Chapter 3
Research Methodology

3.1 Introduction

The previous chapter closed by identifying the seven explanatory variables that were to be used in the multiple regression model, giving reasons as to why those variables were chosen. This chapter begins by describing the research methodology that was used. It goes on to explain the research design, including the population of the study, sampling, the data and the data gathering method. It then defines the empirical model, explains how it can be applied and how the relevant coefficients can be interpreted. Finally, hypotheses are formulated and the data analysis statistical tool stated.

3.2 Research Methodology

The statistical method used in this study is econometric multiple regression modelling, adopting a panel data approach, and using four dummy variables. Ordinary Least Squares (OLS) regression and sequential hypothesis testing are used to derive the final statistically significant equation. To test the accuracy and validity on the explanatory variables and the model, t-statistics, P-values, adjusted R-squared, the F-test and the Durbin-Watson statistic are used.

To elaborate on why the panel data approach was adopted, other researchers who have used econometric multiple regression techniques to examine the relationships between macroeconomic time series variables and stock market indices have generally only focused on one stock market at a time and have developed equations for that one stock market in isolation. This study is different in that all five Southeast Asian equity markets are considered *together* as a group and one equation is developed to discover variables that have statistically significant correlations with all five stock markets together. Thus, the statistical approach used is a *panel data approach* (with four dummy variables being used to cater for the five different stock market indices). This is generally considered the correct approach to use when both time-series and cross-sectional data are evaluated together. The data in this study have a cross-sectional dimension in that, for example, the level of the Consumer Price Index (CPI) for all five countries will be considered for, say, June 2011. The data also have a time-series dimension in that, for example, the level of CPI is considered for Singapore from January 2000 to September 2011. If only one country had been assessed, as other researchers have done, then a panel data approach would not be possible since the cross-sectional element would have been lacking.

In order to derive the final equation, sequential hypothesis testing was carried out with the most statistically insignificant variable being excluded on each round of testing. In order to test for significance, P-values, which are calculated automatically by the software, were used. Since the chosen level of significance in this study was 5%, explanatory variables with P-values greater than 0.05 were excluded during the process of sequential hypothesis testing. Thus only explanatory variables with P-values less than 0.05 were included.

To provide some explanation, the P-value is the level of significance at which the null hypothesis (that $\beta = 0$) can be rejected. Here the term β is used generically to refer to any coefficient on an explanatory variable. If the value of this coefficient equals zero, then, logically, it follows that this coefficient is not significant. Since the 5% level of significance is used in this study, if a P-value of less than, or equal to, 0.05 is calculated then the null hypothesis can be rejected, and it can be concluded that the relevant variable is significant and should be included in the regression. Conversely, if the P-value is greater than 0.05 then the null hypothesis cannot be rejected at the 5% significance level, and the relevant variable should therefore be excluded.

It is also important to discuss t-statistics. The values of the t-statistics for each of the statistically significant coefficients are shown in the Results section. The t-statistic is used to test the null hypothesis that the value of the coefficient on the independent variable is zero (H_0: $\beta = 0$) against the alternate hypothesis that the value of the coefficient does not equal zero (H_1: $\beta \neq 0$). If the value of the coefficient is zero then the explanatory variable that it refers to must be statistically insignificant. The computed t-statistic is compared to a critical value (taken from the Student's t-distribution table). If the computed value does not exceed the bounds of the critical value then the null hypothesis cannot be rejected and the relevant variable should be excluded from the regression. If, however, the calculated t-statistic exceeds the bounds of the critical value, then the null hypothesis that $\beta = 0$ can be rejected at the chosen significance level (5% in this study). In such a case it can then be concluded that the relevant variable is significant and should be included in the regression model. Generally, values of t-statistics that either exceed +2.0 or that are more negative than -2.0 indicate that the pertinent explanatory variable is significant and should not be excluded from the equation.

