

## **CHAPTER 3**

### **DATA**

#### **3.1 Period of Analysis**

This study is conducted using monthly data series. For the full sample, the time period covered is from January 1987 to December 2001 with a total of 180 observations. The full sample period is then divided into two sub-periods. The first sub-period is from January 1987 to August 1998 and the second sub-period is from September 1998 to December 2001. The first sub-period has experienced the stock market crash (1987), stock market boom (1993-1997) and the financial or currency crisis (1997-1998). The second sub-period is characterized by the period in which the selective capital controls regime was adopted since 1 September 1998.

#### **3.2 Data and Sources**

In measuring the stock prices (SP), we use end-of-month values of Kuala Lumpur Stock Exchange (KLSE) Composite Index, which are obtained from the Public Information Centre in KLSE, Kuala Lumpur. The Kuala Lumpur Composite Index (KLCI) is a broadly accepted measure of the share price performance of

100 component stocks on the Main Board of KLSE. The classification of Main Board sectors was revamped in September 1993 and the companies were regrouped into 10 sectors, reflecting their business activity. The Second Board was launched in 1988 while the Exchange Main Board All Share (EMAS) Index was launched in October 1991. The Main Board lists shares of companies, which have a proven healthy financial track record, and with a minimum paid-up capital of RM20 million widely held by public. In 1977, there was only one board in KLSE with 264 listed companies. The computation of the index was based on 5 percent selection from the biggest and smallest companies and 10 percent from the middle group, with a total of 67 counters. The new Composite Index is more flexible as companies can be added or deleted if considered necessary by the Exchange. The number of stock was increased to 82 in 1986 and further increased to 100 counters in 1995. Table 3.1 shows the 100 component stocks in KLCI.

Figure 3.1 plots the KLCI. There was a stock market crash in October 1987. In one-month period, KLCI fell from 417.2 in 1 October 1987 to 273.21 on 2 November 1987. KLCI recorded its lowest point of 223.13 on 7 December 1987. After that, there was a period of recovery. External negative factors such as Gulf war, the Tokyo brokerage scandal and the Soviet Union Turmoil also influenced KLCI in 1991. In 1993, there was a bull run from January to July and super bull run from August to December. The bull run of 1993 spilled over into 1994. KLCI recorded the highest single day turnover on 5 January 1994 which was RM5.9 billion worth of transactions. The whole market was in bullish condition until

early 1997. It was followed by the event of financial crisis, which occurred since July 1997. The KLCI slumped dramatically and Malaysia experienced another stock market crash. The index declined to its lowest point of 262.70 since 1990s on 1 September 1998, when the selective capital controls measures were announced. The imposition of selective capital controls in September 1998 aimed at insulating the economy from the contagion effect of the regional crisis had successfully regained investors' confidence. The lending limits for share purchases have been raised to boost the stock market. As a result, KLCI began to rise steadily. Stock prices seem more stable after the implementation of capital controls as uncertainties in the stock market are reduced due to several measures taken by the Malaysian government. For instance, effective from 16 September 1998, the trading of Malaysian securities on the Stock Exchange of Singapore's Central Limit Order Book International OTC market ceased. There was a one-year minimum waiting period for repatriation of Malaysian securities held abroad. On 15 February 1999, the one-year waiting period was replaced with graduated exit taxes. The two-tier exit tax on the repatriation of profits on equity investments was replaced by a flat 10 percent levy as from September 1999, irrespective of when the profits are repatriated. During the period of 1997-1998, The Employees' Provident Fund (EPF) increased its investment in the stock market. The KLCI was successfully re-listed in the Morgan-Stanley Index in May 2000. However, the slow down in US economy in 2001 caused the KLCI to decline.

