-.00624	-.73742	-.01624	-1.8917	.00676	.55933
88	-.01229	-1.9808	-.01866	-3.2036	-.00502	-.46386
89	-.00546	-.63189	-.00070	-.05555	-.01164	-.98847
90	-.00156	-.17234	-.00527	-.47558	.00339	.23411
91	-.00769	-1.3130	-.01097	-1.1876	-.00444	-.57749
92	.00936	.44443	.01383	.61854	.00078	.02210
93	-.00176	-.33817	-.00187	-.35421	-.00315	-.37483
94	-.00142	-.29057	-.00382	-.60795	.00070	.09055
95	.00686	1.26489	-.00248	-.35312	.01529	1.94537
96	-.00431	-.87349	-.00162	-.25850	-.00765	-.99306
97	-.00029	-.02815	-.01420	-2.1922	.01087	.60049
98	-.00486	-1.0628	-.00973	-1.0455	-	-
99	.00921	1.19537	.00142	.17293	.01559	1.21374
100	.00527	.58480	-.00550	-.42727	.01559	1.21374
101	-.00763	-1.9879	-.01448	-2.0132	-	-
102	-.00796	-1.88998	-.01608	-1.9455	-	-
103	.00034	.03866	-.00778	-.89326	.00641	.43554
104	-.00287	-.58110	-.00675	-1.0484	-	-
105	-.00592	-1.2219	-.01487	-1.9690	-	-
106	.00080	.11025	-.01422	-2.4546	.01594	1.24420
107	-.00656	-.69132	-.00650	-.85803	-.00662	-.36862
108	-.00815	-.83992	-.00934	-1.0824	-.00662	-.36862
109	-.00583	-.56712	-.00590	-.54191	-.00662	-.36862
110	-.00532	-.55483	-.00471	-.60006	-.00662	-.36862
111	-.00219	-.26098	-.00202	-.28308	-.00288	-.18430
112	-.00094	-.10364	-.00030	-.03248	-.00298	-.19090
113	-.00217	-.23418	-.00444	-.60094	-.00288	-.18430
114	-.00048	-.04352	-.00049	-.03292	-.00288	-.18430
115	.00481	.60242	-.00191	-.21172	-	-
116	-.00255	-.28251	-.00896	-1.0787	.00097	.06661
117	-.00706	-.96849	-.00944	-1.2128	-.00559	-.44386
118	-.00544	-.75623	-.00671	-.98577	-.00559	-.44386

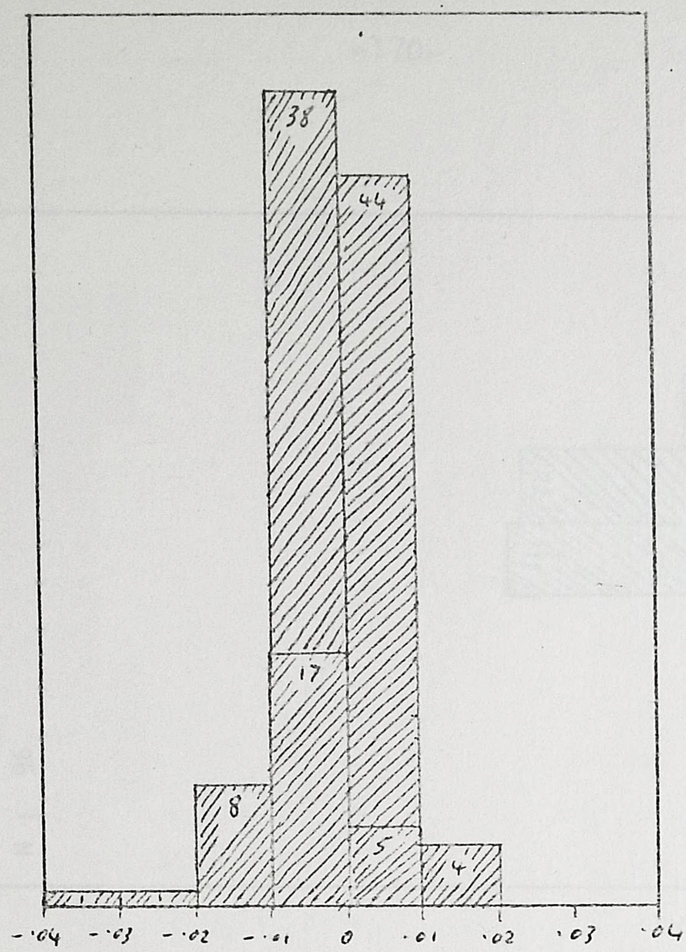
TABLE 8.I

Even relaxing the standard significance levels, the results do not support the contention that above-average results are being generated:-

T-Distribution Significance Levels	1966-1975	1966-1970	1971-1975
.4	31	27	32
.3	23	18	12
.2	15	5	6
.1	7	6	4
.05	2	2	-
.02	-	-	-
.01	-	1	-
.001	-	1	-

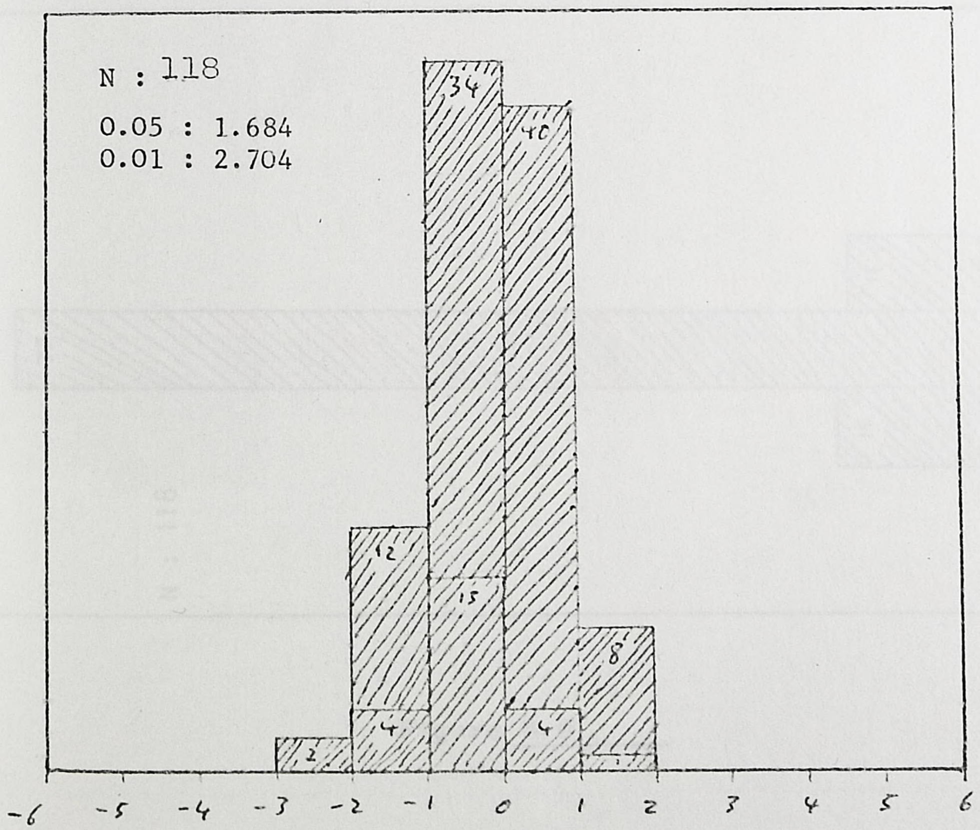
The distribution of alpha is shown in Figures 8.7, 8.8 and 8.9. The dispersion is close around zero. Based on the observed alpha scores there is, consequently, no direct evidence supporting the contention that unit trust managers are generating consistent above-average returns. The evidence is, however, consistent with the tendency for good or bad performance, whether due to managements' investment policies or some other factors, to persist across the time intervals analysed. This tendency is small, but slightly above that due to chance alone.

A similar conclusion emerges from an examination of the other performance measures: there is no direct evidence, of a statistical nature, in favour of unit trust superior performance. The results indicate that the sample of trusts had a neutral performance for the period 1966 to 1975.

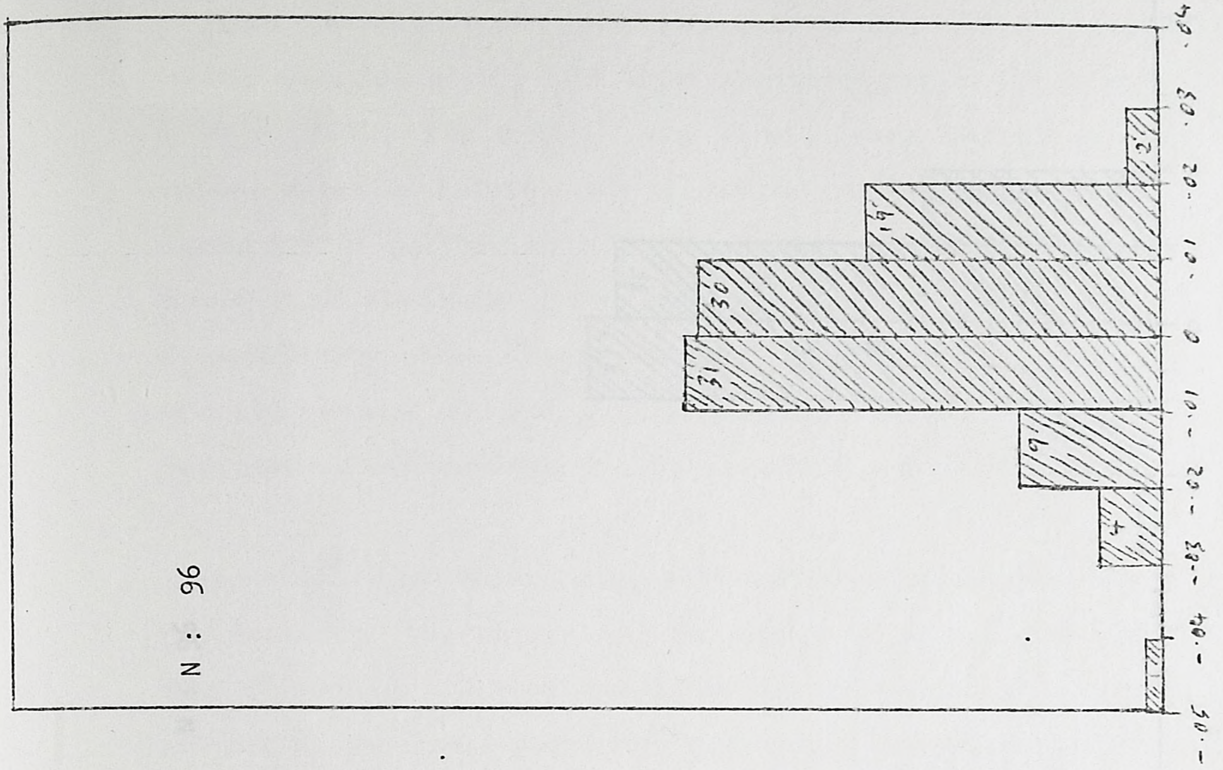


ALPHA 1966-1975

Figure 8.8



T- ALPHA 1966 - 1975



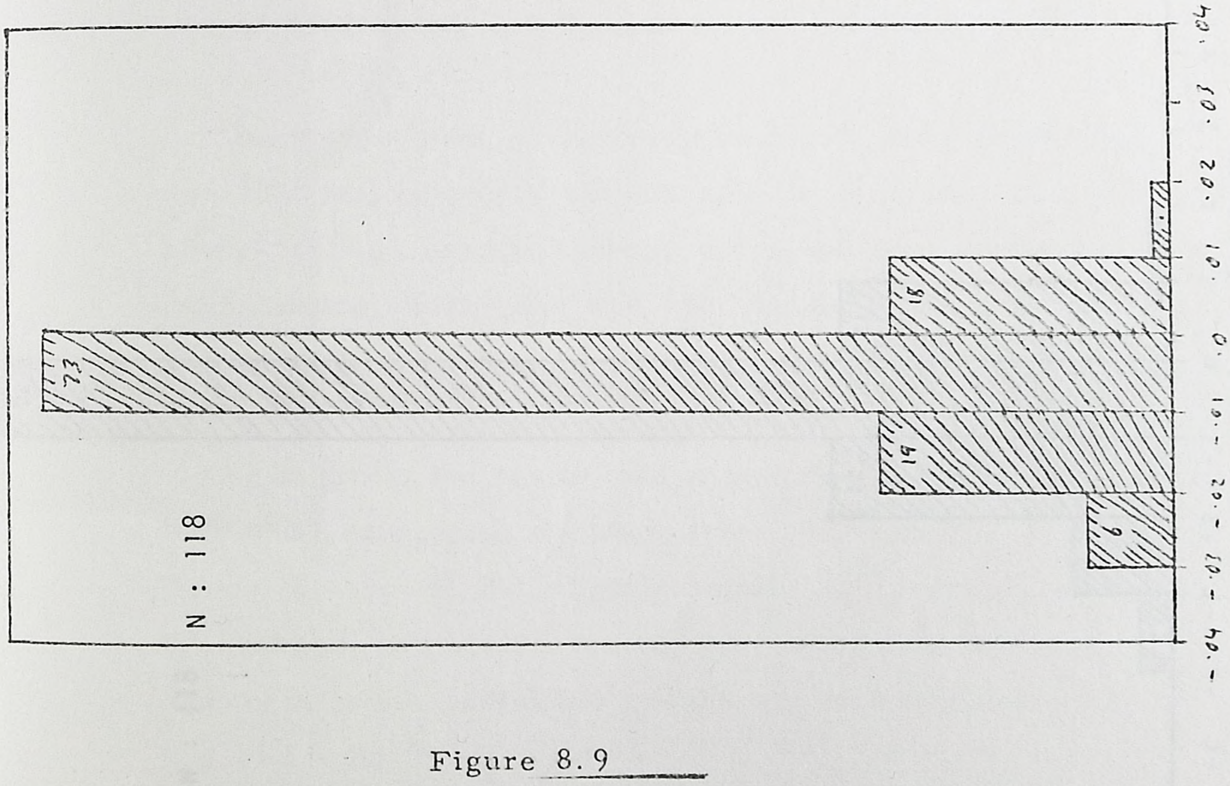


Figure 8.9

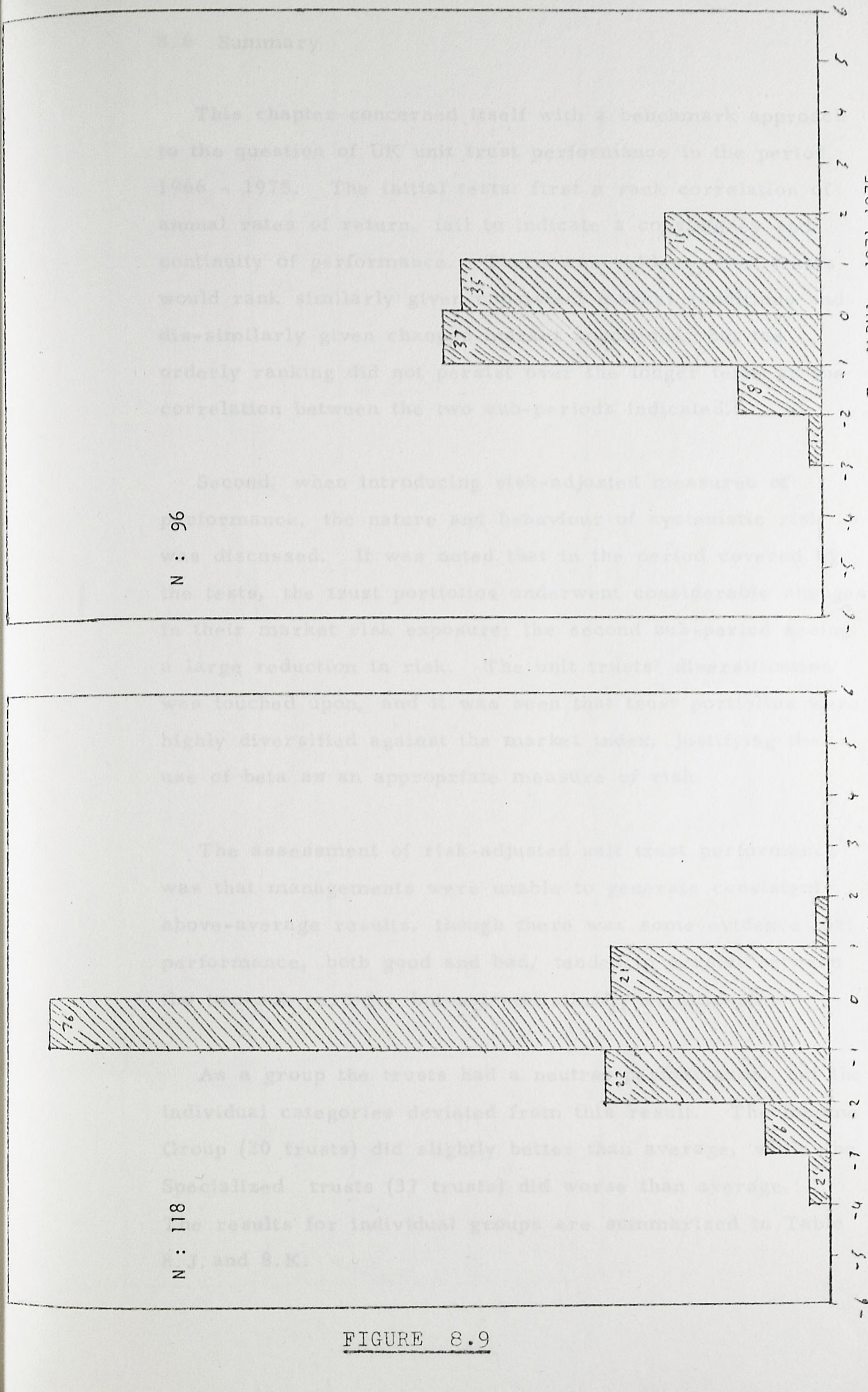


FIGURE 8.9

8.6 Summary

This chapter concerned itself with a benchmark approach to the question of UK unit trust performance in the period 1966 - 1975. The initial tests: first a rank correlation of annual rates of return, fail to indicate a consistency and continuity of performance. There was evidence that trusts would rank similarly given consistent market conditions and dis-similarly given changed market conditions, but the orderly ranking did not persist over the longer term as the correlation between the two sub-periods indicated.

Second, when introducing risk-adjusted measures of performance, the nature and behaviour of systematic risk was discussed. It was noted that in the period covered by the tests, the trust portfolios underwent considerable changes in their market risk exposure: the second sub-period seeing a large reduction in risk. The unit trusts' diversification was touched upon, and it was seen that trust portfolios were highly diversified against the market index, justifying the use of beta as an appropriate measure of risk.

The assessment of risk-adjusted unit trust performance was that managements were unable to generate consistent above-average results, though there was some evidence that performance, both good and bad, tended to persist between the two-sub periods, but not statistically significant.

As a group the trusts had a neutral performance, but the individual categories deviated from this result. The Income Group (20 trusts) did slightly better than average, while the Specialized trusts (37 trusts) did worse than average.
The results for individual groups are summarized in Table 8.J. and 8.K.

TABLE 8.J

STATISTICS FOR TRUST GROUPS 1966-1975

		PERFORMANCE		RISK					DIVERSIFICATION	
		Average Annual Return %	$\hat{\alpha}_j$	$\hat{\beta}_j$	Very low β 0-.36	Low β .36-.58	Medium β .58-.8	High β .8-2.0	D^1 Statistic %	Number of Shares in Trust, 1975
ALL	118[2]	8.0 (2.9)[3]	-.001 (.007)	.709 (.149)	3	19	50	24	75.4 (18.7)	77
INCOME	20	10.6	.005	.739	-	2	10	5	80.4	97
GENERAL	47	7.9	-.002	.747	-	3	22	11	82.7	78
CAPITAL	14	7.8	-.002	.682	-	3	8	3	73.5	46
SPECIAL	37	6.8	-.004	.655	3	11	10	4	64.3	79
Commodity	2	9.8	.004	.607	-	1	1	-	62.0	69
Sector	26	6.7	-.004	.692	2	3	8	4	71.2	86
Overseas	9	4.9	-.006	.423	1	7	1	-	35.8	51

1- The D-Statistic is the percentage of explained variance: $\dfrac{\text{Total Variance} - \text{Unexplained Variance}}{\text{TOtal Variance}} \times 100\,\%$.

2- Of the 118 trusts, 11 General, 2 Income, and 9 Special were merged or terminated between 1966 and 1975. Two Tax-exempt trusts were excluded, together with 1 Special (Overseas) trust terminated in 1966.

3- The figures in brackets are the cross-sectional standard deviations of the sample.

PERFORMANCE SCORES FOR UNIT TRUSTS
1966-1975

Net of Charges	1966-1975	1966-1970	1971-1975
$\hat{\alpha}_j$	-.001	-.004	.000
	(.007)	(.007)	(.011)
$\hat{\delta}_j$	-.048	-.085	-.001
	(.290)	(.140)	(.239)
Reward-to-Volatility	.086	.055	-.045
	(.521)	(.232)	(.523)

Figures in brackets are the standard deviations of the sample.

RANK CORRELATION OF PERFORMANCE MEASURES
1966-1970 AND 1971-1975

1966/1970 \ 1971-1975	$\hat{\alpha}_j$	$\hat{\delta}_j$	Reward-to-Volatility
$\hat{\alpha}_j$	.258*	.265*	.261*
$\hat{\delta}_j$	.218*	.225*	.244*
Reward-to-Volatility	.184	.193	.214*

* Indicates significant at the 5% level.

TABLE 8.K

9.0 COMPONENTS OF UNIT TRUST PERFORMANCE

This chapter will examine in detail the various factors which are held by common consent to influence the performance of equity portfolios. Each factor will be initially treated seperately in assessing its contribution to fund performance. Then an attempt will be made to combine the factors into a holistic model of the enviromental influences on the unit trust returns.

It is, however, important to remember that the data available for such an analysis is often sparse and at times unavailable. Consequently some surrogates, often arrived at by approximation, and therefore open to question, have had to be used.

9.1 Fund Growth & Performance

One possible influence on performance is the impact of cash flow through additions and withdrawals to the fund. The argument is as follows: funds which are receiving additional funds are given an opportunity to take on new investments without having to realize the old ones. They are also better able to take advantage of market timing in making their investments. In consequence they should outperform funds which are having to make debursements or which are static in terms of cash flow. This effect is called here "growth".

Data is not available for the unit trusts in the period 1966 - 1975 giving the actual cash income available to the funds. Two surrogates were in consequence used. The first surrogate was the logarithmic change in the number of units in the trust over the period. This change in the number of units was deemed to be a reflection of the "growth" in the fund. By taking the logarithmic change anticipated that this would minimize two effects which could distort the results of the use of such a growth measure:-

1. the number of units in a trust is related to the price at which the units are sold;
2. the greater the price increase, i.e. performance, of the trust units over the period, the fewer units that may be purchased for a given sum.

The second surrogate used, both in terms of a check on the first one, and also in its own right took as its basis the logarithmic change in the overall size of the portfolio. The basic data, giving the number of units and the size of the funds examined in this test, is given in Appendices four and five.

The results for both "growth" surrogates are given in Tables 9.A to 9.G. The results indicate a positive relationship between growth and performance. The results based on the second surrogate, the logarithmic change in the size of the trust, are high (Tables 9.D, 9.E and 9.F) in comparison to those based on the first surrogate, the change in the number of units in the trust, (Tables 9.A, 9.B and 9.C). This will be true because the change in the size of the trust reflects the performance of the trust over the period. High performers will have the greatest change in portfolio size. This makes the results based on the size-growth regressions difficult to evaluate.

However, the two measures are correlated better than 0.001 for all three periods, indicating that the change in the number of units is measuring some growth effects. Given this, one has more confidence in the validity of the first surrogate as a "growth" measure.

It was found impossible to measure two effects which are supposed to have a bearing on the "growth" effect of a fund, what may be termed the "go-go fund" mechanism:-

a. feedback between the fund and the investing public, where the performance and behaviour of the individual fund, as written up in the press, creates a demand for units which leads to growth in the fund size, and develops into a self-fulfilling process;

b. the performance of the fund draws in cash.

The effect of growth in the first period was analysed below in terms of performance in the second sub-period.

The growth effect on performance as measured by the first surrogate (Tables 9.A, 9.B and 9.C) indicates a positive relationship. This effect is, however, small in its intensity, the R^2 are very small. There is also a difference in effect between the first and second five-year periods. This may be due to first less influx of new funds in the period 1971-1975, nor was there much growth in the trust portfolios.

The growth in trust portfolios was responsible for an additional return of:-

	1966 - 1975	1966/70	1971/75
Growth Effect	1% p.a.	1% p.a.	8 p.a.

The differences between the two sub-periods and the ten-year period are accounted for by the large standard error of the estimates. Given this, not too much emphasis can be placed on the figures; however, the results are significant on the F test at the 0.05 level.

