

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

The goal of this empirical study is to determine whether stock market in Malaysia reacts to political and national budgets announcement and analyze the behavior of the stock market upon arrival of those information in order to further justify whether the stock market is efficient in reflecting such events. From the results of this study, we can further determined implications such as whether market reaction can be utilized to produce abnormal investment profit by adopting systematic buy or sell strategy based on the average market reactions to the announcements (Guidolin and La Ferrara, 2011).

According to conventional finance theory, the security prices reflect the present discounted value of the expected future stream of cash flow generated by the assets. The discount rate reflects the uncertainty or underlying riskiness of the cash flow discounted. The pricing formula, using the argument of Guidolin and La Ferrara (2011), is thus:

$$P = \sum_{j=1}^k \frac{E(C_j)}{(1+r)^j}$$

where P is the stock price at $t=0$, $E(C_j)$ is the expected cash flow at $t=j$ and r is the discount rate that incorporate the risk premium required .

Therefore, that is obvious that any arrival of information will affect the prices through either updating the expected future cash flow $E(C_j)$ or updating the discount rate r . In other words, if an arrival of news concerns the market participants, they will adjust their expectation on $E(C_j)$ and / or the risk factor r , thus causing the change in price.

On top of whether the announcements concern the investors, what this research intend to further find out is: If the news really concerns the investors, how fast would they adjust their expectation on $E(C_j)$ and / or risk premium r that finally cause the update of stock price? Are all investors always rational in judging the futures based on the news received? This led us to form the theoretical framework for this study.

4.2 Theoretical Framework and Development of Hypotheses

This study of the market reaction is framed by the following theories:

Efficient Market Hypothesis

Based on the Efficient Market Hypothesis (Fama, 1970), market is efficient in reflecting information and therefore stock price adjustment is almost immediate and as a consequence, there is hardly any chance to make abnormal profit based on public announcements.

Uncertain Information Hypothesis

Efficiency proclaimed by the Efficient Market Hypothesis stands on the premise that investors are all rational and that new information is incorporated into security prices in an immediate and unbiased fashion. Yet Brown et al. (1988) argue that existence of

rationality in the market does not necessarily mean the information assimilates instantaneously. The Uncertain Information Hypothesis, which they referred to, contend that when new information arrives, it is usually imperfect and full of uncertainty and therefore rational and risk-adverse investors will cautiously respond by overreacting to bad news and underreacting to good news. The implication behind this hypothesis is that the immediate price increase (or decrease) induced by favourable (unfavourable) events will be followed by positive returns during the post-event period when all uncertainties dissipate.

Overreaction Hypothesis

The appropriate reaction to new arrival of information was once thought to closely relate to Bayes' Rule through its probability revision problem.¹ However, DeBondt and Thaler (1985) contend that in violation of Bayes' Rules, people tend to overreact to surprise and unexpected events. In short term analysis, overreaction behavior can be observed when there is an obvious stock price reversal, where the increase (decrease) in stock price immediately after the release of news is followed by a decrease (increase) in stock price later (Lasfer et al., 2003; Spyrou et al., 2007)

Momentum Hypothesis

Market is said to manifest the momentum phenomenon when positive shocks create positive abnormal return and negative shocks create negative abnormal return for the

¹ According to Mario F. Triola, Bayes' Theorem deals with a series of events, whereby new information is obtained for a subsequent event and this new information is used to revise the probability of the initial event.

following days (Lasfer et al., 2003; Spyrou et al., 2007). Market underreaction to a shock is often seen as the manifestations of market momentum.

