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SCHOOL OF BUSINESS, ECONOMICS AND LAW

The Relationship Between Beta and Arbitrage Spread in M&A Deals

Master's Thesis in Finance

Daniel Granat, William Fredriksson

Supervisor: Mussa Hussaini

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Abstract

Risk arbitrage is an event-driven investment strategy where the risk arbitrageur aims to capture the arbitrage spread between the target's stock price and the bid price by the acquiring firm in a merger and acquisition (M&A) deal. Previous research suggests that specific risks connected to the deal as completion or duration risks, as well as firm and bid characteristics, influence the arbitrage spread. We contribute to the risk arbitrage literature by investigating whether a firm's beta (β) influences the arbitrage spread and the risks connected to the deal. The study is achieved through conducting a regression analysis measured on an international sample of 673 observations from 1995-2022. The results do not document any significant relationships between beta, arbitrage spread, and the days to resolution. The target beta was, however, found positively significant with the successful deal variable, and several control variables in the study revealed interesting effects, which brings a more recent contribution to the risk arbitrage literature and a valuable input for risk arbitrageurs around the world.

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1 Introduction

Mergers and acquisitions (M&A) activity is a common occurrence in the business world, and it can significantly impact the value of the companies involved. As such, investors often seek to profit from M&A transactions through various event-driven strategies. One of these strategies is referred to as risk arbitrage, which is an investment strategy aimed at capturing the difference between the target's stock price and the bid price by the acquiring firm. The investors that use the strategy are referred to as risk arbitrageurs, whose overall aim is to capture and profit from the arbitrage spread (Mitchell & Pulvino, 2001). The arbitrage spread represents the potential profit from a risk arbitrage investment. For example, if the bid price by the acquiring firm is higher than the target's current stock price, the arbitrage spread would be positive, indicating a potential profit for the investor. On the other hand, if the bid price is lower than the target's stock price, the arbitrage spread would be negative. The size of the arbitrage spread represents the market's expectation on whether the deal will go through; a wider spread suggests diminished confidence in the deal's probability of completion, whereas a narrower spread suggests higher expectations for its success (Arouri et al., 2019). If the deal is successful, the risk arbitrageur captures the spread and earns a profit. If the deal is withdrawn or, in another way, unsuccessful, the risk arbitrageur incurs a loss that is often much greater than the potential profit. The investment strategy is hence often referred to as the practice of picking up pennies in front of a steam roller due to its high risk but small reward.

The earliest research focusing on risk arbitrage includes Larcker and Lys (1987), Mitchell and Pulvino (2001), Baker and Savosoglu (2002) and Jindra and Walkling (2004), who all found evidence of excess returns concerning the risk arbitrage strategy. Mitchell and Pulvino (2001) estimate this excess return to around 4 percent annually between 1963 to 1998 and suggest that the explanation is due to a premium the risk arbitrageurs receive for bearing additional systematic risk and providing liquidity, especially during market downturns. Subsequent research conducted by Jetley and Ji (2010) documents a median arbitrage spread for successful deals of about 1.91 percent between 2002-2007 and 3-5 percent for unsuccessful deals during the same period.

Research has also focused on the overall risks that may impact the arbitrage spread. According to Baker and Savasoglu (2002), Jindra and Walkling (2004), Branch and

Wang (2008), and Arouri et al. (2019), the primary risk in an M&A deal is completion risk, which is closely tied to the uncertainty surrounding the days to resolution. Days to resolution is a variable that represents the number of days between the announcement date and the date on which the deal is resolved, whether completed or not. The authors further explain that any change in these risks and uncertainties will directly impact the arbitrage spread, which implies that any factors that influence these risks will also affect the arbitrage spread.

Previous studies have predominantly concentrated on particular determinants, where arbitrage spreads are found significantly related to specific deal and firm characteristics. Branch and Wang (2008) investigated 1223 US deals during 1995-2000 and discovered that the target's relative size, price run-up, bid-premium, bidders beta, and bidder volatility are significant for stock deals. For cash offers, the authors find that the target run-up, the size of the target, and the bid premium are significant. In addition, Jetley and Ji (2010) discovered that lower arbitrage spreads are associated with lower bid premiums, increased friendly deal attitudes, and higher popularity in the target stock after the bid announcement.

One interesting factor that we expect could affect the arbitrage spread is a firm's beta (β). Beta is often understood as a metric that quantifies how responsive an asset's returns are to fluctuations in the market's returns (Fama & French 2004). To our knowledge, the only existing literature that considers beta when predicting arbitrage spreads is by Branch and Wang (2008), who implement it as a control variable. Previous research suggests potential links between systematic risk, uncertainty, and factors such as a firm's financing ability, capital limitations, and information asymmetry. We expect that beta could influence these factors and, as a result, impact arbitrage spreads by amplifying the uncertainty they produce and consequently increase the arbitrage spread.

Drawing on this, our thesis aims to answer whether the beta for the target, the acquirer, and their beta ratios are associated with the arbitrage spread, the probability of deal completion, and the days to resolution in a M&A transaction.

Studying the relationship between arbitrage spread and beta is intriguing because of the limited research on this relationship. Our thesis is distinctive as it examines both sides of the transaction in a merger or acquisition and includes a new set of variables, such as the beta ratio, that, to our notice, have yet to be examined earlier. The relationship is also interesting from an investor's viewpoint, as the findings can aid in identifying the deal risks that are associated with a firm's beta value in a merger or acquisition. This can consequently be valuable for risk arbitrageurs in assessing various investment opportunities in the financial markets.

In order to investigate this relationship, beta measurements are used as a proxy for both the target's and acquirer's sensitives to systematic risk. The relationships are investigated through OLS, probit, and tobit regressions based on an international sample of 673 observations and nine industries collected from 1995-2022.

The results from the regression analysis did not find any significant relationship between beta and arbitrage spread nor beta and days to resolution. However, it found a significant positive relationship between the probability of deal completion and the target firm's beta, indicating that it has a significant positive effect on the completion rate of M&A deals. In addition, several of the study's control variables, such as deal and firm-specific variables, were found significant. While some of the control variables in the study provided evidence that supported prior research, others were also found to be contradictory. The results, however, bring an additional and more recent contribution to the risk arbitrage literature.

The remainder of the paper is organized as follows: Section 2 presents the literature review and theory, comprising an overview of the background to risk arbitrage, prior research on arbitrage spread, and the central research hypothesis. Section 3 outlines the methodology, data collection process, and the variables used in the study. Section 4 presents the results and regression analysis, while section 5 provides a discussion and conclusion.

