CHAPTER THREE

DATA AND RESEARCH METHODOLOGY

3.1 Introduction to Performance Measurement

The traditional method of performance measurement is based only on the rate of returns to the portfolio. The rate of return is usually expressed on a per dollar basis. However, this simple measurement does not take into account the factor of risk associated with the returns to a fund.

However, in Modern Portfolio Theory, this simple measurement is an inadequate yardstick because it does not take into account the factor of risk associated with the return to a fund. For example, Fund A may have earned a higher returns compared to Fund B by investing in more risky assets. According to theory, investors generally dislike risk, and therefore more risky stocks must necessarily yield higher returns[1]. The risk adjusted return of Fund A as a result can be lower than that of Fund B, and the performance of Fund B may be viewed as superior to that of Fund A.

Several statistics are required to derive an indicator, which can measure the performance of a unit trust. These are the rate of return of the funds, rate of return of the market portfolio, standard deviation, betas of the funds, coefficient of variation, coefficient of determination and standard error of estimates.

[1] The risk mentioned here refers to component of undiversifiable risk in an asset.

3.2 Methodology

3.2.1 Variance of Return

3.2.1.1 Rate of Return of the Market Portfolio

According to CAPM, the market portfolio comprises all the stocks of the market in proportion to their contribution to the total stock value in the market. The market portfolio is the most diversified portfolio in the stock market. To measure the performance of the fund, certain indices are needed to act as a proxy for comparison. In this study, the fund performance is at best compared with the market portfolio performance in term of the associated risk and the expected returns.

In this study, Malaysian Security Exchange Berhad (MSEB) Composite Index (CI), which comprises 100 counters from various sectors in the main board are assumed to be the best barometer of the overall stock market performance of the MSEB. The MSEB CI is widely referred to in Malaysia, and is therefore considered to be the representative of the market.

The variance of returns, which estimate the dispersion of the returns around the expected return, indicates of how risky a security is compared to another. If a fund's returns are more dispersed around its expected return compared to another fund's returns, then it shows that the former fund is riskier between the two funds. The more dispersed the returns, the fund will be more riskier. Likewise, the less dispersed the returns then the funds will be less risky. Furthermore if all the returns are equal to the expected return (there is no dispersion) the implication is that there is zero risk.

The variance of the market portfolio is estimated by using the following equation as follows:

$$R_{mt} = \frac{I_t - I_{t-1}}{I_{t-1}} \qquad \text{(Equation 3.1)}$$

$$\sigma_m^2 = \frac{\sum_{t=1}^{N}(R_{mt} - \bar{R}_m)^2}{N-1} \qquad \text{(Equation 3.2)}$$

Where;

R_{mt} = the rate of return of market portfolio at week t;

I_t = the level of MSEB CI at the end of week t;

σ^2_m = variance of returns of market portfolio;

R_m = the mean of the rate of returns for market portfolio;

N = number of observations.

3.2.1.2 Unit Trust

The variance of return of a unit trust is calculated as follow:

$$R_{jt} = \frac{P_{jt} - P_{j,t-1} + D_{jt}}{P_{j,t-1}} \qquad \text{(Equation 3.3)}$$

$$\sigma_j^2 = \frac{\sum_{t=1}^{N}(R_{jt} - \bar{R}_j)^2}{N-1} \qquad \text{(Equation 3.4)}$$

Where:

R_{jt} = the weekly return of fund j at week t;

P_{jt} = the net asset value or buying price of fund j at the end of week t;

D_{jt} = the dividend and bonus unit per unit paid by the management company at week t;

σ^2_j = the variance of return of fund j;

$\overline{R}_j$ = the mean of the rate of returns for fund j;

N = the number of observations.

3.2.2 Measurement of Risk.

Risk can be measured by two ways, standard deviation and beta coefficient. Standard deviation will be used to measure the total risk or historical risk, which consists of two types of risk (diversifiable risk and non diversifiable risk) whereas the beta coefficient will be used to measure only the non-diversifiable risk.

3.2.2.1 Standard deviation:

$$\sigma_j = \left[\sum_{t=1}^{N} \frac{(R_{jt} - \overline{R}_j)^2}{N-1} \right]^{1/2} \quad \text{(Equation 3.5)}$$

Where:

σ_j = the standard deviation of portfolio j, which measures the total variability of funds return;

R_{jt} = the rate of return for fund j at week t;

$\overline{R}_j$ = the mean of the rate of returns for fund j;

N = the number of observations.

3.2.2.2 Beta Coefficient:

The second measure of risk is the beta coefficient (β) of the unit trust. The more responsive the price of a security to the changes in the market, the higher will be that security's beta, and the riskier is the security. All securities with a beta greater than 0 will therefore earn a positive market risk premium and a return in excess of the risk-free rate.

