Identifying Synergy in Vertical Merger and Acquisition: The Synthetic Firm Method

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วิทยานิพนธ์ฉบับนี้ศึกษาการควบรวมกิจการในแนวตั้งบริษัทแล้วเสร็จและเข้าซื้อกิจการในช่วงปี พ.ศ.2541-2553 โดยอาศัยผลตอบแทน 5 ปีทั้งก่อนและหลังการควบรวมกิจการว่าการประสานกำลังจากการควบรวมกิจการมีอยู่จริงหรือไม่ ผลของการศึกษาแสดงผ่านผลตอบแทนเกินปกติและประสิทธิภาพของผลการดำเนินงานระหว่างเวลาที่ทำการศึกษา ตามวิทยานิพนธ์ฉบับนี้ใช้ประโยชน์จากวิธีการใหม่ซึ่งอาศัยความล้ายคลึงกันของบริษัทศึกษาผลกระทบต่อผลตอบแทนของบริษัท โดยหนึ่งชุดของบริษัทที่ต้องมีการควบรวมกิจการและการเข้าซื้อกิจการที่เกิดขึ้นจริง ในขณะที่ชุดอื่นๆ ต้องใช้การสังเคราะห์ของการควบรวมกิจการกับกิจการที่เกิดขึ้นจริง ในวิทยานิพนธ์ฉบับนี้ใช้สองรูปแบบในการแสดงให้เห็นถึงการมีอยู่ของการประสานกำลังและยืนยันว่าการประสานกำลังสามารถเพิ่มมูลค่าในกับบริษัทที่เข้าซื้อกิจการ ผลจากการศึกษาแสดงให้เห็นถึงผลตอบแทนที่ผิดปกติและประสิทธิภาพการดำเนินงานของการควบรวมกิจการและการเข้าซื้อบริษัทในแนวตั้งในทางลบอย่างมีนัยสำคัญ ที่เกิดขึ้นหลังจากการควบรวมกิจการและการเข้าซื้อกิจการ ผลของการศึกษายังแสดงด้านมืดของการควบรวมกิจการและการเข้าซื้อกิจการในเรื่องของความขัดแย้งระหว่างผู้ถือหุ้นและผู้จัดการบริษัทของพวกเขา

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This research investigates the completed vertical merger and acquisition during 1998-2010 in five year windows both of before and after merger and acquisition whether the synergy demonstrates through the abnormal return and operating performance during the study period. According to this research, I exploit a new approach in which the most similarity of firm affects the return of firms: one set of the firm requires the actual merger and acquisition deals, while the other set requires the synthetic of the actual merger and acquisition deals. In this paper uses two model to demonstrate the existing of synergy and confirm that it can add more value to the acquirers. The results demonstrate the significantly negative abnormal return and the performance of the actual vertical merger and acquisition firms after making merger and acquisition deal. The results also examine the dark side of the merger and acquisition which relate to the conflict of interest between shareholders and their managers.

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CONTENTS

CHAPTER 1

INTRODUCTION

1.   Background and Problem Review

1.1   Background

Merger and acquisition is business consolidation, which is a combination of

two companies, buy sides are called acquirer and sell sides are call target, to form a

new company under the name of acquirer's company or creating new company.

There are three types of the combinations. First type is Horizontal Merger and

acquisition, which is a combination between two companies, and they are in the

same production lines or industries. Objectives of making the deal are improving cost

efficiency i.e. economic of scale, increasing market power and expanding size of

company. Second type is Vertical Merger and acquisition, which is a combination

between two companies, and they are classified in different production lines or

different industries but there are the same finished goods or services. It often occurs

between companies themselves and their suppliers or distributors. Objectives of

making this type of merger and acquisition, vertical merger and acquisition, are to

reduce costs and improve efficiency by decreasing transportation expense and

reducing turnaround time. Moreover, the vertical M&A can help to decrease reliance

and increase profitability. The vertical merger and acquisition is the type that I focus

on this study. Third type is Conglomerate Merger and acquisition, which is a combination between two companies, which are unrelated companies; the companies have no relevance in industry or product. Objectives of making the deal are to diversify business risk and expand the company across industry.

In this paper, I focus only on Vertical Merger and Acquisition, which is combination between the companies and their supply chains. There are little empirical works on vertical merger and acquisition and these papers, which have been done, are based on small samples.

Fan, Joseph PH and K. Goyal (2006) state that mergers during 1980s and 1990s are mostly between related firms. Nowadays, United State merger and acquisition activity are more widespread. The more number of merger and acquisition deals, the more chance vertical merger and acquisition occurs.
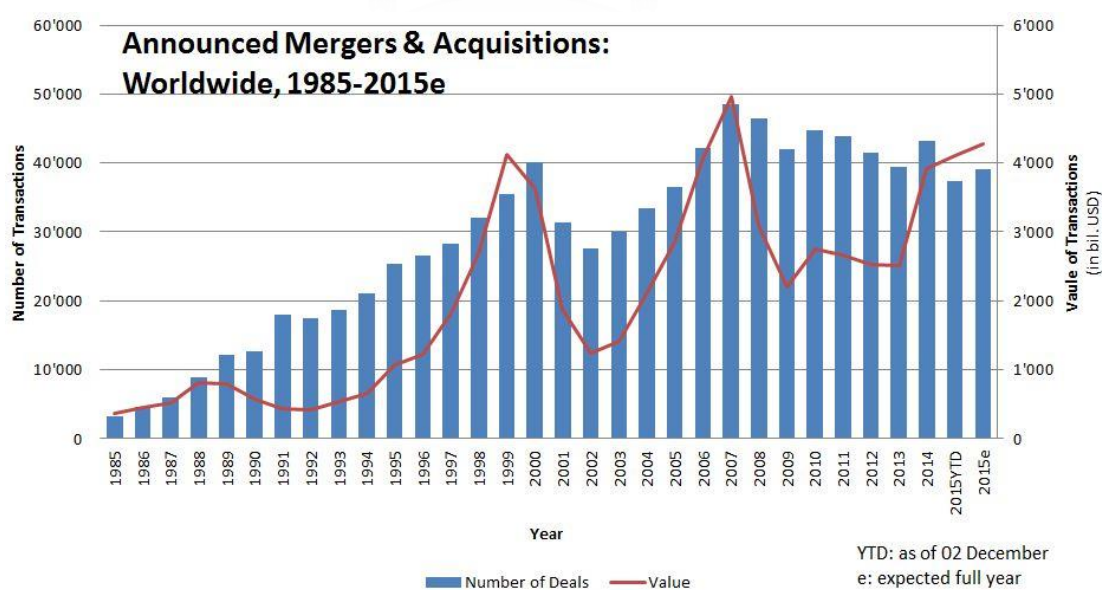
1.2   Problem Review

The goal of making merger and acquisition activity is get the expected benefits, which generate to companies. Obtaining the benefits of merger and acquisition needs to pay more than the intrinsic value of the target firm. When acquirers decide to make merger and acquisition deal, they concern the price they should pay for buying a target. Kengelbach and Roos (2011) show that average of the acquirers often pay premium 20-30 percent of targets' share price before merging. Additionally, on the average, the performance of acquirers who pay premium below the average is better than who pay above the average. The higher acquirers pay premium, the more chance they overpay and reduce the chance of success in merger and acquisition. Further, there are two main reasons, which enhance acquirers to pay premium. First, they want to win in the bidding competition. Second, they expect the controlling right and benefit after merger and acquisition called synergies. Trautwein (1990) Zollo and Singh (2004) state that a variety of value-creating motives seen to drive merger decisions. Additionally, Cording et al., (2008) Graebner (2004) Zollo and Singh (2004) show that many mergers are pursued to capture integrative benefits through creating efficiencies via economies of scale and/or scope, by leveraging shared resources, increasing revenue from joint market expansion, as well as by improving competitiveness of the merged firm.

