



Master Thesis Financial Economics

Inattention as a Limit to Merger Arbitrage

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Abstract

This research explores the relation between inattention and merger spread. It will test whether the inattention of institutional investors will pose a limit on the merger arbitrage. Additionally, the factors that explain inattention of institutional investors will also be looked upon. Data has been acquired through Thomson One database and Bloomberg Terminal. The M&A data is covering the period from 2001 to 2016. The main findings of this paper state that there is a positive lagged effect of inattention on merger spread, supporting previous research on the limits of merger arbitrage. Moreover, the research on the explanatory variables of inattention indicate that profitability has a lagged negative effect on inattention and deal value is negatively correlated to the inattention of institutions. Overall, the findings provide an answer that inattention of institutions does pose a limit to the merger arbitrage.

Keywords: merger spread, merger arbitrage, inattention, mergers and acquisitions

Table of Contents

Abstract.....	2
Table of Contents.....	3
1. Introduction.....	4
2. Theoretical background.....	7
3. Hypothesis development.....	10
4. Research Design.....	13
4.1 Merger Spread	14
4.2 Payment method	16
4.3 Industry fit.....	16
4.4 Deal Value	17
4.5 Target Market-to-Book Ratio.....	17
4.6 Bid Premium.....	18
4.7 Attitude	18
5. Data.....	19
6. Methodology	23
6.1 Merger Spread	24
6.2 Inattention	25
7. Results.....	26
7.1 Merger spread and Inattention	27
7.2 Inattention and profitability	31
7.3 Inattention and deal value	35
8. Conclusion	36
9. Limitations	37
References	38
Appendix	39

1. Introduction

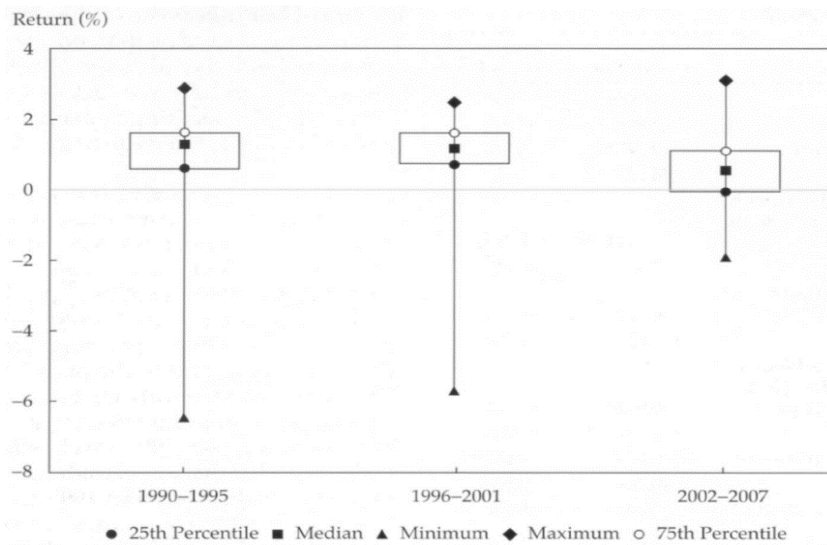
In today's economy, mergers and acquisitions have become a standard business tool. The global volume and value of merger and acquisition (M&A) transactions have been increasing over the past decades and on top of that, the role of private equity purchases has increased tremendously since the 1990s. This research aims to provide new insight on the subject merger arbitrage. Specifically, it will investigate whether the inattention of institutional investors will pose a limit to merger arbitrage.

M&A activities today reached record high levels, beating the previous high set record in 2007 before the financial crisis. Astounding is the values of these strategic deals, they have grown in size as larger companies agree to merge or be acquired. This increase in M&A activities is due to several reasons, the main one which plays a role in the current economic environment is the cheap money argument since the interest rates are historically low it makes debt financing of deals extremely attractive.

An M&A is often associated with an arbitrage opportunity. A merger arbitrage strategy, also known as price arbitrage or risk arbitrage in M&A, attempts to capture the price spread between the price at which the target company trades after a deal is announced, and the price offered by the acquiring company. The spread between the two prices exists due to uncertainty on the deal completion, also known as merger spread.

Several studies cover the subject merger arbitrage since it is a well-known phenomenon and past research has suggested that merger arbitrage produces abnormal returns. Previous papers have also indicated that various factors can limit the risk arbitrage's ability to arbitrage away the abnormal returns associated with M&A activities. Baker and Savasoglu (2002) have documented that these factors include completion risk, selling pressure by target shareholders, and the supply of arbitrage capital. In addition, Jetley and Ji (2010) have found that the alphas (abnormal returns) of merger arbitrage has substantially declined since the 1990s.

Fig. 1. Merger Arbitrage Hedge Fund Monthly Returns, 1990-2007¹



Although many papers have covered merger spread and found variables having a significant impact on the arbitrage returns, the inattention of institutional investors has never been focussed on. French (2008) and Stambaugh (2014) have shown that the fraction of equity owned by individual investors has fallen tremendously since 1980, from 48% to 20% in 2012. Since the major players in the financial markets are financial institutions, consequently their actions have a significant price impact on the assets they trade in. However, as Kahneman (1979) indicates "attention is a limited cognitive resource" and information needs to attract the attention of the institutional investors to be processed and absorbed into asset prices through trading. Considering the stock price fluctuations after an M&A announcement are swift and heavily influenced by institutional investors, this will provide a good setting to test for the effect of inattention on arbitrage profits. Accordingly, the research question within this paper is as follows:

Does the inattention of institutions pose a limit on the merger arbitrage strategy?

¹ Source: HFR (2008)

Two main theories will be the framework of this research. First, Baker and Savasoglu (2002) have documented that a lower supply of arbitrage capital will lead to a higher merger spread. Inattention of institutional investors should lead to a lower supply of arbitrage capital. Secondly, different papers of Mitchell and Pulvino indicate that after an M&A announcement the acquirer's stock is subject to downward price pressure caused by merger arbitrage short selling. Inattention of institutions affect both the supply of arbitrage capital as the merger arbitrage short selling. The expectation is that inattention is positively related to the merger spread. Furthermore, this research will try to find the explanatory variables for inattention of institutions. Overall, this paper will go in depth on the inattention of institutional investors to contribute to the research regarding the factors that affect the profitability of an arbitrage strategy.

The remaining structure of this paper is as follows. Section 2 will cover the theoretical framework and discuss the existing theories around merger arbitrage and merger spread. Section 3 will cover the hypothesis development and discuss the relevant literature corresponding to the hypotheses. Section 4 discusses the research design and covers the explanatory variables used in the models. The data description is provided in section 5. The methodology will be presented in section 6, discussing the different models and elaborating on the dependent variables. Section 7 will present the results, followed by the conclusion in section 8 and ending with the limitations of this research in section 9.

2. Theoretical background

Merger arbitrage is an investing strategy in M&A transactions. Important is to know the difference between M&A activity and merger arbitrage. The definition M&A activity is extensive and covers everything surrounding the processes involved in mergers and acquisitions, restructuring of businesses, management of deals, takeover tactics, valuation and all the other processes regarding M&A. Merger Arbitrage, however, has a much more refined definition and is defined as the speculation in stocks of the parties which go through an M&A process. This strategy aims to capture the arbitrage spread, which is the difference between the acquisition price and the stock price of the target before the completion of the merger. This arbitrage spread occurs between the periods of the announcement and the completion of the merger. The stock of the target company usually trades at a discount after a merger announcement. Gradually the price will convert to the offer price set by the acquirer once the completion risk diminishes. The fundamental risk that is associated with the merger arbitrage is the probability of failure in the merger. Merger arbitrageurs, mainly financial institutions, offer liquidity for the holders of the target shares that wish to sell the stocks to avoid completion risk.

The merger arbitrage strategy differs between a cash merger and a stock merger. In case of a cash merger, the strategy involves buying the target stock and holding it until the merger completes. The return will be realized by the merger spread, the difference between the offer price and the current stock price. In a stock merger, additional to buying the target stock the arbitrageur also short sells the acquirer stock. As a simple illustration, suppose that the target firm is receiving an offer from the acquiring firm equivalent to \$40 per share. For simplicity, assume that the stock price prior to the takeover announcement of both the acquirer and target is \$30. After the information of the merger plans reached the public markets, the investors react to the news and the stock price of the target firm reaches \$38. At this moment, the arbitrageur decides whether the completion of the deal is likely to succeed and justifying the purchase of the target firm's stock to capture the \$2 merger spread. If the merger spread is justified, the strategy exercised depends on the nature of the acquirer's offer. In a cash offer, the price difference can be simply locked in by purchasing the stock of the target company.

In a stock offer, however, the post-announcement value of the offer is dependent on the stock price of the acquiring company. Hence, in order to lock in the merger spread, the acquirer's stock must be shorted simultaneously with the purchase of the target stock. When the deal is successful, the arbitrageur can cover its short position with the converted stocks of the target. (Brown & Raymond, 1986)

Merger arbitrage, also called risk arbitrage is not the classic textbook arbitrage. Classic arbitrage is defined as two identical assets selling for different prices, in which an investor can profit by buying the low priced asset and selling the same asset in another market for a higher price. This is the pure form of arbitrage and will not be seen in most financial markets since these are arbitrated straight away due to efficient supply and demand. In contrast to the classical arbitrage, merger arbitrage does come along with risks. The pay-offs of the merger arbitrage are asymmetrical if a deal succeeds the pay-off will be the merger spread, but if a deal fails the potential losses can be massive. Referring back to the previous example; if a deal goes through the profit will be the merger spread of \$2 per share. On the other hand, if a deal fails it is likely that the target stock will return to its pre-announced stock price and the \$8 per share will be lost plus the additional transaction costs and short selling costs that will go uncovered. The risk of deal failure explains the nature of the merger spread as compensation to the investors offering liquidity to those who wish to sell the target stock to avoid the completion risk.

