The effect of the acquirers' market capitalization and payment method on the short-term return of M&As in Greater China and South Korea

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Aim: The main goal of this paper is to gain insights into the effect of the market capitalization of the acquirer and the method of payment utilized on the short-term return of the acquiring firm, for deals made between a buyer and target in Greater China (including Hong Kong) and/or South Korea. Additionally, differences between these geographical areas and differences in the acquirer's industry are analyzed.

Design / Research methods: Data was retrieved from Refinitiv's EIKON database. A total of 462 deals was obtained and analyzed, using a nested methodology combining elements of an event study with regression analyses.

Conclusions / findings: Acquirers with a small market capitalization obtain either more negative or more positive CARs as compared to large market capitalization acquirers. Secondly, no significant evidence is found that paying a deal using solely cash results in higher CARs as compared to paying a deal fully in shares. Interestingly, it is found that in South Korea paying a deal using shares results in statistically significant higher CARs. Moreover, in China negative CARs tend to be more extreme. Lastly, acquirers operating in the Media and Entertainment industry and in the field of High Technology generate higher CARs.

Originality / value of the article: This paper provides insights into the effects of market capitalization and the payment method in the context of Greater Chinese and South Korean M&As, which thus far have been little studied. Moreover, it uses a nested approach, combing elements from an event study with regression analyses.

Keywords: Mergers and Acquisitions, Cumulative Abnormal Return, Market Capitalization, Payment Method, Greater China, South Korea, Media & Entertainment, High Technology

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1. Introduction

Mergers and Acquisitions (M&As) are a key growth and investment strategy and have far reaching effects for all the parties involved. Previous research has found that M&As are often not as effective as anticipated by the acquiring company (in the case of an acquisition) and bear major risks. Studies estimate that 70-90% of all the M&As worldwide result in failure (Kenny 2020). Nevertheless, they are still often used by many companies globally. Much of the literature has focused on the different aspects that increase or decrease the gains of M&As. A popular method is to investigate the cumulative abnormal return (CAR) in the period regarding the announcement date of the M&A. This is done as in a reasonably efficient market; the stock market will react instantaneously to the announcement of the merger or acquisition. Consequently, the reaction of the shareholders on the announcement can be fully captured within a short time span surrounding the announcement date.

Most of the research has been conducted in the US, UK and increasingly more in continental Europe as historically the majority of deals have been conducted in either one of these markets. Moreover, the majority of the research has focused on domestic deals as opposed to cross-country ones. This entails that up until now little research has taken place to investigate the effect of an M&A announcement on the reaction of the stock market in the East Asian market; specifically in South Korea and Greater China (which includes Hong Kong). Although little research has focused on these markets, they are gaining an increasing presence in the international environment. It is expected that the East Asian market will keep developing and will become stronger (Lui et al. 2020). Therefore, it is important to study M&As in this context as the cultural and institutional environment are largely different in the East Asian market and thus the views developed in western countries cannot simply be extended to this context.

The main goal of this paper is to investigate the impact of company size (in terms of market capitalization), as well as the method of payment on the short-term return of the acquiring firm, for deals made between a buyer and target in Greater China and/or South Korea.

The analysis will cover deals announced by public acquirers in the period from 01-01-2013 up to 01-012023 that have their primary address in either Greater China or South Korea. Moreover, the target company needs to have its primary address in one of these countries, but may be both public or private. The data is accordingly analyzed using a nested approach, combing elements from an event study with regression analysis.

The findings of this paper may be useful to managers from Greater China or South Korean companies that are deciding whether to pursue a merger or acquisition, as they can use it to forecast the reactions of shareholders at the announcement. Additionally, it provides companies with insights into the shareholders reaction to the method of payment used to finance the deal. This is important for the company when they are opting for a method of payment to use. The research also has implications for (potential) shareholders. They can use the findings to make an inference about whether they want to keep, buy or sell shares in a company when there are rumors of an M&A.

The findings indicate that companies with a small market capitalization have more extreme CARs, both positive and negative, when compared to large market capitalization companies. Secondly, we find some evidence that paying with shares leads to a lower CAR but this effect is insignificant given the CAR is both negative and positive. We do however find evidence that in South Korea paying with shares is associated with a significantly higher CAR as compared to paying the deal in cash. The effect of the geographical area on the

CAR is also analyzed irrespective of the method of payment and market capitalization. It was found that given the CAR is negative, being an acquirer from South Korea leads to a significantly higher return, but this no longer holds given the CAR is positive. Finally, it was found that acquirers operating in the Media and Entertainment industry as well as the High Technology industry generate higher CARs.

The paper will continue as follows. First of all, existing literature is analyzed which acts as the corner stone of the hypotheses. Following this, the regression models are provided, the methodology is outlined and certain assumptions are tested to validate the chosen methodology. Then the results are analyzed and backed-up by

more literature in case necessary. Finally, the findings are summarized and a concluding section is added.

2. Literature research

2.1. Market capitalization and cumulative abnormal return

Previous research by Moeller, Schlingemann and Stulz (2003) has found that on average smaller firms (market capitalization below or equal to the 25th percentile of the NYSE, in the respective year) tend to have a higher CAR. The return for small firms is on average 2.24 percentage points (pp) lower as compared to larger firms (market capitalization above the 25th percentile of the NYSE, in the respective year). In their research they used panel data from the period 1980 until 2001 as recorded by the Securities Data Corporation, which focuses on the acquisition of US companies. They find negative dollar synergy gains as well as larger acquisition premiums amongst large acquirers. Although the findings have been very influential and the paper is well regarded in the academic world, the findings are twenty years old and have low external validity with regards to the Greater China and South Korean market.

A factor that may cause the abnormal return to be lower for firms with a high market capitalization as compared to firms with a low market capitalization is that the agency problem tends to become greater when the firm has a higher market capitalization (Demsetz, Lehn 1985). The agency problem in M&As refers to the self-interested behavior of top management (Rani et al. 2020). In many cases, it is in the self-interest of top managers to grow companies through mergers or acquisitions as it exposes them to increased bonuses and enhances their self-esteem. This self-interested behavior leads managers to undergo these expansion activities even though they may be detrimental for the company in the long-run.

An additional factor is that these managers are more prone to managerial hubris. This can be explained through successful company growth in the past, their status and they face less obstacles in the acquisition process due to larger firms having on average more resources. This leads to misaligned incentives between shareholders and management (Demsetz, Lehn 1985). The opposite is the case for small companies. In these companies a high degree of firm ownership is more common and they take more

care in undergoing M&A activities due to their limited resources. This makes their goals closer aligned to those of their shareholders (Moeller et al. 2003).