2 Literature Review and Theory

2.1 Risk Arbitrage

As touched upon in the introduction, risk arbitrage is an event-driven investment strategy where the risk arbitrageur seeks to profit from an M&A transaction. Brown and Raymond (1986) explain that the strategy has been used since the 1930s but that it was not until the 1970s that the concept started to gain recognition from the public. The authors explain that institutional specialists were its primary users before the strategy gained wider popularity. The reason for its low popularity was that financial newspapers often implied that it required specific skills and business acumen that only were possessed by Wall Street insiders. Dennis (1988), however, explains that Ivan Boesky, a well-known stock trader, and risk arbitrageur, most presumably known for his prominent role in an insider trading scandal, played a crucial role in making the strategy more accessible to small-scale investors by promoting it through limited partnerships and thereby increasing its visibility and popularity. The strategy has since continued to grow, as HFR (2008), cited in Jetley and Ji (2010), mentions that assets in certain risk arbitrage hedge funds grew from 233 million USD to 28 billion USD from the end of 1990 to the end of 2007.

Regarding the more technical parts of the strategy, the overall aim of a risk arbitrageur is to capture the difference between the target's stock price and the bid price by the acquiring firm, which is known as the arbitrage spread (Mitchell & Pulvino, 2001). The spread occurs if the target's stock trades at a discount to the cash offered by the acquirer, which it can do if selling pressures from the market make the target firm fall below its efficient market price (Baker & Savasoglu, 2002). Jindra and Walkling (2004) suggest that the percentage difference between the bid and the target's stock price on the day after the announcement represents the arbitrage spread, where the bidder reveals information concerning their valuation of the target firm in their bid price. In contrast, the arbitrage spread reveals the market's pricing of the target conditioned on the bid. Consequently, when the market prices move upwards, even surpassing the bid price, it provides crucial insights into how the market views the offer, considering the characteristics of the bidder, target, and the bid itself.

The investment strategy can be achieved differently depending on if it is a cash or stock deal. If it concerns a cash offer, the strategy is achieved by setting up a long position in a target firm's stock. For stock deals, a risk arbitrageur must establish a long position in the target company's stock while simultaneously creating a short position in the acquiring company's stock. The purpose of the short position is to serve as a hedge against the potential risk of the deal falling through and the acquirer's stocks experiencing a decline. If the deal is successful, the strategy succeeds, and the risk arbitrageurs capture the arbitrage spread. However, if the deal falls apart, the risk arbitrageur incurs a loss which often is much greater than the potential profits (Moore et al., 2018).

Various research has documented the excess return concerning the risk arbitrage strategy. Baker and Savasoglu (2001) document an abnormal monthly return between 0.6 percent to 0.9 percent from 1981 to 1996. Mitchell and Pulvino (2001) document an annual excess return of 4 percent. More previous research, such as Jetley and Ji (2010), documents a median arbitrage spread for successful deals to about 1.91 percent between 2002-2007 and 3-5 percent for unsuccessful deals during the same period.

It should also be noted that there are a considerable amount of risk in the investment strategy. As Paulson (2000) states, "risk arbitrage is not about making money, it's about not losing money" (p.1). Paulson (2000) further explains that risk arbitrage is not for the average investor since the potential downside could be much greater that the potential upside.

We want to emphasize that while risk arbitrage is an investment strategy, this thesis does not aim to analyze the strategy per se but rather the arbitrage spreads that are interlinked to the strategy, as well as the determinants of these spreads. This implies that our analysis considers multiple perspectives beyond the single investor's viewpoint.

2.2 Arbitrage Spread and Deal Risk

Previous research in the risk arbitrage literature has tried to explain the general factors affecting the arbitrage spread. Branch and Wang (2008) suggest that arbitrage spreads reflect certain risks and expectations regarding the deal, including the likelihood that the deal succeeds, the market's assessment of the days to resolution, and the possibility of future price revisions. In addition, Baker and Savoglu (2002), Jetley and Ji (2010), and Arouri et al. (2019) mention that the main risk concerning risk arbitrage is completion risk and the days to resolution. The risk arbitrage returns are, according to the authors, considered a premium for taking on these increased risks, and if these risks shifted, the arbitrage spread would be readjusted.

Including these risks and expectations when analyzing arbitrage spreads is thus a fundamental approach to capture not only the factors that influence the arbitrage spread directly but also the factors that influence these risks, which in turn could have an impact on the arbitrage spread. Arouri et al. (2019) illustrate this approach interestingly as they investigate the relationship between corporate social responsibility and M&A uncertainty. They utilize a linear regression model to capture arbitrage spreads and a probit model to capture the risks associated with the deal, which they do by using the probability of a deal being successful as a proxy. Incorporating an additional dependent variable and using a probit regression gives a broader result, where factors that also affect the risks associated with the deal are captured. Deng et al. (2013), as cited in Arouri et al. (2019), incorporate the days to resolution as an additional variable in a regression model to capture the factors that impact the days to resolution. Following Deng et al. (2013) and Arouri et al. (2019), we also decide to incorporate these additional variables in a probit and tobit regression to capture a broader range of factors that indirectly could influence the arbitrage spread.

2.2.1 Arbitrage Spread and Probability of Deal Completion

Factors that we expect to impact the arbitrage spread includes the risk and uncertainty connected to the probability of deal completion and, consequently, the factors affecting these risks. Previous research, as Branch et al.(2008) has found that arbitrage spreads are negatively correlated with the probability of deal completion. Their analysis reveals that deals with a higher arbitrage spread tend to have a lower probability of being completed. Additional literature, as Hoffmeister and Dyl (1981), finds that target size is an essential factor for a deal to succeed, where a larger target value lowers the success rate. Leverage is also an important factor where Stulz (1988) finds that higher leverage is associated with a lower probability for a deal to turn successful. The author explains that a firm's capital structure decisions affect the distribution of a firm's voting rights, where higher leverage can strengthen the management's bargaining position and subsequently make a hostile bid less likely.

Brown and Raymond (1986) discover that the predictions regarding the success of a merger or acquisition can be inferred from the stock prices that are set post-announcement. They explain that this is because the prices reflect prevailing attitudes about the deal, and these attitudes can be used to predict future events.

Branch and Yang (2003) investigate the relationship between deal, firm, and equity price information with the success rate of a merger and discovers that cash offers tend to increase the probability of success compared with stock offers. The author attributes this relationship to the fact that different types of payment methods may create signals regarding uncertainty and financial soundness for both the target and the acquirer. The author also finds that the greater the relative size of the target relative to the acquirer, the lower the likelihood that the deal will succeed. Finally, in contrast to Stulz's (1988) findings, Branch and Yang (2003) discovers that a higher level of debt for the target company leads to an increased probability of a successful takeover.

2.2.2 Arbitrage Spread and Days to Resolution

Another risk expected to affect the arbitrage spread is the number of days to resolution. Jindra and Walkling (2004) examined 362 US cash tender offers during 1981-1995, comparing the arbitrage spreads to certain characteristics regarding the bid and the target firm. They discover that the arbitrage spread is significantly positively related to the number of days to resolution, where they explain that the duration of the offer is proportionally connected to the holding costs that the risk arbitrageurs carry and that the spread is expected to increase with the duration and the cost of funds of the deal. In their discussion concerning the cost of funds and holding costs, the authors also explain that stocks with smaller market capitalization tend to be less liquid which increases the costs of taking a long position in the target firm and hence increases the spread. In addition, Wang (2017) explains that a hostile offer may increase the days to resolution because the target company's management may initiate a bidding war by contacting other potential bidders. The author also explains that a bidding war is more likely to occur with a small bid premium than a larger one, which can consequently prolong the merger process and increase the days to resolution. Variables such as hostile attitudes and the size of the bid premium may influence the number of days to resolution and are, therefore, also expected to indirectly affect the arbitrage spread since a higher number of days to resolution is expected to generate higher uncertainties.

