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The impact of cross-border M&A on stock returns

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ABSTRACT:

This paper studied the impact of cross-border M&A on stock returns on announcement date. The prior research shows controversial arguments on whether cultural factors influence the stock returns. To study the topic, 157 samples of cross-border M&A deals acquired by U.S. firms are collected and t-test and OLS analyses are conducted from 2004 to 2014. First, the research proves that the cross-border M&A makes significant difference on stock returns on announcement date. Second, it researched whether particular cultural aspect: trust, independence, and creativity can explain the difference. The empirical findings in this research indicate that those cultural characteristics do not have significant explanatory power so the cultural distance should not be considered significantly in the acquisition process.

Contents

1. Introduction

Recently, mergers and acquisition (referred as M&A below) market has been developed enormously. The New York Times reported that "a record $2.5 trillion in mergers were announced in the first half of 2018", which is an increase of 61% compared to the first half of 2017. The record level of $5 trillion could be reached by the end of this year. 2018 is not only record-breaking in terms of volume but also regarding the proportion of mega deals. 50% of the total announced value, in exact numbers $1.3 trillion, were invested.

There were various studies on the impact of M&A on stock returns. According to many studies on M&A, it mostly consents on positive impacts of acquisition on target companies in terms of stock returns. Asquith and Kim (1982) studied returns to target firms around announcement date and they found that the stockholders of target firms gained, whereas those of bidding firms did not. Jensen and Ruback (1983) reviewed 13 studies on the abnormal returns around takeover announcements date and they concluded that the average excess returns to target firms' stockholders are 20% for the mergers, while bidding firms' stockholders gained no abnormal return around the merger.

On the contrary, for the cross-border M&A; mergers or acquisitions between the firms in the different nations, there is more negative perspectives than domestic acquisitions. Since there is cultural barrier between the targets and bidders, it is expected to intensify the information asymmetry, which trigger more uncertainty. Despite of this negative recognition, the cross-border M&A trends are apparent in U.S currently, since US regulatory climate has been relaxed and cash reserves increased, it leads to optimism among US M&A market in 2019. This positive conditions attract foreign companies to search for target companies in U.S. Compared to the first half of 2017, the number of international M&A transactions in 2018 increased significantly by 84%, and these international transactions made up 44 % of all announced transactions.

The research on cross-border M&As is under the controversy. Some research insists on positive impact of foreign takeovers. Harris and Ravenscraft (1991) and Swenson (1993) concluded that US target firms' shareholders benefited more from a foreign M&A than a domestic operation. Markides and Ittner (1994) showed that cross-border operations were on average welfare-improving for the US buyers. This leads to research question as follows:

1. Does the cross-border M&As have positive impacts on stock returns?

The second question is whether the cross border M&As result in different "wealth creation" (simply, it can be interpreted as synergy effect)depending on how the target and acquirers are "culturally different". The way of defining "cultural distance" were various(Teerikangas and Very,2006); some focused on organizational cultural difference, and some on national cultural difference, others on both. In this research, national cultural difference would be focused on. Especially, national difference of trust, individualism, and creativity are picked to measure the difference. These are based on the prior research.

First, trust is recognized as primary factor to make the trade agreement proceeds(Arrow, 1972) and this leads to a theoretical model by Zak and Knack(2001) which emphasizes the monitoring costs when there is not enough trust between trade parties. According to Ahern, Daminelli, and Fracassi(2015), trust facilitates trade so that the cultures with high trustfulness are expected to conduct more mergers and also expected to have higher total gains since they are easier to cooperate with each other after merger. Second, individualism is defined as how people in the nation think important about self-interest or the public interest. Collectivism cultures prioritize group goals and the individual goals are tied to social obligations, whereas individualism cultures reward people based on individual efforts and accomplishments(Ahern, Daminelli, and Fracassi, 2015). If two firms are based on different cultures, one on the collectivism culture, another on the individualism culture, respectively and they are merged, the working process would be inhibited than the case in which two firms are based on the similar level of collectivism/individualism culture. Lastly, creativity is picked as another standard to measure the cultural difference, since it is recognized as one of the significant factors in the current industry. Especially, high technology industry needs more creative human resources. This is supported by Valetini(2011). However, for other industries, creativity cannot be a principal quality. More details on why these three factors are considered will be addressed in the section 3.2.6. This leads to another research question as follows:

2. *Do the cultural differences have an impact on wealth effect of cross border M&As?*

The answer to this question would devote to decide whether the fear of investors on cross-border M&A is misunderstanding. Theoretically, as there is not enough research on cross-border M&As (Olivier and Habib, 2008), it could devote to specify how the M&A of firms from different countries would influence stock returns and how it differs from the domestic M&As. Practically, shareholders of targets or bidders can expect certain direction toward which the stocks would change so that this could lower the uncertainty of cross-border M&As.

The followings will start with addressing the related prior research on cross-section M&A and announcement returns. Next, the methodology and data will be explained followed by the results. Finally, the results will be summed up in the conclusion.