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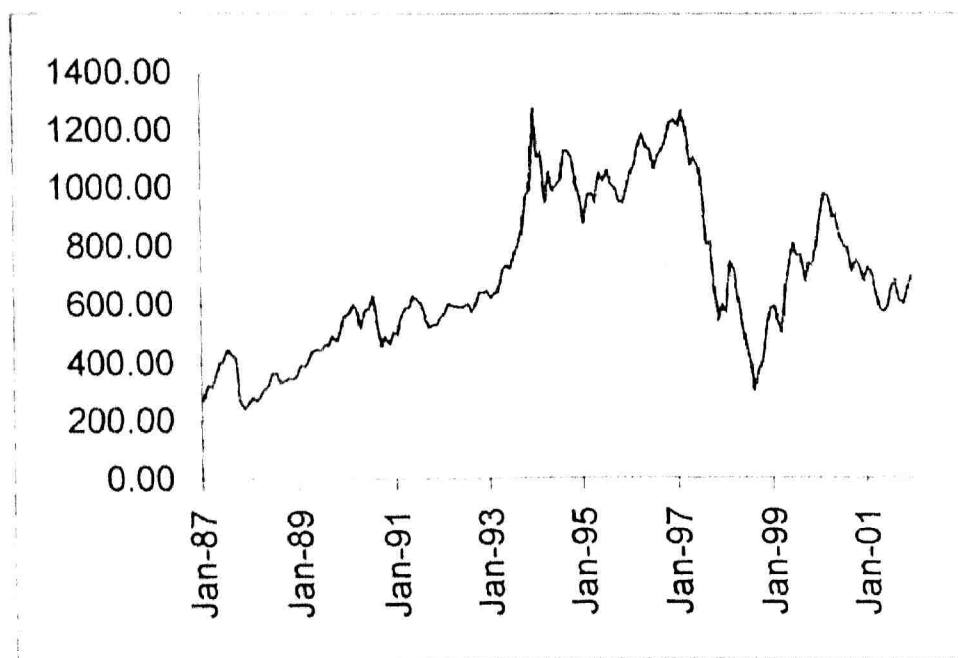
**Table 3.1: KLSE Composite Index Components (As At 31/10/2001)**

No	Company	No	Company
1	Aflin Holdings Bhd.	51	Malaysian Industrial Development Finance Bhd.
2	Aluminium Company of Malaysia Bhd.	52	Malaysian National Reinsurance Bhd.
3	AMMB Holdings Bhd.	53	Malaysian Oxygen Bhd.
4	Amsteel Corporation Bhd.	54	Malaysian Pacific Industries Bhd.
5	Amway (Malaysia) Holding Bhd.	55	Mesiniaga Bhd.
6	Arab-Malaysian Development Bhd.	56	Metroplex Bhd.
7	Bandar Raya Developments Bhd.	57	MNI Holdings Bhd.
8	Berjaya Sports Toto Bhd.	58	Mulpha International Bhd.
9	Boustead Holdings Bhd.	59	Nestle (M) Bhd.
10	British American Tobacco (Malaysia) Bhd.	60	New Strait Times Press (M) Bhd, The
11	Chemical Company of Malaysia Bhd.	61	Nikko Electronic Bhd.
12	Commerce Asset-Holding Bhd.	62	Northport Corporation Bhd.
13	Country Heights Holdings Bhd.	63	Nylex (M) Bhd.
14	Daiman Development Bhd.	64	Oriental Holdings Bhd.
15	Digi.com Bhd.	65	Padiberas Nasional Bhd.
16	DNP Holdings Bhd.	66	Palmco Holdings Bhd.
17	Europlus Bhd.	67	Pelangi Bhd.
18	Gamuda Bhd.	68	Perusahaan Otomobil Nasional Bhd.
19	Genting Bhd.	69	Petronas Dagangan Bhd.
20	Golden Hope Plantations Bhd.	70	Petronas Gas Bhd.
21	Grand United Holdings Bhd.	71	PBB Group Bhd.
22	Guinness Anchor Bhd.	72	Public Bank Bhd.
23	Hap Seng Consolidated Bhd.	73	Puncak Niaga Holdings Bhd.
24	Hong Leong Bank Bhd.	74	Ramatex Bhd.
25	Hong Leong Properties Bhd.	75	RHB Capital Bhd.
26	Hume Industries (M) Bhd	76	Road Builder (M) Holding Bhd.
27	IGB Corporation Bhd.	77	Sarawak Enterprise Corporation Bhd.
28	IJM Corporation Bhd.	78	Selangor Dreging Bhd.
29	IOI Corporation Bhd.	79	Selangor Properties Bhd.
30	Jaya Tiasa Holdings Bhd.	80	Shangri-La Hotels (M) Bhd.
31	John Hancock Life Insurance (M) Bhd.	81	Shell Refining Co (FOM) Bhd.
32	Johor Port Bhd.	82	Sime Darby Bhd.
33	Kian Joo Can Factory Bhd.	83	SP Setia Bhd.
34	Kim Hin Industry Bhd.	84	Sistem Televisyens Malaysia Bhd.
35	Kuala Lumpur Kepong Bhd.	85	Star Publications (Malaysia) Bhd.