A final explanation of the lower CARs in large companies is due to the fact that they have more capital available and rather acquire firms then increase payouts to shareholders. This entails that sometimes even value destroying M&As occur in these companies (Jensen 1986). Based on the previous literature the following hypothesis can be constructed:

H1: The larger the acquiring company becomes, the lower the CAR obtained from the deal announcement.

2.2. Payment method and cumulative abnormal return

Prior research by amongst others Chang (1998) and Uddin & Boateng (2009) has shown that the payment method of the M&A can have a significant effect on the returns. This is in-line with recent research from Bessler, Kruizenga and Westerman (2020) who also focused on determining the cumulative abnormal return with regards to the announcement of an M&A. They take different time windows with regards to the announcement date to determine the effect of alternative financing sources and methods of payments. They find that debt financed deals and cash paid M&As result in the highest abnormal return. However, this is only for private targets, for public targets the bidder does not experience any positive return post-announcement. This is also consistent with the idea as outlined by Dong, Hirshleifer, Richardson and Teoh (2006); and Caneghem and Luypaert (2017). Moreover, they found that overvalued firms prefer using equity as a method of payment, as it signals to the shareholders that the firm might be overvalued and thus the CAR will be lower as investors become aware of this overvaluation. Additionally, paying cash signals an abundance of cash-flow and future investment opportunities (Liu 2022).

Goergen and Rennenboog (2004) on the other hand have contrary findings. They analyze M&A returns in the European market during the mergers and acquisitions wave of the 1990s. Their research outlines that the return is higher when the deal is made using equity as opposed to cash; hence, rejecting the overvaluation hypotheses. Although the findings differ per research, most research has found evidence for higher

returns when the deal is paid using cash. Therefore, the following hypothesis can be derived:

H2: Deals which are paid for using cash will generate a higher CAR as compared to deals paid for with shares.

2.3. M&As in North Asia

The following section will specifically focus on M&A characteristics in Greater China and South Korea as these two areas are the main units of analysis.

2.3.1. Greater China

With 12,790 completed deals in 2021, totalling $637bn (PricewaterhouseCoopers 2022), China is one of the most prominent countries in the Asian M&A market. The domestic M&A market has been rapidly developing since the beginning of the 2000s (Wang, Miao 2016). An especially interesting case is the technology sector. Due to the prevalent information asymmetries in this industry, many industry leaders pursue M&As to build their own ecosystems, by acquiring both firms in the upstream and downstream market (Liu, Yang 2022).

China is a special case in the M&A market, as the government is actively trying to promote cross-border M&As. In 2015, the Chinese State Council came up with the Made in China 2025 initiative, in which ten high technology sectors were identified that would receive support through amongst others subsidies, to boost innovation and acquire advanced technologies (Oh, No 2020). Not only does the Chinese government support companies going through with M&As, companies also take part in M&As to support the National People's Republic of China. Gordon and Milhaupt (2018) have termed these companies national strategic buyers (NSB). The presence of the NSBs makes it complicated to determine the motive behind the M&A as both economic and political incentivized M&As take place. The politically incentivized M&As tend to not be profitable for the buyer firm. Moreover, across the world politically incentivized M&As are increasingly being scrutinized (Gordon, Milhaupt 2018).

Therefore, it may be expected that in the case of M&As pursued by the Chinese the return will be lower as compared to other countries in East Asia.

2.3.2. South Korea

As one of the largest e-commerce markets in today's globalized world (Jobst 2022), South Korea is gaining increasing importance in the M&A market (Liu, Yang 2022). This can also be seen by the main industries in which M&As occur namely; e-commerce, green transition, high tech and media & entertainment, which is largely in line with the most prominent areas for M&As in the west. The biggest reason as to why South Korean firms initiate domestic M&As is for strategic organizational restructuring, with the primary goal to strengthen the core competencies of the acquiring firm. Some South Korean businesses even sell profitable assets in order to secure enough liquidity for strategic acquisitions (Liu, Yang 2022). This is vastly different from the Greater Chinese approach, where many M&As are happening in order to control all parts of the supply chain. Moreover, in South Korea many acquisitions are done with the purpose of long-term profitability. This however may affect the CAR negatively as it will take a while before the acquisition turns profitable (Liu, Yang 2022). Nevertheless, due to the politically incentivized M&As done in China, the return on South Korean M&As is still expected to be higher, as can be seen in hypothesis 3.

H3: Deals done with a Chinese acquirer generate lower CARs as compared to deals involving a South Korean acquirer.

3. Data

In the following section an overview is provided of the selection methods for the data. The procedures used mostly follow those such as outlined by Bessler et al. (2020). Moreover, in this section information and descriptive statistics are provided for the dependent, independent and control variables.

3.1. Data description

Almost all the data used for the research has been obtained from Refinitiv's EIKON database. The exception to this is the data regarding the founding date of the acquirer in a few instances. This data was found by using Yahoo Finance and Bloomberg. The sample consists of M&As announced in the ten-year period lasting from 01-01-2013 until 01-01-2023. Additionally, the dataset only includes deals announced between companies that have their headquarters in East Asia. Due to a large amount of incomplete information, observations from Mongolia, North Korea, Taiwan and Japan were excluded from the dataset, leaving only Greater China (including Hong Kong) and South Korea. The acquiring company must be publicly listed, so that the information regarding the stock prices in the period surrounding the event can be obtained. However, the target includes both public and private firms. Furthermore, the deal value must be at least 1 million USD and the deal must have been completed. The initial dataset consisted of 12,469 observations (including private acquirers and other countries in East Asia). After filtering out the missing values and private firms, 469 deals remain in the dataset. It needs to be noted that during the filtering process one observation got removed regarding a deal done by Lumens Co Ltd. This company only went public in 2020 and thus was private during the time of the M&A announcement (22-12-2014). Henceforth, no data regarding the PermID could be obtained. Secondly, there were 3 companies that had their announcement date prior to their founding date and for one company no information regarding their founding date could be retrieved. Accordingly, these observations were also deleted from the dataset. Of the remaining 469 deals, 261 have a positive CAR [-3; +1] and 201 a negative CAR [-3; +1]. The filtering process can be seen in Table 1.

Table 1. Selection criteria sample

Criteria deals remaining

Deals announced in East Asia	12,469
Market capitalization of the buyer available	4,383
Total assets and liabilities of the buyer available	1,325
Acquirers PermID available	1,324
Number of employees of the buyer available	713
Founding date buyer available	709
Fully paid in either shares or cash	580
Change in stock prices [-3; +1] & [-1; +3]: $\neq 0$	462
Final dataset	462

Source: author's own research.

