The Empirical Analysis about Wealth Effect of Chinese M&A Firms after Stock Market Crash

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Abstract: The paper analyzes wealth effects of merger and acquisition from 508 China companies between 2015–2016 Chinese stock market turbulence from 2015.8.27 to 2016.5.30, to examine whether payment methods (cash payment and stock payment) could influence wealth effects, and analyze the wealth effects of M&A conducted in the second industry and the third industry. And the findings suggest that M&A cannot create wealth effects in the stock market turbulence, and M&A in the second industry were outperformed by M&A in the third industry within the (-5, +5) event window.

1. Introduction

In recent years, as the economic development of China, there are more studies of merger and acquisition (M&A) appeared as the increased number of deals of M&As in China. However, China has a rapidly development year by year, according to data announced by Ministry of Finance of the People's Republic of China(2013-2014), Chinese GDP of 2013 is 58,801,870 and 2014 is 63,591,000, which has increased 8.1%, thus, every year's data changed a lot compared to last year. What is more, there are 904 times merger and acquisition happened at 2013, the year-on-year growth rate is 32.8% compared to 2012, moreover, the number of companies disclosed sum is 848 and the volume of trade is 285,58 hundred million dollar, which increased 103.3% compared with 2012. At the same time, industrial adjustment in China has changed radically. Thus, the previous studies have slight significance for current analysis because of the time-lag effect of the data. Therefore, after combining of background, this study will concentrate on the wealth effect of Chinese M&A firms, which data is keep pace with the time.

2. Literature review

2.1. Introduction

Harris and Ravenscraft (1989) [1] stated that merger and acquisition appeared in waves, and different types of merger and acquisition happened in various waves. From 1897 to 1904, the development of rail way enhanced link between different regions, and enabled firms to transfer their products, which led to the needs of merger and acquisition within mining and manufacturer

industries, and horizontal merger became popular at that time. Megginson and Smart (2005) [2] declared that the second wave of M&A was from 1916 to 1929, due to the development of railway, motor vehicle and radio industries appeared, which improved the whole economy of the US, however, as a result of high level of horizontal mergers, monopolistic competition reduced the potential of horizontal mergers, to seek growth, firms tended to conduct vertical merger backward or forward the supply chains for raw materials or cost savings. From 1965 to 1969, in the third wave, both horizontal and vertical merger were restricted by the regulatory system, because mergers would increase combined firms' market power and limit other firms profits, to seek expansion, firms have started conglomerate merger. [3] The fourth wave was from 1981 to 1989, hostile takeovers were common is this stage, and there were corporate raiders, who are person or agencies make profits by acquiring and reselling companies. A strong and long lasting bull market increased many companies' value in fifth wave during 1992- 2001, due to the increment of firms' value, which allowed them to employ equity to acquire other firms easily, thus, stock-swap purchase became more common. From 2003, the sixth wave lasted to present, there were industry consolidation, so that companies' internationalization are stronger.

2.2. Hypothesis

The null hypothesis and alternative hypothesis about M&A'wealth effects are following:

$H1_0$(null hypothesis): M&A creates significant wealth effects in the long-term.

$H1_a$(alternative hypothesis): M&A cannot create significant wealth effects in the long-term.

$H2_0$(null hypothesis): M&A creates significant wealth effects in the short-term.

$H2_a$(alternative hypothesis): M&A cannot create significant wealth effects in the short-term.

$H3_0$(null hypothesis): M&A creates significant wealth effects on announcement date.

$H3_a$ (alternative hypothesis): M&A cannot create significant wealth effects on announcement date.

The null hypothesis and alternative hypothesis about M&A'effects in different industries effects are following:

$H4_0$ (null hypothesis): M&A happened in the third industry will create more wealth effects than those happened in the second industry.

$H4_a$ (alternative hypothesis): M&A happened in the third industry will create less wealth effects than those happened in the second industry.

The null hypothesis and alternative hypothesis about M&A'effects in different payment method are following:

$H5_0$(null hypothesis): M&A with cash payment will create more wealth effects than those with stock payment.