Although merger arbitrage involves risks, several studies have indicated substantial excess returns. For instance, Larcker and Lys (1987), Mitchell and Pulvino (2001), Baker and Savasoglu (2002), and Jindra and Walkling (2004) have all shown that merger arbitrage delivers significant excess returns. However, there are limits to the merger arbitrage as shown by Baker and Savasoglu (2002), besides the completion risk there are various other factors that pose a limit to arbitrage activities around M&A's. Baker and Savasoglu show that undiversified investors sell target stocks to avoid completion risk. The arbitrageurs, limited in capital and number, will require a premium to bear the idiosyncratic risk. Their results indicate that idiosyncratic risk and firm size are determinants of abnormal returns, which is consistent with limited arbitrage. Also, the arbitrage capital is consistent with limited arbitrage; meaning that arbitrage capital has a negative correlation to future abnormal returns. If arbitrage capital decreases, subsequent abnormal returns will increase. All these factors influence the arbitrageur's ability to make abnormal returns with the merger arbitrage strategy.

At this time the major players in the financial markets are financial institutions; consequently, their actions have a significant price impact on the assets they trade in. Merger arbitrageurs are mainly financial institutions, and they have the knowledge and capital to provide liquidity to the investors selling the target stocks. These financial institutions are trading on superior knowledge; time and money spent on research to determine whether the belief justifies the action. So in turn, information needs to attract the attention of investors in order to be processed and absorbed into asset prices through trading. However, as Kahneman (1979) indicates; attention is a limited cognitive resource. This research provides new insights into the limits of merger arbitrage and questions whether the inattention of institutional investors will pose a limit to the merger arbitrage.

3. Hypothesis development

This paper is to research whether inattention will pose a limit on the merger arbitrage. There are two main theories that explain the effect of inattention on merger spread. First of all, due to the inattention of institutional investors the selling pressure on the target shares will be relatively higher, due to a lower supply of arbitrage capital catering the selling pressure. Consequently leading to a higher merger spread and in turn higher abnormal returns. Secondly, the inattention of institutional investors leads to fewer institutions short selling the acquirer's stock which would induce a lesser decrease in the acquirer's stock. A lower decrease in the acquirer's stock price would lead to a higher merger spread which leads to higher returns made on the price spread of the M&A. Both of the theories assume a positive relation of inattention on merger spread. Consequently, leading to the following research question:

Does the inattention of institutions pose a limit on the merger arbitrage strategy?

Baker and Savasoglu have documented that the supply of arbitrage capital will have a negative effect on the expected returns in merger arbitrage. This study will test the rationale that due to the inattention of institutional investors the effect of the supply of arbitrage capital on expected returns will be enhanced since less institutional investors are aware of the M&A, thus less supply of arbitrage capital to cater the selling pressure of investors who try to avoid completion risk. Due to this selling pressure, the price of the target firm can fall below its efficient market price. This market inefficiency will lead to abnormal returns for the risk arbitrageurs. As inattention of institutions will lower supply of arbitrage capital and therefore slowing down the price reversal to its fundamental value, leads to an increase in the abnormal returns on merger arbitrage (Baker & Savasoglu, 2002).

Furthermore, Mitchell and Pulvino have found evidence that after an M&A announcement the acquirer's stock is subject to downward price pressure caused by merger arbitrage short selling. In particular, if excess demand curves for the acquirer stock is downward sloping in the short run, an increase in the supply of the stock will cause the equilibrium price to decrease. In normal circumstances, the stocks' supply curves are vertical and fixed. Although this assumption is unlikely to hold around M&A announcements when merger arbitrage

short selling dramatically increases the effective supply of the acquirer's stock. During periods of inattention of institutional investors, the downward price pressure should be relatively less, therefore the acquirer's stock will maintain a higher stock price.

Consequently leading to a higher merger spread. (Mitchell, Pulvino, & Stafford, Price Pressure around Mergers, 2004)

Many papers have found that the merger arbitrage strategy earns abnormal returns, but this strategy is losing its profitability since recent studies have indicated that there is a substantial decline in the arbitrage spread since the 1990s, see figure 2. Not surprisingly, the decline in arbitrage spread coincides with a decline in the aggregate returns. The decline in arbitrage spread can be explained mainly by the change in characteristics of a merger deal and increased trading in the target company's stock following a merger announcement (Jetley & Ji, 2010).

This, in turn, creates a good opportunity for this research to focus on the merger spread during low institutional investor attention periods. As theory suggest that in periods of low investor attention, there is less trading in the target- and acquirer stock and subsequently leading to larger arbitrage spreads during investor's inattention periods. Resulting in the following hypothesis:

The inattention of institutional investors is positively correlated to the merger spread

This hypothesis would imply that merger arbitrage in times of low investor attention would lead to less merger arbitrage short selling on the acquirer's share and less supply of arbitrage capital to cater the selling pressure of the target stock. Consequently, this would induce a lesser decrease in both the acquirer's stock price as the target stock price and a higher merger spread in the merger. Since the merger spread is positively correlated to the abnormal returns, the inattention of investors in this aspect would increase abnormal returns in the merger arbitrage strategy.

The next hypothesis will focus on the effect of profitability and merger spread on the inattention of institutional investors. Institutional investors could have gotten their hands on private information or were aware of a possible M&A offer before it was confirmed. Therefore they could have investigated the companies that are involved before the announcement date and therefore it is not entirely reflected in the inattention scores after the announcement date. The possibility of insider knowledge by institutions is plausible and

could pose a relation between the inattention of institutional investors and the profitability of the merger arbitrage strategy. Thus, indicating that institutions have superior knowledge and focus their attention on more profitable M&A transactions with a higher merger spread. Leading to the following hypothesis:

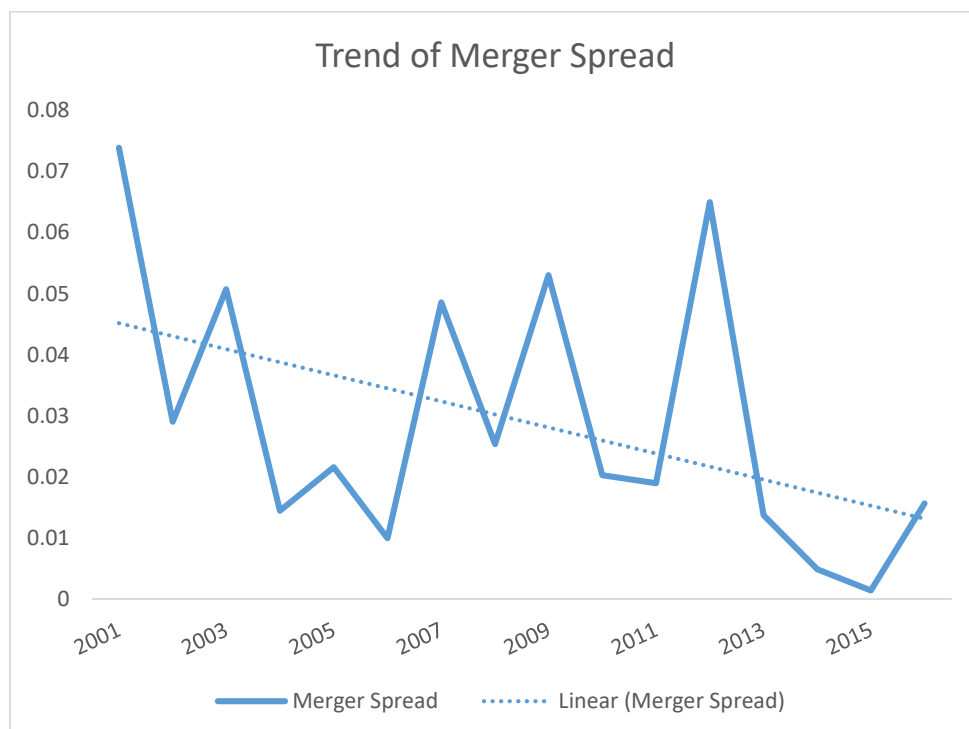
The inattention of institutions is negatively correlated to the profitability of M&A deals

Besides the profitability of the M&A transaction, the main factor that attracts institutional attention is also transaction value. The bigger the transaction value of the M&A, the more news coverage the companies get and the more institutions will be aware of the M&A. Furthermore, the bigger the deal value, the more impact the M&A will have on the industry field the firms are operating in, which should also draw institutional attention to the M&A deal. In turn leading to the following hypothesis:

The inattention of institutional investors is negatively correlated to the deal value

There is, however, a contradicting theory regarding future M&A performance indicating for a positive relation between inattention and deal value. The contradiction of these two theories will be discussed more in the research design section.

Fig. 2. Trend Line of Merger Spread, 2001-2016.



4. Research Design

This research uses data provided by Thomson One M&A database and Bloomberg. The data covers M&A transactions worldwide during the period between 2001 and 2016. This duration is chosen to see the effect of inattention before and after the financial crisis. The M&A data is filtered public companies only and deals transactions based on either cash-only or stock-only deal offers. All of the M&A data are completed mergers and acquisitions, excluding withdrawals.

