CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This chapter illustrates how the research was designed and implemented. A research model was developed to show the relationship between the variables such as interest rates, inflation, money supply, industrial production growth, international reserves and the Kuala Lumpur Stock Exchange. Five hypotheses were developed from the research model to answer the research questions. The secondary data on the macroeconomic variables and the KLCI from January 1983 to June 1999 was collected from Bank Negara Malaysia's Monthly Statistical Bulletins and Quarterly Reports. The data collected was then analysed using SPSS statistical software.

3.1 Definition of Concepts

(a) Money Supply

M1 which includes currency in circulation and demand deposits was not chosen because it is a narrow measure of the money supply. M2 has been selected in this study to represent money supply. M2 consists of M1 plus narrow quasi money. M3 was not used because data on a monthly basis was not available for the period under study. Data was published on M2 and M1 only under the old Bank Negara Malaysia's financial reporting format in the 1980s.

(b) Interest Rate

The 1-month interbank rate was chosen to represent nominal interest rate. This is because most studies reviewed in the literature review have used the interbank
rate as opposed to other interest rates such as the fixed deposit rate. My choice was also influenced by the fact that data was easily available.

(c) General Price Level

The Consumer Price Index (CPI) was used to represent the price level.

(d) Real Economic Activity

The Index of Industrial Production was used to measure real activity. Based on the fact that industrial production explain as much or more return variation as any other real economic activity variables such as growth rate of real Gross National Product and Gross Private Investment which are its close competitors (Fama (1990)), I have decided to use the industrial production index in Malaysia as a proxy for real economic activity in my study.

(e) International Reserves

Gross International Reserves of Bank Negara Malaysia which consists of Special Drawings Rights, International Monetary Fund reserves position, Gold and foreign exchange is used to measure international reserves.

(f) Performance of the KLSE

The performance of the Kuala Lumpur Stock Exchange (KLSE) is measured based on the movement in the Kuala Lumpur Stock Exchange Composite Index (KLCI) although the KLSE Emas Index could also be used as a proxy.
3.2 Research Model

This research is empirical in nature because it tries to analyse the relationships among macroeconomic variables. In this case the effect of money supply, interest rates, growth in industrial production, inflation and changes in international reserves as the major variables affecting the performance of the KLSE Composite Index (KLCI) is investigated.

The expected relationship between money supply and the KLSE Composite Index is that an expansionary monetary policy will lead to an increase in the KLSE Composite Index while a contractionary monetary policy will cause a reduction in the KLSE Composite Index because fewer funds will be available for investment. Thus increase in interest rate will make debt instruments more attractive than stocks and as such there will be an inverse relationship between the KLSE Composite Index and the interest rate.

Increase in real economic activity will have a favourable effect on the KLSE Composite Index through an increase in output and income while decrease in real economic activity will have an adverse effect on the KLSE Composite Index. Increase in the general price level through an increase in nominal return will lead to an increase in the KLSE Composite Index.

An inflow of foreign funds is expected to increase the KLSE Composite Index as more funds is available for investment while an outflow of funds will lead to a decrease in the KLSE Composite Index.

For the purpose of conducting a multivariate regression analysis in chapter four, the independent variables under study are the money supply, interest rates, growth in industrial production, inflation international reserves while the dependent variable is the KLSE Composite Index.
3.3 Measurements of Concepts

As mentioned in Chapter One, the secondary data on the macroeconomic variables and the KLCI from January 1983 to June 1999 was collected from Bank Negara Malaysia's Monthly Statistical Bulletins and Bank Negara Malaysia's Quarterly Reports. Data was restricted to the above period because of the need to maintain consistency. For example data on monthly interbank rates was not published in Bank Negara Malaysia's Monthly Statistical Bulletins prior to January 1983.

198 observations were obtained on each of the following variables used in the study namely: M2 to measure money supply, 1-month money market rate to measure nominal interest rate, CPI to measure inflation , Index of Industrial Production to measure real economic activity, international reserves of Bank Negara Malaysia to measure international reserves and the KLCI to measure performance of the KLSE. This sample is larger than that of Chun, Tai and Bacon (1997) where money supply (M1) was regressed against the monthly returns of the value weighted Korean Composite Stock Price Index (KOSPI) for the period of January 1980 to December 1992 using only 156 monthly observations.

The data on the consumer price index and industrial production growth index were constantly being re-based. For example the CPI observations from 1981 to 1990 was based at 1981 prices, data for 1991 onwards was based at 1990 prices while data for 1995 till 1999 was based at 1994 prices. There was a need to re-base all the data from 1983 to date using a common base so that a trend could be extracted. A base of 1994 was chosen for all the CPI observations while the base for industrial production was 1993.
3.4 Statistical Procedures

The following techniques were used to analyse the data:

**Factor Analysis** was used for two primary functions: (1) to identify the underlying construct in the data and to test if the items were tapping to the designed construct; (2) to reduce the five variables namely interest rates, inflation, money supply, industrial production growth, international reserves to a small number of factors. Principal components analysis was used with varimax rotation to reduce the number of complex variables. Factors with loadings of more than 0.5 were accepted as they were considered very significant (Zikmund 1997).

**Pearson product moment correlation analysis** was used to identify significant relationships between variables. Pearson correlation was also used as a basis for testing multicollinearity among the variables.

**Regression Analysis** was used for identifying the variables which best explain the variation between independent variables and the dependent variable. In this study, the dependent variable is the KLCI which was measured on an interval scale. The independent variables which were also measured on an interval scale are Money Supply, the Interest Rate, CPI, the Industrial Production Index and International Reserves.

Pearson product moment correlation analysis was used for determining the impact of macroeconomic variables on the KLCI and formed the basis for hypothesis testing (based on the results of the t-test). Factor analysis on the other hand was used to identify the subset of variables, that is, factors, accounting for movement in the KLCI and subsequently naming those factors. Regression analysis was used to determine the amount of the variation in the KLCI explained by the macroeconomic variables as measure by R-squared.