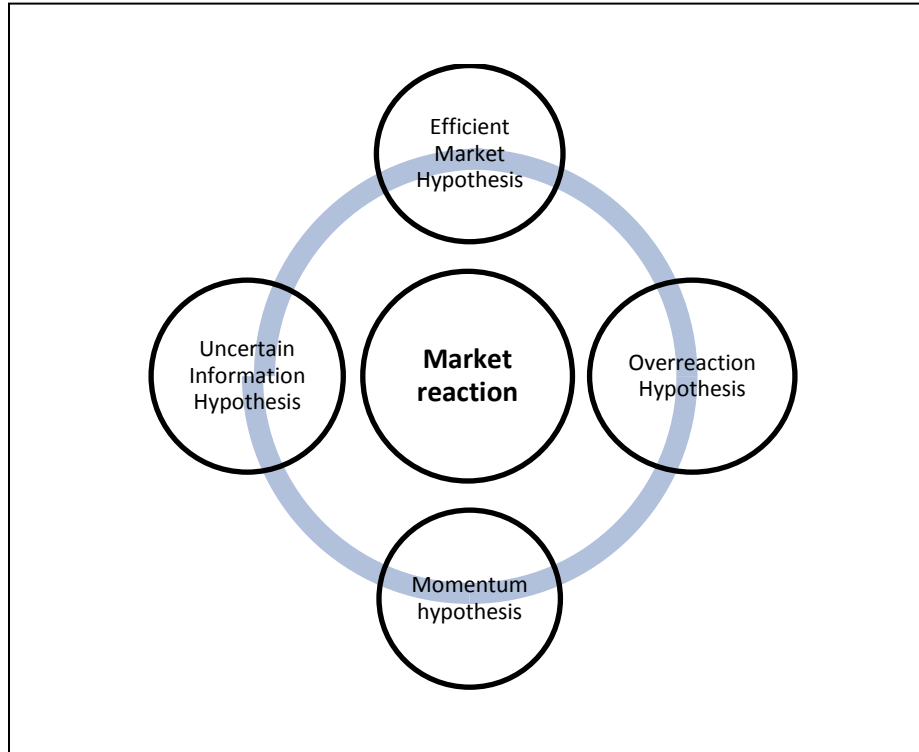


Figure 4.1: Theoretical framework

Therefore, the aforementioned theoretical framework thus formed the following hypotheses:

Hypotheses

H₁₀: Political announcements have no information impact on stock market

H_{1A}: Political announcements have information impact on stock market and that market is efficient in reflecting the information

H₂₀: National Budget announcements have no information impact on stock market

H_{2A}: National Budget announcements have information impact on stock market and that market is efficient in reflecting the information

H₃₀: There is no difference between market reactions to political announcements and national budget announcements.

H_{3A}: There is a difference between market reactions to political announcements and national budget announcements.

4.2 Methodology

The purpose of this study is to analyze the impact of the political and national budget announcement on local stock market on a short-term basis by adopting event study methodology.

Event study is a methodology to examine impact of an event on stock prices, trading volume and stock volatility (Sitthipongpanich, 2011). According to Sitthipongpanich (2011), this empirical study is based on the following assumptions:

- Under the Efficient Market Hypothesis, the impact of an event will be reflected in the stock price immediately. Therefore the market reaction can be observed through the stock return over the period of study.
- The announcement of the event is unanticipated. Market reaction to the unforeseen event is indicated by the abnormal (excess) return of the stock.

- During the period of study (the event window), there is no other confounding factor that affects the test results. In other words, the study is not contaminated by other events.

4.2.1 Data Collection

In this research project, daily KLCI data were extracted from *Datastream* which cover period from January 1981 to December 2011. The data on the selected 38 political events and the corresponding announcement dates were sourced from major local newspapers whereas the 15 National Budgets from 1998—2012 were downloaded from the Ministry of Finance official website.²

Stock Index Data

In order to obtain a broader overview on how political and national budget announcements have affected the Malaysian stock market over the past three decades, the daily closing Kuala Lumpur Composite Index (KLCI) for the past thirty one years starting from January 1, 1981 until December 31, 2011 have been collected from *Datastream*. In a short term event study daily data is commonly used (Lumner & McConnell, 1989; Small et al., 2007) whilst monthly data is usually used when conducting long term event studies (Ritter, 1991; Teoh et al., 1998b). Also, it is reasonable to select KLCI to represent the stock market because it consists of 30 largest

