

## **Chapter 2**

### **Literature Review**

#### **2.1 Introduction**

For the last two decades, the issue of stock market interdependence has been the subject of extensive research. There is vast empirical work on the issue. In this chapter, empirical studies based on Western markets will be discussed in section 2.2 followed by empirical studies on Asia Pacific and ASEAN markets in section 2.3. The last section will conclude this chapter.

#### **2.2 Empirical Studies on Western Markets**

In Choudhry (1996) study, he investigates the long-run relationships between the stock indices of six European markets during the 1920s and 1930s. Logs of monthly stock indices from Czechoslovakia, France, Italy, Poland, Spain and Sweden are applied in the empirical investigation. The tests are conducted for three different time periods, a long period covering most of the 1920s and 1930s, and two shorter periods, pre- and post-October 1929 stock market crash. The cointegration tests indicate a stationary long-run relationship between the stated indices during the longest period (1925-1936) and also during the pre-October 1929

period (1925-1929). However, the results fail to indicate a stationary long-run relationship during the post-crash period (1929-1936). According to Choudhry (1996), the extensive international financial integration and cooperation that took place between countries in Europe after the First World War may be the reason behind the stationary long-run relationship between the indices. On the other hand, lack of a significant result after October 1929 could be due to the stock market crash or the breakdown in economic and political ties between the countries.

Corhay et al. (1993) study the common stochastic trends in European stock markets: France, Germany, Italy, the Netherlands and the United Kingdom. By using cointegration analysis-static regressions and a VAR-based maximum likelihood framework, they found evidence of cointegration between the stock price series of European countries. This reveals the existence of some common stochastic trends among the five important markets over the long-run period from 1975 to 1991.

Dwyer and Hafer (1988) in their survey of October 1987 crash used daily data of seven months before and after the crash and found no evidence to show that the level of stock market price indices for the US, Japan, Germany and the United Kingdom (UK) are related. Similar result was obtained by Malliaris and Urrutia (1992), as they found no evidence to support the presence of a lead-lag relationships before and after the October 1987 crash but instead found a significant uni- and bi-directional Granger-causality during the month of the crash.

However, Arshanapalli and Duokas (1993) found a contrast evidence compared to the studies done by Dwyer and Hafer (1988). By employing daily closing data, they found a strong interdependence among France, Germany, Japan, the UK and the US stock market prior to October 1987. For the post-October 1987, their results show that the degree of international co-movements among the stock price indices has increased substantially, except the Nikkei index. Furthermore, they found out that the Japanese equity market performance do not have any linkage with the US, France, Germany and the UK stock markets during the pre- and the post-October 1987 crash period.

In Kanas (1998) paper, he employs the multivariate trace statistic  $\hat{P}_z$ , the Johansen (1998) method, and the nonparametric approach which is proposed by Bierens (1997) to test for pairwise cointegration between the US and each of the six largest European equity markets, namely those of the UK, Germany, France, Switzerland, Italy, and the Netherlands. The analysis covers the period from 3<sup>rd</sup> Jan 1983 to 29<sup>th</sup> Nov 1996, as well as the pre- and post-1987 crash periods.

The main finding is that the US equity market is not pairwise cointegrated with either the UK, Germany, France, Switzerland, Italy or the Netherlands. The result holds for the entire period (1983-1996) as well as the pre- and post-1987 crash periods. In the long run, the US stock market does not exhibit any tendency to move together with any of the major European markets and consequently, there are no long-run linkages between the US and any of the major European markets.

More importantly, the result of no long-run linkages between the US and these European markets holds not only for the entire period but also consistent for the pre- and post-1987 crash periods. As the US market tends to drift apart from each of these European markets in the long run, an investor cannot use the performance of any of these European equity markets to forecast the long run performance of the US equity market. The results of no pairwise cointegration between the US and the major European markets also implies that there exist potential long-run benefits in risk reduction from diversifying in the US stocks and stocks in any of the six largest European equity markets. The result can be valuable to investors and financial institutions evaluating international portfolios, as well as institutions such as superannuating funds and life insurance companies which holding long-run investment portfolios.

Smith, Brocato and Rogers (1993) examine market linkages of the US, Great Britain, West Germany and Japan by using weekly stock returns data from 17<sup>th</sup> January 1979 to 26<sup>th</sup> June 1991. The four countries are examined because these countries represent approximately 84% of world-wide capitalization. The stock returns of the four countries were generated from indexes obtained from Morgan Stanley Capital International Perspectives.

Smith, Brocato, and Rogers (1993) found evidence of Granger unidirectional causality running from the US to the other countries (with the exception of the German market) immediately after the October 1987 world-wide crash, however the linkage appears to be short-lived. By the given result, conclusion is made that the market crash 1987 in the US caused instability, which was transmitted to other major markets around the world. Other than the crash period, it appears to be a lack of Granger causality from market to market. The implication for international portfolio diversification is clear.

Cheng (1998) provides new empirical evidence on the international transmission mechanism of the UK and the US stock market movements and the relationship between the UK and the US economic indicators by using factor analytic approach and canonical correlation analysis. The sample period of the study is from January 1965 to December 1988. In the smaller scope of study where the concentration on the UK and the US, the results show that the UK and the US economies are closely related. The US economic cycle seems to lead those in the UK, as the US economy is more influential than the UK economy. This is in accordance with the results supporting high international integration between the UK and US stock markets. As a result, there seems to be a statistically significant relation between the UK and the US stocks. The results are not consistent with Kanas (1998) and Smith, Brocato and Rogers (1993) study as we discussed previously.

