Chapter 3

RESEARCH METHODOLOGY

This chapter discusses the research methodology employed in the study. Chapter consists of four main sections. The first section details research questions and hypotheses. The second describes research methodology. The third section presents procedure chart, and the last section summarizes the chapter.

3.1 Research Questions and Hypotheses

As explained in Chapter 1, the main purpose of this study is to examine abnormal returns of the stocks around contract announcement. The secondary aim is to examine direction between the abnormal return measures whether results are sensitive to the different measures. The third aim is to examine the difference of market reactions to different types of contract announcements.

The primary aim is to examine abnormal returns of the stocks around contract winning announcement. If winning contracts are considered good news for winning firms, investors should respond favorably to such announcements and the prospect of future cash

flow should be impounded into their security prices immediately under the premise that the capital market is efficient. This primary aim generates research question 1.

Research question 1: Do abnormal returns exist surrounding the announcements of business contracting?

H_{01}: The expected value of the cumulative average abnormal return is equal to zero.

H_{A1}: The expected value of the cumulative average abnormal return is not equal to zero.

In addition, since the two abnormal return measures; the OLS market model and the capital asset pricing model, employed to estimate abnormal return using different procedures, it is important to consider whether results are dependent upon which of the measure is used. This issue leads to research question 2.

Research question 2: Is the abnormal return result of security associated with a contract announcement firm dependent upon which of the abnormal return measures is used?

H_{02}: The OLS market model and the Capital asset pricing model measures on abnormal return of winning firm are not correlated.

H_{A2}: The OLS market model and the Capital asset pricing model measures on abnormal return of winning firm are correlated.

This study further examines the informative roles of contract announcement by investigating the different announcement effects when both government and corporate contracts are awarded. Government contracting is regard as a 'safe' project. Future cash flow to the firms that sign contracts with government agencies are 'implicitly guaranteed'. Therefore, according to the signaling hypothesis, we should observe higher abnormal returns when the contract is signed with government agency. However, investors may not see the abnormal returns on the announcement of contracts signed with the Thai government because government information is more efficient than corporate information due to the capabilities of government networks to make public news announcements across the country. Regarding the efficiency role of announcement, we may not observe abnormal returns for business contracts with government agencies. The disaggregated types of contracts are divided into two groups: (1) government vs. corporate contracts, and (2) five different size contracts. These issues generate research question 3a and 3b and the hypotheses are as follows.

Research question 3a: How do the returns to firms engaging in government contracts compare with returns to firms in corporate contracts?

H_{03a}: The returns to firms engaging in government contracts compared to returns to firms in corporate contracts are not different.

H_{A3a}: The returns to firms engaging in government contracts compared to returns to firms in corporate contracts are different.

The next hypothesis focuses on the question of how the size of a business contract affect stock returns. The size of a business contract conveys important signals to future cash flow. Large business contract announcements should attract more investors and lead to higher prices or higher returns around the announcement date, according to the signaling hypothesis.

Research question 3b: How do the returns to firms engaging in five different size contracts differ?

H_{03b}: The returns to firms engaging in five different size contracts are not different.

H_{A3b}: The returns to firms engaging in five different size contracts are different.

3.2 Research Methodology

3.2.1 Data Required and Data Collection

The data set in this study will focus on abnormal returns of the stocks around contract announcement between January 1st, 1994[1] and June 30, 2010. This is an appropriate period because it is long enough to cover a variety of market fluctuations. The complete data employed in this study is 676 business contract announcements. The data to be analyzed are:

[1] Contracting announcement data is available since 1994.

(i) Contract announcements are obtained from news and announcements from the Stock Exchange of Thailand, which is recorded in the Kim Eng e-World Program of the Kim Eng Securities Thailand PLC.

(ii) Daily stock prices around contract announcement dates of the winning firms are collected from the DATASTREAM AFO database at the Financial and Investment Centre, Chiang Mai University.

(iii) Daily SET Index around contract announcement dates of the winning firms are also collected from the DATASTREAM AFO database.

3.2.2 Method of Analysis

To examine how fast security prices adjust to specific significant economic events, a standard event study is used to examine whether the returns surround the event dates are relatively higher than 'normal' returns. If the market is considered 'efficient' in terms of information, no one can gain excess returns after transaction costs (Fama ,1991; Reilly and Norton, 2006).

3.2.2.1 Sample Construction

Studying period is divided into two sub-periods, event period and estimation period. For each security associated with a winning firm, a maximum of 151daily return observations for the period around its respective event will be examined.

Event Period

The event period is defined as the observations of abnormal returns around the announcement day. The event day ($t = 0$) is the day that the contract was announced by the Stock Exchange of Thailand. We capture the abnormal returns using the market model and CAPM model to make sure that our results are not sensitive to the model used. In this study, the 'event period' is defined as the following 3 intervals:

- 25 days before and after the event day ($t \pm 25$), 51 total days.
- 10 days before and after the event day ($t \pm 10$), 21 total days.
- 3 days before and after the event day ($t \pm 3$), 7 total days

Estimation Period

According to the risk adjusted model, we need to estimate relevant parameters used in the model. In this study, we use a number of 100 days before day t *(t = -25, -24, ..., 25)* as the estimation period. Cumulative abnormal returns are compound computed subsequent to the announcement date by calculating the continuously compounded rate of return to security i at event day t; continuously compounded rate of return to the SET Index at event day t; and the beta for security i; which will be explained in the next section.