3.2. Variables

3.2.1. Dependent variable

In this event study the dependent variable refers to the percentage increase in share price in the time period three day before the deal announcement to one day after the deal announcement [-3, +1]. The share price of both dates has been obtained from EIKON and the percentage change has been calculated as follows:

$$CAR\ [-3;\ +1] = \frac{stock\ price^{+1} - stock\ price^{-3}}{stock\ price_{-3}} \tag{1}$$

The observations that had a CAR of exactly zero were discarded as mentioned in Table 1. This was done as it can be assumed that either the data retrieved from Refinitiv's EIKON was incorrect or the market already had perfect information about the announcement of the M&A, in which case including these deals in the research is not useful. Subsequently, the percentage change in stock price has been divided into

two categories: positive and negative. This is done as the average CAR [-3; +1] of all the deals is close to zero (mean=1.413), thus the results of the regression are likely to be insignificant when not split into positive and negative. More importantly, when running separate regressions, a more nuanced picture can be obtained of the effect of different actors which impact the CAR.

Finally, to check the robustness of the findings, the regressions are also run using the time window [-1; +3], which follow the same calculation method as in formula 1.

3.2.2. Independent variables

The first independent variable measures size, in terms of market capitalization in million USD (*MarketCap*), of the acquirer four weeks prior to the announcement of the deal. It is calculated by multiplying the number of outstanding shares by its corresponding share price on the respective day. The variable has been winsorized at the 95% level to get rid of the few large outliers present in the sample, which greatly reduced the skewness and kurtosis of the variable.

The second independent variable is the method of payment. As this is a categorical variable, a dummy variable needs to be used, which is specified as follows:
 • Payment method= [shares=0, cash=1]
All the observations which could not be specifically categorized as either fully shares or fully cash have been removed from the data set, as described in Table 1.

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3.2.3. Control variables

In this research three company specific control variables are used, namely; Debt, Employee and Age. These control variables are similar to the firm specific control variables used in other studies, for example Vagenas-Nanos (2020); Caneghem and Luypaert (2017); and Bessler et al. (2020). The variable Debt refers to the debt ratio of the acquiring firm, which has been obtained by taking the ratio of total assets to total liabilities during the year of the announcement. The control variable Age refers to the age of the company during the time of the announcement and has been found on Refinitiv's EIKON by taking the difference in founding date and announcement date in completed years. Finally, the variable Employee refers to the number of employees working at the acquiring firm during the year in which the deal was announced.

In this research, the control variable Employee has been winsorized at the 95% level. This has been done to address the presence of a few large outliers, which substantially inflated the skewness and kurtosis of the distribution. Moreover, Debt has been winsorized at the values of 1 and 0.

As a final step, the variables Employee and Age have been transformed by taking the natural logarithm, with as goal of making the distribution of these control variables normal. This approach is common in this field of research, as can be observed from amongst others Bessler et al. (2020) research, in which they take the natural logarithm of overall asset value as a measure of firm size.

3.3. Sample distribution

Table 2 indicates the proportion of the deals per headquarter nation. As can be observed from the data, the majority of deals have been made by South Korean companies (58.87%). Furthermore, it is noteworthy that 58.87% of the target companies are also based in South Korea. From the deals made by Chinese acquirers, four were initiated by Hong Kong companies. As for the targets, three companies from Hong Kong were involved.

Table 2. Distribution of acquirer and target headquarter

Acquirer			*Target*		
Acquirer headquarter	Frequency	% of total	Target Headquarter	Frequency	% of total
South Korea	272	58.87	South Korea	272	58.87
Greater China	190	41.13	Greater China	190	41.13
Total	462	100%	*Total*	462	100%

Source: author's own research.

Table 3. Distribution of the acquirers and targets macro-industry

	Acquirer			**Target**	
Acquirer macro-industry	Frequency	% of total	Target macro-industry	Frequency	% of total
Industrials	103	22.29	Industrial	94	20.35
High Technology	82	17.75	High Technology	91	19.70
Materials	57	12.34	Materials	52	11.26
Financials	49	10.61	Financials	40	8.66
Products & Services	32	6.93	Products & Services	35	7.58
Consumer Staples	26	5.63	Healthcare	34	7.36
Energy & Power	24	5.19	Consumer Staples	27	5.84
Media & Entertainment	22	4.76	Media & Entertainment	25	5.41
Telecommunications	19	4.11	Energy & Power	20	4.33
Retail	15	3.25	Real Estate	15	3.25
Real Estate	3	0.65	Telecommunications	15	3.25
			Retail	14	3.03
Total	462	100	*Total*	462	100

Source: author's own research.

Table 3 displays the frequencies and the percentage of total deals per industry. As can be seen from the table the majority of the acquirers as well as targets are operating in the "Industrials" macro industry. This is closely followed by "High Technology". This is in alignment with the expectations as South Korea is a prominent player in the

High Technology sector and Greater Chinese firms are incentivized by the government to pursue M&As specifically in this industry.

4. Methodology

4.1. Event study methodology and time window

In this research a nested methodology will be adopted, combining elements from an event study with regression analysis. Events studies are often used to analyze the reaction of shareholders to M&A announcements (Aybar, Ficici 2009) as it captures the immediate effect of the announcement on the stock price by taking a small-time window surrounding the event. In this research an event window of [-3; +1] days was taken as well as a window of [-1; +3] days, to check the robustness of the prior findings. In these time windows, day zero refers to the announcement day of the M&A.

In a perfect world the shareholder reacts instantaneously to the announcement of the deal and thus the full effects of the announcement can be captured in a very small-time window surrounding the announcement. This theory is however less applicable in Greater China and especially South Korea due to the presence of data/deal leakage (Ke 2022). Prior research found that in the past 20 years South Korea has been consistently in the top of countries with the most deal leakages worldwide. In 2019, they even had the most leakages worldwide with an estimate of 19.6% leaked deals (SS&C, Intralinks 2020). Information leakage results in biased stock prices prior to the announcement date. This makes it more difficult to determine the true reaction of shareholders on the M&A announcement, as part of the shareholders reaction is already reflected in the price prior to the announcement. Henceforth, to control for deal leakage a large time window is taken with regards to the days prior to the announcement; namely that of [-3; +1].