2.3 Determinants of Arbitrage Spreads

When it comes to the factors that explain the arbitrage spreads more directly, i.e., its determinants, several previous research mentioned above have also discovered certain deal and firm-specific variables to be significantly related to arbitrage spreads.

Branch and Wang (2008) investigates 1223 US deals during 1995-2005 to develop prediction models to help risk arbitrageurs reach higher returns. The authors identify several ex-ante variables connected to firm characteristics and market information that affects arbitrage spreads. The target's relative size, price run-up, bid premium, bidders beta, and bidder volatility are significant regarding stock offers. The authors find that the target run-up, the target size, and the bid premium are significant for cash offers.

Jetley and Ji (2010) aim to investigate the shrinking arbitrage spread that has been noticeable since the turn of the twentieth century. The sample consists of 2118 cash, stock, and hybrid deals from 1990-2007. The authors document a reduction in the arbitrage spreads since the beginning of the 1990s, with substantial declines in mergers announced since the early 2000s. They associate this reduction with the decline in risks in mergers, which is justified by lower bid premiums, increased friendly deal attitudes, and higher popularity in the target stock after the bid announcement. They also find that cash deals have a lower spread, where they explain that cash transactions are associated with higher certainty in the offer price, resulting in a lower arbitrage spread.

Lastly, Redor (2019) examines 285 firms on the S&P 500 from 2004 through 2014, where the aim is to analyze the determinants of arbitrage spread. The paper is one of the newer contributions to the arbitrage spread literature, which gives valuable insights if new determinants and factors related to arbitrage spread have arisen in recent years. Redor (2019) discovers that the bid premium, the relative size of the target, and bid hostility are associated with higher arbitrage spreads. Additionally, termination fees and the cash percentage were associated with lower arbitrage spreads.

2.4 Underlying Mechanism of the Relationship Between Beta and Arbitrage Spread

2.4.1 Limited Access to Financing

As previously mentioned, beta measures how responsive an asset's returns are to fluctuations in the market's returns (Fama & French 2004). Investors and lenders involved in investing in firms often look at the beta measurement to get a perception of the risk present in a firm, where we expect that a higher beta could deter investors from investing in particular firms, which consequently would impact these firms financing capabilities. In turn, we expect that inferior financing capabilities could influence the arbitrage spread by signaling the market regarding the deal's success. Paulson (2000) mention for example that the financing of a merger or acquisition can, under certain circumstances, present a significant risk to the completion of the deal. He illustrates this with an real life scenario, where he describes how Welch Allen withdrew its offer with PSC due to its inability to obtain sufficient financing.

One of the links to how beta could affect the ability to receive financing is through the increasing cost of equity. Damodaran (2012) explains that a higher beta value increases a firm's equity cost through the CAPM fundamentals. The author explains that equity investors need compensation for the risk they have taken by investing in the firm, which is directly translated to the expected return. Firms with higher risk, and hence a higher beta, will consequently be needed to offer a higher expected return to their investors. This obligation could aggravate the firm's overall ability to receive new financing if the firms obtain difficulties in meeting the requirements of higher returns.

Bo, Lensink, and Sterken (2003) explore the relationship between uncertainty, capital market imperfections, and investments where their main focus is to compare riskier firms, i.e., firms with a higher degree of uncertainty, with firms with relatively less risk, and analyze the capital constraints that these different firms face. The sample contains 96 firms listed on the Dutch market, measured from 1985 to 1997. The authors use the measure of investment cash-flow sensitivity as a measure of financial constraint and subsequently contrast this investment elasticity with regard to internal funds, which they determine using a company's cash flow. Different kinds of volatility measurements, such as the volatility of employees, stock price volatility, and sales volatility, are included in the study. The authors provide empirical evidence that more risky firms are confronted with more strict capital market constraints than relatively less risky ones. They explain that the degree of uncertainty in a firm impacts the level of investments through capital market imperfections. Firms that face greater uncertainty will encounter greater challenges in conveying their information to lenders. As a result, fluctuations in investment spending for these risky firms will be more closely tied to variations in the availability of internal funds (cash-flow) compared to relatively less risky firms.

Some other actors in the market that take the beta into account are credit rating agencies. Schwendiman and Pinches (1975) investigate the similarities between common stock systematic risk and corporate bond ratings, where they mention that both are widely available measures of investment risk for firms. The authors discovered that the measurement was consistent across the firm analyzed but that significant results only were discovered in firms with extreme values. Even if the relationship was not found significant overall, the research provides an interesting viewpoint on the link between systematic risk and a firm's ability to receive financing.

Aima (2007) explains that significant shifts in the market may make it harder for firms in receiving financing for acquisitions. As beta measures how responsive an asset's returns are to fluctuations in the market's returns, firms with a higher beta would react stronger to these shifts, which in turn could aggravate their abilities in receiving financing.

Baker and Savasoglu (2002), Jindra and Walkling (2004), and Branch and Wang (2008) suggest that arbitrage spreads are indicative of market expectations regarding the success of a deal. Factors that we expect to influence these expectations include the likelihood of receiving financing, as a company that can obtain financing more easily with more favorable terms (e.g., lower interest rates, longer repayment period) may signal the market with increased confidence in the deal's success. We consequently expect that changes in the expectations regarding the success of the deal, where financial constraints are an important factor, will impact the arbitrage spread.

2.4.2 Information Asymmetry

Akerlof (1970) is one of the first studies that discuss the concept of information asymmetry. He examines the market for used cars and how information asymmetry between buyers and sellers leads to adverse selection. The author argues that information asymmetry can create inefficiencies in markets, as one party may have more information than the other, leading to a lack of trust and potentially harmful decisions. He notes that this problem is particularly prevalent when information is difficult or costly to obtain, such as in the financial markets. The concept of information asymmetry can be related to a firm's systematic risk, which can create uncertainty and unpredictability in the market, leading to overall market volatility.

Martins and Paulo (2014) examine the relationship between information asymmetry in the trading of stocks and the economic and financial characteristics of firms listed in the Brazilian stock market during 2010 and 2011. Based on microstructure data, the authors use the probability of informed trading (PIN) to measure information asymmetry. They discovered that trading with information asymmetry tends to increase as the stock beta increases, suggesting a positive relationship between information asymmetry and stock beta. The authors also discovered that the cost of equity was related to information asymmetry, where they explain that investors tend to require higher returns in firms with higher insider trading. This could imply that firms with higher information asymmetry and a higher beta will have more difficulty accessing financing due to the increased cost of equity they face in the financial markets.