It is possible to conclude that growth has a positive

GROWTH & PERFORMANCE REGRESSIONS
FOR THE PERIOD: 1966-1970

R^2

Alpha 6670 = a_o + a_1 Growth 6670 — R^2 = .10702

a_o = -.00620, a_1 = .00309 (.00101)

ANOVA	DF	SS	MS	F
	1	.00047	.00047	9.34839
	78	.00396	.00005	

Delta 6670 = a_o + a_1 Growth 6670 — R^2 = .06994

a_o = -.11935, a_1 = .04977 (.01923)

ANOVA	DF	SS	MS	F
	1	.10755	.10755	5.86569
	78	1.43018	.01834	

RVOL 6670 = a_o + a_1 Growth 6670 — R^2 = .01877

a_o = .03207, a_1 = .03834 (.03286)

ANOVA	DF	SS	MS	F
	1	.07985	.07985	1.49212
	78	4.17412	.05351	

Return 6670 = a_o + a_1 Beta 6670 + a_2 Growth 6670 — R^2 = .15430

a_o = .08955, a_1 = .30017 (.10398), a_2 = .04805 (.01916)

ANOVA	DF	SS	MS	F
	2	.25515	.12757	7.02459
	77	1.39840	.01816	

TABLE 9.A

GROWTH & PERFORMANCE REGRESSIONS
FOR THE PERIOD: 1971-1975

					R^2
Alpha 7175 =	a_o	+ a_1 Growth 7175			.02182
	-.00052	.00340			
		(.00267)			
ANOVA	DF	SS	MS	F	
	1	.00021	.00021	1.62826	
	73	.00942	.00013		
Delta 7175 =	a_o	+ a_1 Growth 7175			.02723
	-.01620	.07962			
		(.05570)			
ANOVA	DF	SS	MS	F	
	1	.11518	.11518	2.04324	
	73	4.11498	.05637		
RVOL 7175 =	a_o	+ a_1 Growth 7175			.00748
	-.06171	.09138			
		(.12318)			
ANOVA	DF	SS	MS	F	
	1	.15173	.15173	.55032	
	73	20.12729	.27572		
Return 7175 =	a_o	+ a_1 Beta 7175	+ a_2 Growth 7175		.09441
	.16310	.35309	.06363		
		(.15275)	(.05454)		
ANOVA	DF	SS	MS	F	
	2	.39916	.19958	3.75297	
	72	3.82890	.05318		

TABLE 9.B

GROWTH & PERFORMANCE REGRESSIONS
FOR THE PERIOD: 1966-1975

				R^2
Alpha6675 = a_0 + a_1 Growth 6675				.09301
	-.00322	.00248		
		(.00094)		
ANOVA	DF	SS	MS	F
	1	.00034	.00034	6.97342
	68	.00328	.00005	
Delta6675 = a_0 + a_1 Growth 6675				.09166
	-.12922	.09837		
		(.03255)		
ANOVA	DF	SS	MS	F
	1	.53172	.53172	6.86163
	68	5.26942	.07749	
RVOL 6675 = a_0 + a_1 Growth 6675				.04812
	-.01984	.12799		
		(.06903)		
ANOVA	DF	SS	MS	F
	1	.90013	.90013	3.43768
	68	17.80525	.26184	
Return6675 = a_0 + a_1 Beta 6675 + a_2 Growth 6675				.11221
	.53166	.26364	.09739	
		(.22701)	(.03788)	
ANOVA	DF	SS	MS	F
	2	.66368	.33184	4.23418
	67	5.25091	.07837	

TABLE 9.C

PERFORMANCE & LOG CHANGE IN PORTFOLIO SIZE REGRESSIONS FOR THE PERIOD: 1966-1975

					R^2
Alpha6675	=	a_o	+ a_1 Growth(Size6675)		.29542
		-.00574	.00348		
			(.00059)		
ANOVA	DF		SS	MS	F
	1		.00132	.00132	35.21920
	84		.00314	.00004	
Delta6675	=	a_o	+ a_1 Growth(Size6675)		.29257
		-.22955	.13857		
			(.02351)		
ANOVA	DF		SS	MS	F
	1		2.09078	2.09078	34.73912
	84		5.05555	.06019	
RVOL6675	=	a_o	+ a_1 Growth(Size6675)		.23667
		-.20752	.22379		
			(.04385)		
ANOVA	DF		SS	MS	F
	1		5.45344	5.45344	26.04347
	84		17.58941	.20940	
Return6675	=	a_o	+ a_1 Beta6675	+ a_2 Growth(Size6675)	.30764
		.55592	.08274	.14078	
			(.18372)	(.02417)	
ANOVA	DF		SS	MS	F
	2		2.24151	1.12076	18.44014
	83		5.04458	.06078	

Growth(Size6675) = logSize75 - logSize66

Correlation of Growth 6675 to Growth(Size6675) = .9450

N = 69 Sig. .001

TABLE 9.D

PERFORMANCE & LOG CHANGE IN PORTFOLIO SIZE REGRESSIONS FOR THE PERIOD: 1966-1970 R^2

Alpha6670 $= a_o + a_1$Growth(Size6670) .21839

-.00794 .00383
(.00079)

ANOVA	DF	SS	MS	F
	1	.00105	.00105	23.75029
	85	.00377	.00004	

Delta6670 $= a_o + a_1$ Growth(Size6670) .20662

-.14973 .06944
(.01476)

ANOVA	DF	SS	MS	F
	1	.34588	.34588	22.13666
	85	1.32810	.01562	

RVOL6670 $= a_o + a_1$ Growth(Size6670) .10865

-.02353 .08375
(.02602)

ANOVA	DF	SS	MS	F
	1	.50314	.50314	10.36074
	85	4.12776	.04856	

Return6670 $= a_o + a_1$ Beta6670 $+ a_2$ Growth(Size6670)

.27067

.08250 .26975 .06830
(.09247) (.01478)

ANOVA	DF	SS	MS	F
	2	.48723	.24362	15.58746
	84	1.31283	.01563	

Growth(Size6670) = logSize70 - logSize66
Correlation of Growth 6670 to Growth(Size6670) = .9139
N = 79 Sig. .001

TABLE 9.E

PERFORMANCE & LOG CHANGE IN PORTFOLIO SIZE REGRESSIONS FOR THE PERIOD: 1971-1975

				R^2
Alpha7175	= a_o	+ a_1 Growth(Size7175)		.12183
	-.00246	.00668		
		(.00197)		
ANOVA	DF	SS	MS	F
	1	.00133	.00133	11.51503
	83	.00960	.00012	
Delta7175	= a_o	+ a_1 Growth(Size7175)		.14831
	-.06077	.15448		
		(.04064)		
ANOVA	DF	SS	MS	F
	1	.71214	.71214	14.45283
	83	4.08966	.04927	
RVOL7175	= a_o	+ a_1 Growth(Size7175)		.08047
	-.14052	.24916		
		(.09245)		
ANOVA	DF	SS	MS	F
	1	1.85241	1.85241	7.26364
	83	21.16703	.25502	
Return7175	= a_o	+ a_1Beta7175	+ a_2Growth(Size7175)	.19590
	.15597	.29888	.13999	
		(.13560)	(.04025)	
ANOVA	DF	SS	MS	F
	2	.94023	.47011	9.98897
	82	3.85919	.04706	

Growth(Size7175) = logSize75 - logSize70
Correlation of Growth 7175 to Growth (Size7175) = .8565
N = 74 Sig. .001

TABLE 9.F

effect on unit trust performance, but that an accurate assessment was difficult to make.

Finally, as laid out in Table 9.G, the effect of growth in period one on the performance in period two indicates a weak positive relationship between the two. This result may be caused by two factors:-

1. the possibility that investors make their investment decision based on past data. If so, then the selection of unit trusts with a past record of growth will cause the effect to persist over time;
2. a possible leakage effect between the two sub-periods where the pay-off result of additional funds in period one only came about in period two.

The weakening of the F statistic in Table 9.B, the results for the 1971/75 period compared to the F statistic in Table 9.G would suggest the second effect.

9.2 Trust Size & Performance

It is commonly assumed that small portfolios perform better than large ones. This belief is based on the market marginal liquidity theory, where a large trust has difficulty in realizing shareholdings without affecting the price if it has information relating to its portfolio. The small trust has the advantage of being able to deal in the market without this liquidity restriction. Another possible source of the size effect is the possible "feedback" between the fund's behaviour and investors. This feedback was explained in the previous section. However, the result of the trust size and performance tests indicate that portfolio size has no significant effect upon performance.

Tables 9.H through 9.J summarize the results. The

REGRESSIONS FOR

PERFORMANCE 1971-1975 AND GROWTH 1966-1970

1971-1975 R^2

Alpha 7175 =	a_o +	a_1 Growth 6670		.02927
	-.00135	.00246		
		(.00164)		
ANOVA	DF	SS	MS	F
	1	.00029	.00029	2.26136
	75	.00961	.00013	
Delta 7175 =	a_o +	a_1 Growth 6670		.02901
	-.03180	.05141		
		(.03434)		
ANOVA	DF	SS	MS	F
	1	.12604	.12604	2.24087
	75	4.21844	.05625	
RVOL 7175 =	a_o +	a_1 Growth 6670		.02281
	-.10383	.09981		
		(.07543)		
ANOVA	DF	SS	MS	F
	1	.47511	.47511	1.75085
	75	20.35199	.27136	
Return 7175 =	a_o +	a_1 Beta 7175 +	a_2 Growth 6670	
				.10100
	.14090	.36317	.04655	
		(.14918)	(.03322)	
ANOVA	DF	SS	MS	F
	2	.43857	.21928	4.15676
	74	3.90377	.05275	

TABLE 9.G

one significant result comes in Table 9.H for the ex-post size test based on the portfolio size in December 1975. The result of using the end-of-period size would be to include a large measure of performance in the size side of the equation. This explains the significant result.

One effect that was not tested for was the possible short term relationship of a new trust to its performance when the portfolio is being invested. The sample size of new trusts in 1966 was not sufficient to allow such a test.

The test based on the ex-ante data indicate no relationship between the trust size and its subsequent performance. If the supposed liquidity effect had any influence on performance one would have expected a negative relationship between the variables: there was none.

9.3 Trust Liquidity & Performance

This test sought to determine whether the liquidity levels had any bearing on trust performance. All the trusts examined in this study had varying percentages of their portfolio in liquid assets, the actual figures are given in Appendix C. Regressions were run to establish the effect of these liquidity balances on the performance of the trusts. These results are summarized in Tables 9.K through 9.M.

The results indicate that the liquidity balance had an adverse effect upon performance. This conclusion is particularly true for the ten-year period (Table 9.M) where the significance of the results is superior to the five-year periods. However, the explained variance is very small if statistically significant.

Variance in liquidity, a measure used to test the

SIZE AND PERFORMANCE

REGRESSIONS FOR 1966-1975

1966-1975

					R^2
RVOL 6675	=	a_o +	a_1 Log_eSize 66		.00027
		.04201	.00602		
			(.04023)		
ANOVA	DF	SS	MS	F	
	1	.00615	.00615	.02241	
	84	23.03671	.27425		
RVOL 6675	=	a_o +	a_1 $\log_e$Size 76		.14026
		-1.16269	.14413		
			(.03893)		
ANOVA	DF	SS	MS	F	
	1	3.23199	3.23199	13.70394	
	84	19.81087	.23584		
Return 6675	=	a_o +	a_1 Beta 6675 +	a_2 $\log_e$Size 66	.02579
		.52238	.31654	.00713	
			(.21453)	(.02262)	
ANOVA	DF	SS	MS	F	
	2	.18790	.18790	1.09859	
	83	7.09819	.08552		
Return 6675	=	a_o +	a_1 Beta 6675 +	a_2 $\log_e$Size 76	.17901
		-.06774	.16630	.08646	
			(.19884)	(.02188)	
ANOVA	DF	SS	MS	F	
	2	1.30427	.65213	9.04860	
	83	5.98183	.07207		

TABLE 9.H (1)

SIZE AND PERFORMANCE

REGRESSIONS FOR 1966-1975

1966-1975

R^2

$$\text{Alpha 6675} = a_o + a_1 \log_e \text{Size 66} \qquad .00061$$

		a_o	a_1	
		-.00211	.00013	
			(.00056)	
ANOVA	DF	SS	MS	F
	1	.00000	.00000	.05157
	84	.00446	.00005	

$$\text{Alpha 6675} = a_o + a_1 \log_e \text{Size 76} \qquad .16588$$

		a_o	a_1	
		-.02007	.00218	
			(.00053)	
ANOVA	DF	SS	MS	F
	1	.00074	.00074	16.70448
	84	.00372	.00004	

$$\text{Delta 6675} = a_o + a_1 \log_e \text{Size 66} \qquad .00067$$

		a_o	a_1	
		-.08669	.00531	
			(.02240)	
ANOVA	DF	SS	MS	F
	1	.00477	.00477	.05613
	84	7.14156	.08502	

$$\text{Delta 6675} = a_o + a_1 \log_e \text{Size 76} \qquad .16530$$

		a_o	a_1	
		-.80272	.08713	
			(.02136)	
ANOVA	DF	SS	MS	F
	1	1.18127	1.18127	16.63456
	84	5.96507	.07101	

TABLE 9.H (2)

SIZE AND PERFORMANCE

REGRESSIONS FOR 1971-1975

1971-1975

					R^2
Alpha 7175	$= a_o + a_1 \log_e$Size 70				.02694
	$-.01182$	.00142			
		(.00094)			
ANOVA	DF	SS	MS	F	
	1	.00029	.00029	2.29764	
	83	.01064	.00013		
Delta 7175	$= a_o + a_1 \log_e$Size 70				.03573
	$-.28929$	.03435			
ANOVA	DF	SS	MS	F	
	1	.17157	.17157	3.07554	
	83	4.63023	.05579		
RVOL 7175	$= a_o + a_1 \log_e$Size 70				.04985
	$-.78926$	.08882			
ANOVA	DF	SS	MS	F	
	1	1.14716	1.14716	4.35321	
	83	21.87227	.26352		
Return 7175	$= a_o + a_1$ Beta 7175 $+ a_2 \log_e$Size 70				.10309
	$-.07074$	.35265	.02934		
		(.14209)	(.01911)		
ANOVA	DF	SS	MS	F	
	2	.49475	.24738	4.71231	
	82	4.30467	.05250		

TABLE 9.I

SIZE AND PERFORMANCE

REGRESSIONS FOR 1966-1970

1966-1970

R^2

$$\text{Alpha } 6670 = a_o + a_1 \log_e \text{Size } 66 \qquad .00396$$

a_o = -.00683, a_1 = .00033 (.00055)

ANOVA	DF	SS	MS	F
	1	.00002	.00002	.37364
	94	.00531	.00006	

$$\text{Delta } 6670 = a_o + a_1 \log_e \text{Size } 66 \qquad .00395$$

a_o = -.13079, a_1 = .00621 (.01017)

ANOVA	DF	SS	MS	F
	1	.00730	.00730	.37231
	94	1.84187	.01959	

$$\text{RVOL } 6670 = a_o + a_1 \log_e \text{Size } 66 \qquad .00027$$

a_o = .03446, a_1 = .00272 (.01695)

ANOVA	DF	SS	MS	F
	1	.00140	.00140	.02580
	94	5.11412	.05441	

$$\text{Return } 6670 = a_o + a_1 \text{ Beta } 6670 + a_2 \log_e \text{Size } 66 \qquad .08695$$

a_o = .09893, a_1 = .28646 (.09847), a_2 = .00431 (.01018)

ANOVA	DF	SS	MS	F
	2	.17290	.08645	8.75403
	93	1.81904	.01935	

TABLE 9.J

TRUST LIQUIDITY & PERFORMANCE REGRESSIONS FOR 1966 - 1970

1966-1970

					R^2
Alpha 6670 = a_o + a_1 Average Liquidity 6670					.00834
	-.00369	-.00016			
		(.00018)			
ANOVA	DF	SS	MS	F	
	1	.00005	.00005	.83261	
	99	.00557	.00006		
Delta 6670 = a_o + a_1 Average Liquidity 6670					.03781
	-.05814	-.00640			
		(.00325)			
ANOVA	DF	SS	MS	F	
	1	.07359	.07359	3.88996	
	99	1.87290	.01892		
RVOL 6670 = a_o + a_1 Average Liquidity 6670					.00132
	.06288	-.00199			
		(.00550)			
ANOVA	DF	SS	MS	F	
	1	.00709	.00709	.13049	
	99	5.37768	.05432		
Return 6670 = a_o + a_1 Beta 6670 + a_2 Average Liquidity 66-70					.11507
	.15325	.28886		-.00590	
		(.09421)		(.00325)	
ANOVA	DF	SS	MS	F	
	2	.24085	.12043	6.37155	
	98	1.85225	.01890		

TABLE 9.K

TRUST LIQUIDITY & PERFORMANCE REGRESSIONS FOR 1971 - 1975

1971-1975

R^2

Alpha 7175 = a_o + a_1 Average Liquidity 7175 .05465

.00475 -.00052
(.00022)

ANOVA	DF	SS	MS	F
	1	.00067	.00067	5.37637
	93	.01157	.00012	

Delta 7175 = a_o + a_1 Average Liquidity 7175 .06229

.10232 -.01164
(.00468)

ANOVA	DF	SS	MS	F
	1	.33471	.33471	6.17769
	93	5.03873	.05418	

RVOL 7175 = a_o + a_1 Average Liquidity 7175 .05261

.16391 -.02343
(.01031)

ANOVA	DF	SS	MS	F
	1	1.35534	1.35534	5.16488
	93	24.40450	.26241	

Return 7175 = a_o + a_1 Beta 7175 + a_2 Average Liquidity 71-75 .05246

.28250 .27196 -.00622
(.16437) (.00567)

ANOVA	DF	SS	MS	F
	2	.47892	.23946	4.50344
	92	4.89186	.05317	

TABLE 9.L

TRUST LIQUIDITY & PERFORMANCE REGRESSIONS FOR 1966 - 1975

1966-1975

R^2

Alpha 6675 = a_o + a_1 Average Liquidity 6675 .05246

.00165 -.00044
(.00019)

ANOVA	DF	SS	MS	F
	1	.00028	.00028	5.59180
	101	.00507	.00005	

Alpha 6675 = a_o + a_1 Average liquidity 66-75 + a_2 Variance Liquidity 66-75 .07521

.00225 -.00010 -.00039
(.00029) (.00025)

ANOVA	DF	SS	MS	F
	2	.00040	.00020	4.06631
	100	.00495	.00005	

Delta 6675 = a_o + a_1 Average Liquidity 6675 .05400

.06695 -.01791
(.00746)

ANOVA	DF	SS	MS	F
	1	.46306	.46306	5.76506
	101	8.11254	.08032	

Delta 6675 = a_o + a_1 Average Liquidity 66-75 + a_2 Variance Liquidity 66-75 .07588

.09061 -.00449 -.01517
(.01144) (.00986)

ANOVA	DF	SS	MS	F
	2	.65069	.32534	4.10533
	100	7.92491	.07925	

TABLE 9.M (1)

TRUST LIQUIDITY & PERFORMANCE REGRESSIONS FOR 1966 - 1975

1966-1975

R^2

RVOL 6675 = a_o + a_1 Average Liquidity 6675 .05167

	a_o	a_1
Coefficient	.28756	-.03146
(s.e.)		(.01341)

ANOVA	DF	SS	MS	F
	1	1.42880	1.42880	5.50320
	101	26.22265	.25963	

RVOL 6675 = a_o + a_1 Average Liquidity 66-75 + a_2 Variance Liquidity 66-75 .06583

	a_o	a_1	a_2
Coefficient	.32172	-.01208	-.02192
(s.e.)		(.02066)	(.01780)

ANOVA	DF	SS	MS	F
	2	1.82020	.91010	3.52325
	100	25.83123	.25831	

Return 6675 = a_o + a_1 Beta 6675 + a_2 Average liquidity 66-75 .07100

	a_o	a_1	a_2
Coefficient	.83142	.12034	-.01834
(s.e.)		(.20739)	(.00821)

ANOVA	DF	SS	MS	F
	2	.62080	.31040	3.82150
	100	8.12251	.08123	

Return 6675 = a_o + a_1 Beta 6675 + a_2 Average Liquidity 66-75 + a_3 Variance Liquidity 66-75 .09711

	a_o	a_1	a_2	a_3
Coefficient	.96609	-.01114	-.00463	-.01789
(s.e.)		(.21969)	(.01148)	(.01058)

ANOVA	DF	SS	MS	F
	3	.84905	.28302	3.54924
	99	7.89426	.07974	

TABLE 9.M (2)

the portfolios' market timing strategy, was also negative. It would appear that "going liquid" in an attempt to anticipate market turns, was not a component of good performance, but instead distracted from it.

The liquidity statistics were also regressed against the beta estimates (Table 9.N). There is a significant negative relationship between the two variables, as expected. This re-inforces the view that the generalized form of the CAPM:-

$$E(\tilde{R}_j) = E(\tilde{R}_z) + \beta_j E(\tilde{R}_M - \tilde{R}_z) \quad (3.24)$$

with a two-factor generating mechanism, applies, at least at the portfolio level.

The statistical relationship for liquidity and beta is not significant in the first sub-period when the liquidity balances held by unit trusts were much lower (and their beta average, much closer to unity with the market); but in the second sub-period, the relationship becomes very important. The changes in beta estimates in 1971/75 are due to changes in liquidity levels by the trust managements. A phenomenon due to the large increase in market variance during this period, and the unit trusts managements' stated objective of being money managers.

The variance in liquidity also was significant in relation to the beta coefficient: the higher the variance in liquidity levels, then the lower the beta estimates, an expected result. The beta coefficient will be less well defined if unit trust managers are continually adjusting the relative weights of their equity and fixed interest portions of the portfolio. Both the true beta, and the estimated beta will be lower, and it is a result of regression techniques that the less well-defined the series, the more the beta estimate will tend towards zero.

TRUST LIQUIDITY & BETA COEFFICIENTS
REGRESSIONS FOR 1966 - 1975

1966-1975

					R^2
Beta 6675 =	a_o +	a_1 Average Liquidity 6675			.16493
	.81211	-.01607			
		(.00381)			
ANOVA	DF	SS	MS	F	
	1	.33278	.33278	17.77595	
	90	1.68486	.01872		
Beta 6675 =	a_o +	a_1 Variance Liquidity 6675			.26916
	.83698	-.01770			
		(.00307)			
ANOVA	DF	SS	MS	F	
	1	.54307	.54307	33.14667	
	90	1.47486	.01638		

1966-1970

					R^2
Beta 6670 =	a_o +	a_1 Average Liquidity 6670			.00001
	.92464	-.00010			
		(.00363)			
ANOVA	DF	SS	MS	F	
	1	.00002	.00002	.00075	
	90	1.93804	.02153		

1971-1975

					R^2
Beta 7175 =	a_o +	a_1 Average Liquidity 7175			.33110
	.81975	-.01986			
		(.00298)			
ANOVA	DF	SS	MS	F	
	1	.94306	.94306	44.54884	
	90	1.90522	.02117		

TABLE 9.N

The percentage of funds invested in risk-free (or in the zero-covariance portfolio for the generalized model equation (3.24) assets by trust managers will affect their market exposure. It seems, however, that taking refuge in liquidity has not increased the portfolio returns, the evidence suggests the opposite though the coefficients are not very large. Unit trusts would seem to benefit most from following a policy of remaining fully invested since the analysis of market turns does not seem to be very effective. The more variable their liquidity balances the likely the trusts were to reduce the risk-adjusted performance, but – as with their holdings of liquid assets – this effect had very small coefficients.

9.4 Unit Trust Types & Performance

A test was run, using dummy variables to represent the type of trust (the Income, Capital, Special and General trusts), to ascertain the effect of trust types on performance. In order to prevent the introduction of a singularity in the coefficient matrix, there was no dummy used for the general type of trust. The generalized type of trust can also be said to have a balanced portfolio, neither too concerned with capital gains, nor income, nor invested in special situations. The dummy variables for the types of trust should indicate the performance effect of the qualitative category which can be attributed to the trust. If there is an identifiable characteristice for the trust categories, and their own literature indicates that such differences are held to exist, these dummy variables will indicate the extent to which this contributes to their overall performance.

The test results on the regressions in Table 9.0 conform to the effect of grouping the performance measures by the trust categories. The risk-adjusted performance of the average specialized fund in this study was negative

TRUST TYPE AND PERFORMANCE

1966-1975

Equation	a_o	a_1	a_2	a_3	R^2
Alpha 6675 = a_o + a_1 Special + a_2 Income + a_3 Capital					.17958
	-.00164	-.00224	.00686	.00007	
		(.00146)	(.00177)	(.00202)	

ANOVA	DF	SS	MS	F
	3	.00110	.00037	8.31788
	114	.00504	.00004	

Equation	a_o	a_1	a_2	a_3	R^2
Delta 6675 = a_o + a_1 Special + a_2 Income + a_3 Capital					.17967
	-.06754	-.08764	.27658	.00507	
		(.05847)	(.07103)	(.08101)	

ANOVA	DF	SS	MS	F
	3	1.76732	.58911	8.32257
	114	8.06940	.07078	

Equation	a_o	a_1	a_2	a_3	R^2
RVOL 6675 = a_o + a_1 Special + a_2 Income + a_3 Capital					.11439
	.06263	-.13351	.38957	-.00302	
		(.10910)	(.13252)	(.15114)	

ANOVA	DF	SS	MS	F
	3	3.62808	1.20936	4.90809
	114	28.08974	.24640	

Equation	a_o	a_1	a_2	a_3	a_4	R^2
Return 6675 = a_o + a_1 Beta 6675 + a_2 Special + a_3 Income + a_4 Capital						.19546
	.65175	.17930	-.08619	.27671	.00609	
		(.17283)	(.06084)	(.07135)	(.08213)	

ANOVA	DF	SS	MS	F
	4	1.96029	.49007	6.86325
	113	8.06880	.07141	

TABLE 9.0

likewise the coefficient of the dummy variable for the same group of trusts indicated a negative relationship of trust characteristic to performance. The dummy representing income trusts showed that this group did perform above their risk-adjusted, expected performance. In the analysis, however, the coefficients for both the Capital trusts and the Specialized group fail to be significant.

	Calculated Average Performance	Regressed Average Performance
General	-.002	-.002
Special	-.004	-.002*
Income	.005	.007
Capital	-.002	.000*

(*not significant in the regression equation.)

While these results confirm the general impression that some trust groups did as a whole do better than others over the period 1966 - 1975, one must doubt the validity of the classification used. In a following chapter evidence on trust groupings will be given which indicates that, at best, only 60 percent of the trusts are correctly classified. The reasons for this are also discussed in the chapter.

9.5 Change of Name, of Management Company & Performance

In the previous section an analysis was made of the effect of trust classifications as measured by dummy variables on the performance of the unit trust funds. In this section two further qualitative effects will be analysed.

The first is change of management group (called group change in Table 9.P). During the 10-year period a number of unit trusts were switched from one management group to another. In some cases this is due to the

TRUST GROUP CHANGE & PERFORMANCE REGRESSIONS FOR 1966 - 1975

1966-1975

R^2

Alpha 6675 = a_o + a_1 Name Change (Dummy) .04342

-.00015 -.00324
(.00141)

ANOVA	DF	SS	MS	F
	1	.00027	.00027	5.26547
	116	.00587	.00005	

Alpha 6675 = a_o + a_1 Group Change (Dummy) .05288

.00028 -.00335
(.00132)

ANOVA	DF	SS	MS	F
	1	.00032	.00032	6.47669
	116	.00581	.00005	

Delta 6675 = a_o + a_1 Name Change (Dummy) .04256

-.00729 -.12839
(.05654)

ANOVA	DF	SS	MS	F
	1	.41866	.41866	5.15658
	116	9.41805	.08119	

Delta 6675 = a_o + a_1 Group Change (Dummy) .05168

.00972 -.13249
(.05270)

ANOVA	DF	SS	MS	F
	1	.50833	.50833	6.32122
	116	9.32838	.08042	

TABLE 9.P (1)

GROUP & NAME CHANGE & PERFORMANCE
REGRESSIONS FOR 1966 - 1975

1966-1975

R^2

RVOL 6675 = a_o + a_1 Name Change (Dummy) .05403

	a_o	a_1
Coefficient	.16788	-.25975
		(.10092)

ANOVA DF	SS	MS	F
1	1.71365	1.71365	6.62521
116	30.00416	.25866	

RVOL 6675 = a_o + a_1 Group Change (Dummy) .04316

	a_o	a_1
Coefficient	.18040	-.21743
		(.09505)

ANOVA DF	SS	MS	F
1	1.36893	1.36893	5.23237
116	30.34888	.26163	

Return 6675 = a_o + a_1 Beta 6675 + a_2 Name Change (Dummy) .06244

	a_o	a_1	a_2
Coefficient	.66744	.24107	-.12408
		(.18028)	(.05762)

ANOVA DF	SS	MS	F
2	.62618	.31309	3.82915
115	9.40292	.08176	

Return 6675 = a_o + a_1 Beta 6675 + a_2 Group Change (Dummy) .07015

	a_o	a_1	a_2
Coefficient	.76837	.12728	-.13679
		(.19260)	(.05765)

ANOVA DF	SS	MS	F
2	.70358	.35179	4.33817
115	9.32552	.08109	

TABLE 9.P (2)

to the management group being acquired by another. But the acquisition may be attributed to the performance of the trusts in the acquired company's stable. The adverse performance of the trusts, either in terms of the number of units sold. or in performance terms, may lead directly to the transfer of the trust to another management team. The most extreme example of this is trust number 27: it switched management groups three times over a 10 year period, while at the same time it performed adversely over this same period.

The second qualitative variable considered here is the change in name of a trust. A unit trust which was not selling well may well be re-vamped and re-launced with a new name and set of objectives. The qualitative variable is designed to ascertain this effect.

The results support the hypotheses:-

1. the trusts which change group have a dummy variable with a negative relationship to performance, indicating that these trusts performed, on average, less well than trusts which remained within a trust group throughout the 10-year period. The coefficients are, however, small, although significant. It was not possible to ascertain whether the adverse performance result occurred prior to or following the change in ownwership;

2. the name change dummy variable also had a significant negative coefficient. The direction of the sign is consistent with the view that trusts which are doing adversely tend to have their names changed, i.e. they are re-vamped.

While both these results are consistent with the hypotheses put forward, it is also true to say that the coefficients are themselves small. There is also some difficulty concerning the direction of causality: it is possible that adverse performance contributed to the decision to dispose of trusts to other groups, or to change the name and direction of a trust. The results as they stand, however, do not tell whether the observed effect is not causing the adverse performance. Other observations of a casual nature do lead to the view that name changes and changes in management groups were contributory to inferior risk-adjusted performance.

9.6 Trust Management Groups & Performance

As with the previous sections, qualitative dummy variables were used to ascertain the contribution of management groups to the overall performance of unit trust portfolios. The results are shown in Tables 9.Q, 9.R and 9.S.

Table 9.Q gives the trust management groups as for 1966 for the entire period 1966 - 1975. Those groups with fewer than 3 unit trusts were not represented. The results indicate that most of the trusts' management groups have a qualitatively neutral contribution to the performance statistics. There were a number of exceptions: the Ebor, Hodge, M&G and Unit Trust Services groups had statistically significant variables.