36	Kulim (M) Bhd.	86	Sunway Holdings Incorporation Bhd.
37	Kumpulan Emas Bhd.	87	TA Enterprise Bhd.
38	Kumpulan Guthrie Bhd.	88	Tan & Tan Developments Bhd.
39	Leader Universal Holdings Bhd.	89	Tan Chong Motor Holdings Bhd.
40	Lingui Developments Bhd.	90	Tanjong PLC
41	Lingkaran Trans Kota Holdings Bhd.	91	Telekom Malaysia Bhd.
42	MAA Holdings Bhd.	92	Tenaga Nasional Bhd.
43	Magnum Corporation Bhd.	93	Time Engineering Bhd.
44	Malayan Banking Bhd.	94	Tradewinds (M) Bhd.
45	Malayan Cement Bhd.	95	UDA Holdings Bhd.
46	Malayan United Industries Bhd.	96	UMW Holdings Bhd.
47	Malaysia Airports Holding Bhd.	97	WTK Holdings Bhd.
48	Malaysia International Shipping Corp. Bhd.	98	United Engineers (M) Bhd.
49	Malaysia Mining Corporation Bhd.	99	Yeo Hiap Seng (M) Bhd.
50	Malaysian Airline System Bhd.	100	YTL Corporation Bhd.

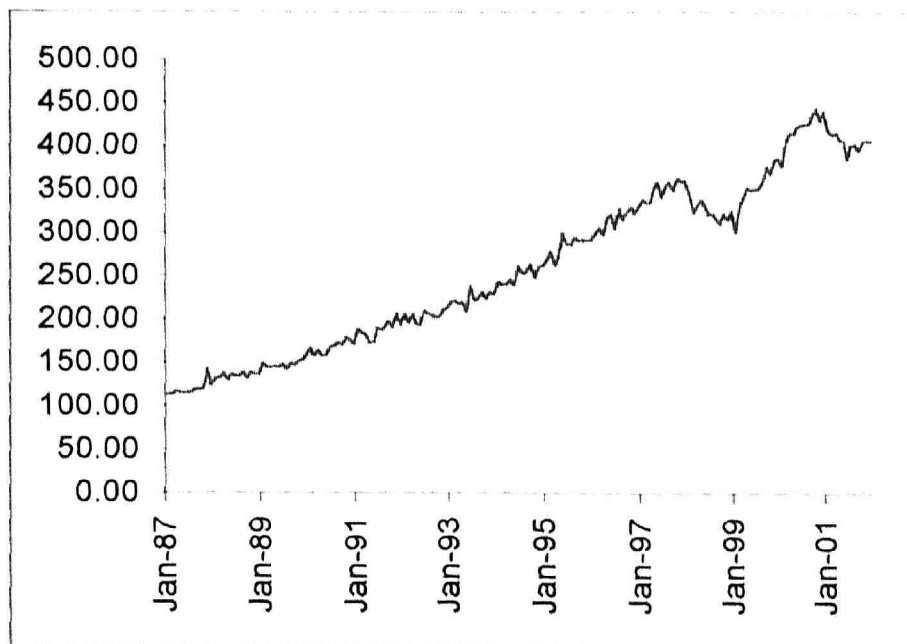
Source: Investors Digest, November 2001.