2. Theoretical Framework

2.1. Domestic and Cross Border M&As

Cross border M&As differ from domestic M&As to extent which the deals include the firms from different nation, instead of the firms in the same countries. There are some different advantages between domestic and cross border M&As according to Bertrand and Zitouna(2008) . When the domestic firms are merged, it enlarges geographical range which the firms can cover which lowers the transport costs or custom duties. In addition, since they produce as a whole, they can benefit from economy of scale. This makes merged firms get higher competitive status. However, when the companies in the different countries integrates, they have different marginal cost structure such as capital and labor endowment, and legal system, it is hard to realize economy of scale. Instead, as in the cross border M&As, merging partners are more likely to differ in terms of knowledge such as technology, managerial and organizational know-hows. This can realize more creative combination of intangible assets and synergy gains.

In the shareholder perspective, cross border M&As have more uncertainty. In the domestic M&As, one of the concerns is organizational differences between firms and it can inhibit the efficiency in operating company. However, when the firms in different countries merge, shareholders should consider the national difference additionally, which gets them "double lemon". Therefore, the announcement effect, the stock prices changes when the M&A news are announced, is expected to be apparent in the cross border M&As relative to domestic ones(Bertrand and Zitouna,2008).

2.2. M&A and stock returns

When the acquiring firms announced M&As with target firms, there is a change in the stock price both in the acquiring firms and target firms on the announcement date. This is referred as "announcement effect". One of the reasons is that people expect wealth creation via acquisition. Therefore, diverse researches are conducted to use the announcement effect as a predictor of the post-acquisition accomplishment of the deal.

The acquisition announcement effect on acquirer stock returns are inconclusive. A review study carried out by Bruner (2002) concluded that out of the 44 studies, he surveyed 24 reported positive returns, with 20 reporting negative returns for the acquiring firms.

Originally, it was accepted that acquisition announcement affects acquirer's stock returns through precedent research. Firth (1980) found that bidding firms had large negative returns which completely offset the target gains in his sample. Dodd (1980) analyzed that in his sample containing 60 mergers, acquiring firms gained significant negative abnormal returns of 1.09%. This adheres to other research carried out by Bruner (2002), Campa and Hernando (2004).

However, other empirical research shows opposite outcome on the announcement day return of acquiring firms. Asquith, Bruner and Mullins (1983) mentioned on average 0.9% positive excess returns for bidding firms during the announcement month. Franks and Harris (1989) also mentioned significant positive gains to bidding firms' shareholders on the announcement day. Cornett and De(1991) also concluded that significant positive excess returns for both bidding and target banks are observed during announcement period. Moreover, Alexandridis.et al(2017) observed that M&A deals create more value for acquiring firm shareholders after 2009 than before. Acquiring shareholders now gain 1.05% abnormal return around the announcement day. In addition, Manzon, Sharp, and Travlos (1994); Black, Carnes, and Jandik (2001) also got the same conclusion.

On the other hand, the effect on target company has been quite obvious that the acquisition puts positive impact on their announcement returns. Bruner(2001) summarizes conclusions of 21 studies and proves that the target companies had material, significant positive returns, regardless of time length, type of deal(for example, merger or tender offer) and observation period(Langetieg, 1978 ; Dennis and McConnell, 1986; Lang, STulz and Walkling 1989; Jarrell and Poulsen, 1991; Franks, Harris and Titman, 1991; Bardley, Desai and Kim, 1998).

2.3. Cross-border M&A and stock returns

There is various research on cross border m&a effect on firms' wealth. Lowinski, Schiereck and Thomas(2004) researched 114 deomestic and international acquisitions among Swiss corporations between 1990 and 2001, but they do not find any difference between them. Zhu and Malhotra(2008) studied indian firms acquiring U.S. firms during 1999-2005 and shows that there is a positive abnormal return in the short run, but negative in the long run. However, Rani, Yadav and Jain(2011) investigated that there is a positive cumulative abnormal return to Indian acquirers whose target is foreign based

companies.Tao, Liu and Gao(2017) investigated that Chinese acquiring firms got positive stock returns which acquire foreign targets. Ning.et al(2014) showed another research which adhere to what Tao,Liu and Gao(2017)said, to be detailed, they found that multinational enterprises in China got positive announcement stock returns on average. There are similar researches on positive stock market reaction revealed when the acquisitions are performed by firms in the emerging market. This conclusion also aligns with other companies in non-emerging market. Gregory and O'Donohoe(2014) used UK targets as samples and found that domestic acquirers under-perform relative to cross-border acquirers in general but they found that when the firm characteristics are controlled, there are no difference between domestic and cross-border acquisitions . It rises a specified hypothesis:

H1: There are positive significant abnormal returns to targets around cross border acquisition announcement day.

H2: There are negative significant abnormal returns to acquirers around cross border acquisition announcement day.

H3: There are positive significant abnormal returns to targets and acquirers as a whole(synergy effect exist) around cross border acquisition announcement day.

2.4. Cultural difference and wealth effect

Cultural distance(difference) is a national cultural differences on values. It has been studied by various researchers but Hofstede(1980) is the one who quantified the cultural difference related to business operation. He analyzed survey data on work-related values between 1967 and 1973 derived from more than 117,000 IBM workers working in 40 different countries(Drogendijk and Slangen, 2006). He assigned a score each country in his sample between 0 and 100. This will be benchmark to create cultural index in this research.

