STOCK RETURNS AND VOLATILITY: AN EMPIRICAL STUDY OF MALAYSIAN STOCK MARKET

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DECLARATION

The materials in this thesis are original except for quotations, excerpts, summaries and references, which have been duly acknowledged.

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ABSTRACT

This paper investigates the time-series behavior of stock returns for Malaysia stock market. A weekly sample for Kuala Lumpur Composite Index from January 1977 to February 2007 and sample for EMAS from April 1992 to June 2006 from Malaysia is examined. In most studies, higher average returns appear to be associated with a higher level of volatility. The GARCH(1,1) is used to analyze the relationship between returns and volatility on the Kuala Lumpur Composite Index and EMAS. The evidence shows that the volatility Malaysia stock market is highly persistent. Further analysis the relationship between unexpected return shock and volatility by using TARCH(1,1) and EGARCH(1,1). The result indicates that TARCH(1,1) is no asymmetric effect. However, when using EGARCH(1,1) there are asymmetric effect but not significant.



ABSTRAK

PULANGAN SAHAM DAN VOLATILITY: SATU EMPIRIK KAJIAN DARIPADA PASARAN SAHAM DI MALAYSIA.

Kajian ini dijalankan untuk mengkaji tindakan volatiliti. Sampel mingguan dari tahun Januari 1977 ke Februari 2007 untuk Kuala Lumpur Composite Index dan sampel untuk EMAS dari tahun April 1992 sehingga Jun 2006 dari Malaysia digunakan sebagai data kajian ini. Kajian lepas menunjukkan purata pulangan yang tinggi akan berkadar langsung dengan volatilliti yang tinggi. GARCH(1,1) digunakan untuk menganalisis hubungan antara pulangan dan volatiliti dalam Kuala Lumpur Composite Index dan EMAS dalam pasaran saham Malaysia. Keputusan memperlihatkan volatiliti pasaran saham Malaysia adalah berterusan. Kajian lanjutan dijalankan untuk mengkaji hubungan antara pulangan secara kejutan dan volatiliti dengan menggunakan TARCH(1,1). Keputusan memperlihatkan bahawa tidak wujud tindak balas asimetri pembolehubah. Manakala kajian yang dijalankan dengan EGARCH(1,1) telah memcatatkan keputusan bahawa wujud kesan asimetri pembolehubah tetapi tidak signifikan.



LIST OF ABBREVIATIONS

ARCH	Autoregressive Conditional Heteroskedasticity model		
EGARCH	Exponential Generalised Autoregressive Conditional Heteroskedasticity model		
GARCH	Generalized Autoregressive Conditional Heteroskedasticity		
KLCI	Kuala Lumpur Composite Index		
KLSE	Kuala Lumpur Stock Exchange		
KLSEB	Kuala Lumpur Stock Exchange Bhd		
SEMS	Stock Exchange of Malaysia and Singapore		
SES	Stock Exchange of Singapore		
TARCH	Threshold Heteroskedasticity model		



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GLOSSARY

Exogenous Endogenous	Variables with value that is not explained within the model. Variables with values determined inside the model.
Stock index	A measure in value changes among a group of similar securities, with the gauge used to predict possible future
	movements. A group of similar securities are measured to determine differences and trends
Stock market	The organized trading of securities on one of the many exchange
Volatility	The extent to which a security's price fluctuates back and forth within a short time.



KEYWORDS

Stock Returns, Volatility, Malaysia Stock Market, Asymmetric Effect, GARCH, TARCH, EGARCH.



CHAPTER 1

INTRODUCTION

1.1 Overview

It is very important to forecast the volatility of stock market for portfolio selection and asset management as well as for the pricing of primary and derivative assets (Engle and Ng, 1993). It is commonly known that the volatility is predictable in many assets. Recently, many researchers have been conducted about the volatility of stock markets. There are differences in the way they model the volatility. Among these models, GARCH (Generalised Autoregressive Conditional Heteroskedasticityl) model is the most successful (Gokcan, 2000). The main reasons that GARCH model are very successful is it can effectively remove excess kurtosis in return series.

Furthermore, Engle and Ng (1993) are focusing on the asymmetric effects of news on volatility which is contributed to the further study of many researches. Bekaert and Harvey (1997) also pointed out understanding volatility in emerging capital markets is important for determining the cost of capital and for evaluating direct investment and asset allocation decisions.

