Analysis of Post-Merger Integration of Automobile Firms

By Ziyue Gao

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Written for MFIN 6692.0 under the direction of

Dr. J. Colin Dodds

Approved: Dr.J.Colin Dodds

Faculty Advisor

Approved: Dr. Francis Boabang

MFIN Director

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Abstract

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This paper's objective is to determine whether merger announcements of world automobile companies would influence the stock price of acquired companies and whether the market reaction to merger announcements is good or bad. 24 acquired companies from the OTC market and 10 acquired companies come from the NYSE market are randomly chosen for this study. The time period is chosen from 1998 to 2012. The DJ (USA) index is used as market return in this paper.

The Market Return Model, the Average Abnormal Return Model and the Capital Asset Pricing Model (CAPM) will be used in this paper. In summary, this study is going to prove whether the merged world automobile firms would gain or loss after merger announcement.

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Chapter1

Introduction

1.1 Merger

From online dictionary.com (2013), a merger has been defined as: "Any combination of two or more business enterprises into a single enterprise".

More specifically, acquiring corporations should purchase the total firm value of its target corporations which includes both debt and equity. After merger, the acquiring corporations will control the power of the combined firms. From © 2013 Answers Corporation, a merger needs a majority vote of shareholders. A merger is also a way for pursuing realized gain, since the two firms, one is acquiring firm and the other is its target firm, merge together will worth more than the total value when they are separated.

Mergers carry with the risk which may cause problems in the future. Deutsch and West (2010, June) argued that mergers often occur at a rapid volume during the downturn of economy, especially a financial crisis. Because stock prices of some firms are low and the competitors may be in trouble, it is a favorable time for many powerful firms to take over other firms in a horizontal concentration. However, economic uncertainty has caused the boards of such companies to worry about their company's ability to implement and manage the merger successfully.

Gallant (2009) indicated that the acquiring company can use several methods to

purchase the assets of target companies. For example, cash for some or of all the equity and a share exchange. For example, the acquiring company should use X numbers of its shares to exchange one share owned by the target company's shareholders.

Mergers are different from straight investment decisions. As © 2013 Answers Corporation confirms, there are difficulties in measuring pre and post-merger value, the accounting, tax, and legal aspects are complex and there are issues of corporate control, governance and management.

According to the © 2013 Answers Corporation and © 2010 Investopedia.com, there are three strategies to describe the merger process.

The first one is a horizontal merger, which occurs between two firms in the same industry. Horizontal mergers usually occur in industries with fewer firms, since the competitive power of such firms is really high and the synergy effects can cause 1+1>2 results.

The second one is a vertical merger, which occurs between two or more firms, operating at different levels within an industry's supply chain. A vertical merger usually happens through the integration of enterprises. For example, an agricultural machinery manufacturer may purchase a retail machinery store.

The third one is a conglomerate merger, which occurs when two firms are involved in unrelated business activities. There are two types of conglomerate mergers: pure and mixed. Pure conglomerate mergers involve firms with anything different, while mixed conglomerate mergers involve firms with the purpose of product extensions or market extensions.

For the post-merger integration process, Lassere (2003) argued that the quality of post-merger processes such as integration framework, transition management and consolidation, are major sources of success or failure for cross-border mergers.

1.2 Stock exchange market

1.2.1 Over-The-Counter Market (OTC)

As © 2013 Investopedia US ("OTC") introduces, the OTC market is one of the oldest stock exchange in the world, which is derived from the 'original' bank engaged in the business of buying and selling shares. Because the trading stock activity is at the counter of the bank, it is called over-the-counter markets. An OTC market and an exchange market are the foundations of organized financial markets. In an OTC market, dealers do the trading work. A trade can be carried out between two people in an OTC market without the disturbance and attention of others. So an OTC market has less regulation and communication is not transparent.

The majority trading activities of OTC markets include bonds, currencies, derivatives

and structured products. For equity, they include the OTCQX, OTCQB and OTC Pink

marketplaces in the U.S. The Financial Industry Regulatory Authority (FINRA)

regulates the U.S. OTC markets. The stocks of OTC market in this paper all come

from US OTC markets and the market index is the Dow Jones index (DJ).

1.2.2 New York Stock Exchange (NYSE)

As © 2013 Investopedia US ("NYSE") confirms, the NYSE is based on total market

capital of its listed securities and it is deemed to the world's biggest stock exchange.