4.2. Regression models

Ordinary Least Squared (OLS) is used to analyze the effect of market capitalization and payment method on the CAR of the security. The first two regressions test the effect of market capitalization and payment method on the CAR

respectively. The third regression focusses on the effect the method of payment has on the CAR in the two different geographical areas and the fourth regression tests the effect of geographical area on the CAR in general. The first hypothesis will be tested by utilizing the following regression model:

(1) $R_i[-3; +1] = \beta_0 + \beta_1 MarketCap_i + \beta_2 \ln(Age_i) + \beta_3 \ln(Employee_i) + \beta_4 Debt_i + \varepsilon_i$

In this model $R_i[-3; +1]$ relates to the percentage change in stock price three day prior to the announcement and one day after, for security i. Secondly, $MarketCap_i$ refers to the market capitalization of the acquiring firm four weeks prior to the announcement in million USD. Thirdly, the first control variable Age_i refers to the age of the acquiring company, as measured during the year of the announcement. Similarly, the control variable $Employee_i$ refers to the total number of employees that were working for the acquiring company during the year of the announcement. The last control variable; $Debt_i$ refers to the ratio of total liabilities to total assets of the acquiring company. Finally, β_0 is the intercept, ε_i the error term and β_1, β_2, β_3 and β_4 are the coefficients of $MarketCap_i$, Age_i, $Employee_i$ and $Debt_i$ respectively. To test how the payment method of the deal effects the CAR, the following regression model will be employed:

(2) $R_i[-3; +1] = \beta_0 + \beta_1 PayMeth_i + \beta_2 \ln(Age_i) + \beta_3 \ln(Employee_i) + \beta_4 Debt_i + \varepsilon_i$

In this model $PayMeth_i$ is a dummy variable indicating how the deal is paid for. It holds a value of one when it is paid by cash and a value of zero when it is paid in shares.

The third regression refer to the effect the method of payment has on the CAR in the two different geographical areas. This is done by making the second regression model conditional on the $Area_i$, resulting in the following regression model:

(3) $(R_i[-3; +1] | Area_i) = \beta_0 + \beta_1 PayMeth_i + \beta_2 \ln(Age_i) + \beta_3 \ln(Employee_i) + \beta_4 Debt_i + \varepsilon_i$

The final regression tests whether the location of the acquirer has a significant impact on the CAR, irrespective of the method of payment and the acquirers' market capitalization. This is tested by adding $Area_i$ as a dummy variable into the regression. The variable is specified as follows:

[Greater China=0; South Korea=1]. Accordingly, the regression becomes the following:

$$(4)\ R_i[-3; +1] = \beta 0 + \beta 1 Area_i + \beta 2 \ln(Age_i) + \beta 3 \ln(Employee_i) + \beta 4 Debt_i + \varepsilon_i$$

4.3. Descriptive statistics

In order to perform an OLS regression, the variables need to be tested for amongst others skewness and kurtosis. This will be done in the following section.

Table 4 indicates the company characteristics of the acquiring firm. The variables Debt and ln(Employee) both have a kurtosis less then, but close to, three. This indicates that the distribution is slightly leptokurtic, meaning the tails are heavier as compared to normal. The variable ln(Age) has a kurtosis approximately equal to 3, indicating that it is mesokurtic. The only relevant variable which has a relatively high kurtosis is MarketCap, with a value of 9.569. This is significantly different from 3 which may become a problem when performing OLS regressions. The second independent variable PayMeth also has a high kurtosis but since this is a dummy variable analyzing the kurtosis is not relevant. The variable Area on the other hand has a relatively low kurtosis but again this is a dummy variable thus the low kurtosis is not a cause for concern.

When analyzing the skewness; ln(Employee), ln(Age), Debt and Area all have a skewness within the range [-1; +1], indicating that they are not significantly skewed. The variable MarketCap on the other hand is more problematic, with a positive skewness of 2.768. The skewness for PayMeth is also significant with a value of 3.605. This indicates that a disproportionate number of deals had a value of one. This can also be inferred by analyzing the mean of the variable, which is .936. This indicates that 93.603% of the deals are paid fully with cash and the remaining 6.397% of the deals are fully paid for by shares, referring to 439 and 30 deals respectively.

The limited sample of share deals makes it difficult to make good inferences of the findings; hence, reducing the external validity of the research.

In conclusion, based on the shape of the distribution of the independent and control variables, it can be assumed that OLS is appropriate, as the majority of the data is normally distributed. Nevertheless, caution needs to be taken in making generalizable conclusions based on the method of payment.

Table 4. Characteristics of the acquiring firm

	Mean	**Median**	**Min**	**Max**	**Std. Dev**	**Skewness**	**Kurtosis**
MarketCap	2,265.004	541.834	.847	1,7942.32	4457.977	2.74159	9.409603
PayMeth	.9372294	1	0	1	.2428128	-3.605275	13.99801
ln(Employee)	6.585412	6.629342	1.386294	10.04238	1.841969	-.1548768	2.801392
ln(Age)	3.059475	2.995732	.6931472	4.644391	.6538184	-.0362967	3.0266
Debt	.5487853	.5523402	0	1	.2718825	-.1226338	2.171656
Area	.5930736	1	0	1	.4917935	-.3789171	1.143578

The variables MarketCap, Debt and ln(Employee) are winsorized at the 95% level. ln(Age) has one missing variable as one buyer has an age of zero; consequently, the natural log cannot be taken.
Source: author's own research.

4.4. Further assumptions

In order to apply OLS, a couple of other assumptions need to hold, as outlined by Gauss-Markov. These assumptions include the following; (1) the error terms should be uncorrelated, (2) the sample is independent and identically distributed (i.i.d.), (3) must have finite fourth moments, (4) contain no multicollinearity and (5) have a constant variance in the error terms (Hanck et al., 2023).

The third assumption has already been tested in section 4.3, and shows that besides for the variable MarketCap, the distribution of the variables can be assumed to be normal. The sample can further be assumed to be mostly i.i.d., as all the deals in the time period, for which information was available, have been included in the sample. There was however a lot of missing data for all the deals, so many observations had to be removed, which may have introduced a bias into the sample, as there could be an underlying reason for the absence of certain information. The

fifth assumption regarding endogeneity is outside the scope of this analysis, as the data is cross-section of nature which makes directly testing for endogeneity using longitudinal techniques nonfeasible. The final two assumptions regarding heteroscedasticity (assumption 1) and multicollinearity (assumption 4) will be discussed in the following sub-sections.

4.5. Heteroscedasticity

An important assumption that needs to hold in order to perform OLS is that the data is homoscedastic. Therefore, a Breusch-Pagan test has been performed. A Chi-square value of 13.62 was found, which is statistically significant at the 1% level. This indicates that the null hypothesis of equal variances is violated and thus there is a problem of heteroscedasticity. To correct for this, the White robust standard error will be used throughout the regressions.

4.6. Correlation analysis

Secondly, in order to fully understand the effect of the independent and control variables, it is important that these are not highly correlated. Hence, no multicollinearity should be present in order to apply OLS techniques. To test this, a Pearson correlation matrix has been created as can be seen in Table 5. The majority of the variables have a correlation close to zero, which indicates that performing OLS will not be problematic. The variables with the largest correlation are MarketCap and ln(Employee) with a correlation of 0.413 and ln(Employee) and Area with a correlation of -0.3863. When taking the commonly used threshold of 0.7, the correlations are still a lot lower. Thus, indicating that in this sample multicollinearity is not a substantial problem.