² Ministry of Finance (MOF) website: <http://www.treasury.gov.my/>

companies in Malaysia by market capitalization³ and cover about 70% of the FTSE Bursa Malaysia Emas Index.⁴

The daily returns for KLCI were then computed based on the following conventional formula suggested by many past literatures (Lasfer et al., 2003; Spyrou et al., 2007; Corrado and Truong, 2007; Salameh and Albahsh, 2011):

$$R(t) = \frac{P(t)-P(t-1)}{P(t-1)} \dots\dots\dots (1)$$

Where R (t) is the return of KLCI at time t, P (t) and P (t-1) are the KLCI at time t and t-1 respectively

4.2.2 Defining the Events

In this research, the announcements of thirty eight political events have been selected over a time frame of thirty one years from 1981 to 2011 (see Table 4.1) based on reasons previously explained. The event date is defined as the announcement date of the event (day 0). This event date will be the actual event date if the event of study falls on a trading day and is publicly announced before the market closed. Otherwise the first trading day after the announcement of the event is treated as the actual event day in the event window.

³ Before the KLCI was enhanced by the FTSE standard effective on 6th July 2009, the KLCI consists of top 100 companies by market capitalization which cover about 81% of the full market capitalization

⁴ FTSE Bursa Malaysia Emas Index is a broader benchmark that aims to capture 98% of the Bursa Malaysia Main Board

Description of the news data

In order to conduct the exploratory study on how political events affect the Malaysian stock market reactions over the past 31 years, 38 political events have been randomly selected from 1981 to 2011 and the date of announcement of these events were identified from major local press.⁵ The selection of the announcements intends to cover a wide range of political events which are believed to create impact to the stock market based on past literatures. These thirty eight political events are further separated into favorable news (21) and unfavorable news (17), based on the impact they created on the stock index on the day of the announcement.⁶ To test the hypothesis, the political events are also classified into six types of events: Dissolution of parliament (7), General Elections (6), party elections (5), Cabinet reshuffle (3), changing of administration leaders (9) and other extraordinary events (8). Table 4.1 presents the thirty eight selected political events and the date of the events.

Table 4.1: Timeline of selected political events for the period 1981—2011

No.	Date of events	Events	Types of event
1	15/5/1981	Hussein Onn announced Mahathir to be the 4 th PM	Changing of administration leaders
2	26/6/1981	The 36 th UMNO Election	Party election
3	29/3/1982	Announcement of the 6 th National Election, 1982	Dissolution of parliament
4	22/4/1982	The 6 th National Election—announcement of results	General election
5	19/3/1984	MCA Crisis	Extraordinary event
6	25/5/1984	UMNO election 1984	Party election
7	14/7/1984	Major Cabinet Reshuffle	Cabinet reshuffle
8	24/11/1985	MCA Party election 1985	Party election

⁵ Major references are from *The Star*, *The Malay Mail* and *Sin Chew Jit Poh*.

⁶ Lasfer et al. (2003) and Spyrou et al. (2007) define positive (negative) extreme event as an event happened that could cause the market index return at that particular day to reach above (below) two standard deviations the average daily index return computed over 50 days before the given day. In this study, the same reasoning is adopted when identifying positive and negative announcements. However, the condition of above / below two standard deviations is relaxed to accommodate the context.