Ben-Rephael, Da and Israelsen (2016) propose a measure of institutional investor attention by using Bloomberg Terminals that track news searching and news reading activity for specific stocks. They have conducted an extensive search on Bloomberg's user profiles and have shown that approximately 80% of the terminal users are working in the financial industries. Indicating a majority of Bloomberg terminal users are institutional investors who have the incentives and financial resources to respond to critical news regarding a firm rapidly. Bloomberg tracks the number of times each news article is read and the number of times the user searches news regarding a specific stock. News searching in Bloomberg requires users to use the firm's stock ticker symbol followed the function "CN" (Company News). To stress the news searching for a specific firm, Bloomberg appoints a score of 10 to news searching and a score of 1 to reading the news article. Subsequently, these numbers will be aggregated into hourly counts and Bloomberg will transform these hourly counts into a ranking system of 0 to 4 which represents the attention score. The numerical attention score is created by comparing the average hourly counts during the past 8 hours to all hours counts over the past month for the same stock. A score of 0 will be assigned if the rolling average is in the lowest 80% of the hourly counts over the past 30 days. Furthermore, a score of 1,2,3 or 4 will be assigned if the average is between 80%-90%, 90%-94%, 94%-96% or greater than 96% of the hourly counts in the past 30 days, respectively. Bloomberg then aggregates up to the daily frequency by picking a maximum of all the hourly scores throughout the calendar day.

In this research the measure of inattention will be measured by looking at the latter transformed scores, the raw hourly counts are not provided by Bloomberg. Naturally, the interest here lies in the attention score of 0. This captures the left tail of the measure

distribution and will indicate whether there is an institutional inattention regarding the M&A. The attention score of 0 or 1 will be classified as 'Inattention'. (Ben-Rephael, Da, & Israelsen, 2016)

4.1 Merger Spread

The descriptive statistics for the means of the merger spread are presented in table 2. The merger spread at announcement date will be represented by MS0, as MS1 will be representing the merger spread one trading day after the announcement date. Additionally, since the majority of M&A data is from the United States, the company's origin is added within the table and a distinction can be made between M&A transactions within the US and foreign transactions.²

In table 2 it is clearly visible that the merger spread on announcement date MS0 is in overall higher than MS1. This is evident in both the inter-US transactions and the foreign transactions. There could be several reasons for this observation. One explanation could be that the market needs more time than one trading day to incorporate the newly arrived information into the stock price. Leading to a higher target stock price on t+1 and resulting in a lower merger spread MS1. Another explanation can be that announcements have been made public outside of trading hours when the stock market is closed. This will lead to a delayed response to the stock price and therefore lagging behind one trading day.

Moreover, with the distinction made in M&A transactions within the US compared to transactions with a foreign target firm, table 1 indicates that the M&A transactions for companies within the US have a higher merger spread than the foreign transactions. The higher merger spread coincides with a lower standard deviation for inter-US transactions. This finding would imply that inner-US transactions are in general safer and more profitable than the foreign transactions. The foreign M&A transactions have a broader range in merger spread, their maximum is higher but the losses can be more substantial as well.

² Foreign transactions are defined as US or foreign firms acquiring a target outside the US.

Table 1

	Inter-US Transactions								Foreign Transactions								Total								
	MSO				MS1				MSO				MS1				MSO				MS1				
	Mean	Sd.	Min	Max	Mean	Sd.	Min	Max	Mean	Sd.	Min	Max	Mean	Sd.	Min	Max	Mean	Sd.	Min	Max	Mean	Sd.	Min	Max	
<i>Year</i>																									
2001	0.14	0.30	-0.98	1.94	0.07	0.23	-0.98	1.94	0.02	0.03	-0.01	0.04	0.02	0.03	-0.01	0.04	0.08	0.16	-0.50	0.99	0.04	0.13	-0.50	0.99	
2002	0.07	0.20	-0.46	1.38	0.03	0.11	-0.48	0.31	0.03	0.37	-0.99	1.41	0.01	0.34	-0.99	1.11	0.05	0.28	-0.73	1.39	0.02	0.23	-0.73	0.71	
2003	0.04	0.13	-0.43	0.47	0.01	0.11	-0.43	0.38	0.07	0.25	-0.57	1.90	0.07	0.29	-0.57	2.27	0.06	0.19	-0.50	1.19	0.04	0.20	-0.50	1.32	
2004	0.10	0.20	-0.14	1.19	0.06	0.14	-0.14	0.86	0.07	0.20	-1.00	0.62	0.02	0.18	-1.00	0.57	0.08	0.20	-0.57	0.90	0.04	0.16	-0.57	0.71	
2005	0.08	0.18	-0.50	0.66	0.03	0.13	-0.51	0.58	-0.02	0.30	-0.99	1.23	-0.05	0.27	-0.99	1.20	0.03	0.24	-0.75	0.95	-0.01	0.20	-0.75	0.89	
2006	0.11	0.21	-0.64	1.02	0.03	0.11	-0.64	0.47	0.03	0.24	-0.99	0.67	0.00	0.21	-0.99	0.53	0.07	0.22	-0.81	0.84	0.02	0.16	-0.81	0.50	
2007	0.07	0.18	-0.90	0.75	0.03	0.16	-0.91	0.61	0.04	0.18	-0.90	0.60	0.03	0.17	-0.90	0.62	0.05	0.18	-0.90	0.68	0.03	0.17	-0.90	0.62	
2008	0.04	0.20	-0.88	0.70	0.02	0.19	-0.88	0.70	0.01	0.22	-1.00	0.94	-0.02	0.20	-1.00	0.61	0.02	0.21	-0.94	0.82	0.00	0.20	-0.94	0.65	
2009	0.04	0.12	-0.31	0.39	0.00	0.09	-0.32	0.19	0.06	0.32	-0.90	2.80	0.02	0.30	-0.90	2.80	0.05	0.22	-0.60	1.59	0.01	0.20	-0.61	1.50	
2010	0.08	0.20	-0.56	0.84	0.04	0.13	-0.50	0.39	0.01	0.29	-0.99	1.19	-0.02	0.26	-0.99	0.90	0.05	0.25	-0.78	1.02	0.01	0.19	-0.75	0.64	
2011	0.10	0.21	-0.11	1.07	0.05	0.09	-0.13	0.24	0.12	0.25	-0.91	1.34	0.07	0.24	-0.91	1.36	0.11	0.23	-0.51	1.20	0.06	0.17	-0.52	0.80	
2012	0.10	0.18	-0.04	0.90	0.07	0.15	-0.06	0.90	0.23	0.52	-0.14	4.11	0.15	0.50	-0.18	4.13	0.16	0.35	-0.09	2.50	0.11	0.33	-0.12	2.51	
2013	0.06	0.16	-0.29	0.70	0.02	0.10	-0.29	0.51	-0.01	0.17	-0.99	0.40	-0.04	0.16	-0.99	0.56	0.03	0.16	-0.64	0.55	-0.01	0.13	-0.64	0.53	
2014	0.06	0.20	-0.89	1.01	0.03	0.18	-0.89	1.12	0.01	0.17	-0.84	0.77	-0.02	0.13	-0.84	0.37	0.04	0.18	-0.87	0.89	0.00	0.15	-0.87	0.75	
2015	0.08	0.16	-0.14	0.86	0.03	0.08	-0.12	0.33	0.02	0.31	-0.54	2.97	-0.01	0.32	-0.56	3.16	0.05	0.24	-0.34	1.91	0.01	0.20	-0.34	1.74	
2016	0.09	0.21	-0.13	1.33	0.03	0.11	-0.64	0.47	0.01	0.13	-0.30	0.80	-0.02	0.11	-0.29	0.57	0.05	0.17	-0.21	1.07	0.01	0.11	-0.46	0.52	
<i>Total</i>	<i>0.08</i>	<i>0.19</i>	<i>-0.46</i>	<i>0.95</i>	<i>0.03</i>	<i>0.13</i>	<i>-0.49</i>	<i>0.62</i>	<i>0.04</i>	<i>0.25</i>	<i>-0.75</i>	<i>1.36</i>	<i>0.01</i>	<i>0.23</i>	<i>-0.76</i>	<i>1.30</i>	<i>0.06</i>	<i>0.22</i>	<i>-0.61</i>	<i>1.16</i>	<i>0.02</i>	<i>0.18</i>	<i>-0.62</i>	<i>0.96</i>	

4.2 Payment method

In an M&A transaction, both the acquiring company and the target company have to agree upon a method of payment. There are various payment structures ranging from simple cash- and stock-only deals to complicated structures with option like features. For the sake of simplicity and ease of comparison, the focus of this research will be solely on cash-only deals, stock-only deals and a combination of both.

In the corporate decision making regarding financial structuring, there two main theories in the prominent literature. These are the trade-off theory and the pecking order theory. Both of these theories present a framework in what sources the firm should allocate to their investment capital when making an investment decision (Fama & French, 2002). The theory that is relevant to this research is the pecking order theory since that framework explains why the firms choose to use equity to invest. This paper will not go deeply into these two theories to limit the scope of the research. However, the payment method will be used a variable used in the data analysis to see what effects the payment structure has on the merger spread. Additionally, this could also shed light on some interesting future research.

