Chapter 3

Data and Methodology

3.1 Net Asset Value and Return

The Net Asset Values (NAV) of unit trusts at the end of months is used to calculate the monthly returns of unit trusts. The NAV data from year 1991 to 2000 was obtained from Federation of Unit Trust Manager and The Edge magazine. All dividends are assumed to be reinvested by purchasing units in the unit trusts at ex-dividend price. Calculation of monthly returns use the following equation:

$$R_t = [(1 + D_t / B_{xt})(B_{t+1} / B_t) - 1]$$

where R_t = NAV return for the period

B_{t+1} = Manager bid price of unit at period t+1

B_t = manager bid price of unit at period t

B_{xt} = ex-dividend manager bid price

D_t = gross dividend paid in period t

3.2 Sources of Data

The data used in this study are obtained from the following sources:

1. Three-monthTreasury Bills from Bank Negara Malaysia Monthly Statistical Bulletin

2. Kuala Lumpur Composite Index from Security Commission and Bank Negara Website

3. Net Asset Values, dividends and ex-dividend prices from year 1991 to 1998 from Federation of Malaysia Unit Trust Managers (FMUTM)

4. NAV returns of unit trusts from year 1999 to 2000 from Lipper Fund Table (by Lipper-Asia in association with FMUTM) published in The Edge Magazine.

The numbers of equity funds included in this study are summarized in the following table.

Table 2 Numbers of unit trusts included in the study

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Government-sponsored trust	12	13	13	13	16	17	17	17	17	17
Private unit trust	12	15	21	29	40	46	46	46	46	46
Total	24	28	34	42	56	63	63	63	63	63

3.3 Research methodology

Hypothesis

Let R_{it} be the net return in excess of the risk free rate of unit trust i in month t. R_{it} can be decomposed as follows:

$$R_{it} = E_{t-1}(R_{it}) + \varepsilon_{it}$$

where $E_{t-1}(R_{it})$ = market's expected value at t–1;

ε_{it} = residual return realized in month t.

Null hypothesis

The usual null hypothesis of efficient market is that ε is unpredictable.

$$E_{t-1}(R_{it}) = 0, \text{ for all i and t}$$

Alternative hypothesis

The alternative hypothesis allows for the unconditional mean of ε to be zero, admits short run predictability of residual returns from past history, which violates a weak-form market efficiency.

$$E(\varepsilon_{it} | \varepsilon_{it-1}, \varepsilon_{it-2}, \varepsilon_{it-3}, \ldots) \neq 0 \quad \text{for some i and some t}$$

The alternative hypothesis can be projected into a linearized form for the purpose of cross sectional time series tests:

$$E(\varepsilon_{it} \mid \varepsilon_{it-1}, \varepsilon_{it-2}, \varepsilon_{it-3}, \ldots) = \sum_{j=1}^{J} \rho_{ij} \varepsilon_{it-j} \; ; \quad \rho_{it} \neq 0 \text{ for some i and some j}$$

The above alternative hypothesis implied that some unit trusts' recent performance will persist, at least in the near future.

Research Design

Method 1: Regression of residual returns

To investigate the serial correlation of unit trusts returns, the following regression model can be written for month t (Hendricks,Patel and Zeckhauser (1993):

$$R_{it} - E_{t-1}(R_{it}) = a_t + \sum_{j=1}^{J} b_{jt} R_{it-j} + \varepsilon_{it} \qquad \text{(equation 1)}$$

where

$i = 1,2,3,\ldots\ldots N_t$, where N equals to the number of unit trusts in the sample

R_{it} = excess return of unit trust i at time t, where $R_{it}=(r_{it}-r_f)$

$E_{t-1}(r_{it})$ = market's expected value of the unit that is conditioned on the information available to the market at time t-1

ε_{it} = residual returned realized in time t

To operationalize the statistical test, we need to determine $E_{t-1}(r_{it})$, i.e. the market equilibrium return. Thus R_{it}-$E_{t-1}(R_{it})$ is the residual return or abnormal return of unit trust i at time t. Three different approaches are used to calculate the residual returns:

1 Moving average-adjusted residual

This simple approach assumes that $E_{t-1}(R_{it})$ is constant over the sample period. The residual return for unit trust i is the excess return of unit trust I in month t less its mean over the sample period.

2 Market adjusted residual

Market adjusted residual for unit trust i can be defined as the excess return of unit trust i in month t less the market portfolio return in month t.

Market adjusted residual is a simple measure of how much unit trust i performs better than the market without considering the risk of the unit trust. If market adjusted residual for the unit trust is greater than zero, then the unit trust beat the market.

3 Risk adjusted return

Under this approach, the market equilibrium return for fund I is obtained using the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

where

R_{it} = return in excess of risk free rate of unit trust I for period t

R_{mt} = return in excess of risk free rate of the market portfolio for period t

ε_{it} = residual return that is independent of the return on market portfolio

α_i = intercept of unit trust i

β_i = risk of unit trust i relative to market portfolio

Using this market model, the return of unit trust i in excess of risk free rate is regressed against the market return in excess of risk free rate similar to CAPM regression model.

Cross sectional regression

The cross sectional regression approach was first adopted by Fama and Macbeth (1973) and Jegadeesh (1990) implemented the cross sectional regression using the above model for testing of the predictability of stock returns.

The above regression model is fitted across the full samples of unit trusts using Ordinary Least Square methods where the dependent variable is the residual return of unit trust i at time t and the independent variables are the excess return of lag 1, 2, ... to J. The slope coefficient obtained should be zero under the null hypothesis of non-serial correlations in the unit trust excess returns.

The cross sectional regression is performed for each month of the study period from 1991 to 2000 where J sets of slope coefficients a_{j1}, a_{j2}, a_{j3}, ...a_{jT} are obtained.

t-Statistic can then be computed for the set of slope coefficients for a particular lag to test for non-autocorrelation of residual return with the lag.

Method 2: Contingency Tables

The non-parametric contingency table analysis identifies the frequency with which unit trusts defined as winner or losers maintained that relative performance over succeeding time periods. Cross-section tests of fund performance persistence in at least two consecutive two-year periods were studied. The first two-year period of will be called prior period and the next two-year period will be called subsequent period.

For each unit trust, raw returns and Jensen's alphas were calculated based on two years of data for all periods.

Funds were then grouped as winners or losers depending on whether the specified performance measure was above or below the median value of all unit trust for the period. For each period, the unit trusts are divided into two categories: Unit trusts with performance measure above the median in the prior period are assigned to the winner (W) group, and those with below median performance are assigned to the loser (L) group. The same criterion is used to identify unit trusts as a winner or loser for in the subsequent period. Since we look at two periods, the prior and subsequent period, some unit trusts will belong to the winners in both periods (WW) and some will be losers in both (LL). Unit trusts that belong to WW and LL groups indicate repeat winners or losers, suggesting persistence in performance. The rest of the unit trusts are winner in one period and loser in the other period, hence categorised as WL or LW accordingly. The WL and LW groups suggest performance reversal.

The null hypothesis(h_o) states that there is no relation between prior period performance and subsequent period performance, corresponds performance reversal. The alternative hypothesis(h_1) suggests performance persistence. Chi-square non-parametric test of independence is used to test the significance. The null hypothesis can be rejected if Chi-square p-value is lower than 0.05 at 95% confidence level or 0.10 at 90% confidence level.