The beta for the overall market is considered to be equal to 1. All other betas are viewed in relation to this value. Securities with beta less than unity are less volatile toward any changes in the market conditions (they are generally called defensive stocks). The returns to securities with beta greater than unity fall slower and rise slower in response to upward and down swings in the market. The securities will fall faster in a downswing and rise faster in an upswing. Therefore securities with beta greater than unity (they are generally called offensive stocks) are more volatile than securities with beta less than unity toward changes in market conditions.

According to CAPM, under the equilibrium market condition, the risk premium (beta) for any stock or fund is related to the risk premium of the market portfolio m in the following formula:

$$R_{jt} = \alpha + \beta_j R_{mt} + \varepsilon \qquad \text{(Equation 3.6)}$$

Where:

R_{jt} = the weekly returns of the fund j in week t;

α = the regression intercept or the constant term;

β_j = the slope of characteristic line for fund j, which measures the sensitivity of the fund's return over the market return;

R_{mt} = the market return in week t;

ε = the unexplained residual in week t, E(j,t) = 0

The beta coefficient of the fund is obtained by regressing the weekly returns of the fund (weekly fund's closing buying price) on the weekly returns of the market portfolio (represented by MSEB Composite Index).

3.2.3 The Goodness of Fit of CML

As discussed earlier (Chapter two Section 2.2), the Capital Market Line (CML) shows the various combinations of risks and returns offered by the capital market. It is a straight line with the risk-free rate as the Y intercept and passing through the market portfolio. The CML is the highest expected return an investor can obtain with a given level of risk. The CML can be expressed in the following equation;

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i \qquad \text{(Equation 3.7)}$$

Where:

β_0 = Y intercept for the risk-free rate

β_1 = slope of CML

ε_i = random error in Y for observation i

Other statistics calculated are sum of squares (SST), Total Sum of Squares (SST), Regression Sum of Squares (SSR), Error Sum of Squares (SSE) which can be used to derive the coefficient of determination (r^2) and is defined as a measure of the goodness of fit of the relationship between the dependent and independent variables in a regression analysis; for instance, the percentage of variation in the return of an asset explained by the Capital Market Line.

$$R^2 = \frac{\text{CML sum of squares}}{\text{Total sum of squares}} = \frac{\text{SSR}}{\text{SST}} \qquad \text{(Equation 3.8)}$$

The standard error indicates the average deviation between actual returns and the returns given by the CML. The equation is as follows;

$$\text{Standard Error of the Estimate} = \sqrt{\frac{\text{SSE}}{n-2}} \qquad \text{(Equation 3.9)}$$

It is important to note that if institutional investors such as the unit trusts follow the hypothetical world of CAPM, they will hold the market portfolio and vary the level of risk by borrowing (marginal financing) or lending (holding of risk free assets). Therefore, the combinations of risk (measured by standard deviation) and return should be at or near to the CML. If every institutional investor follows this strategy, then his or her risk-return relationship can be explained by the CML with the value of R^2 close to unity.

On the other hand, if the institutional investors do not follow the hypothetical world of CAPM, they will not hold the market portfolio. They will hold a narrower range of stocks, and may be actively trading stocks with the hope of outperforming the market. In this case, the combination of risk and return may be far from the CML. If all the unit trusts follow this latter strategy, the CML will be unable to explain the risk and return relationship of the unit trusts. The value of R^2 will not be close to unity.

3.3 Sources of Data

In the qualitative study, interview sessions were held to gauge several funds the strategies used for asset allocation and overall concept of stock picking strategies. These interviews were held with top management personnel from SBB Mutual Bhd., Hwang DBS Unit Trust Bhd., Mayban Unit Trust Bhd and CIMB Securities Sdn. Bhd.

The twenty-nine master prospectuses consisting of 200 listed funds as per Appendix 1 were used for the section two of the analysis. Most of the prospectuses were

downloaded from the Internet from their homepage or obtained from their respective sales offices.

By going through the prospectus, one would be able to identify the unit trust's prospectus as an official document containing detailed information of the fund and the company managing it. It should also include information on the company's list of funds together with the fund performance and track record. Investors are advised to read the respective prospectuses before investing and to keep the prospectus for record. A lot of information is available in these prospectuses, which can be used and analyzed. Among them is the Overview Index Data, which is an executive summary that provides general information, including management and investment objectives. Strategy and investor profile are also included and detailed together with the nature and objectives of the scheme including strategies employed to achieve them.

The data used for the quantitative study was secondary data. Weekly effective yields of 90-day Treasury bill were used. This 90-day Treasury bill data was used to represent risk free rate, which was obtained from the Bank Negara Monthly Statistical Bulletin.

The returns and variance of portfolio returns data used in this study were taken from Liew (2002). She had done a study on investment performance and ranking of 37 unit trust funds in Malaysia for the period from January 1995 to June 2001. The whole period is divided into four sub-periods, which represents rising markets and downward trending market. Sub-period 1 and 3 represents rising market while sub-period 2 and 4 signifies market falling.