CHAPTER 2

DATA AND METHODOLOGY

2.1 Empirical Research in Europe, United States and Singapore and Malaysia

Prior to the discussion on data and methodology, we now highlight some studies and empirical findings of investment of unit trusts done by the researchers in Europe, United States of America ("USA"), Singapore and Malaysia. The Modern Portfolio Theory developed by Markowitz and the subsequent Capital Asset Pricing Model are the two fundamental concept of portfolio performance.

The first person to study the performances of mutual funds using a risk adjusted measure in USA is William Sharpe (1966). He has then developed a very useful portfolio measurement index, which is known as the Sharpe Index. A total of 34 mutual funds were evaluated and the results showed that the average return of mutual funds is lower than that of the Dow Jones Industrial Index ("DJIA").

Jensen developed another widely used index in 1968. It is called the Jensen's Alpha and can be used to evaluate a portfolio manager's predictive ability of the securities prices. His findings also showed that mutual funds were not able to outperform a 'naive buy and hold strategy'.

In the United Kingdom, Fifth (1977 & 1978) carried out an extensive study on the performances of unit trusts. The results also showed that fund managers have not been able to outperform the market.

In Singapore, Koh and Koh did a study in 1987 and they found that the returns and risks characteristics of the funds were not fully in consistent with their stated objectives. Growth funds, for example, should have higher returns and higher risks. The results, however, showed otherwise. They also found that the performances of the unit trusts were lower than the market return.

Another researcher, Lee, did a study in 1993 on 21 unit trusts in Singapore over a 5-year period from 1986 to 1990. Her results, again, showed that the unit trusts under performed the naive buy and hold strategy.

In Malaysia, Chua did a study in 1985 for a 10-year period from March 1974 to April 1984. His study showed that, on average, the 12 unit trusts under his study provided better returns when compared to investments in risk-free assets and market portfolios. His samples, however, consisted of 9 government-sponsored funds and 3 private funds. The results also showed that the government-sponsored funds performed better than the private funds.

In 1995, Tan did an empirical study that covered a 10-year period from January 1984 to December 1993, about ten years after Chua's study. Tan managed to analyse 21 funds, out of which 13 funds are government-sponsored and the rest are private funds. In his research, the unit trusts performed worse than the market portfolio, which contradicted Chua's findings. His study, however, showed that the government-sponsored funds performed better than private funds, consistent with Chua's findings.

Although Tan's study has covered period of boom and recessional markets, he did not sub-divide the period. Therefore, his study cannot conclude how the unit trusts performed during different market scenarios.

The most recent research on this topic was by Ch'ng. In 1997, Ch'ng studied the performance of unit trusts and property trusts for a 6-year period from January, 1991 to December, 1996. The study was sub-divided into two sub-periods. The first sub-period was from 1991 to 1993 and the second was from 1994 to 1996. The results showed that generally, unit trusts outperformed the market portfolio in almost all the periods. The performances of the funds were better in the sub-period 1991 to 1993 than in the sub-period 1994 to 1996.

However, the study cannot conclude whether unit trusts performed better during boom or recessional market because there was no significant difference in the market conditions during this period. Both periods saw the country's GDP grew by more than 8% per annum.

From the above researches, it illustrates that there is no research performed to compare how the unit trusts perform under the two different market conditions. This research will provide insights as to how the unit trusts perform during the two different economic scenarios, as Malaysia experienced consistent growth from 1995 to 1997 and suffered one of the worst economic crises from 1997 to 1999.

2.2 Measurement of Rate of Return

2.2.1 Rate of Return for Risk-free

This is calculated using the three-month Treasury Bills. The data is extracted from the Bank Negara Malaysia Monthly Statistical Bulletin. Treasury Bills is chosen as a proxy for a risk-free rate of return because it is government guaranteed and considered default free. The three-month period was chosen because it is most active in trading.

2.2.2 Market Rate of Return.

The market proxy used in this research is the Kuala Lumpur Stock Exchange Emas Index. The reasons of choosing this index as the market proxy is discussed later. The market rate of return is calculated as follows:-

$$\text{Market rate of return} = \frac{(EI_t - EI_{t-1})}{EI_{t-1}} \times 100$$

Where

EI_t - Emas Index in period t

EI_{t-1} - Emas Index in period $t - 1$

2.2.3 Unit Trusts Rate of Return

There are two different prices quoted in the unit trusts, namely the selling price and the bid price (or buying price). Unit trusts companies are obliged to repurchase the units from the unit trusts holders at the published bid prices. Most of the unit trusts calculate their bid prices based on the net assets values ("NAV"). Therefore, for simplicity, the unit trusts rate of return in this research will

be based on the monthly closing bid price or NAV. The rate of return is calculated as follows:

$$R_t = \frac{(P_t - P_{t-1}) + D_t}{P_{t-1}}$$

Where

R_t = rate of return in the period t

P_t = bid price of unit trust at period t

P_{t-1} = bid price of unit trust at period t-1

D_t = dividend paid in period t

For example, the NAV/Buy of Amanah Saham Kedah as of 28th of February, 1997 is RM1.35. Dividend paid out in March 1997 was RM0.143 per unit. Closing buy price for the month was RM1.19. Therefore, the monthly return for the month March is

$$R = \frac{(1.19 - 1.35) + 0.143}{1.35}$$

$$= -0.01259$$

It is important to ensure that all the prices are adjusted for bonus issues. This can be done by either forward or backward adjustment. If no adjustments are made, the prices obtained from the published prices will not be compatible.