Table 9.R gives the same analysis for the trusts but based on their 1975 management groupings. By the end of the period, there had been considerable consolidation in trust management groups, reducing the number in the analysis from 16 to 11. Here the results were statistically significant for the following groups of trusts: Allied, M&G, Oceanic and S&P.

TRUST MANAGEMENT GROUPS AND PERFORMANCE

REGRESSIONS FOR 1966-1975

1966-1975

	Alpha 6675	Delta 6675	RVOL 6675	Return 6675
a_o	-.00111	-.04996	.05982	.79371
a_{oo}				.00424 (.18590)
a_1 Abacus	.00270 (.00358)	.11350 (.15555)	.20429 (.29513)	.10625 (.15598)
a_2 Allied	.00504 (.00277)	.20701 (.11111)	.34444 (.21081)	.19966 (.11158)
a_3 Britannia	.00299 (.00315)	.12506 (.12609)	.22178 (.23924)	.12982 (.12638)
a_4 Castle	-.00233 (.00388)	-.08776 (.15555)	-.00710 (.29513)	-.05768 (.15966)
a_5 Commonwealth	.00045 (.00344)	.02352 (.13788)	.07095 (.26160)	.00121 (.14050)
a_6 D. Walker	.00041 (.00315)	.02201 (.12609)	.07666 (.23924)	.04654 (.12946)
a_7 Ebor	.00890 (.00315)	.36152 (.12609)	.61999 (.23924)	.37125 (.12677)
a_8 H. Samuel	.00348 (.00344)	.14458 (.13788)	.21292 (.26160)	.15752 (.13888)
a_9 Hodge	-.01120 (.00277)	-.44240 (.11111)	-.70482 (.21081)	-.45669 (.11250)
a_{10} Jessel	-.00300 (.00254)	-.11452 (.10183)	-.02243 (.19321)	-.11764 (.10203)
a_{11} L. Wall	.00288 (.00315)	.12053 (.12609)	.18785 (.23924)	.15505 (.13253)
a_{12} Moorgate	.00034 (.00294)	.01915 (.11758)	.39560 (.22310)	.01792 (.11775)
a_{13} M & G	.00646 (.00315)	.26403 (.12609)	.38008 (.23924)	.27578 (.12700)
a_{14} National	-.00033 (.00254)	-.00790 (.10183)	.00558 (.19321)	-.02240 (.10336)
a_{15} S & P	-.00044 (.00227)	-.01193 (.09079)	.01555 (.17225)	-.01439 (.09095)
a_{16} Unitserv	-.00548 (.00246)	-.21401 (.09838)	-.37844 (.18665)	-.22017 (.09877)
R^2	.36171	.36118	.28680	.37800

TABLE 9.Q (1)

Alpha 6675

ANOVA	DF	SS	MS	F
	16	.00222	.00014	3.57715
	101	.00392	.00004	

Delta 6675

ANOVA	DF	SS	MS	F
	16	3.55285	.22205	3.56904
	101	6.28387	.06222	

RVOL 6675

ANOVA	DF	SS	MS	F
	16	9.09666	.56854	2.53845
	101	22.62116	.22397	

Return 6675

ANOVA	DF	SS	MS	F
	17	3.79101	.22300	3.57483
	100	6.23808	.06238	

TABLE 9.Q (2)

TRUST MANAGEMENT GROUPS (1975) & PERFORMANCE REGRESSIONS FOR 1966-1975

1966-1975

	Alpha 6675	Delta 6675	RVOL 6675	Return 6675
a_o	-.00252	-.10339	-.00129	.66525
a_{oo} Beta 6675				.11488 (.18458)
a_1 Allied	.00644 (.00262)	.26044 (.10471)	.40555 (.29574)	.25502 (.10716)
a_2 Arbuthnot	.00410 (.00381)	.16692 (.15232)	.26541 (.28475)	.16154 (.15436)
a_3 Henderson	.00431 (.00334)	.17512 (.13359)	.29749 (.24974)	.16416 (.14049)
a_4 H. Samuel	.00505 (.00302)	.20457 (.12098)	.28451 (.22615)	.20534 (.12155)
a_5 L. Wall	.00716 (.00381)	.28918 (.15232)	.37113 (.28475)	.29539 (.15480)
a_6 M & G	.00787 (.00302)	.31746 (.12098)	.44120 (.22615)	.31787 (.12152)
a_7 Oceanic	-.00979 (.00262)	-.38897 (.10471)	-.64370 (.19574)	-.39651 (.10899)
a_8 S & P	.00427 (.00200)	.17366 (.07984)	.29155 (.14925)	.17116 (.08075)
a_9 S, Walker	.00030 (.00169)	.01457 (.06766)	.04962 (.12649)	.00740 (.07322)
a_{10} Target	-.00349 (.00279)	-.13702 (.11177)	-.29164 (.20895)	-.14238 (.11410)
a_{11} Unicorn	.00426 (.00302)	.17333 (.12098)	.36346 (.22615)	.17289 (.12152)
R^2	.30701	.30763	.24963	.32136

Alpha 6675

ANOVA DF	SS	MS	F
11	.00188	.00188	4.26919
106	.00425	.00004	

Delta 6675

ANOVA DF	SS	MS	F
11	3.02607	.27510	4.28158
106	6.81065	.06425	

RVOL 6675

ANOVA DF	SS	MS	F
11	7.91775	.71980	3.20580
106	23.80007	.22453	

TABLE 9.R

TRUST MANAGEMENT GROUPS AND PERFORMANCE

1966-1970

REGRESSIONS
FOR 1966-1970

	Alpha 6670	Delta 6670	RVOL 6670	Return 6670
a_0	-.00204	-.04122	.13047	.14572
a_{00} Beta 6670				.31723 (.08254)
a_1 Abacus	.00208 (.00437)	-.17900 (.07782)	-.18701 (.13939)	-.19021 (.07668)
a_2 Allied	.00231 (.00312)	.05146 (.05559)	.04854 (.09957)	.04766 (.05463)
a_3 Britannia	-.00475 (.00354)	-.03580 (.06309)	-.03715 (.11300)	-.03965 (.06204)
a_4 Castle	-.00998 (.00437)	-.04378 (.07782)	-.07593 (.13939)	-.03202 (.07651)
a_5 Commonwealth	-.00498 (.00387)	-.10201 (.06898)	-.11735 (.12356)	-.10745 (.06782)
a_6 D. Walker	-.00126 (.00354)	-.00957 (.06309)	-.02089 (.11300)	-.01273 (.06201)
a_7 Ebor	.00372 (.00354)	.05368 (.06309)	.03488 (.11300)	.05508 (.06199)
a_8 H. Samuel	.00048 (.00387)	.01274 (.06898)	-.00002 (.12356)	-.00447 (.06840)
a_9 Hodge	-.01538 (.00312)	-.32143 (.05559)	-.34153 (.09957)	-.32726 (.05468)
a_{10} Jessel	-.00159 (.00286)	.00232 (.05095)	-.01488 (.09126)	.02300 (.05037)
a_{11} L. Wall	-.00257 (.00354)	-.07983 (.06309)	-.09210 (.11300)	-.08859 (.06214)
a_{12} Moorgate	-.00061 (.00330)	.00547 (.05883)	-.00857 (.10537)	.00680 (.05781)
a_{13} M & G	-.00096 (.00354)	-.01759 (.06309)	-.03037 (.11300)	-.01827 (.06198)
a_{14} National	-.00175 (.00286)	-.03423 (.05095)	-.05219 (.09126)	-.03340 (.05006)
a_{15} S & P	-.00126 (.00255)	-.02819 (.04542)	-.04463 (.08136)	-.03342 (.04469)
a_{16} Unitserv	-.00616 (.00276)	-.11838 (.04922)	-.36857 (.08816)	-.10458 (.04919)
R^2	.32711	.38453	.28625	.45377

TABLE 9.S (1)

Alpha 6670

ANOVA	DF	SS	MS	F
	16	.00195	.00195	2.73443
	90	.00400	.00004	

Delta 6670

ANOVA	DF	SS	MS	F
	16	.79339	.04959	3.51432
	90	1.26989	.01411	

RVOL 6670

ANOVA	DF	SS	MS	F
	16	1.63379	.10211	2.25574
	90	4.07407	.04527	

Return 6670

ANOVA	DF	SS	MS	F
	17	1.00677	.05922	4.34911
	89	1.21191	.01362	

Return 6675

ANOVA	DF	SS	MS	F
	12	3.22294	.26858	4.14342
	105	6.80615	.06482	

TABLE 9.S (2)

Table 9.S has the same information for the trust groupings in 1966, as with Table 9.Q, but with the performance measures covering the period 1966 - 1970 only. Again some of the management groups have coefficients that are statistically significant: Abacus, Hodge, and Unit Trust Services.

While many of the coefficients in this analysis are not statistically significant a few are above the cut-off point. It therefore seems likely that there is some "management group" effect. Other evidence seems to suggest the effect may well be of a congruence of policy as relating to market exposure or a reliance on a common forecast for both securities and the market in the investment period. Circumstantial evidence by DRAPER (1973) concerning one investment institution about a common "office philosophy" certainly supports this hypothesis. Thus trusts within a group will invest and dis-invest in step, thus leading to a significant group effect.

9.7 Unit Trust Charges & Performance

One of the questions which arises in the American literature on mutual funds is whether there is any relationship between the charges made by a fund and its performance. These US studies are unanimous that there is no enduring relationship. This section replicates this analysis on UK data. There is one problem which does not appear in the US studies, that in the UK there is a legal limit on the charge permited, both as a front-end load and as an on-going annual fee. This restriction has been discussed in Chapter 5. In Appendix D summary details of trust charges, both annual and front-end are tabulated for all the trusts in this study.

TRUST CHARGES AND PERFORMANCE

REGRESSIONS FOR 1966-1970

1966-1970

					R^2
Alpha 6670	= a_o	+ a_1 Initial Charge 66			.07124
	.00132	-.14385 (.05065)			
ANOVA	DF	SS	MS	F	
	1	.00042	.00042	8.05421	
	105	.00553	.00005		
Alpha 6670	= a_o	+ a_1 Annual Charge 66			.01748
	-.00962	1.27229 (.93087)			
ANOVA	DF	SS	MS	F	
	1	.00010	.00010	1.86808	
	105	.00585	.00006		
Alpha 6670	= a_o	+ a_1 Initial Charge 66	+ a_2 Annual Charge 66		.07264
	.00380	-.15914 (.06398)	-.45307 (1.14321)		
ANOVA	DF	SS	MS	F	
	2	.00042	.00022	4.07331	
	104	.00552	.00005		
Delta 6670	= a_o	+ a_1 Initial Charge 66	+ a_2 Annual Charge 66		.10834
ANOVA	DF	SS	MS	F	
	2	.22354	.11177	6.31827	
	104	1.83974	.01769		

TABLE 9.T (1)

$$\text{Return 6670} = a_o + a_1 \,\text{Beta 6670} + a_2 \,\text{Initial Charge 66} + a_3 \,\text{Annual Charge 66}$$

.31204	.25237	-3.29061	-4.74600
	(.08942)	(1.17768)	(20.92755)

R^2 .17476

ANOVA	DF	SS	MS	F
	3	.38773	.12924	7.27060
	103	1.83095	.01778	

TABLE 9.T (2)

TRUST CHARGES AND PERFORMANCE

REGRESSIONS FOR 1971-1975

1971-1975

Equation		a_o	a_1	a_2	R^2
Alpha 7175	= a_o + a_1 Initial Charge 70	.00337	-.08148 (.08999)		.00864

ANOVA	DF	SS	MS	F
	1	.00011	.00011	.81964
	94	.01226	.00013	

Equation		a_o	a_1	a_2	R^2
Alpha 7175	= a_o + a_1 Annual Charge 70	-.01093	2.56716 (1.73135)		.02285

ANOVA	DF	SS	MS	F
	1	.00028	.00028	2.19854
	94	.01269	.00013	

Equation		a_o	a_1	a_2	R^2
Alpha 7175	= a_o + a_1 Initial Charge 70 + a_2 Annual Charge 70	-.02360	.11409 (.17096)	4.44985 (3.31282)	.02751

ANOVA	DF	SS	MS	F
	2	.00034	.00017	1.31545
	93	.01203	.00013	

Equation		a_o	a_1	a_2	R^2
Delta 7175	= a_o + a_1 Initial Charge 70 + a_2 Annual Charge 70	-.48130	2.26194 (3.58412)	90.49747 (69.45242)	.02650

ANOVA	DF	SS	MS	F
	2	.14390	.07195	1.26521
	93	5.28670	.05685	

TABLE 9.U (1)

$$\text{Return } 7175 = a_0 + a_1 \text{ Beta } 7175 + a_2 \text{ Initial Charge } 70 + a_3 \text{ Annual Charge } 70$$

-.36843	.37189	2.99522	95.61053
	(.13425)	(3.47125)	(67.09573)

R^2 .10144

ANOVA DF	SS	MS	F
3	.55063	.18354	3.46217
92	4.87729	.05301	

TABLE 9.U (2)

TRUST CHARGES AND PERFORMANCE

REGRESSIONS FOR 1966-1975

1966-1975

					R^2
Alpha 6675 =	a_o +	a_1 Initial Charge 66			.03957
	.00293	-.10357			
		(.04738)			
ANOVA	DF	SS	MS	F	
	1	.00024	.00024	4.77903	
	116	.00590	.00005		
Alpha 6675 =	a_o +	a_1 Annual Charge 66			.03387
	-.00823	1.71212			
		(.84905)			
ANOVA	DF	SS	MS	F	
	1	.00021	.00021	4.06634	
	116	.00593	.00005		
Alpha 6675 =	a_o +	a_1 Initial Charge 66 +	a_2 Annaul Charge 66		.04592
	-.00217	-.07190	.93254		
		(.05967)	(1.06609)		
ANOVA	DF	SS	MS	F	
	2	.00028	.00014	2.76725	
	115	.00586	.00005		
Delta 6675 =	a_o +	a_1 Initial Charge 66 +	a_2 Annual Charge 66		.04401
	-.11457	-2.58137	41.00331		
		(2.39090)	(42.72022)		
ANOVA	DF	SS	MS	F	
	2	.43287	.21643	2.64679	
	115	9.40385	.08177		

TABLE 9.V (1)

$$\text{Return}_{6675} = a_0 + a_1\,\text{Beta}_{6675} + a_2\,\text{Initial Charge}_{66} + a_3\,\text{Annual Charge}_{66}$$

	a_0	a_1	a_2	a_3
	.52117	.28690	-2.46126	41.74961
		(.17847)	(2.40263)	(42.83110)

R^2 .06626

ANOVA	DF	SS	MS	F
	3	.66452	.22151	2.69651
	114	9.36458	.08215	

TABLE 9.V (2)

The result of the restriction on the charge that is allowed is to fix an upper limit to the significance of this factor in relation to trust performance. The results summarized in Tables 9.T, 9.U and 9.V indicate no significance between the level of charges and trust performance. There is some evidence in Table 9.T for the charges in 1966 to be significantly related to performance over the five-year period 1966/70, but this result is not consistent.

In view of the restricted nature of the range of charges open to trust managements, the result must be left unproven. Because the law restricts the opportunities for successful managements to recompense themselves, there is no relationship between these variables and trust performance.

9.8 Summary

This chapter has looked at some of the variables which have been considered by the investment community to be important in influencing portfolio performance, and in particular, unit trusts.

On the whole, while some of the individual tests produced results which were statistically significant, the conclusion is that most of the supposed effects on performance, if they do operate, are hardly significant enough of themselves to explain the great differences in performance. This must be attributed to random factors, or variables which have not been included in the analyses.

In addition, some of the tests due to their rought nature, must remain inconclusive, and point to the desirability of obtaining better and more detailed data before arriving at a result. In the next chapter, the "holistic" question of trust performance will be examined.

10. THE PREDICTABILITY OF TRUST PERFORMANCE

In chapter nine the question of individual factors thought to account for unit trust performance were assessed. It was found that individual most factors failed to explain the discrepancy in performance. In this chapter, we will discuss a multi-dimensional, multi-variate model for unit trust performance.

We may postulate that the returns generating function of portfolio effects is:-

$$\tilde{R}_j = a_1\tilde{D}_1 + a_2\tilde{D}_2 + \ldots\ldots + a_n\tilde{D}_n + \tilde{e}_j \qquad (10.1)$$

where $\tilde{D}$ is the data set of characteristics and a is the relative weight of the data set in relation to the return $\tilde{R}_j$.

A step-wise multiple regression approach to the available variables D to determine the best mix of explanatory factors was used.

In Table 10.A the initial solution using all 27 variables was tried out. It immediately became apparent that the period 1966 - 1975 was too long to produce any useful results. Consequently, the run was repeated for data on return for 1971/75 with the predicting variables from the first sub-period, Table 10.B. The table indicates the order in which the variables entered the regression. It was not a perfect solution since not all the variables are significant.

The results were improved in Table 10.C when a cut-off point at which only significant variables were allowed to enter the equation was calculated. Here only variables with an F-statistic of 1.5 or more were allowed to enter the predictor equation. This multiple regression model

THE PREDICTABILITY OF PERFORMANCE:
Multiple Regression for the period: 1966-1975

1966-1975

		Alpha 6675	Delta 6675	RVOL 6675	Return 6675
a_0		-.00317	-.16151	.07335	1.19014
a_{00}					-.27535 (.28299)
a_1	Varliqid	.00009 (.00035)	.00371 (.01414)	.00020 (.02959)	-.00008 (.01420)
a_2	Initch66	-.04365 (.08811)	-1.30070 (3.52492)	-3.02301 (7.37784)	-1.82853 (3.48710)
a_3	Annuch66	.65197 (1.62579)	32.73631 (65.04083)	71.89671 (136.13388)	23.29110 (64.32057)
a_4	LnSize66	-.00011 (.00131)	-.00610 (.05235)	-.03396 (.10958)	-.03102 (.05407)
a_5	Income	.00693 (.00255)	.27958 (.10207)	.40731 (.21364)	.28056 (.10048)
a_6	Capital	-.00227 (.00283)	-.08777 (.11317)	-.13424 (.23687)	-.08052 (.11152)
a_7	Special	.00063 (.00226)	.02907 (.09037)	.08854 (.18915)	.01733 (.08922)
a_8	Abacus	.01000 (.00655)	.40799 (.26190)	.80877 (.54817)	.39760 (.25784)
a_9	Allied	.00799 (.00446)	.32881 (.17847)	.61936 (.37355)	.35419 (.17669)
a_{10}	Britania	.00394 (.00416)	.15946 (.16632)	.30229 (.34811)	.19599 (.16560)
a_{11}	Castle	.00033 (.00559)	.01442 (.22366)	.16398 (.46814)	.05973 (.22221)
a_{12}	Commweale	.01082 (.00535)	.43617 (.21398)	.79129 (.44788)	.42696 (.21068)
a_{13}	D. Walker	.00049 (.00535)	.02768 (.21421)	.21858 (.44835)	.13236 (.22176)
a_{14}	Ebor	.00713 (.00478)	.28805 (.19121)	.56581 (.40022)	.36341 (.19432)
a_{15}	H. Samuel	.00438 (.00553)	.18742 (.22108)	.36995 (.46272)	.24622 (.22122)
a_{16}	Hodge	-.00392 (.00441)	-.15646 (.17648)	-.22963 (.36939)	-.15866 (.17374)
a_{17}	Jessel	-.00068 (.00368)	-.02597 (.14704)	.13283 (.30776)	-.03150 (.14477)
a_{18}	L. Wall	.00133 (.00443)	.05590 (.17738)	.14632 (.37127)	.14552 (.18415)

TABLE 10.A (1)

	Alpha 6675	Delta 6675	RVOL 6675	Return 6675
a_{19} Moorgate	.00253	.10446	.15549	.11942
	(.00401)	(.16051)	(.33595)	(.15833)
a_{20} M & G	.00404	.16990	.27133	.19447
	(.00465)	(.18615)	(.38962)	(.18396)
a_{21} National	.00176	.07287	.18902	.09395
	(.00398)	(.15905)	(.33290)	(.15724)
a_{22} S & P	.00023	.02398	.16408	.05260
	(.00433)	(.17332)	(.36276)	(.17170)
a_{23} Unitserv	-.00479	-.18654	-.21972	-.15359
	(.00373)	(.14911)	(.31209)	(.14842)
a_{24} Avliquid	-.00059	-.02436	-.04251	-.02813
	(.00040)	(.01598)	(.03345)	(.01593)
a_{25} Growth6675	.00316	.12423	.14096	.09528
	(.00163)	(.06533)	(.13673)	(.06705)
a_{26} Namchang	-.00140	-.05738	-.16581	-.06471
	(.00224)	(.08952)	(.18738)	(.08829)
a_{27} Grpchang	.00026	.01291	.06506	-.01252
	(.00284)	(.11373)	(.23804)	(.11296)
R^2	.60868	.60919	.46903	.63758

Alpha 6675

ANOVA	DF	SS	MS	F
	27	.00217	.00008	2.36201
	41	.00140	.00003	

Delta 6675

ANOVA	DF	SS	MS	F
	27	3.48281	.12899	2.36709
	41	2.23426	.05449	

RVOL 6675

ANOVA	DF	SS	MS	F
	27	8.64628	.32023	1.34139
	41	9.78800	.23873	

Return 6675

ANOVA	DF	SS	MS	F
	28	3.71640	.13273	2.51323
	40	2.11248	.05281	

TABLE 10.a (2)

THE PREDICTABILITY OF PERFORMANCE:
Multiple Regressions for 1971 - 1975

1971-1975

	Alpha 7175	Delta 7175	RVOL 7175	Return 7175
a_0	-.02585	-.50748	-1.30950	.04373
a_{00} Beta7175				-.12574 (.19723)
a_1 Grpchang	-.00449 (.00441)	-.06491 (.09454)	.01230 (.24182)	-.07300 (.09600)
a_2 Initch 70	.21122 (.19029)	3.40894 (4.08285)	1.37538 (10.44383)	3.33392 (4.11097)
a_3 Annuch 70	6.17691 (3.53602)	107.13761 (75.87002)	234.35827 (194.07374)	107.43037 (76.36155)
a_4 LnSize 70	-.00127 (.00148)	-.01393 (.03174)	.01294 (.08119)	-.01868 (.03281)
a_5 Income	.01472 (.00350)	.28422 (.07510)	.38604 (.19211)	.28338 (.07560)
a_6 Capital	-.00305 (.00430)	-.04818 (.09216)	-.14138 (.23574)	-.05201 (.09295)
a_7 Special	-.00163 (.00333)	-.04129 (.07146)	-.08450 (.18279)	-.05355 (.07450)
a_8 Abacus	.00247 (.01069)	.08454 (.22937)	.82074 (.58673)	.09225 (.23118)
a_9 Allied	.00832 (.00690)	.16685 (.14808)	.57603 (.37878)	.17633 (.14979)
a_{10} Britannia	.00924 (.00632)	.19434 (.13568)	.62203 (.34708)	.20491 (.13758)
a_{11} Castle	.00466 (.00783)	.09960 (.16809)	.38815 (.42997)	.10279 (.16925)
a_{12} Comwealth	.01305 (.00855)	.29390 (.18352)	1.00069 (.46943)	.30518 (.18557)
a_{13} D. Walker	.00297 (.00739)	.11131 (.15846)	.37225 (.40533)	.13271 (.16304)
a_{14} Ebor	.02208 (.00697)	.42701 (.14956)	1.01309 (.38256)	.45389 (.15642)
a_{15} H. Samuel	.00551 (.00796)	.11425 (.17088)	.34073 (.43712)	.13056 (.17392)
a_{16} Hodge	-.00164 (.00665)	.00033 (.14261)	.30436 (.36479)	.00608 (.14382)
a_{17} Jessel	-.00015 (.00504)	.00592 (.10808)	.30036 (.27646)	.00703 (.10879)
a_{18} L. Wall	.00348 (.00722)	.09236 (.15487)	.43124 (.39616)	.11054 (.15852)

TABLE 10. B (1)

	Alpha 7175	Delta 7175	RVOL 7175	Return 7175
a_{19} Moorgate	.00745 (.00591)	.08474 (.12686)	.20219 (.32452)	.08667 (.12772)
a_{20} M & G	.01525 (.00662)	.28915 (.14204)	.37427 (.36333)	.28389 (.14320)
a_{21} National	.00686 (.00587)	.11534 (.12588)	.37093 (.32199)	.11552 (.12669)
a_{22} S & P	.00392 (.00686)	.07160 (.14718)	.41453 (.37647)	.08540 (.14973)
a_{23} Unitserv	.00139 (.00552)	-.02709 (.11847)	.09548 (.30305)	-.02517 (.11928)
a_{24} Avlq 7175	-.00029 (.00036)	-.00745 (.00767)	-.03082 (.01963)	-.01017 (.00884)
a_{25} Growth7175	-.00007 (.00353)	.03185 (.07573)	.03799 (.19371)	.02947 (.07631)
a_{26} Namchang	-.00148 (.00346)	-.03322 (.07426)	-.09680 (.18995)	-.03320 (.07474)
R^2	.59655	.57697	.42260	.58039

Alpha 7175

ANOVA	DF	SS	MS	F
	26	.00567	.00022	2.67290
	47	.00383	.00008	

Delta 7175

ANOVA	DF	SS	MS	F
	26	2.40768	.09260	2.46548
	47	1.76531	.03756	

RVOL 7175

ANOVA	DF	SS	MS	F
	26	8.45412	.32516	1.32306
	47	11.55086	.24576	

Return 7175

ANOVA	DF	SS	MS	F
	27	2.42078	.08966	2.35654
	46	1.75015	.03805	

TABLE 10.B (2)

THE PREDICTABILITY OF PERFORMANCE:
Multiple Regression for 1971-1975, Optimum Solution

1971-1975

		Return 1971-1975	F
a_0		.85095	
a_1	Income (Dummy)	.33403 (.05046)	43.813
a_2	Alpha 6670	7.34239 (2.87569)	6.519
a_3	M & G (Dummy)	.22551 (.09532)	5.598
a_4	Ebor (Dummy)	.30074 (.10171)	8.743
a_5	GrpChange (Dummy)	-.15571 (.04679)	11.073
a_6	Avlq 6670	-.02337 (.00558)	17.520
a_7	Britannia (Dummy)	.23532 (.09363)	6.317
a_8	Castle (Dummy)	.29773 (.12812)	5.400
a_9	Log_eSize 70	-.04776 (.01822)	6.870
a_{10}	Commonwealth (Dummy)	.21324 (.10540)	4.093
a_{11}	National (Dummy)	.13883 (.07903)	3.086
a_{12}	Growth 6670	.04691 (.03073)	2.330
a_{13}	Allied (Dummy)	.11381 (.08443)	1.817
	R^2	.64597	

ANOVA	DF	SS	MS	F
	13	2.69427	.20725	8.42116
	60	1.47665	.02461	

TABLE 10.C (A)

THE PREDICTABILITY OF PERFORMANCE:
Multiple Regression for 1971-1975, Optimum Solution plus One.

	Return 1971-1975
a_0	.85742
a_1 Income (Dummy)	.33533 (.05045)
a_2 Alpha 6670	7.38346 (2.87402)
a_3 M & G (Dummy)	.23755 (.09595)
a_4 Ebor (Dummy)	.29935 (.10165)
a_5 Group Change (Dummy)	-.14778 (.04738)
a_6 Average Liquidity 66-70	-.02320 (.00558)
a_7 Britannia (Dummy)	.23924 (.09364)
a_8 Castle (Dummy)	.30645 (.12831)
a_9 Log_eSize 1970	-.04990 (.01833)
a_{10} Commonwealth (Dummy)	.21713 (.10540)
a_{11} National (Dummy)	.14274 (.07907)
a_{12} Growth 6670	.04882 (.03076)
a_{13} Allied (Dummy)	.12558 (.08513)
a_{14} D. Walker (Dummy)	.09845 (.09468)
R^2	.65234

ANOVA	DF	SS	MS	F
	14	2.72085	.19435	7.90745
	59	1.45008	.02458	

TABLE 10.C (B)

explained 0.646 of the dependent variable which was the return for the period 1971/75. The 14 dependent variables thus accounted for 64.6 percent of the variance of the dependent variable.