Cultural distance has been considered as a significant factor in merger and acquisition for the long time. If the firm is in the innovatory industry, cultural variety is one of the crucial part to improve company performance. Goergen and Renneboog(2004) concluded that there is more significant positive synergy gains in cross border M&As than domestic ones. However, there are risk which harms the integrity of the company. Moelller and Schlingeann(2005) found cross border acquirers gain lower stock returns than the acquirers in the domestic deal. And the wealth creation of the deal is negatively associated with an increase in global and industrial diversification. Bauer, Matzler, and Wolf(2016)

argued that it is inconclusive to say whether the cultural difference is beneficial to the company. For example, human factor can be deteriorated since values conflict among employees, but technical factor can be improved through sharing technology and resources. They found that the cultural difference effect is inverted U-shaped on the integration and innovation-driven M&A in central Europe got positive synergy through merging culturally distant companies. In addition, Ahern.et al(2018) argued that the national cultural difference matters and trigger lower likelihood of merger and also lower announcement returns. Meanwhile, Sarala(2010)and Ahammad.et al(2014) even insisted that there is no impact of national cultural differences on post-acquisition performances, only the organizational cultural differences in each firms matter. These research contribute to make the hypothesis as follows:

H4: Cultural distance has negative significant impact on wealth creation from acquisition.

3. Data and Methodology

3.1. Data

To collect the sample for this study, Thomson One is used. The cross-border M&A deals from 1/1/2004 to 31/12/2014 is chosen. To get the data on stock returns, only the deals which include public acquirers and public targets are selected. The transaction of which acquired shares exceeding 51% of the target firms are chosen to be clear with the meaning of acquisition. To calculate the market model adjusted abnormal returns(market model will be illustrated in section 4.1.), S&P 500 index is chosen for U.S. acquirers as a benchmark, and MSCI is chosen for worldwide targets. This found all of the financials needed for the control variables in the section 3.2.2. Totally 232 deals are found.

After the deals are selected, Datastream is used to get the stock price data of acquirers and targets. From total 232 samples of acquirers, 32 observations dropped out since, there are no stock price data during event period found from Datastream. For cross-section analysis, the deals without stock price of the target or acquirer are all dropped out.

3.2. Variables

3.2.1. Dependent variable : cumulative abnormal returns

To verify what makes the difference on announcement date returns to acquirers, the regression is used with the dependent variable as the cumulative abnormal returns of each acquirer in the U.S.

3.2.2. Independent variable : culture index

The independent variable is cultural distance between the acquiring firms and target firms. The distance is calculated based on the location of the firms. The answer to the questionnaire collected by the World Value Survey. Three different characteristics are compared; trust, individualism, and creativity. First, trust has been researched widely in finance and economics. Li. et.al(2017) concluded that there is a relationship between social trust and stock price. Second, even though most of the cultural dimension classifications are using different standards, they commonly use individualism to analyze the differences. Hofstede(1980, 2001), Schwartz(1994), Trompenaars(1993) and Fiske (1991) all used individualism as an important factor to make a different cultural dimensions(Ahern, Daminelli, and Fracassi, 2015). Creativity is chosen as the last variable to estimate the cultural difference, since creativity has significant effect on the M&A decisions. A lot of research has shown that in the innovatory industry which needs more creative human resource gains more through cross border M&As. Boateng, Qian and Tianle(2008) researched the motives of the integration and they revealed that one of the main reasons is to access and acquire resources and technology. Bauer, Matzler and wolf(2016) insisted that transfer and sharing of industrial resources and creative human resources.

For the cultural index, World Value Survey(WVS) is used. "It is the largest study ever conducted on cultural values and covers 97 societies on six continents and samples from populations that represent more than 88% of the total world population. The survey is carried out in seven waves of surveys(Ahern, Daminelli, and Fracassi, 2015)." The survey between 2005-2009 and 2010-2014 is chosen for calculating cultural index. To merge the stock price data and cultural index data, some countries are treated as another country located nearby or dropped out, as there is no cultural index of them. Jersey, Ireland republic, and Bermuda are regarded as United Kingdom. Luxembourg and Belgium as Netherlands. Denmark, Greece, Russian fed, and Neth antiles, Israel are dropped out, and this results in 157 samples for cross-sectional analysis.

Trust index

Trust index is calculated by the answer to the question:

Can you trust your neighbor?

For all of the index calculation, the answer missing values, don't know is excluded and only "most people can be trusted"(T) and "Can't be too careful"(N) are taken into account. Trust index is calculated as follows:

$$trust_j = \frac{n(T_j) * 1 + n(N_j) * 0}{n(T_j) + n(N_j)}$$

where

$trust_j$: trust index of country j

$n(T_j)$: the number of people who answered as "most people can be trusted" in country j

$n(N_j)$: the number of people who answered as " can't be too careful" in country j

Individualism index

Individualism index is calculated by the answer to the question:

Should government tax the rich and subsidize the poor?

Repliers can choose the degree which they agree with from 10 options "Not essential(A_1)" to "essential(A_{10})" and the answers are weighted by the number of the repliers to each option. Additionally, natural weighted average is divided by 10 for convenience in cross-sectional analysis.

$$individualism_j = \frac{n(A_{1,j}) * 1 + n(A_{2,j}) * 2 + \cdots + n(A_{10,j}) * 10}{\{n(A_{1,j}) + \cdots + n(A_{10,j})\} * 10}$$

where

$individualism_j$: individualism index of country j

$n(A_{1,j})$: the number of people who answered as "not essential" in country j

$n(A_{10,j})$: the number of people who answered as "essential" in country j

Creativity index

Creativity index is calculated by the answer to the question:

Is it important to people to think up new ideas and be creative?