Aslan et al. (2011) support these relationships by investigating the relationship between firm characteristics captured by accounting and market data with a firm's (PIN). In addition, the authors discover that firms with fewer common shareholders, smaller turnover, and smaller size, among others, are more likely to have higher information risk. The authors put a significant emphasis on the size of a firm, where they describe that small firms have higher PINs, which implies that the information structure of smaller firms is different from that of larger firms. Consequently, the arbitrage spreads could be linked to smaller firms, where a higher information risk could generate a higher arbitrage spread due to the increased risks and uncertainties these smaller firms face.

Chincarini et al. (2020) examined the relationship between age and beta using weekly data between 1966 and 2016 for companies listed on the NYSE, AMEX, and NASDAQ. They found age to have a significant negative relationship with beta which their analysis suggests is due to familiarity with the stock. According to their analysis, as investors gain more experience and information over an extended period, they become more familiar with the stocks, leading to a decrease in beta. Additionally, the study revealed that the decline in beta is partly influenced by the presence of varying degrees of information asymmetry, indicating differences in the availability of information among investors.

Other research, as Easley et al. (1996) argue that stock risk is positively associated with information asymmetry because the asymmetry generates a new form of systematic risk in the market, namely the risk of information. This risk arises due to the presence of private information in stock trading negotiations.

Given the evident connection between beta and information asymmetry, prior research concerning the underlying factors of arbitrage spreads can also account for the relationship between information asymmetry and arbitrage spread. Branch and Wang (2008) suggest that the arbitrage spread reflects specific expectations related to a deal, while other studies, including Baker and Savoglu (2002), Jetley and Ji (2010), and Arouri et al. (2019), argue that arbitrage spreads represent a premium paid for assuming the risks associated with the deal, where any changes in these risks influence the arbitrage spread. These findings imply that inefficiencies in the market resulting from limited and unequal access to information can affect the expectations and risks around the deal, leading to changes in the arbitrage spread.

2.4.3 Risk and Return

The fundamental framework concerning the relationship between risk and return stems from the famous CAPM model developed by Sharpe (1964). Fama and French (2004) explain that the variables in the model include the expected return on an asset $E(R_i)$, the risk-free interest rate (R_f), the assets market beta (β_i), and the expected return on the market $E(R_m)$. The authors also explain that under the theoretical conditions of risk-free borrowing and lending, the expected return on an asset (given that it is uncorrelated with the market return) equals the risk-free rate. The model suggests that a higher market beta (the risk of an asset that cannot be diversified away) induces a higher expected return when holding all other variables constant. Investors who choose to invest in firms with a higher beta will consequently require a higher expected return.

Mitchell and Pulvino (2001) take the framework of CAPM one step further as they investigate the effectiveness of linear asset pricing models to capture the risk present in the risk arbitrage strategy. They discover that the risk and return relationship in the risk arbitrage strategy is not truly reflective in a standard linear asset pricing model and that it can instead be evaluated using the method of contingent claims. The authors discover an excess return of approximately four percent annually and explain that the risk arbitrage return is uncorrelated with market returns in most market environments. This is true under the condition of a successful consummation since the return is then based on the initial arbitrage spread, which does not depend on the market return and hence systemic risk. They, however, also suggest that this correlation increases strongly during market recessions, given that the probability of a deal failure increases in a depreciating market. The authors attribute this excess return as compensation to the risk arbitrageur for bearing additional systemic risk and a premium paid to the risk arbitrageur for providing liquidity, especially when the market is receding.

The overall idea of risk and return could be related to this thesis in several ways, connected to risk arbitrageurs and investors who invest directly in the acquiring firm. Regarding the risk arbitrageurs, a higher risk would require a higher return, as Fama and French (2004) suggested, which relates to a higher arbitrage spread in the risk arbitrage scenario. This is because the risk arbitrageurs would require a premium for carrying the additional risks that come with higher systematic risk in down markets, as Mitchell and Pulvino (2001) explained. When it comes to acquiring firms, a higher beta will create a higher risk for investors that invest in the firm, which would consequently lead to requiring a higher return to compensate for the increased risk, as suggested by the CAPM model. While the return itself may not directly impact arbitrage spread, it has the potential to affect the overall expectations of a merger's success. Specifically, if one of the firms involved in the merger has a weaker ability to secure financing with less favorable terms due to the increased cost of capital stemming from a higher required return, as explained by Damodaran (2012), it could lead to greater uncertainty and potentially jeopardize the deal.

2.5 Research Hypothesis

As mentioned earlier, previous research suggests that certain expectations regarding a transaction are highly influential in determining the arbitrage spread. Two of these expectations include the probability that the deal succeeds and the days to resolution. (Branch & Wang, 2008).

We hypothesize that beta, the primary variable of interest in the thesis, impacts the arbitrage spread, as well as the probability that the deal succeeds and the days to resolution, through multiple factors that are amplified by the degree of risk and uncertainty and as a consequence influences the arbitrage spread. Previous research connected to the limited access to financing in a firm has touched upon these factors, where Bo, Lensink, and Sterken (2003) suggest that more risky firms are confronted with more strict capital market constraints compared to relatively less risky firms, whereas Damodaran (2012) suggests that a higher beta increases the cost of equity for a firm through the fundamentals of the CAPM. We expect that a limited access to financing can affect certain expectations regarding a M&A transaction, such as the probability of deal completion, which in turn impacts the arbitrage spread.

Other research concerning information asymmetry is also helpful in explaining these factors, where Aslan et al. (2011) and Orleans and Edilson (2014) suggest that trading with information asymmetry tended to increase as the stock beta increased. An increase in information asymmetry may consequently affect the arbitrage spreads due to heightened uncertainty and limited access to information.

Studies examining the basics of risk and return within the context of risk arbitrage, such as the work of Mitchell and Pulvino (2001), propose that greater risk necessitates a greater return as compensation for heightened risks during market downturns. This relationship is in turn helpful in explaining the link between beta and arbitrage spread.

Drawing upon the previous research mentioned, we now present the following three hypotheses:

Hypothesis 1 (H1): *The target firm's beta is associated with a higher arbitrage spread, a decrease in the probability of the deal succeeding, and an increase in the days to resolution.*

Hypothesis 2 (H2): *The acquiring firm's beta is associated with a higher arbitrage spread, a decrease in the probability of deal completion, and an increase in days to resolution.*

Hypothesis 3 (H3): *The beta ratio is associated with a higher arbitrage spread, a decrease in the probability of deal completion, and an increase in days to resolution*

3 Data and Methodology

3.1 Data Collection and Management

The main dataset was collected from Refinitiv Eikon, which included data concerning international M&A deals from 1995 to 2022 that were both successful and unsuccessful. We specifically chose this time period to incorporate the substantial volume of M&A transactions that took place during the late 1990s. To filter the data, we only collected data from public companies. We also required that the the acquiring company held less than 50% of the target company's outstanding shares prior to the announcement and declared intent in the announcement to own more than 50% of the outstanding shares after the deal was completed.