Although the companies willing to pay premium because they believe that the merger and acquisition can generate more value and benefits, I find the

evidences which demonstrate that after merger and acquisition some firms can

generate more value and take more benefits and some firms cannot generate more

value or take more benefits. There are extensive literatures that examine whether

the synergy can generate more value, take benefits from merger and acquisition to

the new firm, and reflect in stock price. Jarrell et al. (1988) demonstrates that many

capital market event studies have found substantial returns to stockholders in

acquired companies – ranging from 19 percent gains during the 1960s to 30 percent

or more during the 1970s and 1980s. They acknowledge, however, that returns to

acquiring firms are smaller, but still significant, in the 1960s and 1970s before turning

negative (though not significantly different from zero). Moreover, companies perform

well in post-merger and acquisition comparing to pre-merger and acquisition.

Lubatkin (1983) reviews major empirical studies on mergers from the 1970s, and finds

neutral impacts in profitability are generally found after acquisition. Ravenscraft and

Scherer (1989) find that acquired companies tended be more profitable than average

pre-merger, especially for smaller firms.

In contrast, there are many firms, which cannot generate both more value

and benefits after merger and acquisition. I find the evidences show that the merger

and acquisition is not only cannot create the value but also destroy value of the

firms. The destroying effect reflect to market price. Dodd (1980) Asquith (1983)

Malatesta (1983) Jarrell &Poulsen (1989) suggest that merger and acquisition do not

enhance firm value in the short-run. Asquith (1983), Agrawal, Jaffe, &Mandelker (1992) and Loderer& Martin (1992) state that merger and acquisition also do not improve firm value in the long run. More specifically, Chatterjee (1992) Datta, Pinches and Narayanan (1992) Seth, Song, & Pettit (2002) King, Dalton, Daily and Covin (2004) Moeller, Schlingemann and Stulz (2004) demonstrate that acquisitions are often found to erode acquiring firm value and Langetieg, Haugen and Wichern (1980) and Pablo, Sitkin and Jemison (1996) document that the merger and acquisition produce highly volatile stock returns.

1.3   Contribution

There are two contributions to the literature in this paper. First, this paper shows the abnormal return of the merger and acquisition firm. From the previous papers, they only examine the abnormal return either acquirer or target. To demonstrate abnormal return of the sum of acquirer and target, I create the new approach for merger and acquisition performance evaluation. Using this method can show the actual performance of the firm after making vertical merger and acquisition deal. Moreover, the controllable group is a replicated the actual merger and acquisition firm. Then, it can document whether the merger and acquisition are the better option of the companies. Second, this paper also examines the operating performance of the sum of acquirer and target. I measure operating performance by using different in different model, which is panel data. The data are both cross-

sectional and time series. Additionally, I use the synthetic firm to be controllable group and measure the operating performance. The cut off pre-and post-merger and acquisition is announcement date.

1.4   Research Questions

There are evidences, which show that merger, and acquisition can generate more firms' value. Otherwise, there are evidences, which demonstrate that merger, and acquisition can destroy firms' value too. Because of all of evidences, the research question arises whether the synergy is existed and can generate more value to the firm. To investigate that synergy form merger and acquisition is existence and can create more value to the firm, I use market-based approach to measure the excess return or abnormal return and accounting based approach to measure operating performance. If I find that the actual vertical merger and acquisition firms have significant abnormal return and outperform, it can be implied that there is synergy of the actual vertical merger and acquisition.

From the previous paper, there are two methods, which are used to measure synergy of merger and acquisition. The first one is market reaction, the movement of stock price after merger and acquisition announcement. Dodd and Ruback (1977) analyze abnormal returns around the time of a takeover announcement and find that shareholders of both acquirers and targets earn positive and significant gain from a successful takeover. Langetieg (1978) measures shareholder gains from the mergers

and find an insignificant post-merger excess returns. Asquith and Kim (1982) examine

the return to stockholders of target firms around the date of the initial

announcement or completion of a merger. Nevertheless, they do not identify two

gaps. Firstly, they do not identify that is the occurring synergy be positive or

negative. Secondly, they measure the excess return or abnormal return either

acquirer or target. Thus, I investigate the excess return of the combination of acquirer

and target firms the second one is measure the operating performance, comparing

company itself before and after vertical M&A. Gugler et al. (2003) investigate that

mergers in various countries during the 1980s and 1990s use accounting data to

compare their post-merger profit performance (through five years later) to control

groups of firms in the same broad industry group not involved in merger activity.

They find that five years' post-merger the most common result is increased

profitability but reduced sales, with common patterns across countries, consistent

with enhanced market power. Nevertheless, it remains the case that a substantial

share of mergers (for the U.S., the country with the bulk of the sample mergers, 41%)

fail to have positive profit impacts. By type of merger, horizontal mergers are found

to be the most likely source of long-term profit gains (especially in manufacturing).

There is a gap, which is no good controllable groups to compare the operating

performance in two dimension, time and firm comparing. Then, if the operating

performance of firms is getting bad, they cannot explain cause of bad performance. I

want to investigate that the worst operating performance after merger and

acquisition is cause from underperform or bad integrate. I create the synthetic firms, which is the replicate of the actual vertical merger, and acquisition firms be the controllable groups.

To examine that vertical merger and acquisition can generate more value to the firm; I use the idea from the previous paper. I measure the abnormal return of stock and operating performance after making vertical merger and acquisition deal. The study starts from checking the market reaction after merger and acquisition announcement that how stock price reflects merger and acquisition. To identify whether the stock price move up, it can generate the significant value to the firm. Moreover, to demonstrate the operating performance of the firms whether they can outperform after merger and acquisition, I measure the operating performance by comparing pre-and post-merger and comparing the merger and acquisition firms and the synthetic firms.

1.5   Objectives

To demonstrate whether synergy of vertical merger and acquisition is existed and can generate more value. I use market-based approach and accounting based approach to measure operating performance of the companies. When managers of acquirer decide to pay, premium substituting the opportunity of growth of the company, sometime they make a right decision and get the synergy to add more value to the firm. Otherwise, sometime they make a wrong decision and lost

shareholder's money because none significant synergy appeared. Moreover, merging

destroys value of firms and indicates a result thought shares price in the market,

shares price are decrease. Jarrell et al. (1988) state that many capital market event

studies find substantial returns to stockholders in target's companies. During 1960s,

there are 19 percent gain from merger and acquisition and during 1970s to 1980s,

there are more than 30 percent also gain from merger and acquisition. They

demonstrate that during 1960s and 1970s, return of acquirer firms is small but it still

significant. Then, it turns to be negative in 1980s

From the previous studies, I can categorize the methods, which they use in two

parts. Firstly, measuring market reaction which is only focus on effect of merger and

acquisition announcement to shares price but they do not find out whether

movement of shares price is proper with the expectation of shareholder, paying

premium for the expected synergies. To examine not only existence but also add

value to the firm, in this paper, I focus on the significant abnormal return, relative to

market return, to capture effect of the vertical merger and acquisition announcement

to the market price.

Secondly, measuring operating performance of the firms after merger and

acquisition, which compares operating performance without good controllable

groups. They use two digits, SIC code, to be controllable groups. Therefore, I try to

measure operating performance of the companies after making the vertical merger

and acquisition deal by creating new controllable group. I consider operating

performance by category companies in two groups. First group is treatment group, which is actual merger and acquisition firms. Second group is controllable group. The two main steps that use to compare are (i) comparing company itself in different period of time, between pre-M&A and post M&A. (ii) comparing across groups of companies.

