

Chapter 1

Introduction

1.1 An Overview of the Stock Market

Stock markets become more international in scope as we approach the year 2000. The increased listing of foreign securities on international stock exchanges has led to around-the-world trading across time zones. Beside that, computer and communication technology are affecting the way securities are traded. The increased computerization in the world's stock markets allows 24 hours trading of stocks per day. With all the trading, international competition is heating up between the stock markets (Hirt and Block, 1999).

What is commonly referred to by the term "market" is usually the market for common stocks as measured by the Dow Jones Industrial Average (DJIA), Hang Seng Index (HIS), Kuala Lumpur Stock Exchange Composite Index (KLSECI), or some other measure of common stock performance. Stock market indexes allow investors to measure the performance of their portfolios against an index that approximates their portfolio composition; thus, different investors prefer different indexes. While a professional pension fund manager might use the Standard & Poor's 500 Stock Index, a small investor might use the Value Line Average as the

best approximation of a portfolio's performance. There are hundreds of indexes measuring various market sectors around the world. The next section will discuss the concept of indexes which will be used for this study later.

1.2 The Concept of Indexes

1. *Dow Jones Industrial Average Index*

Dow Jones Industrial Average Index (DJIA) is the oldest and continuously quoted index of stock price performance in the United States of America (US), the index has been computed since 26 of May 1896 by Dow Jones and Company. When the index was first introduced, it contained 12 stocks, the figure was expanded to 20 in year 1916. Today, the editors of *The Wall Street Journal*, who maintain and update the index, take a very broad view of what constitutes an industrial company in today's technology and service-oriented economy. Now, DJIA comprises a price-weighted average of 30 large "blue chip" stocks such as Proctor & Gamble, General Motors, Microsoft and Johnson & Johnson.¹

A price-weighted index reflects changes in the average price of the stock used to construct the index, means that stocks with the highest price will have the most influence on the index. Other characteristics to watch for include the following: (1) volatile stocks with large price swings; (2) a change in the index components,

¹ Motley Fool Index Center. <http://www.fool.com/school/indices/djia.htm> (19/03/2002)

which may alter the hierarchy of influence; and (3) a stock split, which will decrease the stock's influence on the index.²

The "average" is in the title of DJIA because the index's performance was originally computed by adding up stock prices and dividing by the number of stocks.

$$\text{DJIA} = \frac{\text{Sum of the price of the 30 industrials}}{\text{Divisor}}$$

The methodology remains the same today, but the divisor has been changed to preserve historical continuity.³

2. *Hang Seng Index*

The Hang Seng Index (HSI) was created as a measurement of the Hong Kong stock market in 1964. The HSI is considered the benchmark for investment in Hong Kong stocks and closely tracks the broader All Ordinaries Index at the Stock Exchange of Hong Kong Limited (SEHK). Hang Seng Index Services Limited, a

² Gidel (2000), *Stock Index Futures and Options: The Ins and Outs of Trading Any Index Anywhere*, John Wiley & Sons, Inc. United States of America.

³ Motley Fool Index Center. <http://www.fool.com/school/indices/djia.htm> (19/03/02)

wholly owned subsidiary of Hong Seng Bank, compiles, computes, and disseminates the index. The index dates to 31st July 1974 when its base was set at 100.⁴

Today the index consists of 33 companies representing 70% of the market capitalization of the SEHK.⁵ The stocks in the HSI are grouped under one of four subindexes that were developed in 1985: Commerce and Industry, 19.23% weighting in HSI; Finance, 34.96% weighting; Properties, 17.15% weighting; and Utilities, 28.64% weighting.⁶

The daily closing HSI is calculated as:⁷

$$\text{Today's Current Index} = \frac{\text{Today' Current Aggregate Market Capitalization of Constituent Stocks}}{\text{Yesterday's Closing Aggregate Market Capitalization of Constituent Stocks}} \times \text{Yesterday's Closing Index}$$

⁴ Gidel (2000), " *Stock Index Futures and Options: The Ins and Outs of Trading Any Index Anywhere*", John Wiley & Sons, Inc. United States of America.