Finally, the values for adjusted R-squared (and the F-test) and the Durbin Watson (DW) statistic are also used. Adjusted R-squared tests the goodness of fit of the line that the equation generates. It tells us what proportion of the variation in the independent variable is explained by the explanatory variables in the regression equation. Adjusted R-squared can only take on a value equal to or between zero and one. A value of one implies that the line of best-fit is a perfect fit, whilst a value of zero implies that the regression model in no way explains the variation in the dependent variable. Obviously, the higher the adjusted R-squared (R^2) then the better if we are attempting to find regression models that explain the relationship between explanatory and dependent variables. R-squared and adjusted R-squared are explained at length in Appendix 1.

It is also possible to test the null hypothesis H_0: $R^2 = 0$ against the alternate hypothesis H_1: $R^2 \neq 0$. The appropriate statistic here is the F-statistic. Usually, the computed F-statistic is compared with a critical value taken from a statistical table. If the computed value is less than the critical value then the null hypothesis cannot be rejected at the chosen significance level. Consequently, if R-squared equals zero, then effectively the relevant regression model in no way explains the relationships amongst the included variables. Conversely, if the computed F-statistic exceeds the critical value, then the null hypothesis can be rejected and it can be concluded that R-squared does not equal zero and that the regression model has explanatory power. In this research, statistical software will be used to compute a P-value that corresponds to the F-test, and if the P-value is greater than 0.05 then it can be concluded that R-squared equals zero, whilst a P-value of less than 0.05 indicates that R-squared does not equal zero.

The Durbin Watson (DW) statistic effectively tests for the presence of serial correlation (or autocorrelation) in the residuals, which, if present, yields results that are inaccurate and unreliable. The value of the DW statistic is always between zero and four. A value of two implies that there is no serial correlation present, whilst values approaching zero indicate positive autocorrelation and values approaching four indicate negative autocorrelation. The Durbin Watson test involves the calculation of a test statistic (the DW statistic) based on the residuals from the OLS regression procedure. It is essentially testing the null hypothesis that $\rho=0$ against the alternate hypothesis that $\rho\neq0$, where ρ is a coefficient on residuals lagged one period, in an equation where residuals in the current period are the dependent variable. If the null hypothesis can be accepted then no serial correlation is present.

3.3 Research Design

3.3.1 Population of the Study

The population of the study comprises the five stock markets of Singapore, Malaysia, Thailand, Indonesia and the Philippines.

3.3.2 Sampling

The sample is composed of observations of the values of the dependent variable (the five stock market indices) and the independent variables taken from the period January 2000 to September 2011.

3.3.3 Data

The variables used in this study, both dependent and independent, are:

<u>*Stock Market Index*</u>

A stock market index derives its value from the market prices of a grouping of stocks. Indices are generally used as measures of the performance of a country's stock market. As such they are generally composed of the largest stocks by market capitalisation listed on an exchange. They can, however, represent specific sectors or industries, regions, or even the whole world (a global index). The unit of measurement for a stock market index is points. The five indices used in this study will now be explained.

- The *Singapore Straits Times Index (STI)* is composed of the top 30 SGX mainboard-listed companies on the Singapore Exchange selected by full market capitalisation. The index was improved on the 10th January 2008, with a base date and base value of 9th January 2008 and 3344.53 points respectively. (FTSE, 2011)
- The *FTSE Bursa Malaysia KLCI* is composed of the top 30 companies by market capitalisation listed on the Bursa Malaysia Main Market. It has a base date and base value of 1st January 1997 and 100 points respectively. (FTSE, 2012)
- *Thailand's SET index* is a capitalisation-weighted index of all stocks traded on the Stock Exchange of Thailand. It has a base date and base value of 30th April 1975 and 100 points respectively. (Stock Exchange of Thailand, 2006)
- *Indonesia's JSX Composite index* is a capitalisation-weighted index of all stocks listed on the regular board of the Indonesia Stock Exchange. The index was developed with a base index value of 100 points as of the 10th August 1982. (Bloomberg, 2012)
- The *Philippines' PSE Composite index (PSEi)* is a capitalisation-weighted index composed of stocks representative of the Industrial, Properties, Services, Holding Firms, Financial and Mining and Oil Sectors of the Philippine Stock Exchange. The index has a base value of 2922.21 points as of 30th September 1994. (Bloomberg, 2012)