Originally it was as a private organization, but it became a public entity in 2005 after

acquiring electronic trading exchange Archipelago. After the merger with the

European exchange in 2007, the New York Stock Exchange's parent company has

been known as NYSE Euronext.

Also known as the "Big Board", the NYSE has evolved from floor trading, which uses

only the public bidding system, to electronic trading. Nowadays, more than half of

NYSE's trading is conducted electronically.

1.3 Automobile companies

1.3.1 Overview

Accounting to Haugh et al (2010), the automobile industry's size is relatively small to

overall activity, but it has a strong link and impact with the broader economy. The

industry is intertwined with business cycles and has suffered from constrained credit

in the crisis. The automobile industry has also benefited from government support,

including Gm. and Chrysler. Even though the medium-term sales trends of automobile are likely to be divergent across regions, the sales are set to rebound in many countries like North America, Japan and the United Kingdom.

Haughet et al (2010) also discussed the importance of industry variations across countries of OECD economies on the basis of value added and employment. For example, automobile exports obtain about 15% of total exports in Japan, the Slovak Republic, Hungary, Canada and Spain.

1.3.2 Merger in the Automobile Industry

In the past two decades, automobile companies has been eager to enter new markets, get new automobile technology, expand influence and brand effect, and avoid economy risks by mergers. Mergers can lead to gain from complementary resources, garnering tax advantages, eliminating efficiencies, obtaining propriety rights, increasing market power, shoring up some weakness areas, entering new emerging market and providing managers with more rights and opportunities to emerge their business ("c 2013 Answers Corporation").

1.4 Organization of Study

In Chapter 2, we will discuss the efficient market hypothesis (EMH) and introduce some events of mergers of automobile companies. In addition, financial structure of automobile companies will be recommended. Chapter 3 covers the methodology used

in the study— Market Return Model, the Average Abnormal Return Model and the

Capital Asset Pricing Model (CAPM) will be introduced in detail. Chapter 4 provides

an analysis of the test results. Chapter 5 is by way of a conclusion and discusses

limitations of the study and recommendations for future research.

Chapter 2

Literature Review

2.1 Efficient Market Hypothesis (EMH)

The EMH in its various forms, argues that present share prices are influenced by all

the relevant information, so it is impossible for investors to "beat the market". The

theories of EMH means that investors could neither purchase stocks which are

underprices nor sell stocks for overvalued prices for the reason of "stocks always

trade at their fair value on stock exchanges" (c 2013 Investopedia US). As a result, the

only way for an investor to gain higher returns is to purchase risker stocks, since

investors cannot obtain higher return than average through expert stock selection or

market timing.

Even though it is a cornerstone of modern financial theory, EMH is a controversial

topic. Supporters argue that fundamental or technical analyses are not warranted. The

empirical literature is split. On the one hand, the "Quantum fund" always makes

abnormal returns in the stock market, which is certainly not evidence of EMH.

Additionally, the Dow Jones Industrial Average (DJIA) fell more than 20% in one

period when occurring to a credit squeeze. This example is suggestive that stock

prices can trade at a great difference from their fair values.

From the supporters of the EMH, they improve and develop the EMH theory and they

also publish evidence to prove the hypothesis. For Fama (1970), an early supporter

showing that when information occurs in a stock market, the news will rapidly spread and the price of securities will be reflected without delay. "In an efficient capital market, prices fully reflect available information" (Fama, 1970). He came up with three forms for market efficiency: weak, semi-strong and strong.

© 2013 Investopedia US ("Securities Markets") clearly explain three forms:

The weak form of EMH argues that stock prices are being fully reflected by market information at once. If the market remains in the weak form, no one could predict the future stock prices based on past stock information, therefore the work of stock analysts have no value. What's more, investors will receive the same return whether they use investment strategies which rely on historical market databases. Future prices must follow a random walk. The random walk means that stock price patterns are in the same trend and independent of each other, so the historical stock price trend cannot be used to predict its future data. In sum, stock prices are only dominated by information related in the market.

The ways to test the weak form of the EMH include autocorrelation tests which mean that returns are not always significantly correlated and the runs tests which mean that stock price changes are independent.

The semi-strong form of EMH reckons that stock prices are affected by public

information in an unbiased fashion. If the market remains in the semi-strong form, nobody could predict future stock price or find undervalued stocks by analyzing public information, therefore fundamentalist and technical analysts are not worthy of their jobs. In addition, investors will receive the same return whether they use investment strategies which rely on public information. However, the work of the fundamentalists is helpful to market efficiency by eliminating the opportunities to produce consistent excess return.