In addition, we collected data from Datastream were we retrieved unadjusted stock prices, beta values, and accounting data in order to calculate arbitrage spreads, bid premiums, and target run-ups. The SEDOL identification code of the target and acquiring firms and the specific date of the deal were used to merge the data. Firms without an available SEDOL code were therefore removed from the sample. Misclassifications as well as missing and unrealistic values from specific deals were manually adjusted using transaction data retrieved from specific agreements (this is specified in Table 3). After data collection, continuous variables were winsorized at 1% and 99% to remove outliers. The final dataset includes 673 observations from 44 countries and nine industries, comprised of either 100% cash deals or 100% stock deals.

Observations	673
Time period	1995-2022
Countries	44
Industries	9
Deal status	Successful and unsuccessful bids.
Ownership	Public.
Deal value	Deals where the acquirer got majority control.
Payment	Cash or stock deals.

Table 1: Sample Selection

The industries have been classified using their standard industrial classification (SIC), where the two first digits have been used to group the firms into their primary industry groups. The SIC classification has been structured according to the SIC manual from the United States Securities and Exchange Commission (2023).

Type of industry	**Observations**
Agriculture, Forestry, and Fishing	1
Mining	31
Construction	43
Manufacturing	257
Transportation, Communication, Electric, Gas, and Sanitary	50
Wholesale Trade	47
Retail Trade	65
Finance, Insurance, and Real Estate	78
Services	102
Public Administration	0

Table 2: Industry Classification

Criteria for Exclusion	**Removed**	**Remaining**
Initial Data Set	n.a.	6780
Missing SEDOL	5505	1275
Percentage Cash or Percentage Stock $\neq$ 100	286	989
Target or Acquirer Leverage Missing	93	768
Consideration Structure $\neq$ 100 Cash or Stock	58	915
Missing values acquirer price t+1	54	861
Target FCF missing	24	744
Values to calculate Arbitrage Spread Missing	22	694
No Exchange Ratio for Stock Deals	16	973
Value for Target or Acquirer Beta Missing	16	728
Less than 12 months of data for Beta	12	716
Duplicates and other missing values	21	673
Transactions in the final sample	**6107**	**673**

Table 3: Data Exclusion
The table displays the count of transactions excluded by each selection criterion. Out of our initial dataset, 6107 deals were excluded, resulting in a final sample of 673 announced international deals from 1995-2022.

3.2 Variables

3.2.1 Dependent Variables

The first dependent variable included in the study is the arbitrage spread, which can be calculated differently depending on whether it is a cash or stock deal. The day on which the arbitrage spread is calculated also differs. While Branch and Wang (2008) calculate it two days after the offer announcement, Jetley and Ji (2010), Jindra and Walkling (2004), and Aoruri et al. (2019) calculates the spread one day after the offer announcement. We decide to follow the latter method and calculate the arbitrage spread on the day after the offer announcement. Equation 1 shows the calculation for a cash deal, whereas Equation 2 shows the calculation for a stock deal.

$$Arbspread_{cash,t} = \frac{P_{offer} - P_{target,t}}{P_{target,t}} \tag{1}$$

Where P_{offer} is the price in cash offered by the acquiring company for each share of the target company's common stock that will be paid when the deal closes and $P_{target,t}$ is the closing price of the target company's common stock on trading day t (the day after the announcement).

$$Arbspread_{stock,t} = \frac{P_{acquirer,t} \times ER - P_{target,t}}{P_{target,t}} \tag{2}$$

Where $P_{acquirer,t}$ is the closing price of the acquiring firm's common stock on trading day t, (ER) is the exchange ratio which is the number of shares of the acquirer's common stock offered to the target's common shareholders in exchange for one share of the target's common stock on trading day t. Finally, $P_{target,t}$ is the closing price of the target company's common stock on trading day t (the day after the announcement).

Similar to Branch and Wang (2008) and Arouri et al. (2019), we implement the probability of deal completion and the days to resolution as dependent variables. The probability of deal completion is constructed as a dummy variable that equals 1 if the deal was successful and 0 otherwise. Days to resolution is a variable that reflects the days between the announcement date and the date the deal was resolved, whether completed or not.

3.2.2 Independent Variables

In order to measure systematic risk, historical measurements for the beta have been retrieved for both the target and acquiring firms. Beta is collected monthly from six years before the announcement until one year before the announcement, and then the average value of the period is calculated. The data was collected from Datastream, where the SEDOL identification code was used to retrieve the data. We established a requirement that a company should have a minimum of 12 months of historical beta values within the period we analyzed to ensure the accuracy of our observations. Consequently, incomplete data were excluded from our analysis, as shown in Table 3. In order to investigate systematic risk further, ratios between the target's and acquirers' beta were calculated to give us measurements of how the firm's beta values in relation to each other impact the dependent variables.

3.2.3 Control Variables

In order to control for various factors that could potentially influence the arbitrage spread, and mitigate endogeneity issues, we include deal specific, firm-specific, as well as time and industry control variables. A full list of the variables included in the study can be found in Table 22 in the appendix. The deal and firm-specific variables consist of factors that previous research suggests influence the arbitrage spread, where the first deal-specific variable included is the cash-dummy, which equals one if the payment is made in cash and zero otherwise. The second variable is the bid premium, which is calculated according to Jindra and Walking (2004); Branch and Wang (2008); Jetley and Ji (2010) and Arouri et al. (2019), where the offer price is subtracted from the average price before the bid. The third variable is the average price, which is computed from day t − 30 to day t − 10 relative to the announcement date. The fourth variable is the Hostile dummy, which equals 1 if the offer is considered hostile and zero otherwise. According to Eikon, a hostile bid is a bid that the board officially rejects the offer but the acquirer persists with the takeover. Finally, multiple bids are a dummy variable that equals 1 if there are multiple bids involved and zero otherwise.

As for the firm-specific variables, we include toehold-dummy, where we follow Branch and Wang (2008); Arouri et al. (2019) and set it equal to 1 if the acquirer holds a minimum of 5 percent of the target shares prior to the announcement. Relative size is calculated as the total assets for the acquiring company one year before the announcement divided by the total assets for the target company one year before the announcement, while the leverage is calculated as the total liabilities divided by total assets one year prior. Free cash flow is finally measured as cash & equivalents collected one year before the announcement.

Since our study includes data gathered for 27 years and nine industries, we also implement time and industrial categorical variables. Each specific year and industry are considered and controlled for in the regression model.

3.3 Econometric Models

3.3.1 Overview

Our econometric model is based on prior studies such as Jindra and Walking (2004), Branch and Wang (2008), and Arouri et al. (2019), which applied a multivariate regression model to examine the impact of specific variables on the arbitrage spread. Although some researchers, such as Barnett (2022), have utilized panel regression, we opted for a cross-sectional regression approach given time constraints. In order to test the hypothesis that beta influences the probability of deal completion, the days to resolution, and the arbitrage spreads, we construct three groups of models with nine different regression models in total.