1.6   Research Hypotheses

The main purpose of this paper is examined that synergy not only exists and adds value to the firms. I categorize my hypothesis in two parts, which are market-based approach and accounting-based approach.
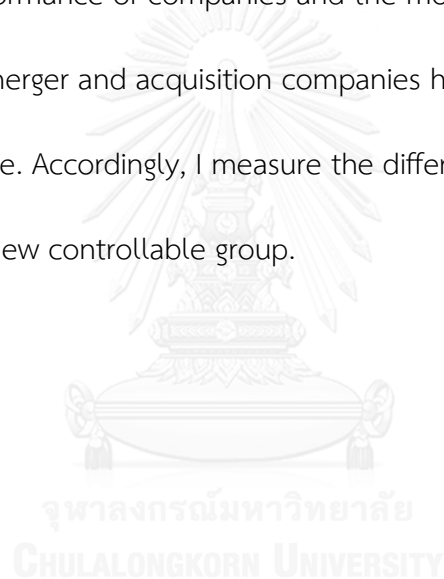
Hypothesis I

I investigate that the synergies, which are the expectation of all the acquirers, are exist. I measure the existing of the synergy by using the return of each vertical merger and acquisition firms. The acquirers pay the premium included in the deal value and wish they get all shareholder rights and benefits from targets to acquirers. If there are the synergies and they can generate more value to the merger and acquisition firms, the investors will receive information, which is good news of the merger and acquisition firm. According to Efficient Markets Hypothesis (EMH), the asset prices fully reflect all available information. If merger and acquisition is a good news, the stock price will be able to capture this information and respond to information by generating the abnormal return to the investors. Thus, I aim to find

the evidences that demonstrate the significant abnormal return on shares price of

the actual merger and acquisition firms.

Hypothesis II

When acquirers make the vertical M&A deal, they expect the decreasing costs

in operating management. The synergy, which they expect, are economics of scale,

bargaining power and the larger size of the firm, etc. The more cost decreasing, the

better operating performance of companies and the more profitability. Thus, I

investigate that the merger and acquisition companies have more potential in

operating performance. Accordingly, I measure the difference of performance of the

companies by using new controllable group.

CHAPTER 2

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2. Literature Review

This section summarizes idea that lead to this paper. I can separate into four parts; generating value of merger and acquisition, destroying value of merger and acquisition, measuring abnormal return and announcement and measuring operating performance.

2.1 Generating value of merger and acquisition

There are many evidences, which show that merger and acquisition can add more value to the firm. Jarrell et al. (1988) state that many capital market event studies find substantial returns to stockholders in target's companies. During 1960s, there are 19 percent gain from merger and acquisition and during 1970s to 1980s, there are more than 30 percent also gain from merger and acquisition. Moreover, they demonstrate that during 1960s and 1970s, return of acquirer firms is small but it still significant. Cording et al., (2008), Graebner (2004) and Zollo and Singh (2004) document that many mergers are tracked to capture integrative benefits i.e. economies of scale by leveraging shared resources, increasing revenue from joint market expansion along with improving competitiveness of the merger and acquisition firms.

2.2   Destroying value of merger and acquisition

There are many evidences which show that merger and acquisition can destroy firm value. Although Jarrell et al. (1988) demonstrates that returns to stockholders in target's companies is significantly positive, they document that return is turn to negative in 1980s.

Jensen (1988) acknowledges that returns to acquirer's shareholders on average are approximately zero in merger and acquisition and declined levels in earlier periods. Moreover, Graham, John R., Michael L. Lemmon, and Jack G. Wolf (2002) states that the market reaction to acquisition announcements is positive but acquiring firm excess values decline after the merger and acquisition event.

2.3   Measuring abnormal return and announcement.

I investigate the abnormal return after merger and acquisition announcement and firms are going to make vertical merger and acquisition deal. Kui Yin Cheung (2009) suggests that the market concerning an upcoming corporate takeover is considered good news only for the shareholders of bidding firms. Although abnormal return which is measured by CAAR is not stable around merger and acquisition announcement, post-merger and acquisition period is still create positive affect to the firm. If merger and acquisition activities are successful and acquiring firms improve the target firms' performance, it is profitable for both the bidding firms and the target firms.

In addition, Mandelker (1974) reports that shareholders of acquired firms earn positive abnormal returns over the seven months before the merger month. If the mergers in his sample are preceded on average by a tender offer or similar announcement, the pre-merger gains could reflect the market reaction to the earlier release of this information. The persistent positive average returns over the seven months suggest that across his sample the time lapse between the earlier announcement and the subsequent merger is distributed randomly over seven months. Accurate estimation of the market response to corporate acquisition that are preceded by a tender offer requires use of an earlier date, i.e. the date of public announcement of the tender offer. Since effective control of a firm can be achieved with less than 100 percent ownership, many corporate acquisition and transfers of control are ignored by evaluating only mergers. Further, an important decision variable for firms attempting corporate takeovers is the probability of the rejection of the offer by the stockholders of the target firm. To consider only those investments which are successfully implemented, the case in the analysts of mergers, ignores many acquisition attempts which fail. To date, the market reaction to unsuccessful attempts at acquisition has never been estimated with US data. Although Ellert (1976) is not concerned primarily with the market reaction to mergers in general, he offers evidence directly comparable to that of Mandelket. Using similar methodology and a much larger sample for an overlapping period. He finds that stockholders of acquiring firms earn significant positive returns over the seven months before the

effective date of merger, results that are inconsistent with Mandelker's findings. The

important thing about the literatures is measuring of abnormal return that measure

either acquirer or target firms.

2.4   Measuring operating performance

Operating performance issue, Ravenscraft and Scherer (1989), arise from the

objectives which are achieve economies of scale and scope in production,

distribution, and financing; to enhance monopoly or monopsony power; to exploit

tax reduction opportunities; to take advantage of 'bargains' on the stock market or in

the private 'company for sale' market; and/or to build managerial empires, for

surveys, see Steiner (1975), Mueller (1980), and Keenan and White (1982). If mergers

lead to these goal of making merger and acquisition, post-merger profits should rise

relative to pre-merger profits.

CHAPTER 3

DATA

3.   Data and Sample Selection

3.1   Samples

For the study, there are four main source of raw data (i.e., SDC platinum, Compustat, CRSP, and WRDS). The main data sets which used in this paper are (i) vertical merger and acquisition deals during 1998-2010. The data set collected from SDC platinum requires only US vertical merger and acquisition deal which both acquirers and targets are US companies. These merger and acquisition are span all industry and cover friendly and hostile deal. Size of M&A deals is more than 100 million dollars to reduce size effect of the firms. (ii) The matching or synthetic firms, their supplier, and the financial data (e.g., asset, sale, revenue, debt and equity) of all firms that I mention above (i.e., the merger and acquisition firms, the synthetic firms, and their suppliers) using to compare with actual merger and acquisition firms. I collect the data set 5 years' window before and after the announcement date of each deal, including the financial crisis period, to verify that every period has the same result.

Compustat is a database of financial, statistical and market information on active and inactive global companies throughout the world. The service began in

1962. This database provides a broad range of information products directed at institutional investors, universities, bankers, advisors, analysts, and asset/portfolio managers in corporate, M&A, private capital, equity, and fixed income markets. The database covers 99,000 global securities, covering 99% of the world's total market capitalization with annual company data history available back to 1950 and quarterly data available back to 1962, depending when that company was added to the database.

Moreover, I collect the return of each firm from the CRSP. In addition, I collect the data set 5 years' window before and after the announcement date. The factors (e.g., tax rate, risk free rate, and market return) that used in this research collected form WRDS.