2.3 Measurement of Risk

The task is only half complete if we just calculate the rate of return of the unit trusts. Another equivalent important variable in assessing the performance of portfolio is "Risk". This is important because return is associated with risk; high return should correlates high risk and vice versa. A fund manager may achieve high return in his investment because he invests in high risk stocks. When recession comes, his investment will suffer huge losses. As such, he might not be a good fund manager if the risk is much higher than the return

Before Markowitz developed his popular Modern Portfolio Theory, financial analysts measured returns but were unable to deal with or incorporate risk in a systematic and rigorous manner in their analysis. In 1952, Markowitz developed the Modern Portfolio Theory. He used the standard deviations of historical returns to measure risks. This is now widely accepted because risk can be defined as "how likely or unlikely we will receive the expected return". Another important finding in his research is the advantage of diversification. Risk or Standard Deviation can be calculated as follows:

$$S.D = \left[\frac{\sum_{t=1}^{N} (Rt - R)^2}{N - 1} \right]^{\frac{1}{2}}$$

where   S.D   = risk or standard deviation of the unit trust

              Rt   = rate of return of the unit trust in period t

              R   = mean of rate of return for the unit trust

              N   = number of data

Another method widely used to measure risk is the beta coefficient, B, which estimates the systematic variation of the returns of the fund with respect to the chosen market index. This can be calculated from the slope line by regressing the monthly returns of the unit trusts with respect to the monthly

returns of the market proxy. The steeper the slope, the riskier the unit trusts because the prices will move more widely than the market, and vice versa. Therefore, Beta for the market is always 1. Beta can be obtained from the following equation:

$$R_{j,t} = A + B\ R_{m,t}$$

Where

A	= regression intercept
B	= slope of characteristic line or beta
$R_{j,t}$	= return on unit trust in month t
$R_{m,t}$	= return on market portfolio m in month t

The first risk measurement (Standard Deviation) is used in Sharpe Index and second measurement (Beta) is used in Treynor Index and Adjusted Jensen Alpha.

2.4 Measurement of Portfolio Performance

The research will use the four types of different measurements, namely the Sharpe Index, Treynor Index, Adjusted Jensen Alpha and Fund market adjusted return. The first three indexes deal with risk adjusted returns and they are only useful when the returns are positive, but could not give conclusive results when the returns are negative. As such, this research introduces the Fund Market Adjusted Return, i.e. funds return minus market return, which will overcome the above problem.

2.4.1 Sharpe Index

William Sharpe developed this index in 1966 when he studied the performances of the mutual funds in USA. Using the concept of the capital market line, Sharpe suggested that historical performance be calculated as the return earned for bearing risk per unit of total risk. Symbolically, the Sharpe index is calculated as follows:

Sharpe Performance Index

$$S_p = \frac{R_p - RF}{S.D}$$

Where

S_p = Sharpe Index

R_p = average return on portfolio over the evaluation period

RF = average risk-free rate over the evaluation period which is estimated by using the 3-month treasury bill rate

S.D = standard deviation of portfolio's return

The nominator, $R_p - RF$, is the excess return over risk free rate, whereas the denominator is the risk factor which was discussed earlier. As such, the greater value of Sharpe Index, the better performance of a unit trust. If the Sharpe Index of a unit trust is greater than the Sharpe Index of market proxy, then the unit trust outperforms the market, and vice versa.

2.4.2 Treynor Index

Using the concept of the security market line, Treynor chose to treat only the non-diversifiable market risk of an investment. Therefore, he developed the following performance index:

Treynor Performance Index

$$T_p = \frac{R_p - RF}{B_p}$$

Where

B_p = beta of a portfolio and it is a measure of the historical volatility or responsiveness of the portfolio to changes in the market index.

By assumption, B_p of the market proxy is 1.0. It can be estimated in either of the two ways:-

i) by regressing the returns on a portfolio on the returns on a market index over some evaluation periods

ii) by regressing the excess returns on a portfolio on the excess returns on a market index over some evaluation periods

The second approach is theoretically better and is used in this research.

2.4.3 Jensen Performance Index

Like Treynor, Jensen relied directly on the Capital Asset Pricing Model ("CAPM") to develop an estimate of investment portfolio performance. However, unlike Treynor's relative measure of performance, Jensen's alpha is an absolute measure that estimates the constant periodic return an investment is able to earn above or below a buy-and-hold strategy with equal systematic risk.