⁵ Motley Fool Index Center. <http://www.his.com.hk/intro/content.html> (19/03/2002)

⁶ *Op.cit.*

⁷ Hong Kong Special Administrative Region of the People's Republic of China, Stock market: Share price index. <http://dsbb.imf.org/country/hkg/spibase.htm> (21/03/2002)

3. *Taiwan Capitalization Weighted Price Index*

The Taiwan stock market is among the most volatile of the emerging markets. Annual turnover velocity of domestic shares, computed as the markets's total volume as a proportion of the total number of shares listed, is more than 200%.⁸ Among the many stock indices published by the Taiwan Stock Exchange Corporation (TSEC), the most frequently quoted one is the Taiwan Capitalization Weighted Price Index (TAIEX). TAIEX has been established since 1971, based on the average capitalization in 1966.

The stocks included in the TAIEX are chosen based on five factors: (1) market capitalization by class and by company; (2) industry group; (3) average monthly trade value (over both a 6- and 12-months period); (4) estimated amount of available shares, or free float; and (5) amount of cross-ownership of shares among component stocks. Although the free float comes into play in selecting stock, each one's capitalization is figured based on the entire number of shares available.

The index level is calculated by dividing the sum of component stocks' current market capitalization (adjusted for corporate actions, such as stock splits, stock dividends, and rights issuers) by the preceding period's sum of market capitalization

⁸ Gidel (2000), "*Stock Index Futures and Options: The Ins and Outs of Trading Any Index Anywhere*", John Wiley & Sons, Inc. United States of America.

for the stocks. This result is multiplied by the preceding period's index level to determine the new index value.⁹

4. *Kuala Lumpur Stock Exchange Composite Index*

The Kuala Lumpur Stock Exchange Composite Index (KLSECI) is a market capitalization weighted index which means that the stocks with the most outstanding shares at the highest price are weighted the heaviest in the index and thus, have the most influence on the index movement.

The KLSECI comprises 100 component stocks selected from various sectors on the Main Board of the Kuala Lumpur Stock Exchange (KLSE) such as Telekom Malaysia Berhad, 13.2% weighting; Tenaga Nasional Berhad, 10.25%; Malayan Banking Berhad, 7.56%; Petronas Gas Berhad, 7.18%; Malaysia International Shipping Corporation Berhad, 5.28%; and Sime Darby Berhad, 4.57%.¹⁰ The KLSECI is weighted by market capitalization based on the year of 1977.

Calculation formula for KLSECI:¹¹

$$\text{Index} = \frac{\text{Current Aggregate Market Value}}{\text{Base Aggregate Market Value}} \times 100$$

⁹ *Ibid.*

¹⁰ Battley (2000), "The World's Futures and Options Markets: A Classified Directory of the World's Exchanges and Contracts" Second Edition, John Wiley & Sons, Ltd, Chichester.

¹¹ Malaysia Stock Market: Share price index. <http://dsbb.imf.org/country/mys/splbase.htm> (21/03/2002)

5. *Korea Composite Stock Market Index*

The Korea Composite Stock Market Index (KOSPI) is a market value weighted index composed of all common and preferred stocks listed on the Korea Stock Exchange (KSE) except the bond-type preferred stocks and newly listed stocks. There are two types of preferred shares listed on the KSE. One is the equity type preferred share whose dividend rate is simply 1 percent higher than the company's common shares. These shares are included in calculating the market capitalization of the company. The other type of share is the bond-type preferred share, which is excluded from the calculation of KOSPI. Newly listed shares will only be included in the calculation of KOSPI on the 31st trading day after listing, as these shares tend to be very volatile after listing. The KOSPI has a base date of 4th January 1980 and a base index of 100.