3.2   Creating Synthetic firms

The two companies that are public firm represent merger and acquisition firms in case of they decide did not make a deal. They are controllable group that I try to create for comparing with the actual M&A firm. They have nearest characteristic of the actual merger and acquisition firms, such as industry, asset size, sale, revenue, equity and debt. Importance is the sum of these companies should equal to combination of fair value of individual part of them.

3.3   Measuring Performance: Market based reaction

Market reaction is strong directional market price movement that its direction of movement depends on news event or relevant economic release. There are three type of market reaction. First is positive movement. The news event or relevant economic released at that time judges a good news and good affect to the country or index. It is positive signal to investors to buy in or get into the market. Stock price become up trend. Secord is negative movement. A news event or issue that happen at that time is interpreted that it is a bad news and negative sign to the country. Therefore, it become upward trend because investors will go out of the market. The last one is uncertain movement. There is no judgment that information that release at that moment is good or bad news. Thus, volatility and shares price move outside the normal range.

3.4   Measuring Performance: Accounting based

3.4.1   Return on equity (ROE)

The amount of net income returned as a percentage of shareholders' equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested.

$$ROE = \frac{net\ income}{shareholder's\ equity} \qquad \text{(A)}$$

3.4.2   Return on asset (ROA)

An indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage. Sometimes this is referred to as return on investment.

$$ROA = \frac{net\ income}{total\ assets} \qquad \text{(B)}$$

3.4.3   Return on invested capital (ROIC)

A calculation used to assess a company's efficiency at allocating the capital under its control to profitable investments. Return on invested capital gives a sense of how well a company is using its money to generate returns. Comparing a company's return on capital (ROIC) with its weighted average cost of capital (WACC) reveals whether invested capital is being used effectively.

$$ROIC = \frac{nopat}{invested\ capital} \qquad \text{(C)}$$

3.4.4   Profit Margin

Profit margin is part of a category of profitability ratios calculated as net income divided by net sales. Net income or net profit may be determined by subtracting all company's expenses, including operating costs, material costs (including raw materials) and tax costs, from its total revenue. Profit margins are

expressed as a percentage and, in effect, measure how much out of every dollar of

sales a company keeps in earnings.

$$profit\ margin = \frac{net\ income}{net\ sales} \tag{D}$$

3.4.5 Debt/Equity Ratio

Debt/Equity Ratio is a debt ratio used to measure a company's financial

leverage, calculated by dividing a company's total liabilities by its stockholders'

equity. The D/E ratio indicates how much debt a company is using to finance its

assets relative to the amount of value represented in shareholders' equity.

$$D/E = \frac{total\ liability}{shareholder's\ equity} \tag{E}$$

3.5 Risk free rate

In theory, risk free rate is minimum rate of return that investors require in any

investment. However, risk free rate, in the real world, is not existed because the

safest security still has probability of default risk i.e. government bond. In this paper, I

use 10 years US government bond represent risk free rate in Carhart model.

CHAPTER 4

METHODOLOGY

4.   Methodology

In this section examine the creation of the synthetic firm which is the new approve to measure the existing of the synergies. Moreover, I demonstrate the measurable and the model that use in this research (i.e., abnormal return and the operating performance of the firms).

4.1   Matching firm – Type 1
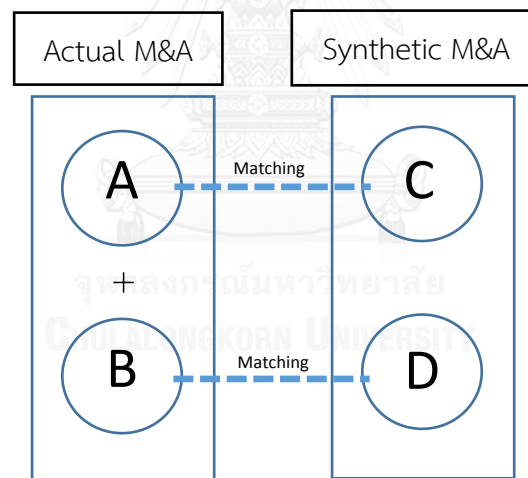
Where   A = acquirer firms

                               B = target firms

                               C = the matching acquirer firms
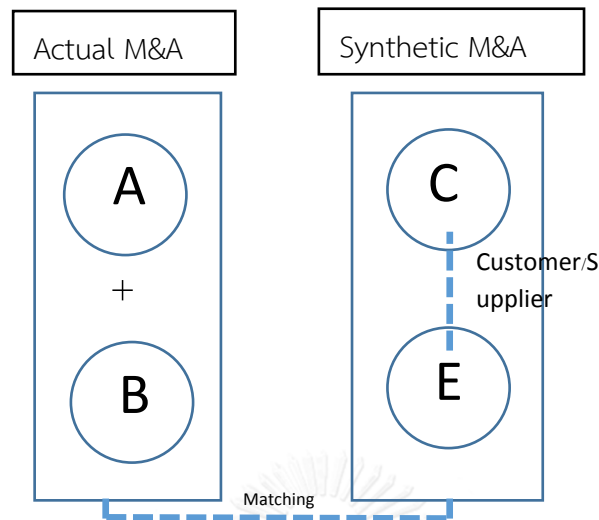
                               D = the matching target firms

To compare actual merger and acquisition firms and synthetic firms, I create synthetic firms by using nearest neighbor matching. I match characteristic of the two public companies with M&A companies. One public company matches with acquirer and another company matches with target. The characteristic is used be industry, asset size, revenue, sales, debt and equity.

In event studies the benchmark group, McDougall and Round (1986), Ravenscraft and Scherer (1987), and Healy et al. (1992), is usually the companies in the market portfolio, in studies like ours that use accounting data, the benchmark firms have been chosen from the same industry as that of the two merging firms.

To verify that the result is useful with all samples. I do a robustness check by changing a matching method. I use the same matched acquirer which is company C but I change the target of synthetic firm which is a major supplier of the simulate acquirer. Then, I repeat all around the methodology.

4.2   Matching firm – Type 2

Where   A = acquirer firms

                               B = target firms

   C = the matching acquirer firms

                               E = the actual supplier or customer of C

4.3   Forming portfolio

        According that forming portfolio, I prepare the data set by arranging the return

5 years of each firm after the merger and acquisition announcement date of each

deal. For the target firm that delisted from the market, I weight the return of the

acquirer equal to 1. When I get the sample set, I form portfolio that weight not only

equal weight but also value weight by long the actual merger and acquisition firms

and short the synthetic merger and acquisition firms. The numbers of the portfolio

are equal to numbers of vertical merger and acquisition deals and there are two

stocks in one portfolio.