9	26/2/1986	Musa Hitam resigned as DPM	Changing of administration leaders
10	7/5/1986	Ghafar Baba appointed as DPM	Changing of administration leaders
11	19/7/1986	Announcement of the 7 th National Election, 1986	Dissolution of parliament
12	3/8/1986	The 7th National Election, 1986—announcement of results	General election
13	24/4/1987	UMNO Election 1987	Party election
14	27/10/1987	Operation Lalang	Extraordinary event
15	4/10/1990	Announcement of The 8 th National Election, 1990	Dissolution of parliament
16	21/10/1990	The 8th National Election—announcement of results	General election
17	15/10/1993	Ghafar Baba officially resigned as DPM	Changing of administration leaders
18	1/12/1993	Anwar Ibrahim officially appointed as DPM	Changing of administration leaders
19	6/4/1995	Announcement of the 9 th National Election, 1995	Dissolution of parliament
20	25/4/1995	The 9th National Election, 1995—announcement of results	General election
21	2/9/1998	Removal of the deputy prime minister, Dato Sri Anwar Ibrahim	Extraordinary event
22	20/5/1999	Cabinet reshuffle 1999	Cabinet reshuffle
23	10/11/1999	Announcement of the 10 th National Election, 1999	Dissolution of parliament
24	29/11/1999	The 10th National Election, 1999—announcement of results	General election
25	22 June 2002	Announcement of resignation of the 4 th prime minister, Tun Dr. Mahathir Mohammad	Changing of administration leaders
26	31/10/2003	Abdullah Ahmad Badawi became the 5 th PM of Malaysia	Changing of administration leaders
27	4/3/2004	Announcement of The 11 th National Election, 2004	Dissolution of parliament
28	21/3/2004	The 11th National Election, 2004—Results announcement	General election
29	10/11/2007	Bersih 1.0 rally	Extraordinary event
30	13/2/2008	Announcement of the 12 th National Election, 2008	Dissolution of parliament
31	8/3/2008	The 12th National Election, 2008—announcement of results	Extraordinary event
32	8 Oct 2008	Announcement of Resignation of the 5 th prime minister, Dato Sri Abdullah Ahmad Badawi	Changing of administration leaders
33	3/4/2009	Najib became the 5th prime minister, Dato Sri Abdullah Ahmad Badawi	Changing of administration leaders
34	28/3/2010	MCA Election 2010	Party election
35	1/6/2010	Reshuffle of Cabinet	Cabinet reshuffle
36	16/9/2010	1Malaysia programme	Extraordinary event
37	26/5/2011	Announcement of Bersih 2.0 Rally	Extraordinary event
38	9/7/2011	Bersih 2.0 Rally “Walk for democracy”	Extraordinary event

The second part of this study is looking at the market reaction to National Budget announcement. Fifteen budget announcements from 1998 to 2012 were extracted from the Ministry of Finance official website and the date of the announcements were identified. Consistent with political announcements, if market reacts favorably (unfavorably) after the announcement of the budget, it is considered a positive (negative) news Table 4.2 shows the date of announcement of Malaysian National Budget from 1998 to 2012.