The postulated returns generating function (10.1) has characteristics D of weight a explaining the returns $\tilde{R}_j$. The optimum solution included the following characteristics:

Income Trusts (Dummy Variable)
Alpha score for 1966/70
Management Group M&G (Dummy Variable)
Management Group Ebor (Dummy Variable)
*Group Change (Dummy Variable)
*Average Liquidity Level 1966/70
Management Group Britannia (Dummy Variable)
Management Group Castle (Dummy Variable)
*Log of Trust Size 1970
Management Group Commonwealth (Dummy)
Management Group National (Dummy Variable)
Trust Growth Statistic 1966/70
Management Group Allied (Dummy Variable)

(The asterix * indicates a negative coefficient in the equation for Table 10.C.)

As with the individual tests in the previous chapter, those variables which had been significant, but with only small coefficients, were in the regression. Many of these variables (nine out of thirteen) were qualitative, dummy variables, the most significant of which was the dummy for Income trusts. But seven were also of the management groups used in the study. This alone would preclude any forecasting powers to the equation. It would also appear to reflect certain effects that were important in the latter part of the period, such as income stocks which appear prominently in the regression.

As in the previous test on the effects of management changes, chapter 9 section 5, this variable is negative in the equation, indicating an inverse relationship between returns in the 1971/75 period, and change of trust management. But more surprisingly is the fact that the size of the unit trust has both a significance in the equation, and also a negative sign. On a multi-dimensional level, it would appear that there was some justification for the view that large portfolios having lower returns than small ones, but that his effect must be considered as part of the overall returns generating mechanism. Liquidity levels had a negative sign, as with the results for chapter 9 section 3.

What emerges is that the various characteristics are attempting to capture dimensions in the data which do not correspond to the observed variables. This will be taken further in the next chapter when a discriminant analysis of unit trusts will be undertaken. This will show that there are three vectors of effect in the data which may be interpreted as a market effect, a management effect and an investor effect.

As to the value of the equations in terms of their predictive value, it would be most unlikely if these equations had any future predictive value, rather they attempt to describe the possible effects on trust returns in the 5-year sub-period 1971/75. These effects will be examined in detail in the following chapter.

11. THE CLASSIFICATION OF UNIT TRUSTS

This chapter undertakes a discriminant analysis of unit trusts to ascertain whether the declared types of trusts can be effectively seperated into their component groups. A comparable study was carried out by LECLAIR (1974) on US mutual funds. He found that using commonly available data 70 percent of his funds could be correctly classified using his discriminant model.

This approach seeks to select the best relationship between the dependent variables – the types of funds in this case – and a set of independent quantitative variables which on a-priori grounds are thought to explain the dependent relationship. It is a model which will optimalize the results, where the given set of data will only reflect the inter-relationship of the body of data analysed and the dependent variables in a mathematical relationship. Consequently in most usages of the model, "hold-out" tests are applied to test the universality of the relationships discovered. In this case no adequate, independent sample of data was available to test the stability and applicality of the discriminant functions derived.

11.1 Factor Analysis of Unit Trust Characteristics

In Chapter Ten the predictive power of the various characteristics of unit trusts was tested. There was some relationship between the returns and the dependent variables which was considered to be of a transitory and unique kind. It was evident that the dependent variables were trying to describe relationships which transcended the individual variables.

As a preliminary to the discriminant analysis a factor analysis was carried out on the data to determine whether there was a possibility of reducing the number of independent variables to a lesser number of factors. There is, however, a danger in using factor analysis in that the derived factors are not easily interpretable as valid dimensions of the original data. This "reification problem", of analysing the data in terms of the new dimensions, is well described by ARMSTRONG (1967) using an amusing analogy. The factor analytic results are shown in Tables 11.A, 11.B and 11.C.

These indicate that, while a set of three factors will account for 70,1 percent of the variance, these dimensionalities to the data cannot be easily interpreted in the light of the original data.

It would appear that factor one is some sort of "management factor" since there are high loadings on both the initial charge and the annual charge variables, but some of the return variable also loads on this factor.

Factor two has some relationship to liquidity levels and unit trust growth, and would be best interpreted as an "investor factor".

It would seem that factor three is a "market effect factor".

Unfortunately, this "picture" of the factors is not consistent through the three analyses. There are a number of sign changes and the loadings change: for instance beta moves from factor three to factor two in Tables 11.A and 11.B.

While interesting in showing the directions of unit trust characteristics which might be derived from the data, the factors are not sufficiently stationary to offer

FACTOR ANALYSIS OF TRUST CHARACTERISTICS 1966-1970

Initial Solution

Factor	Eigenvalue	% of Var	Cum %
1	2.15394	30.8	30.8
2	1.69697	24.2	55.0
3	1.05768	15.1	70.1
4	.85696	12.2	82.4
5	.55040	7.9	90.2
6	.43495	6.2	96.4
7	.24910	3.6	100.0

Factor Matrix Using Principal Factor With Iterations

	Factor 1	Factor 2	Factor 3
Eigenvalue	1.80654	1.18113	.75236
% of Var	48.3	31.6	20.1

Varimax Rotated Factor Matrix

Return 1966-1970	.42627	.02826	.20597
Beta 1966-1970	.13998	-.01498	.85545
Log_e Size 1966	.10141	-.82229	-.00709
Initial Charge 1966	-.92994	.07558	.00735
Average Liquidity 1966-1970	-.10475	.50583	.08706
Annual Charge 1966	.77484	-.06905	.03099
Growth 1966-1970	.11424	.54744	-.11479

TABLE 11.A

a better result than using the raw data as an imput to the discriminant function. The factors do not lend themselves to interpretation as corresponding to the types of trusts as used in this study. Indeed, the first factor, which may be equated to "management", when rotated accounts for approximately half the variance. However, while the data is not uni-dimensional the first three factors account for most of the data, and they alone have an eigenvalue above 1.0.

11.2 Discriminant Analysis of Unit Trust Types

The results for the discriminant analysis are divided into three seperate tables, one for each period: 1966/70, 1971/75 and 1966 - 1975. The first table summarizes the initial solution when all the variables are allowed to enter the discriminant function. The second table gives the optimum solution with the minimum number of variables explaining the maximum percentage of correct classifications. The third table, however, gives the best solution given only two variables: return and beta risk.

The model used the given categories of trusts as given in Table 7.B : General Trusts (Group 1), Capital or growth oriented trusts (Group 2), Income Trusts (Group 3), and Specialized Trusts (Group 4). What the tables summarize is the element of predicted group membership against the actual membership in that group. It also gives the group the trust would be classified in if it were in fact misclassified; i.e. the predicted characteristics make it resemble one of the other types.

In Table 11.D(1) is the initial solution for the period 1966/70. Examining the table, we see that for Group 1, the General Trusts, with this initial solution, there are 15 trusts correctly classified out of a total 29 general

FACTOR ANALYSIS OF TRUST CHARACTERISTICS 1971-1975

Initial Solution

Factor	Eigenvalue	% of Var	Cum %
1	2.32671	33.2	33.2
2	1.53088	21.9	55.1
3	1.19645	17.1	72.2
4	.88955	12.7	84.9
5	.64002	9.1	94.1
6	.29772	4.3	98.3
7	.11866	1.7	100.0

Factor Matrix Using Principal Factor With Iterations

	Factor 1	Factor 2	Factor 3
Eigenvalue	2.09915	1.30732	.73243
% of Var	50.7	31.6	17.7
Varimax Rotated Factor Matrix			
Return 1971-1975	.12276	.30461	.03967
Beta 1971-1975	.01531	.78517	-.23533
Log_e Size 1970	.17918	.39957	.79415
Initial Charge 1970	-.81467	-.14925	.01822
Average Liquidity 1971-1975	-.05820	-.78284	-.15154
Annual Charge 1970	1.04537	.07822	-.05946
Growth 1971-1975	.09714	.11056	-.29216

TABLE 11.B

FACTOR ANALYSIS OF TRUST CHARACTERISTICS 1966-1975

Initial Solution

Factor	Eigenvalue	% of Var	Cum %
1	3.22084	35.8	35.8
2	1.62869	18.1	53.9
3	1.44716	16.1	70.0
4	.89193	9.9	79.9
5	.62660	7.0	86.8
6	.54016	6.0	92.8
7	.31756	3.5	96.4
8	.23373	2.6	99.0
9	.09333	1.0	100.0

Factor Matrix Using Principal Factor With Iterations

	Factor 1	Factor 2	Factor 3
Eigenvalue	2.91566	1.22056	1.16139
% of Var	55.0	23.0	21.9

Varimax Rotated Factor Matrix

Return 1966-1975	-.21328	-.17550	.28303
Beta 1966-1975	-.47768	-.20700	.14654
Log_e Size 1966	-.30046	-.15991	-.64200
Initial Charge 1966	.18054	.95576	.03721
Annual Charge 1966	-.05435	-.73916	-.03002
Average Liquidity 1966-1975	.92594	.12609	.20240
Variance in Liquidity 1966-1975	.89968	.09147	-.04254
Bid-Offer 1969	.42256	.52815	-.02351
Growth 1966-1975	-.11948	.01471	.78527

TABLE 11.C

trusts in the discriminant function. The alternative classification offered two trusts for the Growth group, 5 for the Income group, and 7 General trusts resembling the Specialized group. The initial solution has a number of redundant discriminant variables in the function, and therefore its predictive powers are not very high: in this case, 49.3 percent of known cases were correctly classified.

In using a discriminant function with fewer variables the power of the model is increased. This is reflected in the next table, 11.D (2). This result does not hold for the set of Tables 11.D. The reason for this is in the actual classification used for the trust types in this early sub-period. It seems likely that the classification used does not reflect the true classification for this period since subsequently the trusts have had a number of name changes and group changes. It is, therefore, better to examine Tables 11.E and 11.F, where the correct choice of dependent variables leads to a higher correlation of actual trust classification to the predictions of the model. In this case, examining these tables and comparing parts one and two with the reduction in the number of independent variables from 7 to 3 for 1971/75 and from 9 to 5 for 1966 - 1975 leaves the Chi-square unaltered.

In the third part of each table the risk-return discriminant classification is given. Because a two variable discriminant function cannot predict a four way classification, the regression function has excluded the Income group of trusts, because they are few in number. The real discriminant power of the model should thus be higher, if only by a few percentage points. One solution would have been to include a third variable. However, this solution was not adopted, because it approached the optimum solutions in part two of the tables; and, in this

DISCRIMINANT ANALYSIS 1966 - 1970 INITIAL SOLUTION

Unstandardized Discriminant Function Coefficients

	1	2	3
Return 1966-1970	-2.94706	.521449	2.40243
Beta 1966-1970	1.21929	-6.56402	-2.20622
Log_e Size 1966	.615986	.271445	.228970
Initial Charge 1966	-24.6015	24.9776	-51.8212
Average Liquidity 1966-1970	.20490	-.020017	.003647
Annual Charge 1966	-610.855	-.749728	-78.9436
Growth 1966-1970	1.06451	.030091	.083976
Constant	-2.56637	2.95545	1.61797

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	29	15	2	5	7
			20.5%	2.7%	6.8%	9.6%
Group 2	I	14	1	7	2	4
			1.4%	9.6%	2.7%	5.5%
Group 3	C	6	1	0	5	0
			1.4%		6.8%	
Group 4	S	24	7	5	3	9
			9.6%	6.8%	4.1%	12.3%

49.3 % of known cases correctly classified

Chi-Square = 23.018

Class Probability

The class probability in all cases is based on the universe probability of a trust being of a particular type, which increases the probability of a trust being general or specialist because of the high number of such trusts in existence.

TABLE 11 .D (1)

DISCRIMINANT ANALYSIS 1966 - 1970

Unstandardized Discriminant Function Coefficients

	1	2	3
Beta 1966-1970	7.05227	.305789	-2.64177
Log_e Size 1966	-.281267	-.497482	-.614566
Average Liquidity 1966-1970	.007537	-.318486	.050594
Constant	-4.44686	4.76031	6.90167

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	29	24 32.9%	0	0	5 6.8%
Group 2	I	14	9 12.3%	3 4.1%	1 1.4%	1 1.4%
Group 3	C	6	4 5.5%	0	2 2.7%	0
Group 4	S	24	18 24.7%	3 4.1%	1 1.4%	2 2.7%

42.5 % of known cases correctly classified

Chi-Square = 11.877

TABLE 11.D (2)

DISCRIMINANT CLASSIFICATION BASED ON RETURN AND BETA 1966 - 1970

Unstandardized Discriminant Function Coefficients

	1	2
Return 1966-1970	-.143932	7.04427
Beta 1966-1970	7.54488	-1.81862
Constant	-6.94740	-1.04298

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	29	26 35.6%	0	0	3 4.1%
Group 2	I	14	11 15.1%	1 1.4%	0	2 2.7%
Group 3	C	6	4 5.5%	0	0	2 2.7%
Group 4	S	24	15 20.5%	1 1.4%	2 2.7%	6 8.2%

45.2 % of known cases correctly classified

Chi-Square = 15.895

TABLE 11.D (3)

DISCRIMINANT ANALYSIS 1971 - 1975 INITIAL SOLUTION

Unstandardized Discriminant Function Coefficients

	1	2	3
Return 1971-1975	-3.72812	-2.22145	.840747
Beta 1971-1975	-2.67650	4.91201	-3.02562
Log_e Size 1970	-.147522	.024560	-.604831
Initial Charge 1970	1.07284	-63.8503	-45.7952
Average Liquidity 1971-1975	.014573	.079019	-.160906
Annual Charge 1970	117.747	-274.730	-535.206
Growth 1971-1975	.234925	.064974	1.03460
Constant	3.84359	.506025	12.0953

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	27	12 16.4%	6 8.2%	5 6.8%	4 5.5%
Group 2	I	15	1 1.4%	12 16.4%	0	2 2.7%
Group 3	C	7	1 1.4%	0	6 8.2%	0
Group 4	S	24	5 6.8%	2 2.7%	3 4.1%	14 19.2%

60.3 % of known cases correctly classified

Chi-Square = 48.443

TABLE 11 . E (1)

DISCRIMINANT ANALYSIS 1971 - 1975

Unstandardized Discriminant Function Coefficients

	1	2	3
Return 1971-1975	3.74458	2.72582	-1.46248
Beta 1971-1975	3.13436	-3.54406	3.43095
Initial Charge 1971	-1.86728	51.7417	60.1190
Constant	-3.56480	-.889308	-4.01560

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	27	23 31.5%	1 1.4%	0	3 4.1%
Group 2	I	15	5 6.8%	8 11.0%	0	2 2.7%
Group 3	C	7	3 4.1%	0	0	4 5.5%
Group 4	S	24	8 11.0%	2 2.7%	0	14 19.2%

61.6 % of known cases correctly classified

Chi-Square = 52.259

TABLE 11.E (2)

DISCRIMINANT CLASSIFICATION BASED ON RETURN AND BETA 1971 - 1975

Unstandardized Discriminant Function Coefficients

	1	2
Return 1971-1975	3.77844	-2.99604
Beta 1971-1975	3.10889	4.94416
Constant	-3.63665	-1.96861

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	27	24 32.9%	0	0	3 4.1%
Group 2	I	15	6 8.2%	8 11.0%		1 1.4%
Group 3	C	7	3 4.1%	0	0	4 5.5%
Group 4	S	24	10 13.7%	2 2.7%	0	12 16.4%

60.3 % of known cases correctly classified

Chi-Square = 48.443

TABLE 11 .E (3)

DISCRIMINANT ANALYSIS 1966 - 1975 INITIAL SOLUTION

Unstandardized Discriminant Function Coefficients

	1	2	3
Return 1966-1975	-2.66369	.555690	.370229
Beta 1966-1975	-2.30832	-5.95611	1.18436
Log_e Size 1966	-.184830	.114955	.435964
Initial Charge 1966	2.10293	35.8507	20.9391
Annual Charge 1966	331.748	-349.197	-628.499
Average Liquidity 1966-1975	.160811	-.017496	.426330
Variance Liquidity 1966-1975	.007102	-.047973	-.193925
Bid-Offer 1969	-.582825	-.252183	-1.14234
Growth 1966-1975	.207943	.087049	.307479
Constant	5.29194	4.64327	1.40047

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	25	14 20.6%	6 8.8%	3 4.4%	2 2.9%
Group 2	I	14	1 1.5%	9 13.2%	2 2.9%	2 2.9%
Group 3	C	7	0	1 1.5%	6 8.8%	0
Group 4	S	22	4 5.9%	3 4.4%	4 5.9%	11 16.2%

58.8 % of known cases correctly classified

Chi-Square = 41,490

TABLE 11.F (1)

DISCRIMINANT ANALYSIS 1966 - 1975

Unstandardized Discriminant Function Coefficients

	1	2	3
Return 1966-1975	2.41310	.464309	1.33223
Beta 1966-1975	1.74923	-6.16238	.418145
Annual Charge 1966	-191.961	-601.469	-1233.96
Average Liquidity 1966-1975	-.224871	-.111465	.145072
Bid-Offer 1969	.640291	.184873	-1.00762
Constant	-4.07064	6.34967	7.85782

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	25	19	1	2	3
			27.9%	1.5%	2.9%	4.4%
Group 2	I	14	4	8	0	2
			5.9%	11.8%		2.9%
Group 3	C	7	1	0	3	3
			1.5%		4.4%	4.4%
Group 4	S	22	8	2	2	10
			11.8%	2.9%	2.9%	14.7%

58.8 % of known cases correctly classified

Chi-Square = 41.490

TABLE 11.F (2)

DISCRIMINANT CLASSIFICATION BASED ON RETURN AND BETA 1966 - 1975

Unstandardized Discriminant Function Coefficients

	1	2
Return 1966-1975	1.88604	2.89318
Beta 1966-1975	5.48227	-4.11403
Constant	-5.43271	.425084

Actual Group Name	Code	N of Cases	Predicted Group Membership Group 1	Group 2	Group 3	Group 4
Group 1	G	25	22	0	0	3
			32.4%			4.4%
Group 2	I	14	10	2	0	2
			14.7%	2.9%		2.9%
Group 3	C	7	4	0	0	3
			5.9%			4.4%
Group 4	S	22	9	1	0	12
			13.2%	1.5%		17.6%

52.9 % of known cases correctly classified

Chi-Square = 28.314

TABLE 11.F (3)

case, the risk-return classification was sought. There was also a difficulty in finding a third variable to include on a-priori grounds.

The three solutions represent different possibilities in arriving at a classification of unit trusts according to type. Their similarity suggests an uniformity of predictive power which is common to the classification regardless of the manipulation of the data:

	Initial Solution	"Optimum" Solution	Beta & Return
	%	%	%
1966-1970	49.3	42.5	45.2
1971-1975	60.3	61.6	60.3
1966-1975	58.8	58.8	52.9

The table would suggest that, whatever criteria are used to classify the unit trusts, on average about fifty percent of the unit trusts in the analysis can be classified by external qualitative criterion. In this case the objectives used were General, Capital, Income and Specialized labels attached to individual trust portfolios. Obviously these given classifications are not the only ones available, but in setting classification objectives, they have the advantage of being externally attributed by the Unit Trust Yearbook, and to a lesser extent by the funds themselves.

In relation to LECLAIR (1974) who managed to obtain a 70 percent relationship between classification and the discriminant outcome, the results from this study are inferior. In the USA, however, the objectives used for mutual fund classification, at least in relation to risk, is well-established: see the MACDONALD (1974) article and FRIEND, BLUME & CROCKETT (1970), especially their table 3-16, page 100.

This is not as true for the UK as this classification test has demonstrated. At least, given the present method of classifying unit trusts, there is little relationship between the trust type and their beta risk (this is illustrated in the beta coefficients as shown by Figure 8.2 of Chapter Eight) so that the predictions of the discriminant analysis are not so disappointing.

However, the discriminant functions do give cause for concern when they fail to reveal more than 50 percent of the underlying classifications. It suggests there is little in the discriminant variables used which is significant in distinguishing the various categories of trust. Such common wisdom as the size of the trust, liquidity levels, growth in the trust and the level of trust charges, and less conventional measures such as the Bid-Offer spread and the variance in liquidity, do not adequately, even when used in a multi-variate context describe the unit trust portfolios.

There is a feeling that some additional variable is missing in the classification model. It may be that around half of the unit trusts do not belong to any discernible, qualitative label as crude as those chosen, and that they form a homogeneous mass which it is, indeed, irrelevant to disentangle, but it must be a disincentive to the potential investor not to be able to choose among the different, alternative unit trust portfolios.

11.3 Summary

This chapter set out to classify the trusts using a multi-variate technique for discriminant analysis. As a preliminary a factor-analytic test was carried out on the data set to determine whether any useful data reduction could achieved by using factor indices. There were three vectors of dimensionality which were seen as a "management factor", an "investor factor" and a "market effect factor" but they were not altogether stable. The results did not lead to the adoption of indices based on these factors due to their instability.

The discriminant analysis found that 50 percent of the trusts, using whatever combination of predictor variables, were correctly classified. This result is below equivalent US studies using the same techniques. The results indicate that many trusts do not conform to the qualitative labels by which they are described. This does not mean there may not be some additional criteria, not included in the discriminant functions, which would adequately classify the trust types.

Also no "hold-out" tests on further samples of trusts were made to test the validity and universaility of the discriminant coefficients. In order to be certain that the coefficients were correctly classifying the data, a further test would be necessary using data from trusts not part of the initial model, to ascertain whether the discriminant function correctly predicted their classification. As it is the test was a purely descriptive exercise in which it was hoped to establish whether some objectives-based criteria governed the selection of trust types. From the results it would appear this was not so.

It may be that while trust managements are willing to make use of the convenient labels of trust types, these categories do not reflect differences which can be detected using the available means and data set.

12.0 SOME IMPLICATIONS OF THE ANALYSIS

In Chapter One, two questions were posed concerning the characteristics and nature of institutional investors in the capital: first the question of market efficiency, and second, the question of performance of institutional portfolios.

Five criteria of investment management had to be taken into account: risk, timescale, income requirements, resources, and timing.

These criteria and results will be considered in the light of the actual findings from the previous four chapters. In Chapter Eight, the performance of unit trusts was measured against a market-wide proxy and performance benchmarks on both a risk-adjusted basis and in terms of relative performance. The results indicate that managers were on the whole unable to produce consistent above-average results, though there was some evidence that performance, both superior and inferior, tended to persist between the two sub-periods. As a whole the unit trusts had neutral performance statistics, while for the individual trust types there was some deviation from this pattern.

In Chapter Nine variables deemed to have an influence on performance were analysed. The conclusion reached was that most of the supposed effects on performance, if they do operate, are hardly significant enough by themselves to explain the great differences in outcome. The different performance results must be attributed to factors or variables which have escaped detection or to random outcomes. Some of the tests, which were based on proxies, point to the desirability of obtaining better and more detailed data, before arriving at a conclusion.

Chapter Ten examined the factors considered to be influential on trust performance in a multi-variate context. The model gave an optimum predictive result of 64.6 percent, but as with the univariate analyses, the individual factors were the same in significance. The one major difference being the increased importance of size as a negative factor on returns. It appeared that the model was attempting to capture dimensions of the data which did not correspond to the observed variables.

This was taken further in the first part of Chapter 11 where a factor analysis of the data set gave three dimensions for unit trusts: a management factor, an investor factor and a market effect factor. Unfortunately, the coefficients were not stable enough throughout the three factor runs to make the use of the factor indices in the discriminant analysis of trust types. This classification of unit trust type indicated that 50 percent of the trusts, using whatever combination of variables, were correctly classified. Many trusts do not conform to the qualitative labels which are generally attributed to them. It may, however, be that alternative variables may increase this discriminant power.

12.1 Unit Trust Performance

One of the most dramatic, and to the practitioner unbelievable, revolutions in the field of finance has been the development of the Efficient Market Theory. This model, as laid out in Chapter Two, postulates that there is no reward in seeking to "beat the market" because the price at which a transaction takes place already "fully reflects" the available information. The test of unit trust performance is a test of this hypothesis. If unit trust portfolios are capable of bettering the market's average-compounding-rate on a risk-adjusted basis, then the market is less than fully information efficient. It is held that the test is of the strong-form of the model: that the market is information-efficient for all information.

The evidence presented suggests that the trusts analysed were unable to better the benchmark portfolios in a significant way, even if there was a tendency to carry forward both goo and bad performance results.

One may question a number of the actions carried out by unit trusts in the belief that they can improve their performance.

12.1.1 Fund Turnover

Industry statistics were presented in Chapters Four and Five in which the unit trust and investment trust vehicles were compared to other investing institutions. One factor which distinguishes the unit trust portfolios from that of the other institutions is their predominant equity holdings. And yet, these equity holdings have been turned over at a very high rate throughout the period of analysis. If, as the results indicate, there is no advantage that was being gained by timing effects or the use of their resources in seeking out investment opportunites, above the costs associated with such policies; this high rate of fund turnover adds up to a hidden charge on the investor in such vehicles.

Not all turnover can be avoided if the trusts are to be fully invested and investors seek to redeem units, and there may thus be a conflict between the requirements of individual timescale and timing. However some investment and dis-investment must be prompted by performance considerations, which when analysed, does not seem to be paying off. One is examining what was, and not what might have happened had the unit trusts followed some mechanical rule throughout this period (such as a B&H

policy). It is conceivable that had they done so their performance scores would have been worse. Seen from an administrative point of view, the unit trusts were required to maintain a well-balanced and diversified portfolio.

12.1.2 Fund Liquidity

A part of the high turnover which characterizes the unit trust industry may be due to changes in the funds' liquidity levels. It seems that "going liquid" was both a means of anticipating turns in the market and also part of the managements' ethos as to their function. If this was a successful strategy as to their timing, then there should be a positive relationship between fund liquidity and performance.

It appears likely that the fund managements were unable to anticipate market turns, and thus failed to capitalize on rising markets to the benefit of the investor. There was no evidence of a timing effect, and this too is in accord with the Efficient Market Theory.

12.2 Fund Risk

There are two observations to be made concerning the results of the risk coefficient: beta.

1. the funds studied did not seem to present a complete choice of risk classes to the investor. There were no very high risk funds with beta beyond 1.5, or 2.0. This represents both a marketing opportunity missed, and a lack of choice for investors. Nor were there any very low risk funds, though gilt-edge unit trusts have since rectified this deficiency;

2. the funds showed a high degree of variability in their measured risk levels. Between the two five-year periods the funds became much less exposed to market variance through the simple mechanism of going liquid. While from the point of view of aiming to preserve the value of the units in the fund this seems to make sense, this makes the choice of funds based on some level of market exposure a difficult task.

Perhaps it is unjust to criticize fund managements for seeking to preserve the capital integrity of their funds by manipulating their market exposure, but individual investors when seeking to select a trust have to rely on current information and the past behaviour of the fund in making their decision.

12.3 Unit Trust Types

In analysing the different trust types it was found that they did not signify particular risk classes. Rather, the fund types express the way in which returns are to be generated: they reflect tax considerations and sector effects. Consequently, there is no great difference between the different trusts within a management group. The trusts were also homogeneous in their outlook, the discriminant analysis model correctly classified 50 percent, and there was little to differentiate them.

More specific details of the unit trust objectives could help in determining the different types of funds available, and the relative merits of individual funds within the categories. One possible indication is whether a fund will remain fully invested, or perhaps some indication of the risk attitude to be adopted. Because of the great changes in unit trusts over this period, there have even been suggestions that the old, fixed-investment type of trust be resurrected in order to force fund managers to follow fund objectives, but this seems a draconian type measure. If fund managements are convinced of the virtues of stability in setting objectives then they will ensure that trusts maintain stable and known objectives.

Thus, there is still room within the investment community for new types of funds: the very high risk equity portfolio is an example; there is room for a real Index fund (none of the funds available is a genuine index fund). There could be some very passive low cost funds to satisfy the long-term investor, and funds with a mixed gilt edge-equity portfolio for investors with a high income requirement.