The tests of the semi-strong form of the EMH are event tests and regression/time series tests. An event test analyzes the stocks both before and after an event to establish whether will achieve an abnormal return.

The strong-form of EMH argues that the stock prices are reflected of both public and private information. If the market remains in the strong form, no investors could predict future stock prices even when insider information is given. What's more, investors will receive same return whether they use investment strategies which rely on all information.

The tests for the strong-form center are divided in groups of investors: insiders, exchange specialists, analysts and institutional money managers. Insiders such as senior managers have access to inside information and have been forbidden to use such information to gain. Exchange specialists can also obtain more than average

returns if they use the specific order information. For equity analysts, tests have been

performed to assess whether an analyst's opinion can help an investor achieve above

average returns. Much of the empirical evidence suggests that institutional money

managers do not beat the market on a consistent basis.

Khan (1986) had proved semi-strong efficiency through grain futures markets. Firth

(1976, 1979, and 1980) in the UK analyzed the share prices before and after a merger

announcement. He found that the UK stock market was semi-strong-form efficient,

since the share prices fully and immediately return to their "correct" levels.

However, as Vivian (2007) has mentioned 'the market's ability to efficiently respond
to a short term, widely publicized event such as a takeover announcement does not
necessarily prove market efficiency related to other more long term, amorphous
factors.'

Fama (1993) realized the problems in the EMH, which included the joint-hypothesis.

So he modified his earlier work to address these problems. He used return

predictability, events studies and private information to test, which make the study

clearer and easier to distinguish. The stock prices adjusted with firm-specific

information such as investment decisions, dividend changes and changes in capital

structure.

Malkiel (2003) argued that the efficient market hypothesis had lost the authority it

once had. However, the emergence of behavioral finance is reviving an interest in the

ability to predict stock price.

2.2 Events and study on merger of automobile

Some well-known mergers in the automobile sector include the Daimler-Benz merger with Chrysler (1998), Renault SA and Nissan Motor (1999), Volvo AB and Mitsubishi Motor (1999), Daimler Chrysler with Hyundai Motor (2000). Aktas et al. (2003) has argued that the purpose of such mergers is to produce vehicles with better equipment, lower sale price and more standardized management. Thus, a higher focus of the automobile market can be created by mergers. Aktas et al. (2003) studies the effects of the merger on business combinations. By using 443 business combinations samples, they conclude that the wealth creation is positive and statistically significant.

However, not all mergers mean a success. An example of merger failure is the 1998, Daimler-Benz AG merge with the Chrysler Corp. for $39 billion. This was the largest transnational merger at the time. Daimler took a 57% share while Chrysler had 43%. Daimler Chrysler then became the second largest car manufacturer and the world's fifth largest car company. The corporate company' goal was to realize cost savings of $1.4 billion in the first year after the merger and $3 billion over the next few years. The problem was that this company could not benefit from fast cost reductions via layoffs and factory elimination. This was due to the fact that their businesses are so different from each other and they rarely compete. The reason for merging was to deal with the global financial crisis and to have a low cost expansion. (Anonymous, 1998 May 11)

However, after six months, the revenue of the merged company rose while profits remained the same (Sterz & Vlasic, 2000). More seriously, DaimlerChrysler stock price dropped $13 per share in only two days and $10 billion evaporated (Sterz & Vlasic, 2000). Chrysler continued to have many problems and the losses were almost the equivalent of DaimlerChrysler net profit in 2000 (Carpiaux, 2002). As the situation continued and shareholders considered Chrysler as an "affliction," Daimler finally sold Chrysler for $650 million to Cerberus Capital Management in 2007 (© 2013 Time Inc). In short, this merger is regarded as a failure.

Chapter 3

Methodology

The paper is going to explain and analyze the market impact of a multinational merger in the world automobile industry and to test the market efficiency by using data from 1998 to 2012. The purpose is to determine whether abnormal returns will occur and the change of firm value before or after a merger announcement happen. Copeland and Weston (1988) mentioned that models such as Market Return Model, the Average Abnormal Return Model and the Capital Asset Pricing Model (CAPM) could be used to test event studies.