3.2.2.2 Estimating Abnormal Returns

Security rate of return and market rate of return are two main variables for computing abnormal returns in the next stage. The two measures are stated as follows:

Security Rate of Return

In computing each security rate of return, it is assumed that all dividend distributions are reinvested on the ex-dividend date. Thus, the daily rates of return are computed as the change in total value of a security that contains reinvesting dividend distribution. To smooth the volatility in the daily data, log transformation is used (Pindyck and Rubinfeld, 1998). Hence, returns are expressed as a percentage of stock values, as follows:

$$R_{it} = \log\left[\frac{P_{it} + D_{it}}{P_{it-1}}\right] \qquad (1)$$

where,

R_{it} = rate of return for security i in day t,

P_{it} = the market stock closed price of security i day t,

P_{it-1} = the market stock closed price of security i of the preceding day, and

D_{it} = the total of dividend distributions on day t.

Market Rate of Return

From the SET index, rate of return for the market are obtained as follows:

$$R_{mt} = \log\left[\frac{SET_t}{SET_{t-1}}\right] \qquad (2)$$

where,

R_{mt} = rate of return for the market in day t,

SET_t = the SET Index closing value at day t, and

SET_{t-1} = the SET Index closing value at the preceding day

Abnormal Returns Measures

After computing the security rate of return and market rate of return, the abnormal or abnormal rate of return will be calculated. Two abnormal return measures, the OLS market model and the Capital Asset Pricing Model (CAPM) will be employed to calculate abnormal returns. The OLS market model is used to adjust for market wide factors and for risk, while the Capital Asset Pricing Model is used to consider the significant effects of a risk-free asset.

(i) Market Model (MM)

This research will use market model methodology similar to that documented by Dodd and Warner (1983), Brown and Warner (1985), and Diltz (1990). The market model is employed to test for abnormal returns. Defining $A_{i,t}$ as the abnormal return for security i at day t. Let $R_{i,t}$ designate the observed arithmetic return for security i at day t. For every security associated with a winning firm, the abnormal return for each day in the event period is computed using the equation bellow:

$$A_{i,t} = R_{i,t} - \alpha_i - \beta_i R_{m,t} \qquad (3)$$

Where,

α_i *and* β_i are OLS values from the estimation period, 100 days prior to day t.

(ii) Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) is a model that indicates what should be the expected or required rate of return on risky assets (Reilly and Norton, 2006). The equation for the CAPM is:

$$E(R_i) = R_f + (R_m - R_f)\,\beta_i \qquad (4)$$

For each security associated with a winning firm, CAPM is used to calculate a prediction error, or abnormal return, for the event day *t*. Defining $A_{i,t}$ as the abnormal return for security *i* at day *t*. The abnormal return for each day in the event period is estimated using the CAPM is:

$$A_{i,t} = E(R_i) - R_f - [(R_m - R_f)\,\beta_i] \qquad (5)$$

Where,

$E(R_i)$ = expected rate of return to security *i* at day *t*,

R_m = rate of return to the SET Index at day *t*,

β_i = the systematic risk (beta) for security *i* calculated using 100 day data prior to the event day *t*,

R_f = the risk-free rate in time period t

3.2.3 Test Statistics under the Null Hypothesis

Given the abnormal returns based on each method, the statistical significance of the event period abnormal returns is assessed for each sample. The null hypothesis (H_{0i}) to be

tested is that the expected value of the cumulative average abnormal return is equal to zero.

(1) Statistics under the first null hypothesis (H_{01})

According to Diltz (1990), statistical tests for an absence of an abnormal return use the following procedures. For a sample of N contracts, an average abnormal return (AAR_t) for each day t is defined as:

$$AAR_t = \sum_{i=1}^{N} A_{it} / N \qquad (6)$$

The cumulative average abnormal return ($CAAR$) from event period day T_1 through T_2 is:

$$CAAR = \sum_{t=T_1}^{T_2} AAR_t \qquad (7)$$

The expected values of AAR and $CAAR$ are zero in absence of abnormal performance. Assuming cross sectional independence, the significance of these two random variables will be examined, respectively, using the following statistics:

$$Z_t = (1/\sqrt{N}).\sum_{i=1}^{N} A_{i,t} / S_{i,t} \qquad (8)$$

Where,

$S_{i,t}$ = estimated standard deviation of the prediction error

(2) Statistics under the second null hypothesis (H_{02})

The relationship between the two return measures, OLS market model (MM) and the Capital Asset Pricing Model (CAPM), will be tested using the Pearson' correlation