12.4 General Conclusions

While it seems that the unit trust industry is not capable of beating the indices on a risk-adjusted basis consistently, that is not a reason to condemn the concept of a unit trust. The funds provide a genuine service to their unit holders in offering the opportunity of participating in investments which, due to cost and complexity, are unlikely to be open to the individual acting on his own.

There were six reasons offered for investing through the intermediation of an institution: investment advice, diversification, convenience, book-keeping, objectives and tax advantages. If we discount the fiscal benefits which are open in such schemes as life insurance cover and pensions, there are two broad reasons for investors:-

1. the "Administrative Function", as opposed

to the better appreciated,

2. "Performance Function". (See B. TAYLOR (1969)).

The value of the unit trust to the investor lies in the cheap form of managed portfolio which is both diversified and administered. The unit trust movement has taken over this role from the investment trust. Funds, as the evidence in this study indicate, are well-diversified and are mostly mini-reflections of the market as a whole. The specialized funds fall into a different category in that they cater to a specific investment objective: a market segment or overseas securities and behave in a somewhat different manner. There is scope for a greater range of unit trust types with clearer definitions as to their investment objective. This is an area which has not been fully exploited by industry in the past.

If investors seek specialized objectives, overseas securities or sector effects, then such funds can be useful, and the management function thus performed is a great benefit to the public. For a purely domestic equity portfolio, the General type of fund, or Income funds, seem adequate, and – given the results obtained – more likely to return an average performance.

If the benefits of tax planning are required and a Capital type fund is required, then a fund should be selected which mirrors the general or income type of fund. There is no advantage in buying into a fund which goes very liquid as many investors found to their regret in December 1974.

Unit trusts, then, are useful to the private individual seeking a diversified portfolio invested in equities, or equities and fixed interest, at low cost. The investor is unlikely to obtain better-than-average performance from the unit trust, what he will obtain is the advantages of a managed portfolio. In some circumstances he can invest through a unit trust in activities he would not be able to do as an individual.

The basic advantages offered are cheapness, flexibility and simplicity. These facts account for the popularity of the concept.

SUMMARY STATISTICS BASED ON TRUST GROUPS -1-

	General	Income	Capital	Special
Return 1966	-.039	-.042	-.018	-.034
	(.028)	(.038)	(.025)	(.051)
Return 1967	.264	.224	.344	.293
	(.066)	(.057)	(.061)	(.088)
Return 1968	.339	.315	.366	.324
	(.045)	(.084)	(.049)	(.091)
Return 1969	-.140	-.140	-.140	-.145
	(.038)	(.041)	(.037)	(.100)
Return 1970	-.043	.013	-.103	-.080
	(.054)	(.049)	(.074)	(.109)
Return 1971	.354	.428	.297	.298
	(.087)	(.067)	(.064)	(.177)
Return 1972	.193	.217	.195	.226
	(.077)	(.068)	(.075)	(.149)
Return 1973	-.309	-.258	-.313	-.286
	(.057)	(.058)	(.040)	(.131)
Return 1974	-.457	-.424	-.400	-.356
	(.102)	(.082)	(.154)	(.209)
Return 1975	.617	.695	.554	.403
	(.156)	(.140)	(.168)	(.224)
Return 1966-1975	.786	1.061	.780	.683
	(.217)	(.228)	(.225)	(.347)
Return 1966-1970	.414	.371	.440	.368
	(.103)	(.134)	(.117)	(.189)
Return 1971-1975	.398	.652	.332	.282
	(.161)	(.111)	(.160)	(.297)

Figures in brackets are the standard deviation of the sample. N varies with the years.

TABLE 11.A

SUMMARY STATISTICS BASED ON TRUST GROUPS -2-

	General	Income	Capital	Special
Alpha 1966-1975	-.002	.005	-.002	-.004
	(.005)	(.006)	(.005)	(.009)
Beta 1966-1975	.747	.739	.682	.655
	(.104)	(.111)	(.137)	(.198)
Alpha 1966-1970	-.004	-.003	-.002	-.006
	(.005)	(.009)	(.006)	(.009)
Beta 1966-1970	.913	.824	1.024	.955
	(.096)	(.159)	(.095)	(.174)
Alpha 1971-1975	-.000	.012	-.004	-.005
	(.008)	(.006)	(.008)	(.014)
Beta 1971-1975	.698	.714	.609	.542
	(.128)	(.128)	(.156)	(.220)
MTTARET	.677	.830	.844	.480
	(.225)	(.236)	(.376)	(.420)
MT Beta 1966-1975	.712	.709	.704	.592
	(.103)	(.111)	(.152)	(.183)
RFR 1966-1975	.055	.330	.049	-.048
	(.217)	(.228)	(.225)	(.347)
RVOL 1966-1975	.063	.452	.060	-.071
	(.307)	(.349)	(.304)	(.750)
Delta 1966-1975	-.068	.209	-.062	-.155
	(.213)	(.229)	(.218)	(.348)
RFR 1966-1970	.087	.044	.122	.041
	(.103)	(.134)	(.117)	(.189)
RVOL 1966-1970	.091	.007	.115	.017
	(.106)	(.308)	(.105)	(.304)
Delta 1966-1970	-.067	-.092	-.047	-.116
	(.102)	(.121)	(.110)	(.186)

TABLE 11.A

SUMMARY STATISTICS BASED ON TRUST GROUPS -3-

	General	Income	Capital	Special
RFR 1971-1975	-.006	.248	-.072	-.122
	(.161)	(.111)	(.160)	(.297)
RVOL 1971-1975	-.033	.350	-.124	-.273
	(.270)	(.161)	(.270)	(.811)
Delta 1971-1975	-.006	.248	-.072	-.121
	(.161)	(.111)	(.160)	(.297)
Bid-Offer	4.818	4.950	4.550	5.305
	(.740)	(1.022)	(1.340)	(.677)
Average Liquidity 1966-1975	5.717	5.517	6.417	7.705
Variance Liquidity 1966-1975	6.695	4.723	8.321	8.817
Average Liquidity 1966-1970	3.956	4.347	3.152	4.859
Average Liquidity 1971-1975	7.976	6.713	9.405	11.362
Growth 1966-1975	.723	.895	1.143	.817
	(.888)	(.698)	(1.171)	(.945)
Growth 1966-1970	.427	.797	1.263	.507
	(.812)	(.591)	(1.189)	(.666)
Growth 1971-1975	.265	.173	-.120	.194
	(.466)	(.465)	(.409)	(.557)
Sample Number	47	20	14	37

Figures in brackets are the standard deviation of the sample. N varies in the statistics.

TABLE 11.A

APPENDIX A

A.1 Calculation of Rates of Return

The rate of return on an asset, or portfolio, is the terminal value plus dividends minus the initial value expressed as a fraction of the initial value.

$$r_t = \frac{(P_t + D_t) - P_{t-1}}{P_{t-1}} \qquad (A.1)$$

An alternative way of arriving at the same result is to use the "price relative" or wealth ratio.

$$r_t = \frac{(P_t + D_t)}{P_{t-1}} - 1 \qquad (A.2)$$

Over a multi-period analysis the rate of return is the sum of the geomteric series of individual period returns.

$$1 + r_n = \prod_{t=1}^{n} \frac{(P_t + D_t)}{P_{t-1}} \qquad (A.3)$$

$$= \prod_{t=1}^{n} (1 + r_t)$$

The n^{th} root of the equation (A.3) gives the geometric mean rate of return which is the correct way of estimating average return. A simple example taken from LORIE & HAMILTON (1973) will illustrate this. Suppose an initial investment of £100 was made and that after 1 year it was worth £200, but at the end of the second year it had fallen back to £100. Obviously the true rate of return is zero, but by taking the average arithmetic return would give the erroneous figure of 25%, the mean of +100% and -50%. The geometric mean would be,-

$$(2.0 * 0.5)^{\frac{1}{2}} - 1 = 0$$

The total rate of return in equation (A.3) is the rate of return required to obtain the terminal wealth ratio of a particular investment over the n periods. The terminal wealth ratio (TWR) is the terminal value of the investment divided by its initial value,

$$\frac{W_n}{W_o} = \prod_{t=1}^{n} (1 + r_t) \qquad (A.4)$$

In computing this return it is better to use the natural logarythms of the rates of return since this is the continuously compounded return,

$$R_t = \log_e (1 + r_t) \qquad (A.5)$$

Therefore,

$$R_n = \sum_{t=1}^{n} R_t = \prod_{t=1}^{n} (1 + r_t) \qquad (A.6)$$

$$= \log_e \frac{W_n}{W_o}$$

The mean return of the natural logarythms of a series of n period returns will be its arithmetic average, which is equal to the geometric mean,-

$$\bar{R}_t = \frac{1}{n} \sum_{t=1}^{n} R_t = \sqrt[n]{\prod_{t=1}^{n} (1 + r_t)}$$

It should be noted that the logarythmic form of return is not the only valid one. For small changes the use of percentages is equally valid. However, computers work best with logarythms.

The fund rates of return are calculated by-

$$\tilde{R}_{j,t} = \log_e(\tilde{P}_{j,t} + \tilde{D}_{j,t}) - \log_e(\tilde{P}_{j,t-1})$$

where $\tilde{R}_{j,t}$ is the continuously compounded rate of return in the $t-1$ to t interval, $t = 1,2,\ldots,41$.

The riskless rate of return is calculated by-

$$\tilde{R}_{f,t} = \frac{1}{4}\log_e(1 + \tilde{r}_{T,t-1})$$

where $\tilde{r}_{T,t-1}$ is the annual yield on a Treasury Bill at the start of $t-1$.

The market rate of return is calculated by-

$$\tilde{R}_{M,t} = \log_e(\tilde{I}_t + \tilde{D}_t) - \log_e(\tilde{I}_{t-1})$$

where the dividends on the market are the estimated quarterly rates based on the annual yields in the FT All Share classification. The Index does not publish dividends, the use of the estimated quarterly dividend yield is a close approximation designed not to bias the fund rates of return against those of the market.

A.2 Dispersion of Returns

The usual form of dispersion of returns is the variance, or the square root of the variance, the standard deviation-

$$VAR = \frac{1}{n-1} \sum_{t=1}^{n} (R_t - \bar{R}_t)^2 \qquad (A.7)$$

$$\sigma_j = \sqrt[2]{\sigma_j^2}$$

These two related measures have been adopted for computational and conceptual ease of manipulation. They are not the only measures that can be used, and if the distribution of returns follows a Stable Paretian distribution as hypothised in Chapter 3, it is incorrect to use them, the interquartile range being the correct measure. In the study of the variability of returns FISHER & LORIE (1970) use the following measures of variability, minimum, maximum, standard deviation, mean deviation, Gini's mean difference, the coefficient of variation, relative mean deviation, and the coefficient of concentration plus skewness and kurtosis.

A.3 Interdependence of Returns

Interdependence is measured by the covariance between the two sets of returns on any investment j and k, -

$$COV(\tilde{R}_j, \tilde{R}_k) = \frac{1}{n-1} \sum_{t=1}^{n} (\tilde{R}_{j,t} - \bar{R}_j)(\tilde{R}_{k,t} - \bar{R}_k) \qquad (A.8)$$

Note that the $COV(\tilde{R}_j, \tilde{R}_j)$ equals the variance of j.

To normalise the deviation the correlation coefficient is used. This is probably a more understandable measure of relation,-

$$r_{\tilde{R}_j, \tilde{R}_k} = \frac{COV(\tilde{R}_j, \tilde{R}_k)}{\sigma_j \sigma_k}$$

The square of the correlation coefficient, the coefficient of determination gives the percentage of interaction between the variables j and k.

A.4 Portfolio Returns

The return on a portfolio over any period t is the fraction weighted returns of the portfolio's component securities, 1,2,....,m.

$$\tilde{R}_{p,t} = \sum_{f=1}^{m} f_1\tilde{R}_{1,t} + f_2\tilde{R}_{2,t} + \ldots + f_m\tilde{R}_{m,t} \qquad (A.9)$$

$$\sum_{f=1}^{m} = 1.0$$

A.5 Portfolio Dispersion

In the two asset case the dispersion is

$$\sigma_p^2 = f_1^2\sigma_j^2 + f_2^2\sigma_k^2 + 2f_1f_2(COV(\tilde{R}_j, \tilde{R}_k)$$

which demonstrates why the appropriate measure of interdependence between any two assets is their covariance. In practice a more immediate intuitive model using the correlation coefficient could be used,

$$\ldots\ldots\ldots\ldots\ldots\ldots + 2f_1f_2r_{\tilde{R}_j,\tilde{R}_k}\sigma_j\sigma_k$$

In the m security case,

$$\sigma_p^2 = (f_1\ f_2\ \ldots\ f_m)\begin{bmatrix} \sigma_1^2 & \sigma_{1,2} & \cdots & \sigma_{1,m} \\ \vdots & & & \vdots \\ \sigma_{m,1} & \sigma_{m,2} & \cdots & \sigma_m^2 \end{bmatrix}\begin{pmatrix} f_1 \\ f_2 \\ \vdots \\ f_m \end{pmatrix}$$

A.6 Unit Accounting

The method used by unit trusts to value units means that their unit values are independent of the inflows and ouflows of the trust.

	Beginning of Month		End of Month		
Month	Number of Units	Portfolio Value £	Value of Units £	Additional Units/ Redemptions	New Money £
	(1)	(2)	(3=2÷1)	(4)	(5=3*4)
1	100	1000	10		
3	100	1300	13	20	260
3	120	1560	13		
7	120	1320	11	(40)	
7	80	880	11		

A.7 Systematic Risk/Beta

This is the measure of risk which is rewarded by additional expected return for risk-bearing. It is that proportion of risk which is due to covariance with the overall market portfolio of assets. It is the normalized covariance of the asset or portfolio against the market portfolio-

$$\beta = \frac{COV(\tilde{R}_j, \tilde{R}_M)}{VAR(\tilde{R}_M)} \qquad (A.10)$$

If the asset is perfectly diversified, as a portfolio should be, then beta is a perfect description of the market exposure of a portfolio--a beta of unity, 1.0 means the portfolio moves exactly in line with the market, a beta of 2.0 means the portfolio will rise, and fall, twice as fast as the market, a portfolio with zero beta will not move with the market at all. While a portfolio with a negative beta would move against the market.

The value of beta as a measure depends upon the correlation coefficient between the portfolio and the market, the closer the correlation is to unity, the better the relationship. In perfectly diversified portfolios this relationship will be unity, in less well diversified portfolios, it will be below one. In such cases there will be a measure of residual, or diversifiable risk.

APPENDIX B

BID-OFFER SPREAD

The difference between the price at which unit trust units are issued and redeemed is an important factor in investment in unit trusts. The DoT authorized difference is 13.5% but the actual spread is usually somewhat lower. It has the following significance.

1)- It is controlled. There is competition between the management groups to maintain a low spread. Trusts within a management group tend to have similar spreads as a result of management policy.

2)- The spread is potential porfit to trust managements. Since they act as market makers in their own securities they can match issues of new units to redemptions without changing the underlying portfolio, thus the charge for new units accrues to them, rather than on transactions costs in creating new units.

3)- The sudden increase in the bid-offer spread can indicate that a trust is in difficulties. This is usually a sudden and unforseen large number of redemptions, but other, unknown factors may be at work.*

4)- The spread is a cost of disinvesting for the unit holder.

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* Told to the author by the general manager of one of the management groups used in this study.

The behaviour of the bid-offer spread over the last ten years, 1965-1975, indicates the following- first, it has tended to increase in recent years, and second, there is a tendency for the spread to widen in a declining market.

In the following tables the spread is based on the last day's trading in December of the year in question.

BID-OFFER STATISTICS (1969)

mean	=	4.973			
stan. dev.	=	.9	min = 2.1		max = 7.6

THE FREQUENCY DISTRIBUTION OF BID-OFFER SPREAD AT 1969, AS A PERCENTAGE OF THE OFFER PRICE

VALUE Lowest percentage	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
2.10	1	0.8	0.9	0.9
2.20	1	0.8	0.9	1.8
2.70	1	0.8	0.9	2.8
2.80	2	1.7	1.8	4.6
2.90	1	0.8	0.9	5.5
3.30	1	0.8	0.9	6.4
3.50	1	0.8	0.9	7.3
3.60	3	2.5	2.8	10.1
3.70	2	1.7	1.8	11.9
3.80	1	0.8	0.9	12.8
4.00	1	0.8	0.9	13.8
4.10	1	0.8	0.9	14.7
4.20	3	2.5	2.8	17.4
4.30	2	1.7	1.8	19.3
4.40	4	3.4	3.7	22.9
4.50	2	1.7	1.8	24.8
4.60	1	0.8	0.9	25.7
4.70	1	0.8	0.9	26.6
4.80	3	2.5	2.8	29.4

BID-OFFER SPREAD (1)

As % of Offer Price -- December of Year

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Change on FT Actuaries Index[1]			+6.7	+9.7	+9.96	+9.3	+2.5	+9.7	+12.3	-14.5	-2.9	+14.2
ALLIED												
1	G	4.8	4.7	5.2	4.5	5.2	6.1	5.0	5.6	5.2	6.2	6.4
2	G	4.7	5.1	4.5	4.8	5.3	5.9	5.2	5.6	5.2	6.1	6.4
3	G	5.0	5.4	5.0	4.5	5.3	7.9	5.9	5.6	5.0	6.0	6.2
4	G	4.8	5.3	4.9	4.5	5.4	6.0	5.2	5.5	5.1	6.1	3.6
5	G	4.0	4.4	3.4	4.2	5.7	6.9	5.5	5.7	5.2	6.5	6.3
6	I	4.6	5.0	5.4	4.9	5.5	6.0	5.0	5.5	5.2	6.3	6.4
7	S	4.8	5.4	5.2	4.6	5.4	6.5	6.4	5.5	4.9	6.3	6.5
ARBUTHNOT												
8	G	5.0	5.5	5.9	4.2	5.6	6.0	4.5	6.2	9.1	8.8	7.1
9	C	4.9	5.4	5.7	4.5	5.1	6.4	6.0	6.7	9.7	9.3	7.0
10	I	4.8	5.6	6.6	5.1	6.3	6.3	5.5	6.4	8.9	10.4	6.9
BARBICAN												
11	G	2.9	3.2	3.9	4.3	4.2	4.4	4.2	4.6	4.7	7.4	6.1
BRITISH LIFE												
12	G	5.6	4.6	4.3	4.1	4.2	4.5	3.5	3.9	4.0	3.9	4.2
CRESCENT												
13	I	4.6	5.4	4.4	4.0	4.9	4.3	4.9	4.9	4.9	6.8	6.7
14	G	4.7	5.4	4.7	3.9	4.3	4.4	4.8	4.9	4.9	7.0	7.6
DISCRETIONARY												
15	G	2.1	2.4	3.4	3.0	3.6	3.6	4.0	4.0	4.0	5.8	5.7
GOVETT												
16	G	5.6	5.4	5.9	5.8	5.8	9.6	3.7	4.0	4.1	5.0	5.0

BID-OFFER SPREAD (2)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
HENDERSON												
17	C	4.7	5.0	3.7	4.6	4.9	5.8	7.5	7.6	8.9	6.1	5.9
18	I	5.0	5.6	4.7	5.1	5.1	5.7	4.9	5.0	4.9	6.4	6.5
19	G	5.2	5.5	4.5	4.8	5.1	4.9	6.0	5.8	5.7	6.4	5.9
20	S	6.1	6.3	4.9	4.8	4.8	4.6	5.6	5.6	5.6	6.2	5.9
HILL SAMUEL												
21	G	4.5	4.7	4.6	4.6	4.5	4.7	5.0	5.0	5.5	6.6	6.5
22	C	1.6	2.0	2.0	2.1	2.2	4.7	4.7	4.6	5.9	6.5	6.8
23	I	2.0	2.4	2.3	2.2	2.1	4.5	4.5	4.5	5.6	6.9	6.8
24	S	4.7	5.1	4.6	4.6	4.5	4.6	5.0	5.0	5.6	6.9	6.6
25	G	6.5	4.9	4.1	5.1	4.8	5.1	5.2	5.2	5.6	6.9	6.7
INTEL												
26	G	5.2	5.4	4.8	4.9	4.4	4.4	4.9	5.1	5.0	7.1	7.0
LAWSON												
27	S	5.2	6.3	5.6	5.6	7.6	7.2	6.5	6.7	6.5	9.2	9.5
LONDON WALL												
28	G	5.2	5.1	5.2	4.8	5.5	5.5	5.6	5.6	5.6	6.5	6.5
29	S	5.4	5.0	4.8	4.9	5.2	5.7	6.1	6.3	6.1	7.4	6.4
30	I	5.3	5.1	5.1	4.9	5.6	6.0	5.5	5.6	5.5	6.3	6.5
M & G												
31	I	4.3	4.3	3.8	3.8	4.0	3.7	3.8	4.8	4.8	5.2	5.7
32	G	4.2	4.2	3.8	3.9	3.8	3.8	3.8	5.7	4.8	5.2	5.7
33	G	4.3	4.4	3.9	3.9	3.7	3.8	3.7	3.8	4.8	5.2	5.6
34	G	4.4	4.4	4.0	3.8	3.7	3.9	3.9	3.9	4.7	5.2	5.7
35	G	3.2	3.1	3.0	3.1	2.9	3.8	3.9	3.9	4.8	4.7	5.2

BID-OFFER SPREAD (3)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
MUTUAL												
36	I	6.0	4.8	6.0	4.7	5.6	5.6	4.1	4.6	5.3	6.8	5.5
37	G	6.0	4.0	5.4	4.7	5.7	5.9	4.6	4.7	2.1	8.8	6.0
OCEANIC												
38	S	5.7	5.4	6.2	5.4	5.9	4.0	5.7	6.1	6.8	5.5	5.6
39	G	6.0	5.8	6.1	4.7	5.7	4.9	5.6	5.6	7.4	5.9	6.0
40	I	5.1	5.5	5.3	5.7	5.3	4.8	5.6	5.6	7.1	5.8	5.7
41	S	5.0	5.7	5.9	6.0	5.4	5.1	5.6	6.0	8.0	5.7	5.3
42	S	5.8	5.6	4.1	5.8	5.5	4.6	5.8	5.7	7.6	6.1	5.6
43	S	5.7	5.4	5.9	6.0	6.3	4.7	5.8	5.8	7.5	5.9	5.9
44	S	5.5	5.0	5.5	6.2	5.4	5.6	6.2	6.1	8.4	5.8	5.5
PRACTICAL												
45	S	6.1	6.0	6.1	5.1	5.0	5.0	5.2	5.1	7.7	10.1	7.2
S & P												
46	C	5.1	5.2	5.0	5.1	5.2	5.4	5.5	5.5	5.4	6.6	6.5
47	S	5.2	5.4	5.0	5.0	5.1	4.9	5.5	5.5	5.3	6.7	6.6
48	G	4.9	5.5	4.8	4.9	5.0	5.8	5.7	5.7	5.7	6.6	6.6
49	S	5.1	4.9	5.1	5.2	5.4	5.3	5.5	5.4	5.8	6.4	6.7
50	C	5.3	5.1	5.4	5.2	5.4	6.3	6.8	5.6	5.6	7.1	6.7
51	S	5.5	5.4	5.0	5.2	5.4	5.1	6.7	5.5	5.4	6.3	6.6
52	I	5.2	4.8	5.1	5.1	4.8	5.3	5.5	5.5	5.4	6.5	6.6
53	I	5.3	4.3	4.9	5.0	5.0	5.4	5.5	5.6	5.5	6.3	6.6
54	I	5.2	5.0	5.0	5.2	5.3	5.8	5.6	5.7	5.7	7.0	6.6
55	S	5.4	5.4	5.2	5.2	5.4	4.7	5.6	5.5	5.5	7.0	6.7
56	S	5.2	5.2	5.3	5.1	5.3	5.2	6.9	5.5	5.4	6.3	6.6
57	S	5.1	4.4	5.1	5.2	3.6	5.7	5.4	5.5	5.4	6.7	6.7
58	S	5.3	5.2	4.8	4.3	5.1	5.2	5.4	5.5	5.3	6.5	6.6
59	I	5.0	5.2	4.6	3.9	5.1	3.1	5.4	5.6	5.4	6.5	6.7

BID-OFFER SPREAD (4)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
SLATER, WALKER												
60	S	4.8	5.7	5.3	4.1	4.9	5.9	4.5	3.8	5.2	6.4	7.1
61	G	5.8	6.7	5.9	4.8	5.8	6.5	6.5	6.5	6.5	5.0	6.8
62	C	4.6	4.9	3.7	2.7	3.3	3.6	2.8	3.1	5.0	7.6	7.0
63	S	4.5	4.9	5.4	3.5	4.4	5.9	6.0	6.0	4.6	4.7	6.9
64	C	5.1	5.1	5.0	2.9	5.2	5.2	3.8	3.7	4.9	7.0	7.0
65	C	-	-	-	-	5.2	5.1	5.4	4.3	5.5	7.6	7.1
66	G	4.7	5.7	5.6	4.1	4.9	5.9	4.1	5.2	7.8	7.2	7.1
67	S	5.4	6.0	5.3	5.4	5.6	5.6	6.1	6.0	6.5	4.7	6.9
68	S	4.5	5.0	5.6	4.5	5.1	6.3	6.1	6.5	6.1	3.1	7.5
69	C	4.9	5.2	4.1	2.9	3.6	3.8	2.9	2.9	4.1	6.6	7.1
70	I	4.5	6.8	6.0	4.8	5.7	6.0	6.0	6.0	6.5	4.7	6.9
71	S	6.9	7.4	6.0	5.3	5.2	7.5	5.7	5.3	6.6	7.1	6.6
72	G	5.3	5.7	5.1	5.1	5.0	5.3	3.9	3.5	6.0	9.4	7.3
73	G	5.3	5.2	5.0	3.7	4.6	4.9	3.4	3.5	5.1	8.3	7.2
74	I	4.8	5.1	4.7	3.5	4.1	5.9	4.4	3.5	4.4	6.8	7.0
75	S	6.0	4.7	5.8	4.9	6.6	6.5	5.7	6.0	6.1	5.0	6.4
76	C	-	-	-	5.6	6.5	6.9	5.2	4.1	5.2	7.3	5.0
77	G	5.0	5.7	5.8	4.4	5.3	5.7	4.4	3.7	4.8	8.7	7.1
78	G	4.9	5.7	5.1	3.8	4.7	5.3	4.1	3.8	5.3	8.2	7.0
79	G	4.8	5.8	4.8	3.8	4.4	5.8	4.5	3.4	4.5	6.7	7.2
80	G	4.8	5.7	4.3	4.5	5.0	4.3	5.1	4.4	5.4	6.2	7.2
81	C	6.6	6.4	6.6	5.3	6.0	6.3	4.8	4.0	6.1	7.1	7.0
82	C	4.2	4.5	3.4	2.4	2.8	6.1	5.0	4.3	5.2	5.6	7.0
TARGET												
83	S	5.0	5.9	4.6	4.9	4.3	6.2	5.5	5.5	5.7	6.2	6.4
84	G	5.0	5.7	4.5	4.2	4.2	5.3	5.5	5.6	5.6	6.6	6.5
85	S	5.4	5.1	5.2	4.5	4.4	4.5	5.6	5.6	5.7	6.3	7.0
86	C	5.2	5.7	4.6	4.6	5.5	5.8	6.0	6.1	5.8	6.4	6.3
87	I	4.8	5.2	4.3	3.6	5.6	6.9	5.7	5.4	6.8	6.1	7.0
88	S	5.0	5.4	-	3.8	5.7	5.1	5.8	5.5	6.8	7.9	7.1

BID-OFFER SPREAD (5)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
TYNDALL												
89	C	3.0	2.9	2.8	2.8	2.8	3.0	2.9	2.9	3.0	4.9	4.9
90	I	3.0	2.9	2.8	2.8	2.7	3.3	2.9	3.0	3.1	5.1	4.9
ULSTER BANK												
91	G	-	-	-	4.6	5.2	7.3	6.0	5.3	7.3	8.2	8.0
UNICORN												
92	S	4.9	5.3	4.6	4.7	5.1	5.3	6.5	6.5	6.6	7.4	7.9
93	G	5.5	5.9	4.4	3.8	5.3	5.8	5.5	5.5	5.6	6.5	6.5
94	G	4.6	4.9	5.3	4.4	5.5	5.8	5.5	5.5	5.6	6.3	7.6
95	I	4.7	5.3	4.3	3.8	5.3	6.0	5.5	4.9	4.9	3.1	6.1
96	G	4.1	4.5	3.9	3.8	5.4	5.9	5.5	5.0	5.0	5.9	6.0
TRUSTS WHICH MERGE OR TERMINATE												
97		5.5	5.9	5.5	4.7	5.5	/	/	/	/	/	/
98		5.6	5.9	5.5	6.9	6.2	5.7	/	/	/	/	/
99		6.3	6.9	6.9	5.0	5.6	/	/	/	/	/	/
100		4.9	5.6	6.3	5.7	/	/	/	/	/	/	/
101		5.0	5.7	7.4	/	/	/	/	/	/	/	/
102		5.1	7.1	6.3	5.8	5.4	/	/	/	/	/	/
103		5.6	6.1	5.1	4.9	4.9	5.9	7.0	/	/	/	/
104		6.0	6.5	5.6	/	/	/	/	/	/	/	/
105		4.7	5.2	4.7	5.5	5.4	5.5	5.5	/	/	/	/
106		4.9	5.8	4.8	5.0	5.4	5.4	/	/	/	/	/
107		5.6	6.1	5.4	/	/	/	/	/	/	/	/
108		5.8	6.6	5.8	/	/	/	/	/	/	/	/
109		5.7	6.5	5.7	/	/	/	/	/	/	/	/
110		6.4	6.3	5.3	/	/	/	/	/	/	/	/

BID-OFFER SPREAD (6)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
TRUSTS WHICH EITHER MERGE OR TERMINATE												
111	S*	5.3	5.1	5.3	5.2	5.2	5.2 @	/	/	/	/	/
112	S*	5.1	5.4	5.3	5.1	5.3	7.0	5.6	5.6	5.4	6.6	6.5
113	S*	5.2	5.0	5.0	5.3	5.4	-	/	/	/	/	/
114	S*	5.1	5.4	5.4	5.3	5.3	-	/	/	/	/	/
115		5.2	5.1	4.0	2.3	3.5	4.0	3.2	3.1	4.3	/	/
116		5.9	7.1	5.6	5.3	5.0	5.4	6.1	7.0	/	/	/
117		4.9	5.3	4.5	/	/	/	/	/	/	/	/
118		5.6	5.2	4.3	/	/	/	/	/	/	/	/

NOTES

Trust Type
- G - General
- C - Growth
- I - Income
- S - Specialized
- * - Infered Category From Trust Name

1 - Percentage change on FT Actuaries Index over the previous quarter.
- - Indicates bid-offer spread quotation not available.
/ - Indicates the price series has been discontinued
@ - The price series for trusts 111, 112, 113 and 114 were continued in the S&P Financial Trust

Bid-Offer Spread: ((Offer price - Bid price)/(Offer price))x 100 %

APPENDIX C.