Table 4.2: National budget announcement date from 1998—2012

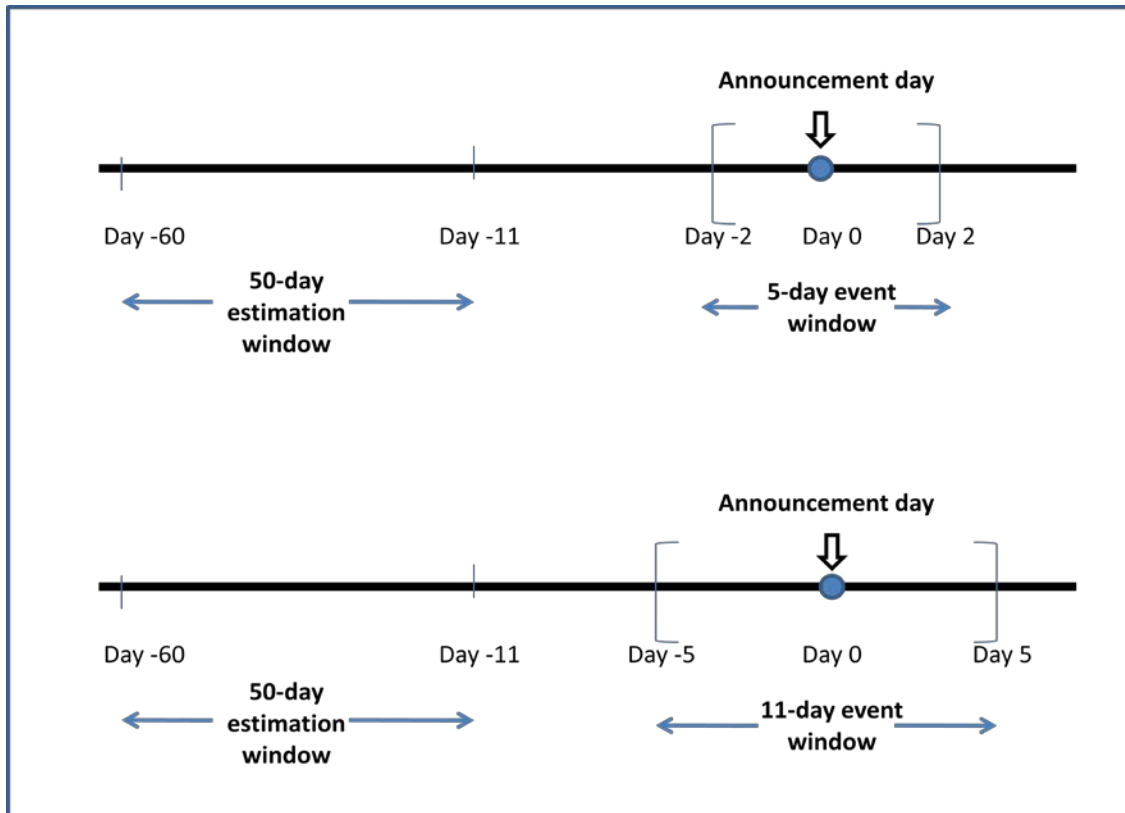
No.	Budget	Date presented	No.	Budget	Date presented
1	1998	17 Oct 1997	9	2006	30 Sep 2005
2	1999	23 Oct 1998	10	2007	1 Sep 2006
3	2000	29 Oct 1999	11	2008	7 Sep 2007
4	2001	27 Oct 2000	12	2009	29 Aug 2008
5	2002	19 Oct 2001	13	2010	23 Oct 2009
6	2003	20 Sep 2002	14	2011	15 Oct 2010
7	2004	12 Sep 2003	15	2012	7 Oct 2011
8	2005	10 Sep 2004			

4.2.3 Establishing the Event Windows and Estimation Windows

Many researches focus on the short term effect of an event to the stock market. Lummer and McConnell (1989) uses an event window as short as a two-day period (-1,0) whereas Small et al. (2007) conduct an event study with an event window set between day -1 and day 1. In this study, a symmetrical 5-day and 11-day event windows are used to study the short term reaction of stock market. Using the 5-day event window, abnormal return and cumulative return will be observed starting 2 days before the announcement day and

2 days after the announcement day (i.e. [-2, 2]). For the 11-day window, the same measures will be observed and tested 5 days before the announcement and 5 days after the announcement (i.e. [-5, 5]). Figure 4.2 illustrated the event windows and estimation windows selected for this study.

Figure 4.2: The Event Windows and Estimation Windows



As Beverly (2007) explained, the use of wider event windows exposes the study to other confounding factors, such as some other events which are not related to the studies, which could interrupt the effect of the specific factor we are looking at. However, Abdelrehim et al. (2011) contends that using a too narrow window increases the risk of making errors because it might not effectively capture any leakage of information prior to

the announcement of news. Taking consideration of both arguments, this study therefore uses two event windows with different range to address these issues.

The estimation window, as illustrated in Figure 4.1 (p.64), covers a period which the normal return of a stock will be estimated. It is a common practice to select the estimation window prior to the event window (MacKinlay, 1997; de Jong, 2007) or after the event window (Sitthipongpanich, 2011) to isolate the effect of the event when calculating the expected return (MacKinlay, 1997). However, the choice of the length of the estimation window is rather arbitrary. Lummer and McComell (1989) used an estimation window of 150 days whereas Small et al. (2007) used a wider 225-day estimation window. Lasfer et al. (2003) and Spyrou et al. (2007), however, chose a much narrow of estimation window that covers only 50 days to predict the expected return when studying the impact of extreme events on various stock markets. In this study, due to the fact that some of the event dates are close to each other, therefore in order to avoid overlapping of estimation window and event window of two events, a reasonably shorter estimation window of 50 days is selected for the study.