**Figure 3.1: KLSE Composite Index**



For this study, real economic activity is measured by the index of industrial production (IIP). IIP is used rather than GDP because it is available monthly while GDP series is only available quarterly. This is also consistent with the approach of many other studies as surveyed in Chapter 2. The IIP is compiled from various issues of the Monthly Statistical Bulletin published by Bank Negara Malaysia (BNM).

**Figure 3.2: Seasonally Adjusted Industrial Production Index (1985 = 100)**



The IIP series was seasonally adjusted using an additive time series component model. Figure 3.2 shows a plot of the seasonally adjusted index of industrial production (IIPS). The index was increasing steadily from 1987 to 1997. The

effect of the financial crisis started to influence the industrial production in 1998 where it showed a downward trend. Nevertheless, it increased to its growth path in 1999 and 2000. There was a minor fluctuation in the index due to uncertainties of the global economic condition in 2001.

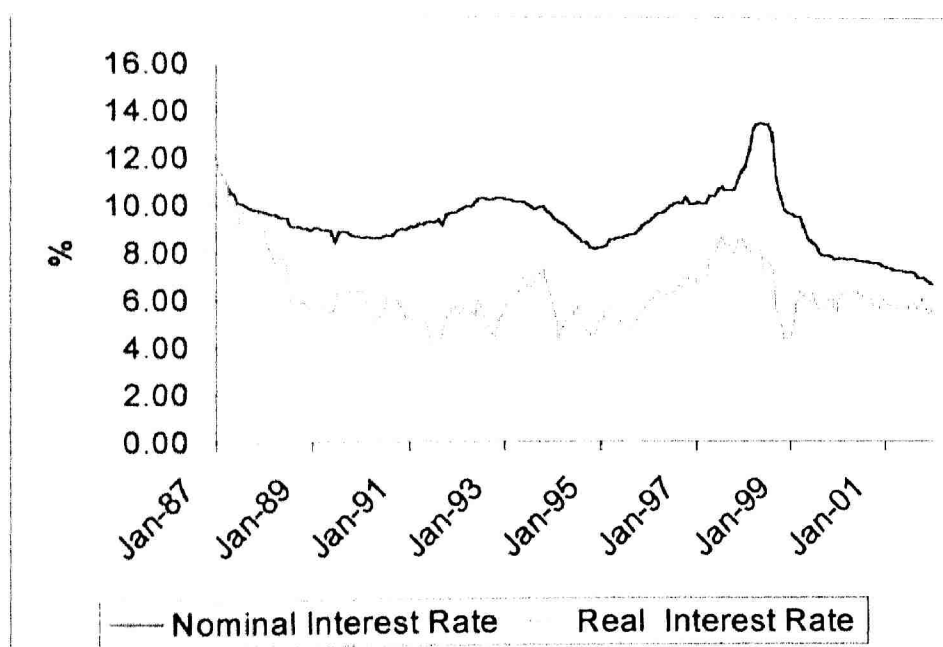
The nominal average lending rate by commercial banks is used as the proxy for interest rate. The reason for choosing average lending rate rather than the Treasury bill rate is that the movement or fluctuation in the former reflects better the economic activity. Moreover, although there exists a viable money market in Malaysia, long-term government securities or bonds have generally been sold to captive holders such as the EPF and other financial institutions. They hold the bonds to maturity to meet statutory investment requirement. As a result, government papers are thinly traded and in limited units compared with other developed countries. However, average lending rate and Treasury bill rate are closely related. We use the real interest rate (RIR) which is the nominal interest rate adjusted by monthly inflation rate of the Consumer Price Index (CPI). The data of average lending rate and CPI are obtained from Monthly Statistical Bulletin published by BNM. The CPI is also checked against the figures published by the Department of Statistics, Malaysia.