A second way to test for multicollinearity is by using VIF values, which are displayed in Table 6. As can be seen from the table, all VIF values are far below 10 which is indicative of no substantial multicollinearity, confirming our prior predictions.

Table 5. Correlation matrix

	MarketCap	PayMeth	ln(Employee)	ln(Age)	Debt	Area
MarketCap	1					
PayMeth	-.1476	1				
ln(Employee)	.4160	-.0668	1			
ln(Age)	.0985	-.1019	.1258	1		
Debt	.0835	.0394	-.0356	-.0686	1	
Area	.0835	-.1605	-.3863	.3994	.0789	1

Source: author's own research.

Table 6. Variance Inflation Factor

Variables	VIF	1/VIF
MarketCap	1.21	.826044
PayMeth	1.06	.943577
ln(Employee)	1.69	.590661
ln(Age)	1.36	.735376
Debt	1.03	.969696
Area	1.70	.588659

Source: author's own research.

5. Results

5.1. The effect of market capitalization on CAR

Firstly, the effect of market capitalization on the CAR for the time window [-3 +1] is analyzed and the results are displayed in Table 7, models 1.1 and 1.2. Having a high market capitalization has a considerable negative effect on the CAR during the announcement period, given the CAR is positive. On average an increase in market capitalization of 1 million USD reduces the CAR by 0.001 percentage point (pp) ceteris paribus. This effect is significant at the 10% level, thus providing support for H1. The model itself is also significant at the 1% level, indicating that the model does a good job in explaining the change in CAR [-3: +1], given it is positive. This is in-line with the findings of Vagenas-Nanos (2020) and Dong et al. (2006). The argument

is that the agency problem tends to be greater in firms with a higher market capitalization, thus they may undergo an M&A even though it is not in the best interest of the company. Secondly, managerial hubris is greater in larger companies, resulting in managers being overconfident in benefitting from synergies. Finally, managers may prefer to undertake an M&A as a way to spend cash as opposed to paying out dividends.

Table 7. The effect of market capitalization and payment method on the CAR [-3; +1]

	Positive CAR	Negative CAR	Positive CAR	Negative CAR
Event window	[-3: +1]	[-3; +1]	[-3: +1]	[-3: +1]
MarketCap	-.0001033*	.0001309**		
	(.0000615)	(.0000517)		
PayMeth			.4270037	2.613482
			(1.525166)	(4.444161)
ln(Age)	1.290771*	-.3588252	1.269302	.5313654
	(.7511388)	(.2278976)	(.7733903)	(.5829896)
ln(Employee)	-1.091434***	.5075242	-1.20874***	-.2049944
	(.3683914)	(.569336)	(.3431979)	(.1965734)
Debt	-.7938067	.7908541	-.9703711	.8409612
	(1.910692)	(1.288616)	(1.898631)	(1.137531)
Constant	10.04586***	-4.603193***	10.35358***	-7.915493
	(3.123245)	(1.666514)	(3.306065)	(5.489962)
Observations	261	200	261	200
R-squared	.0767	.0198	.0743	.0198
F-statistic	6.69***	1.78	4.06***	.41

*, **, *** *Statistically significant at the 10%, 5% and 1% level respectively. The value in brackets indicates the robust standard error*.
Source: author's own research.

The effect of market capitalization on the CAR given it is negative is analyzed in model 1.2. In the model, the effect of market capitalization is positive, as an increase of 1 million USD leads to an increase in CAR [-3; +1] of 0.001pp ceteris paribus. This effect is significant at the 5% level. This finding opposes the previous findings in model 1.1; hence, following these findings H1 should be rejected. A plausible explanation for this reverse relationship is related to the risks attached to holding a

share in a low-market capitalization company. Small-cap firms tend to have greater than average volatility in stock prices as compared to high-cap firms (Jackson, Curry 2023). This is the case due to amongst others the small-cap firms being more illiquid, having less access to capital and being less diversified, thus bearing greater risks (Jackson, Curry 2023). This would explain the findings that either being a small-cap firm leads to significantly high returns given the return is positive and significantly negative returns when the CAR is negative as compared to high-cap firms.

Table 8. The effect of market capitalization and payment method on the CAR [-1; +3]

	Positive CAR	Negative CAR	Positive CAR	Negative CAR
Event window	[-1: +3]	[-1; +3]	[-1: +3]	[-1; +3]
MarketCap	-.0000805* (.0000442)	.0000282 (.0000641)		
PayMeth			-1.54332 (1.496123)	7.112388 (6.608218)
ln(Age)	.2745937 (.4250506)	.9029833 (.6899694)	.2058495 (.4370793)	1.195744 (.860728)
ln(Employee)	.0047143 (.1966228)	.1383216 (.2808139)	-.0954719 (.1801971)	.1905204 (.2341683)
Debt	-1.827164 (1.20147)	1.678606 (1.595453)	-2.030203* (1.17747)	1.453603 (1.336235)
Constant	5.429724** (2.253336)	-8.927421*** (2.192649)	7.617433*** (2.741946)	-16.81169*** (8.526416)
Observations	252	209	252	209
R-squared	.0200	.0148	.0221	.0675
F-statistic	2.10*	1.78	1.20	1.76

*, **, *** *Statistically significant at the 10%, 5% and 1% level respectively. The value in brackets indicates the robust standard error.*
Source: author's own research.

The effect of market capitalization on the CAR is also analyzed in Table 8 models 1.3 and 1.4, for the time window [-1; +3]. The results are largely in line with the previous findings. MarketCap also has a negative effect on the CAR, given this is positive. This time an increase of 1 million USD in MarketCap amounts to a decrease in CAR [-1; +3] of -.0001pp ceteris paribus.

It can be concluded that having a high market capitalization indeed reduces the CAR, but this only holds for a CAR that is positive. Hence, H1 is only supported in case the CAR is negative.

5.2. The effect of payment method on CAR

Secondly, the effect of the payment method on the CAR [-3; +1] is analyzed in Table 7 models 2.1 and 2.2. It is hypothesized that deals paid fully in cash will result in a higher CAR, due to a lower chance of the buyer being overvalued. It is found that deals paid fully in cash indeed result in higher CARs [-3; +1] given the CAR is positive as well as negative. When the CAR [-3; +1] is positive, paying in cash leads to an increase in CAR of 0.427pp ceteris paribus and when the CAR [-3; +1] is negative, paying in cash results in an increase of 2.613pp ceteris paribus. This is in-line with the findings of amongst others Bessler et al. (2020). The effect of the payment method is however insignificant at the 10% level, given the CAR is negative as well as positive.