Based on the research conducted by Engle and Ng (1993), it is interesting to forecast whether Malaysia stock market has asymmetric effect. The asymmetric is responding of good and bad news to future volatility. The aim of asymmetric forecast is to predict the impact of bad news. When the stock price falls, its value of the equity also falls. This leads the company's leverage or debt to equity ratio increase.



Leverage interpreted as an indicator of a company risk. When the leverage increased, the company is considering more risky and a high degree of risk is associated with high volatility (Engle and Patton, 2001). As we know Malaysia has undergone several economy crises, there are two oil crises in 1973-1974 and 1980-1981. The commodity crisis are occur during 1985-1986 and financial crisis of 1997- 1998 (Cheng and Sayed, 2000).

Since the Asian crisis in July 1997 caused the number of researchers in the investigation the stock market volatility during the 1997 financial crisis in Asian stock market. The reason caused this crisis is currency turmoil rocked Malaysia equity market with sudden decline in Malaysia stock market and loss of confident investor. This high volatility in stock market catches attention of market participants because they worry stock prices do not appear to be accompanied by any important news about the firm or market fundamentals (Law, 2006).

1.2 Statement of Problem

Although there have been many studies relating to the volatility of stock markets, there are still a few empirical studies examine the asymmetric effect in Malaysia. Most of the studies conduct are only focusing on volatility of Malaysia stock market and compared several models. Furthermore, the studies are more focusing on the correlation of Asian stock market and developed stock markets like United State (So, Lam Li, 1997; Pan, Liu and Roth, 1999; Jiang, Ma and Cai, 2006). There are few research are really look in the aspect of asymmetric effect and plot out news impact curve in Malaysia (Gokcan, 2000; Shin, 2005). So it is interesting to see, whether Malaysia stock market has asymmetric effect and how the news impact curve of Malaysia stock market look like. This research will be conducted based on previous study (Engle and Ng, 1993; Henry, 1998; Engle and Patton, 2001). Furthermore, the



limitation on ARCH and GARCH model is not adequate to find the asymmetric effects so TARCH model and EGARCH model will be used.

1.3 Research Questions

- Does Malaysia stock market volatility change over the time? If so, are volatility changes predictable?
- 2. Is the negative shock to stock returns will generate more volatility than a positive shock?
- 3. What is the shape of the news impacts curve?
- 4. Why stock returns are much better used to forecast the volatility of stock market?

1.4 Objectives of Study

The objectives for this research are state as below:

- To examine the stock returns and volatility in Malaysia stock market by using GARCH(1,1), TARCH and EGARCH model.
- To analyze the asymmetric effects by using TARCH and EGARCH in Malaysia. The asymmetric GARCH models allow positive and negative news surprises to have different impacts on future volatility.
- To examine the News Impact Curve. The news impact curve displays the relationship between an unexpected return shock (news) and the volatility of stock market.
- The result of stock price and stock returns is compared which one is better measuring the stock volatility.



1.5 Scope of Study

Instead of asking whether the bad news had higher volatility than good news, the study of examine the asymmetric effect can help the objective in this study. This study is conducted in Malaysia with secondary data from January 1977 until February 2007 for KLCI and April 1992 to June 2006 for EMAS. The secondary data obtain from web site www.klsedaily.com. The GARCH model is not adequate to do asymmetric effects test so TARCH model and EGARCH model will be used and plotting the news impact curve. Stock price and stock returns will examined in this research to make compare which one is better to explain the volatility of stock market.

1.6 Significance of study

This paper represents an advance over previous empirical work in this area into two respects. First, this paper borrow ideas from recent development in econometrics to extent previous study because previous studies does not predicted the news impact in Malaysia with various method to see have asymmetric effect or not. The GARCH model, TARCH model and EGARCH model will used to test the asymmetric effect in Malaysia because it helps to determine the cost of capital asset allocation and direction of foreign investment. Secondly, based on the volatility obtain from TARCH and EGARCH models will plot out the News Impact Curve. In addition, the data used in this research is starting from 1977 to 2007 for KLCI and 1992 to 2006 for EMAS. This study use a longer period of date.

1.7 The Key Concept

For the purpose of this study, we provide some information of Malaysia stock market to avoid confusion and what it means in the context of this study.



1.7.1 Kuala Lumpur Stock Exchange (KLSE)

The Stock Exchange of Malaysia was officially formed in 1964 and in following year, with the secession of Singapore from Malaysia, the common stock exchange continue to function under the name Stock Exchange of Malaysia and Singapore (SEMS).