$H5_a$ (alternative hypothesis): M&A with cash payment will create less wealth effects than those with stock payment.

$H6_0$(null hypothesis): M&A with cash payment will create positive significant abnormal return at announcement date.

$H6_a$ (null hypothesis): M&A with stock payment will create positive significant abnormal return at announcement date.

3. Methodology and data

The main methodology is event study method. Meanwhile, the process of choosing data will be stated in this chapter.

3.1. Introduction

The author collected 508 companies' data at a background of China stock market crash, all of those firms had M&As between August 2015 and May 2016. In addition, the data were used in this model is from The China Stock Market & Accounting Research (CSMAR) Database and the China Securities Regulatory Commission. 508 data were collected from CSMAR database, which is an research-based database and its company is the only one chinese data provider accepted by the Wharton School into the Wharton research service system, which offers accurate database services, mainly serves financing insitutions like Morgan Stanley-Barra and China Securities Regulatory Commission, moreover, more than 500 Asian universities chose it as an important library resource. The database is significantly for China-focused studies, for instance, the Rousseau and Xiao used this database to compare China and USA market and Zhou and Habib (2013) used this to analysis the Chinese stock market. In addition, the data was chosen by date from 2015.8 to 2016.5.30 of Chinese public traded companies of their first announcement date.

Moreover, the information of payment method and the classification of industry were also collected from this database.A. B. Fischer and C. G. Clark first came up with the concept of three industries. According to the National Statistics Bureau of China, the primary sector of economy is defined as agriculture, animal, husbandry and fishery industry.There are nine of data is belong to the primary industry. The secondary sector of economy includes mining, manufacturing and power sectors; tertiary industries cover services.

3.2. Estimation for normal return

According to event studies on M&A, using the effective date of merger (the date of final permission of M&A made by target shareholders) as the event date would lead to inaccuracy of calculation of abnormal returns. Because the reflection of stock prices on the M&A events would appear on or around date of first announcement and first announcement date is different from final permission date. Therefore, using the effective date as event date will bring in errors to the estimation of abnormal return. So the data needed including the announcement date, and market index and stock price in the estimation period and event window. The stock return near the announcement date contains expected normal return and abnormal return related to the events. In other words, if the events do not have effects on firms' value or there are no events exist abnormal return will be 0.

According to Brown and Warner [4], there is expression of real return, expected return and abnormal return at event window.

$$R_{i;t} = E[R_{i;t} | X_t] + \xi_{i,t} \tag{1}$$

Where $R_{i;t}$ is the real return at time t,

$E[[R_{i;t} | X_t]$ is the expected return at time t,

X_t is the conditioning information at time t,

$\xi_{i,t}$ is called the "abnormal" return

Thus, calculating abnormal return is important to analyze the effects of events on firms' value. To calculate abnormal return, real return Ri;t on time t, and expected return $E[R_{i;t} | X_t]$ on time t needed.

Real return $R_{i,t} = P_t - P_{t-1}/P_{t-1}$,

where Pt is stock I's price on time t,

P_{t-1} is the stock I's price on time t - 1.

3.3. Expected return

Brown & Warner [4] and MacKinlay [5] introduce three main statistical models for measuring stock return. The first is the mean-adjusted return model that developed by Brown & Warner, which has very unrealistic assumptions about individual stock risk, risk premiums and interest rates stay constant over time. Thus, employing this model will bring limitations to the study. The other two models which avoid this kind of limitations are the market-adjusted return model; and the market model.

3.3.1. Market-adjusted return model

Brown and Warner [4] describe that the market adjusted return model, which supposes expected returns EMA (Rit) for security i at day t is constant and is equal to market return on the same date t: Rmt. Therefore, the correlation between stock i' return and market return will be 1, so $\beta_i = 1$ and the unique risk returns α_i is 0:

$$E_{MA}(R_{it}) = R_{mt} \tag{2}$$

Where:
$E_{MA}(R_{it})$ is the expected return for security I at time t.
Rmt is the market return at time t.