3.1 Models.

3.1.1 Market Return Model

To test semi-strong form of EMH, we can use an event study methodology. For the Market Model, we need to calculate the return on a stock at first and Equation 3.1 is:

$$R_t = \frac{P_t - P_{t-1}}{p_{t-1}} \tag{3.1}$$

R_t = return on stock at time t.

P_t = stock price at time t.

P_{t-1} = stock price at time t-1.

Then we can use STATA normal Equation 3.2 as follows:

$$R_{i,t} = \widehat{\beta_{1t}} + \widehat{\beta_{2t}} R_{m,t} + u_{i,t} \tag{3.2}$$

$R_{i,t}$ = return on stock i at time t

$\widehat{\beta_{1t}}$= intercept of equation for stock i

$\widehat{\beta_{2t}}$= slope of equation for stock i

$R_{m,t}$=market rate at time t

$u_{i,t}$=random disturbance of equation

Regression of (3.2) can be used by STATA procedure. The NYSE index will be treated

as $R_{m,t}$. $u_{i,t}$ would be the risk of one stock for a certain company.

For the Equation 3.2, Gujarati & Porter (2009) provide four assumptions:

Zero mean value of the statistical error u_i=: $E(u_i) = 0$

Homoscedasticity or constant variance of the statistical error u_i: $Var(u_i) = \sigma^2$

No autocorrelation between statistical errors u_i and u_j: $Cov(u_i, u_j) = 0$

The values of u_i are normally distributed: $u_i \sim N(0, \sigma^2)$

3.1.2 Abnormal Returns (AR), Average Abnormal Returns (AAR) and

Average Cumulative Abnormal Returns (ACAR)

The Abnormal Return (AR) will have the equation form as follows:

$$AR_{i,t} = R_{i,t} - (\widehat{\beta_{1t}} + \widehat{\beta_{2t}}R_{m,t}) \qquad (3.3)$$

$AR_{i,t}$= the abnormal return on security i at time t

$R_{i,t}$= return on stock i at time t

$\widehat{\beta_{1t}}$= intercept of equation for stock i

$\widehat{\beta_{2t}}$= slope of equation for stock i

$R_{m,t}$= the index for NYSE

For Average Abnormal Return (AAR), we have Equation 3.4:

$$AAR_t = \frac{1}{n}\sum AR_{i,t} \tag{3.4}$$

n= number of stocks

Then, a t-test will be used for testing and the null hypothesis and alternative

hypothesis will be set up like:

Null hypothesis: $H_0: AAR_t = 0$

Alternative hypothesis: $H_1: AAR_t \neq 0$

After a t-test, we would have two answers. The first one is that t-test rejects the null

hypothesis, so we obtain the result that market is efficient. The second one is that the

t-test does not reject null hypothesis, so we can conclude that the market is not

efficient.

3.1.3 Capital Asset Pricing Model – CAPM

As © 2013 Investopedia US ("CAPM") suggests, the CAPM clearly expresses the

relationship between risk and expected return, it could also be used to evaluate risky

stocks value. The Equation 3.4 would be as follows:

$$R_{it} = R_{ft} + \beta_i(R_{mt} - R_{ft}) \tag{3.4}$$

R_{it}= return on stock i at time t

R_{ft}= risk free rate at time t

R_{mt}= expected market rate at time t

β_i= Beta (systematic risk) for stock i

According to © 2013 Investopedia US ("CAPM"), 'the expected return of a security or a portfolio equals the rate on a risk-free security plus a risk premium.' If the expected return of stock is lower than the required return, then the investor should not purchase the stock. If the expected return of stock is higher than the required return, the stock is worthy of purchase. Different stocks have different risks (betas) in the security market. We can also notice in the CAPM a linear relationship between expected return and beta. Beta stands for systematic risk, which cannot be avoided

3.2 Research Procedure

3.2.1 Trading Volume

The impact of a merger announcement to a market can be tested by event studies. At the beginning, I use an event window of 20 days which means that 10 days before t=0 (merger announcement occur) and 10 days after that time. V_0 means the return on the event window. Then, I will put forward 40 days *ex-event* window and 40 days *post-event* window. At this point, V_{-1} and V_{+1} mean the return on *ex-event* window and the return on *post-event* window.