With the termination of currency interchange ability between Malaysia and Singapore in 1973, the SEMS was separated into The Kuala Lumpur Stock Exchange Bhd (KLSEB) and The Stock Exchange of Singapore (SES). Malaysia companies continue to be listed on SES and vice-versa. In 1994, The Kuala Lumpur Stock Exchange (KLSE) took over the operation of KLSEB as the stock exchange and renamed it to KLSE. Kuala Lumpur Stock Exchange became a demutualised exchange and was re-named Bursa Malaysia in 2004. It consists of a Main Board, a Second Board and the Second Board for medium sized companies or the MESDAQ with total market capitalization of MYR700 billion (US\$189 billion). The main index for Bursa Malaysia is Kuala Lumpur Composite Index (KLCI). However, in June 2006, a new index series jointly developed by Bursa Malaysia and FTSE Group will be introduced. Normally trading takes place 5 days a week (Monday-Friday) in two trading sessions. The morning session runs from 9.30 a.m. to 12.30 p.m., while the afternoon session runs from 2.30 p.m. to 5.00 p.m. (Ahmad and Hussain, 2001 and http://en.wikipedia.org/wiki/kuala_lumpur_composite_index).

1.7.2 Kuala Lumpur Composite Index (KLCI)

Kuala Lumpur Composite Index (KLCI) is a stock market index generally accepted as the local stock market barometer. It was introduced in 1986 to answer the need for a stock market index in which would serve as an accurate performance indicator of the Malaysian stock market as well as the economy. It is used to main index and one of



the three primary indices for Malaysia stock market which is the other two are FMB 30 and FMBEMAS, Bursa Malaysia. It contains 100 stocks and is capitalization-weighted index (http://en.wikipedia.org/wiki/kuala_lumpur_composite_index).

1.7.3 FTSE MALAYSIA EMAS INDEX (EMAS)

The FTSE Bursa Malaysia EMAS Shariah index has been designed to provide Malaysian investors with a broad benchmark for Shariah-compliant investment. The FTSE Bursa Malaysia EMAS Index is a capitalization weighted index. The index is comprised of the large and mid cap constituents of the FTSE Bursa Malaysia 100 Index and the FTSE Bursa Malaysia Small Cap Index. The index was developed with a base value of 6000 as of March 31, 2006. Features of EMAS:

- The index comprises the constituents of the FTSE Bursa Malaysia EMAS index that are Shariah-compliant according to the Securities Commission's Shariah Advisory Council (SAC) screening methodology. The FTSE Bursa Malaysia EMAS index incorporates the large and mid cap stocks of the FTSE Bursa Malaysia 100 Index, and the FTSE Bursa Malaysia Small Cap Index.
- The index is part of the FTSE Bursa Malaysia index series which includes the FTSE Bursa Malaysia Large 30, FTSE Bursa Malaysia Mid 70, FTSE Bursa Malaysia 100, FTSE Bursa Malaysia Small Cap, FTSE Bursa Malaysia EMAS and FTSE Bursa Malaysia Fledgling Indices.
- The indices are designed for the creation of derivatives, index tracking funds, ETFs and performance benchmarks.
- Stocks are free-float weighted to ensure that only the investable opportunity set is included within the indices.
- Stocks are liquidity screened to ensure that the index is tradable.
- Capital and total return indices are available within this series.



(http://www.ftse.com/)

1.8 Organization of Study

The study is organized as follow. Chapter two summarizes the theoretical and some related literature. Chapter three discusses the data and econometric framework employs in this study. Chapter four reports the empirical results. Lastly, the final chapter concluded the study and give suggestion for further studies.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Based on the past studies, there are many research have done with stock return and volatility stock market. Besides, there are many research focuses on determinant of volatility, seasonality effect, the impact of news, asymmetric effect and liberalization on markets. Recently, many researches are focus on Asian financial crisis. Most of the research are test by using ARCH model introduce by Engle (1982), provide the basic for further studies in ARCH model. Bollerslev (1986) furthers the studies to GARCH method. However Nelson (1991) based on the GARCH model, he introduced EGARCH model and Zakoian (1993) had introduced TARCH model which is both methods are testing the asymmetric effects. These literature reviews have leads to formulation of research on stock return and volatility in Malaysia. This chapter will discuss more various studies conducted previously on volatility stock and News Impact on stock.

2.2 Important of Understanding Stock Volatility

Recent years have seen an increasing interest in modeling the volatilities of stock returns. From a financial economist's point of view, understanding and modeling stock volatility is important. First, investment decisions, as characterized by asset pricing theories, depend heavily on the assessment of future return and risks of



various assets. The estimated volatility (or standard deviation) of a security return I widely used as a simple risk measure in many assets pricing models.