It should be noted that, since it is hard to score how people are creative, how important people think about creativity is used instead. The index is calculated based on the answer from "not at all(A_1)" to "very much(A_6)". The repliers choose the level which they agree with. Additionally, the weighted average is divided by 10 for the same reason of individualism index.

$$creativity_j = \frac{n(A_{1,j}) * 1 + n(A_{2,j}) * 2 + \cdots + n(A_{6,j}) * 6}{\{n(A_{1,j}) + \cdots + n(A_{6,j})\} * 10}$$

where

$creativity_j$: creativity index of country j

$n(A_{1,j})$: the number of people who answered as "not at all" in country j

$n(A_{6,j})$: the number of people who answered as "very much" in country j

Table 1 summary of cultural distance index (trust, individualism, and creativity)

Variable	obs	Mean	Std. Dev	Min	Max	United States
Trust	157	.3906046	.0925245	.0263329	.6952247	0.375386
Individualism	157	.5533485	.0443109	.4560314	.7459516	0.540031
Creativity	157	.4335328	.0297586	.3307348	.475707	0.40383

It shows that average trust index is 0.391, average individualism index is 0.553, average creativity index is 0.434 and all of the indexes are slightly higher than those of United States. It can be interpreted that globally people trust their neighbors more, people are more independent and people think creativity more important on average than those in the United States.

3.2.3. Control variables

To collect the control variables for this study, Thomson One is used. It has broad data for over 1.1 million public and private M&A deals worldwide since the 1970s, consisting of 350,000 US target and 750,000 non US-target transaction. All deals which acquire at least 5% stake or 3% with a value at least USD 1 million, are collected. The data is sourced from direct deal submissions from global banking and legal contributors.

Acquiring frim size

Moeller, Schlingemann and Stulz(2004) examined massive samples (12,023 acquisitions by public firms from 1980 to 2001) and found that the announcement return to small acquiring-firm shareholders is roughly two percentage points higher than the big acquiring-firms shareholders. They show that the firm size effect on announcement date returns do not change even when the other firm and deal characteristics are considered and also the size effect does not reverse in the time series. It can support that acquiring firm size can be the control variables in the cross-section regression which should not be correlated with other control variables and has stable effect. The book value of asset, "size" will be used as the research said that the size effect has been robust to the choice of measure between book value and market value. The data is collected from Thomson One.

High technology industry

Industry type can influence the stock returns, especially, for the high tech industry, timely exchange of human resources and keeping high end technology is most important to the business operation. Under this condition, there might be marginal benefits to the high technology industry companies after the acquisitions and would signal positive prospects to the market. Valentini(2011) supports this arguments by exploring the impact of M&A on the patent quantity and quality of the firms. The literature finds that M&A have positive impact on patenting outcome to the engaging firms. The term "high_tech" is set equal to 1 when the both acquirers and targets are categorized as 'High Technology' by macro industry indication. This is because it is obvious that the synergy effect explained by Valentini(2011) can surely be expected when the both parties have technology resources. The data is collected from Thomson One.

Industry relatedness

When the acquiring firms and target firms have common working sources, the synergy gains for the both sides are easily expected. Scanlon, Trifts and Pettway(1989) verified that the acquisitions between unrelated industries lead to negative wealth effect to the shareholders of the acquiring firms. Lim and Lee (2016) also demonstrated that deals with high industry relatedness tend to achieve successful cross-border acquisition outcomes. It will be captured as dummy variable, "Related", it is equal to one if the four-digits U.S. SIC code is the same, equal to zero, otherwise. The data is collected from Thomson One.

Payment method

There is controversy on the effect of payment methods on announcement date returns. The researches mostly consent on equity payments have negative impact on announcement date, since it can signal that the acquirer tries to exploit their overestimated stocks to pay the target firms. This is reflected in the market as lower stock price to the acquirers after the acquisition. However, for the cash payments, the synergy evaluation of the deals is more credible, which results in less decrease in the stock price. Payment method will be controlled by the dummy variable, which would be set equal to one, if the deal is paid by stock, equal to zero, otherwise. There are other payment methods instead of cash and stocks, but to focus on the cultural differences and as most of the research consider the difference between cash and stocks, other payment methods is set equal to zero with cash payments. The data is collected from Thomson One.

3.3. Methodology

3.3.1. Event study

The event study is used to measure the impact of M&A announcement on firms. This assumes the efficient market hypothesis that the market absorbs all the available information instantly. It implies that the impact of an event can be observed in the security prices around the event date. The final end of this methodology is to find abnormal returns and analyze whether it is significant. Therefore, the initial step is to decide to which extent is normal to derive abnormal returns. To know the normal returns, the returns during prior-event period are analyzed and compared with the returns around the event period.