4.2.4 Identifying the measurements of market reaction

When comes to measuring market reactions, there exists many optional measures which accommodate different scenarios. Market reaction can be measured by the volatility of the market on the day of the announcement (Schwert, 1990; Beaulieu et al., 2005; Białkowski et al., 2008) or trading volume (Hameed and Ting, 2000; Lin and Tao, 2005).

For researches which adopt event study methodology, the appraisal of market reaction to an event requires a measure of the Abnormal Return (MacKinlay, 1997). The Abnormal Return (AR) is defined as the difference between actual observed return and the expected return (also known as *normal return*⁷) over the event window. The expected return is the predicted return that is not conditioned under the event of study. The AR thus can be represented by the following equation:

$$AR_{it} = R_{it} - E(R_{it}) \dots\dots\dots(2)$$

where AR_{it} , R_{it} , and $E(R_{it})$ are the Abnormal Return, actual observed return and expected return of stock i at time t respectively.

The impact of an event, represented by AR, can also be aggregated through time in order to draw overall inferences of the event of interest over the event window. Thus, for stock i , the time series aggregation of AR is known as the Cumulative Abnormal Return (CAR) and it is the sum of all ARs over a time period t , where t is from t_1 to t_2 :

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \dots\dots\dots (3)$$

By testing the significance of the AR and CAR, one can understand if the market responds to the announcement and to what extent the reaction goes. For example, by examining significant CAR prior to a merger and acquisition announcement, Selcuk and Yilmaz (2011) are able to conclude that the market did react to the announcement and

⁷ The terms “expected return” and “normal return” carry the same meaning and are used interchangeably in this study.

leakage of information is found. In addition, Spyrou et al. (2007) used the average CAR to test if the various stock markets underreact or overreact to extreme events.

Since this research project focuses on examining the impact of political and budget announcement on market reaction and testing the market efficiency, event study is adopted reasonably as the methodology and AR and CAR become the main measurement of market reactions.

4.2.5 Selecting the Normal Return Model

To calculate the *ex-ante* expected return of a security during the estimation period, there exist two commonly used models: (1) the Constant Mean Return Model; and (2) the Market Model (MacKinlay, 1997)

(1) The Constant Mean Return Model

In the Constant Mean Return Model, the normal return (also known as the benchmark return or expected return) is the average returns for security *i* over the estimation window $[t_1, t_2]$. The mathematical interpretation of the normal return, as suggested by de Jong (2007), is written as:

$$ER_{it} = \frac{1}{T} \sum_{s=t_1}^{t_2} R_{is} \dots\dots\dots(4)$$

where $T = t_2 - t_1 + 1$ equal the number of days used to computed the Expected Return for stock *i*, ER_{it} . R_{is} is the actual stock return during the estimation period.

Although constant mean return model is the simplest model to be used, Brown and Warner (1985, 1990) contend that the result yield from this model is similar to other more complicated models. The reason is because the use of other benchmarking model does not reduce the variance by much as compare to the constant mean model (MacKinlay, 1997)

(2) The Market Model

The market model is a statistical model that links the return of a security to the return of the market portfolio. The linear relationship is expressed as follows:

$$\mathbf{R}_{it} = \alpha_i + \beta_i \mathbf{R}_{mt} + \varepsilon_{it} \dots\dots\dots(5)$$

$$E(\varepsilon_{it}) = 0, \quad \text{Var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}$$

where R_{it} and R_{mt} are the return of stock i and market portfolio respectively at time t . ε_{it} is the disturbance term with zero mean and constant variance σ_{ε_i} . The parameters of the model α_i and β_i can be estimated by using OLS regression over the estimation period, followed by the expected return at time t .