3.3.2. Capital asset pricing model

Capital asset pricing model assumes expected return of stock i equals to risk free rate plus β_i times market risk premium.[6]

$$E[R_i] = R_f + \beta_i \ (E[R_m] - R_f) \tag{3}$$

Where $E[R_i]$ is expected return for stock i,
R_f is risk free rate,
β_i is sensitivity of stock I's return for the market return,
$E[R_m]$ is expected market return,
And $E[R_m] - R_f$ is market risk premium

The following are reasons why market model will be as a benchmark model for expected return. Cable and Holland's research about benchmark model for calculation of expected stock return shows that market model are appropriate for 70% cases in the sample, while market adjusted return model are only appropriate at 30%, and capital asset pricing model are dominated by other two models, for it just is appropriate for 10%. And the important point is that the cases which could be measured by market adjusted return model also could be analyzed by market model. Because of the assumption market adjusted return model based on, there is no unique stock risk and the correlation between the given stock I and market is positively perfect, equals to 1, market adjusted return model will not be used in this paper. [7] Though CAPM accounts for security unique risk as market risk premium, and market wide risk as risk free rate, it still outperformed by market model, due to market model captures all unique risk including risk free return instead of formulating it as risk free return and market model includes all systemic risk instead of market risk premium, and market model is a statistical model, so the parameters are easily acquired by regression.

3.4. Results expectation

In the short run, abnormal return will be significantly different from zero, and merger will affect

firms' value. In the long run, abnormal return will not be significantly different from zero.

All M&A decisions will generate significant abnormal returns at announcement date.

Companies in the third industry will gain more wealth effects through M&A than companies in the second industry.

Cash payment M&A will create more wealth effects than stock payment M&A.

4. Results and analysis

4.1. Introduction

The section will discuss about average abnormal returns and cumulative average abnormal returns for all, the second industry (group 1) and the third industry (group 2) and average abnormal returns and cumulative average abnormal returns for all, cash payment, hybrid payment and stock payment. The sample contains transactions for 508 Chinese companies experienced M&A from 2015.8.27 to 2016.5.30 traded in Shanghai stock exchange and Shenzhen stock exchange, in which cash payments are 300, hybrid payments are 134, and stock payments are 73, and those transactions happened in the second industry are 363, and in the third industry are 145.

4.2. Average abnormal returns for all, group 1 and group 2 in event window (-5, +5)

		All	group	
			1	2
AR -5	Mean	-0.792244	-0.740634	-0.921448
	t	[-3.68756***]	[-2.88073***]	[-2.35421**]
AR -4	Mean	-0.735315	-0.883416	-0.364552
	t	[-3.11704***]	[-3.23082***]	[-0.786994]
AR -3	Mean	-1.02963	-1.07617	-0.913103
	t	[-4.6931***]	[-4.08242***]	[-2.30996**]
AR -2	Mean	-0.244902	-0.403333	0.151724
	t	[-1.09404]	[-1.53706]	[0.354456]
AR -1	Mean	0.156634	0.064573	0.387103
	t	[0.715934]	[0.249752]	[0.94104]
AR0	Mean	0.302697	0.391405	0.080621
	t	[1.411276]	[1.53764]	[0.20206]
AR 1	Mean	-0.381535	-0.227025	-0.768345
	t	[-1.54246]	[-0.791088]	[-1.58511]
AR 2	Mean	-0.811457	-0.670799	-1.16359
	t	[-3.40213***]	[-2.51883**]	[-2.30796**]
AR 3	Mean	-0.450295	-0.480744	-0.374069
	t	[-1.98457**]	[-1.77832*]	[-0.894057]
AR 4	Mean	-0.203209	-0.12595	-0.396621
	t	[-0.945254]	[-0.496738]	[-0.976105]
AR 5	Mean	0.10498	0.005455	0.354138
	t	[0.492623]	[0.022247]	[0.831777]

*, **, *** denotes the significance of t-stats at the 10%, 5% and 1 %, respectively.