Announcement date

Each graph represent the monthly return of each stock following the announcement date
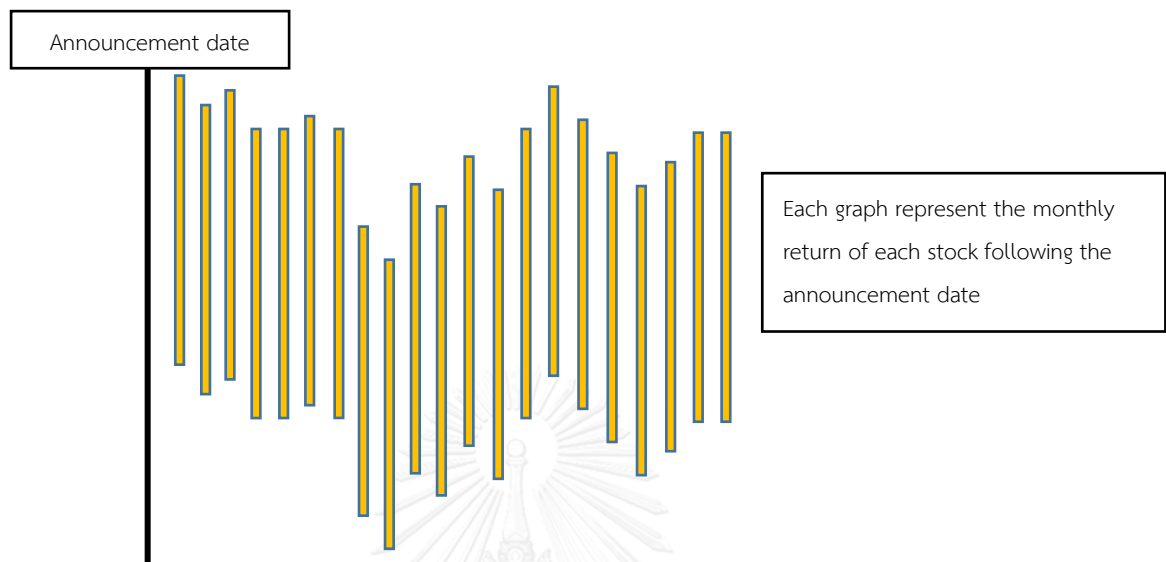
4.4   Zero investment strategy

To measure the abnormal return, I make zero investment strategy by long the

actual merger and acquisition firms and short selling the synthetic firms. Based on

zero investment strategy, investors do not use their own money for investing. They

will short the synthetic firms, the replicate merger and acquisition firms, and use

money that they get to long actual merger and acquisition firm. Therefore, if

investors do this strategy and can generate the return, it means that the actual

merger and acquisition can generate more benefit than the synthetic firm. Formerly, I

expect to get the return from the zero-investment strategy.

4.5   Fama-MacBeth approach

$$R_{1,t} = \alpha_{i,t} + \beta_{1,t}(R_M - R_F) + \beta_{2,t} * SMB_t + \beta_{3,t} * HML_t + \beta_{4,t} * MOM_t + \varepsilon_{i,t}$$
$$R_{2,t} = \alpha_{i,t} + \beta_{1,t}(R_M - R_F) + \beta_{2,t} * SMB_t + \beta_{3,t} * HML_t + \beta_{4,t} * MOM_t + \varepsilon_{i,t}$$
$$\vdots$$
$$R_{n,t} = \alpha_{i,t} + \beta_{1,t}(R_M - R_F) + \beta_{2,t} * SMB_t + \beta_{3,t} * HML_t + \beta_{4,t} * MOM_t + \varepsilon_{i,t}$$

Where $R_{i,t}$ is the return of each zero investment portfolio

$R_{f,t}$ is risk-free rates at time t

SMB_t is firm size factors at time t

HML_t is book-to-market ratio factors at time

MOM_t is momentum factor at time t

$\propto_{i,t}$ is alpha at time t

n is equal to portfolio of zero investment strategy

The Fama-MacBeth is a practical way of testing how these factors describe

portfolio or asset returns. To calculate the alphas which represent abnormal return, I

use the exposure factors of Carhart (1997) model (i.e., SMB, HML, and MOM) to

supplement control factors to eliminate factors that affect the alphas. The Fama-

Macbeth regression captures the abnormal return of each portfolio. Noted that one

portfolio represents the profit or loss from doing the zero-investment strategy, long

one the actual vertical merger and acquisition firm and short-selling one the

synthetic firm, per monthly return. The control factors are size effect, book-to-market ratio and momentum effect.

However, I run regression of monthly return of the portfolio on size effect, book-to-market ratio and momentum effect factors on one by one portfolio. Moreover, I run each coefficient that have 60 coefficients per one portfolio by using the GRS test. Then, I test whether the coefficient or the alpha is significantly greater than zero or not. Positive alpha can be implied that return of the portfolio arises from using the zero-investment strategy can generate significant abnormal return when controlled for firm size, book-to-market ratio and momentum effect.

First, I try to calculate control factors. First is size effect. I measure by from portfolio in two group, small and big, based on market capitalization of the firms and then taking average return of small firm subtract by average return of big firms.

Second is book to market ratio. I also from portfolio in two groups, big and small, but this time based on book to market ratio. When I get two portfolios, I subtract average return of high book to market ratio from average return of low book to market ratio.

The last one is momentum effect. I from portfolio in two group that is stocks that have high return and low return in the past. Then, taking average return of past-high-return stock subtract by average return of past-low-return stock.

4.6   GRS statistic test

$$GRS \ test = T[1 + \left(\frac{E_T(f)}{\hat{\sigma}(f)}\right)^2]^{-1}\widehat{\alpha}'\widehat{\Sigma}^{-1}\widehat{\alpha}' \sim \chi^2{}_N$$

Where ˆ α is the vector of assets' alphas, and

           Σ is a sample estimate of the residual covariance matrix E[²t² 0 t]

       The GRS statistic is the Gibbons et al. (1989) statistic that tests whether the

estimated intercepts from regression model, in this paper implied to the Fama-

Macbeth regression, are significantly different from zero at 95% significant level. The

typical scenario involves a multivariate linear panel regression where you are

explaining the returns to securities in terms of its exposures to factor return series.

Theoretically, a good factor model will have an intercept statistically

indistinguishable from zero.

4.7   Difference in differences method ("DD")

       I use this method to measure operating performance of the firm. The data of

this method is panel data that is not only be cross sectional, treatment group and

controllable group, and be time series, pre-and post-merger and acquisition. I

identified return and ratios of synthetic firms by using average return of two

companies that replicate the actual M&A firms. I choose financial ratio to measure

operating performance of the firms. The financial ratios that I choose are return on

equity, return on asset, return on investment capital, and profit margin. I run

regression to find the different between two groups of companies on both cross

sectional and time series. The cross sectional is treatment group or the actual merger

and acquisition comparing to controllable group at the same point of time. The time

series is different of company itself in different time, pre-and post-merger and

acquisition. I take care the endogeneity problem by adding two-fixed effect into the

model. The two-fixed effect are $\delta_t \ (fixed\ time)$ which help to capture the

time that I cannot observe and $\eta_g \ (firm\ fixed\ effects)$ which also help

to capture others companies effecting to operating performance-ratio. Moreover,

there are control variables that I put them into the model are leverage and market

to book ratio because I want to control debt and equity of the firms that

automatically increase after making merger and acquisition.

$$Financial\ Ratio_i = \delta_t + \eta_g + \beta_1(merge * post) + \beta_2 * merge + \beta_3 * post$$
$$+\beta_4 * leverage + \beta_5 * \frac{MV}{BV} + u_i$$

Where $\delta_t \quad = fixed\ time$
         $\eta_g \quad = firm\ fixed\ effects$

This table shows the idea behind Different in Different Model.

		Pre-M&A period	Post-M&A period	Difference
		Post=0	Post=1	
Merge=1	M&A Firms (treatment group)	$\beta_0 + \beta_2$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$	$\beta_0 + \beta_3$
Merge=0	Synthetic Firms (control group)	β_0	$\beta_0 + \beta_3$	β_3
	Difference	β_2	$\beta_1 + \beta_2$	β_1

I test whether if the different is significantly greater than zero, I can conclude that vertical merger and acquisition makes operating performance of the actual M&A firms be better than the synthetic firms. If not, I can imply that the merger and acquisition do not improve the performance of the actual vertical merger and acquisition firms. However, the performance of the actual vertical merger and acquisition which do not improve after making merger and acquisition deal does not mean that synergies of merger and acquisition are not exist, it can be implied that the synergies of merger and acquisition are only not occur during the study period.