4.3 Industry fit

There are two main reasons for a firm to initiate an M&A. The acquiring firm could aim to achieve synergies and reduce costs through economies of scales or reduce risks, e.g. acquiring a supplier to be in control of the supply chain. Synergies through M&A are more likely to occur when both acquirer and target firm are operating in the same industry. When M&A occur in different industries, it is more likely that the acquiring firm is aiming for diversification so that the firm performance not being entirely dependent on one single industry.

This paper will use the macro industry code provided by Thomson One database to determine the industry fit of the two firms. The results will indicate which purpose of the acquiring firm to initiate an M&A, achieving synergies or diversification, will be lead to higher merger spread and be more profitable when applying the merger arbitrage strategy. Furthermore, this variable will also suggest whether industry fit will attract more institutional attention, since an industry fit is supposed to accommodate deal success more easily. (Gomes, Angwin, Weber, & Tarba, 2012)

4.4 Deal Value

Deal value reflects the transaction value of the M&A deal. The main rationale is that deal value attracts more institutional attention due to more news coverage and having a more significant impact on the industry fields the firms are operating in. More institutional attention leads to an increased supply of arbitrage capital and increased merger arbitrage short selling, which in turn leads to a lower merger spread.

In contrary, past research has found a significant negative relation between deal value and future performance (KPMG, 2007). The correlation could be explained by the fact that smaller deals involve smaller firms that are easier to integrate with the acquirer and in turn have a better performance post completion. Furthermore, according to (Roll, 1986) on average there is very little evidence that M&A creates value for the acquirer. So one would think that smaller M&A deals would have a higher success rate because they are easier to integrate and post-completion they tend to outperform the bigger M&A deals and actually create value through the M&A (Rehm, Uhlener, & West, 2012). Because of smaller M&A deals are more likely to succeed, and merger spread reflects the insecurity around deal completion, smaller M&A deals should have a smaller merger spread. Hence, a positive relation between merger spread and deal value.

4.5 Target Market-to-Book Ratio

Traditionally, the market-to-book ratio (P/B) has been interpreted as an indicator for expected return on equity (Graham, Todd, & Cottle, 1962). Furthermore, the market-to-book ratio was modelled to be a growth indicator and is often compared to Tobin's q. It can be used as an indicator for mispriced stocks to make the distinction between a "value stock" (low P/B) versus a "glamour stock" (high P/B) (Lakonishok, Shleifer, & Vishny, 1994). Lastly, K, Chan, Hamao, & Lakonishok (1991) and Fama & French (1992) have reported that the market-to-book ratio reflects mean stock returns, characterized by assumptions that it serves as a proxy for risk or as an indication of distress.

The target market-to-book ratio will be added as a control variable to see whether the inattention and merger spreads differ for a value stock or a glamour stock and whether it serves as a proxy for completion risk. Since a more risky M&A transaction should have a higher merger spread to capture the uncertainty of deal completion.

4.6 Bid Premium

The bid premium reflects the premium offered by the acquiring firm to the target. It is essentially the difference between the estimated real value of the target firm and the price offered by the acquirer. It captures the price the acquirer is willing to pay extra to obtain the target company. Since this variable has a high correlation with the merger spread, bid premium will not be used in the regression on merger spread to prevent multicollinearity. This variable will be used as a control variable in the regression on inattention.

4.7 Attitude

The attitude of the takeover will also be looked upon. Deals can be characterized as hostile or friendly. A hostile takeover means the acquirer will not negotiate terms with the management of the target company but directs his intentions towards the shareholders. This will most often occur if management and acquirer have failed to come to terms. After negotiations with management have failed, the acquirer will try to negotiate with shareholders, this process is more complicated and time-consuming, thereby reducing the completion chance. Moreover, many firms have anti-takeover measures to prevent a hostile takeover. In other words, friendly deals have a higher chance of completion. Since merger spread reflects completion risk, a friendly dummy will be added as control variable.

5. Data

The sample used in this research consists of 17414 completed merger offers worldwide that occurred in the years 2001 to 2016. The data was acquired from Thomson One M&A database and was filtered based on several criteria; the acquiring company had to be publicly listed, the offers were either cash-, common stock-only or a combination of both. Considerations with option-like features are excluded.

Sample selection

Furthermore, the data got filtered due to insufficient information and penny stocks were taken out of the sample. The rationale behind taking out the penny stocks is to improve the consistency of available data on both Datastream and Bloomberg and to reduce bias. The SEC classifies the definition penny stocks as all shares that are trading below \$5. Penny stocks tend to be highly illiquid and speculative; this can lead to abnormally large merger spreads and might cause the merger spread dataset to have a right-skewed distribution. To prevent these outliers, the dataset of 17169 merger offers was reduced to a quantity of 6492. The data is divided into subsets in which 4543 merger offers are cash-only offers, 1023 stock-only offers and 926 offers are a combination of both.

The inattention data, however, was scarce and inconsistent. Out of the 6492 M&A offers, only a small portion of attention data was available and matched the time period at the announcement date. Ending up with only 327 relevant attention scores on the total M&A sample.

The sample of the M&A deals is shown in figure 3 and table 4. A noticeable increase in M&A activity is seen since 2001, which peaked at 2008 and experienced a moderate decline after the financial crisis. Since the economy is recovering and regaining the trust of investors after 2013, the M&A activity exhibits an increasing trend again. This is consistent with past literature that M&A activity correlates with economic cycles. Periods with economic growths go combined with increasing M&A activity.

Fig. 3. Merger Spread Moving Average, 2001-2016

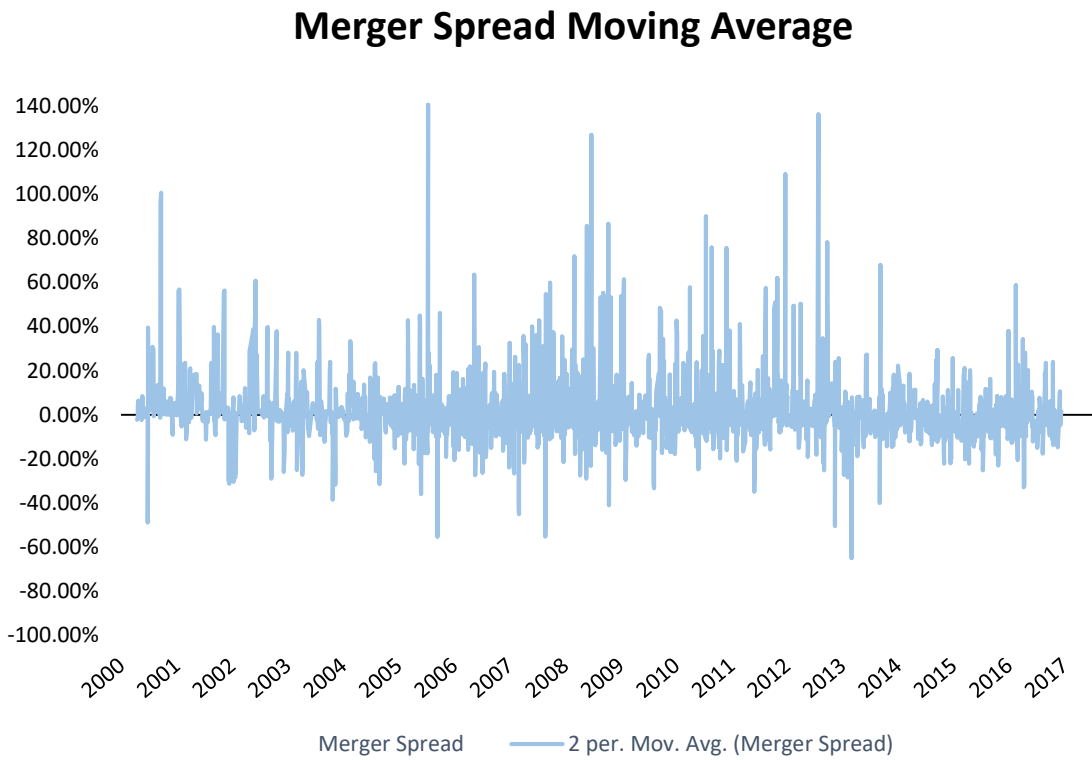


Fig. 4. Mergers and acquisitions, 2001-2016. Annual mergers and acquisitions recorded by Thomson One's database. Includes only completed mergers or acquisitions and with a consideration of cash-, stock-only deals or a combination of both. Excludes penny stocks.