3.3.2. Estimation period

The estimation period is to observe the prior history of the stock prices and estimate the normal returns of firms on the event date if there is no event happen. The period for the estimation window is from the date 250 days prior to the event date, when the acquisition is announced initially, to 20 days prior to the event date, which is referred as [-250, -20], since the acquisition announcement date is set as t=0. The length of 250 days are commonly used as estimation windows in several event study research(Mackinlay,1997; Thomsen and McKenzie, 2001; Park, 2004; Graca and Masson,2012).

3.3.3. Event window

The 5 days pre-event window [-5,0] and 5 days post-event window [0,5] is used to calculate cumulative abnormal returns. The pre-event window is needed, since there might be some leakage of information before the actual event implemented. The post-event window is set, as the information is hardly immediately reflected in the real market situation due to technical obstacles.

The daily closing stock prices in S&P 500 for U.S. firms and MSCI for international firms is used and the daily price series is converted into daily return series using the formula:

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

where $R_{i,t}$ is the return on day t for the stock i, $P_{i,t}$ and $P_{i,t-1}$ are the closing prices on day t and t-1 respectively of the stock i.

3.3.4. Normal returns

Next, the market model is used to derive normal returns which regress the return of a security to the return of the market portfolio as follows:

$$R_{i,t} = \alpha_i + \beta_i * R_{m,t} + e_{i,t}$$

(where $E[e_{i,t}] = 0$ and $Var[e_{i,t}] = \sigma^2 e_i$)

where $R_{i,t}$ and $R_{m,t}$ are the day t returns on security i and the market index(in the research, S&P 500 for U.S. firms and MSCI for international firms are used), respectively. $e_{i,t}$ is the zero mean error term and , α_i, β_i and $\sigma^2 e_{i,t}$ are the estimated parameters of the market model. The market model is estimated using Ordinary least squares (OLS) regression. The period [-250,-20] is used to obtain the initial estimates of α i , β_i..

Next, the abnormal return would be

$$AR_{i,t} = (Actual\ Return)_{i,t} - (Expected\ Return)_{i,t}$$

where (Actual Return)i, t is the realized return of the security i on day t and (Expected Return)i , t is calculated according to equation (2) for Ri , t for the period [-5,5]

To analyze the event impact on specific date, average abnormal returns are calculated as follows:

$$AAR_i = \frac{1}{n} \sum_{i=1}^{N} AR_i$$

To analyze the event impact, the abnormal return observations must be aggregated. Cumulative Abnormal Returns(CARs) are defined for the stocks as:

$$CAR_i = \sum_{t=-5}^{t=5} AR_{i,t}$$

where CARi are the Cumulative Abnormal Returns in the event period from T0-5 to T0+5.

To see if the CAR values are significant, cumulative average abnormal returns is calculated for every firms to see if the event makes significant difference as a whole.

$$CAAR_i = \frac{1}{n} \sum_{i=1}^{N} CAR_i$$

Additionally, combined cumulative abnormal returns(CCAR) is calculated to check if there is synergy effect of acquisition. The market value(MV) is the total asset value of the last twelve months.

$$CCAR = \frac{CAR_{bidder,i} * MV_{bidder,i} + CAR_{target,i} * MV_{target,i}}{MV_{bidder,i} + MV_{target,i}}$$

3.3.5. Significance test

The student t-test and is used to check the significance of abnormal returns.

The t-test is executed under the following alternative hypothesis:

Ha: $\mu > 0$

The student t-test is used to check if the average abnormal returns are significant.

$$t_{AARt} = \frac{AAR_t}{S_{ARRt/\sqrt{N}}}$$

Where

t_{AARt} = t-statistics for average abnormal returns of all the firms at time t

S_{AARt} = standard deviation across the firms at time t

N = sample size

$$S^2{}_{AARt} = \frac{1}{N-1}\sum_{i=1}^{N}(ARi, t - AARt)^2$$

For the CAAR:

$$t_{CAARt} = \frac{CAAR_t}{S_{CARRt/\sqrt{N}}}$$

And

$$S^2{}_{CAARt} = \frac{1}{N-1}\sum_{i=1}^{N}(CARi - CAAR)^2$$

3.2. multicollinearity and heteroskedascity

To use the Ordinary least squared (OLS) analysis, multicollinearity should be checked between the variables since it can harm accurate interpretation of each independent variable's impact on dependent variables. The perfect multicollinearity is the existence of linear relationship between independent variables. Generally, to interpret one explanatory variable's marginal impact on dependent variable, the other explanatory variables should be constant when the variable of interest is changed. However, if there is a linear relationship between those independent variables, marginal change on one variable would change the other variable, which makes general interpretation hardly accepted.

Mostly, high correlation between variables can be one of the evidence of multicollinearity. If the absolute value of correlation is higher than 0.4, it is generally considered as highly correlated. The table 3 (Appendix 1)shows that the absolute values of correlation between the variables are generally below 0.2, which shows weak correlation. The cultural indexes are converted to the squared value to consider the absolute cultural distance between them.

The correlation table(Appendix 3) shows that there is generally no significant correlation between all the variables.

Industry relatedness and high technology variables have positive correlation with CCAAR(dependent variable),respectively, which is align with the prior research that deals involving the same industry companies or in the high technology company, higher synergy effect is observed. Industry relatedness and high technology are weakly correlated(0.188), but there can be multicollinearity, theoretically, since the high technology variable is set to be 1 if the "both" companies are in the high technology industry. Therefore, the high technology variable itself has two effects combining (1) industry characteristic effect which is intended, and (2) the same industry effect which is unintended. As the numerical outcome and the theoretical estimation are different, detail will be addressed in the regression analysis to see whether the multicollinearity is significant.

