CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Some of the previous studies on stock market interdependence are discussed in three sections. A lot of past work concentrated on the established stock markets. Interdependence among these major markets and with other markets is reviewed in the first section. In the second section, the interdependence among some emerging stock markets or stock markets with smaller market capitalisation will be reviewed. Finally, in the third section, we discuss the scenario in the Malaysian stock market, particularly the interdependence between the Main and Second Board in the KLSE and also among the different sectors.

2.2 Interdependence Among the Established Stock Exchanges and Other Stock Exchanges

Schollhammer and Sand (1985) conducted an empirical study on the interdependence of stock price among the major European countries and the United States (US). Daily closing indices from 1 January 1981 to 30 June 1983 were used in the analysis. The Box-Jenkins ARIMA (autoregressive integrated moving average) time series analysis was employed to study the inter-relationships among the stock market in France, Germany, Italy, Netherlands, Switzerland, United Kingdom (UK) and US. The results showed that interdependence exists between Germany, UK, Netherlands and Switzerland. Only France and Italy are unaffected by the stock price changes in other

European countries. In terms of the lead-lag relationship, any changes in the US Dow Jones Index on a particular day affect all the European stock markets on the following day except for Italy. The results also revealed that the France, Germany, Switzerland and UK stock markets follow a random walk model. This means that investors could not predict the price changes based on the previous days' returns as they occurred independently of each other.

Taylor and Tonks (1989) evaluated the impact of the abolition of UK exchange controls on the degree of integration of the UK and foreign stock markets. Using cointegration techniques, they studied the correlation between stock markets both in the short and long run. Their results showed that the abolition of the exchange controls enabled the UK stock exchange to become cointegrated with the other major exchanges, such as Germany, Netherlands and Japan. With the relaxation of exchange controls, more unexploited opportunities have been filled, resulting in more international interdependence. The results also showed that in the short run, investors would be able to gain profit from diversification. However, this does not apply to the long run, as the covariance between the stock markets was high. Other than this, cointegration of stock markets implied inefficiency because forecasting of stock returns is possible.

Interdependencies among the Nordic markets, which comprised of the Norwegian, Danish, Finnish and Swedish stock markets, and with the US stock market were investigated by Marthur and Subrahmanyam (1990). They utilized the method of Granger causality and vector autoregression model. Monthly prices for the period of 1974 to 1985 were examined. Their results revealed that

out of the four Nordic markets, US market only affected the Danish market. However, all the four Nordic markets did not affect the US market in return. The Swedish market had some impact on the Norwegian and the Finnish markets. As for other Nordic markets, they did not show any evidence of cointegration among themselves.

Smith, Brocato and Rogers (1993) employed the method of Granger causality test to examine the linkages of the four established stock exchanges of the US, UK, West Germany and Japan. The period study covered 17 January 1979 to 26 June 1991. Interdependence among these stock markets occurred during the week of October 1987. The contagion effect from the market crash, which has spread to other major markets, caused the linkages. Other than the crash period, evidence of Granger causality between these markets was not found.

Byers and Peel (1993) examined the interdependence between the stock exchanges of the US, UK, Japan, West Germany and Netherlands. Besides Granger causality test, unrestricted vector autoregression was also utilized in the study. Monthly data for the period from October 1979 to October 1989 were used. Their results showed no evidence of cointegration even after the abolition of exchange controls in the UK, except for the cointegration between the UK and Japanese markets. This is in contrast with the study of Taylor and Tonks (1989) which proved the existence of market integration after the abolition of exchange controls.

Bala (1993) investigated the interdependence among the major international stock markets prior to October 1987 and also their relationship after that period. A total of 2709 daily closing indices were used in the study, which included the period of January 1980 to May 1990. Their results showed that there was no interdependence prior to October 1987 but after that period, the international interdependence has increased markedly. This pattern was true among the France, Germany and UK stock markets but not with the Japanese market. The Japanese stock market did not show any evidence of interdependence before or after October 1987 with the US or any of the European stock markets. Based on the error-correction model approach, innovations in the US market have an effect on the French, Germany and UK markets after the period of October 1987 but not vice versa. Efficiency in the cross border information could have contributed to the increase in the international interdependence. This, however, contradicted the findings of Smith, Brocata and Rogers (1993), which found no evidence of causality.

Kwan, Sim and Cotsomitis (1995) employed the method of Granger causality test and Engle and Granger cointegration analysis to examine the interdependence among nine stock markets of the US, UK, Japan, West Germany, Australia, Taiwan, South Korea, Singapore and Hong Kong. Monthly data for the period January 1982 to February 1991 were used. Pairwise and higher order cointegration tests indicated the existence of cointegration among these stock exchanges. Other than that, evidence of lead-lag relationship was found and this rejected the hypothesis of market efficiency.

However, Kanas (1998) suggested that the US market is not pairwise cointegrated with any of the European markets. This is another finding supporting non-cointegration between the US and European markets. The period from 3 January 1983 to 29 November 1996 was covered in the study. The multivariate trace statistic, the Johansen method and Bierens nonparametric approaches were employed. He tested for the cointegration of the six largest European equity markets, comprising of the markets in UK, Germany, France, Switzerland, Italy and the Netherlands, with the US market. The study was in a bivariate framework as no multiple comparison was carried out. As cointegration was not found, this was consistent with the hypothesis of market efficiency. Thus, by diversifying in US stocks and any other established European markets, investors would be able to reduce their risk of investment in the long run.