Consumer Price Index (CPI)

A Consumer Price Index (CPI) is used to measure inflation. It derives its value from a weighted average of prices of a 'basket' of consumer goods and services, such as transportation, food and medical care. The CPI is calculated by taking price changes for each item in the predetermined basket of goods and averaging them; the goods are weighted according to their importance. The CPI usually has a base year at which its value is set to 100. As explained earlier, due to the lack of data, the CPI measure for Indonesia is based on sixty-six cities, whereas for the other four countries it is based on the whole country.

Exchange Rate

An exchange rate is the price of one country's currency expressed in another country's currency. Alternatively, it is the rate at which one currency can be exchanged for another. In this study, the exchange rate variable is expressed in terms of home currency per unit of US Dollar.

Exchange Rate Risk

The measure of exchange rate risk used in this study is the standard deviation of the previous twelve months' percent changes in the exchange rate (expressed as home currency per unit of USD)

Short-Term Interest Rate

An interest rate is the rate which is charged, or paid, for the use of money. It is usually expressed as an annual percentage of the principal (the total amount borrowed or lent). In this study, in general, short-term interest rates were used and they were: the Singaporean interbank 3-month interest rate, the Malaysian 3-month Treasury Bill discount rate, Thai commercial banks' 3-month time deposit minimum rate, Indonesia's 3-month JIBOR, and the Philippines' Treasury Bill rate all maturities.

Market Volatility

This variable derives its value from the market index values and is a measure of variance. In simplistic terms, it measures how much the market index oscillates. Specifically, in this study, it is the standard deviation of the previous twelve months' changes in the value of the stock market index.

M2 Money Supply

Money supply is a measure of how much money there is in an economy. Money consists of either currency or deposits at banks and other depository institutions. Two of the main measures of money are M1 and M2. M1 generally consists of currency and travellers' cheques, plus checking deposits belonging to individuals and businesses. M2 generally consists of M1 plus time deposits, savings deposits, money market mutual funds and other deposits. M2 money supply is used in this study and its unit of measurement is constant (in other words, adjusted for inflation by dividing by the GDP deflator) US Dollars.

Price-to-Earnings Ratio

Price-to-earnings (P/E) ratios are valuation measures. They measure how 'cheap' or 'expensive' a stock or a market is. When applied to an individual stock, the P/E ratio is the ratio of the relevant company's share price to its earnings per share (EPS). There are different ways of calculating the P/E ratio. For example, it is sometimes calculated using the trailing twelve months (ttm) EPS, whilst frequently it is calculated using a forecasted or projected EPS for the next twelve months. In this study past measures (and not projected) measures of EPS are used. Also, the P/E measure used here applies to the whole market and not to individual stocks.

The Dependent Variable

The dependent variable should be a measure of the attraction or appeal of the Southeast Asian equity markets. An ideal dependent variable would, therefore, have been net portfolio fund inflows. This would measure directly, in dollar terms, how much money investors were investing in the relevant stock markets. Obviously, an attractive stock market would attract more fund inflows than a less attractive market. The problem with this measure is the lack of availability of information. Whilst annual data is readily available, monthly data is not. Consequently, the relevant *stock market index is* used as a *proxy* for the attraction, or appeal, of each of the relevant stock markets. In general, if a stock market is attractive to investors, then they will attempt to buy stocks listed in that market. As they do so, the increased demand for those stocks will push up their prices, thus also pushing up the relevant stock market index. Conversely, if a stock market becomes unattractive to investors, they will sell their stock holdings in that market, thereby increasing supply. This increased supply will act to reduce stock prices and the relevant index. Additionally, as previously mentioned, other researchers have used stock market indices as dependent variables in their studies.