I use STATA to test V_0, V_{-1} *and* V_{+1}. V_0 *and* V_{-1} is the first to determine whether a merger announcement can influence trading volume. If V_0 is bigger than V_{-1} while V_0 is positive and significant, we can get the result that the announcement has influenced trading volume's changes and vice versa. V_{-1} and V_{+1} can be compared to test whether *post-merger* can create value for global automobile companies. If V_{+1}

is bigger than V_{-1} and it is significantly positive, we can get the results that the firm value of global automobile companies has increased after a merger transaction and vice versa.

Figure 3.1

Ex event window   Event window   Post event window

I------------------------------I---------------I---------------I------------------------------I

t$-=40$ V_{-1} t$-=10$ t$=0$ t$+=10$ V_{+1} t$+=40$

$$V_0$$
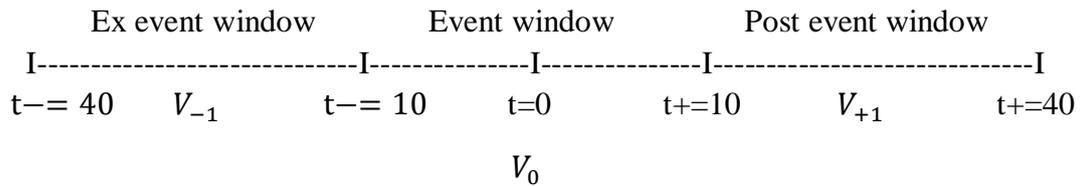
3.2.2 Stock price

Just as with the work of trading volume above, STATA is used to test R_0, R_{-1} and R_{+1}. R_0 and R_{-1} would be the first to justify whether a merger announcement will influence stock price. If R_0 is bigger than R_{-1} while R_0 is positive and significant, we can get the result that the merger announcement has influenced trading volume's changes and vice versa. What's more, I compared R_{-1} and R_{+1} to test whether *post-merger* can create value for global automobile companies. If R_{+1} is bigger than R_{-1} and it is significantly positive, we can obtain the result that the value of global automobile companies is increased after a merger transaction and vice versa.

Figure 3.2

Ex event window   Event window   Post event window

I------------------------------I---------------I---------------I------------------------------I

t$-=40$ R_{-1} t$-=10$ t$=0$ t$+=10$ R_{+1} t$+=40$

$$R_0$$
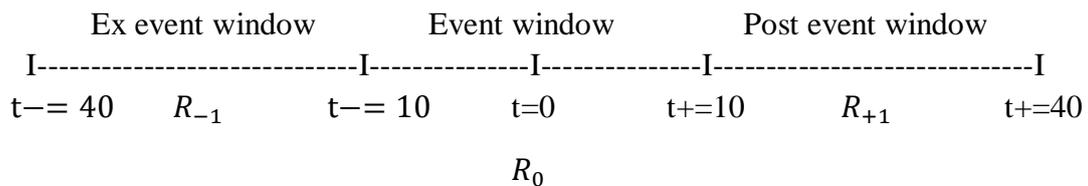
3.3 Data Selection

This study chooses global automobile companies traded on the Over-The-Counter

Market (OTC) and NYSE market. The merger announcement is from January 1998 to

December 2012. The company list in the sample would meet the following criteria:

1) It is a common stock and traded on the OTC market or NYSE Market.

2) The companies in the list must have an IPO at least 6 months before the merger

announcement and be successfully completed, and

3) The repeated cases will be eliminated in the data list.

3.4 Data sources

The data of merger announcements for this study were collected from Bloomberg.

Data of daily trading volume and daily closing prices from 1998 to 2012 can be found

from: http://ca.finance.yahoo.com/

Chapter 4

Analysis of Results

4.1 Overview

This section will analyze and explain the results of the models using a sample of 24

acquired companies from the OTC market and 10 acquired companies come from the

NYSE market. The data collected covered a wide range of time and STATA software

was used.

4.2 Stock Price

4.2.1 Regression Analysis

Equation (3.2) from the previous chapter describes the linear relationship between

beta (systematic risk) and expected return and the DJ (USA) index was used for the

expected market return.