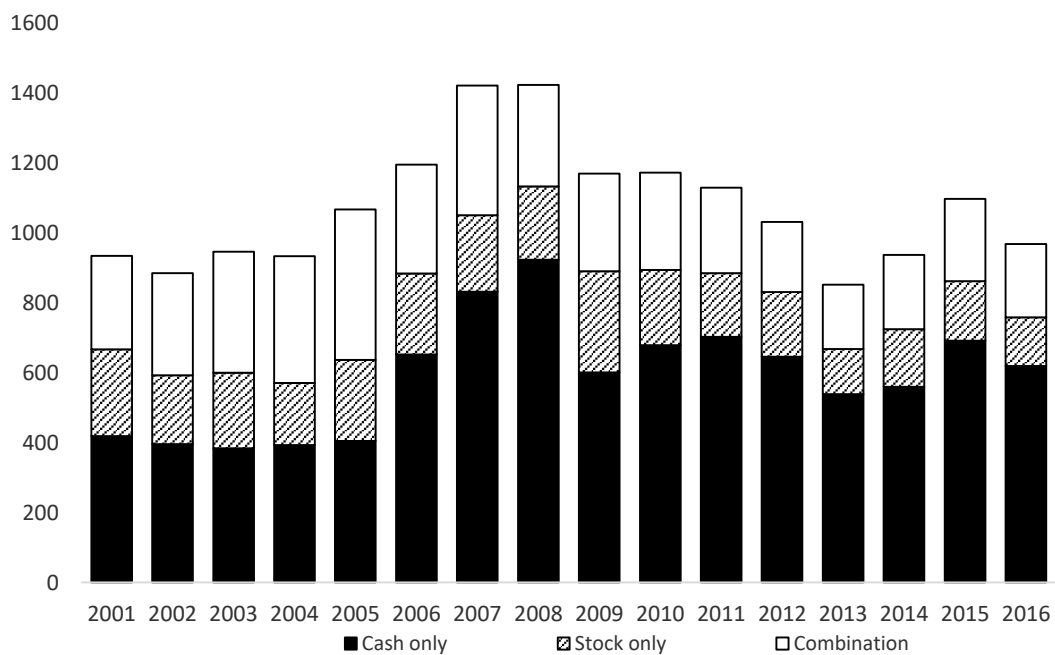


Table 2

Mergers and acquisitions, 2001-2016 This table provides a comparison of the amount of M&A activity recorded in the Thomson One Database and the final sample. The data includes only completed mergers or acquisitions and with a consideration of cash-, stock-only deals or a combination of both.

<i>Announcement year</i>	<i>Complete Thomson One data</i>				<i>Sample</i>			
	<i>All</i>	<i>Pure cash</i>	<i>Pure stock</i>	<i>Combination</i>	<i>All</i>	<i>Pure cash</i>	<i>Pure stock</i>	<i>Combination</i>
2001	935	419	248	268	275	138	66	71
2002	885	396	197	292	231	143	43	45
2003	946	384	216	346	278	161	48	69
2004	934	393	178	363	339	184	77	78
2005	1067	405	232	430	432	262	85	85
2006	1196	652	232	312	546	384	96	66
2007	1422	832	219	371	668	499	79	90
2008	1424	924	209	291	572	473	62	37
2009	1170	601	290	279	348	243	69	36
2010	1173	679	215	279	413	309	66	38
2011	1130	703	182	245	389	296	53	40
2012	1032	646	185	201	350	271	44	35
2013	852	539	129	184	357	270	46	41
2014	937	560	165	212	414	290	61	63
2015	1098	692	170	236	452	323	60	69
2016	968	619	140	209	428	297	68	63
<i>Total</i>	<i>17169</i>	<i>9444</i>	<i>3207</i>		<i>6492</i>	<i>4543</i>	<i>1023</i>	<i>926</i>

Table 2 is divided into two sections. The first section depicts all the data recorded from Thomson One database and the second one is the remaining sample after filtering out the data with insufficient information and penny stocks. Each section is broken into four columns: all deals, cash-only deals, stock-only deals and a combination of both. The sample consists of roughly 40% of all the deals acquired from Thomson One. The data reveals that a strong preference for cash-deals is dominant and is consistent with both the data from Thomson One and the test sample.

Table 3

	Nr. of observ.	% Cash Only	% Stock Only	% Comb. Stock & Cash	Deal Value	% Industry Fit	Bid Premium (Incl penny stocks)	Bid Premium	Trgt. MVTBV
<i>Year</i>	Mean values of variables per year								
2001	275	50%	24%	26%	747	84%	26%	26%	2.94
2002	231	62%	19%	19%	734	79%	24%	15%	1.91
2003	278	58%	17%	25%	818	76%	26%	16%	1.45
2004	339	54%	23%	23%	1304	78%	11%	11%	1.45
2005	432	61%	20%	20%	868	76%	11%	9%	1.48
2006	546	70%	18%	12%	967	75%	13%	9%	1.32
2007	668	75%	12%	13%	518	75%	10%	7%	1.44
2008	572	83%	11%	6%	535	84%	20%	9%	1.61
2009	348	70%	20%	10%	363	78%	18%	8%	1.46
2010	413	75%	16%	9%	353	78%	17%	11%	1.62
2011	389	76%	14%	10%	512	83%	26%	8%	1.28
2012	350	77%	13%	10%	427	83%	14%	15%	1.92
2013	357	76%	13%	11%	405	84%	18%	5%	1.24
2014	414	70%	15%	15%	778	85%	14%	7%	1.34
2015	452	71%	13%	15%	1052	84%	14%	7%	1.34
2016	428	69%	16%	15%	470	85%	14%	9%	1.31
<i>Total</i>	<i>6492</i>	<i>69%</i>	<i>16%</i>	<i>15%</i>	<i>678</i>	<i>80%</i>	<i>17%</i>	<i>11%</i>	<i>1.57</i>
<i>Location</i>	Mean values of variables per location								
Inter-US	2121	51%	16%	16%	661	93%	39%	26%	1.90
Foreign	4371	83%	17%	13%	513	81%	1%	7%	1.64
<i>Total</i>	<i>6492</i>	<i>69%</i>	<i>16%</i>	<i>15%</i>	<i>678</i>	<i>80%</i>	<i>17%</i>	<i>11%</i>	<i>1.57</i>

6. Methodology

This passage will explain the methodology used in the research and which variables are used in the regression models. Moreover, the two dependent variables, inattention and merger spread, in relation to the control variables will be clarified.

The first regression will test the relation of inattention on the merger spread:

$$\text{Merger Spread} = \beta_0 + \beta_1 \text{Inattention} + \beta_2 \text{Inattention (Lag)} + \beta_3 \text{Cash Only} + \beta_4 \text{Stock Only} + \beta_5 \text{In Deal Value} + \beta_6 \text{In MVTBV} + \beta_7 \text{Industry Fit} + \beta_8 \text{Domestic} + \beta_9 \text{Friendly} +$$

The first regression will explain the relation of inattention on merger spread with control variables added for deal and stock characteristics. The results will indicate whether the inattention will pose a limit to the merger arbitrage strategy.

Additionally, various control variables and year fixed effects are included in the regression to increase the accuracy of the model. The control variable *Bid Premium All* includes the sample data plus the penny stocks that were filtered out. This variable is included to test and confirm whether there is a sample bias if penny stocks were not excluded.

The deal value is an interesting control variable to test upon since it has contradicting theories regarding its relation to merger spread; theories of supply in arbitrage capital and merger arbitrage short selling suggest deal value would have a negative relation to merger spread. The other theory of completion risk suggests a positive relation between deal value and merger spread. The results will indicate which of the theory is applicable to this research.

The second regression will test which variables explain the most of the inattention:

$$\text{Inattention} = \beta_0 + \beta_1 \text{MSO} + \beta_2 \text{In Deal Value} + \beta_3 \text{In MVTBV} + \beta_4 \text{Cash Only} + \beta_5 \text{Stock Only} + \beta_6 \text{Industry Fit} + \beta_7 \text{Friendly} + \beta_8 \text{Bid Premium} + \beta_9 \text{Domestic} +$$

$$\text{Inattention Lag} = \beta_0 + \beta_1 \text{MS1} + \beta_2 \text{In Deal Value} + \beta_3 \text{In MVTBV} + \beta_4 \text{Cash Only} + \beta_5 \text{Stock Only} + \beta_6 \text{Industry Fit} + \beta_7 \text{Friendly} + \beta_8 \text{Bid Premium} + \beta_9 \text{Domestic} +$$

The first regression will test whether inattention poses a limit to the merger spread or merger arbitrage strategy. Subsequently, the second regression will try to explain what causes the inattention of institutional investors. In order to test the limits to the merger spread, one should also understand the variables that limit the merger arbitrage strategy.

6.1 Merger Spread

The method of Jetley and Ji (2010) is used to measure the merger spread. There are two different arbitrage spreads one of cash deals in which target shareholders are paid in cash only. The arbitrage spread of cash deals is calculated by the price in cash that the acquiring company offers to pay for each share of the target company's common stock P_{offer} minus $P_{target,t}$ the closing price of the target company's common stock on trading day t , divided by $P_{target,t}$, where t is the date announced:

$$S_{cash,t} = \frac{P_{offer} - P_{target,t}}{P_{target,t}}$$

The calculation of M&A transactions consisting of stock deals or a combination of stock- and cash deals is more complicated. Jetley and Ji (2010) use an approach which includes the exchange ratio, number of shares offered by the acquiring company for the shares of the target company, instead of merely the offer price. The data acquired through Thomson One already converted the amounts to cash per share, therefore the formula below will not be used in calculation but merely serves to help the interpretation of the merger arbitrage strategy regarding stock deals.

$$S_{stock,t} = \frac{(P_{acquirer})(ER) - P_{target,t}}{P_{target,t}}$$

Due to the possibility of the market not reacting immediately or the announcement taken place after the markets are closed, the target price adjustment to the offer price may be lagging behind. This will be taken into account by constructing a lagged variable where the target price of one trading day after announcement ($t+1$) will be used to calculate the lagged merger spread. The lagged variable will in turn increase robustness of the results:

$$S_{t+1} = \frac{P_{offer} - P_{target,t+1}}{P_{target,t+1}}$$

6.2 Inattention

The second dependent variable of interest is inattention, which was already used in the first regression on merger spread. This time, however, this regression will test to what extent the deal value and other control variables influence the measure of inattention. As discussed before the inattention scores obtained from Bloomberg Terminal range from 0 to 4.