The KOSPI is calculated by using the Paasche's concept of a total capitalization weighted index. Since the KOSPI is a market capitalization weighted index, a large and widely held company has greater impact on the KOSPI performance than a small company. Similarly a company with a high share price has greater impact on the KOSPI's performance than a company with a low share price even if the two companies have the same number of shares. The base date is 4th January 1980 with a base of 100. The KOSPI is calculated as 100 times the current

capitalization divided by the base market capitalization. The aggregate market capitalization is the sum of the market capitalization for all constituent stocks.¹²

6. *Straits Times Index*

The Straits Times Index (STI) is a free-float weighted index comprising 45 stocks listed on the Singapore Exchange Securities Trading Limited (SGX-ST), formerly known as the Stock Exchange of Singapore (SES). The STI was introduced on 31st August 1998 to replace the Straits Times Industrial Index (STII). It was further revised on 12th September 2001. There are three major differences between the new STI and the old STI:¹³

- (a) The old STI was weighted by market capitalization, while the new STI is weighted by free-float.
- (b) The secondary objective of having the STI reflect the Singapore economy has dropped. The new STI comprises of 45 stocks, while the old STI covered 55 stocks; and
- (c) The restriction that any stock with more than a 40 percent cross-holding by another component stock was ineligible for inclusion has been removed.

¹² Korea Stock Market: Summary Methodology. <http://dsbb.imf.org/country/kor/spimeth.htm> (21/03/2002)

¹³ Singapore Stock Market: Share price index. <http://dsbb.imf.org/country/sgp/spibase.htm> (21/03/2002)

7. *Stock Exchange of Thai Index*

The Stock Exchange of Thai Index (SET) is a composite index calculated from stock price trading on the main board of the Stock Exchange of Thailand. The SET Index is a market capitalization price index that compares the current market value of all listed ordinary shares with a base of 30th April 1975, when the SET Index started it was set at 100 points. Its calculation is adjusted according to the new listings, delisting, and all types of capitalization changes.¹⁴

$$\text{SET Index} = \frac{\text{Current Market Capitalization of All Listed Common Stocks}}{\text{Market Capitalization of those Listed Common Stocks on Base Date}} \times 100$$

8. *Jakarta Composite Stock Price Index*

The Jakarta Composite Stock Price Index (JCSPI) comprises 287 listed companies on the Jakarta Stock Exchange (JSX). The first CSPI base value of 100 is 10th August 1982 with 25 issuers, which included the weighted capital of all listed stock, not issued stock. The latest base value of 100 is 14th August 1991 with 132 issuers divided into 10 economic sectors. The economic sectors are agriculture, basic

¹⁴ Thailand Stock Market: Summary Methodology. [http://dsbb.imf.org/country/tha/spimeth.htm\(21/03/2002\)](http://dsbb.imf.org/country/tha/spimeth.htm(21/03/2002))

industry, miscellaneous industry, mining, consumer goods, manufacturing, finance, property, infrastructure and trade.

The stock index is computed by using the Laspeyres formula, it is calculated as the sum of the regular closing price multiplied by number of shares and divided by base value.¹⁵

9. *Philippines Stock Exchange Composite Index*

The Philippines Stock Exchange Composite Index (PSECI) or Stock Price Index is a weighted aggregate index that provides a definite measure of the country's stock market performance. The PSECI is computed by using a fixed basket of 30 common stocks of listed companies, carefully selected from different industries such as the banking and financial services sector, the commercial-industrial sector, and the property, mining and oil sectors to represent the general movement of the market prices. The criteria used to select the constituent stocks whose share price movements closely reflect that of the market are sector representation, market capitalization, liquidity, maturity and stock type. The PSECI base value of 100 is on 30th September 1994.

The method of computation is called the "Weighted Market Capitalization Method" where the composite index for the day is computed by comparing the total market capitalization of constituent stocks for the day with the total market capitalization

¹⁵ Indonesia Stock Market: Share price index. [http://dsbb.imf.org/country/ind/spibase.htm\(21/03/2002\)](http://dsbb.imf.org/country/ind/spibase.htm(21/03/2002))

on the previous day. Weighting for each stock varies daily as market capitalization changes.¹⁶

The PSECI is computed by using the following formula:¹⁷

$$\text{SPI}(t) = (\text{MC}(t) / \text{MC}(t-1)) \times \text{SPI}(t-1)$$

Where

SPI(t) = Stock Price Index for today

SPI(t-1) = Stock Price Index for the preceding business day

MC(t) = Market capitalization of constituent stocks for today

MC(t-1) = Market capitalization of constituent stocks of the preceding business day

- Market capitalization is the sum of the products of the outstanding shares and current market price of each component stock.
- Outstanding shares include the issued and subscribed shares of common stock of the company.
- Closing price is today's last traded price of the company's shares of stock.
- Constituent stocks is composed of the thirty common stocks of listed companies constituting the composite index. These also include the Class "B" shares of companies which have classifications for their common shares.