The market model is regarded as a better model as it removes the portion of the return that is caused by the movement in the market, hence reduce the variance of any abnormal returns detected (MacKinlay, 1997; Beverly, 2007).

(3) Other benchmarking models

Two economic models that could be used are the CAPM and the Arbitrage Pricing Theory (APT). CAPM gained its popularity in event study in the 1970s. However, deviations from CAPM had been discovered and this suggests that there is a possibility that the result of event studies is sensitive to CAPM restrictions, causing the use of CAPM model almost cease in event studies (MacKinlay, 1997). While the use of APT allows more input of other factors, these factors behaves like a market factor and therefore, there is little gain in advantage of using this method as compare to market model.

In this research project, the constant mean return model is used to find the normal return for three reasons. First, the use of market model is limited by data availability. This research is exploring the KLCI far back in 1980. However, the bigger benchmark market index—the FTSE Bursa Malaysia EMAS Index—is only available from 1996 onwards. Moreover, data before 1996 were computed in a different methodology⁸, which is not directly comparable with those after 1996. Second, the return of KLCI is a stationary process and the unit root test result is tabulated in Appendix 2. By econometrics theory (Gujarati and Porter, 2009), a stationary process has a constant mean and a constant variance. Therefore, it is reasonable to adopt the constant mean return model in this case. Third, the use of constant mean return model has been proven to yield similar results as other more complicated models (Brown and Warner, 1985). In studies conducted by Lasfer et al. (2003) and Spyrou et al. (2007), constant mean return model is used to find

⁸ Refer FTSE Bursa Malaysia EMAS Index from *Datastream*.

the benchmark return model in examining market reaction to extreme events in various stock markets in the world.

4.2.6 Hypothesis Testing

To examine market reactions to political and budget announcements, graphical plot of ARs and CARs are supported by statistical tests to answer the question of whether the AR and CAR calculated at a certain point in time are significantly greater than zero, given the pre-determined significant level. If the AR and CAR are significantly greater than zero, then we can conclude that there is impact on the stock market and that market is efficient in reflecting the information content in the announcement provided that there is no significant abnormal return found in other days beside the announcement day (Spyrou et al., 2007). However, if AR and CAR are not significantly greater than zero, we can then argue that the announcements do not have any impact on the market.

(1) Testing the impact of individual announcement on market reaction

As mentioned before, the market reaction is measured by the abnormal return (AR) and cumulative abnormal return (CAR). Therefore, in order to test whether the market reacts to individual event i , the null hypothesis H_{10} and H_{20} in section 4.2 can be expressed statistically as:

$$\mathbf{H_0: E (AR_{it}) = 0 \dots\dots\dots (6)}$$

If H_0 can be rejected, we therefore conclude that market does react significantly to the announcement of an event and that market is inefficient in reflecting the publicly available information if H_0 can be rejected for $t > 0$, and thus the EMH is not supported.

Simple t-test is commonly used for the purpose of testing the significance of abnormal return (de Jong, 2007). In order to study how the political or budget announcements affect the stock market index *individually*, we need to first determine the statistical properties for AR_{it} . As MacKinlay (1997) points out, the distributional properties of the abnormal returns can be used to test on the significance of any abnormal returns within the event windows. The distribution of the sample abnormal return of a given observation in the event window is

$$AR_{it} \sim N(0, \sigma^2(AR_{it}))$$

Therefore the test statistics t is:

$$t = \frac{AR_{it}}{\sigma(AR_{it})} \dots\dots\dots (7)$$

where $\sigma^2(AR_{it}) = \sigma^2_{\epsilon i}$ when the estimation window is reasonably large

$\sigma^2_{\epsilon i}$ is known as the *disturbance variance* and is estimated from the estimation windows using the adjusted concept of MacKinlay (1997) :

$$\sigma^2_{\epsilon i} = \frac{1}{L-1} \sum_{\tau=s}^k (R_{i\tau} - \bar{R}_{i\tau}) \dots\dots\dots (8) \text{ where}$$

the estimation window starts from $\tau=s$ and ends on $\tau=k$. L is the number of days in estimation windows and $\bar{R}_{i\tau}$ is the expected return during the estimation period.