CHAPTER 5

EMPIRICAL RESULT

5. Empirical Result

In this section, there are two parts that display hypothesis testing and the analysis of results of the study. Before analyzing the results of the study, I set the assumptions that the vertical merger and acquisition firms can generate the synergies and show the existing of their own through the abnormal return. Additionally, the vertical merger and acquisition can improve the operating performance of the firms.

5.1 Descriptive statistics

Table **1:** Basic statistics of observations

	Panel A: Financial Ratio			
	Count	Mean	Median	Std. dev.
Return on equity	4,015	0.055	0.092	0.401
Return on asset	4,015	-0.030	0.043	0.412
Return on investment capital	4,015	0.114	0.072	0.217
Profit margin	4,015	-0.084	0.059	0.532
Leverage	4,015	0.169	0.139	0.453
Market to book value	4,015	0.243	0.587	0.102

	Panel B: Return value and equal weight			
	Count	Mean	Median	Std. dev.
Value-weighted of vertical merger and acquisition firms	1980	-0.006	0.006	0.579
Equal-weighted of vertical merger and acquisition firms	1980	0.008	0.007	0.167
Value-weighted of synthetic firms – type 1	1980	0.011	0.008	0.127
Equal-weighted of synthetic firms – type 1	1980	0.014	0.009	0.132
Value-weighted of synthetic firms – type 2	1980	0.008	0.002	0.138
Equal-weighted of synthetic firms – type 2	1980	0.008	0	0.139

The table above report the statistic of observations. In panel A, they show the ratio which measure the performance in operate of the firms. There are 4,015 observations that are operate in the United State of America and only be public companies. The companies that are calculated the ratios are the vertical merger and acquisition firm, synthetic firms, and their supplier. The ratios are demonstrate using to be variables in the model that uses in the research that shows the detail in the next section. In panel B, they show the return of the vertical merger and acquisition and their synthetic firms five years after making merger and acquisition.

According to the table 1, it shows the statistic of ratio which use in the Different in Different model for measuring the performance of the firms. The mean of ROE, ROA, ROIC, Profit Margin, D/E ratio, and Market to Book value are equal to 0.055, -0.030, 0.114, -0.084, 0.169, 0.243, respectively. Moreover, it also demonstrates the return five years after making merger and acquisition both vertical merger and acquisition firms and two type of the synthetic firms, including their suppliers. There are two type of synthetic firms; the matching of both acquirers and targets and the matching of only acquirers and use their supplier to be targets. The mean of return of value-weighted of vertical merger and acquisition firms, equal-weighted of vertical merger and acquisition firms, value-weighted of synthetic firms – type 1, equal-weighted of synthetic firms – type 1, value-weighted of synthetic firms – type 2, and equal-weighted of synthetic firms – type 2 are equal to -0.6%, 0.8%, 1.1%, 1.4%, 0.8%, and 0.8%, respectively.

5.1   Synthetic Firm

According to the new approach, I create the synthetic firms by matching each firm following the criteria (i.e., industry, asset size, sale, debt, and equity) which the comparable have to be the same or nearest the vertical merger and acquisition firm.

However, there are two sets of the matching firm for use to measure the existing of the synergies and be a robustness check.

- The pair of synthetic firms' match with acquirer and target to represent the actual vertical merger and acquisition firms

- The synthetic firms only match with acquirer and use their own supplier or customer to represent the target

5.2   Market based reaction

Along with Markets Hypothesis (EMH), the asset prices fully reflect all available information. If merger and acquisition is a good news, the stock price will be able to capture this information and respond to information by generating the abnormal return to the investors and vice versa. Then, I from the portfolio by using the zero-investment strategy by using the monthly return of each stock in five years after the merger and acquisition announcement date. Noted that there are two type of the set of synthetic firms that are used in this study.

According to hypothesis 1, the result used the Fama-Macbeth and GRS statistic test determine the negative significant abnormal return on shares price of

the actual vertical merger and acquisition firms during the study period not only in value-weighted portfolio but also in equal-weighted. The result of this study is consistent with Jensen (1986) which examines the agency theory talking about the principle-agent conflicts between shareholders who seek to the maximum their wealth and the managers of the firm who seek for a larger firm, a less-risky firm or the maximum their own wealth. The agency theory can use to explain the negative abnormal return because some firms have a fundamental determinant of executive compensation by using the firm's size to be a measurable of performance of their managers, Baker, Jensen and Murphy (1998); Jensen and Murphy (1990). Thus, managers have strong incentive to decide to make merger and acquisition deal to increase the firm's size; even it decreases the shareholder wealth.

Additionally, the result of the robustness check is consistent with the evidence of Fuller et al. (2002) which indicate that the abnormal returns of the firms acquiring private firm or subsidiaries are get higher return than firms acquiring public firms. Moreover, most of these studies demonstrate that the acquirers suffer with the negative abnormal return, but there are none of these studies can explain under what conditions the acquirers are expected to have negative returns.

Table 2: GRS statistic test of alpha of zero investment strategy portfolio – type 1 of set of synthetic firm

|	ABCD	
	Value-weighted	Equal-weighted
GRS-test	29.929	10.204
p-value	0.000	0.002

The table above shows the value of GRS statistic test and its p-value. However, it cannot be implied that the result which examined in the table be negative or positive.

Table 3: Statistic of the alpha of value-weighted portfolios – the matching type 1

	ABCD			
	N	Mean	Median	Std.dev.
ABCD – Value weighted	33	-0.003	-0.001	0.008

The table above show the statistic of alpha of value weighted portfolio that get from the Fama-Macbeth first step regression and use set of synthetic firm matched of both acquirers and target. The number of observation in this table is amount of the portfolios.

Figure 1: The distribution of the alpha of value-weighted portfolios – the matching type 1
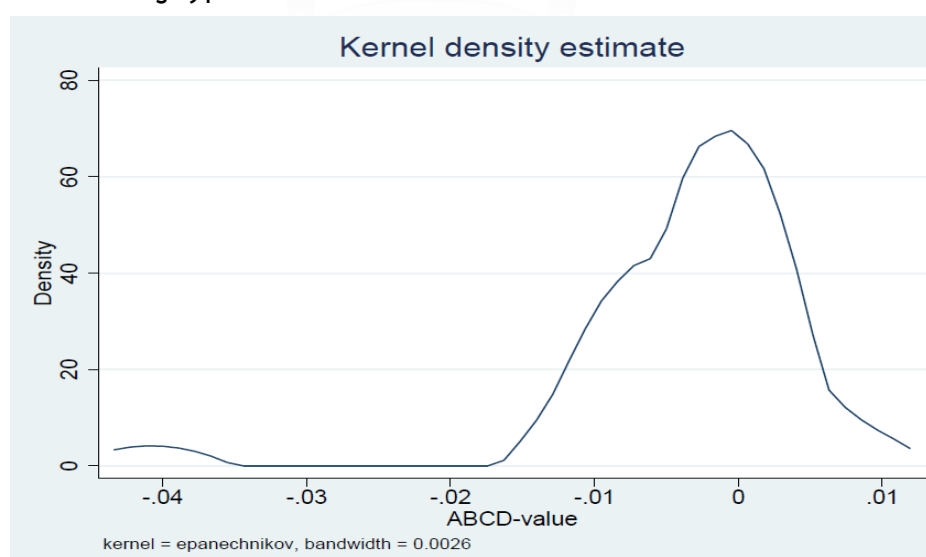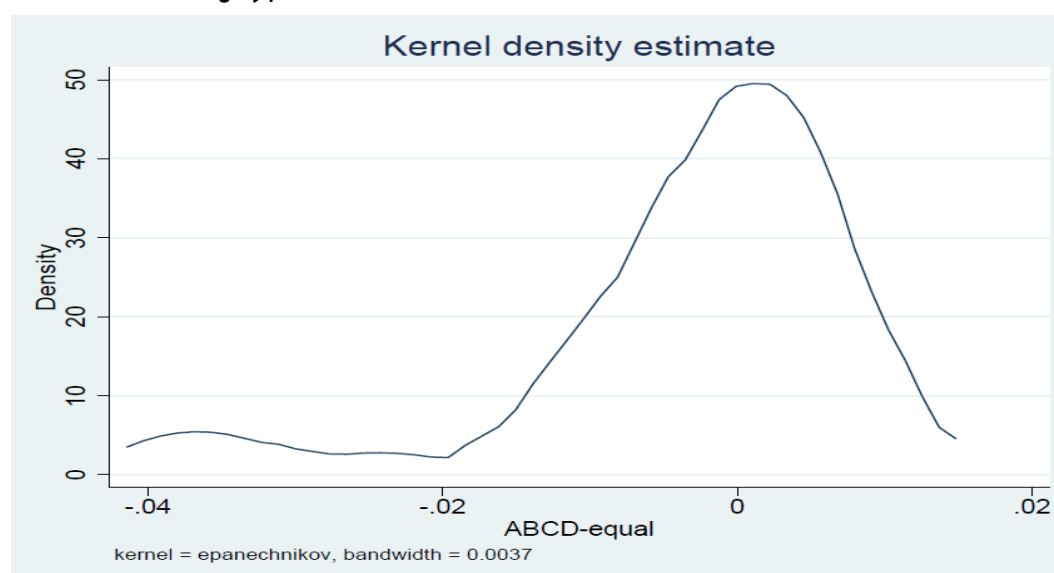