The study aims to contribute with new research to the risk arbitrage literature, where the relationship between arbitrage spreads and beta is analyzed. This is achieved by regressing the arbitrage spread with both the target and acquirer beta and their beta ratio. In addition, a set of control variables are also included in order to mitigate endogeneity issues. The first models implemented are OLS models, chosen because the dependent variable in question is a continuous variable. Three types of OLS models are constructed in the first group of models, where equation (3) aims to capture the relationship between the target's beta and arbitrage spread. Equation (4) aims to capture the relationship between the acquirer's beta and arbitrage spread. Equation (5) aims to capture the relationship between the target's and acquirer's beta ratio and arbitrage spread. The models are as follows:

$$ArbSpread_i = \beta_0 \ + \beta_{Beta-target} \ + \beta_k \sum Controls_{target,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (3)$$

$$ArbSpread_i = \beta_0 \ + \beta_{Beta-acquirer} \ + \beta_k \sum Controls_{acquirer,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (4)$$

$$ArbSpread_i = \beta_0 \ + \beta_{Beta-ratio} \ + \beta_k \sum Controls_{all,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (5)$$

Where ArbSpread captures the arbitrage spread from cash and stock deals, and beta captures the systematic risk in the different firms. It includes the target beta, acquirer beta, and target-acquirer beta ratio. Controls are a vector of the control variables, including firm characteristics for the target or acquiring firm and deal characteristics. In addition, α and δ are industry and time factors control variables.

The second group of models consists of probit regressions, which are used as the dependent variable in these regressions is binary. These models aim to capture the relationship between the probability of deal completion and the firm's beta measurements. Equation (6) aims to capture the relationship between the probability of deal completion and target beta. Equation (7) aims to capture the relationship between the probability of deal completion and the acquirer's beta, whereas Equation (8) aims to capture the relationship between the probability of deal completion and the target's and bidders' beta ratio. The models are as follows:

$$SuccDeal_i = \beta_0 \ + \beta_{Beta-target} \ + \beta_k \sum Controls_{target,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (6)$$

$$SuccDeal_i = \beta_0 \ + \beta_{Beta-acquirer} \ + \beta_k \sum Controls_{acquirer,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (7)$$

$$Succdeal_i = \beta_0 \ + \beta_{Beta-ratio} \ + \beta_k \sum Controls_{all,i} \ + \alpha_i \ + \delta_i + \epsilon_i \quad (8)$$

Where SuccDeal is a dummy variable that equals 1 if the deal is successful and 0 otherwise. As previously stated, the vector of control variables and the time and industry effects remains the same.

The third and final group of regression models consists of tobit regressions, which are used as the dependent variable is continuous at the upper level but with a lower limit of 0 since days to resolution can't be negative. These models aim to capture the relationship between the days to resolution and the firm's beta measurements. The equations follow the same concept as the previous equations, where the models are as follows:

$$Days2Res = \beta_0 + \beta_{Beta-target} + \beta_k \sum Controls_{target,i} + \alpha_i + \delta_i + \epsilon_i \tag{9}$$

$$Days2Res = \beta_0 + \beta_{Beta-acquirer} + \beta_k \sum Controls_{acquirer,i} + \alpha_i + \delta_i + \epsilon_i \tag{10}$$

$$Days2Res = \beta_0 + \beta_{Beta-ratio} + \beta_k \sum Controls_{all,i} + \alpha_i + \delta_i + \epsilon_i \tag{11}$$

Where Days2Res captures the days to resolution measured in the number of days between the date of announcement and the date the deal was resolved, whether completed or not. As previously stated, the vector of control variables and the time and industry effect remains the same.

3.3.2 Conditions and Assumptions

In order to mitigate endogeneity issues, several conditions and assumptions concerning the econometric model were tested and evaluated.

The first step was to check for outliers, which was manually conducted through Excel. We decided to winsorize the data at the 1 percent and 99 percent levels for the continuous variables in the model. We also tested the normality for the residuals by creating kernel density plots and standard probability plots and visually inspecting the figures for signs of non-normality.

The second step was to check for endogeneity and multicollinearity between the independent variables. Endogeneity was addressed by following prior research and economic theory in order to estimate factors that could affect the dependent variables and consequently incorporate them into the model. In order to control for multicollinearity, we followed Daniels and Minot's (2019) guidelines by conducting a VIF test (Table 23 Appendix) and constructing a correlation matrix for the independent variables where highly correlated variables were removed from the model. As seen in Figure 2 the highest correlation between two independent variables is 0.47 which is between acquirer leverage and target leverage. We do not find this correlation high enough to remove any of the two variables. The highest value in the VIF test was for target leverage at 1.55, thus, we found no reason to remove any variables based on this test.

The third step was to check for heteroscedasticity. This was done through visual inspections of the residuals fitted against the model's independent variables and the Breusch-Pagan test, as suggested by Daniels and Minot (2019). The tests identified signs of heteroscedasticity, which made us implement robust standard errors to account for heteroscedasticity.

3.4 Method Discussion and Limitations

Data collection and the construction of the models have been done to ensure high reliability and validity for the study. The dataset contains an international sample from 44 countries which ensures a variety of different financial markets around the world, and the time period spanning from 1995 to 2022 takes into account various different historical periods. However, sorting the data based on various criteria and selecting a particular variable to capture systematic risk can lead to certain limitations.

One possible limitation could be connected to the data filter criteria. We chose to limit our selection to firms with available SEDOL identification codes. This decision may introduce a potential bias in our study, as the firms with SEDOL codes may possess certain characteristics, such as size or nationality, that the firms without SEDOL codes do not possess. This could have an impact on our findings and, ultimately, affect the reliability of the study.

Another limitation can be connected to the validity of the study. Beta is our study's main variable, and it may be possible that it fails to fully capture the true risk in the firms that are included. This could be because the beta measurements only capture the risk that is reflected through the available information in the market, and not risks that could be hidden, which could affect the expectations and risks regarding a deal. This could be connected to the efficient market hypothesis, where Fama (1970) explains that a market in which prices fully reflect available information is called efficient. However, this may not be the case, since some investors may have more information than others. This would in turn lead to that some investors could regard specific firms to be more riskier than what the beta values suggest, and consequently have different expectations for the outcome of certain deals. This can imply that the study does not answer the questions that we aim to answer, since our variables might not capture the total amount of risk that is present.

4 Results and Findings

4.1 Descriptive Statistics

Table 4 provides an overview of the central tendency, variability, and distribution of the variables used in this study. Among the variables, the Arbitrage Spread, Target Beta, Acquirer Beta, and Beta Ratio are particularly relevant to the research question of the impact of Beta on Arbitrage Spread.