TRUST LIQUIDITY

Trust liquidity is an assessment of the percentage of unit trust funds held in current assets. These current assets are a mixture of bank deposits, sterling certificates of deposit, Treasury Bills and other interest bearing short-term accounts. These funds are liquid and realisable at short notice and therefore are cash equivalents. They also represent that part of a unit trust's portfolio in riskless assets, or held in the zero-covariance portfolio of the generalized CAPM.

At a behavioural level, funds may "go liquid" if they are uncertain about the future course of the market. The attempts to gauge market turns is one of the principal means employed by fund managers to generate above-average returns. By selling out at the top of the market and holding value-safe assets during bear conditions and then re-investing at the bottom, in theory trust managements can do much to increase their rate of return. This policy of market-movement investment is in contrast to US mutual funds where such funds remain in the market, but shift their holdings between aggressive and defensive stocks.

Evidence presented in the chapters on performance indicates a negative relationship between the performance scores and liquidity. However, there was no direct test carried out to determine whether trusts were able to anticipate market turns and invest accordingly. The major problem was to devise a test suitable to testing this assumption. The variance in liquidity, used as a proxy for this behaviour, indicated a negative outcome between variations in liquidity levels and performance.

In the following table, the type of data reported is divided into two sorts, based on the information provided: the percentages marked by an asterix indicate that the trust reported holding fixed-interest stocks and loans along with the cash element, the others merely indicated that cash made up the percentage of assets. In practice it would seem that the two sorts of data described the same part of the trusts' portfolios: liquid assets held in short term instruments and transactional balances.

As the data is extracted from the unit trusts' annual accounts it is not all sampled at the same time, but for each unit trust the time interval between observations of the liquidity levels will be a year.

As an illustration of fund attitudes to liquidity levels, in Figure C.1 three trusts were selected to give an impression of the differing types of behaviour that have been followed. There is considerable differences between the funds, drawn from three seperate management groups, concerning liquidity behaviour. Trust nine goes from a position of zero liquidity to over 50 percent in one year.

TRUST LIQUIDITY -- STATISTICS

	Average Liquidity 1966-1975 %	Variance in Average Liquidity 1966-1975 %	Average Liquidity 1966-1970 %	Average Liquidity 1971-1975 %
Mean Average Liquidity	6.393	7.211	4.193	9.839
Standard Error	.371		.409	1.072
Standard Deviation	3.762		4.236	10.562
Variance	14.153		17.940	111.549
Minimum	0.530	0.570	0.070	0.050
Maximum	19.6	24.59	18.66	100.0
Range	19.07	24.020	18.59	99.5

TABLE C.1

LIQUIDITY BEHAVIOUR OF THREE SELECTED UNIT TRUSTS 1966 - 1975

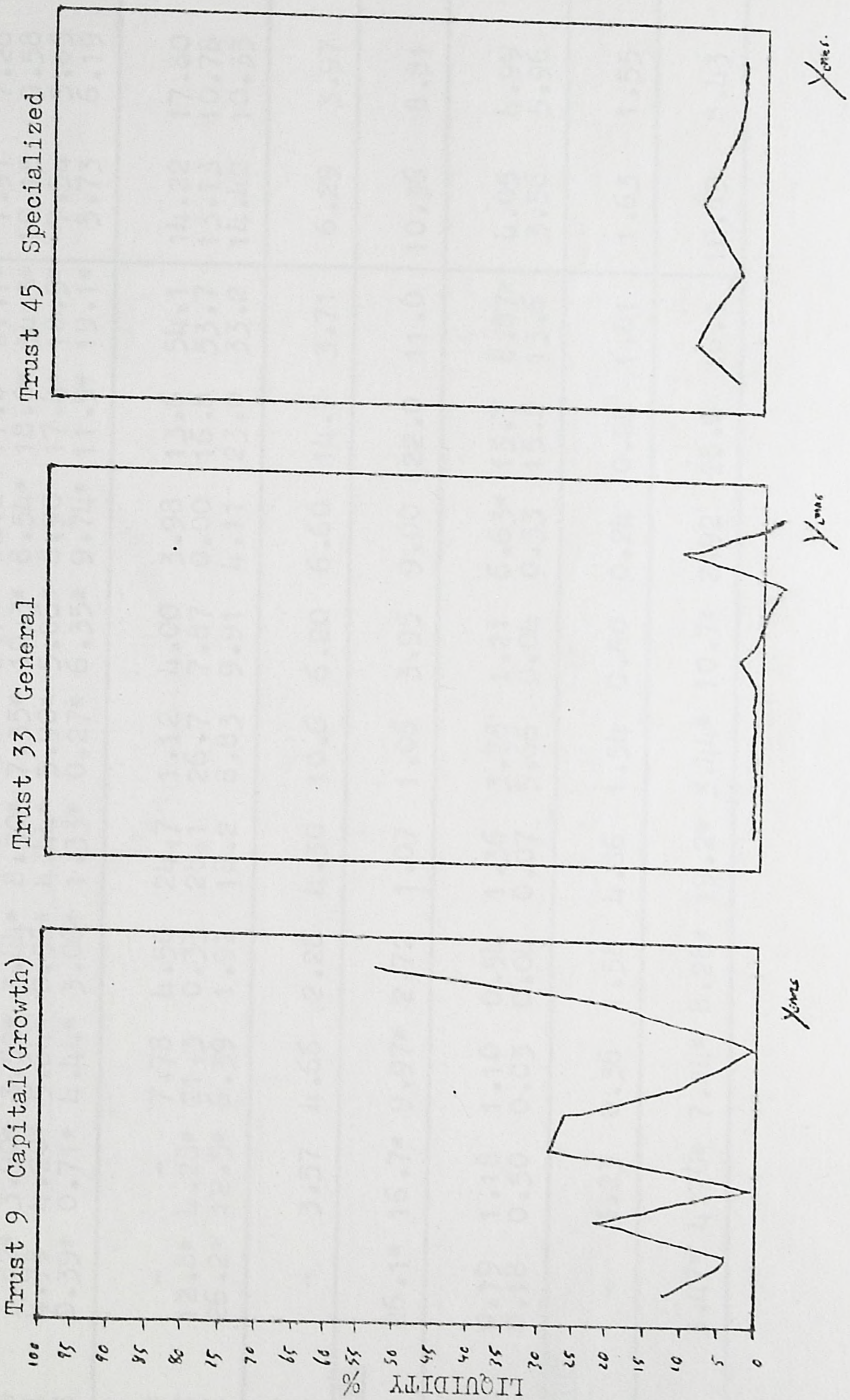


FIGURE C.1

LIQUIDITY PERCENTAGES 1965 - 1974

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
ALLIED														
1	G	1.43*	0.75*	1.53*	2.04*	5.64*	5.92*	12.8*	9.82*	14.9*	30.5*	8.53	9.20	1.078
2	G	1.22*	3.03*	2.00*	2.01*	8.84*	6.11*	6.82*	11.2*	18.0*	18.1*	10.45	9.26	.886
3	G	2.83*	0.49*	1.16*	0.94*	3.87*	4.99*	4.63*	11.2*	18.7*	28.6*	7.74	9.22	1.191
4	G	1.27*	1.91*	2.02*	0.91*	8.06*	7.50*	5.76*	12.2*	17.8*	21.7*	7.91	7.26	.918
5	G	3.82*	3.90*	3.52*	3.44*	8.30*	7.35*	10.3*	8.54*	18.0*	34.3*	10.15	9.58	.944
6	I	4.78	4.20*	5.64*	0.56*	4.44*	5.90*	5.06*	8.90	17.4*	18.5*	7.54	5.85	.777
7	S	0.39*	0.71*	4.44*	3.06*	1.33*	0.27*	6.35*	9.74*	11.9*	19.1*	5.73	6.19	1.080
ARBUTHNOT														
8	G	-	-	7.78	4.50	24.7	1.12	4.00	3.98	13.6	54.1	14.22	17.80	1.252
9	C	12.8*	4.28*	21.3	0.33	28.1	26.7	7.87	0.00	16.8	53.7	13.13	10.78	.8213
10	I	26.2*	12.5*	6.39	1.92	18.2	8.83	9.91	4.11	23.0	33.2	14.42	10.33	.717
BARBICAN														
11	G	-	3.57	4.66	2.28	4.30	10.6	6.20	6.60	14.7	3.71	6.29	3.97	.630
BRITISH LIFE														
12	G	26.1*	16.7*	9.97*	2.72	1.07	1.06	3.95	9.00	22.0	11.0	10.36	8.81	.851
CRESCENT														
13	I	0.19	1.18	1.10	0.54	1.36	3.78	1.21	6.63*	15.7	8.87*	4.05	4.99	1.232
14	G	0.18	0.50	0.03	0.04	0.07	5.66	0.04	0.33	15.2	13.6	3.56	5.96	1.675
DISCRETIONARY														
15	G	-	3.23	0.36	1.58	4.86	1.54	0.80	0.24	0.24	1.81	1.63	1.55	.951
GOVETT														
16	G	3.47*	4.70*	7.44*	8.28*	19.2*	3.44*	10.7*	2.92	28.6	16.1	10.49	8.43	.804

LIQUIDITY PERCENTAGES 1965 - 1974 (2)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
HENDERSON														
17	C	3.75	5.46	10.3	5.44	0.51	16.0	19.3	29.8	58.5	1.98	15.10	17.77	1.176
18	I	-	5.60	2.15	8.75	11.6	-1.1	4.70	0.20	17.9	6.02	6.20	5.92	.956
19	G	0.00	0.00	0.00	0.00	9.20	2.70	17.3	32.0	43.3	5.36	10.98	15.31	1.394
20	S	6.22	7.71	1.13	3.02	-.36	-4.1	8.40	29.2	47.9	2.21	10.13	16.05	1.586
HILL SAMUEL														
21	G	1.93	5.71	0.5	2.31	3.9	0.11	0.07	0.26	5.57	2.55	2.29	2.17	.946
22	C	0.66	0.52	0.21	0.2	0.55	2.93	2.47	4.87	20.4	2.19	3.50	6.13	1.750
23	I	1.35	1.46	3.39	4.14	1.68*	0.76	0.22	0.39	4.09	1.21	1.87	1.47	.787
24	S	0.29	2.23	1.15	0.05	6.86*	6.01*	4.26*	20.8*	32.7*	41.5*	11.59	14.88	1.284
25	G	3.35	7.27	13.6	1.7	8.1	5.7	1.33	1.24	29.1	8.39	7.98	8.39	1.052
INTEL														
26	G	10.2*	0.8*	1.1*	0.4*	1.7*	2.3*	4.9*	16.4*	28.5*	23.2*	8.95	10.31	1.152
LAWSON														
27	S	14.8*	13.6*	6.1	1.2	40.1	5.19	17.4	17.4	28.4	1.5	14.56	12.32	.846
LONDON WALL														
28	G	-	11.4	12.2	7.59	1.04	1.78	1.62	2.16	3.75	17.9	6.60	6.02	.912
29	S	-	-	4.18	2.4	6.37	1.01	0.78	6.72	7.01	18.6	5.89@	5.77@	.981
30	I	8.22*	21.7*	7.58*	1.24	2.85	8.84	2.56	4.41	3.15	4.33	6.50	5.94	.914

LIQUIDITY PERCENTAGES 1965 - 1974 (3)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
M & G														
31	I	7.33	3.55	0.61	3.53*	-2.6	-.38	-.84	0.0	2.87	0.85	1.49	2.86	1.910
32	G	2.96*	-.03	-.86	1.02	-2.0	0.35	0.18	-.51	5.58	-.19	0.66	2.15	3.284
33	G	0.88	0.33	0.34	0.71	0.43	2.26	-.32	-4.1	10.9*	-4.4	0.70	4.18	5.946
34	G	5.5*	1.08	1.78*	1.21	-.36	1.61	-1.4	-1.7	7.57*	0.28	1.55	2.92	1.881
35	G	0.78*	0.7	0.07	0.34	0.1	2.27	0.5	1.56*	9.23*	-1.6	1.39	2.93	2.106
MUTUAL														
36	I	1.86	0.07	0.42	0.42	0.48	1.31	0.43	0.93	3.2	5.24	1.44	1.63	1.135
37	G	0.35	0.26	0.15	0.49	0.78	0.4	0.86	1.13	7.95	6.17	1.85	2.79	1.506
OCEANIC														
38	S	-	1.33	1.8	2.27	1.87	4.39	22.4	14.1	5.63	25.4	8.77	9.47	1.080
39	G	-	0.48	7.43	0.9	10.0	4.18	0.15	19.3	2.02	15.0	6.60	6.91	1.046
40	I	-	6.14	1.17	2.58	2.07	5.3	2.02	14.3	6.75	16.5	6.31	5.53	.877
41	S	0.6	6.75	0.3	0.69	58.0	6.11	3.26	19.8	2.54	17.7	11.52	17.70	1.537
42	S	-	13.8	3.25	2.25	1.52	2.16	0.95	13.3	7.83	14.1	6.57	5.72	.871
43	S	-	4.14	2.32	1.97	2.17	0.18	5.95	15.1	15.1	77.7	13.84	24.59	1.776
44	S	-	3.55	1.8	0.15	2.9	4.25	6.08	17.4	14.6	23.9	8.29	8.27	.998
PRACTICAL														
45	S	4.37	9.68*	6.61*	3.95*	6.19*	9.14*	6.27*	4.7*	3.05*	3.0	5.70	2.34	.411
S & P														
46	C	-	-	26.5*	17.2*	7.53	7.53	3.6	0.65	17.8	9.56	11.30@	8.55@	.757
47	S	-	3.92	1.57	1.01	5.26	14.9	4.06	2.73	17.9	16.1	7.50	6.77	.903
48	G	1.48	2.28	5.75	2.26	3.58	9.09	3.63	3.01	12.9	11.1	5.51	4.08	.741
49	S	4.08	4.64	9.33	9.17	5.54	8.07	3.26	4.46	25.5	11.8	8.59	6.58	.766
50	C	2.44	2.04	1.46	1.25*	16.5*	10.2*	3.48	6.53	12.6	8.63	6.52	5.32	.816
51	S	7.22	11.8	0.53	6.08	18.0	17.5	11.6	11.1	15.5	19.5	11.89	6.02	.506
52	I	2.34	0.08	2.6	0.47	1.99	8.06	2.85	2.46	16.0	11.2	4.80	5.22	1.087

LIQUIDITY PERCENTAGES 1965 - 1974 (4)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
S & P														
53	I	0.35	0.35	1.14	0.69*	0.99*	5.61*	3.05*	9.18	15.1	6.98	4.34	4.90	1.127
54	I	0.15	0.35	0.0	0.81*	7.68*	4.99*	3.7*	4.64	9.01	2.8	3.12	3.22	1.031
55	S	0.19	0.14	0.32	-	-	-	-	-	-	-	/	/	/
56	S	3.57	2.74	1.72	4.27	2.45	12.3	3.87	14.8	9.09	17.4	7.21	5.73	.794
57	S	0.69	0.61	1.58	1.38	5.6	3.48	1.53*	4.86*	18.1	8.83	4.66	5.39	1.156
58	S	3.08	2.07	0.81	0.51	5.44	4.79	1.27	2.4	8.76	10.4	3.95	3.38	.856
59	I	-	11.5	4.56	0.8	3.46	4.6	0.47	2.44	19.5	11.0	6.49	6.29	.970
SLATER, WALKER														
60	S	2.2	1.18	0.35	0.02	0.35	0.32	0.05	0.84	26.4	36.5	6.82	13.21	1.937
61	G	1.83	5.92	5.84	2.6	0.37	7.84	1.52	2.29	7.72	18.1	5.40	5.20	.962
62	C	0.09	0.02	0.82	0.16	0.75	0.05	0.47	0.19	12.4	9.42	2.44	4.53	1.859
63	S	3.58	2.01	20.5	0.1	2.51	2.26	9.47	9.31*	16.5	21.8	8.80	8.15	.926
64	C	0.3	0.03	0.08	0.05	0.07	0.23	0.01	0.43	26.9	22.7	5.08	10.44	2.056
65	C	0.82	0.13	0.04	0.76	0.05	0.38	0.07	0.27	15.0	22.8	4.03	8.04	1.998
66	G	0.98	0.55	0.81	0.02	0.02	0.02	0.06	0.2	14.5	15.1	3.22	6.10	1.894
67	S	-	6.15	3.35	0.0	4.21	7.88	4.19	0.94	11.9	39.7	8.70	12.16	1.398
68	S	8.61	8.0	0.05	2.09	3.49	5.6	3.0	0.5	0.21	48.8	8.03	14.64	1.823
69	C	0.1	0.09	0.26	0.04	0.48	1.0	0.28	0.06	34.5	8.71	4.55	10.84	2.384
70	I	-	0.73	0.57	2.59	4.25	0.71	4.21	1.41	1.1	16.0	3.50	4.89	1.396
71	S	-	-	-	-	-	-	11.5	0.71	26.9	39.3	19.60@	16.96@	.865
72	G	0.3	0.41	0.34	0.42	0.39	1.8	0.65	2.39	19.6	27.6	5.39	9.81	1.819
73	G	0.35	0.14	1.55	0.14	0.99	0.49	0.09	0.62	30.9	22.2	5.75	11.18	1.942
74	I	29.9*	17.6*	15.7*	11.6*	10.6*	13.0*	11.0*	9.37*	14.0*	16.0*	14.87	5.92	.398
75	S	24.9*	1.18*	14.4*	0.5*	3.8	1.63	0.34	0.95	10.1	53.1	11.10	16.80	1.514
76	C	1.26	0.29	0.17	2.0	1.02	0.61	0.27	0.54	14.3	23.8	4.43	8.05	1.819

LIQUIDITY PERCENTAGES 1965 - 1974 (5)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
SLATER,WALKER														
77	G	0.06	0.03	0.06	0.76*	0.82*	1.63*	0.1*	0.39	15.7	19.8	3.94	7.37	1.871
78	G	0.71	0.4	0.02	1.3	.59	.76	.01	.43	14.6	18.8	3.76	6.89	1.834
79	G	.06	1.1	.69	.81	4.5	.79	.53	.29	26.0	23.8	5.82	10.13	1.741
80	G	1.20	0.82	1.51	.39	1.79	.51	.11	.02	19.4	34.0	5.97	11.45	1.918
81	C	.13	.03	2.35	.05	.02	.51	.06	.06	11.1	27.0	4.13	8.75	2.117
82	C	.13	.16	.13	.05	.25	.06	.21	1.03	15.1	7.21	2.43	4.96	2.041
TARGET														
83	S	11.9	5.02	4.62	3.18	8.74	6.77	1.92	2.10	15.1	4.20	6.36	4.36	.685
84	G	-	15.3	17.8	13.1	4.34	4.66	1.63	.13	8.21	3.20	7.59	6.35	.837
85	S	.70	.05	.59	.36	3.97	7.62	2.94	7.69	18.8	4.40	4.71	5.71	1.212
86	C	2.04	7.30	7.24	23.9	12.6	2.30	2.80	4.09	21.4	3.30	8.89	8.04	.904
87	I	.02	.06	.31	.03	5.89	5.62	2.11	6.06	7.42	7.60	3.51	3.28	.935
88	S	.14	.01	.13	.01	.05	1.27	.01	.33	2.44	3.00	.74	1.12	.166
TYNDALL														
89	C	1.75	.80	3.87	.44	13.6	6.45	9.02	3.5	0.0	3.70	4.31	4.30	.997
90	I	5.13	2.18	10.3	-.82	.58	.46	2.31	5.2	0.0	6.93	3.23	3.57	1.105
ULSTER														
91	G	11.5*	8.14*	9.1*	.89	8.91	7.60	1.54	3.24	16.0	.17	6.71	5.14	.767
UNICORN														
92	S	2.9	1.4	.87	10.0	7.4	10.3	3.9	2.4	11.5	24.4*	7.50	7.11	.948
93	G	2.02*	1.71*	2.39*	2.28*	5.51*	1.03*	4.25*	4.65*	5.55*	4.48*	3.39	1.67	.494
94	G	2.8*	1.19*	3.15*	.45*	2.17*	2.37*	1.15*	4.27*	8.65*	7.55*	3.38	2.73	.810
95	I	-	.31	1.58	2.00	6.74*	5.81*	5.81*	9.97*	11.4*	10.0*	5.95	4.02	.675
96	G	5.34*	1.13*	3.72*	.09	3.42*	6.44*	3.73*	3.18*	4.83*	17.4*	4.93	4.76	.966

LIQUIDITY % 1965 - 1974 (6)

Trust Number	Trust Type	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Mean Value	Standard Deviation	Relative Dispersion
TRUSTS WHICH EITHER TERMINATE OR MERGE														
97	S"	-	7.86	18.2	.18	/	/	/	/	/	/	/	/	/
98	S"	-	19.6	24.3	.04	30.7	/	/	/	/	/	/	/	/
99	I"	-	12.0	.8	5.25	.01	/	/	/	/	/	/	/	/
100	G"	16.3*	7.34*	5.65	40.9	/	/	/	/	/	/	/	/	/
101	G"	-	13.3*	15.3*	/	/	/	/	/	/	/	/	/	/
102	S"	-	1.14*	7.73	.11	/	/	/	/	/	/	/	/	/
103	G"	6.35	5.04	.59	1.44	16.0	.97	/	/	/	/	5.07@	5.86@	1.157@
104	G"	1.8*	1.05	.79*	/	/	/	/	/	/	/	/	/	/
105	S"	-	-	6.69	6.87	.40	14.0	/	/	/	/	/	/	/
106	I"	-	.55	4.03	10.1	3.00	8.32	/	/	/	/	5.19@	3.91@	.753@
107	G"	14.7	11.6	21.3	21.3	/	/	/	/	/	/	/	/	/
108	G"	6.23	5.72	.59	0.0	/	/	/	/	/	/	/	/	/
109	G"	2.75	1.76	1.61	1.58	/	/	/	/	/	/	/	/	/
110	G"	20.4	5.90	3.28	1.64	/	/	/	/	/	/	/	/	/
111	S	1.26	.75	.31	2.24*	20.6*	/	/	/	/	/	5.04@	8.75@	1.736@
112	S	.35	.13	1.16	2.02*	8.22*	/	/	/	/	/	2.38@	3.35@	1.410@
113	S	.59	.14	2.53	.69*	6.96*	/	/	/	/	/	2.18@	2.82@	1.294@
114	S	1.01	.70	.81	1.59*	12.0*	/	/	/	/	/	3.22@	4.92@	1.527@
115	G"	.20	.07	.14	.04	1.77	1.14	.40	.51	.51	/	.53	.57	1.081
116	S"	8.30	.99	3.20	4.47	2.16	7.19	.20	15.1	/	/	5.20@	4.90@	.942@
117	G"	10.7	4.26	2.03	1.38	/	/	/	/	/	/	/	/	/
118	G"	-	3.97	10.0	4.45	/	/	/	/	/	/	/	/	/

* - indicates the percentage includes fixed interest and loans;
\- - indicates data not available;
@ - means estimated on less than 9 items of data;
/ - indicates not applicable;
" - means derived from trust name.

APPENDIX D

SIZE OF UNIT TRUST PORTFOLIOS & MANAGEMENT CHARGES

In the ten-years, 1965-1975, the average size of the unit trust portfolios studied has gone up by a factor of 4. Since these unit trust have been in existence for at least 10 years at the end of the period, this growth is due to:-

a. longlevity, with investors coming to own more units and current owners holding a greater number of units through monthly investment schemes;

b. an increased value of the overall portfolio due to performance effects, though as reported there was no evidence of above-average unit trust management;

c. inflation effects;

d. the fact that small portfolios were becoming less economic as the period progressed: viz. the number of mergers of small, unpopular funds.

The construction of charges during the period was such as to not exceed 13.25 percent over a period of 20 years. During the period there was an increase in the number of trusts making a full initial charge of 5 percent, and a decline in the number of trusts charging less than the full 13.25% over twenty years. But because regulations governing trust charges have not changed significantly in the 10-years, little change has occured in this category.