After closer inspection of the data, it is found that the deal which led to the lowest CAR [-3; +1] in the sample was paid for by shares. The deal in the sample which resulted in the highest CAR [-3; +1] on the other hand was paid for by cash, again providing support for H2.

Models 2.3 and 2.4 in Table 8 analyze the effect of payment method on the CAR [-1; +3]. Although insignificant, it is interesting to note that paying with cash in this case results in a lower CAR as compared to deals paid for in shares, given the CAR is positive. Concretely, paying with shares will lead to a reduction in CAR [-1; +3] of 1.543pp ceteris paribus. This opposes the findings from Table 7. The effect of paying cash is nevertheless still positive given the CAR is negative, which is in-line with the previous findings, but also in this case the effect is found to be insignificant, thus no real inferences can be made.

It can therefore be concluded that there is insignificant evidence to reject our null hypothesis. Henceforth, no evidence is found that cash deals result in significantly higher CARs for the acquiring firm. A plausible explanation for the low statistical significance is that only a small number of deals are paid for fully in shares, specifically only 6.277%. This entails that the population parameters have low precision and hence have high p-values, which increases the chance of obtaining

insignificant findings. A second explanation may be that Area acts as a moderator which causes the average difference in CAR to be close to zero. Thus, to test this hypothesis PayMeth is analyzed for Greater China and South Korea separately. The regression can be found in Table 9. This time around the regression of payment method on the CAR [-3; +1] is not split into positive and negative as this would further reduce the already limited number of cash deals, which would plausibly lead to inaccurate/insignificant results. For the effect of payment method on the CAR [-3; +1] in Greater China, no significant difference between the return based on payment method is found. Notwithstanding, the coefficient for PayMeth is positive, which indicates that cash payment results in higher short-term returns, which is in-line with the predictions. This effect is robust for the time window [-1; +3].

The case is different for South Korea. Here it is found that paying for a deal by shares increases the CAR [3; +1] with 3.090pp ceteris paribus. This effect, as well as the model itself, are significant at the 5% level. Moreover, the findings are robust with regards to the time widow [-1; +3]. This opposes the majority of the empirical evidence that recommends cash deals for achieving a higher short-term return.

There is however a small niche of literature that provides support for the finding that share deals lead to a higher CAR, with regards to the high tech/R&D heavy industries. Previous literature by Kohers and Kohers (2000) report for instance that in the High Technology industry the CARs are relatively high (see also section 6.4), and are not dependent on the payment method. Officer, Poulsen and Stegemoller (2009) even reports higher returns in stock-swap acquisitions of targets with idiosyncratic return volatility and high R&D intensity.

The first explanation is that the shareholders from the target firm are more prone to keep a stable level of ownership when the deal is financed with shares being important and beneficial due to the complexity of the industry (Shantanu, Vinod 2009). The second reason is related to risk. In the High Technology industry risk tends to be higher, thus share payments offer the opportunity to share the risk of overvaluation of the target firm (Hansen 1987) and to lower information asymmetries (Officer et al. 2009). Finally, in cash deals it often happens that the top management of the target firm changes, which may be problematic in the post-acquisition phase for High Technology companies (Shantanu, Vinod 2009).

As South Korea is a large player in the High Technology industry, the returns tend to be higher in this industry and share deals are more frequent (Shantanu, Vinod 2009), which may explain why they result in a higher CAR.

Moreover, it can be the case that due to certain cultural values in South Korea, shareholders are less likely to be of the opinion that the acquiring firm is overvalued. South Korea is one of the most pragmatic countries worldwide, with a score of 100 out of 100 on the Hofstede dimension of Long-Term Orientation (Hofstede Insights 2023). This entails that companies prioritize steady growth as opposed to one-off profits. Moreover, they care for the society and their stakeholders whilst keeping the future in mind (Hofstede Insights 2023). M&As fully paid for in shares create a shared interest in the company thus long term relationships can be built between the acquirer and target which might be more valuable in South Korea as compared to other geographical areas, including but not limited to Greater China. Despite these possible explanations, further research is necessary to make a clear inference about the causes of the finding that share payments lead to a significantly higher CARs [-3; +1] as compared to other countries.

Table 9. Effect of the method of payment on the CAR per geographical area

	Greater China	South Korea	Greater China	South Korea
Event window	[-3: +1]	[-3; +1]	[-1; +3]	[-1; +3]
PayMeth	17.19833	-3.090034**	25.97437	-3.957208***
	(12.09201)	(1.360902)	(17.1373)	(1.512231)
ln(Age)	1.019362	.0586436	1.393091	-0.137145
	(1.093665)	(.7924643)	(1.176466)	(.53481)
ln(Employee)	-.7357823*	-.729295**	.0484399	-.1049165
	(.4035757)	(.3449318)	(.3278472)	(.2260547)
Debt	-.9952851	1.326164	.2468822	-1.105305
	(1.786293)	(2.324006)	(1.714678)	(1.47852)
Constant	-12.96592	8.103987***	-28.64271	5.46953
	(13.317)	(3.077965)	(18.38481)	(2.992162)
Observations	188	273	188	273
R-squared	.0993	.0263	.1706	.0327
F-statistic	1.55	2.66**	.83	1.90

*, **, *** *Statistically significant at the 10%, 5% and 1% level respectively. The value in brackets indicates the robust standard error.* Source: author's own research.

5.3. CAR in Greater China vs South Korea

The differences in CARs between South Korea and Greater China are analyzed in Table 10, by the inclusion of a dummy variable indicating the origin of the acquirer.

Table 10. Effect of geographical area on the CAR

	Positive CAR	Positive CAR	Negative CAR	Negative CAR
Event window	[-3: +1]	[-3; +1]	[-3; +1]	[-3; +1]
Area	1.752234* (.9233066)	-.8456612 (.9708889)	1.799378** (.8922028)	1.649981** (.7741221)
ln(Age)		1.5637* (.9170019)		.0159543 (.5470548)
ln(Employee)		-1.316815*** (.3662225)		-.0691867 (.2099075)
Debt		-.9005776 (1.898406)		.5925163 (1.244085)
Constant	5.085405*** (.489262)	11.01327*** (2.885837)	-5.771935*** (.7710012)	-5.605944*** (1.693224)
Observations	261	261	201	200
R-squared	.0119	.0758	.0230	.0236
F-statistic	3.60*	4.07***	4.07**	1.22

*, **, *** *Statistically significant at the 10%, 5% and 1% level respectively. The value in brackets indicates the robust standard error. Area is a dummy variable which equals to one when the company is from South Korea.* Source: author's own research.