The stock markets that were assessed were those in Singapore, Malaysia, Thailand, Indonesia and the Philippines. The specific stock market indices that were used have already been stated.[19] The Vietnamese stock markets (in particular the Ho Chi Minh City stock market) would also have been possible candidates. Vietnam was not included, however, due to the scarcity of available data.

The Independent Variables

As previously discussed, seven factors were chosen to be used as explanatory variables in the multiple regression model. Additionally, *lagged values* (up to three periods lagged) of the dependent variable are also used as explanatory variables. Thus, the explanatory variables are:

- *Stock market index (lagged values up to three periods)*
- *short-term interest rate (current value and values lagged up to three periods)*
- *price level / inflation (current value and values lagged up to three periods)*
- *M2 money supply (current value and values lagged up to three periods)*
- *exchange rate (current value and values lagged up to three periods)*
- *valuation of the market (market price-to-earnings ratio) (current value and values lagged up to three periods)*
- *exchange rate risk (current value and values lagged up to three periods)*
- *market volatility (current value and values lagged up to three periods)*

Natural Logarithms

[19] Data was obtained from the following online sources: World Federation of Exchanges, Singapore Department of Statistics, Monetary Authority of Singapore, Central Bank of Malaysia, Stock Exchange of Thailand, Central Bank of Thailand, Central Bank of Indonesia, Philippines National Statistics Office, and Central Bank of the Philippines.

Other researchers who have studied this subject and who have developed regression models have generally used the natural logarithms of variables (Maysami, Howe, & Hamzah, 2004) (Menike, 2006). Natural logarithms are also used in this study. One of the main reasons for this is that they can be used to transform a linear regression model into a non-linear model. Also, lagged values of variables (up to three periods) are used in this study. For example, as independent variables, the value of CPI in the current period, and in the three previous periods, are used. There are several reasons for this. Firstly, if statistically significant relationships are discovered between the dependent variable and lagged values of variables, then this is extremely useful in forecasting: in other words, if *past* values of one variable predict *future* values of another variable, then forecasts of the latter variable can easily be made using current available data. Secondly, the precedence set by other researchers is important. Menike, for example, in studying the Sri Lankan stock market used values of variables lagged up to two periods (Menike, 2006). Finally, lagged values up to three periods (and no more) have been used because there are statistical limitations on how many independent variables can be used given a certain number of observations.

The variables used, their names and definitions are listed in the table below:

Table 3: Names, Types and Definitions of Variables to be Used in the Empirical Model

Name of Variable	Type	Definition of Variable	Unit of Measurement
LnINDEX	Dependent	Natural logarithm of the value of the country's stock market index (STI, KLCI, SET, JSX or the PSEi) / Current Value	Points
LnINDEX(-1), LnINDEX(-2), LnINDEX(-3)	Explanatory	Natural logarithm of the value of the country's stock market index (STI, KLCI, SET, JSX or the PSEi) / Lagged Values	Points
LnCPI, LnCPI(-1), LnCPI(-2), LnCPI(-3)	Explanatory	Natural logarithm of the Consumer Price Index (CPI) / Current and Lagged Values	Points
LnEXRT, LnEXRT(-1), LnEXRT(-2), LnEXRT(-3)	Explanatory	Natural logarithm of home currency per unit of USD / Current and Lagged Values	Currency (per unit of US Dollar)
LnEXRTRISK, LnEXRTRISK(-	Explanatory	Natural logarithm of the	Standard