SIZE OF TRUST

	1966 £	1970 £	1975 £	1976 £
Mean	3,918,364	10,130,364	11,038,354	13,344,042
Standard Deviation	6,012,061	16,528,527	18,287,145	20,731,726
Min	60,000	282,000	220,000	382,000
Max	38,917,000	121,991,000	140,397,000	158,464,000
Range	38,857,000	121,709,000	140,175,000	158,082,000
N	107	88	96	96

TRUST CHARGES

	1966	1970	1975
Initial			
Mean	.04	.04	.041
Mode	.05	.05	.05
Min	.0	.0	.0
Max	.06	.06	.06
Annual			
Mean	.004	.004	.004
Mode	.004	.004	.004
Min	.002	.004	.004
Max	.007	.007	.007
N	118	96	96

TABLE D.1

SIZE OF TRUST & CHARGES (1)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init.	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init.	1975/6[1] Charges % Year	1976[2] Size £000
ALLIED											
1	G	2,870	3	½	3,993	3	½	6,028	3¼	½	10,345
2	G	2,517	3	½	3,662	3	½	8,218	3¼	½	10,783
3	G	6,133	3	½	6,909	3	½	8,170	3	½	13,498
4	G	7,553	3	½	8,543	3	½	11,868	3¼	½	15,519
5	G	1,498	3	½	2,546	3	½	6,821	3¼	½	12,419
6	I	6,885	5	⅜	13,823	5	⅜	19,456	5	⅜	22,675
7	S	7,525	3	½	12,500	3	½	11,176	3¼	½	15,392
ARBUTHNOT											
8	G	313	5	⅜	400	5	⅜	254	5	⅜	406
9	C	132	5	⅜	403	5	⅜	222	5	⅜	382
10	I	349	5	⅜	1,150	5	⅜	943	5	⅜	2,413
BARBICAN											
11	G	1,019	-*	½	1,627	-*	½	2,274	-*	½	2,299
BRITISH LIFE											
12	G	388	3¼	½	1,570	3¼	½	5,161	3¼	½	6,900
CRESCENT											
13	I	1,081	5	⅜	1,774	5	⅜	2,967	5	⅜	3,467
14	G	7,470	5	⅜	9,370	5	⅜	7,981	5	⅜	9,363
DISCRETIONARY											
15	G	970	½	½	1,516	3¼	½	1,847	3¼	½	2,161
GOVETT											
16	G	1,044	-*	⅜	1,889	¼	½	6,543	1¼	½	6,672

SIZE OF TRUST & CHARGES (2)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init.	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init.	1975/6[1] Charges % Year	1976[2] Size £000
HENDERSON											
17	C	2,695	3¼	½	1,986	3¼	½	1,695	5	⅜	1,936
18	I	435	5	⅜	2,828	3¼	½	4,885	5	⅜	6,608
19	G	2,863	5¾	⅜	1,371	5	⅜	4,368@	3¼	½	4,289@
20	S	3,401	5	⅜	3,543	5	⅜	3,667	5	⅜	3,497
HILL SAMUEL											
21	G	8,112	3¼	½	13,793	3¼	½	15,631	3¼	½	18,483
22	C	1,208	–*	½	4,077	3¼	½	6,737	5	⅜	17,179
23	I	8,639	–*	½	16,771	3¼	½	9,720	3¼	½	22,490
24	S	5,602	3¼	⅜	12,065	3¼	⅜	10,767	3¼	½	16,208
25	G	247	5	⅜	1,399	5	⅜	3,421@	5	⅜	5,532@
INTEL											
26	G	60	3¼	½	2,950	3¼	½	1,983	3¼	½	3,662
LAWSON											
27	S	–	5	⅜	445	5	⅜	447	5	⅜	1,140
LONDON WALL											
28	G	251	5	⅜	3,535	5	⅜	2,494	5	⅜	3,057
29	S	243	5	⅜	790	5	⅜	1,327	5	⅜	1,831
30	I	1,766	5	⅜	5,713@	5	⅜	3,397@	5	⅜	7,095@

SIZE OF TRUST & CHARGES (3)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init	1975/6[1] Charges % Year	1976[2] Size £000
M&G											
31	I	3,080	$2\frac{1}{2}$	$\frac{1}{2}$	29,769	$2\frac{1}{2}$	$\frac{1}{2}$	51,237	$2\frac{1}{2}$	$\frac{1}{2}$	60,258
32	G	20,366	$2\frac{1}{2}$	$\frac{1}{2}$	47,843	$2\frac{1}{2}$	$\frac{1}{2}$	62,313	$2\frac{1}{2}$	$\frac{1}{2}$	63,547
33	G	1,506	$2\frac{1}{2}$	$\frac{1}{2}$	3,200	$2\frac{1}{2}$	$\frac{1}{2}$	4,093	$2\frac{1}{2}$	$\frac{1}{2}$	4,705
34	G	2,881	$2\frac{1}{2}$	$\frac{1}{2}$	10,557	$2\frac{1}{2}$	$\frac{1}{2}$	16,389	$2\frac{1}{2}$	$\frac{1}{2}$	16,910
35	G	1,857	2	$\frac{3}{8}$	4,962	2	$\frac{3}{8}$	6,027	2	$\frac{3}{8}$	6,479
MUTUAL											
36	I	3,567	5	$\frac{3}{8}$	–	5	$\frac{3}{8}$	5,644	5	$\frac{3}{8}$	6,474
37	G	658	$3\frac{1}{4}$	$\frac{1}{2}$	–	$3\frac{1}{4}$	$\frac{1}{2}$	407	$3\frac{1}{4}$	$\frac{1}{2}$	811
OCEANIC											
38	S	584	5	$\frac{3}{8}$	972	5	$\frac{3}{8}$	1,116	5	$\frac{3}{8}$	914
39	G	3,026	5	$\frac{3}{8}$	2,421	5	$\frac{3}{8}$	1,056	5	$\frac{3}{8}$	1,098
40	I	4,547	5	$\frac{3}{8}$	5,169	5	$\frac{3}{8}$	3,836	5	$\frac{3}{8}$	4,392
41	S	1,274	5	$\frac{3}{8}$	710	5	$\frac{3}{8}$	560	5	$\frac{3}{8}$	705
42	S	1,168	5	$\frac{3}{8}$	1,851	5	$\frac{3}{8}$	940	5	$\frac{3}{8}$	940
43	S	554	5	$\frac{3}{8}$	1,905	5	$\frac{3}{8}$	1,267	5	$\frac{3}{8}$	1,299
44	S	1,236	5	$\frac{3}{8}$	614	5	$\frac{3}{8}$	535	5	$\frac{3}{8}$	563
PRACTICAL											
45	S	13,500	–*	11/16	28,774	–*	11/16	29,080	–*	11/16	30,861

SIZE OF TRUST & CHARGES (4)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init.	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init.	1975/6[1] Charges % Year	1976[2] Size £000
S & P											
46	C	284	5	$\frac{3}{8}$	15,294	5	$\frac{3}{8}$	13,487	5	$\frac{3}{8}$	16,602
47	S	1,067	5	$\frac{3}{8}$	18,909	5	$\frac{3}{8}$	24,762	5	$\frac{3}{8}$	26,983
48	G	529	5	$\frac{3}{8}$	1,234	5	$\frac{3}{8}$	3,540	5	$\frac{3}{8}$	4,456
49	S	147	5	$\frac{3}{8}$	282	5	$\frac{3}{8}$	1,139	5	$\frac{3}{8}$	1.260
50	C	11,438	$3\frac{3}{4}$	$\frac{3}{8}$	33,316	5	$\frac{3}{8}$	28,849	5	$\frac{3}{8}$	34,096
51	S	318	$3\frac{3}{4}$	$\frac{3}{8}$	772	5	$\frac{3}{8}$	4,914	5	$\frac{3}{8}$	6,316
52	I	1,721	5	$\frac{3}{8}$	4,042	5	$\frac{3}{8}$	7,950	5	$\frac{3}{8}$	10,695
53	I	8,229	$3\frac{3}{4}$	$\frac{3}{8}$	27,249	5	$\frac{3}{8}$	31,917	5	$\frac{3}{8}$	36,991
54	I	21,831	$3\frac{3}{4}$	$\frac{3}{8}$	27,255	5	$\frac{3}{8}$	29,721	5	$\frac{3}{8}$	36,308
55	S	38,917	$3\frac{3}{4}$	$\frac{3}{8}$ 1/5	121,991	5	$\frac{3}{8}$	140,397	5	$\frac{3}{8}$	158,464
56	S	940	$3\frac{3}{4}$	$\frac{3}{8}$	5,886	5	$\frac{3}{8}$	17,735	5	$\frac{3}{8}$	22,004
57	S	29,700	$3\frac{3}{4}$	$\frac{3}{8}$	58,437	5	$\frac{3}{8}$	58,419	5	$\frac{3}{8}$	59,635
58	S	8,028	$3\frac{3}{4}$	$\frac{3}{8}$	11,144	$3\frac{3}{4}$	$\frac{3}{8}$	12,003	5	$\frac{3}{8}$	13,262
59	I	5,892	$3\frac{3}{4}$	$\frac{3}{8}$	25,448@	5	$\frac{3}{8}$	37,023@	5	$\frac{3}{8}$	44,049@
SLATER.WALKER											
60	S	6,782	5	$\frac{3}{8}$	11,230	5	$\frac{3}{8}$	7,184	5	$\frac{3}{8}$	9,242
61	G	510	5	$\frac{3}{8}$	1,663@	5	$\frac{3}{8}$	2,305@	5	$\frac{3}{8}$	2,203@
62	C	–	2	$\frac{1}{2}$	–	$3\frac{1}{4}$	$\frac{1}{2}$	2,280	$3\frac{1}{4}$	$\frac{1}{2}$	2,553
63	S	94	$3\frac{1}{4}$	$\frac{1}{2}$	838	$3\frac{1}{4}$	$\frac{1}{2}$	981	$3\frac{1}{4}$	$\frac{1}{2}$	1,082
64	C	–	2	$\frac{1}{2}$	–	2	$\frac{1}{2}$	2,681	2	$\frac{1}{2}$	3,149
65	C	–	2	$\frac{1}{2}$	–	2	$\frac{1}{2}$	2,185	$3\frac{1}{4}$	$\frac{1}{2}$	3,356
66	G	9,080	5	$\frac{3}{8}$	11,751	5	$\frac{3}{8}$	9,329	5	$\frac{3}{8}$	9,476
67	S	1,509	$3\frac{1}{4}$	$\frac{1}{2}$	2,407	$3\frac{1}{4}$	$\frac{1}{2}$	5,997	5	$\frac{3}{8}$	6,755
68	S	1,851	$3\frac{1}{4}$	$\frac{1}{2}$	4,709	$3\frac{1}{4}$	$\frac{1}{2}$	6,050	$3\frac{1}{4}$	$\frac{1}{2}$	3,874
69	C	–	2	$\frac{1}{2}$	–	2	$\frac{1}{2}$	1,562	$3\frac{1}{4}$	$\frac{1}{2}$	1,659
70	I	131	$3\frac{1}{4}$	$\frac{1}{2}$	2,634@	$3\frac{1}{4}$	$\frac{1}{2}$	3,704@	5	$\frac{3}{8}$	4,383@
71	S	1,844	5	$\frac{3}{8}$	2,328	5	$\frac{3}{8}$	1,060	5	$\frac{3}{8}$	903
72	G	–	2	$\frac{1}{2}$	–	2	$\frac{1}{2}$	747	2	$\frac{1}{2}$	796
73	G	–	2	$\frac{1}{2}$	–	$3\frac{1}{4}$	$\frac{1}{2}$	503	$3\frac{1}{4}$	$\frac{1}{2}$	759

SIZE OF TRUST & CHARGES (5)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init.	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init.	1975/6[1] Charges % Year	1976[2] Size £000
SLATER, WALKER											
74	I	2,814	5	3/8	18,117	5	3/8	17,646	5	3/8	19,048
75	S	2,453	5	3/8	2,629	5	3/8	1,510	5	3/8	2,070
76	C	–	2	1/2	–	2	1/2	639	2	1/2	693
77	G	2,741	5	3/8	3,140	5	3/8	2,247	5	3/8	2,719
78	G	4,135	5	3/8	5,571	5	3/8	2,909	5	3/8	4,874
79	G	1,325	5	3/8	1,017	5	3/8	627	5	3/8	879
80	G	11,696	5	3/8	19,813	5	3/8	14,132	5	3/8	17,075
81	C	–	6	1/2	–	6	1/2	1,829	6	1/2	2,913
82	C	–	4	1/2	–	3½	1/2	1,367	3¼	1/2	1,585
TARGET											
83	S	580	5	3/8	1,299@	5	3/8	993@	5	3/8	1,185@
84	G	654	5	3/8	6,886@	5	3/8	11,167@	5	3/8	13,138@
85	S	728	5	3/8	5,817	5	3/8	19,748	5	3/8	19,395
86	C	731	5	3/8	7,403	5	3/8	3,968	5	3/8	4,026
87	I	1,827	5	3/8	2,373+	5	3/8	2,448+	5	3/8	2,827+
88	S	3,242	5	3/8	5,856+	5	3/8	12,376+	5	3/8	15,778+
TYNDALL											
89	C	3,321	1	1/2	44,000	2	1/2	32,245	2	1/2	31,419
90	I	3,959	1	1/2	21,000	2	1/2	21,958	2	1/2	22,149
ULSTER											
91	G	396	3¼	1/2	1,911	3¼	1/2	914	3¼	1/2	1,421
UNICORN											
92	S	1,661	4¼	3/8	11,100	5	3/8	12,564	5	3/8	14,588
93	G	12,539	5	3/8	23,912	5	3/8	36,899	5	3/8	56,431
94	G	7,684	5	3/8	22,519@	5	3/8	24,959@	5	3/8	33,685@
95	I	3,516	3¼	1/2	11,352	3¼	1/2	19,897	3¼	1/2	36,801
96	G	1,221	3¼	1/2	2,330	3¼	1/2	3,248	3¼	1/2	7,370

SIZE OF TRUST & CHARGES (6)

Trust Number	Trust Type	1965/6[1] Size £000	1965/6[1] Charges % Init.	1965/6[1] Charges % Year	1970/1[1] Size £000	1970/1[1] Charges % Init.	1970/1[1] Charges % Year	1975/6[1] Size £000	1975/6[1] Charges % Init.	1975/6[1] Charges % Year	1976[2] Size £000
TRUSTS WHICH EITHER MERGE OR TERMINATE											
97		1,031	$3\frac{1}{4}$	$\frac{1}{2}$	/	/	/	/	/	/	/
98		436	$3\frac{1}{4}$	$\frac{1}{2}$	/	/	/	/	/	/	/
99		1,141	5	$\frac{3}{8}$	/	/	/	/	/	/	/
100		200	5	$\frac{3}{8}$	/	/	/	/	/	/	/
101		219	5	$\frac{3}{8}$	/	/	/	/	/	/	/
102		236	5	$\frac{3}{8}$	/	/	/	/	/	/	/
103		1,598	5	$\frac{3}{8}$	/	/	/	/	/	/	/
104		9,965	5	$\frac{3}{8}$	/	/	/	/	/	/	/
105		608	5	$\frac{3}{8}$	924	5	$\frac{3}{8}$	/	/	/	/
106		1,075	5	$\frac{3}{8}$	1,183	5	$\frac{3}{8}$	/	/	/	/
107		330	5	$\frac{3}{8}$	/	/	/	/	/	/	/
108		169	5	$\frac{3}{8}$	/	/	/	/	/	/	/
109		424	5	$\frac{3}{8}$	/	/	/	/	/	/	/
110		657	5	$\frac{3}{8}$	/	/	/	/	/	/	/
111		8,019	$3\frac{3}{4}$	1/5							
112		17,130	$3\frac{3}{4}$	1/5	61,079	$3\frac{1}{4}$	$\frac{1}{2}$				
113		5,963	$3\frac{3}{4}$	1/5							
114		7,633	$3\frac{3}{4}$	1/5							
115		-	6	$\frac{3}{8}$	/	/	/	/	/	/	/
116		667	5	$\frac{3}{8}$	813	5	$\frac{3}{8}$	/	/	/	/
117		251	5	$\frac{3}{8}$	/	/	/	/	/	/	/
118		375	5	$\frac{3}{8}$	/	/	/	/	/	/	/

1 - Source: Stock Exchange Official Yearbook. Data not collected simultaneously. Original source the annual trust accounts. 1965/6 data from 1966 Yearbook, 1970/1 data from 1971 Yearbook.
2 - Source: Unit Trust Yearbook, 1976. Data for year end 1975, from trust managements.
@ - Data not compatible due to mergers.
-* - A no-load trust with no initial charge.
Underlined observations for 1966 from 1967 Official Yearbook.
- - Indicates data not given.

FREQUENCY DISTRIBUTION OF
THE INITIAL CHARGE 1966

VALUE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
0.00	5	4.2	4.2	4.2
0.00	1	0.8	0.8	5.1
0.02	10	8.5	8.5	13.6
0.03	4	3.4	3.4	16.9
0.03	6	5.1	5.1	22.0
0.03	15	12.7	12.7	34.7
0.04	13	11.0	11.0	45.8
0.04	1	0.8	0.8	46.6
0.04	1	0.8	0.8	47.5
0.05	59	50.0	50.0	97.5
0.06	1	0.8	0.8	98.3
0.06	2	1.7	1.7	100.0
TOTAL	118	100.0	100.0	100.0

FREQUENCY DISTRIBUTION OF
ANNUAL CHARGE 1966

VALUE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
0.00	5	4.2	4.2	4.2
0.00	72	61.0	61.0	65.3
0.00	40	33.9	33.9	99.2
0.01	1	0.8	0.8	100.0
TOTAL	118	100.0	100.0	100.0

TABLE D.3

FREQUENCY DISTRIBUTION OF
INITIAL CHARGE 1970

VALUE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
0.00	2	1.7	2.1	2.1
0.00	1	0.8	1.0	3.1
0.02	8	6.8	8.3	11.5
0.03	4	3.4	4.2	15.6
0.03	6	5.1	6.2	21.9
0.03	19	16.1	19.8	41.7
0.03	1	0.8	1.0	42.7
0.04	1	0.8	1.0	43.7
0.05	53	44.9	55.2	99.0
0.06	1	0.8	1.0	100.0
0.90	22	18.6	MISSING	100.0
TOTAL	118	100.0	100.0	100.0

FREQUENCY DISTRIBUTION OF
INITIAL CHARGE 1975

VALUE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
0.00	2	1.7	2.1	2.1
0.01	1	0.8	1.0	3.1
0.02	6	5.1	6.2	9.4
0.03	4	3.4	4.2	13.5
0.03	1	0.8	1.0	14.6
0.03	23	19.5	24.0	38.5
0.05	58	49.2	60.4	99.0
0.06	1	0.8	1.0	100.0
0.90	22	18.6	MISSING	100.0
TOTAL	118	100.0	100.0	100.0

FREQUENCY DISTRIBUTION OF
THE ANNUAL CHARGE 1970

VALUE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)	CUMULATIVE ADJ FREQ (PERCENT)
0.00	55	46.6	57.3	57.3
0.00	40	33.9	41.7	99.0
0.01	1	0.8	1.0	100.0
0.90	22	18.6	MISSING	100.0
TOTAL	118	100.0	100.0	100.0

TABLE D.4

APPENDIX E

GROWTH IN UNIT TRUST PORTFOLIOS

The growth in the unit trusts' portfolios cannot be directly ascertained since the required data is not readily available. As a result a surrogate measure was used, with some disadvantages which are discussed below.

The actual data used to calculate growth was based on the number of trust units in the portfolio. The growth statistic is the change in the continuously compounded number of units in the trust. This gives a measure of the amount of new investment in the trust relative to the other trusts in this study. It does not give the level of funds put into the trust since accurate data concerning the prices at which units were acquired would be necessary.

$$\text{Growth} = \log_e \left(\frac{\text{number of units in trust, time } t+1}{\text{number of units in trust, time } t} \right)$$

The potential disadvantage of the measure, apart from the normal considerations of accuracy, is that the number of units acquired in a trust is inversely related to the price of the units at any point in time. By using the continuously compounded rate of increase in units, it is hoped to minimise this effect.

The other form of growth surrogate was the change in the value of the portfolio over the periods analysed. The major disadvantages are discussed in the section dealing with growth (Chapter 9, Section 1).

Surrogates were calculated from the data for the periods 1966/70, 1971/75 and also 1966 - 1975, the first second and last Growth statistics in the following table.

GROWTH IN UNIT TRUST PORTFOLIOS (1)

Trust Number	Trust Type	1965/6[1] Units		1970/1[1] Units	1970/1[1] Growth	1975/6[1] Units	1975/6[1] Growth	1966-75 Growth
ALLIED								
1	G	2,312	(4)	8,569	-.0762	19,232	.8084	.7321
2	G	7,504		8,195	.0880	18,811	.8309	.9190
3	G	9,406	(4)	32,920	-.1335	52,979	.4758	.3422
4	G	23,694		22,224	-.0640	28,479	.2479	.1839
5	G	1,117	(8)	8,748	-.0212	40,777	1.5392	1.5180
6	I	26,866		42,994	.4701	47,461	.0988	.5690
7	S	8,266	(4)	39,186	.1698	44,466	.1264	.2962
ARBUTHNOT								
8	G	1,525		1,515	-.0065	1,304	-.1499	-.1565
9	C	550		1,670	1.1106	1,266	-.2769	.8336
10	I	1,455		4,701	1.1727	4,808	.0225	1.1952
BARBICAN								
11	G	1,704 346-A		1,903 333-A	.0868	3,136 269-A	.4205	.5074
BRITISH LIFE								
12	G	1,360		4,330	1.1580	16,150	1.3163	2.4744
CRESCENT								
13	I	4,251		6,125	.3652	8,477	.3249	.6902
14	G	10,455	(3)	10,305 (3)	-.0144	27,956	-.1006	-.1150
DISCRETIONARY								
15	G	1,724		1,907 128-A	.1658	2,083 176-A	.1044	.2702
GOVETT								
16	G	1,780		3,820 2,372-A	1.2466	3,582 1,942-A	-.1141	1.1324

GROWTH IN UNIT TRUST PORTFOLIOS (2)

Trust Number	Trust Type	1965/6[1] Units		1970/1[1] Units	1970/1[1] Growth	1975/6[1] Units	1975/6[1] Growth	1966-75 Growth
HENDERSON								
17	C	2,625	(5)	8,500	-.4344	6,120	-.3285	-.7629
18	I	1,925		3,083	.4709	14,369	1.5391	2.0101
19	G	3,860	(4)	4,650 (4)	.1862	18,354@	-	-
20	S	5,788	(4)	4,904 (4)	-.1657	14,907	-.2745	-.4402
HILL SAMUEL								
21	G	11,230		13,469	.1818	14,865	.0986	.2804
22	C	1,234	(10)	2,418 (10)	.6726	52,574	.7766	1.4493
23	I	7,035	(8)	11,492 (8)	.4907	91,598	-.0036	.4870
24	S	9,189	(4)	12,941 (4)	.3423	51,828	.0012	.3436
25	G	1,034		4,800	1.5351	11,051@	-	-
INTEL								
26	G	142		4,985	3.5583	4,742	-.0499	3.5083
LAWSON								
27	S	-		1,058	-	1,789	.5252	-
LONDON WALL								
28	G	1,057		7,317	1.9347	5,512	-.2832	1.6514
29	S	1,025	(4)	1,477 (4)	.4257	5,819	.7192	1.1449
				92-A		7,065-A		
30	I	7,420		17,090@	-	16,986@	-.0061	-

GROWTH IN UNIT TRUST PORTFOLIOS (3)

Trust Number	Trust Type	1965/6[1] Units	1970/1[1] Units	1970/1[1] Growth	1975/6[1] Units	1975/6[1] Growth	1966-75 Growth
M & G							
31	I	5,446	44,723	2.0074	59,031	.2668	2.2742
		1,103-A	4,028-A		4,631-A		
32	G	24,934	34,743	.3557	31,810	-.0401	.3156
		6,248-A	9,763-A		10,946-A		
33	G	2,678	3,625	.3965	3,523	.0270	.4235
		92-A	495-A		708-A		
34	G	5,061	7,836	.7233	6,790	.0324	.7557
		416-A	3,454-A		4,872-A		
35	G	2,883	4,420	.5387	4,033	-.0360	.5027
		312-A	1,056-A		1,249-A		
MUTUAL							
36	I	14,720	-	-	12,750	-	-.1436
37	G	2,745	-	-	2,038	-	-.2978
OCEANIC							
38	S	2,300	4,090	.5756	3,077	-.2845	.2910
39	G	11,100	8,754	-.2374	6,210	-.3433	-.5807
40	I	18,935	27,499	.3731	19,391	-.3493	.0237
41	S	5,535	3,394	-.4890	2,904	-.1559	-.6450
42	S	4,446	8,753	.6773	5,272	-.5069	.1704
43	S	2,150	9,419	1.4772	5,735	-.4961	.9811
44	S	5,345	3,405	-.4509	2,838	-.1821	-.6330
PRACTICAL							
45	S	17,217	20,940	.2361	20,628	-.0343	.2617
		2,103	3,526		3,011		

GROWTH IN UNIT TRUST PORTFOLIOS (4)

Trust Number	Trust Type	1965/6[1] Units		1970/1[1] Units	Growth	1975/6[1] Units	Growth	1966-75 Growth
S & P								
46	C	360	(4)	39,528	3.3123	32,063	-.2093	3.1030
47	S	4,452		56,570	2.5421	41,753	-.3037	2.2384
48	G	2,431		4,087	.5195	9,177	.8088	1.3283
49	S	319	(2)	567 (2)	.5751	2,736	.8807	1.4559
50	C	30,405	(2)	121,096	.6888	108,724	-.1077	.5810
51	S	895		1,635	.6025	6,329	1.3534	1.9560
52	I	3,932	(2)	7,348 (2)	.6252	20,460	.3308	.9561
53	I	34,515		90,336	.9621	79,666	-.1256	.8364
54	I	73,760		99,929	.3036	94,871	-.0519	.2517
55	S	98,060	(3)	567,759	.6575	669,408	.1646	.8222
56	S	2,237		8,660	1.3536	27,349	1.1499	2.5035
57	S	128,745		155,077	.1860	164,947	.0617	.2477
58	S	28,265		33,148	.1593	31,229	-.0596	.0997
59	I	23,800		81,507@	-	98,382@	.1881	-
SLATER, WALKER								
60	S	18,700		18,970	.0143	-	-	-
61	G	2,148		6,192@	-	7,931@	.2475	-
62	C	-	(10)	-	-	-	-	-
63	S	1,197		1,854	.4375	3,161	.5335	.9710
64	C	-	(6)	-	-	-	-	-
65	C	-	(6)	-	-	-	-	-
66	G	36,830		33,100	-.1067	-	-	-
67	S	5,191		7,427	.3581	12,599	.5284	.8866
68	S	3,340		6,439	.6564	4,087	-.4545	.2018
69	C	-	(10)	-	-	-	-	-
70	I	514		8,001@	-	9,807@	.2035	-
71	S	6,860		8,650	.2318	-	-	-
72	G	-	(6)	-	-	-	-	-
73	G	-	(6)	-	-	-	-	-

GROWTH IN UNIT TRUST PORTFOLIOS (6)

Trust Number	Trust Type	1965/6[1] Units	1970/1[1] Units	1970/1[1] Growth	1975/6[1] Units	1975/6[1] Growth	1966-75 Growth
UNICORN							
94	G	48,548	112,345@	-	135,805@	.1896	-
95	I	11,448	29,123	.9337	54,077	.6188	1.5525
96	G	2,365	3,180	.2961	7,403	.8450	1.1411
TRUSTS WHICH EITHER MERGE OR TERMINATE							
97		3,681	/	/	/	/	/
98		1,532	/	/	/	/	/
99		5,705	/	/	/	/	/
100		406	/	/	/	/	/
101		906	/	/	/	/	/
102		1,007	/	/	/	/	/
103		6,668	/	/	/	/	/
104		39,941	/	/	/	/	/
105		2,648	3,026		/	/	/
106		4,840	4,359		/	/	/
107		1,376	/	/	/	/	/
108		719	/	/	/	/	/
109		1,771	/	/	/	/	/
110		2,606	/	/	/	/	/
111		15,326					
112		56,815	108,769				
113		17,556					
114		24,175					
115		-	/	/	/	/	/
116		3,750	3,090		/	/	/
117		541	/	/	/	/	/
118		1,698	/	/	/	/	/

1 - Source: Stock Exchange Official Yearbook. Data not collected simultaneously. Original source the annual trust accounts. 1965/6 from 1966 Yearbook, 1970/1 data from 1971 Yearbook.

@ - Data not compatible due to mergers.

_-- Underlined observations for 1966 from 1967 Yearbook

/ - Indicates data not given.