Secondly, the expected volatility of a security return plays an important role in the option pricing theory. For example, the standard deviation of a return series enters directly into the well-know Black-Scholes model. Finally, an adequate specification of return volatility may shed some light on the generating process of the returns (Cao and Tsay, 1993).

Research of Song, Liu and Romilly (1998) examine the stock return and volatility in China stock market. They suggest that the variance of return in two markets is best model by GARCH-M(1,1). Volatility transmission between the markets is existent. The conditional variance of the return are exhibit a similar pattern. However, researcher Tay and Zhu (2000) is doing same analysis but in Pacific-Rim stock market. Their results suggest that while the stock market is correlated in return and volatilities, idiosyncratic factor play important roles in national stock markets. In additional, they find out market returns volatility can take a much longer time than previous findings.

Li, Yang, Hsiao and Chang (2005) also investigated the expected return and volatility but in 12 largest international stock markets. They find out positive but not significant relationship between return and volatility. But using flexible semiparametric specification of conditional variance, they find evidence of negative relationship between expected return and volatility in 6 out of the 12 markets. Another researcher (Bae, Kim and Nelson, 2006) is examining low stock returns associated with increased leverage. They find out that changes in volatility regime are reflecting in stock return but not in GARCH.

Another research carries out by Errunza and Hogan (1998) is examining the determinant of European stock market volatility. They found out monetary instability



is main determinant cause Germany and France stock markets volatility while for Italy and Netherlands is industrial production. However, Binder and Merges (2001) has identified four determinant of stock market volatility there are uncertainty about price level, the riskless rate of interest, the risk premium on equity and the ratio of expected profits to expected revenues. The estimate of these four economic factors is statistically significant.

Some researchers are doing the impact of news on stock markets. Aggarwal, Inclan and Leal (1999) examined the kind of events that cause large shifts in the volatility of emerging stock markets. They first examine the large change of stock return due to global and local events like social, politic and economic during of the period increased volatility. They included sudden change in the variance of returns in each market and how long the shift lasts. The same study is conducted by Beaulieu, Cosset and Essaddam (2006). In their study they investigated the short run effect of the 30 October 1995 Quebec referendum on the common stock return of Quebec firms. They find out uncertainty in referendum outcome had an impact on stock returns of Quebec firms. In additional, they also find that referendum varied with the politic risk exposure of Quebec firms, that is, structure of asset and principally the degree of foreign involvement.

Researcher Hayo and Kutan (2005) also examine the impact of news, oil price and global market development in daily return on Russian Financial markets. They find out news of energy affects returns while news from war in Chechnya is not significant in affecting the Russian stock market. The growth of oil price affects Russian stock return as well.

However, researchers Syyed, Abraham and Al-Hajji (2005) using GARCH specification and data for Saudi Arabian stock market to examine seasonality in stock return and volatility. Their result shows the Saudi Arabia Stock Market is significant



that is declining trading activity during Ramadan. Evidence of systematic decline in volatility during Ramadan has significant implications for pricing of securities especially option-like products and asset allocation decision by investors in the Islamic countries.

During Asian financial crisis, stock market volatility in Asian stock market has increased substantially and the investors confident were shaking. This high volatility in the stock market was getting attention from stock market participants including investor, brokers, dealers and regulators.

Researcher Chukwuogor-Ndu (2005) examines the post financial crisis thedays-of-the-week effect and volatility in stock returns. A set of parametric and nonparametric test are used to test equity of means returns and standard deviation of return across the-days-of-the-week. Their results validate the presence of thedays-of-the-week but not significant in daily returns volatility in most of Asian Pacific financial markets. They also find out prior to the Asian financial crisis, the Asian markets were characterized by high return and volatility which is important in their finding.

Bakaert and Harvey (1997) and Hassler (1999) study the liberalization on market and volatility. Bakaert and Harvey (1997) suggest that capital markets liberalization often increased the correlation between local market returns and the world market but do not drive up local market volatility. However, Hassler (1999) points out foreign influence on the stock market show a clear, positive trend, while domestic factor does not influence the stock market volatility. The trend wise increase in volatility on the Swedish stock market can thus be attributed to increased foreign influence.

Dias, Soares and Tardivo (2005) discuss the consequences of liberalization on market performance, especially in the case of the capital market. In order to do that,



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