By using command "reg index retn" (index stands for series of the DJ index, retn

stands for series of daily price), I get:

Table 4.1

```
. reg retn index
```

Source	SS	df	MS			
Model	.198146069	1	.198146069			
Residual	1.59757544	1840	.000868248			
Total	1.79572151	1841	.000975405			

					Number of obs =	1842
					F(1, 1840) =	228.21
					Prob > F =	0.0000
					R-squared =	0.1103
					Adj R-squared =	0.1099
					Root MSE =	.02947

retn	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
index	.7814953	.0517315	15.11	0.000	.6800366	.882954
_cons	-.000472	.0006874	-0.69	0.492	-.0018201	.0008762

From this table, we can know that the intercept $\widehat{\beta_{1t}}$ is -0.000472 and the slope $\widehat{\beta_{2t}}$ is

0.7814953. Ceteris paribus, the slope $\widehat{\beta_{2t}}$ means that when the return of the stock

increases by 1%, the expected return will increase by 0. 7814953%. Then we can

know that a change in these stocks is sensitive to the market change.

Gujarati & Porter (2009) confirmed the use of that R-squared to evaluate how well the

data fit the regression line. The R-squared is certainly a nonnegative quantity. In

addition, when R-squared behaves closer to 1 the stock match the Market Model

better and better, and vice versa. From the Table 4.1, we know that the

R-squared=0.1103 and adjusted R-squared=0.1099, which are relatively low. So we

can conclude that the stocks trend in the sample could not influence the performance

of DJ index.

For the event window, we can also check for the regression:

Table 4.2

. reg retn1 index

Source	SS	df	MS		Number of obs =	497
					F(1, 495) =	47.45
Model	.034161842	1	.034161842		Prob > F =	0.0000
Residual	.356348543	495	.000719896		R-squared =	0.0875
					Adj R-squared =	0.0856
Total	.390510385	496	.000787319		Root MSE =	.02683

retn1	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
index	.669144	.0971368	6.89	0.000	.4782927	.8599953
_cons	-.0010302	.0012059	-0.85	0.393	-.0033994	.001339

Table 4.2 shows the regression result of market model Equation (3.2) only in the

period of the event window. By this result, we know that the intercept $\widehat{\beta_{1t}}$ is -0.

0010302 and the slope $\widehat{\beta_{2t}}$ is 0.669144. Ceteris paribus, the slope $\widehat{\beta_{2t}}$ means that

when return of stock increases by 1%, the expected return will increase by 0.

669144%. Then we can know that a change in these stocks' price is sensitive to the

market change. However, when these results are compared to those of Table 4.1, we

can observe that the $\widehat{\beta_{2t}}$ is less (0. 669144 <0. 7814953). So the change in stocks'

price for a long period may be more sensitive to market change than a short period.

From Table 4.2, we know the R-squared=0.0875 and adjusted R-squared=0.0856

which are relatively low. So we can conclude that the stocks trend in the sample could

not influence the performance of the DJ index in the short period.

4.2.2 Average Abnormal Return (AAR) Analysis and Result

For the average abnormal return (AAR), we should test whether the market is efficient

and whether a merger announcement can influence stock price. What's more, AAR

can test whether the firm value of global automobile companies will increase after the

merger announcement. For the AAR model, the event window is 20 days, which are

10 days before merger announcement and 10 days after merger announcement. The

model also has 40 days *ex-event* window and 40 days *post-event* window.

At first, we will use the whole data for testing market efficiency. By using the STATA

menu: Statistics > Summaries, tables, and tests > Classical tests of hypotheses> one

sample mean-comparison test, we get the Table 4.2 as follows:

Table 4.3

```
. ttest retn == 0

One-sample t test

Variable |    Obs        Mean     Std. Err.    Std. Dev.    [95% Conf. Interval]

    retn |   1842     .0000377     .0007277     .0312315    -.0013895     .0014649

    mean = mean(retn)                                              t =    0.0518
Ho: mean = 0                                   degrees of freedom =       1841

   Ha: mean < 0                    Ha: mean != 0                   Ha: mean > 0
Pr(T < t) = 0.5207        Pr(|T| > |t|) = 0.9587          Pr(T > t) = 0.4793
.
```

For the t-test, we use hypotheses as follows:

Null hypothesis: $H_0: AAR_t = 0$

Alternative hypothesis: $H_1: AAR_t \neq 0$

If the $Pr(|T| > |t|) > 0.05$ (P-value>0.05), we will accept the null hypothesis. If the $Pr(|T| > |t|) < 0.05$ (P-value <0.05), we will reject the null hypothesis. From Table 4.3, we know that P-value is 0.9857>0.05, so we will accept the hypothesis. The t value= 0.0518< Critical t value=1.96 (when α is at 95% level), so the value is statistically significant. So we can conclude that the market is semi-strong efficient.