### **2.3 Empirical Studies on Asia Pacific and ASEAN Markets**

Cheung and Mak (1992) employs weekly stock index data from 1977 to 1988 to study the causal relationship between the eight Asian Pacific emerging markets and the two developed markets. The eight Asian Pacific markets includes Hong Kong, Taiwan, Korea, Malaysia, Singapore, Thailand, Indonesia and the Philippines. The two developed markets chosen are the US and the Japanese market.

The study provides evidence that the US stock market leads most of the Asian Pacific stock markets with the exception of Korea, Taiwan and Thailand. According to Cheung and Mak (1992), the differences in results between the three markets and other Asian Pacific markets is probably attributable to the differences in the degree of openness of the respective stock markets. The three markets impose strong restrictions on foreign investors in order to protect local investors. For example, foreign investors are only allowed to hold 1% of Taiwanese stock.

Similar testing procedures are performed to examine the causal relationships between the Japanese market and the Asian emerging markets. Unlike the US market, the Japanese market seems to play a less important role and have a less influence in the region. In this case, the conclusion is that the effect of a global factor seems to exist in this part of world and the regional factor (Japanese market) seems to have a less significant impact on the Asian Pacific markets.

Chung and Liu (1994) examine the common stochastic trend among national stock price of the US and five East Asian economies (Japan, Hong Kong, Taiwan, South Korea and Taiwan). Similar results are found, their results suggest that the US and Taiwan market-relatively closed market may not belong to a common stock region containing the remaining four countries. Their result shows that most variables have similar adjustment speed in moving from short run disequilibria toward the common trend.

Beside that, by employing monthly data, Garret and Spyrou (1997) investigate the stock market linkage of Latin America and Asia Pacific regions. The Asia Pacific regions included are India, Malaysia, Thailand, Philippines, South Korea and Taiwan. The evidence shows that the stock markets of these regions are becoming increasingly integrated with the presence of common stochastic trends among the national stock market indices. However, closer examination of the common trends reveals that some countries do not enter the region's common trend. In their study, among the Asia Pacific regions only South Korea and Taiwan were found to have significant impact in the long run relationship. The implication of this is that any benefits that arise from diversification will be eradicated in the long run, therefore, investors with long run horizons may not actually benefit from international portfolio diversification.

Huang (1995) studied the random walk hypothesis of Asian stock markets. The random walk hypothesis has great implications in financial theories and statistical modeling. If stock prices follow random walk, the market is said to be efficient. Market efficiency is one of the factors for investors in making investment decision. The Asian stock markets tested are Japan, Hong Kong, Taiwan, Korea, Malaysia, Thailand, Singapore, Indonesia and Philippines. The random walk hypothesis is tested by using a basis of the variance ratio statistics, with the sample period spanning from 1<sup>st</sup> January 1988 to 30<sup>th</sup> June 1992 . Out of the nine emerging markets been examined, it is found that the random walk hypothesis for the Korean stock market and the Malaysian stock market is rejected for all different holding periods. In the other words, there is positive serial correlations in Malaysia and Korea stock markets for all the holding periods.

The paper by Arshanapalli, Doukas and Lang (1995) documents the presence of a common stochastic trend between the US and the Asian stock market movements during the post-October 1987 period. The evidence suggests that the “cointegrating structure” that ties these stock markets together has substantially increased since October 1987. The influence of the US stock innovations were found to be greater during the post-October 1987 period. Finally, the results also indicate that the Asian markets are less integrated with Japan’s equity market than they are with the US market.



Azali (2000) utilizes the weekly data spanning from January 1988 to August 1999 to study the long run relationship among ASEAN-5 (Malaysia, Singapore, Indonesia, Thailand and Philippines) equity markets. The results reveal that the Singapore equity market was not affected by other markets except by the Philippines in the long run. As a result, there exist some opportunities for beneficial international portfolio diversification within the context of ASEAN-5 equity markets.

More recently, in the study of cointegration among national equity indices before and during the period of the Asian financial crisis 1998, Sheng and Tu (2000) use the multivariate cointegration and error-correction tests to examine the linkages among the Asia Pacific countries. The results demonstrate evidence in support of the existence of cointegration relationships among the national stock indices during and not before the period of financial crisis. In the recent crisis, the relationship within the South-East Asian countries seems to be stronger than that within the North-East Asian countries. The variance decomposition reveals that the "degree of exogeneity" for all indices has been reduced, implying that no countries are "exogenous" to the financial crisis. In addition, Granger's causality test suggests that the US market "causes" some Asian countries during the period of crisis, reflecting the US market's persisting dominant role.

## 2.4 Conclusion

Section 2.2 of this chapter reviews the empirical studies on western markets. It has been shown that there are few empirical studies concerned about the 1987 crash. In the survey by Dwyer and Hafer (1988), Malliaris and Urrutia (1992) and Kanas (1998), they do not find any evidence to support the presence of linkages between the US stock market and the emerging western markets such as the UK and Germany. However, Cheng (1998) finds contrasting evidence. His main finding is that the US and the UK equity markets are closely related.

Beside that, Arshanapalli and Doukas (1993), Smith, Brocato and Rogers (1993) in their studies, find that the degree of international co-movements among France, Germany, Japan, the UK and the US stock markets increased substantially after the post-October 1987 crash but not before.

The empirical results of Asia Pacific and ASEAN markets in section 2.3 show that the US stock market plays a dominant role on the majority of Asian markets. The evidence is found by Cheung and Mak (1992), Arshanapalli, Doukas and Lang (1995), Sheng and Tu (2000).