The highest correlation is shown between acquiring firm size and independence difference (0.233) among all the variables. This is unexpected outcome so additional test should be executed to see if there should be change in the variables selection. Therefore, additional test should be implemented to see whether variables should be adjusted.

The Variance Inflation Factor(VIF) measures how much the variance of estimated coefficients change when the independent variables are assumed to be correlated. Without correlation, the VIFs will all equal to be 1. Generally, when the VIF is over 10, the regression coefficients can be judged to be poorly estimated due to multicollinearity problem. The VIF test shows that there is no severe multicollinearity to extent which the variables should be adjusted. This test is executed for each regression for accurate analysis.

Another assumption which should be considered to execute ordinary squares least regression is homoskedascity, the situation in which the error terms is the same across all the independent variables. It is checked by Breusch-Pagan/ Cook-Weisberg test.

4. Results

4.1. Significance test

To do the t-test, the sample distribution is assumed to be normal as the number of samples both from acquirers and targets are large enough to meet the central limit theorem. Second, the cumulative

abnormal returns during [-5,5], [-4,4], [-3,3] [-2,2], [-1,1] is studied to see the uncertainty effect. Third, the combined cumulative abnormal returns are tested to see if there is a wealth creation. The samples of acquirers and targets are different as there are irregular missing information; there are 200 samples of acquirers, 194 samples of targets abnormal returns. In addition, there are only 157 samples left for combined cumulative abnormal returns to use it for cross sectional analysis (section 4.2.).

Table 1 shows the abnormal returns on each day during the event period for both acquirers(aAR) and targets(tAR), respectively. It shows that target firms generally get positive effect on their returns after the acquisition announcement during the estimation window[-5,5]. Particularly, on the announcement date(tAR(0)), the average abnormal returns significantly increase by 0.192%p and a day after the announcement(tAR(1)), the average abnormal returns significantly increase by 0.049%p. The delayed response can be explained by the market uncertainty of the acquisition announcement. Therefore, hypothesis 1: there are positive significant abnormal returns to targets around cross border acquisition announcement day is not rejected.

Meanwhile, acquirers show negative but economically insignificant changes after the event. The variation is minor across the estimation period comparing targets variation. The most economically significant changes occur on a day before the event; the returns decrease by 0.003%p, but it is insignificant at 5% level. Thus, hypothesis 2: there are negative significant abnormal returns to acquirers around cross border acquisition announcement day is rejected. However, the results align with the various research which reveal that acquirers get insignificant or slightly negative returns after the announcement in the theoretical framework.

Table 2 One Sample t-test Results of abnormal returns(AR)
tAR stands for Abnormal Returns of target firms and t is relative distance from the announcement day(t=0). aAR represents Abnormal Returns of acquirer firms.

	obs	Mean	St_Err	t_value	p_value
tAR(-5)	194	.004	.003	1.35	.181
tAR(-4)	194	.004	.004	.95	.337
tAR(-3)	194	.005	.003	1.95	.055
tAR(-2)	194	.002	.003	.65	.524
tAR(-1)	194	.007	.004	1.6	.108
tAR(0)	194	.192	.022	8.7	0
tAR(1)	194	.049	.012	4	0
tAR(2)	194	.007	.004	1.8	.072
tAR(3)	194	.001	.003	.25	.791

	obs	Mean	St_Err	t_value	p_value
tAR(4)	194	-.003	.002	-1.7	.09
tAR(5)	194	-.001	.002	-.35	.74
aAR(-5)	200	.001	.002	.2	.825
aAR(-4)	200	0	.002	.05	.955
aAR(-3)	200	.003	.002	1.45	.145
aAR(-2)	200	-.001	.002	-.6	.542
aAR(-1)	200	-.003	.002	-1.9	.059
aAR(0)	200	-.001	.003	-.25	.821
aAR(1)	200	.001	.003	.4	.708
aAR(2)	200	-.002	.002	-.75	.444
aAR(3)	200	.002	.002	.95	.331
aAR(4)	200	-.002	.002	-1.6	.108
aAR(5)	200	-.002	.002	-1.15	.252

The cumulative abnormal returns(CAR) are analysed to see if the uncertainty estimated in the abnormal returns can be verified in table 2. Both abnormal returns of targets and acquirers show that the effect of the announcement is larger as the length of the event period increases. This verify that the event news is not reflected in the market efficiently and some information leakage and uncertainty are speculated. However, there is also distinctive difference between targets and acquirers in CAR; targets show significantly positive change, approximately, 0.2%p in the returns for every event period; [-5,5], [-4,4], [-3,3] [-2,2], [-1,1], while acquirers suffer from negative returns, but statistically insignificant.