On certain occasions, such as to test market momentum and overreaction, the abnormal returns must be aggregated across time in order to draw inference. The null hypothesis to test the significance of aggregated market reaction across time can be expressed in a statistical format as:

$$\mathbf{H_0: E (CAR_{it}) = 0 \dots\dots\dots (9)}$$

According to MacKinlay (1997) the distributional properties of CAR can be represented as:

$$\mathbf{CAR_i (\tau_1,\tau_2) \sim N(0, \sigma_i^2(\tau_1,\tau_2))}$$

And the test statistics is simply

$$\mathbf{t = \frac{CAR_{it}}{\sigma_i(\tau_1,\tau_2)} \dots\dots\dots (10)}$$

where the variance of CAR_i is $\sigma_i^2(\tau_1,\tau_2) = (\tau_2 - \tau_1 + 1) \sigma_{ei}^2$ for reasonably large estimation windows.

(2) Testing the overall impact of announcements on market reaction

The null hypothesis H_{10} and H_{20} can also be tested on an overall basis. In order to study how the political or budget announcements affect the stock market index *as a whole*, we first aggregate the ARs across each event i over the same period of time (t) within the event window and compute the average abnormal return (AAR) at time t :

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it} \dots\dots\dots (11)$$

where N indicates the number of events. And for large estimation window L , its variance is

$$Var(AAR_t) = \frac{1}{N^2} \sum_{i=1}^N \sigma_{\epsilon i}^2 \dots\dots\dots(12) \text{ (MacKinlay, 1997)}$$

As above, the abnormal return at any time within the event windows can be analyzed by using these estimates to calculate the test statistic.

Similarly, the average abnormal return can also be aggregated over any interval in the event window to find the average cumulative abnormal return (ACAR), where

$$ACAR (\tau_1, \tau_2) = \frac{1}{N} \sum_{\tau=\tau_1}^{\tau_2} AAR_{\tau} \dots\dots\dots(13) \text{ and}$$

$$Var (ACAR (\tau_1, \tau_2)) = \sum_{\tau=\tau_1}^{\tau_2} Var(AAR_{\tau}) \dots\dots\dots(14)$$

(3) Testing the impact of particular set of political events on market reaction

The methodology of testing the impact of a specific group of events on the stock market is similar to testing the impact of overall announcements. In this case, instead of separating the events into positive news and negative news, the political events are analyzed according to their classification mentioned in section 4.2.2. The formula of calculating the ARs and CARs are the same as above. For example, to study the overall impact of General Elections on stock market, we apply formula 11—14, but only aggregating across the six General Elections at each point of time within the event windows.

(4) Testing the significance of the difference between impact of political and budget announcement on market reaction

To investigate whether the apparent differences in reaction to both types of announcements are statistically significant we test the null hypothesis that the mean reaction of KLCI after the political announcement is equal to the mean reaction of KLCI after national budget announcement, against the alternative hypothesis that the mean reaction to both types of announcement is different. Therefore, mathematically speaking, the null hypothesis (H_{30}) is:

$$H_0: E (AR_p(t)) = E (AR_b(t))$$

A pair-wise t-statistic is employed and calculated as:

$$t = \frac{AAR_p(t) - AAR_b(t)}{\sqrt{\text{Var}(AAR_p(t)) + \text{Var}(AAR_b(t))}} \dots\dots\dots (15)$$

where AAR (t) and Var (AAR(t)) can be calculated by using equation 11 and 12 respectively.

The testing of the efficient market hypothesis is conducted concurrently with these tests. If $E(AR_t) > 0$ and / or $E(CAR_t) > 0$ at time other than day 0, we therefore conclude that market efficiency hypothesis is not supported in this case and the behavior of the market could be explained by using some other hypothesis within the framework of this study.

The test results and interpretation of the results are presented in Chapter 5.