Figure 1: Average abnormal return for all, group 1 and group 2

Daily Abnormal Return for (-5,+5)
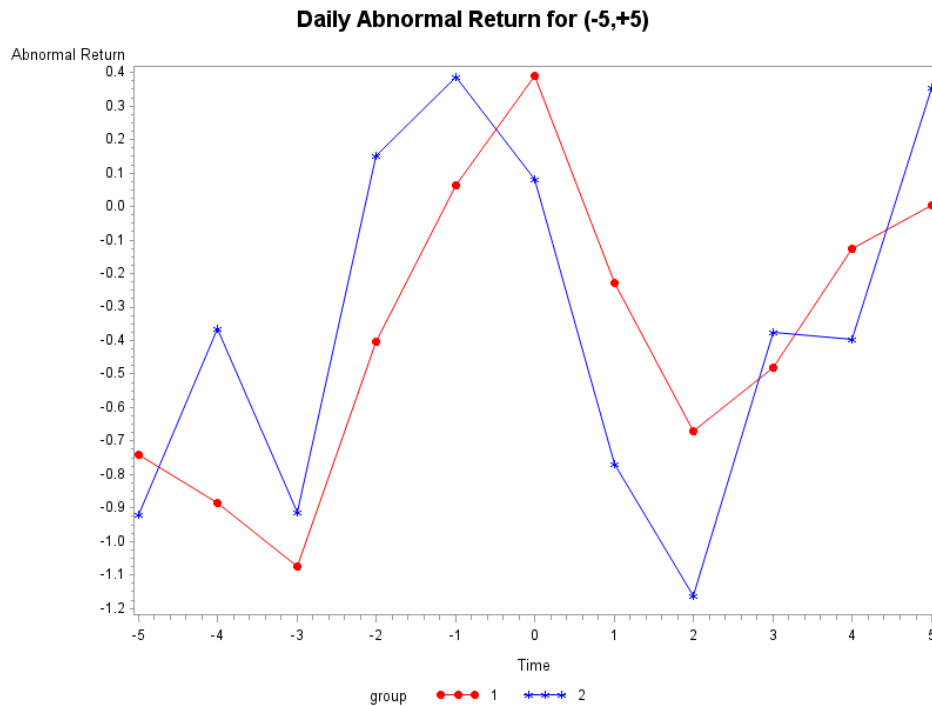
Group 1 is the second industry; Group 2 is the third industry

Figure 2: Average abnormal return for group 1 and group 2 in (-5, +5) event window

Figure 2 shows that M&A creates very similar wealth effects in the second industry and the third industry. Both of them increase from -3, and reach to peaks at -1 and 0 respectively, and then abnormal returns keep decreasing to the lowest value at 2, and then they increase in similar trend. From figure 1, M&A in the second industry (group 1) generate three decreasing negative statistically significant abnormal returns at -5, -4, and -3, the significance levels are 1%. It means that information about M&A in the second industry may be leaked before the official announcement. Comparing with M&A in the second industry, there are two significant abnormal returns on -5 at 5% significance level, and on -3 at 5% significance level, which means information leakage also exist in the third industry before announcement date. Both t-statistics of group 1 and group 2 indicate that no significant abnormal returns at announcement date even at 10% significance level, due to the information leakage, the market has adjusted to the M&A information before announcement date, leading to no significant abnormal returns can be observed at announcement date. After announcement date, abnormal returns at 1, 4 and 5 in group 1 are not significant even at 10% significance level, and abnormal return at 2 are significant at 5% significance level, and abnormal return at 3 are significant at 10% significance level, which implies that the M&A in group 1 will lead to another increase after announcement date, and it implies that the reflection of market stock for M&A is inadequate, so another increase appears after announcement. While M&A in group 2 only create one significant abnormal return at 5% significance level on two days (time 2) after announcement date, due to only one significant abnormal return is observed after announcement ate, we can make conclusion there is high possibility that M&A in group 2 has no effects on stock market after announcement date.

The results can reject H3$_0$(null hypothesis): M&A creates significant wealth effects on announcement date.