1), LnEXRTRISK(-2), LnEXRTRISK(-3)		standard deviation of the previous 12 months' percent changes in the exchange rate (home currency per unit of USD) / Current and Lagged Values	Deviation (of percent changes)
LnINTRT, LnINTRT(-1), LnINTRT(-2), LnINTRT(-3)	Explanatory	Natural logarithm of the short-term interest rate / Current and Lagged Values	Percentage
LnMKTVOL, LnMKTVOL(-1), LnMKTVOL(-2), LnMKTVOL(-3)	Explanatory	Natural logarithm of the standard deviation of the previous 12 months' changes in the value of the stock market index / Current and Lagged Values	Standard Deviation (of percent changes)
LnMONSPLYCONST, LnMONSPLYCONST(-1), LnMONSPLYCONST(-2), LnMONSPLYCONST(-3)	Explanatory	Natural logarithm of the country's M2 money supply in units of 1 million (in constant USD) / Current and Lagged Values	US Dollars
LnPE, LnPE(-1), LnPE(-2), LnPE(-3)	Explanatory	Natural logarithm of the stock market's price-to-earnings ratio / Current and Lagged Values	Numerical Ratio
DMY1	Explanatory / Dummy	A dummy variable that takes the value of 1 when the equation is used to apply to Singapore. Otherwise it takes the value of 0	N/A
DMY2	Explanatory / Dummy	A dummy variable that takes the value of 1 when the equation is used to apply to Malaysia. Otherwise it takes the value of 0	N/A
DMY3	Explanatory / Dummy	A dummy variable that takes the value of 1 when the	N/A

		equation is used to apply to Thailand. Otherwise it takes the value of 0	
DMY4	Explanatory / Dummy	A dummy variable that takes the value of 1 when the equation is used to apply to Indonesia. Otherwise it takes the value of 0	N/A

As can be seen in the table above, lagged variables are denoted by the suffix (-1), (-2) or (-3). For example, the index value lagged two periods is LnINDEX(-2). LnINDEX is the dependent variable and the others are explanatory variables.

From the table above it can be noted that there are four dummy variables, which take the value of one (with the other three dummy variables taking the value of zero) when using the multiple regression equation to apply to either Singapore, Malaysia, Thailand or Indonesia. If the equation is to be used to find a value for the index relating to the Philippines, then all four of these dummy variables should be set to zero.

3.3.4 Data Gathering Method

Data was gathered using online sources: World Federation of Exchanges, Singapore Department of Statistics, Monetary Authority of Singapore, Central Bank of Malaysia, Stock Exchange of Thailand, Central Bank of Thailand, Central Bank of Indonesia, Philippines National Statistics Office, and Central Bank of the Philippines. In the case of M2 money supply for the Philippines, this was not available online. Hence, it was requested for and received by e-mail from the Central Bank of the Philippines.

3.4 Research Model

The empirical model is:

$$LnINDEX = \alpha + \beta t + (a)LnINDEX(-1) + (b)LnINDEX(-2) + (c)LnINDEX(-3) + (d)LnCPI$$

$$+ (e)LnCPI(-1) + (f)LnCPI(-2) + (g)LnCPI(-3) + (h)LnEXRT + (i)LnEXRT(-1) + (j)LnEXRT(-2) + (k)LnEXRT(-3) + (l)LnEXRTRISK + (m)LnEXRTRISK(-1) + (n)LnEXRTRISK(-2) + (o)LnEXRTRISK(-3) + (p)LnINTRT + (q)LnINTRT(-1) + (r)LnINTRT(-2) + (s)LnINTRT(-3) + (t)LnMKTVOL + (u)LnMKTVOL(-1) + (v)LnMKTVOL(-2) + (w)LnMKTVOL(-3) + (x)LnMONSPLYCONST + (y)LnMONSPLYCONST(-1) + (z)LnMONSPLYCONST(-2) + (ab)LnMONSPLYCONST(-3) + (ac)LnPE + (ad)LnPE(-1) + (ae)LnPE(-2) + (af)LnPE(-3) + (ag)DMY1 + (ah) DMY2 + (ai)DMY3 + (aj)DMY4 + \varepsilon$$

Where,

(a), (b), (c), ... (aj) are the coefficients on the explanatory variables;
DMY_1 is the dummy variable that corresponds to Singapore;
DMY_2 is the dummy variable that corresponds to Malaysia;
DMY_3 is the dummy variable that corresponds to Thailand;
DMY_4 is the dummy variable that corresponds to Indonesia;
α is the intercept;
$\mathfrak{J}t$ is a deterministic time trend;
ε is the error term

To explain the error term, ε, this refers to the difference between an actual observed value for the index and a value that has been predicted, or estimated, by the regression model. To provide further intuition, if simple linear regression were being used, and OLS estimated a line of best fit on a graph, then the error would be the distance between a point representing an observed value and the corresponding point on the line of best fit. The purpose of this study has been to *estimate* a regression equation and its line of best-fit. Consequently, the regression model is an *estimate* of the real relationships amongst the variables. Thus, to be accurate, the error terms in estimated models are referred to as *residuals*, to indicate that they are estimates and not true values.

