CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

As at September 2003, there were more than 750 companies listed in the Main Board of Bursa Malaysia. Bursa Malaysia's Composite Index fell by 79.3 % from a high of 1271.57 points in February 1997 to a low of 262.70 points on 1 September 1998. The market capitalization in that period dropped from more than RM 375 billion to just above RM 75 billion. As previously discussed, Malaysia took several measures to help revive the economy from the recession experienced during the financial crisis. Among the measures included selective exchange controls and the establishment of Danaharta, Danamodal and the CDRC.

3.2 SCOPE OF THE STUDY

Based on the CAPM, Jensen (1969), Treynor (1965) and Sharpe (1966) derived three different risk-adjusted measures of performance. Although these measures have been used mainly for mutual funds performance, as intended by their respective authors; there is no reason why these measures cannot be applied for portfolios comprising equities from a particular sector when comparing the performance of these portfolios to that of the market. This study covers a five-year period from September 1998 to September 2003. This five-year period is chosen as it covers the period after the financial crisis. It is also a sufficient number of years to provide a good insight into the relative performance between the sectors in the Bursa Malaysia Main Board and the overall market after the financial crisis.

3.3 SOURCES OF DATA

For the purpose of this study, secondary data was used. They are as follows :

1. Month end closing of the sector indices obtained from Bursa Malaysia.
2. Month end closing of the EMAS Index obtained from Bursa Malaysia.
3. Risk free rate from the Malaysian Treasury Bills available at Bank Negara Malaysia

3.4 QUARTERLY RATES OF RETURN AND MEAN RETURNS

The quarterly rate of return for each sector was computed using the following equations. **Equation 3.1** shown below is used for calculating the quarterly rates of raw return for each sector.

$$R_s(t) = \frac{P_s(t) - P_s(t-1)}{P_s(t-1)} \qquad (3.1)$$

whereby,

$R_s(t)$ = The quarterly rate of raw return for each sector at quarter t

$P_s(t)$ = Sectoral index of sector s at quarter t

$P_s(t-1)$ = Sectoral index of sector s at quarter t-1

Equation 3.2 shown below was used for calculating the quarterly rates of raw return for the market.

$$R_m(t) = \frac{P_m(t) - P_m(t-1)}{P_m(t-1)} \quad \textbf{(3.2)}$$

whereby,

$R_m(t)$ = The quarterly rate of raw return for the market at quarter t

$P_m(t)$ = Composite Index at quarter t

$P_m(t-1)$ = Composite Index at quarter t-1

Equation 3.3 shown below was used for calculating the quarterly rates of risk free return.

$$R_{rf}(t) = P_{rf}(t-1) / 4 \quad \textbf{(3.3)}$$

whereby,

$R_{rf}(t)$ = The quarterly risk free return at quarter t

$P_{rf}(t-1)$ = The annual risk free rate at quarter t

The quarterly rate of excess returns of the sectors and market was computed using **equation 3.4** and **equation 3.5** below.

$$R_{es}(t) = R_s(t) - R_{rf}(t) \quad \textbf{(3.4)}$$

$$R_{em}(t) = R_m(t) - R_{rf}(t) \quad \textbf{(3.5)}$$

whereby,

$R_{es}(t)$ = quarterly rate of excess returns of the sectors
$R_{em}(t)$ = quarterly rate of excess returns of the market

The mean of the rate of quarterly returns was computed using **equation 3.6.**

$$\bar{R}_i = \frac{R_i(t)}{n} \quad \textbf{(3.6)}$$

whereby,

$\bar{R}_i$ = mean of the rate of return for i where i can take the value s,m, rf, es or em.
n = number of quarters

3.5 MEASUREMENT OF RISK

The standard deviation of historical returns was used as the measure of risk as shown in **equation 3.7** below.

$$\sigma_i = \Sigma \left[(R_i(t) - \bar{R}_i)^2 \right]^{0.5} \qquad (3.7)$$

whereby i can take the values of s, m, rf, es or em.

3.6 INVESTMENT PERFORMANCE MEASUREMENT

The investment performance measures used for evaluating and ranking the performance of the sectors in the Bursa Malaysia Main Board for this study are the Sharpe Index, Treynor Index and Jensen Index.

3.6.1 Sharpe Index

The Sharpe Index (SI) is defined in **equation 3.8**.

$$SI = \frac{\text{Risk Premium}}{\text{Total Risk}} = \frac{\bar{R}_s - \bar{R}_{rf}}{\sigma_{es}} \qquad (3.8)$$

whereby,

$\bar{R}_s$ = mean of the rate of quarterly return for each sector

$\bar{R}_{rf}$ = mean of the rate of quarterly return for the market

σ_{es} = standard deviation of rate of excess returns for each

sector.

3.6.2 Treynor Index (TI)

The Treynor Index (TI) is defined in **equation 3.9.**

$$TI = \frac{\text{Risk Premium}}{\text{Systematic Risk}} = \frac{\bar{R}_s - \bar{R}_{rf}}{\beta_s} \qquad (3.9)$$

Whereby β_s is the beta coefficient obtained from the slope of the sector's characteristic line. This is obtained by regression.

3.6.3 Jensen Index

Equation 3.10 below defines the Jensen's characteristic line in the risk premium form.

$$\alpha_s = R_{es}(t) - \beta_s R_{em}(t) \qquad (3.10)$$

whereby α_s represents the Jensen's alpha.

3.7 OVERALL PERFORMANCE RANKING

The overall performance rank was obtained by a simple points system and is shown in **Table 1** below.

TABLE 1

POINTS SYSTEM FOR OVERALL RANKING

Rank	Points
1	10
2	9
3	8
4	7
5	6
6	5
7	4
8	3

3.8 SOFTWARE FOR ANALYSIS

All mathematical calculations and analysis was performed using Microsoft Excel spreadsheet programme and SPSS v 11.01.