

# CHAPTER 1

## Introduction

### 1.1 The Efficient Market Hypothesis (EMH)

Fama (1970) stated that an efficient market is one where all available information is fully reflected by stock prices at any point in time. In general terms, it is the ideal market in which prices provide accurate signals for resource allocation. The EMH describes the concept that competition in the financial market alerts investors to information so that the new information is reflected in the stock prices almost immediately. This implies that investors can only expect to obtain normal rate of return as prices adjust so quickly that the awareness of any news when it is released does not render investors to act and profit from it. The three forms of market efficiency are defined according to how security prices react to information available, namely, the weak form, semi-strong form and the strong form.

*Weak form:* Historical information is of no value for pricing securities. Historical information is restricted to details of past share prices, returns and trading volumes. Future prices cannot be predicted from historic price data alone and trading rules based only on such price and volume data cannot consistently produce excess returns if the hypothesis holds true.

*Semi-strong form:* Share prices reflect all publicly available information. Reaction to public announcements, published accounting information, etc., will not

produce excess returns as the information content of such announcements is already reflected in share prices.

*Strong form:* Share prices reflect all information whether publicly available or not. No excess returns are generated even if someone has private (insider) information.

## **1.2 Seasonal Anomalies in Stocks Return**

From decades of studies, market anomalies have become the basis for investors to look for a pattern or patterns to earn abnormal gains from the market. As Ng(1999) aptly put it, an anomaly is an exception to the rule, a deviation from what is expected. Anomalies and regularities of the stock returns imply that the market is not efficient. If a market is weak form efficient, historical prices do not provide additional predictive power to explain the future prices. This means price movements occur randomly and successive price changes are independent. Therefore, systematic rules cannot be formulated using past price changes to reap abnormal profits in a weak form efficient market.

## **1.3 Literature Review**

Seasonality in stock returns is a well-documented pricing anomaly in financial economics. Over the past decades, various studies have been conducted to examine the stock market anomalies in stocks' returns ranging from developed stock markets such as U.S., U.K. and Japan, to recently emerging stock markets such as Malaysia, Singapore, Thailand, Philippines, Korea and Taiwan. Anomalies that are identified from previous studies comprise turn-of-the-year effect, January effect, end-of-the-month effect, day-of-the-week or weekend effect, pre-holiday and post holiday effects, size effects, etc. More

recent studies revealed that researchers have started to turn their interest to the stock market volatility. Discovery of seasonality in the variances of returns is important as return is interpreted as the compensation for risk. In this study, we will only examine the day-of-the-week effects on both returns and volatility (taking into consideration the factor of market environment, variation of the market risk and market stability) and the causal relationship between risk and return.

### **1.3.1 Empirical Evidence On The Day-Of-The-Week Effect On Returns**

Wong et al. (1992) did a research on the day-of-the-week effects of the stock markets of Singapore, Malaysia, Hong Kong, Thailand and Taiwan. All of these small-sized markets exhibit the day-of-the-week effects except Taiwan. These four markets have negative mean returns on Monday or Tuesday and high positive returns on Friday. Further studies by them on four sub-periods of data revealed that the weekly seasonal patterns appear to be period specific especially the non-consistence of the patterns from period to period shown by the Malaysian market.

Evidence for daily anomalies from an emerging stock market of a developing country, namely Turkey, was given by Balaban (1995). Lowest and negative average return, although insignificant, was observed on Tuesday while highest and significantly positive return was observed on Friday. The results conclude that although day-of-the-week effects are present in Istanbul Securities Exchange Composite Index return data for the period of study, these effects change in direction and magnitude through time.

Kok and Ho (1997) found that the most pronounced regularity found in the Second Board Index is the Friday effect while the Kuala Lumpur Stock Exchange

Composite Index (KLCI) displayed Monday effect. In general, individual stocks on the Second Board exhibit low and negative returns at the beginning of the week and high and positive returns at the end of the week. For the indices, similar results as for the whole period was obtained in the first sub-period (January 1992 – December 1993) while only the Friday effect in the Second Board Index is significant in the second sub-period (January 1994 – September 1995).

The study by Clare, et al. (1997) on the 5 Asia-Pacific markets revealed that Monday is the weekday with the lowest mean returns for Hong Kong, Malaysia, Philippines and Singapore. For Australia, it is Tuesday. Wednesday returns are highest, on average, for 3 markets whereas in Australia and the Philippines, the highest returns occur on Friday.