2.3 Interdependence Among the Emerging Stock Exchanges and the Other Stock Exchanges

Cheung and Mak (1992) investigated the inter-relationship of some emerging Asian-Pacific markets with the two developed markets of the US and Japan. Weekly stock indices from 1977 to 1988 were used. Their results indicated that the US market led most of the markets except for the markets of Korea, Taiwan and Thailand. They suggested that the difference in the market integration could be due to the policy of openness in each of the stock markets. The Japanese market showed less impact on the emerging stock markets.

Allen and MacDonald (1995) conducted an empirical study on the cointegration of the Australian market and 16 other markets. Monthly indices from 1970 to

1992 were used. The results from two different methods were compared and was found that there is a difference between the power of the Engle-Granger two-step method and the new Johansen procedure. Other than that, the results from this study revealed that bivariate cointegrating relationship did not exist except for a few pairs, including Australia and Canada, Australia and Hong Kong, Australia and Germany, and Australia and Switzerland. It was commented that the use of a range of lags to run the cointegrating regression was important because in some cases, the results were very much affected by the lag length chosen.

Chaudhuri (1997) examined the behaviour of stock prices in six emerging Latin markets, namely Argentina, Brazil, Chile, Colombia, Mexico and Venezuela. Long-run relationship among all these countries existed in a bivariate framework. The Granger causality test detected the presence of bidirectional relationships. The absence of a unidirectional causality implies that there is no exogeneity in their stock prices.

Liu, Song and Romilly (1997) investigated the efficiency and relationship between the two stock markets in China, i.e, the Shanghai and the Shenzhen Stock Exchange. Analysis based on the Engle-Granger two-step cointegration and the Johansen procedure suggested the existence of cointegration or a long-run equilibrium relationship between the two stock exchanges. The Granger causality test detected a bidirectional relationship between the returns of the Shenzhen and Shanghai shares. These results implied that the stock markets were collectively inefficient although statistical evidence showed that both the

markets followed random walk process, which means that the markets were efficient individually.

Masih and Masih (1997) examined the linkages among the stock markets of the four Asian newly industrializing countries (NIC), i.e., Taiwan, South Korea, Singapore and Hong Kong. This study used a time-series econometric approach, including the methods of unit root testing, multivariate cointegration, vector error correction modeling and impulse response functions. In their models, the effect of the price movements in the established markets of Japan, US, UK and Germany was incorporated. The results showed the importance of all the major markets in leading or activating the fluctuations in the NIC stock markets. The findings from the study also revealed that all the established markets and the Hong Kong market were the initial receptors of any shock in the long run. Taiwan and Singapore seemed to be affected more by shocks from the established markets compared to the other NIC markets.

2.4 Interdependence in the Malaysian Stock Market

Habibullah and Baharumshah (1995) investigated the integration between the Main and Second Board of the KLSE with the hypothesis that the integration was due to the high degree of sophistication in the KLSE. The technique of cointegration, Granger causality test and the error correction model approach were employed in the study. Based on monthly and weekly data, the findings showed that the Main Board and Second Board of the KLSE were not cointegrated in the long run. This was in compliance with the theory of market efficiency. This would bring benefits to the investors in terms of risk reduction as they could diversify their investment between the two boards. As for the

short-run movements, there was a one-way causality moving from the Main to the Second Board. Investors could use this information to gain some abnormal returns based on the appropriate forecasting.

Kok and Goh (1997) examined the inter-sectoral causal relationship in the Malaysian stock market. Daily sectoral stock indices for the period 1984 to 1993 were used to represent the various sectoral returns in their analysis. A two-year sub-period analysis was also conducted. Based on vector autoregression model, it was found that the inter-sectoral relationship was not fixed over time. The industrial sector was the dominant sector in the period 1984-1985 while the finance and property sectors were jointly the dominant sectors in the period 1986-1987. In the period 1988-1989, the dominant sectors were plantation and tin. In the periods 1990-1991 and 1992-1993, the finance sector was dominant. In short, each of the sectors used to be the leading sector in the KLSE with the finance sector Granger causing the other sectors most frequently. Although there was no exact pattern of interdependence, it was proven that sectors in the KLSE are inter-related.

2.5 The Way Forward

Based on the literature review, two points are vividly shown. Firstly, most of the previous studies emphasized on the inter-market dependency with very few examining the intra-market dependency. Interdependence between stock exchanges of different countries was analysed particularly between the established stock markets such as UK and US and some emerging or smaller stock markets. Not many studies focus on the interdependence among the sectors in each particular stock market. Numerous studies are done on the Malaysian

stock market but the studies on the interdependence among the sectors are quite rare. This work is conducted as a continuation from the study conducted by Kok and Goh (1994) on the interdependence among the sectors in the KLSE, in terms of the period of study. A different econometric approach is used in this study. Besides studying the short-run dynamics as was done by Kok and Goh (1994), this study investigates also the long-term relationship among the different sectors of the KLSE.

Secondly, the literature review sees a change in the technique of analysis from the traditional time-series analysis to the time-series econometric approach. In 1980's, univariate analysis such as the Box-Jenkins ARIMA modeling was used to study the stock market behaviour. In the early and mid 1990's, analysis based on the bivariate framework was widely used among the researchers. Among the most common methods were the bivariate Granger causality test and the Engle-Granger two-step cointegration test. Lately, more complicated analysis in the form of multivariate framework has been employed. Time-series econometric approach is used to analyse the cointegration among the stock markets. Among the popular methods are the vector autoregression and the vector error correction modeling. This study is done using similar approaches for a multivariate framework.