3.4.1 Application of the Model

Development and use of the model serves two purposes: firstly, as stated specifically in the objectives of the study, the multiple regression model includes only the explanatory variables that exhibit statistically significant relationships with the dependent variable. It will be concluded that these statistically significant explanatory variables are the factors that affect investors' asset allocation decisions in the Southeast Asian equity markets.

Secondly, the model can be used to forecast a value for the dependent variable, the stock market index, by 'plugging in' values for the explanatory and dummy variables. In this way, the 'attractiveness', or appeal, of the relevant Southeast Asian equity market can be determined. Later in the study a specific decision rule for investors is developed, but suffice to say here that if the forecasted index value is significantly greater than the current index value then the relevant market represents an attractive investment destination. Conversely, a forecasted index value that is much lower than the current index value represents an unattractive investment destination. Calculating projected, or forecasted, *percentage* increases (or decreases) in the index values for the five Southeast Asian stock markets allows them to be *compared* and *ranked* in terms of how attractive they are to investors. Their relative 'attractiveness', or appeal, can thus be determined.

The values of the coefficients on the independent variables represent the marginal effect that an increase in the relevant independent variable by 1% will have on the dependent variable, *holding all other independent variables constant*. If, for example, the coefficient (d) has a value of 1.11, then it can be expected that an increase in the value of LnCPI by 1% will lead to an increase in the value of the dependent variable, LnINDEX, by 1.11%, holding all other explanatory variables constant.

3.5 Hypotheses

Having now identified the variables that will be used in the multiple regression models, it is necessary to discuss the expected relationships between the dependent variable and the explanatory variables.

The expected relationships between each independent variable and the market index are listed below. The theoretical justification for these expected relationships, where relevant, has already been discussed at length in the Literature Review (largely in the Economic Outlook sub-heading, but in other places too) and it is not necessary to repeat it here:

- Hypothesis 1:

  H_0: d = 0
  H_A: d $\neq$ 0

  H_0: e = 0
  H_A: e $\neq$ 0

H_0: f = 0
H_A: f ≠ 0

H_0: g = 0
H_A: g ≠ 0

A negative relationship should exist between the inflation rate and the market index. High levels of inflation in an economy are undesirable. They erode wealth and, in the extreme case of hyperinflation, can cause significant economic problems. Central Banks therefore will act to reduce inflation (often by means of raising interest rates, increasing banks' reserve requirements, or allowing the home currency to appreciate), and, in so doing, will attempt to slow economic growth. It is both the negative effects of inflation in eroding the value of company profits and in ultimately slowing the economy that are viewed as negative for stock market returns. *The implications of this hypothesis are that the expected signs on the coefficients d, e, f and g should be* *negative*.

- Hypothesis 2:

H_0: h = 0
H_A: h ≠ 0

H_0: i = 0
H_A: i ≠ 0

H_0: j = 0
H_A: j ≠ 0

H_0: k = 0
H_A: k ≠ 0

A positive relationship should exist between the exchange rate variable and the market index. For export-based economies a weak or depreciated home currency is advantageous, since it makes goods and services produced in the home country more competitive in the global market place. Thus, a weak currency should increase exports, thereby increasing company profits and economic growth. In this study the exchange rate variable is measured as home currency per unit of US dollar, thus a *higher* value for the exchange rate variable implies a *weaker* home currency, hence the hypothesised *positive* relationship. *The implications of this hypothesis are that the expected signs on the coefficients h, i, j and k should be* positive.