The figure above illustrates the distribution of the zero-investment strategy portfolio by using value-weighted portfolio. The matching used in this distribution is match both acquirer and target firms.

Table 4: Statistic of the alpha of equal-weighted portfolios – the matching type 1

	ABCD			
	N	Mean	Median	Std.dev.
ABCD – Equal weighted	33	-0.003	-0.000	0.011

The table above show the statistic of alpha of equal weighted portfolio that get from the Fama-Macbeth first step regression and use set of synthetic firm matched both of acquirers and of target. The number of observation in this table is amount of the portfolios.

Figure 2: The distribution of the alpha of equal-weighted portfolios – the matching type 1

The figure above illustrates the distribution of the zero-investment strategy portfolio by using equal-weighted portfolio. The matching used in this distribution is match both acquirer and target firms.

According to the table and the figures, they demonstrate the negative significant abnormal return on shares price of the actual vertical merger and acquisition firms during the study period not only in value-weighted portfolio but also in equal-weighted. However, I do the robustness check by changing the type of matching from type 1 to type 2.

## Table 5: GRS statistic test of alpha of zero investment strategy portfolio – type 2 of set of synthetic firm

	ABCD	
	Value-weighted	Equal-weighted
GRS-test	15.763	11.924
p-value	0.000	0.000

The table above shows the value of GRS statistic test and its p-value. However, it cannot be implied that the result which examined in the table be negative or positive.

Table 6: Statistic of the alpha of value-weighted portfolios – the matching type 2

	ABCE			
	N	Mean	Median	Std.dev.
ABCE – Value weighted	33	-0.002	0.000	0.008

Figure 3: The distribution of the alpha of value-weighted portfolios – the matching type 2
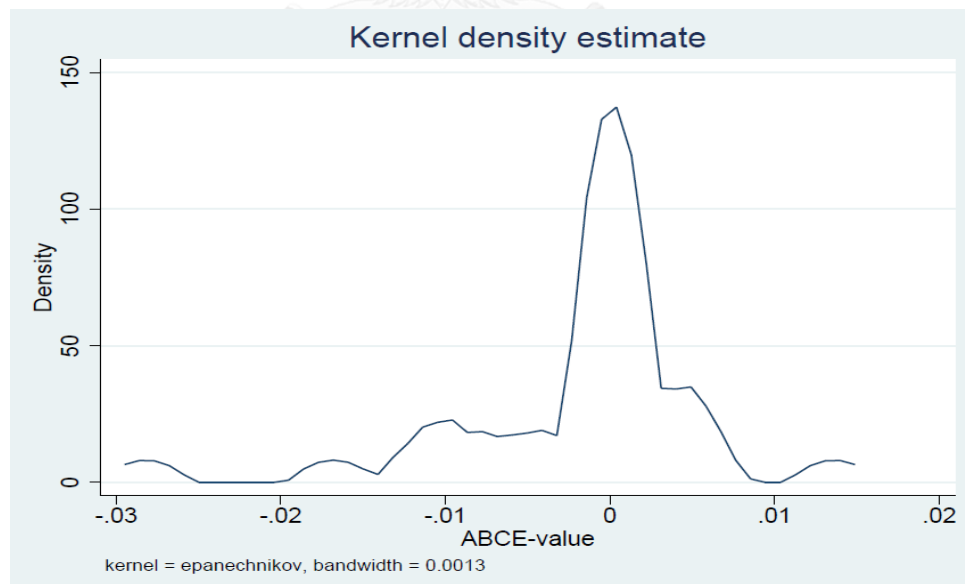
kernel = epanechnikov, bandwidth = 0.0013

The figure above illustrates the distribution of the zero-investment strategy portfolio by using value-weighted portfolio. The matching used in this distribution is match only acquirer and use their supplier to be the target firms.

Table 7: Statistic of the alpha of equal-weighted portfolios – the matching type 2

	ABCE			
	N	Mean	Median	Std.dev.
ABCE – Value weighted	33	-0.002	0.001	0.011

Figure 4: The distribution of the alpha of equal-weight portfolios – the matching
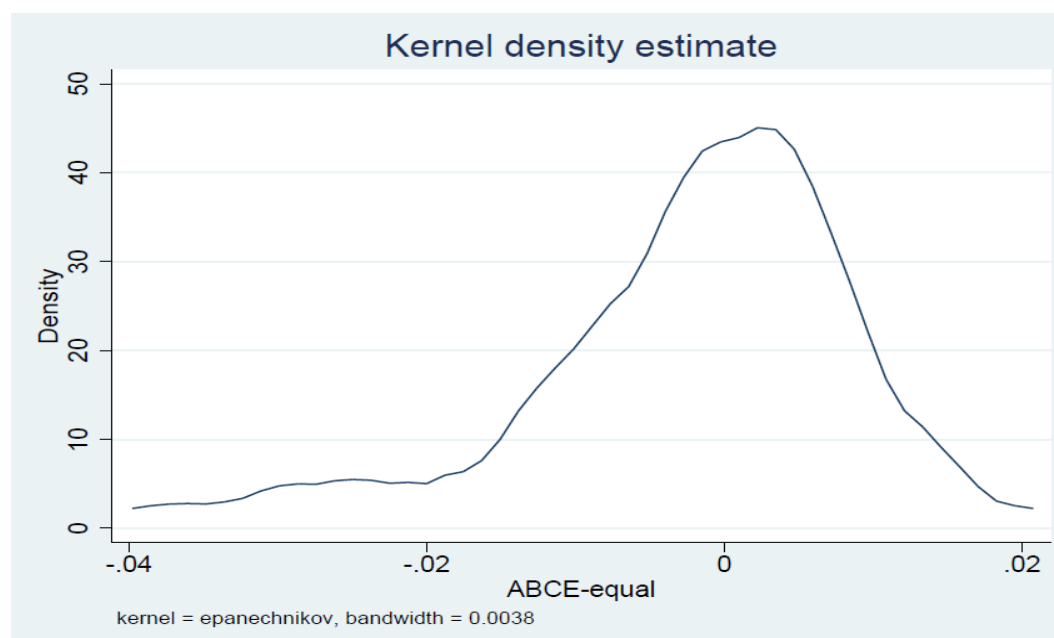
type 2

The figure above illustrates the distribution of the zero-investment strategy portfolio by using equal-weighted portfolio. The matching used in this distribution is match only acquirer and use their supplier to be the target firms.