In models 4.1, 4.2 and 4.4, Area is positive and significant at the 10% level for the prior model and at the 5% level for the latter two models. This indicates that being an acquirer from South Korea increases the CAR [-3; +1] in these cases. After adding all the control variables in the regression, for the case in which the CAR is positive, a different picture emerges. As seen in model 4.2, the effect of Area on the CAR turns negative, albeit that this effect is insignificant at the 10% level. Comparable results are found when analyzing the effect of the Area on the CAR for the time window [-1; +3], as analyzed in Appendix A. For this time window a positive relationship is found between Area and the CAR, given the CAR is negative. Given the CAR is positive no statistically significant relationship is found between Area and the CAR. The reason being that politically incentivized M&As in Greater China have a non-economic motive according to Gordon and Milhaupt (2018). Therefore, it is plausible to assume that most of the NSBs realize negative CARs; hence, the negative effect associated with these NSBs is only observable in case the CAR is negative. Thus, deals related

to positive CARs are likely not done by NSBs and therefore no significant difference in the realized CARs is observable between Greater China and South Korea.

It can be concluded that hypothesis 3 is partially supported, as South Korean firms do tend to outperform Greater Chinese firms when the CAR is negative, but this effect no longer holds given the CAR is positive.

5.4. CAR in the Media and Entertainment & High Technology Industry

The Technology, Media and Telecommunications (TMT) industry is rapidly advancing and gaining an increasing share in the worldwide M&A market (PricewaterhouseCoopers 2022). One of the key leaders in this industry is South Korea. Their dominant position has grown large over the past years, with the increasing popularity of South Korean dramas, music, games, etc. Moreover, South Korea benefits from a good ICT infrastructure, which makes it an even better country for companies within the TMT sector to flourish (International Trade Administration 2022). The popularity of this industry is also reflected in the amount of M&As within this field. In the sample, 21 out of the 23 buyers that operate in the Media and Entertainment industry are from South Korea. Because of the increasing popularity of South Korean TMT companies and the positive future outlooks, it is expected that the CAR will be higher for this industry as opposed to other industries. In China on the other hand, the TMT industry is less developed which is reflected in the number of deals that occurred in this area. The two Greater Chinese acquirers operating in the TMT industry in the sample are Bluefocus Commun Grp Co Ltd and Shanghai New Culture Media. The deal initiated by the prior acquirer reached a CAR of 2.840, which is slightly above the average CAR of all other industries in the sample. The latter deal resulted in a CAR of 7.536, which is far above average.

To test the hypothesis that the average CAR is greater in the Media and Entertainment industry as compared to the other industries, a two-sample t-test is performed. As the ratio between the sample variances is less then 4, equal population variances can be assumed. Thus, the following formula will be applied:

$= \frac{\overline{x_1}-\overline{x_2}}{\underline{\qquad}}$, where $s_p{}^2$ is the pooled standard deviation, which is equal to:

(2)

$$\sqrt{\frac{s_p^2}{n}} + s\text{-}p\ 2$$
$$n$$

$$s_p{}^2 = \frac{(n_x-1)s_x^2+(n_y-1)s_y^2)}{(n_x+n_y-2)} = \frac{(22-1)8.96788591.+(440-1)8.82938788)}{(22+440-2)} = 8.836$$

(3)

The test statistic becomes: $\sqrt{\dfrac{4.646939-1.24160081}{\frac{8.83571062}{22}+\frac{8.83571062}{440}}} = 5.244$

The critical value is equal to $t_{23+446-2,0.05} \approx 1.645$. As the test statistic is greater than the critical value, the null hypothesis of equal means can be rejected. In conclusion, there is significant evidence that the mean of Media and Entertainment is greater than that of the category Others. This is in-line with the previously stated predictions.

A second particularly interesting industry is the High Technology industry. This industry is of importance in both countries. In China this is reflected in the incentives offered by the government such as those outlined in the Made in China 2025 initiative. South Korea is also a prominent leader in the High Technology industry. In the past couple of years, they have consistently been ranked in the top 10 of the Global Innovation Index (World Intellectual Property Organization 2022). As this industry is important to both countries, and has grown substantially in the past decade, it is expected that the CAR in this industry will be higher as compared to that of other industries within the sample. To test the difference in means between Media & Entertainment and the category Others, formula 2 and 3 will be applied. The calculations can be found in Appendix B.

The test statistic of 5.703 is greater than the critical value of 1.645, thus we can reject the null hypothesis of equal means. In conclusion there is significant evidence that the mean CAR [-3; +1] of the High Technology industry is greater than that of the category Others, which is in-line with the theoretical predictions. Previous

research by amongst others Canace and Mann (2014); Shantanu and Vinod (2009), and Kohers and Kohers (2000) also support these findings.

6. Conclusion & implications

6.1. Conclusion

The main goal of this study was to determine the effect of the acquirers' market capitalization and the method of payment on the short-term return of the acquiring company during an M&A announcement in South Korea and/or Greater China. Studying these in conjunction is relevant, as the problem of asymmetric information increases when the target increases. Asymmetric information in this case refers to the target firm having more accurate knowledge about the actual value of its firm. Given the asymmetry is high, the acquirer prefers share payments to divide the burden, in the case of post-acquisition revaluation. Consequently, the larger the acquiring firm ceteris paribus, the less likely shares are used as a method of payment (Hansen 1987). Moreover, larger firms tend to have more cash on hand, thus leading them to prefer cash payments.

To analyze this, a sample of 462 deals was taken in the time period 01-01-2013 to 01-01-2023 from Refinitiv's EIKON. A nested methodology was used, combing elements from an event study with regression analysis. It was expected that acquiring firms with a high market capitalization will have a lower cumulate abnormal return as compared to companies with a low market capitalization. The reason for this negative relationship can be attributed to a couple of reasons. Firstly, the agency problem tends to be greater in companies with a high market capitalization, leading to a miss-alignment in incentives. Secondly, managerial hubris tends to be more widely present in larger firms, thus they tend to be overconfident in realizing synergies. Finally, these companies have more capital available and may therefore be more inclined to acquire firms as opposed to increasing shareholder payouts. This research partially supports these previous findings, as having a high market capitalization indeed reduces the CAR, but this only holds for the case in which the CAR is positive. Given the CAR is negative, it was found that having a high market capitalization is associated with a reduction in the negativity of the CAR. Henceforth, small market capitalization firms

either produce significantly high returns or significantly negative returns, whereas the returns for large market capitalization companies are more closely centered at zero. These more extreme negative CARs can be explained by the increased risk small-cap stocks hold as a consequence of the company being more illiquid, less diversified and having on average higher volatility. It can therefore be concluded that H1 is supported in the case the CAR is positive, but is not supported in case the CAR is negative.