Clare, et al. (1998) found that there are strong day-of-the-week effects in the KLCI during the period of 1983 to 1993. Lowest return occurs on Monday (though not statistically significant) and the highest on Thursday (at the 1% level of significance). When the sample period was broken down into individual years, the results are stronger for some of the years. This might indicate that the seasonality is not persistent. Clare, et al. (1998) also investigated the proposition that the day-of-the-week effects in the Malaysian stock market are due to seasonal variation in equity market risk by applying the GARCH models for the stock returns. Wednesday and Thursday effects are caused by the daily variation in the return volatility of market while the same cause cannot explain the Monday effect.

Coutts and Hayes (1999) utilised 'close to close' data covering from July 1979 to December 1994 to examine the existence of weekend effect in the UK stock market. Their research revealed that the weekend effect exists in the Financial Times Industrial Ordinary Shares Index (FT 30), but it is not as strong as has been documented for other major UK indices. They suggested that the weekend effect found is, in part, a settlement effect after considering the operation of the stock exchange account. They further concluded that the results do not contest the notion of market efficiency.

Ng (1999) analyzed the seasonality effects of finance stocks on the Main Board of the Kuala Lumpur Stock Exchange (KLSE) for the period of January 1992 to June 1999. Day-of-the-week effect was discovered in the stocks for the entire sample period; Monday's returns are significantly negative whilst Friday's returns are positive. This is especially true for small companies (the stocks were separated into two groups according to the market capitalization of the companies). On the results obtained for the sub-period analysis, Ng (1999) noted that day-of-the-week effect exists in a stable market rather than in a rising and declining market. Further study using the GARCH model revealed that the majority of the stocks do not show that the seasonality in daily returns is due to changes in stock return volatility.

Choudhry (2000) investigated the day-of-the-week effects in returns and conditional variance using the GARCH model. Daily stock market returns during the period of January 1990 to June 1995 from India, Indonesia, Malaysia, Philippines, South Korea, Taiwan and Thailand were utilised in the study. Significant negative effect on Monday stock returns are found in the markets of Indonesia, Malaysia and Thailand

while significant negative Tuesday effect is found in the markets of Korea, Taiwan and Thailand. Of the 7 markets, only returns from Thailand are significant for all five days.

Toh (2001) investigated the presence of seasonal variation in stock volatility and trading return across the days of the week and their causal relationship on 44 stocks randomly selected from the Main Board and Second Board of the KLSE, and the KLSE Composite Index. The period of study covers from July 1995 to June 2000. He found that there is moderate presence of the day-of-the-week effect of the daily stock trading returns for the entire sample period and the first sub-period. The findings in Toh's study will be used as the main comparison with this study.

### **1.3.2 Empirical Evidence On The Day-Of-The-Week Effect On Volatility**

Using the Levene test, Ho and Cheung (1994) discovered that most of the emerging Asian stock markets display day-of-the-week variations in volatility. Daily stock indices for 8 Asian markets; Hong Kong, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand, covering the period from January 1975 to December 1989 are used in the study with both the UK and US markets included as comparison. In general, Monday returns are found to have the highest volatility for all the markets except Korea. Korea, Malaysia and Singapore are among the markets that have significant day-of-the-week effects in volatility with the lowest volatility on the last trading day of the week.

Clare et al. (1997) examined the seasonal pattern in the volatility in five Asia-Pacific stock markets; Hong Kong, Malaysia, the Philippines and Singapore, and the Australian stock market using the daily stock market index and volume data from

January 1986 to June 1994. The conditional estimates of daily return volatility are derived using a GARCH model and compared with the results from the modified Levene test. Although the ARCH approach has the advantage of enabling the days that caused the rejection of homoscedasticity be identified, they suggested that these two approaches are complementary to each other. With respect to unconditional volatility, all markets experienced their highest volatility on Monday except for Australia and Malaysia. The volatility of these two markets is highest on Tuesday. The lowest weekday volatility occurred on Friday for Australia, Hong Kong and the Philippines, Wednesday for Singapore and Monday for Malaysia. Using the Levene test, the null hypothesis of homoscedasticity across weekday returns is rejected for all markets at 10% significance level. More robust results were obtained using the GARCH models with or without the inclusion of volume data. The findings suggested that at least some of the seasonal variation in return volatility is a function of the volume of trade. The most consistent result in these findings is that volatility on Mondays is significantly high despite the inclusion of a measure of volume. They suggested that most of the heteroscedasticity in return volatility in the markets considered is caused by the arrival of information over the weekend, when the market is closed, causing an increase in activity and variance on Monday.