Market model of a portfolio

$$R_{jt} = RF_t + B_j (R_{mt} - RF_t) + E_{jt}$$

Where

E_{jt} – portfolio returns that are unrelated to market returns. If a portfolio is completely diversified, the value is zero.

Excess return regression in equilibrium,

$$(R_{pt} - RF_t) = B_p (R_{mt} - RF) + E_{pt}$$

However, if an investor consistently outperforms or under-performs the market, portfolio return would be better described as follows:

$$(R_{pt} - RF_t) = A_p + B_p (R_{mt} - RF) + E_{pt}$$

Therefore, Jensen's Alpha,

$$A_p = (R_{pt} - RF_t) - B_p (R_{mt} - RF)$$

Where A_p = constant periodic return that the portfolio manager is able to earn above an unmanaged portfolio having identical market risk.

Jensen's Alpha cannot be used to rank the performances of different unit trusts unless they are risk adjusted by dividing by B_p. This is because a higher portfolio risk (greater B_p) should provide higher return.

Therefore, Adjusted Alpha Index,

$$\text{Adj. } A_p = \frac{A_p}{B_p}$$

2.4.4 Funds Market Adjusted Return

Treynor and Jenson's Alpha Indexes assume that the CAPM is the correct model of stock pricing. There is no consensus that this statement is true. So it appears that the Sharpe measure of total risk avoids this contentious problem, and does not also require any assumption about the diversification of risk.

There are, however, no consensus on either one of the methods of measurements is the perfect way of portfolio's performance measurement. The methods are subject to criticism and challenges. We will see the problems of using these indexes in Chapter IV later. As such, in this research, another performance measurement is introduced, i.e. Funds Market Adjusted Return.

$$R_{Adj.} = R_j - R_m$$

Where

$R_{Adj.}$ = funds market adjusted return

R_j = average return of unit trust j

R_m = average market return

If $R_{Adj.}$ is greater than zero, then the particular unit trust outperforms the market. If it is less than zero, then it under performs the market. The greater the value of the Funds Market Adjusted return, the more desirable is the unit trust.

This method will show whether a unit trust outperforms the market or not at a glance. The value calculated is an absolute value of how much it outperforms or under-performs the stock market.

2.4.5 Other Methods of Portfolio Measurement

For the Malaysia unit trusts industry, independent financial services, monitoring and rating agencies such as Lipper Analytical Services (foreign based), Micropal (foreign based), and Normandy (Malaysian based) provide regular past performance ratings. These are easily accessible and available in financial publications such as the Edge magazines. All these ratings, however, do not consider risk. They group these unit trust funds into their stated objectives and rank them accordingly based on the returns only.

However, dividing these funds into their stated objectives is not so relevant because studies have shown that these were not always adhered to. Growth funds, for example, should have the highest returns and risks, but the results showed otherwise (Tan, 1995; Lee, 1993). The fund managers might invest their money according to the stated objectives, but the results did not reflect what were anticipated. The conclusion was based on the past performance, aggressive funds should have higher risk and higher return. Later we will discover that this research also provides similar results.

In fact, Sharpe Index, Treynor Index, Adjusted Jensen Alpha incorporate risk into their measurements. So it is not important to know the nature of the funds when assessing its performances.

2.5   Market Proxy

Besides the methods of performance measurements, the market proxy is another controversial one because it is difficult to determine what market is.

Most of the researchers in Malaysia use either the Kuala Lumpur Stocks Exchange Composite Index or the Emas Index. They will be absolutely right if all the unit trusts invest their funds only in the Composite Index stocks or the Main Board stocks. However, most of the funds also invest in equities, bonds/debt, money market instruments, commodities, derivatives, real estate/properties, etc. The magnitude of the investment in each particular market depends on the stated objectives.

To obtain the 'correct market return', one shall get returns from different market instruments where these unit trusts invest, and give weightage according to the investment portfolio. This is impossible to do, because each individual unit trust has different portfolio, and the composition changes frequently depending on market conditions. In Malaysia, most of the funds are equity funds, and as such, most of the funds invest in equities. Therefore, the returns from share market are considered the most appropriate market proxy. This is also to make comparison as whether to invest in the share market or the unit trusts? As such this is a relevant comparison as both have the same nature of investment.

Next we will examine whether Composite Index, Emas Index, Second Board Index or Industrial Index of KLSE to be used. The answer depends on where are these unit trusts invest in. The regulation allows the unit trusts to invest not more than 50% of the fund in non-trustee stocks. This mean there are about half of the fund can be invested in any counters they like, and in fact quite a lot of unit trusts do so. As such, it would not be appropriate to use the Composite Index as the proxy.

On the other hand, some of the unit trusts do not invest in the Second Board counters and even they do so, the amount is quite small. Therefore, it is insignificant to include second board stocks in the market proxy.

The most appropriate market proxy to be used for this research is the Emas Index which include all stocks in the Main Board.