¹⁶ Philippines Stock Market: Share price index. [http://dsbb.imf.org/country/phl/spibase.htm\(21/03/2002\)](http://dsbb.imf.org/country/phl/spibase.htm(21/03/2002))

¹⁷ Philippines Stock Market: Summary Methodology. [http://dsbb.imf.org/country/phl/spimath.htm\(21/03/2002\)](http://dsbb.imf.org/country/phl/spimath.htm(21/03/2002))

1.3 Rationale of Study

One of the important developments in the global economy is the increasing degree of globalization and integration. Following are some of the observations on the process (Khan, 1994):

- i. Important barriers to trade that fragmented the world market in the past has decreased since the 1980s. This has included substantial dismantling, in many developing countries, of restrictions on foreign trade.
- ii. Barriers to international capital movement have been substantially reduced.
- iii. Expansion of free trade within certain regional blocs (for example, the European Union and North America) has led to a fuller integration of the economies belonging to these blocs. This tendency is visible in Asia also, especially in the context of ASEAN.

The current trends of globalization and knowledge-based society and economy, in the context of increased regional integration, provide tremendous opportunities for capital flow across national boundaries, possible gains from international diversification.

In an economic environment where international considerations are prominent, knowledge of the structure of the international stock market linkages is of paramount importance. Individual and institutional investors are interested in knowing the relationship among different national stock prices because it facilitates international investment diversification. Economists also pay attention to the relationship because it affects capital flows, investment and consumption decisions (Azali, 2000).

One idiosyncrasy of national stock prices is that they tend to move together and follow a common upward trending behaviour over long-run. For an example, in the study by Corhay (1993), the existence of some common long-run stochastic trends was found in the European stock markets. In the context of emerging markets, Garret and Spyrou (1997) found evidence of common stochastic trends in Latin American and Asia Pacific regions. They further argued that the stock markets of the emerging economies are becoming increasingly integrated.

The stock market cointegration has been widely discussed and tested because if there is a common stochastic trend in the stock markets, then the benefits from diversification will be directly eradicated, therefore investors with long-run horizons may not actually benefit from international portfolio diversification. Beside the direct effect, diversification has indirect impacts through their effects on real activity variables, which in turn postulated to be fundamental determinants of stock prices. In line with this situation, a lot of focus and the issue of stock market

interdependence has been the subject of extensive research for the last two and half decades. The following section we will investigate whether there is any difference between the stock indices movement pattern of selected market pre- and post-1997 financial crisis.

1.4 The Stock Indices Movement Trend Pre- and Post-1997 Financial Crisis

Basically there are three types of situations we can observe from the graphs below:

Figure 1.4.1 (a)

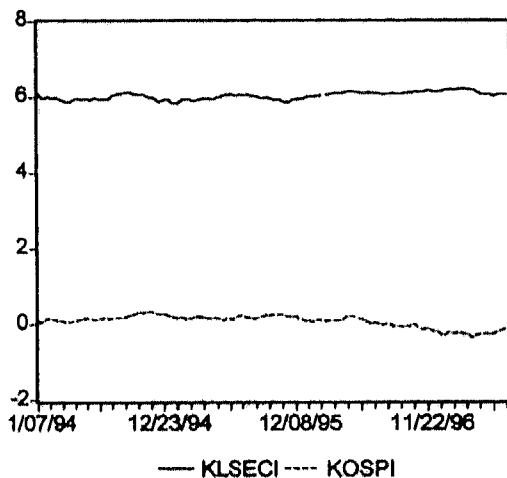


Figure 1.4.1 (b)