Figure 3.3 plots the nominal and real interest rates. The figure shows that the real interest rate is stable around 4 percent to 8 percent from 1988 to early 1997. Although Malaysia did not seek emergency International Monetary Fund (IMF)



credit facilities or accept any conditionalities from IMF, the Malaysian authorities did briefly adopt tighter fiscal and monetary policies from late 1997 until second quarter in 1998. BNM raised its three-month intervention rate from 8.7 percent at the end of 1997 to 10 percent in early February 1998. The nominal average lending rate by commercial banks increased from about 11 percent in November 1997 to 13.54 percent in May 1998. High interest rate had adversely affected economic activities as a whole and contributed to the rise of non-performing loans (NPLs). Nevertheless fiscal stimulus and expansionary monetary policy were implemented since September 1998. Both nominal and real interest rates showed a downward trend. The decline in interest rate lowered the cost of capital and stimulates lending activity in the economy.

**Figure 3.3: Nominal and Real Interest Rates**



Two definitions of money are used for this study, namely, the real money balances for M1 (RB1) and real money balances for M2 (RB2).<sup>1</sup> Real money balances refer to the money demand, which are adjusted by the price level. We assume that money supply is equal to money demand, which means that the money supplied by BNM will be totally demanded by the public. The data for M1 and M2 are obtained from Monthly Statistical Bulletin published by BNM.

Figure 3.4 plots the real money balances for M1 and real money balances for M2. Both the real money balances showed an upward trend from 1987 until 1997. The implementation of tight monetary policy, which reduced money supply in the economy, caused both real money balances to decline in early 1998 until end of second quarter in 1998. After that period, the tight monetary policy is replaced by an easing monetary policy. In order to increase the liquidity in the economy, BNM reduced the Statutory Reserve Requirement from 13.5 percent in early 1998 to 4 percent on 16 September 1998. As money supply was increased and domestic price level was controlled at low level, the real money balances were trending upwards.

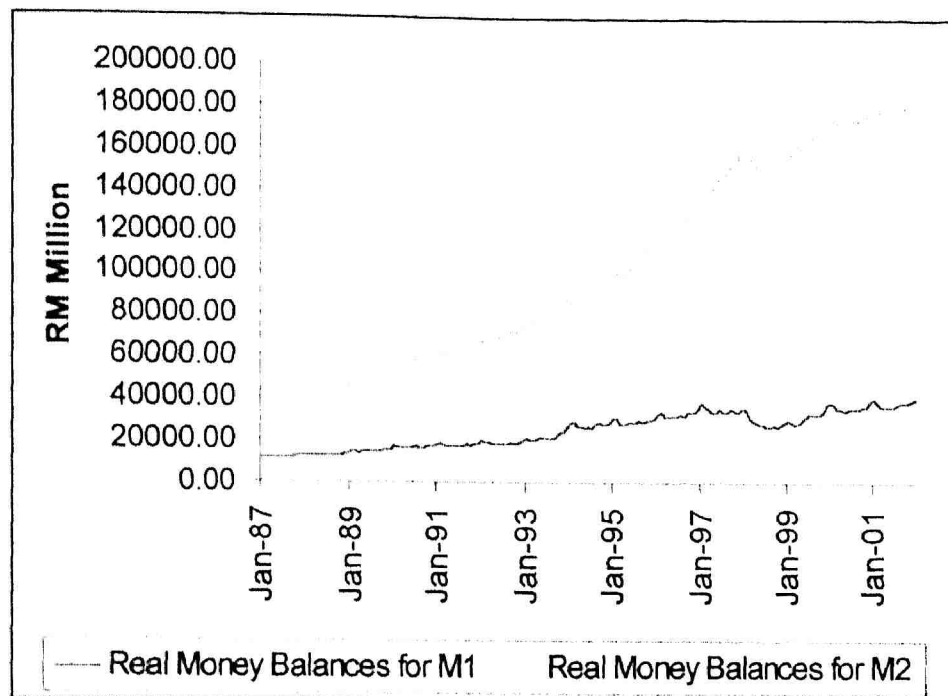
All data series are expressed in logarithmic forms except the real interest rate. The logarithmic transformation was the advantage of stabilising the variance of the series. This is not necessary for the real interest rate because the series fluctuates only in small ranges.