About the event window, we can also use STATA to perform the t-test just as above:

Table 4.4

```
. ttest retn1 == 0

One-sample t test

Variable |    Obs        Mean     Std. Err.    Std. Dev.    [95% Conf. Interval]

   retn1 |    497    -.0005146    .0012586     .0280592    -.0029875     .0019583

    mean = mean(retn1)                                             t =   -0.4088
Ho: mean = 0                                   degrees of freedom =        496

   Ha: mean < 0                    Ha: mean != 0                   Ha: mean > 0
Pr(T < t) = 0.3414        Pr(|T| > |t|) = 0.6828          Pr(T > t) = 0.6586
```

For Ex-event window, we can also use STATA for the t-test:

Table 4.5

```
. ttest retnbef == 0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
retnbef	656	.0014832	.0012705	.0325399	−.0010115	.0039779

```
    mean = mean(retnbef)                                          t =    1.1675
Ho: mean = 0                                    degrees of freedom =       655

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.8783       Pr(|T| > |t|) = 0.2434       Pr(T > t) = 0.1217
```

Comparing Table 4.4 and Table 4.5, the mean return R_0 in the event window's is

-0.0005146 which is less than 0.0014832 of the mean return R_{-1} in the ex-event

window. The difference of P-value is 0.6828-0.2434= 0.4394>0.05, so we accept the

hypothesis. At the end, we can conclude that the merger announcement has no impact

on stock price in the US market.

For the *post-event* window, we can also use STATA to perform a t-test:

Table 4.6

```
. ttest retnaft == 0

One-sample t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
retnaft	688	−.0009395	.0012252	.0321362	−.003345	.0014661

```
    mean = mean(retnaft)                                         t =   -0.7668
Ho: mean = 0                                    degrees of freedom =       687

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.2217       Pr(|T| > |t|) = 0.4435       Pr(T > t) = 0.7783
```

By comparing Table 4.5 and 4.6, the mean return R_{+1} in the *post-event* window is

-0.0009395 which is less than 0.0014832 of the mean return R_{-1} in *ex-event* window.

The difference of P-value is 0.4435-0.2434= 0.2001, so we accept the hypothesis. At

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the end, we can conclude that the value of global automobile companies does not increase after a merger transaction.

4.3 Volume

For the daily volume of merged firms in the global automobile industry, the data were all collected from http://ca.finance.yahoo.com/. The first thing is to test whether the merger announcement can influence trading volume. For the AAR model, the event window is 20 days; 10 days before merger announcement and 10 days after merger announcement. The model also has a 40 days *ex-event* window and 40 days *post-event* window.

By using the excel sum and average command, we can get that:

For the event window: Sum= 1706560700, the average volume for V_0 is 3555334.792.

For the *ex-event* window: Sum= 3045662400, the average volume for V_{-1} is 4518786.944 which is larger than 3555334.792 of event window V_0. So the merger announcement has not influenced trading volume's changes.

For the *post-event* window: Sum= 2387679000, the average volume for V_{+1} is 3595902.108 which is less than *ex-event* window V_{-1} of 4518786.944. So the value of global automobile companies will not be affected after a Merger transaction

Chapter 5

Conclusion

5.1 Conclusions

By using STATA, I obtained five results for the analyzing part of stock price

Firstly, I use STATA to do the regression of the Market Model for the total period and the period of the event window. By analyzing the output, both of the two results suggest that change in these stocks is sensitive to the market change. However, both of the two results point put that the stocks trend in the sample could not influence the performance of the DJ (USA) index. Secondly, the outputs of average accumulative return (AAR) model leads to the results that market is semi-strong efficient, since we accept the null hypothesis. Null hypothesis: $H_0: AAR_t = 0$. Thirdly, the merger announcement has no impact on stock price in the US market. Fourthly, the return in the ex-event window and post-event window does not have difference. Therefore, the value of global automobile companies does not increase after a merger transaction.

I also use excel to analysis the trading volume part. The result is that the merger announcement has not influenced trading volume's changes and the value of global automobile companies will not be affected after a Merger transaction.

5.2 Limitations and Recommendations

The conclusions express that merger announcements do not influence stock prices and the merged firm could not gain value. There are several reasons to explain the results.