4.3. Average abnormal return for all, cash payment, hybrid payment, and stock payment in (-5, +5) event window.

This table presents the daily average abnormal returns for all, the cash payment, hybrid payment and the stock payment for -5 to +5 event window, and 0 is the announcement day. The market model was used with an estimation window of (-206,-6), and data is from CSMAR (China stock market accounting research) database, and stock index involved are Shanghai Stock exchange index and Shenzhen Stock exchange index.

		All	Method of Payment		
			Cash Only	Hybrid	Stock Only
AR -5	Mean	-0.792244	-1.24253	0.063134	-0.515676
	t	[-3.68756***]	[-4.46988***]	[0.144847]	[-1.01065]
AR -4	Mean	-0.735315	-1.1524	-0.035224	-0.312162
	t	[-3.11704***]	[-3.5899***]	[-0.077607]	[-0.639553]
AR -3	Mean	-1.02963	-1.4418	-0.498209	-0.320946
	t	[-4.6931***]	[-4.82678***]	[-1.23925]	[-0.633445]
AR -2	Mean	-0.244902	-0.4044	0.107537	-0.236486
	t	[-1.09404]	[-1.35648]	[0.252297]	[-0.425154]
AR -1	Mean	0.156634	0.156	0.688134	-0.803243
	t	[0.715934]	[0.551389]	[1.64627*]	[-1.34447]
AR 0	Mean	0.302697	0.600567	-0.393284	0.355405
	t	[1.411276]	[2.120464**]	[-0.948264]	[0.675394]
AR 1	Mean	-0.381535	-0.729633	0.15291	0.061892
	t	[-1.54246]	[-2.28301**]	[0.299772]	[0.105188]
AR 2	Mean	-0.811457	-0.6525	-0.465149	-2.08297
	t	[-3.40213***]	[-2.1745**]	[-0.924127]	[-3.4967***]
AR 3	Mean	-0.450295	-0.742467	0.140672	-0.335946
	t	[-1.98457*]	[-2.5046**]	[0.330054]	[-0.543187]
AR 4	Mean	-0.203209	-0.394	0.346045	-0.424324
	t	[-0.945254]	[-1.40117]	[0.811343]	[-0.801623]
AR 5	Mean	0.10498	0.497367	-0.227612	-0.883514
	t	[0.492623]	[1.831873*]	[-0.502324]	[-1.80675*]

*, **, *** denotes the significance of t-stats at the 10%, 5% and 1 %, respectively.

Figure 3: Average abnormal return for all, cash payment, hybrid payment, and stock payment at (-5, +5) event window

From figure 3 and figure 4, there are 3 negative significant abnormal returns for cash payment prior to announcement date at t = -5, -4 and -3, the abnormal returns are -1.24%, -1.14% and -1.44% respectively, at 1% significance level. The appearance of three significant abnormal returns may be caused by information leakage. At the announcement date, there is observation of positive statistically significant abnormal return for cash payment only, 0.60%, which is in accord with the past paper's results mentioned in section 2.7, cash payment for M&A generates more profits for shareholders. After announcement date, cash payment still produces 3 negative significant abnormal returns at t =1 ,2 and 3, -0.72%, -0.65% and -0.74%, and significance levels are both 5%, and 1 positive significant abnormal return at t=5 at 10% significance level. The maximum value appears at t = 0 (announcement date), the appearance of significant abnormal returns after announcement date is production of market inefficiency, which means stock market has not adjusted for the M&A events sufficiently as the information was released.