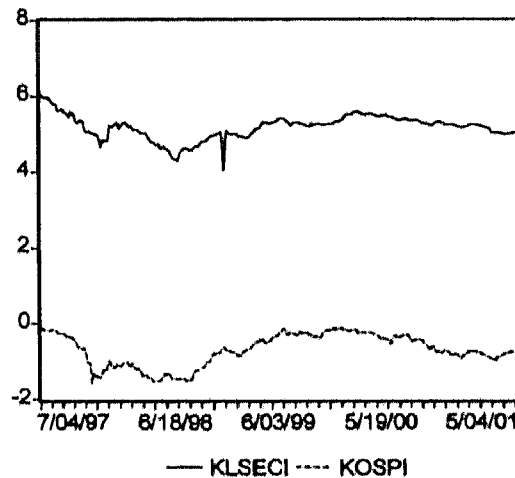


Figure 1.4.2 (a)

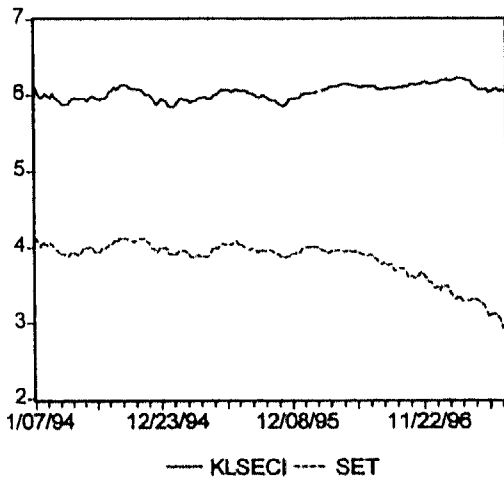


Figure 1.4.2 (b)

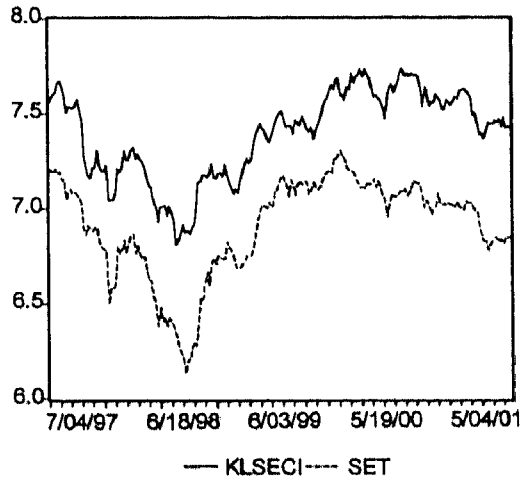


Figure 1.4.1 (a) & (b) shows the stock indices movement between the Kuala Lumpur Stock Exchange Composite Index (KLSECI) and the Korea Composite Stock Market Index (KOSPI), Figure 1.4.2 (a) & (b) represents the stock indices movement between the KLSECI and the Stock Exchange of Thai Index (SET) pre- and post-1997 financial crisis. Based on the graphs we find that the movement of stock indices are same in both cases pre- and post-1997 financial crisis. Therefore, we can conclude that the existence of common stochastic trend between the Malaysian stock market and South Korea stock market, Malaysian stock market and Thailand stock market respectively.

Figure 1.4.3 (a)

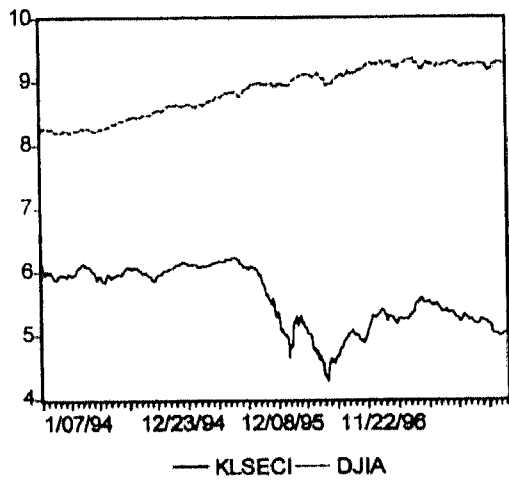


Figure 1.4.3 (b)