Also, the result for the robustness check in the table 4 and 5 and the distribution in figure 3 and 4 show the negative significant abnormal return on shares price of the actual vertical merger and acquisition firms during the study period not only in value-weighted portfolio but also in equal-weighted.

5.3   Accounting based

Normally, the goals of the merger and acquisition on term of operating are economies of scale or economies of scope. The acquirers often expect that after making merger and acquisition the firm can improve the operating performance and reduce the cost of the firms. Improvement of operating performance is the main point of this research. Moreover, there are more benefits that are the expectation of the acquirers after making merger and acquisition (e.g., bargaining power, market share, and the bigger size of the firm). The expectations of acquirers occurred because the deal value that the acquirers pay include the premium represented all rights and benefits of shareholding of target firm that transfer to the acquirers after making the deal.

According to hypothesis 2, I demonstrate the operating performance of the actual vertical merger and acquisition firms that compare with before and after making merger and acquisition. Additionally, in this study I add the controllable group for indicating and comparing whether the actual vertical merger and acquisition firms were not make the merger and acquisition. I use the financial data in yearly during 1993-2014 to be a measurable. The results are used the Difference in Differences to indicated the operating performance. The result of the study shows that the performance of the actual vertical merger and acquisition firms are significantly negative on return on invested capital during after making merger and acquisition deal. The results demonstrate not only for the matching firm type 1 but also for the

matching type 2 that is the robustness check. The results of this study are consistent with Ravenscraft and Scherer (1998) which is widely known finds the evidence and examines that acquirer and target's profitability decline in profitability after making merger and acquisition deals. One of the causes that makes the performance of the firms do not improve may the differences of the culture, nature, employees of each merging firms. Moreover, it is also agency theory. The managers of the firm enter to the merger and acquisition deal for maximum personal utility rather than shareholder value. There is some case that the project earns negative net present value ("NPV") but the manager of the firm decides to make the deal.
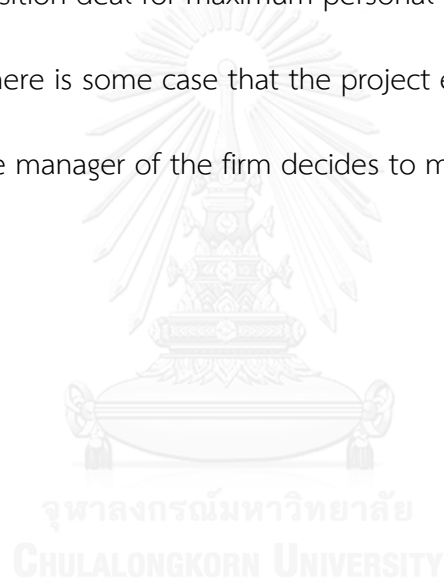
Table 6: The performance of the firms – type 1 of set of synthetic firm

VARIABLES	ABCD			
	ROE	ROA	ROIC	Profit margin
mpost	0.477	0.099	-0.062***	-0.039
	(0.732)	(0.243)	(0.0108)	(0.046)
leverage	-0.048	-0.036	-0.003**	0.003
	(0.084)	(0.027)	(0.001)	(0.006)
MV/BV	0.000	0.000	0.000*	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
ln(asset)	0.128	0.103	0.019***	0.114***
	(0.194)	(0.065)	(0.003)	(0.012)
Observations	1,606	1,606	1,606	1,606
R-squared	0.074	0.084	0.836	0.239
Adj R-squared	0.0202	0.031	0.826	0.195

This table examine the operating performance in two dimension; between before and after merger and acquisition, and between the treatment group and controllable group. Noted that the treatment group is the actual vertical merger and acquisition firms and the controllable group is the synthetic firm. Merge is referred to the actual vertical merger and acquisition firm. Post is referred to the year after the firm making merger and acquisition. Mpost is refer to the actual vertical merger and acquisition after the year that make merger and acquisition deal following the announcement date in each deal. In this table uses type 1 of set of synthetic firm. Standard error is reported in parentheses. *Statistical significance at the 10% level. ** Statistical significance at the 5% level. *** Statistical significance at the 1% level.

To be confirm the result of the performance of actual vertical merger and acquisition firms, I use another type of the set of synthetic firm; matching only the acquirer and use supplier or customer of the result of matching to represent the target.

Table 7: The performance of the firms – type 2 of set of synthetic firm

	ABCE			
VARIABLES	ROE	ROA	ROIC	Profit margin
mpost	0.081	-0.051	-0.082***	-0.033
	(0.022)	(0.057)	(0.011)	(0.041)
leverage	0.018	0.000	-0.004***	0.006
	(0.022)	(0.000)	(0.001)	(0.0058)
MV/BV	-0.000	0.000**	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ln(asset)	0.609	-0.729***	0.023***	0.084***
	(4.692)	(0.120)	(0.002)	(0.008)
Observations	1,606	1,606	1,606	1,606
R-squared	0.111	0.127	0.830	0.260
Adj R-squared	0.062	0.079	0.821	0.219

This table examine the operating performance in two dimension; between before and after merger and acquisition, and between the treatment group and controllable group. Noted that the treatment group is the actual vertical merger and acquisition firms and the controllable group is the synthetic firm. Merge is referred to the actual vertical merger and acquisition firm. Post is referred to the year after the firm making merger and acquisition. Mpost is refer to the actual vertical merger and acquisition after the year that make merger and acquisition deal following the announcement date in each deal. In this table uses type 2 of set of synthetic firm. Standard error is reported in parentheses. *Statistical significance at the 10% level. ** Statistical significance at the 5% level. *** Statistical significance at the 1% level.

Additionally, the result both market based reaction and accounting based also consistent with "Winner's curse theory" Thaler (1991) which state that it is well-known that under information asymmetry, the almost common-value auction mechanism inherently exhibits a serious welfare problem known as the winner's curse, stating that the winner of the auction always overbids (i.e., pays a price higher than the rational value of the firm) which can create huge debt.

CHAPTER 6

CONCLUSION

This study investigates the existing of synergies that believed that they occur after making merger and acquisition. In generally, the goal of making merger and acquisition deals is the economies of scale or economies of scope in the vertical merger and acquisition deals. Thus, I examine the existing of the synergies though the market based reaction and accounting based whether the actual merger and acquisition firms can generate abnormal return and can improve the performance of its own after making merger and acquisition. Thus, I use two model to measure the hypothesis (i.e., Fama-Macbeth, GRS statistic test, and Different and Different).

According to the model in this study, they indicate that the actual vertical merger and acquisition firms do not generate more value to the firm during the period of study. They are not only illustrated in abnormal return but also in the performance. There are two main cause of the negative sign are agency theory and winner's curse. Agency theory is the conflict between shareholder and their managers. Shareholders need to maximize the firm value of shareholder wealth while the managers need to maximize personal utility. The size of the firm is the fundamental determinant of executive compensation. Thus, managers decide to increase firm's size by making merger and acquisition deal, even it will destroy value of the firm. They do not consider the differences of two firms that should not merge.

Then, it leads to uncooperative working between the employees of each companies.

Winner's curse is the winning biding in an auction to go above the intrinsic value of

the item purchased. Because of incomplete information, emotions or any other

number of factors regarding the item being auctioned, bidders can have a difficult

time determining the item's intrinsic value. As a result, the largest overestimation of

an item's value ends up winning the auction.

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APPENDIX

VITA

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