- Hypothesis 3:

H_0: l = 0
H_A: l ≠ 0

H_0: m = 0
H_A: m ≠ 0

H_0: n = 0
H_A: n ≠ 0

H_0: o = 0
H_A: o ≠ 0

A negative relationship should exist between exchange rate risk and the market index. When foreign investors buy local stocks they are not only purchasing the stock but also the local currency. Even if the return on the stock is positive, if the exchange rate moves adversely for them, then they stand to lose money as they convert the funds back into their home currency having sold the stock. Thus, high levels of exchange rate volatility should increase uncertainty regarding future returns, thereby reducing investment in the relevant country's stock market. *The implications of this hypothesis are that the expected signs on the coefficients l, m, n and o should be* negative.

- Hypothesis 4:

H_0: p = 0
H_A: p ≠ 0

H_0: q = 0
H_A: q ≠ 0

H_0: r = 0
H_A: r ≠ 0

H_0: s = 0

H_A: s ≠ 0

A negative relationship should exist between the interest rate and the market index. High interest rates increase the cost of money, thus reducing business and consumer borrowing and investment. Consumers and businesses generally borrow to purchase 'big-ticket' items such as capital goods, houses, cars and other durable goods. Thus, high interest rates should slow an economy, and it is this that is deemed as negative for corporate profits and the stock market. *The implications of this hypothesis are that the expected signs on the coefficients p, q, r and s should be* <u>*negative*</u>.

- <u>Hypothesis 5</u>:

H_0: t = 0

H_A: t ≠ 0

H_0: u = 0

H_A: u ≠ 0

H_0: v = 0

H_A: v ≠ 0

H_0: w = 0

H_A: w ≠ 0

A negative relationship should exist between market volatility and the market index. By definition a highly volatile market delivers highly unpredictable returns. It is these higher levels of uncertainty regarding future returns that should make the relevant stock market less attractive to investors. *The implications of this hypothesis are that the expected signs on the coefficients t, u, v and w should be* <u>*negative*</u>.

- <u>Hypothesis 6</u>:

H_0: x = 0

H_A: x ≠ 0

H_0: y = 0

H_A: $y \neq 0$

H_0: $z = 0$

H_A: $z \neq 0$

H_0: $ab = 0$

H_A: $ab \neq 0$

A positive relationship should exist between money supply and the stock market index. An increase in the money supply increases the availability of money, thus decreasing short-term interest rates (the cost of money). With lower interest rates, consumers and businesses borrow more for investment and consumption. *The implications of this hypothesis are that the expected signs on the coefficients x, y, z and ab should be* *__positive__*.

- Hypothesis 7:

H_0: $ac = 0$

H_A: $ac \neq 0$

H_0: $ad = 0$

H_A: $ad \neq 0$

H_0: $ae = 0$

H_A: $ae \neq 0$

H_0: $af = 0$

H_A: $af \neq 0$

It is hypothesised in this study that a negative relationship exists between the market price-to-earnings (P/E) ratio in *previous periods* and the stock market index in the *current period.* This is because valuation measures lie at the heart of financial theory. Text books teach that if a security is undervalued then the appropriate action is to buy that security, whilst it is advised that an overvalued security should be sold. There should, however, be a positive correlation between the *current* P/E ratio and the *current* value for the index, since the numerator in the P/E ratio, the market price of all stocks in the market should, naturally, be correlated with the market index, which is the market price of a basket of the 'most important' stocks in a market.

The implications of this hypothesis are that the expected sign on the coefficient ac should be positive whilst the expected signs on the coefficients ad, ae and af should be negative.

3.6 Data Analysis

The data was analysed and the significant equation(s) developed using the statistical software package E-Views 7.1.

3.7 Summary

In summary, the research method is a multiple regression model, estimated using sequential hypothesis testing and OLS regression, and adopting a panel data approach with four dummy variables. The statistical tests to be used are the t-test, P-values, adjusted R-squared, the F-test and the Durbin-Watson statistic. The empirical model that is estimated can be used to measure the 'attractiveness' of the Southeast Asian stock markets. Finally, seven hypotheses have been developed that are to be tested.