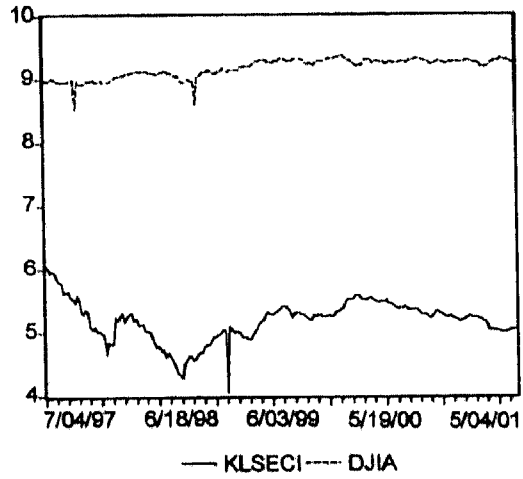


Figure 1.4.4 (a)

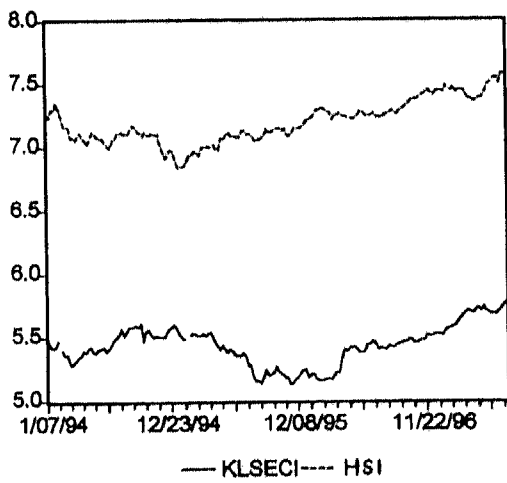


Figure 1.4.4 (b)

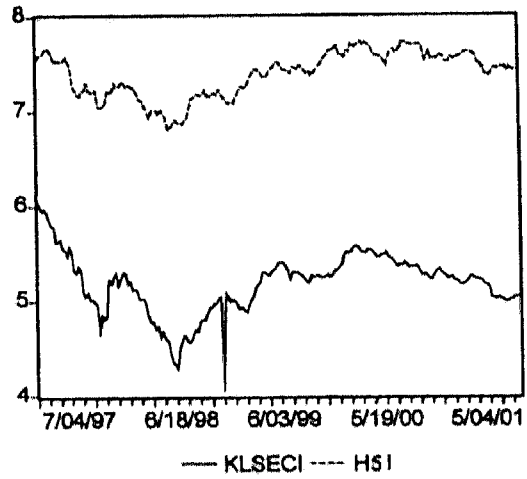


Figure 1.4.5 (a)

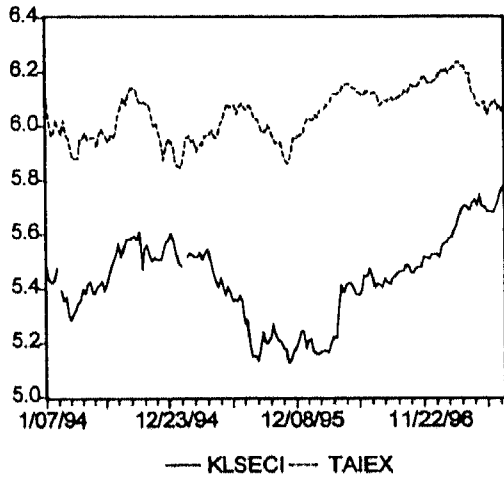


Figure 1.4.5 (b)

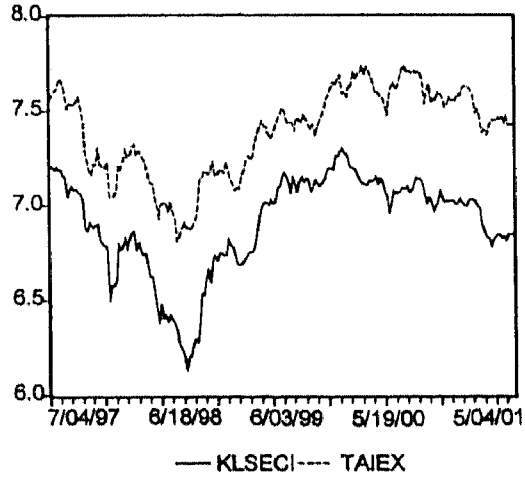


Figure 1.4.6 (a)