The Arbitrage Spread has a mean value of 0.056 and a median of 0.025, indicating that the distribution is positively skewed. The standard deviation of 0.256 suggests high variability in the data. The Target Beta and Acquirer Beta have mean values of 0.928 and 1.006, respectively, and both have medians close to their means. The standard deviation of Target Beta and Acquirer Beta are 0.641 and 0.553, respectively, indicating that the distribution of Target Beta is more dispersed than that of Acquirer Beta. Target Beta being lower than Acquirer Beta, on average, is surprising since acquiring companies usually are larger than the companies being acquired and larger companies tend to have a lower beta.

The Beta Ratio has a mean of 0.899 and a median of 0.839, indicating a positively skewed distribution. The high standard deviation of 10.758 suggests a wide range of values in the data, which outliers may influence. These descriptive statistics highlight the potential impact of the Beta Ratio on the Arbitrage Spread.

Comparing the descriptive statistics of the independent and dependent variables reveals that the Beta Ratio has a much higher standard deviation than the Arbitrage Spread, Target Beta, and Acquirer Beta. This suggests that the Beta Ratio may impact the Arbitrage Spread more than the individual Betas. Additionally, the descriptive statistics of the Target and Acquirer Betas indicate that there may be some differences in the distributions of the two Betas, which could impact the relationship between Beta and Arbitrage Spread.

In conclusion, Table 4 provides valuable insights into the central tendency, variability, and distribution of the variables used in this study. The high level of variability in the Arbitrage Spread and the wide range of values in the Beta Ratio suggests that further investigation is necessary to understand the relationship between Beta and Arbitrage Spread.

Variable	**Mean**	**Median**	**Standard Deviation**
Arbitrage Spread	0.056	0.025	0.256
Beta Ratio	0.899	0.839	10.758
Target 5-year Beta	0.928	0.847	0.641
Acquirer 5-year Beta	1.006	0.957	0.553
Target FCF	110149.153	23054.000	290124.625
Target Leverage	0.532	0.529	0.260
Acquirer Leverage	0.552	0.557	0.222
Target Run-up	0.060	0.024	0.204
Relative Size	92.931	11.106	878.992
Days To Resolution	102.224	81.000	89.586
Deal Successful Dummy	0.911	1.000	0.285
Bid Premium	0.213	0.181	0.349
Toehold Dummy	0.975	1.000	0.157
Hostile Dummy	0.049	0.000	0.216
Multiple Bids Dummy	0.064	0.000	0.245
Cash Deal Dummy	0.654	1.000	0.476

Table 4: Descriptive Statistics

Table 5 revealed two distinct time periods, each exhibiting clear trends. The first period (in blue), spanning from 1999 to 2009, was characterized by a high volume of deals, with an average of 41 deals announced per year. Furthermore, the average arbitrage spread during this time was 6.6%, indicating significant opportunities for profit for a risk arbitrageur. However, the completion rate during this period was comparatively low, with an average of 92.21%. This suggests that although the high volume of deals provided ample opportunities for risk arbitrageurs, there was also a higher risk of potential losses due to the lower completion rate.

In contrast, the second period (in red), from 2014 to 2022, exhibited fewer deals, with an average of only 12 deals announced yearly. Despite this lower volume, the average completion rate during this time was remarkably high, with an average of 97,12% and even higher at 98.96% if the outlier in 2019 is removed. The average arbitrage spread during this period was 4.37%, indicating less potential profit opportunities than in the earlier period.

In conclusion, the results indicate that the earlier period had a larger volume of deals with higher arbitrage spreads. In contrast, the latter period had a lower volume of deals with lower arbitrage spreads but a significantly higher completion rate. These findings have important implications for risk arbitrageurs, who may need to adjust their strategies depending on the prevailing market conditions.

Year	Deals/year	Average Arbitrage Spread	Average Target Beta	Average Acquirer Beta	Successful Deals/year (%)*
1995	7	-9,29%	1.31	1.26	71.43%
1996	6	5.37%	1.19	1.06	66.67%
1997	15	6.08%	0.57	0.74	80.00%
1998	16	10.75%	0.75	0.86	68.75%
1999	34	7.94%	0.91	0.91	88.24%
2000	34	2.68%	0.94	1.03	79.41%
2001	35	11.45%	0.80	0.87	100.00%
2002	29	5.70%	0.93	1.06	89.66%
2003	39	6.13%	0.82	1.15	92.31%
2004	44	-5.05%	1.04	0.95	93.18%
2005	62	-1,51%	1.01	1.18	91.94%
2006	57	2.15%	0.89	0.95	96.49%
2007	48	6.82%	0.90	0.92	93.75%
2008	30	17.56%	0.92	1.12	86.67%
2009	37	18.68%	1.05	1.02	97.30%
2010	25	9.34%	1.08	1.11	84.00%
2011	22	-0.79%	1.06	1.09	86.36%
2012	14	4.33%	0.94	1.01	92.86%
2013	15	11.79%	0.97	0.99	80.00%
2014	10	6.40%	1.32	1.31	100.00%
2015	19	9.53%	0.91	0.96	100.00%
2016	10	2.36%	0.64	0.94	100.00%
2017	9	-1.96%	0.82	0.74	100.00%
2018	21	5.13%	0.74	0.89	100.00%
2019	8	-8.24%	1.12	1.15	75.00%
2020	9	16.92%	0.79	1.02	100.00%
2021	12	7.71%	0.83	0.78	91.67%
2022	6	1.51%	0.76	0.94	100.00%
Average	**24**	**5.58%**	**0.93**	**1.00**	**89.49%**

Table 5: Average Values per Year

This table reports the number of deals announced per year *Successful deals per year expressed as a percentage calculated by dividing the number of completed deals by the number of announced deals, average arbitrage spread per year, average target beta per year, and average acquirer beta per year.

Based on the data provided, there are a few key takeaways from Figure 1. Firstly, the average values of the arbitrage spread exhibits significant year-to-year variability, encompassing a broad spectrum of both positive and negative values. During specific years, such as 2008 and 2009, the average arbitrage spread reached exceptionally high levels, while in other years, such as 1995 and 2019, it sank considerably.

Secondly, a clear trend in the average arbitrage spread over time could not be distinguished. While some years reveals positive values while other shows negative values, there is no consistent upward or downward trend.

Thirdly, while the number of deals announced yearly is relatively stable over time, with some fluctuations from year to year, no clear trend in the data could be identified. The number of deals announced per year ranges from a low of 6 in 1996 and 2022 to a high of 62 in 2005.

In summary, while no clear trend could be identified concerning the average arbitrage spread over time, the data suggests that the arbitrage spread can be highly variable from year to year. Additionally, the number of deals announced yearly is relatively stable over time, with some fluctuations from year to year.