The attention scores obtained from Bloomberg Terminal are classified as inattention if the score is 0, everything with an attention score of 1 and above will be classified as receiving attention by institutions. Thus, inattention is a dummy variable that takes the value of 0 if the M&A is classified as inattention and 1 if the M&A does draw attention. Since the dependent variable Inattention is a dummy, a logistic model is used for both regressions regarding the merger spread and the deal value. Transforming the inattention scores into a dummy variable allows easier interpretation of the differential impact of high versus low attention of institutions.

7. Results

This section will be determining whether the proposed hypotheses will be accepted or rejected. The results can be split into two sections. The first section will be covering the relation between merger spread and inattention. The second section will focus on the Inattention and try to look which variables can explain the inattention of institutional investors.

The results regarding the merger spread will mainly focus on MS1. As seen in table 1, MS0 has an overall higher spread than MS1 due to the market not being able to incorporate the news of the acquisition into the stock price within one trading day or the announcement was made outside of trading hours. Using the lagged merger spread instead of the merger spread on announcement date will avoid an inadvertently upward bias and providing a better estimate of the merger spread.

Unfortunately, to compensate for the small sample of inattention data, only M&A deals were used that had a corresponding attention score, consequently reducing the total observations to 325. The impact of the missing observations in inattention will otherwise be biased when regressed on merger spread and the effect of inattention will be suppressed by the control variables that have a much larger sample size. Moreover, the inattention data only covered the time period from 2010 to 2016. Thus this will also be the timespan the models will be tested on.

First of all, many of the variables used were originally heavily subject to non-normal distribution. M&A data tends to contain many outliers, especially merger spread. This was already partially taken into account by excluding penny stocks in the sample. By conducting the Shapiro Wilk test, all variables were tested for normality. Various variables which didn't pass the Shapiro Wilk test were trimmed or underwent a log transformation. Since a normal distributed variable gives more reliable results in regressions (Stevens, 1984).

Besides the normality of the variables, the heteroscedasticity, skewness, kurtosis and multicollinearity were also tested upon. As expected, the data is subject to Kurtosis due to the majority of M&A deals being clustered around the mean, resulting in a high peak and fat tails. There were no significant signs of heteroscedasticity and skewness was reduced by trimming and log transformations. The results of the tests on biases are presented in the appendix.³

7.1 Merger spread and Inattention

This paper will start off with a univariate model of merger spread and inattention in table 4. Because both merger spread and inattention have two different time periods, at announcement date t and day after announcement $t+1$, the usage of univariate can show the differences between the two time periods. Country fixed effects are added to hold constant any time-invariant country-level factors. Year fixed effects are added to hold constant for exogenous shocks in the economy.

Table 4

<i>MS0</i>	No Fixed Effects	<i>Country</i> <i>fixed effects</i>	<i>Year</i> <i>fixed effects</i>
<i>Inattention</i>	-0.0243 (0.0231)	-0.0123 (0.0232)	-0.0196 (0.0232)
<i>Constant</i>	0.1048*** (0.0199)	0.0959*** (0.0197)	0.1013*** (0.0200)
<i>Adj R</i>	0.0034	0.0034	0.0034
<i>Nr. of observ.</i>	323	323	323
<i>MS1</i>			
<i>Inattention</i>	-0.0123 (0.0198)	0.0005 (0.0200)	-0.0120 (0.0200)
<i>Constant</i>	0.0541*** (0.0171)	0.0446*** (0.0171)	0.0539*** (0.0173)
<i>R-squared</i>	0.0012	0.0012	0.0012
<i>Nr. of observ.</i>	326	326	326

*Note: Results are shown of the univariate regression with merger spread as its dependent variable. Robust standard errors are shown in the brackets. The regressions are shown with no fixed effects, with country fixed effects and year fixed effects. Significance level:*** is significant at a 1% level, ** at a 5% level and * at a 10% level.*

³ See Appendix, Tables 1 – 3

The inattention shows no significant results at a 10% confidence level for neither MS0 nor MS1. This indicates that the inattention on its own does not have a significant effect on the merger spread. This might be because the merger spread is too complex and dependent on many variables other than inattention, as indicated by the explanatory power of the model. The univariate model does support the rationale of mainly focussing on MS1 to prevent an upward biased merger spread since coefficient of MS0 is more negative and with higher standard errors than MS1. This can also be seen and explained by table 1, as the merger spread of MS0 was overall higher than MS1.

The multivariate model is presented in table 5. By using the Akaike's information criterion and Bayesian information criterion, it is determined that the model with country fixed effects is the better fitting model and will be used as reference while discussing the variables.

In contrary to the univariate model, the multivariate model shows a positive relationship between the inattention and the merger spread. This relation is significant at a 1% level for MS1 which, with respect to the univariate model, indicates that the effect of inattention on merger spread is better when tested in context with other variables. The coefficient of inattention is 0.0459. This means that an M&A deal characterized as receiving inattention from institutional investors at time t will produce a 0.0459 unit change in the merger spread at $t+1$ compared to an M&A deal characterized with receiving attention. This finding is supporting the theory Baker and Savasoglu (2002) and Mitchell and Pulvino (2004) that the supply of arbitrage capital and merger arbitrage short selling will have a negative effect on the merger spread. In other words, the increase in inattention of institutional investors will lower the supply of arbitrage capital to cater the selling pressure of investors willing to sell the target stock to protect themselves from the completion risk. Additionally, the inattention of institutional investors will also decrease the downward price pressure on the acquirer's stock caused by the merger arbitrage short selling. Both the supply of arbitrage capital and merger arbitrage short selling are negatively related to the merger spread and therefore inattention at time t will increase the merger spread at time $t+1$, indicating a significant lagged effect.

Table 5

	<i>MS0</i>			<i>MS1</i>		
	<i>No Fixed Effects</i>	<i>Country Fixed Effects</i>	<i>Year Fixed Effects</i>	<i>No Fixed Effects</i>	<i>Country Fixed Effects</i>	<i>Year Fixed Effects</i>
<i>Inattention</i>	0.0173 (0.0210)	.0250** (0.0108)	0.0170 (0.0149)	0.0403** (0.020)	0.0459*** (0.012)	0.0391** (0.016)
<i>Inattention Lag</i>	- (omitted)	- (omitted)	- (omitted)	-0.016 (0.019)	-0.014 (0.013)	-0.014 (0.018)
<i>Cash Only</i>	-0.0440 (0.0293)	-.0526*** (0.0141)	-0.0432 (0.0439)	-0.003 (0.026)	-0.009 (0.013)	-0.003 (0.035)
<i>Stock Only</i>	-.0861** (0.0364)	-.0905*** (0.0186)	-.0830*** (0.0189)	-0.031 (0.027)	-0.036 (0.022)	-0.0304** (0.012)
<i>In MVTBV</i>	0.0064 (0.0182)	0.0110 (0.0157)	0.0093 (0.0200)	0.007 (0.015)	0.009 (0.015)	0.009 (0.007)
<i>In Deal Value</i>	-0.0017 (0.0066)	-0.0031 (0.0064)	-0.0008 (0.0095)	0.0113* (0.006)	0.0109*** (0.004)	0.013 (0.008)
<i>Industry Fit</i>	-0.0336 (0.0282)	-0.0297 (0.0241)	-0.0322 (0.0319)	0.008 (0.021)	0.009 (0.013)	0.007 (0.026)
<i>Domestic</i>	.0708*** (0.0240)	- (omitted)	0.0686 (0.0357)	0.0390* (0.022)	- (omitted)	0.040 (0.030)
<i>Friendly</i>	.0596** (0.0235)	.0695*** (0.0231)	.0611*** (0.0151)	0.033 (0.024)	0.041 (0.031)	0.030 (0.018)
<i>Constant</i>	0.0792 (0.0613)	.1187** (0.0480)	0.0713 (0.0727)	-0.075 (0.061)	-0.056 (0.044)	-0.086 (0.086)
<i>R-squared</i>	0.1131	0.0761	0.1128	0.0892	0.0750	0.0887
<i>Nr. of observ.</i>	322	322	322	325	325	325

Note: Results are shown of the regression with merger spread at t and $t+1$ as its dependent variable. Robust standard errors are shown in the brackets. The regressions are shown with no fixed effects, with country fixed effects and year fixed effects. The variables MVTBV and Deal Value have gone through a log transformation. Significance level:*** is significant at a 1% level, ** at a 5% level and * at a 10% level.

Regarding the payment methods, a hybrid payment is omitted to prevent the dummy variable trap and multicollinearity. This means that the hybrid payment will be reflected in the constant when merger spread will be regressed on cash- and stock only deals. Noticeable is the difference in significance of the payment methods between the merger spread at t and $t+1$. Indicating that the effect of the payment method will be incorporated in the merger spread at announcement date. The coefficients of the payment methods for both cash and stock deals are negative and significant at a 1% level in the country fixed effects model for MS0. Thus, implying that a cash and stock deal has a negative relation to the merger spread relative to the hybrid deal. When looking at the constant at MS0, it shows a positive sign which is significant at a 5% level. To verify this finding, a multivariate regression has been run with only the payment methods included in the model and no constant. This model indicates that all payment methods increase the merger spread, but the hybrid deal has the largest significant effect on merger spread. Since the hybrid deal has been a reference in the models in table 5, the negative coefficients of the cash and stock deal variables simply imply that these variables effect the merger spread positively to a lesser extent relative to the hybrid deal. This finding can be explained by the increase volatility in merger spread in a hybrid deal, because the merger spread will be affected by both the target and acquirer stock (Wooge, 2015).⁴

The variable Deal Value is significant in MS1 at a 1% level. The result of MS1 in comparison with MS0 indicates the deal value has a lagged effect on merger spread. The coefficient is 0.0109, which means that a one percent change in the deal value will produce a 0.0109 unit change in merger spread at $t+1$. By reason of merger spread reflecting completion risk, this is supporting the theory that smaller M&A deals are easier to integrate and more likely to succeed. Additionally, supporting the initial assumption that smaller M&A deals are associated with smaller merger spreads.