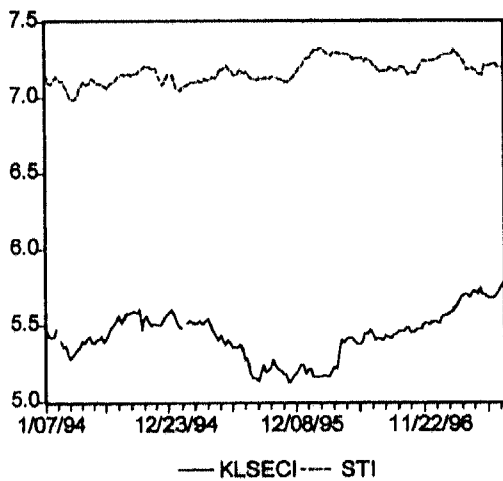


Figure 1.4.6 (b)

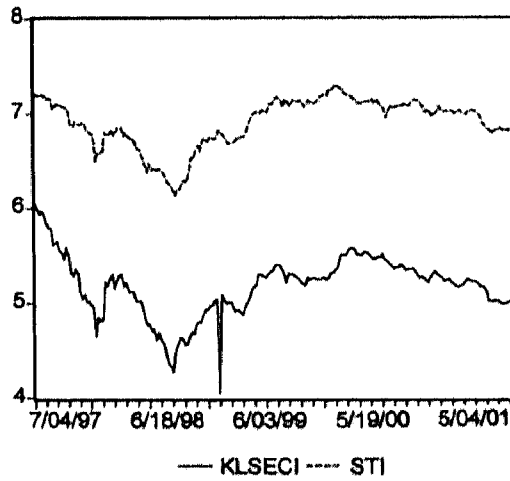


Figure 1.4.3 (a) & (b), 1.4.4 (a) & (b), 1.4.5 (a) & (b) and 1.4.6 (a) & (b) represents the stock indices movement pre- and post-1997 financial crisis between KLSECI and Dow Jones Industrial Average (DJIA), KLSECI and Hang Seng Index

(HSI), KLSECI and Taiwan Capitalization Weighted Price Index (TAIEX), and KLSECI and Straits Times Index (STI) respectively. The graphs show that the stock indices movement trend tend to be same post-1997 financial crisis in each case compared to the graphs pre-1997 financial crisis, Malaysia stock market seem to be more cointegrated with the US, Hong Kong, Taiwan and Singapore stock market after the crisis.

On the other hand, there are some evidence to show that the Malaysian stock market is related to the Indonesian stock market and Philippines stock market pre-1997 crisis compared to post-1997 financial crisis.

Figure 1.4.7 (a)

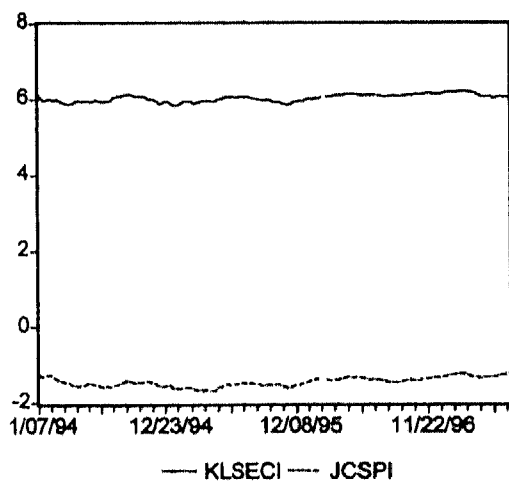


Figure 1.4.7 (b)