GROWTH IN UNIT TRUST PORTFOLIOS (5)

Trust Number	Trust Type	1965/6[1] Units	1970/1[1] Units	1970/1[1] Growth	1975/6[1] Units	1975/6[1] Growth	1966-75 Growth
SLATER, WALKER							
74	I	8,075	36,500		–	–	–
75	S	10,150	8,746	-.1488	–	–	–
76	C	–	–	–	–	–	–
77	G	7,840	6,597	-.1726	–	–	–
78	G	9,625	9,475	-.0157	–	–	–
79	G	3,740	2,250	-.5081	–	–	–
80	G	46,265	46,510	.0052	–	–	–
81	C	–	–	–	–	–	–
82	C	– (8)	–	–	–	–	–
TARGET							
83	S	2,930	5,055@	–	3,881@	-.2642	–
84	G	2,960	24,750@	–	37,250@	.4088	–
85	S	3,460	15,350	1.4899	38,550	.9208	2.4016
86	C	3,310	26,825	2.0923	17,153	-.4471	1.6452
87	I	7,130	–	–	14,380+	–	.7015
88	S	13,300	40,435+	1.1190	114,700+	1.0426	2.1545
TYNDALL							
89	C	4,118	17,235	1.4015	12,185	-.2495	1.1519
		1,191-A	21,053-A		17,646-A		
90	I	5,274	25,346	1.5841	15,062	-.4619	1.1222
		772-A	4,129-A		3,509-A		
ULSTER							
91	G	1,520	5,704	1.3224	4,357	-.2693	1.0530
UNICORN							
92	S	2,183 (2)	9,002	1.2284	7,191	-.1500	1.0784
		1,666-A	17,275-A		15,443-A		
93	G	38,334	52,474	.3139	97,448	.6190	.9329

APPENDIX F

UNIT TRUST DIVERSIFICATION

One of the services offered by unit trusts is the diversification of their portfolios: individuals would not be able to acheive the measure of diversification available to unit trust funds.

While no direct evidence is available on the number of securities required and the resulting diversification based on UK data, two US studies report that relatively few stocks are needed to diversify away most residual or non-market risk: 10 stocks will make portfolio risk account for 95.26 percent of systematic risk (See Table F.1). The results suggest that diversification can be achieved with relatively few, judiciously, selected shares.

While the data for the number of stocks held by the individual unit trust portfolios is not very complete, one fact does emerge. If diversification can be achieved with as few as 10 securities, then most trusts seem to hold far more securities than required, even after taking into account the constraints on the minimum number of securities allowed. (Trusts may only invest up to 5 percent of their portfolios in any one security, or hold more than 5 percent of the issued capital. The minimum number of securities is therefore 20.)

There was an inverse relationship between liquidity and the number of securities held, but this was a very slight relationship. There was a positive relationship between the number of shares held and diversification, as in the US research.

The diversification of the unit trust portfolios, with the exception of those funds primarily investing in overseas markets, was of the same order as studies of mutual funds. The statistic used to measure the diversification of the trusts was the D statistic:-

$$\text{D statistic} = \frac{\text{total variance less residual variance}}{\text{total variance}} \%$$

It is the percentage of the variance of trust returns explained by the market. It is also an indication of the "goodness-of-fit" of the beta coefficient.

The D statistics quoted in the following tables indicate that the unit trust portfolios were fully diversified. Given the fact that most unit trusts held a percentage of their assets in transactional balances or risk-free assets and thus not responsive to the market, it seems that the equity portion of the portfolios were market portfolios.

As part of the management function involved in the running of portfolios and the cheap diversification of the unit trust, the high level of diversification observed indicates that unit trusts effectively carry out this part of their function.

Number of Stocks	Total Risk Percent	Percentage Portfolio Risk Systematic	Residual
1	20.54	57.98	42.02
2	16.22	73.43	26.57
3	14.79	80.53	19.47
4	14.07	84.65	15.35
5	13.64	87.32	12.68
6	13.35	89.21	10.79
7	13.14	90.64	9.36
8	13.00	91.62	8.38
10	12.63	94.30	5.70
15	12.49	95.36	4.64
20	12.34	96.52	3.48
50	12.08	98.59	1.41
100	11.9963	99.29	.71
1000	11.91863	99.93	.07

EVANS, John Leslie

Diversification and the Reduction of Dispersion--
An Empirical Analysis.

Ph.D. Dissertation, University of Washington, 1968

Quoted in D'AMBROSIO, Charles A. (1976)

TABLE F.1

RISK VERSUS DIVERSIFICATION--RANDOMLY SELECTED

PORTFOLIOS OF A+ QUALITY SECURITIES

June 1960 - May 1970

Number of Securities	Average Return	Standard Deviation	Correlation with M R	R.2
1	.88	7.0	.54	.29
2	.69	5.0	.63	.40
3	.74	4.8	.75	.56
4	.65	4.6	.77	.59
5	.71	4.6	.79	.62
10	.68	4.2	.85	.72
15	.69	4.0	.88	.77
20	.67	3.9	.89	.80

WAGNER & LAU

The Effect of Diversification on Risk

Table C. pp.53

Quoted in the FINANCIAL ANALYSTS JOURNAL, Vol 26
(Nov-Dec) 1971
pp. 48-53

TABLE F.2

THE NUMBER OF SHARES & DIVERSIFICATION (1)

Trust Number	Trust Type	Number of Shares 1965/6	1970/1	1975/6	1976	Diversification 1966-75	1966-70	1971-75
1	G	-	-	-	145	85.7	83.4	89.1
2	G	-	-	-	134	85.7	83.1	88.8
3	G	-	-	-	141	87.4	87.1	89.9
4	G	-	-	-	137	76.0	82.8	80.8
5	G	-	-	-	146	88.6	88.4	91.5
6	I	-	-	-	190	77.6	76.2	82.2
7	S	-	-	-	129	43.7	79.2	36.6
8	G	-	51	26	45	75.3	89.4	74.1
9	C	-	37	14	22	76.8	80.1	81.3
10	I	-	-	-	96	40.2	25.4	78.4
11	G	-	-	-	64	93.9	92.8	94.1
12	G	-	-	-	57	92.6	92.3	95.2
13	I	-	-	40	46	91.4	87.1	93.4
14	G	-	54	47	46	95.9	97.2	96.5
15	G	-	-	193	187	86.6	70.1	90.7
16	G	-	-	-	42	63.6	81.0	68.7
17	C	92	42	44	42	37.5	91.2	26.1
18	I	-	-	118	158	78.7	86.4	80.9
19	G	-	-	76	68	83.8	85.0	86.1
20	S	136	58	60	49	50.9	73.5	48.6
21	G	-	-	-	104	95.4	96.6	96.3
22	C	-	-	-	124	95.0	96.0	95.9
23	I	-	-	-	103	93.0	91.3	93.4
24	S	-	-	-	104	48.0	69.7	52.6
25	G	66	-	-	98	91.1	86.9	92.4
26	G	-	-	-	45	85.8	89.4	90.4
27	S	-	-	41	27	24.3	52.9	18.4
28	G	-	74	57	53	90.6	81.0	95.1
29	S	-	-	-	50	89.7	87.8	91.0
30	I	-	113	119	90	84.1	64.8	90.0
31	I	-	-	-	117	82.8	68.2	88.1
32	G	-	-	-	107	83.0	97.1	81.1
33	G	-	-	-	71	88.7	90.0	88.9
34	G	-	-	-	82	78.2	84.5	78.8
35	G	-	-	-	66	91.5	91.3	92.6
36	I	115	92	84	94	85.3	81.1	86.9
37	G	-	-	-	51	86.4	96.3	84.6

THE NUMBER OF SHARES & DIVERSIFICATION (2)

Trust Number	Trust Type	Number of Shares 1965/6	1970/1	1975/6	1976	Diversification 1966-75	1966-70	1971-75
38	S	-	30	22	33	57.7	83.6	53.8
39	G	-	44	32	31	66.4	84.3	68.9
40	I	-	66	43	58	57.8	61.6	59.7
41	S	-	32	21	139	71.9	89.1	68.4
42	S	-	42	34	31	82.5	82.5	85.0
43	S	-	36	9	38	21.5	52.6	14.8
44	S	-	31	22	32	73.6	76.8	75.5
45	S	-	-	-	113	84.0	81.8	85.1
46	C	-	-	-	45	88.9	87.6	93.3
47	S	-	-	-	102	41.9	52.7	41.1
48	G	-	-	-	55	88.0	82.1	90.0
49	S	-	-	-	35	78.3	64.0	83.2
50	C	-	-	-	104	68.0	84.2	67.6
51	S	-	-	-	70	41.3	43.2	45.7
52	I	-	-	-	85	86.9	80.8	89.8
53	I	-	-	-	78	75.4	86.8	88.2
54	I	-	-	-	160	87.1	79.9	90.7
55	S	103	125	109	112	86.9	87.1	92.6
56	S	-	-	-	57	32.8	52.3	31.5
57	S	-	-	-	76	84.8	87.1	88.9
58	S	-	-	-	61	89.5	88.0	90.7
59	I	-	-	-	45	90.0	86.1	92.3
60	S	-	-	74	32	76.4	88.1	80.5
61	G	-	-	-	28	75.4	77.7	75.2
62	C	-	-	-	23	77.6	88.2	79.3
63	S	-	-	-	20	81.5	78.7	84.1
64	C	-	-	-	23	64.7	86.2	66.5
65	C	-	-	40	26	66.8	74.7	70.3
66	G	-	-	-	41	86.8	87.9	87.9
67	S	94	-	-	31	56.8	78.5	57.4
68	S	-	-	-	18	4.6	62.6	.2
69	C	-	-	29	25	75.9	82.4	75.0
70	I	-	-	-	26	79.6	66.4	84.5
71	S	-	-	-	23	32.2	54.2	31.1
72	G	-	74	31	25	80.3	84.1	81.7
73	G	-	-	27	25	76.0	78.1	77.3
74	I	-	-	130	78	67.9	74.5	68.0
75	S	97	56	-	23	68.3	73.7	69.0
76	C	-	69	26	21	66.8	75.4	69.7
77	G	-	-	48	27	82.4	84.4	83.1
78	G	-	-	100	42	83.4	81.1	85.1
79	G	-	-	-	20	66.8	90.2	62.9
80	G	-	-	-	66	64.2	79.3	75.8
81	C	-	-	44	27	78.9	81.6	81.7
82	C	-	-	-	21	72.1	82.3	73.0

THE NUMBER OF SHARES & DIVERSIFICATION (3)

Trust Number	Trust Type	Number of Shares				Diversification		
		1965/6	1970/1	1975/6	1976	1966-75	1966-70	1971-75
83	S	75	68	36	35	82.1	83.9	83.6
84	G	-	126	94	105	85.6	87.4	86.0
85	S	58	71	142	141	73.3	44.7	90.0
86	C	59	105	86	75	79.2	74.8	90.0
87	I	193	40	96	68	73.1	24.1	85.6
88	S	326	414	450	517	63.6	41.5	69.6
89	C	-	-	-	66	82.3	70.7	88.7
90	I	-	-	-	67	82.6	61.8	87.4
91	G	-	-	-	42	90.8	74.9	95.2
92	S	-	-	-	62	14.5	37.8	9.5
93	G	-	-	-	157	93.6	94.0	94.7
94	G	-	-	-	212	94.4	89.1	95.8
95	I	-	-	-	175	92.3	87.4	91.9
96	G	-	-	-	84	94.6	90.6	96.0
97	S"	75	-			61.6	88.3	57.4
98	S"	76	-			96.2*	82.1	*
99	I"	-	-			82.8	82.7	84.5
100	G"	-	-			76.6	58.2	84.5
101	G"	-	-			97.2*	85.7	*
102	S"	-	-			96.8*	85.9	*
103	G"	92	-			75.9	81.8	76.8
104	G"	-	-			94.2*	88.6	95.8*
105	S"	-	-			95.9*	89.4	*
106	I"	-	-			89.1	90.4	90.3
107	G"	-	-			75.8	78.7	
108	G"	-	-			74.4	71.0	
109	G"	-	-			73.9	71.1	75.2
110	G"	-	-			76.3	81.7	
111	S"	-	-			76.1	79.9	
112	S"	-	-			74.7	76.5	
113	S"	-	-			76.0	89.4	75.3
114	S"	-	-			68.4	63.9	
115	G"	-	52			87.3*	83.7	89.0*
116	S"	37	28			77,6	87.1	78.6
117	G"	55	-			84.9	82.9	
118	G"	-	-			85.7	88.3	86.0

"- Inferred category from trust name.
Source: Stock Exchange Official Year Book and Unit Trust Yearbook.

Diversification "D" = $$\left(\frac{COV(R_j, R_M)}{\sigma(R_j)\ \sigma(R_M)} \right)^2$$

The percentage of variation in asset j explained by the market.

APPENDIX G

THE GEOGRAPHICAL DISTRIBUTION OF UNIT TRUST PORTFOLIOS AND GROSS INVESTMENT IN UNIT TRUSTS

In Table G.1, the geographical distribution of the combined portfolios for both unit trusts and investment trusts (as a comparison) are shown. For the 10-year period of the analysis, the unit trusts maintained between 91.4 percent and 84.3 percent of their portfolios in UK securities or current assets. The balance was invested in overseas stockmarkets. The investment trusts, by contrast kept 64.8 percent and 61.8 percent respectively. It is evident that throughout the period the unit trust industry predominantly provided a means for investors to participate in the UK stock market. and UK securities.

The Sales Turnover rates for both the Investment Trust industry and for Unit Trusts were calculated over the period, and are detailed in Table G.2. Because it was not possible to relate the turnover rates for the trusts to the individual portfolios, the overall picture is the only evidence we possess for the search for performance by trust managements. The rate of turnover for the funds over the period varied between the years but was based on a rising trend: there was a peak of activity in the year 1975. The average turnover rate for the period was around 30 percent.

In Figure G.A the relationship of Sales Turnover rates to the sale of unit trust units is shown. There is a positive relationship between the level of sales activity and the sale of units. Thus the actual level of turnover for existing funds is most probably well below the 30 percent average figure for the industry as a whole, as this reflects the effect of setting up new funds.

There appears to have been a considerable change in the nature of unit trust investment over the period under analysis. The following data gives an indication of a shift in pattern of investor behaviour in the unit trust movement:

Year	Sales Turnover Rates	Sales of Units £m	New Trusts Formed	Number of Holdings (millions)
1965	9.2	80.79	17	1.42
1966	11.9	129.7	18	1.64
1967	24.2	126.5	20	1.71
1968	26.8	328.8	30	2.15
1969	31.5	262.7	15	2.4
1970	39.4	171.1	41	2.4
1971	38.19	203.9	7	2.31
1972	32.22	436.8	52	2.29
1973	35.32	357.4	37	2.24
1974	17.11	194.3	(2)	2.2
1975	53.89	320.9	13	2.19

There are two interpretations to be made of the above data.

(1. Sales turnover rates are to a degree linked to the influx of new monies and the creation of new trust portfolios;

(2. The number of holdings has declined at a time when the creation of new trusts continued apace, and there was a positive increase in the flow of funds into unit trusts. The increased turnover may be a reaction to the decline in holdings, and is a response to such a signal.

It would appear there was a worsening in the enviroment within which unit trusts operated over the period. The increased level of interest rates and a higher volatility in share prices may account for this phenomenon. There is also the fact of increased competition between trusts within the industry. In 1965, the 121 trusts in existence received on average £0.49 million each in new investment. In 1975, the 356 unit trusts got an average £0.53 million each, despite the fact that the acquisition of financial assets (Table 4.A page 63) by the personal sector rose from £2bn. in 1965 to £8.976bn. in 1975, a fourfold increase. In addition, there was a decline in the number of holdings from a peak of 2.4 in 1969/70 to 2,19 by 1975.

The principal way in which this changed enviroment manifests itself in this study is through the reduction in the number of management groups by takeover or merger to combat the decline in profitability in managing unit trust portfolios.

Table G.3 is a summary of the quarterly transactions of the unit trust industry. The number of units in millions, the total funds under management, gross quarterly sales, repurchases of units per quarter, and finally the difference between sales and repurchases, the net addition to funds under management.

Numbers of trusts and gross market value of unit trust portfolios for the individual years are given at the bottom of the table.

TABLE G.1

TABLE 5.D

DISTRIBUTION OF FUNDS BY GEOGRAPHICAL AREA FOR INVESTMENT AND UNIT TRUSTS

1965 - 1975 %

Year		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Investment Trusts												
UK Current Assets		2.1	3.5	2.2	1.9	3.5	4.1	1.6	2.5	8.2	16.3	5.4
Investments		62.7	62.6	61.5	62.1	62.2	62.2	69.8	62.2	55.3	43.6	56.4
Overseas	USA	25.5	23.9	26.3	26.1	22.8	22.2	19.2	20.0	20.2	22.4	21.5
	Other	9.6	10.0	9.9	9.9	11.6	11.4	9.3	15.3	16.2	17.7	16.6
Unit Trusts												
UK Current Assets		2.2	2.8	2.2	3.4	3.5	5.4	3.7	8.9	17.6	28.2	9.8
Investments		89.2	87.5	89.3	88.8	86.3	84.3	87.4	77.5	66.2	54.4	74.5
Overseas	USA	4.2	4.1	3.8	3.6	4.0	4.4	3.8	5.2	6.3	6.6	7.5
	Other	4.4	5.6	4.7	4.2	6.2	5.9	5.1	8.4	9.9	10.8	8.2

Based on year end portfolios. Source: Bank of England Quarterly Bulletin, Tables 17 and 18.

TABLE G.2(1)

SALES TURNOVER RATES FOR INVESTMENT & UNIT TRUSTS* 1965 - 1975 % (1)

Year	1965	1966	1967	1968	1969	1970	1971
<u>Investment Trusts</u>							
UK Securities %	9.6	9.5	15.9	14.0	14.7	16.53	15.20
Overseas Securities %	15.4	12.9	17.2	15.6	17.4	14.94	18.64
All securities % Portfolio	11.7	10.7	16.3	14.6	15.7	15.97	16.29
All securities % Total Assets	11.6	10.4	15.8	14.3	15.3	15.37	15.84
<u>Unit Trusts</u>							
UK Securities	9.2	11.7	25.1	28.0	33.5	41.65	39.83
Overseas Securities	9.8	17.1	20.8	23.0	18.1	37.62	38.91
All securities % Portfolio	9.4	12.2	24.8	27.5	32.1	41.22	39.73
All securities % Total Assets	9.2	11.9	24.2	26.8	31.5	39.40	38.19

*Based on BURTON & CORNER (1970).

Sales/(Assets Year t + Assets Year t-1)$\frac{1}{2}$x100

Source: Bank of England Quarterly Bulletin

TABLE G.2(2)

SALES TURNOVER RATES FOR INVESTMENT & UNIT TRUSTS* 1965 - 1975 % (2)

Year	1972	1973	1974‡	1975‡	Average 1965-1975
Investment Trusts					
UK Securities %	20.37	23.97	30.49 (19.24)	33.10 (18.58)	18.49 (16.15)
Overseas Securities %	21.71	30.29	34.60	21.02	19.97
All securities % Portfolio	20.81	26.37	32.25 (25.83)	27.93 (19.65)	18.97 (17.63)
All securities % Total Assets	20.37	25.07	28.57 (22.88)	25.14 (17.69)	17.98 (16.78)
Unit Trusts					
UK Securities %	35.30	38.01	23.22 (19.11)	67.44 (55.18)	32.09 (30.60)
Overseas Securities %	28.92	52.34	15.04	52.20	28.53
All securities % Portfolio	34.51	40.41	21.59 (18.30)	64.47 (54.60)	31.63 (30.43)
All securities % Total Assets	32.22	35.32	17.11 (14.50)	53.89 (45.64)	29.07 (28.03)

‡ Basis of estimation changed in 1974: brackets are for UK listed companies only.

TABLE G.3(1)

UNIT TRUST TRANSACTIONS

Years Quarters	Number of Holdings millions	Total Funds[1] £m	Sales of Units £m	Repurchase of Units £m	Net Sales £m
1964.1	1.13	383	25.65	5.67	19.98
.2	1.20	415	26.36	5.63	20.73
.3	1.26	453	23.95	6.10	17.85
.4	1.31	429	23.68	5.20	18.48
1965.1	1.36	455	22.84	5.49	17.35
.2	1.37	446	15.69	5.50	10.19
.3	1.37	484	15.76	4.58	11.18
.4	1.42	522	26.50	6.20	20.30
1966.1	1.51	570	45.50	7.6	37.9
.2	1.57	640	41.7	6.8	34.9
.3	1.59	553	20.8	6.4	14.4
.4	1.64	582	21.7	3.6	18.2
1967.1	1.65	617	25.1	5.9	19.2
.2	1.67	689	25.1	9.4	15.7
.3	1.67	754	32.1	12.0	20.1
.4	1.71	854	44.2	15.3	28.9
1968.1	1.78	985	65.7	15.0	50.8
.2	1.85	1,190	85.6	18.6	67.0
.3	2.00	1,304	87.4	18.8	68.6
.4	2.15	1,482	90.1	18.0	72.1
1969.1	2.30	1,507	117.7	26.6	91.0
.2	2.36	1,316	63.3	21.2	42.2
.3	2.39	1,329	41.6	12.2	29.4
.4	2.40	1,412	40.1	16.6	23.6
1970.1	2.42	1,457	55.4	22.5	32.9
.2	2.43	1,276	48.2	18.3	29.9
.3	2.41	1,414	34.7	13.4	21.4
.4	2.40	1,398	32.8	19.2	13.6
1971.1	2.38	1,469	39.2	17.6	21.6
.2	2.36	1,688	56.8	32.8	24.1
.3	2.34	1,836	47.2	39.8	7.4
.4	2.31	1,991	60.7	37.1	23.6
1972.1	2.28	2,300	88.3	56.7	31.6
.2	2.29	2,308	130.8	56.4	74.4
.3	2.29	2,319	107.0	44.6	62.4
.4	2.29	2,647	110.7	37.8	72.9
1973.1	2.30	2,461	112.6	44.0	68.6
.2	2.28	2,544	103.1	41.4	61.7
.3	2.25	2,433	73.1	40.6	32.5
.4	2.24	2,060	68.6	45.4	23.2
1974.1	2.22	1,909	50.8	30.6	20.2
.2	2.22	1,700	45.9	25.8	20.1
.3	2.21	1,368	54.2	33.5	20.7
.4	2.20	1,310	43.4	19.9	23.5
1975.1	2.20	1,942	82.5	28.5	54.0
.2	2.19	2,203	94.5	36.5	58.0
.3	2.20	2,279	66.3	28.6	37.7
.4	2.19	2,512	77.6	37.2	40.4

TABLE G.3(2)

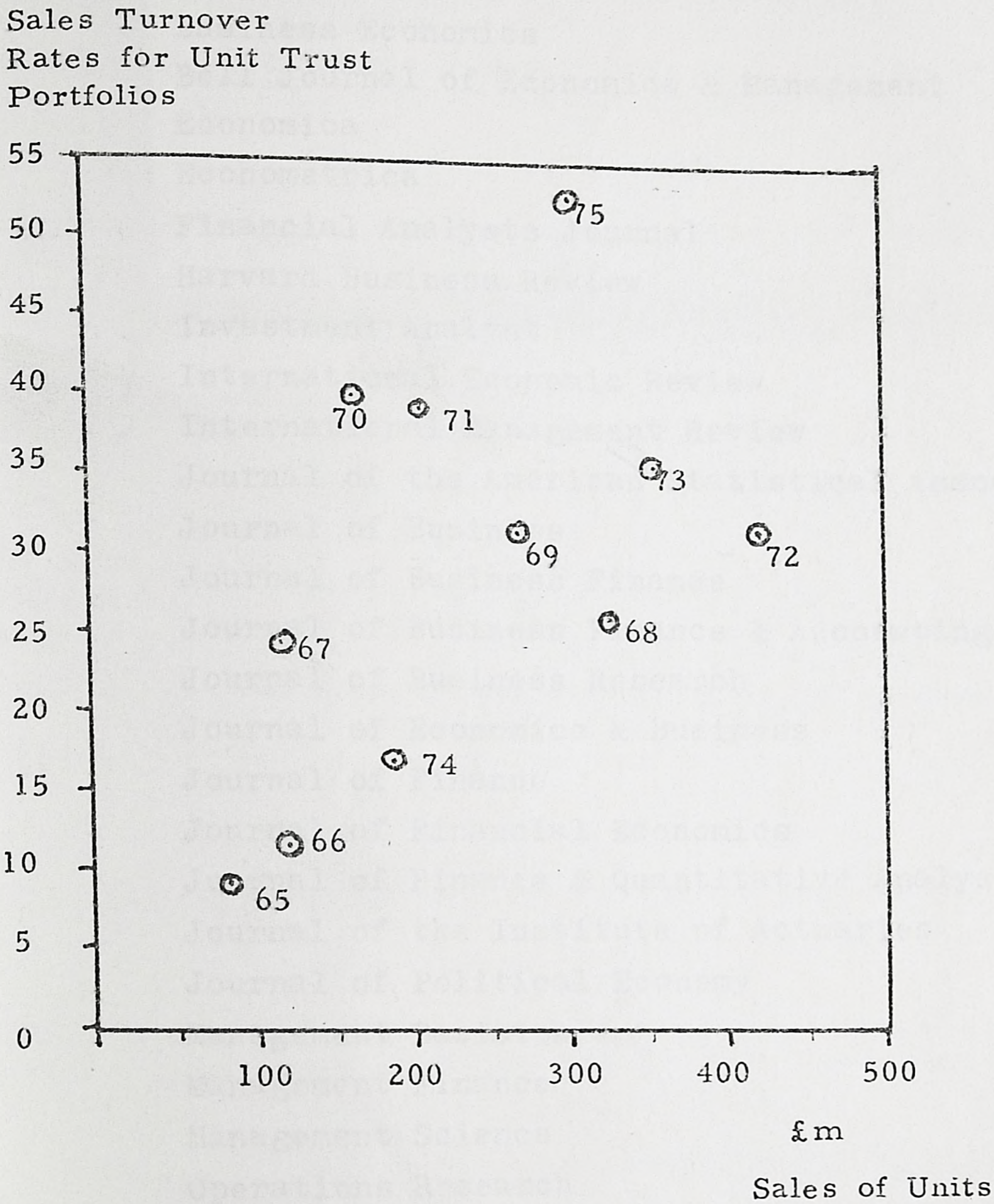
UNIT TRUST TRANSACTIONS

Years Quarters	Number of Holdings millions	Total Funds[1] £m	Sales of Units £m	Repurchse of Units £m	Net Sales £m
1976.1	2.18	2,660	104.4	51.4	53.0
.2	2.16	2,570	91.2	38.7	52.6
.3	2.13	2,424	69.5	38.3	31.2
.4	2.12	2,543	68.2	37.3	30.9

1- At the end of the quarter.
Market Value plus cost of purchase for the portfolio, managers' initial charge and undistributed accumulated dividend.

Year	Number of Trusts	Value £m	Year	Number of Trusts	Value £m
1961	42	236.6	1969	206	1,412.0
1962	54	272.5	1970	221	1,397.7
1963	70	371.2	1971	262	1,991.2
1964	105	428.9	1972	269	2,647.5
1965	121	521.9	1973	321	2,060.4
1966	138	581.8	1974	358	1,310.8
1967	156	853.7	1975	356	2,512.4
1968	176	1,482.4	1976	369	2,275.0

FIGURE G.A



Relationship of portfolio turnover for unit trusts and new funds for units for the period 1966 - 1975

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Abbreviations

A&BR	Accounting & Business Review
AER	American Economic Review
BE	Business Economics
BJEM	Bell Journal of Economics & Management
Ec	Economica
Ecta	Econometrica
FAJ	Financial Analysts Journal
HBR	Harvard Business Review
IA	Investment Analyst
IER	International Economic Review
IMR	International Management Review
JASA	Journal of the American Statistical Association
JB	Journal of Business
JBF	Journal of Business Finance
JBF&A	Journal of Business Finance & Accounting
JBR	Journal of Business Research
JE&B	Journal of Economics & Business
JF	Journal of Finance
JFE	Journal of Financial Economics
JFQA	Journal of Finance & Quantitative Analysis
JIA	Journal of the Institute of Actuaries
JPE	Journal of Political Economy
MD	Management Decision
MF	Management Finance
MS	Management Science
OR	Operations Research
QRe&B	Quarterly Review of Economics & Business
RES	Review of Economic Studies
RE&S	Review of Economics & Statistics
TBR	Three Banks Review

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