Table 2 One Sample t-test Results of cumulative abnormal returns(CAR)

	obs	Mean	St_Err	t_value	p_value
tCAR5	194	.267	.024	11.05	0
tCAR4	194	.264	.023	11.35	0
tCAR3	194	.263	.024	11.3	0
tCAR2	194	.257	.024	10.95	0
tCAR1	194	.247	.024	10.5	0
aCAR5	200	-.004	.006	-.7	.5
aCAR4	200	-.003	.006	-.5	.613
aCAR3	200	-.001	.005	-.2	.861
aCAR2	200	-.005	.005	-.95	.354
aCAR1	200	-.003	.004	-.55	.581

Lastly, combined cumulative average abnormal returns during the event period [-5.5] (Appendix 1) is analysed to see the wealth creation of the acquisition announcement from both acquirers and targets, and it shows that there is significantly positive synergy after the acquisition during the event period. Hence, hypothesis 3: there are positive significant abnormal returns to targets and acquirers as a whole(synergy effect exist) around cross border acquisition announcement day is accepted. In addition, this leads to the next analysis (4.2.) to reveal which factor in the cross border M&As leads to synergy effect as a whole.

4.2. OLS regression results

In this section, the results of the OLS analyses will be addressed, which are shown in the table 4. The regression results which are related to the hypothesis will be explained, followed by observable points discovered.

The overall results show that there is no significant explanatory power to cultural distance factors; trust, independence, and creativity.

In model 1, the coefficient of trust distance is -0.130, This shows that trust level difference between acquiring and target company is related to negative wealth creation from acquisitions. It has the least standard error among three models. Independence distance has positive coefficient (0.570). This can be interpreted that independence level is positively correlated with the acquisition synergy, Lastly, creativity distance is also positively related to the dependent variable. The R squared is 1.3%, which means that the model can only explain 1.3% of the variance in the samples

To increase the explanatory power of the model 1, more control variables are added. As a result, the coefficient of the trust distance has increased by 0.018, but the standard error is increased by 0.007 and independence distance coefficient and standard error have also increased by 0.229 and 0.051, respectively. The standard error of the creativity distance also increased.

In model 3, one of the control variables, acquiring firm size has invisible impact, in model2 it is removed. The coefficient of trust distance decreases from -0.112 to -0.118. The coefficient of independence distance also decreases from 0.799 to 0.670. Lastly, the coefficient of creativity distance increases from 7.931 to 8.018. The coefficient variation of independent variables is larger than that of control variables included in the model 3. In addition, the standard error of the three cultural distance factors decreased. However, three cultural distance factors still cannot explain the synergy effect difference significantly. This is unexpected according to the main findings in section 2. Moelller and Schlingeann(2005) found that cross border M&As gain lower synergy effect than domestic M&As. They even found that the wealth

creation is negatively associated with an increase in global and industrial diversification. However, it is more align with the idea of Matzler and Wolf(2016), who argued that it is inconclusive to determine whether cultural factors matter in a certain way.

The notable coefficients in the regression other than cultural distance is industry relatedness and high technology, even though both coefficients are insignificant. The industry relatedness shows that when the firms in the same industry merges, it is related to the positive market response, which is expected from various research in the section 4.2.1. Also, when the firms are both classified as the high technology industry, it also connected with positive response in the market.

The models show that the hypothesis 4: cultural distance would have negative impact on wealth creation should be rejected. This can be interpreted in various ways. First, it can literally show that the cultural factor cannot explain the wealth creation significantly. The other possible explanation is that the negative and positive effect might be overlapped which leads to insignificant results. The third is that the cultural distance is mostly reflected in the long term outcome, not in the short run, which can be supported by various research (Datta and Puia, 1995; Morosini and Singh, 1998) In other words, it might take time for cultural effect to be fully evaluated by the market.

Table 4. Ordinary Least Squares regression analyses

VARIABLES	(1) CCAAR	(2) CCAAR	(3) CCAAR
Trust distance	-0.130	-0.112	-0.118
	(0.474)	(0.481)	(0.480)
Independence distance	0.570	0.799	0.670
	(0.999)	(1.050)	(1.027)
Creativity distance	8.525	7.931	8.018
	(6.515)	(6.612)	(6.597)
Industry relatedness		0.010	0.011
		(0.020)	(0.019)
High technology		0.009	0.010
		(0.023)	(0.023)
Stock payment		0.001	0.002
		(0.022)	(0.022)
Acquiring firm size		-0.000	
		(0.000)	

Constant	0.012	0.007	0.006
	(0.017)	(0.020)	(0.020)
Observations	157	157	157
R-squared	0.013	0.020	0.017

Standard errors in parentheses

*** p<0.01, ** p<0.05,*p<0.1

5. Conclusion

There are various researches conducted on how acquisition news influence the returns of the firms involved in the deal. The prior researches can be concluded that it is mostly possible to reach an agreement. They revealed that target firms show positive returns, whereas acquiring firms have almost insignificant or slightly negative difference on announcement day. The announcement news take time to fully reflected in the stock market and there is supposedly information leakage before the acquisition announcement. To see if it can be applied to the cross-border acquisition, this research focuses on the following research question:

"What effect does the cross-border acquisition have on the target firms and acquiring firms?"

To answer this question, two hypotheses have been set and student t-test and OLS analyses have been conducted. According to the results, the cross-border acquisition has positive impact on the target firm announcement day returns, whereas it has negative impact on the acquiring firm announcement day returns. As a whole, there are slightly positive synergy effect on announcement day.