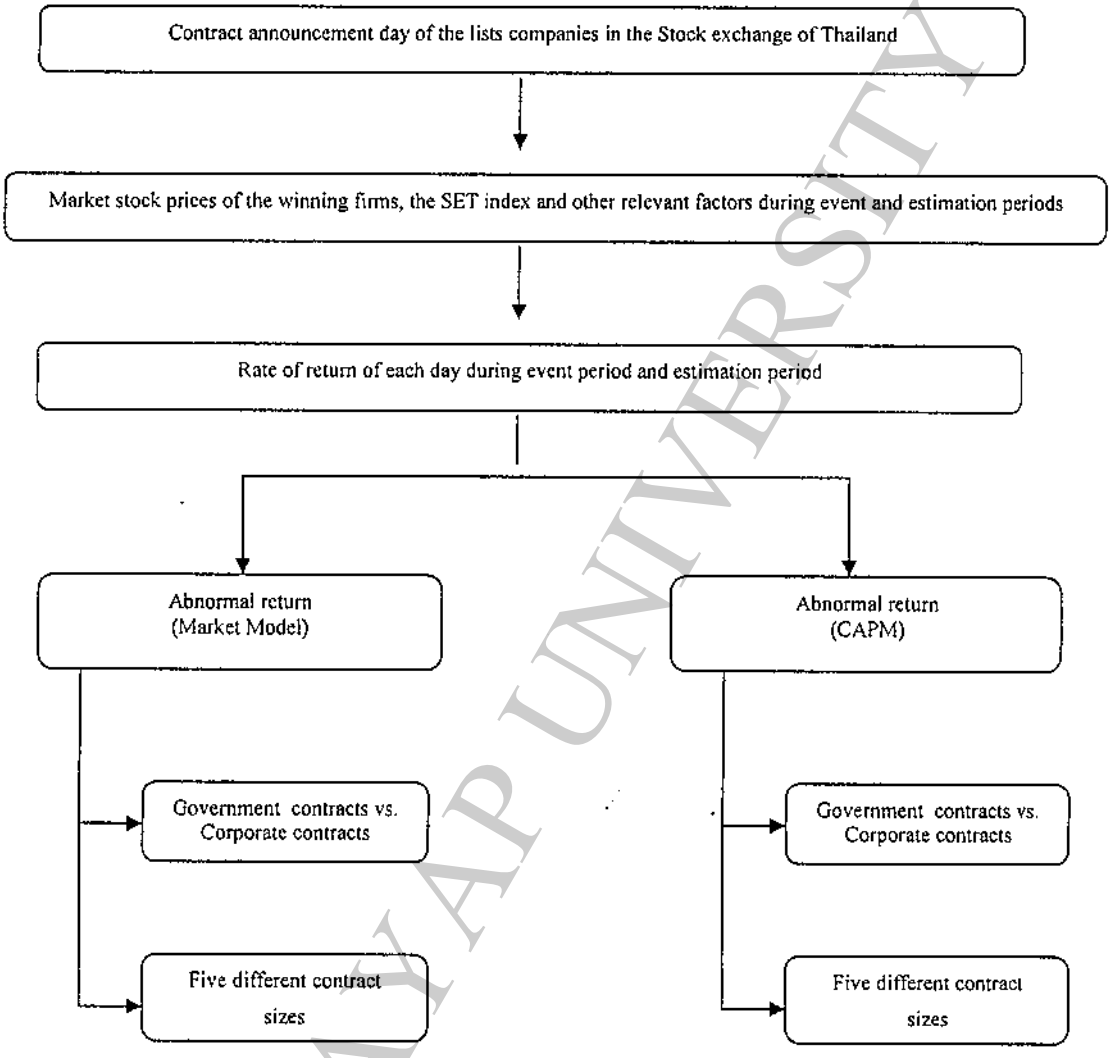
coefficient (λ_i). The null hypothesis (H_{02}) is $\lambda i = 0$ versus the alternative hypothesis of $\lambda i \neq 0$. The coefficient will measure the strength of any liner relationship between two random variables. In this case, two models under investigation are treated as the random variables.

(3) Statistics under the third null hypotheses ($H_{03a} - H_{03b}$)

The test statistic will distribute the *pair sample t-statistic test* to examine whether market reactions to different types of contract announcements with different abnormal return. The contracts are divided into two groups: government vs. corporate contracts, and five different sized contracts. The *t-statistic test* will be used to compare the mean difference on abnormal return results between each pair.

3.3 Procedure Chart

According to the objectives of this research, process of the study will be demonstrated as follows.



3.4 Summary

The primary aim of this study is to examine abnormal returns of the stocks around the time of contract announcement for the period from January 1994 to June 2010. The secondary aim is to examine the direction between the abnormal return measures and determine if the results are sensitive to the different measures. The third aim is to examine the different market reactions based on different types of contract announcements. Three research questions associated with the tree main aims and hypotheses relevant to each research question are expressed in this chapter. Abnormal returns of the winning firm are calculated using the OLS Market Model and the CAPM measures. In addition, the procedure chart of the methodology is provided in this chapter. Results of this study will be reported in the next chapter.