Firstly, not only the merger announcement can affect the stock price, like policy factor. For example, steel price rise, then the benefit of automobile companies is reduced. Therefore, stock price of automobile companies go down. Secondly, the sample I chose is at a long time period. Because time effect can affect stock price, the merger announcement does not have too much influence. Finally, I chose world automobile stocks on the NYSE market and OTC market and the sample is relatively small. So there is no statistically significant result for this paper. The sample is limited to meet the requirement for event studies. If we have more samples to analysis, our output may be better. If we limit the areas of automobile companies, like only in the US, we may receive more favorable result.

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Appendix:

Deal Type	Announce Date	Target Name	Acquirer Name	Announced Total Value (mil.)	Payment Type	Deal Status
JV	2011/2/18	Sollers OJSC	Ford Motor Co	N/A	Undisclosed	Complete
DIV	2010/3/28	Volvo Personvagnar AB	Geely Holding Grou	1800	Cash and Debt	Complete
DIV	2009/10/1	Australian Car Loan Portfolio	Macquarie Group Ltd	899.6	Cash	Complete
DIV	2009/2/2	Automatic Transmis	HZ Holding	N/A	Cash	Complete
DIV	2008/3/26	Jaguar Land Rover Operations	Tata Motors Ltd	2300	Cash	Complete
ACQ	2007/4/11	Troller Veiculos Especiais SA	Ford Motor Co	N/A	Undisclosed	Complete
ACQ	2005/8/2	Jiangling Motors Corp Ltd	Ford Motor Co	0.13	Cash	Complete
DIV	2004/3/26	Polar Motor Co Ltd	Ford Motor Co	N/A	Undisclosed	Complete
ACQ	2000/9/21	Hertz Corp/Old	Ford Motor Co	706.42	Cash	Complete
DIV	2000/3/17	Land Rover	Ford Motor Co	2912.7	Undisclosed	Complete
DIV	1999/8/25	Bougourd Bros Ltd	Ford Motor Co	6.41	Undisclosed	Complete
ACQ	1999/5/11	YOUNG DRIVERS	Ford Motor Co	N/A	Undisclosed	Complete
DIV	1999/1/28	Volvo Cars unit	Ford Motor Co	6451.33	Undisclosed	Complete
DIV	2012/10/16	General Motors India Pvt Ltd	General Motors Co	N/A	Undisclosed	Complete
DIV	2010/2/23	Shanghai GM Motor Co Ltd	SAIC Motor Corp Ltd	84.5	Cash	Complete
JV	2010/5/28	Byd Co Ltd	Daimler AG	N/A	Undisclosed	Complete
JV	2009/11/24	Kamaz OJSC	Daimler AG	N/A	Cash	Complete
ACQ	2009/5/19	Tesla Motors Inc	Daimler AG	N/A	Undisclosed	Complete
DIV	2008/12/12	Kamaz OJSC	Daimler AG	250	Cash	Complete
DIV	2008/4/30	Tognum AG	Daimler AG	910.9	Undisclosed	Complete
ACQ	2007/11/14	DaimlerChrysler Luft- und	Daimler AG	660.15	Cash	Complete
DIV	2004/5/17	New Venture Gear Inc	Magna International Inc	440.14	Cash and Debt	Complete
DIV	2004/1/15	Mitsubishi Fuso Truck & Bus Corp	Daimler AG	490.06	Cash	Complete
ACQ	2000/6/26	Hyundai Motor Co	Daimler AG	385.06	Cash	Complete
DIV	1999/1/20	ADTRANZ	Daimler AG	472	Undisclosed	Complete
DIV	2009/5/12	Michel Thierry SA	Peugeot SA	N/A	Cash	Complete
ACQ	2001/10/30	Renault SA	Nissan Motor Co Ltd	1726.65	Cash	Complete
DIV	2000/4/25	Renault VI	Volvo AB	1722.74	Stock	Complete
ACQ	2011/5/9	MAN SE	Volkswagen AG	7418.43	Cash	Complete
ACQ	2009/12/9	Suzuki Motor Corp	Volkswagen AG	2531.86	Cash	Complete
ACQ	2009/8/13	Porsche Automobil	Volkswagen AG	5568.03	Cash	Complete
DIV	2004/4/21	LeasePlan Corp NV	Volkswagen AG,Olayan	2527.03	Cash	Complete
DIV	2000/3/27	Scania AB	Volkswagen AG	1597	Undisclosed	Complete
DIV	1998/3/25	Rolls-Royce Motor Cars Ltd	Volkswagen AG	802.18	Cash	Complete