The dummy variables Domestic and Friendly are added to test whether foreign M&A deals and attitude of acquiring company has a significant effect on the merger spread. Both the dummies Domestic and Friendly, indicate a positive relation to MS0, without being controlled for country fixed effects. This finding regarding the Domestic dummy aroused suspicion about the systematic differences between countries. That is why a model with

⁴ The multivariate model including solely the payment methods is presented in the appendix, table 4.

country dummies was made to identify which countries had a significant effect on the merger spread.⁵

Finally, after reviewing these findings, a conclusion can be made regarding the first hypothesis. The main findings with respect to the relation between the inattention of institutional investors and merger spread MS0 and MS1 are as follows. The results are significant in the country fixed effects model, which was chosen as the better and more accurate model based on the Akaike's information criterion and the Bayesian information criterion. The significance is strongest in MS1, at a 1% level, and indicates a positive lagged effect of inattention on merger spread. Thus, the hypothesis '*The inattention of institutional investors is positively correlated to the merger spread*' cannot be rejected.

7.2 Inattention and profitability

This section will look into the explanatory variables for inattention. Mainly testing the relation between inattention of institutions and profitability of the M&A deal. The merger spread will reflect the profitability of an M&A deal, the larger the merger spread, the bigger the potential profits with the merger arbitrage strategy. The hypothesis is assuming a negative relation between inattention and profitability based on the superior knowledge argument.

Table 6 presents the results of univariate regressions of merger spread on inattention. Using the Akaike's information criterion and Bayesian information criterion, it is determined that once again the model with country fixed effects is the better fitting model and will be used as reference while discussing the variables.

The results indicate that the relation between profitability and inattention is negative, but only significant for MS0 on the inattention at $t+1$. This finding implies a lagged effect of merger spread on inattention. The coefficient of -0.3571 is significant at a 5% level and reveals that a one unit change in MS0 generates a 100*-0.3571 percentage point change in the probability that the M&A deal is characterized with inattention.

⁵ The multivariate model including country dummies is presented in the appendix, table 5.

Table 6

<i>Inattention</i>	<i>No Fixed Effects</i>	<i>Country Fixed Effects</i>	<i>Year Fixed Effects</i>
<i>MS0</i>	-0.1410 (0.1343)	-0.0766 (0.1445)	-0.1157 (0.1366)
<i>Constant</i>	0.7552*** (0.0269)	0.7496*** (0.0270)	0.7530*** (0.0271)
<i>R-squared</i>	0.0034	0.0034	0.0034
<i>Nr. of observ.</i>	323	323	323
<i>Inattention Lag</i>			
<i>MS0</i>	-0.4761*** (0.1508)	-0.3571** (0.1637)	-0.4354*** (0.1529)
<i>Constant</i>	0.4902*** (0.0303)	0.4866*** (0.0306)	0.4866*** (0.0304)
<i>R-squared</i>	0.0301	0.0301	0.0301
<i>Nr. of observ.</i>	323	323	323
<i>MS1</i>	-0.1737 (0.1777)	-0.0209 (0.1900)	-0.1760 (0.1780)
<i>Constant</i>	0.4557 (0.0287)	0.4487*** (0.0285)	0.4557*** (0.0287)
<i>R-squared</i>	0.0029	0.0029	0.0029
<i>Nr. of observ.</i>	326	326	326

Note: Results are shown of the univariate regression with *Inattention* and *Inattention Lag* as its dependent variable. Standard errors are shown in the brackets. The regressions are shown with no fixed effects, with country fixed effects and year fixed effects. Significance level:*** is significant at a 1% level, ** at a 5% level and * at a 10% level.

For the sake of robustness, a multivariate model will be created for inattention. The multivariate model will include various control variables. Bid premium is a new control variable added to test whether bid premium has a significant impact on inattention since there are several contradicting studies that documented that bid premium has a significant impact on deal completion.

As the models controlled for country fixed effects have been determined to be more fitting model, the models without fixed effects and controlled year fixed effects will be omitted for ease of comparison.⁶

Table 7

	<i>Inattention</i>	<i>Inattention Lag</i>	
<i>MS0</i>	-0.1296 (0.0988)	-0.4080*** (0.0872)	
<i>MS1</i>		0.1460 (0.1481)	
<i>In Deal Value</i>	-0.0466*** (0.0143)	-0.0583** (0.0278)	-0.0558* (0.0276)
<i>In MVTBV</i>	-0.0468 (0.0280)	-0.0406* (0.0209)	-0.0501** (0.0187)
<i>Cash</i>	-0.0799* (0.0414)	-0.0612 (0.0416)	-0.0314 (0.0533)
<i>Stock</i>	-0.1793*** (0.0461)	0.0246 (0.1118)	0.0305 (0.1096)
<i>Industry Fit</i>	0.0156 (0.0452)	0.0922** (0.0353)	0.1071*** (0.0345)
<i>Friendly</i>	-0.0335 (0.0856)	-0.0479 (0.0987)	-0.0355 (0.0957)
<i>Bid Premium</i>	0.0588 (0.1696)	0.1233 (0.1400)	-0.0820 (0.1524)
<i>Constant</i>	1.1179*** (0.1288)	0.8077*** (0.1693)	0.7551*** (0.1971)
<i>R-squared</i>	0.089	0.0808	0.06
<i>Nr. of observ.</i>	322	322	325

Note: Results are shown of the multivariate regression with *Inattention* and *Inattention Lag* as its dependent variable. Standard errors are shown in the brackets. The regressions are shown with fixed effects. Significance level: *** is significant at a 1% level, ** at a 5% level and * at a 10% level.

⁶ Results of the models without fixed effects and controlled for year fixed effects are presented in the appendix, table 6.

The results in table 7 on inattention at announcement date show a non-significant MSO, this is a similar result to the univariate regression. Signifying that MSO has no significant effect on the inattention at time t . However, MSO is significant for the inattention lag. The coefficient of -0.4080 is significant at a 1% level and indicates the effect of the merger spread at announcement date has a lagged effect and is significant on the inattention at time $t+1$. A one unit change in merger spread at t will generate a 100×-0.4080 percentage point change in the probability that inattention occurs at $t+1$. Therefore, providing an answer for the second hypothesis:

The inattention of institutions is negatively correlated to the profitability of M&A deals

As seen in the univariate and the multivariate models, the MSO has a negative relation to inattention, which is significant for the Inattention Lag. Thus, the hypothesis cannot be rejected.

A comparison of the Inattention and Inattention Lag reveals that some variables like Deal Value and payment method are significant for the inattention at announcement date, but are non-significant or significant to a lesser degree when regressed on the Inattention Lag. The payment methods cash and stock are attracting less institutional attention relative to the hybrid payment. However, all the payment methods referred to in this research are significant and have a positive relation to inattention at announcement date. Contrariwise, variables like MSO, MVTBV and Industry Fit are significant for the Inattention Lag but not significant for the Inattention at announcement date. These results indicate that institutional investors react faster to some factors by allocating their attention. Regarding Industry Fit and MSO, these factors have a lagged effect on inattention and will only have a significant effect on the inattention one trading day after announcement date. The relation to deal value will be discussed in the later section covering the third hypothesis.

To summarize the findings in this section. Merger spread at announcement date has a significant negative lagged effect on Inattention. A one unit change in merger spread at t will generate a 100×-0.4080 percentage point change in the probability that inattention occurs at $t+1$. Since merger spread reflects profitability in the merger arbitrage strategy, the hypothesis cannot be rejected. This result could be explained by the argument of institutional investors having superior knowledge and because attention is a limited cognitive resource, institutional investors will allocate their attention to the more profitable M&A deals.

7.3 Inattention and deal value

As discussed in the previous section, table 7 shows a significant negative relation of deal value and inattention. Although, the relation of deal value and inattention at time $t+1$ is significant to a lesser degree compared to the inattention at time t , which is significant at a 1% level. A one percent change in deal value will result in a 100×-0.0466 percentage point change in the probability that inattention at announcement date occurs. This negative relation of deal value and inattention is consistent for both the Inattention as the Inattention Lag. The relation could be explained by the theory that a higher deal value goes combined with more news coverage and therefore attracting more attention at announcement date. Additionally, the higher the deal value, the more impact the M&A will have on the industry field the firms are operating in, which should also draw institutional attention to the M&A deal.

With respect to the findings on deal value in relation to inattention, the hypothesis that *'The inattention of institutional investors is negatively correlated to the deal value'* cannot be rejected.

8. Conclusion

Various research has been done on the topic of merger spread and what variables pose a limit to the merger arbitrage strategy. Although, the relation between merger spread and inattention of institutions has never been focussed upon. This research tries to test whether the inattention of institutional investors will pose a limit on the merger arbitrage strategy and what effects the inattention and tries to broaden the horizon on merger arbitrage. However, it remains challenging to identify a pure relation between the two variables, because there are so many factors to account for when testing on the change in merger spread.