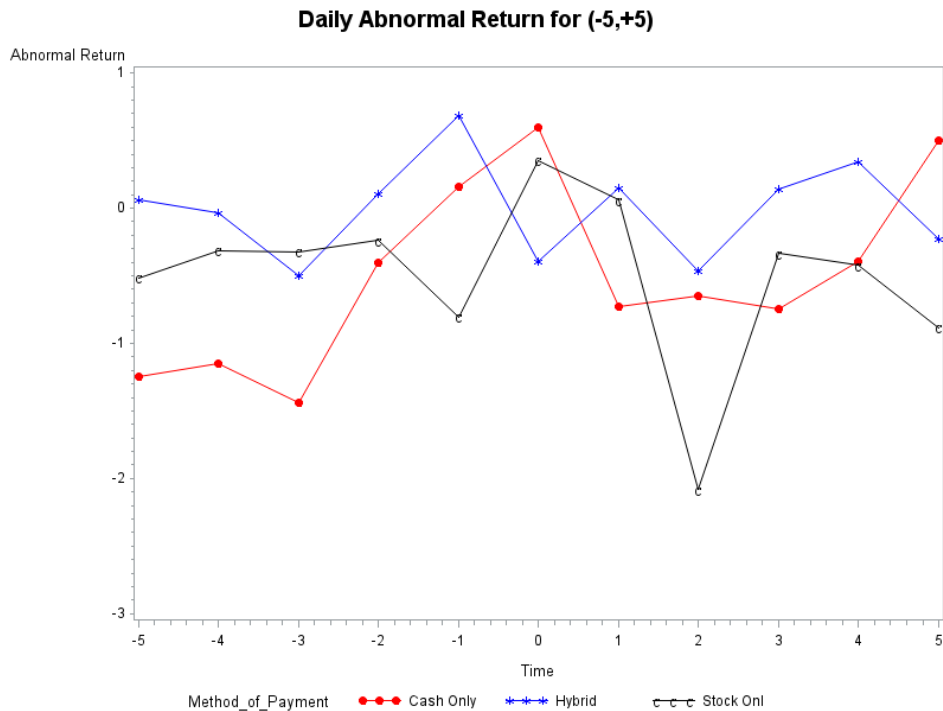**Daily Abnormal Return for (-5,+5)**

Figure 4: the graph presents average abnormal return for all, cash payment, hybrid payment and stock payment for event window (-5, +5), where t = 0 is announcement date.

For hybrid payment, it has a similar shape with cash payment, however, only one observation of significant abnormal returns at t = -1, 0.68% at 10% significance level, abnormal returns at other days within event window are not statistically significant even at 10 % significance level, which means that only limited effects created by hybrid payment on firms' value.

For stock payment, there is no significant abnormal return at announcement date, and similarly, stock payment merely generates two negative significant abnormal return at t= 2, -2.08% at 1 % significance level, and -0.88% at 10 % significance level at t=-5. Consequently, stock payment likewise generates limited wealth effects on firms through M&A.

For all data, the observation of significant abnormal returns dominated by the results of cash payment, and there are 3 significant abnormal returns as the same days of appearance of significant abnormal returns for cash payment, t = -5, -4 and -3 and all of them are at 1% significance levels. But no significant abnormal return at announcement date can be observed for all data, and only one negative significant abnormal return appears after announcement date, at t =2, -0.81% at 1 % significance level.

The results support the $H6_0$(null hypothesis): M&A with cash payment will create positive significant abnormal return at announcement date.

5. Conclusion

The paper analyzes wealth effects of merger and acquisition from 508 China companies in 2015-16 Chinese stock market turbulence from 2015.8.27 to 2016.5.3, to examine whether payment methods could influence wealth effects, and the difference of M&A conducted in the second industry and the third industry.

The findings indicates that M&A is not an efficient strategy to increase shareholders in stock market turbulence, since no significant positive CARs can be observed both in short term, (-1, +1) event window and long term (-5, +5) event window. Due to significant information leakage, significant ARs can be observed on all data before announcement date and this situation weakens

abnormal return at announcement date, leading to no significant abnormal returns for all data on announcement date.

As mentioned above, the study focus on M&A in the second industry and the third industry, because there are only nine companies in our raw date are belong to the primary industry, the Chinese primary industry is well- developed leading to the small size of data. To examine M&A's wealth effects in the primary industry, more data needed to be collected.

The findings also suggest that M&A in both the second industry and the third industry have crucial information leakage, and in the (-5, +5) event window, M&A in the third industry produce more wealth effects than M&A in the second industry, but CARs within this event window are significantly negative, even though the CARs are negative, which is largely cause by the stock market turbulence, and there are significant increases of abnormal returns after announcement. Whereas M&A in the second industry and the third industry in the (-1, +1) event window cannot create significant wealth effects even at 10% significance level.

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