Choudhry (2000) provided ample evidence on the day-of-the-week effects on stock market volatility. Monday was found to impose a significant positive effect on all seven emerging markets except India. Volatility from the Indonesian market is affected by all five days while volatility in the market of India is affected by only a single day. In the case of Malaysia only, significant negative effect is observed on Friday.

Berument and Kiyamaz (2001) tested the presence of the day-of-the-week effects on stock market volatility using the S&P500 market index during the period of January 1973 to October 1997. Three different models were employed in their study; the OLS which assumes the constancy of the residual term's variance, the GARCH(1,1) which allows volatility to change over time and the Modified-GARCH(1,1) in which the explanatory power of the variance equation has been increased by incorporating day-of-the-week effects into the GARCH specification. They discovered that day-of-the-week effects are present in both volatility and return equations. Highest and lowest returns are observed on Wednesday and Monday while the highest and lowest volatility are observed on Friday and Wednesday, respectively. Further investigation of sub-periods revealed that the volatility pattern across the days of the week is statistically significant. They suggested that a possible reason for the highest uncertainty on Friday might be the fact that there is a tendency for bad news to be released over the weekend. Since investors cannot respond to bad or good news released on the weekend, they may take the weekend expectations into account on Friday. On the other hand, the lowest volatility on Wednesday might be explained by the following reasons. On Wednesday, investors have information sets of the previous two days and forecasted for the next two days. Wednesday, in the middle of the week, naturally provided the highest number of trading days before and after any transaction. Thus, investors have more time to react to the information.

Toh (2001) discovered that there is no strong evidence of persistent presence of seasonal variation in stock volatility across the days of the week for the entire sample period and the 3 sub-periods. Majority of stocks and the KLCI are found to have lowest volatility on Monday or Tuesday and the highest on Friday.



### **1.3.3 Empirical Evidence On Returns and Volatility Causality**

Song et al. (1998) utilised the GARCH models to analyse the relationship between returns and volatility on the Shanghai and Shenzhen Stock Exchanges in China. Empirical findings from their study suggested that the variances of the returns in the two markets are best modelled by the GARCH-M(1,1) specification. The estimated GARCH-M models are consistent with a positive risk premium on stock prices i.e. higher risks result in higher returns.

Toh (2001) used the Granger-causality test to examine the causal relationship between stock volatility, trading returns and trading volume. His study reflected that most of the stocks' daily volatility, trading returns and trading volume can be explained by their own lag variables. In addition, the study concluded the presence of feedback relationship between daily volatility and trading returns as well as daily volatility and trading volume.

### **1.4 Objectives of Study**

The main objective of this study is to explore the existence of the day-of-the-week effect on the market trading returns and volatility in the KLSE, Main Board, Second Board and the various sectors for the whole period of the study, which is from 1994 to 2000.

Furthermore, the persistency of the seasonal variation in 3 sub-periods is examined. Sub-period analysis will enable us to know the consistency of the day-of-the-week effect through different sub-periods. So that more meaningful inferences can be

made, the sub-periods are divided to correspond to three market environments; stable, declining and rising market.

On stock volatility, results from two methods in highlighting cases of heteroscedasticity are compared with each other.

Another comparison is between the findings on returns and volatility in the same period. This is to determine whether the general principle of investment stating the risk and return is positively correlated is adhered to. From here, we go one step further to determine whether unidirectional or bidirectional causal relationship (if any) exist between market returns and volatility.

Finally, this study also examines whether the day-of-the-week effects in returns are due to seasonal variation in return volatility. The GARCH model is used in investigating the day-of-the-week effect on the daily mean trading returns.

## **1.5 Organization of Study**

The study is organised with a brief introduction and literature review in Chapter 1. Chapter 2 covers the data and methodology of the various statistical tests, both parametric and non-parametric, used in this study. The result and analysis of the study will be presented in Chapter 3. Finally, the conclusion and discussion of this study are presented in Chapter 4.