This research has found a significant positive relation between merger spread and inattention. It is a lagged effect of the inattention at announcement date on the merger spread one trading day after announcement. This finding is supporting the theory of Baker and Savasoglu (2002) that the supply of arbitrage capital will have a negative effect on the merger spread. In other words, the increase in inattention of institutional investors will lower the supply of arbitrage capital to cater the selling pressure of investors willing to sell the target stock to protect themselves from the completion risk and therefore lowering the merger spread at time $t+1$, indicating a significant lagged effect. Furthermore, it is also consistent with the theory of Mitchell and Pulvino (2004) that states the merger arbitrage short selling is negatively related to the merger spread. Therefore, inattention of institutional investors will both decrease the supply of arbitrage capital and the merger arbitrage short selling. Providing an answer to the research question that inattention of institutions does pose a limit on the merger arbitrage strategy.

Furthermore, this paper tried to find the variables that effect the inattention of institutions. Testing on the profitability of the M&A deal reflected by merger spread and testing on the deal value on inattention. The results show that merger spread at announcement date has a significant negative lagged effect on inattention, the effect was significant one trading day after announcement. This finding is supporting the argument that institutional investors having superior knowledge and because attention is a limited cognitive resource, institutional investors will allocate their attention to the more profitable M&A deals.

With respect to the deal value, the relation with inattention was negative. This relation could be explained by the theory that a higher deal value goes combined with more news coverage and therefore attracting more attention at announcement date. Additionally, the higher the deal value, the more impact the M&A will have on the industry field the firms are operating in, which should also draw institutional attention to the M&A deal.

9. Limitations

It is important to note that this research had several limitations. Specifically the data is the cause of several limitations within this research. First of all, the inattention data was scarce, therefore reducing the total sample tremendously. The reduction in the total sample will reduce the reliability whether the test sample is a good representation for the total M&A deals. However, by using a sample size calculation it was determined that the sample size was large enough for a power of 80% with a 95% confidence interval.

Secondly, the M&A data tends to have many outliers. Ideally the sample should not have to be transformed or trimmed to reduce the biases of a non-normal distribution. However, for the M&A data it was a trade-off between reliability of the test versus the representation of the real world. In this paper the emphasis was put on the reliability of the tests, because in statistics a type I error, incorrectly rejecting the null hypothesis, is worse than a type II error. As the type II error, not rejecting the null hypothesis when it false, will not make things worse as you stick to the status quo or default assumption of literature.

Finally, it is hard to find a pure relation between inattention and merger spread, since merger spread is dependent on many different factors. As seen in the univariate regression of inattention on merger spread, there were no significant results. However, inattention in combination with other control variables does pose a significant effect on the merger spread. Therefore inattention can only be tested in context with other variables.

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Appendix

Control variables explained

Cash	Dummy variable taking the value of 1 if a deal is financed by cash only
Stock	Dummy variable taking the value of 1 if a deal is financed by stock only
Hybrid	Dummy variable taking the value of 1 if a deal is financed by a combination of cash and stock
Inattention	Dummy variable taking the value of 1 if the M&A deal has an attention score of 0 at announcement date
Inattention (Lag)	Dummy variable taking the value of 1 if the M&A deal has an attention score of 0 at 1 trading day after announcement date
Deal Value	Natural Logarithm of deal value in millions of USD
Target MVTBV	Natural Logarithm of market value of target divided by book value of target
Industry Fit	Dummy variable taking the value of 1 if both the target and the acquirer are operating in the same macro industry
Domestic	Dummy variable taking the value of 1 if both the target and the acquirer are operating in the same country
Friendly	Dummy variable taking the value of 1 if the deal is friendly
Bid Premium	Initial offer price minus target share price one week before the announcement date, divided by the target share price one week before the announcement date

Table 1: Cameron & Trivedi's decomposition of IM-test

Cameron & Trivedi's decomposition of IM-test			
<i>Source</i>	<i>chi2</i>	<i>df</i>	<i>p</i>
<i>Heteroskedasticity</i>	30.02	36	0.7481
<i>Skewness</i>	14.1	8	0.0792
<i>Kurtosis</i>	5.89	1	0.0153
<i>Total</i>	50.01	45	0.2813

Table 2: Shapiro-Wilk W test for normal data

Shapiro-Wilk W test for normal data					
<i>Variable</i>	<i>Obs</i>	<i>W</i>	<i>V</i>	<i>z</i>	<i>Prob>z</i>
<i>MS1</i>	326	0.7858	49.13	9.178	0.00000
<i>MS0</i>	323	0.85528	32.923	8.231	0.00000
<i>In MVTBV</i>	326	0.8734	29.038	7.939	0.00000
<i>In Deal Value</i>	327	0.98303	3.904	3.21	0.00066
<i>Bid Premium</i>	327	0.86823	30.305	8.041	0.00000

Table 3: Variance Inflation Factor Test

Variance Inflation Factor Test		
<i>Variable</i>	<i>VIF</i>	<i>1/VIF</i>
<i>Cash</i>	2.02	0.495544
<i>Friendly</i>	1.69	0.591396
<i>Stock</i>	1.65	0.607358
<i>In_DealValue</i>	1.55	0.643926
<i>Domestic</i>	1.29	0.774094
<i>Industry_Fit</i>	1.15	0.87121
<i>Inattentio~C</i>	1.12	0.893182
<i>In_MVTBV</i>	1.07	0.937451
<i>Mean VIF</i>	1.44	

Table 4: Multivariate model with MSO and payment methods

<i>MSO</i>	
<i>Cash</i>	0.0743*** (0.0121)
<i>Stock</i>	0.0564** (0.0258)
<i>Hybrid</i>	0.1584*** (0.0234)
<i>R-squared</i>	0.2151
<i>Nr. of observ.</i>	323

Table 5: The multivariate model including country dummies

MSO	Coef.	MSO	Coef.
Inattention	0.0191 (0.0211)	Netherlands	-0.0941 (0.0766)
Austria	-0.3764* (0.2174)	Norway	-0.1568** (0.0667)
Bermuda	-0.0210 (0.0833)	Poland	-0.1670* (0.0928)
Brazil	-0.0295 (0.1306)	South Africa	-0.1311* (0.0667)
Canada	-0.1411** (0.0692)	South Korea	-0.1612** (0.0809)
China	0.1465** (0.0667)	Spain	0.044 (0.0667)
France	0.0348 (0.1031)	Switzerland	0.2911 (0.2358)
Germany	-0.0664 (0.0866)	Taiwan	-0.1758*** (0.0667)
Hong Kong	0.1150* (0.0666)	Thailand	-0.0573 (0.0667)
India	-0.1082 (0.0769)	United Kingdom	-0.1140** (0.0679)
Israel	0.0709 (0.1406)	United States	0.0086 (0.0673)
Japan	-0.0972 (0.0686)	Constant	0.1171 (0.0667)
Luxembourg	-0.2467*** (0.0667)		

Table 6: Multivariate model without fixed effects and with year fixed effects

	<i>No Fixed Effects</i>			<i>Year Fixed Effects</i>		
	<i>Inattention</i>	<i>Inattention Lag</i>		<i>Inattention</i>	<i>Inattention Lag</i>	
<i>MS0</i>	-0.1268 (0.1793)	-0.4254** (.1685)		-0.1109 (.1404)	-0.3821*** (.0963)	
<i>MS1</i>		0.1203 (.2333)			0.1187 (.1783)	
<i>In Deal Value</i>	-0.0544*** (.0131)	-0.0487*** (.0143)	-0.0455*** (.0149)	-0.0632*** (.0108)	-.0564** (.0174)	-0.0542** (.0216)
<i>In MVTBV</i>	-0.0361 (.0346)	-0.0324 (.0494)	-0.0382 (0.0514)	-0.0449 (0.0287)	-0.0412 (.0436)	-0.0456 (.0461)
<i>Cash</i>	-0.0854 (.0752)	-0.0721 (.0794)	-0.0502 (0.0799)	-0.0943 (0.0731)	-0.0830 (.0796)	-0.0644 (.0693)
<i>Stock</i>	-0.2071** (.0956)	-0.0200 (.0993)	-0.0172 (.1001)	-0.2220* (0.1022)	-0.0337 (.0998)	-0.0314 (.1013)
<i>Industry Fit</i>	0.0074 (.0675)	0.0896 (.0697)	0.1048 (.0701)	0.0138 (.0787)	0.0840 (.0724)	0.0974 (.0720)
<i>Domestic</i>	0.0246 (.0568)	-0.0813 (.0633)	-0.0848 (.0651)	0.0219 (0.0402)	-0.0881 (.0726)	-0.0909 (.0826)
<i>Friendly</i>	-0.0302 (.0727)	-0.0085 (.0821)	0.0040 (.0827)	-0.0293 (.0332)	-0.0149 (.0414)	-0.0055 (.0406)
<i>Bid Premium</i>	0.0321 (.1273)	0.1158 (.1333)	-0.0993 (0.1380)	0.0605 (.1094)	0.1258 (.1801)	-0.0723 (.1736)
<i>Constant</i>	1.1671*** (.1350)	0.7842*** (.1467)	0.7363*** (.14529)	1.2176*** (.1374)	0.8478*** (.1310)	0.8109*** (.1426)
<i>R-squared</i>	0.0902	0.0666	0.06	0.0897	0.0857	0.066
<i>Nr. of observ.</i>	322	322	325	322	322	325