To know which factor can explain the positive synergy impact, cultural difference between the targets and acquirers has been calculated, particularly for trust, independence, and creativity. It shows that they are statistically insignificant to explain the acquisition synergy. This can be interpreted as three ways, one being the trust, independence and creativity literally are insignificant and not related to the synergy impact. The other is that the positive and negative impact has been overlapped so that each impact is not captured. Lastly, it would take time to reflect the cultural difference on the stock returns.

Firms in the same industry has more synergy after the acquisition, moreover, if they are both in the high technology industry, they have more positive impact. Even though the impact is statistically insignificant, the correlation aligns with the prior research.

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These results have managerial implications for companies which participating in cross-border mergers and acquisitions. Since there is no significant impact of cultural difference, the managers should take these account so that they should not overestimate the cultural distance when planning the integration.

This research is conducted using limited number of samples and the results is hard to be generalized to other samples. It is recommended to study with bigger samples. Furthermore, the research is focusing on distance of certain cultural aspects, not a cultural distance as a whole. One of the alternative to the methodology used in this research is using Hofstede(1980) index to see whether cultural distance as a whole would have impact on acquisition synergy effect. Lastly, as this research studied short term impact of the acquisition in the section 4.2, long term synergy effect is not observed. Considering that the cultural factor needs sufficient time to be reflected, long term performance might be different from the results of section 4.2. In other words, it should be noted that this research only revealed the short term performance after the cross border acquisition depending on the cultural distance in certain categories; trust, individualism and creativity. However, "long term" effect of cultural distance " as a whole" is not dealt in this research and should be addressed in the further research.

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Appendices

Appendix 1 Table 3 One-sample t test for combined cumulative abnormal average returns(CCAAR)

	obs	Mean	St_Err	t_value	p_value
CCAAR	157	.03	.009	3.4	.001

Combined cumulative average abnormal returns during the event period is the weighted average of abnormal returns of acquirers and targets during the event period [-5,5]. The mean is 0.03 and this is significant at 5% significance level. (as p-value is 0.001.)

Appendix 2 VIF tests and heteroskedascity tests for regressions

Variance inflation factor of regression(1)

	VIF	1/VIF
d ind2	1.048	.954
d tr2	1.039	.962
d cr2	1.014	.986
Mean VIF	1.034	.

The VIF factor over 10 is usually regarded as having multicollinearity between the independent variable and the dependent variable by Hair, Black, Babin, Anderson and Tatham(2009). The table shows that none of the variables in the regression(1) suffer from multicollinearity

Heteroskedascity test of regression(1)
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
    Ho: Constant variance
    Variables: fitted values of CCAAR
    $chi2(1) = 1.30$
    $Prob > chi2 = 0.2549$
It shows that the error terms of the regression have constant variance so that normal OLS regression is appropriate for the interpretation

Variance inflation factor of regression(2)

	VIF	1/VIF
d ind2	1.135	.881
industryrelatedness	1.099	.91
AcquirorTotalAsset~l	1.077	.929
payment dummy	1.067	.937
hi tech	1.052	.95
d tr2	1.052	.951
d cr2	1.025	.976
Mean VIF	1.072	.

The VIF factor over 10 is usually regarded as having multicollinearity between the independent variable and the dependent variable by Hair, Black, Babin, Anderson and Tatham(2009). The table shows that none of the variables in the regression(2) suffer from multicollinearity

Heteroskedascity test of regression(2)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

    Ho: Constant variance

    Variables: fitted values of CCAAR

    chi2(1)   =   0.30

    Prob > chi2 = 0.5820

It shows that the error terms of the regression have constant variance so that normal OLS regression is appropriate for the interpretation.

Variance inflation factor regression(3)

	VIF	1/VIF
industryrelatedness	1.091	.917
d ind2	1.091	.917
payment dummy	1.064	.94
d tr2	1.051	.951
hi tech	1.049	.953
d cr2	1.024	.977
Mean VIF	1.062	.

The VIF factor over 10 is usually regarded as having multicollinearity between the independent variable and the dependent variable by Hair, Black, Babin, Anderson and Tatham(2009). The table shows that none of the variables in the regression(3) suffer from multicollinearity.

Heteroskedascity test of regression(3)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

    Ho: Constant variance

    Variables: fitted values of CCAAR

    chi2(1)   =   0.05

    Prob > chi2 = 0.8224

It shows that the error terms of the regression have constant variance so that normal OLS regression is appropriate for the interpretation.

Appendix 3 correlation between variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Combined Cumulative abnormal returns	1.000							
(2) (individualism index difference)^2	0.031	1.000						
(3) (trust index difference)^2	-0.020	0.190	1.000					
(4) (creativity index difference)^2	0.102	-0.111	-0.062	1.000				
(5) Acquiring firm size	-0.053	0.233	0.070	-0.058	1.000			
(6) high technology	0.046	-0.017	0.036	0.045	-0.073	1.000		
(7) industry relatedness	0.062	-0.151	-0.092	0.110	-0.137	0.188	1.000	
(8) stock payment	0.007	-0.186	-0.114	0.044	-0.105	-0.063	0.139	1.000

Generally, there is no significant correlation between the variables. The highest correlation in the table is 0.233 which is between acquiring firm size and squared value of individualism index difference. However, studying about reasons behind this is not directly related with the research.