Secondly, the effect of paying with shares as opposed to cash on the CAR is analyzed. It was expected that paying the deal by using shares will result in lower CARs as share payments are often indicative of overvaluation. From the regression it was found that paying by using shares indeed results in a lower CAR [-3; +1] given it is both positive and negative. Nevertheless, this effect is not statistically significant and not robust. Henceforth, no support is provided for H2. Additionally, the effect of the payment method is analyzed for the two geographical areas separately. In Greater China it was found that paying with cash results in higher CARs, but this effect was also found to be statistically insignificant. On the other hand, in South Korea paying the deal by using shares results in significantly higher CARs. This can be related to the South Korean culture, which scores extremely high on the Hofstede dimension of Long-Term Orientation. Moreover, South Korea is a leader in the High-Tech industry in which paying with shares is found to be beneficial.

Thirdly, the effect of the geographical area in general is analyzed. It was found that South Korean acquirers on average realize higher CARs as compared to Chinese acquirers, in case this is negative. This can be explained by the politically incentivized M&As that take place in Greater China, which tend to not be profitable. This explains why the CAR in Greater China is lower. Being an acquirer from South Korea however does not lead to a significantly higher CAR. Henceforth, H3 is supported in case the CAR is negative, but not in the case when the CAR is positive.

Finally, the industries of Media and Entertainment as well as High Technology are analyzed separately and compared to all other industries within the sample. These two industries are prominent industries especially in South Korea and have been, and still are rapidly developing. Both industries are found to lead to a significantly higher CAR. This is attributable to the increasing popularity and optimistic outlooks in both industries.

6.2. Implications for future research

This research comes with certain limitations. First of all, markets may not react instantaneously. Although two different time windows were included to analyze the effect of the two independent variables on the CAR, more and larger time windows can be included to account for this problem.

Secondly, there are multiple ways to calculate the cumulative abnormal return. In this research, simply the percentage difference between the stock price prior to and after the announcement is taken, neglecting other effects that may alter the stock price. To account for this, a more sophisticated model can be used such as the capital asset pricing model (CAPM) or the market model.

Moreover, the sample included a limited number of deals that were paid for fully in shares. This makes it more difficult to make accurate inferences about the effect the method of payment has on the CAR. According to previous research the use of stock is linked to a lower likelihood of deal completion (Huang et al. 2016). Thus, there may be a selection bias present in the sample as these deals are filtered out. Therefore, it can be recommended for further research to also include deals which were not completed, to increase the number of share deals.

Finally, more research can be done regarding the reasons between the significant difference in CAR between South Korea and Greater China. Specifically, regarding why paying with shares results in a higher CAR in South Korea, as this opposes the majority of the previous findings. This can be done by including primary data in the form of interviews or surveys to figure out the rationale as to why managers decide to choose share payments as opposed to cash. Moreover, extra regressions can be run in which the CAR is conditional on the payment method. It can be made conditional on paying with shares and accordingly can be regressed on for example dummy variables for the specific sectors, to test the hypothesis that share payment in the High Technology sector are linked to higher CARs.

6.3. Managerial implications

This research may be of use to managers in South Korea or Greater China that are considering acquiring or merging with another Greater Chinese or South Korean company. It provides insights into the shareholders reaction to the announcement based on the companies' market capitalization, method of payment, geographical area and sector. For example, smaller companies either reap a high cumulative abnormal return, in the case the CAR is positive, but it may well be very negative if the shareholders do not react positive. Accordingly, a risk averse manager may decide to withhold the decision of acquiring or merging. On the other hand, for large companies the announcement is less risky as the return will be more closely centered around zero.

Besides the benefits to managers, the results may also be of relevance to (potential) shareholders. When there is a rumor of an M&A transaction, shareholders can evaluate the potential effects of the announcement on their investment and make more informed decisions. Additionally, by analyzing the Greater Chinese market and the South Korean market separately, shareholders get a better understanding of the risks and opportunities associated with these areas. The same holds for the industry in which they intent to invest/invested as it was found that investing in Media and Entertainment and High Technology on average lead to higher CARs.

Up until now, the majority of research has focused on the US and other western markets. This study contributes to the existing literate by analyzing two major Asian markets together as well as separately. This is important as both markets are taking a prominent position in the global arena. Therefore, it is necessary to study these markets in more depth as there are many differences politically, economically and culturally which may make the findings of studies done in western markets inapplicable.

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8. Appendices

Appendix A

CAR

	Positive CAR	Positive CAR	Negative CAR	Negative CAR
Event window	[-1; +3]	[-1; +3]	[-1; +3]	[-1; +3]
Model	4.5	4.6	4.7	4.8
Area	-.338935 (.6126178)	-.7731687 (.7109764)	1.126977 (1.021402)	1.237266* (.7446)
ln(Age)		.4978569 (.4682837)		.4199568 (.638789)
ln(Employee)		-.173669 (.1858761)		.3066227 (.2359261)
Debt		-2.007737 (1.186276)		1.28195 (1.541572)
Constant	5.255407*** (.437313)	6.241268*** (2.137488)	-4.983337*** (.9284802)	-9.068382*** (2.278421)
Observations	252	252	210	209
R-squared	.0012	.0189	.0076	.0200
F-statistic	.31	1.52	1.22	2.55**

*, **, *** *Statistically significant at the 10%, 5% and 1% level respectively. The value in brackets indicates the robust standard error. Area is a dummy variable which equals to one when the company is from South Korea.* Source: author's own research.

Appendix B

Two-sides t-test for the comparison in average CAR [-3; +1] for the High Technology industry and Others. The hypothesis is as follows:

$H0$: $\mu High\ tech = \mu others$

$H1$: $\mu High\ tech > \mu others$

The test statistic is calculated as follows:

$= \dfrac{\overline{x_1} - \overline{x_2}}{\sqrt{\frac{s_p^2}{n}} + s_p^2}$, where $s_p{}^2$ is the pooled standard deviation, which is equal to:

$s_p{}^2$ $\dfrac{(n_x-1)s_x^2 + (n_y-1)s_y^2}{(n_x + n_y - 2)}$ $=$ $\dfrac{(82-1)10.18329 + (380-1)8.527146}{(82+380-2)}$ $= 8.81877136$. Thus, the test statistic becomes:

$t = \dfrac{3.109914 - 1.047819}{\sqrt{\frac{8.81877136}{82} + \frac{8.81877136}{380}}} = 5.70272415$

The critical value is equal to $t_{82+380-2, 0.05} \approx 1.645$. As the test statistic is greater than the critical value, the null hypothesis of equal means can be rejected. There is significant evidence that the mean CAR [-3; +1] of High-Tech industry is greater than that of the category Others.