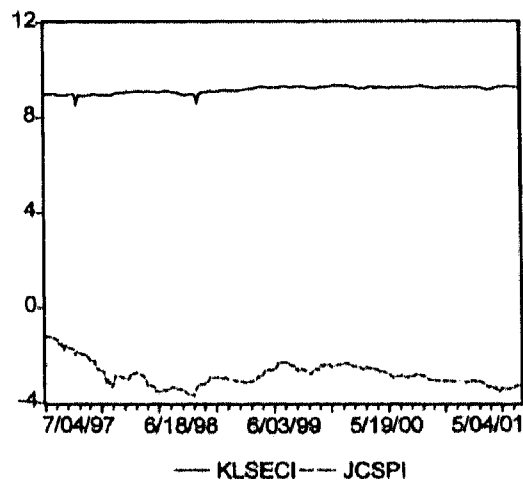


Figure 1.4.8 (a)

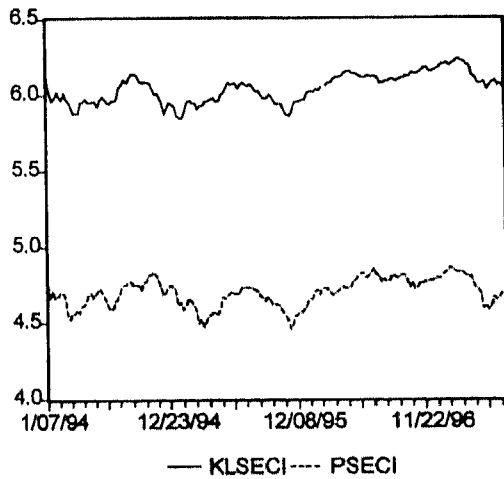


Figure 1.4.8 (b)

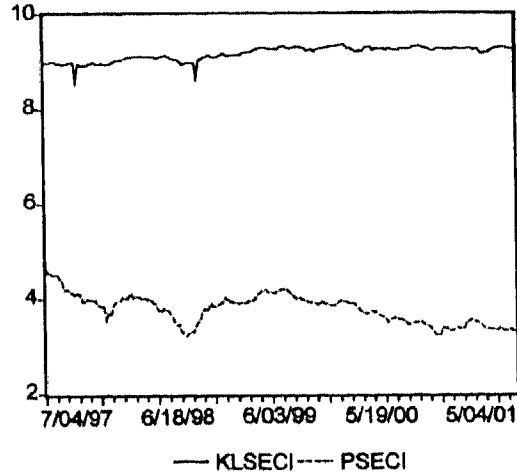


Figure 1.4.7 (a) & (b) show the stock indices movement trend between the KLSECI and the Jakarta Composite Stock Price Index (JCSPI), Figure 1.4.8 (a) & (b) represent the trend between the KLSECI and the Philippines Stock Exchange Composite Index (PSECI) pre- and post-1997 financial crisis.

The above mentioned statements are based on the observation of graphs, from them we notice the trend among the stock markets. A more detail observation and study on the markets linkages will be done by applying cointegration test in chapter 4 and 5.

1.5 Objectives of Study

The objectives of this study are as follows:

1. To investigate the linkages between the Malaysian (Kuala Lumpur Stock Exchange Composite Index) and the US (Dow Jones Industrial Average), Hong Kong (Hang Seng Index), Taiwan (Taiwan Capitalization Weighted Price Index), South Korea (Korea Composite Stock Market Index), Thailand (Stock Exchange of Thai Index), Singapore (Straits Times Index), Indonesia (Jakarta Composite Stock Price Index) and Philippines (Philippines Stock Exchange Composite Index) stock markets using pairwise cointegration.
2. To investigate whether the cointegration pattern of stock prices and their fundamentals are consistent with each other pre- and post-1997 financial crisis and to therefore study the implications for diversification.

1.6 Organization of Study

The study is organized into six chapters. The first chapter comprises the rationale and objectives of the study. Chapter Two consists of the literature review. The following chapter discusses the theoretical framework of international asset pricing model for stock. Chapter Four presents the methodology of this study which is used to investigate long run, pre-crisis and post-crisis relationships among the stock markets. The Fifth Chapter reports on the findings of this study by means of econometric analysis. The last chapter concludes the findings of the past chapters.