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<sup>1</sup> M1 = Currency in circulation + demand deposits

M2 = M1 + savings deposits + fixed deposits + NIDs + repos + foreign currency deposits

**Figure 3.4: Real Money Balances**



### **3.3 Details on Data Computation**

#### **3.3.1 Index of Industrial Production and Seasonally Adjusted Index of Industrial Production**

The index of industrial production is a measure of the level of the production of industrial commodities overtime. This production generates economic activities and the index summarizes past industrial development. The index is a base year

weighted arithmetic average of quantity relatives calculated by the Laspeyres formula as below:

$$I_t = \frac{\sum R_{it} W_{i0}}{\sum W_{i0}} \quad (3.1)$$

where

$R_i$  is the adjusted product relative for item 'i',

$W_i$  is the weights for item 'i',

and subscript "0" denotes the base year.

During the period from 1987 to 2001, there are a total of four different base years (1981 = 100, 1985 = 100, 1988 = 100 and 1993 = 100). We transform the various base years of IIP into a single base year index (1985 = 100). There is an adjustment in the published IIP to remove the differences in the length of periods of operation in the different industry. However, the index still exhibits fluctuations such as seasonal variations, which could affect the analysis of trend. We consider an additive model of IIP:

$$IIP_t = T_t + C_t + S_t + I_t \quad (3.2)$$

where the variation is categorised into four components: trend ( $T_t$ ), cyclical variations ( $C_t$ ), seasonal variations ( $S_t$ ) and irregular movements ( $I_t$ ). The trend measures the long-term growth or decay of a time series variable. The cyclical component refers to the variations due to business cycles, which result in

fluctuations above and below the trend in the medium term. Seasonal variations are repetitive and predictable movements within a year around the trend while irregular movements are unpredictable short-run variations. We performed the moving averages (MA) method to deseasonalize the series by “averaging out” the period to period variations. The seasonally adjusted index of industrial production is denoted as  $IIPS_t$  for this study.

### 3.3.2 Kuala Lumpur Composite Index

The published KLCI is computed based on the following formula, which is weighted by market capitalization:

$$KLCI_t = \frac{AMV_t}{AMV_0} \times 100 \quad (3.3)$$

where

$AMV_t$  = Current aggregate weighted market value,

$AMV_0$  = Base aggregate weighted market value.

The base year is 1977. The KLSE adjusts the base value when there is inclusion or exclusion of a component stock. Similarly, capitalization changes due to bonus and rights issues (as well as conversion of warrant etc.) will also involve revision of the index value by KLSE.

### 3.3.3 Real Interest Rate

As discussed in Section 3.2, the average lending rate by commercial banks is used for representing the nominal interest rate. To obtain the real interest rate, the difference between the nominal interest rate and the expected rate of inflation is required:

$$RIR_t = NIR_t - \pi_t^e \quad (3.4)$$

where

$RIR_t$  = Real interest rate,

$NIR_t$  = Nominal interest rate,

$\pi_t^e$  = expected inflation rate.

Since the expected inflation rate cannot be obtained, the ex-post real interest rate is used:

$$RIR_t = NIR_t - \pi_t \quad (3.5)$$

The CPI is computed based on the Laspeyres formula. The inflation rate is the annual rate of change in monthly CPI computed as below:

$$\pi_t = \frac{CPI_t - CPI_{t-12}}{CPI_{t-12}} \times 100 \quad (3.6)$$

### 3.3.4 Real Money Balances

Real money balances are defined as the nominal quantity of money adjusted for the price level. In this study, we examine two types of real money balances, which are real money balances for M1 and real money balances for M2. M1 and M2 are treated as alternative monetary aggregates. The methods for computation of RB1 and RB2 are as follow:

$$RB1_t = \frac{M1_t}{CPI_t} \times 100 \quad (3.7)$$

$$RB2_t = \frac{M2_t}{CPI_t} \times 100 \quad (3.8)$$