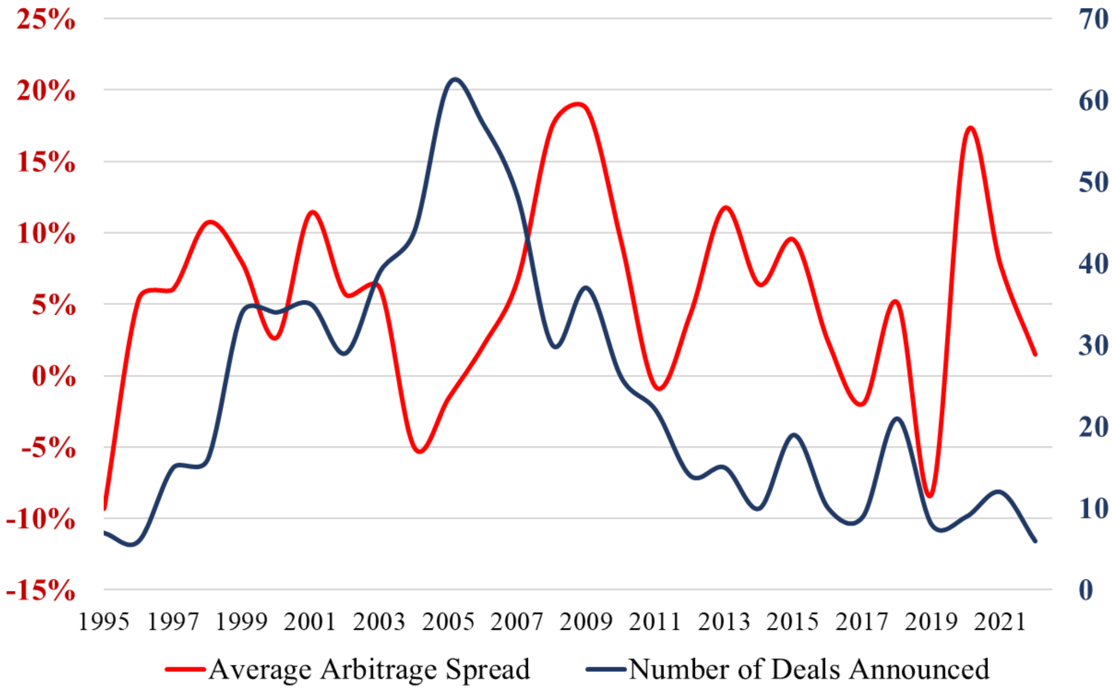

Figure 1: Number of Deals Announced and Average Arbitrage Spread by Year

4.2 Multivariate Analysis

4.2.1 Beta and Arbitrage Spread

In order to investigate the impact of target and acquirer beta values and the beta ratio on arbitrage spread in M&A deals, we conducted three OLS regressions with different independent variables while keeping arbitrage spread as the dependent variable. The first regression (1) included Target Beta as the main variable of interest, other company-specific variables for the target as target leverage and target FCF, and other deal-specific variables such as bid premium and cash deal dummy. The second regression (2) included Acquirer Beta as the main variable of interest, other company-specific variables for the acquirer as acquirer leverage and relative size, and other deal-specific variables such as bid premium and cash deal dummy. The third regression (3) included Target Beta, Acquirer Beta, and Beta Ratio as main variables, along with every control variable.

Our regression analysis did not yield any statistically significant impact of beta values on the magnitude of the arbitrage spread. The coefficients associated with the beta variables exhibited a marginally negative influence on the spread, except for Acquirer Beta in the third regression, where a slight positive effect was observed. However, none of these coefficients reached statistical significance. Furthermore, the 95% confidence intervals for the primary variables indicated that their impact on the arbitrage spread ranged from negative to positive values. These findings suggest that the beta values of the target and acquiring companies and the beta ratio did not significantly impact the arbitrage spread in M&A deals.

In relation to the control variables examined in the analysis, statistical significance at the 0.01 level was observed for both the target run-up and the bid premium. The target run-up exhibited a negative relationship with the arbitrage spread, while the bid premium displayed a positive relationship with the spread. Furthermore, at the 0.05 level of significance, the cash deal dummy indicated a negative correlation with the arbitrage spread, indicating that cash deals generally lead to a reduction in the spread.

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	-0.0178		-0.0165
	(0.0112)		(0.0112)
Acquirer Beta		-0.0041	0.0013
		(0.0141)	(0.0142)
Beta Ratio			-0.0004
			(0.0004)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	-0.0049		-0.0243
	(0.0301)		(0.0348)
Acquirer Leverage		0.0537	0.0609
		(0.0345)	(0.0410)
Target Run-up	-0.377***	-0.374***	-0.372***
	(0.0449)	(0.0451)	(0.0450)
Relative Size	0.0000*	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Days to Resolution	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)
Successful Deal Dummy	0.0161	0.00865	0.0117
	(0.0279)	(0.0278)	(0.0281)
Bid Premium	0.574***	0.574***	0.572***
	(0.0356)	(0.0352)	(0.0357)
Toehold Dummy	-0.0353	-0.0370	-0.0363
	(0.0544)	(0.0532)	(0.0543)
Hostile Dummy	-0.0117	-0.0145	-0.0118
	(0.0535)	(0.0528)	(0.0530)
Multiple Bids Dummy	-0.0151	-0.0199	-0.0186
	(0.0290)	(0.0280)	(0.0286)
Cash Deal Dummy	-0.0356**	-0.0346**	-0.0357**
	(0.0173)	(0.0172)	(0.0173)
Constant	-0.0446	-0.0714	-0.0618
	(0.113)	(0.114)	(0.115)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.588	0.589	0.591
Observations	673	673	673

Table 6: OLS Regression on Arbitrage Spread

Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price the day after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. Robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

4.2.2 Beta and Deal Completion

We also conducted three probit regressions with the completion rate (Successful Deal Dummy) as the dependent variable. The first regression (1) includes Target Beta as the main variable of interest, along with other company-specific variables for the target and other deal-specific variables. The second regression (2) includes Acquirer Beta as the main variable of interest, and the third regression (3) includes Target Beta, Acquirer Beta, and Beta Ratio as the main variables, along with every other control variable. Our findings indicate that Target Beta significantly positively affects the completion rate of M&A deals. In the first and third regressions, the coefficient for Target Beta was positive, specifically 0.294 in the first regression and 0.302 in the third regression. This suggests that an increase in the beta of the target company corresponds to a heightened likelihood of a successful deal. On the other hand, Acquirer Beta and Beta Ratio did not show any significant effect on the completion rate, and their coefficients in the 95% confidence interval ranged from a negative to a positive value, further indicating that they did not have an impact on the completion rate of M&A deals.

Hostile dummy and multiple bids dummy were found to be negatively significant, with the successful deal dummy at the 0.01 level of significance. This implies that if the acquirer shows a hostile attitude or multiple bidders are involved in the transaction, the probability of deal completion decreases. In addition, the days to resolution variable were found negatively significant at the 0.01 level of significance, indicating that an increase in the number of days it takes to consummate the deal decreases the probability of a successful deal.

VARIABLES	(1) Successful Deal Dummy	(2) Successful Deal Dummy	(3) Successful Deal Dummy
Target Beta	0.294**		0.302**
	(0.139)		(0.151)
Acquirer Beta		0.0848	-0.0292
		(0.143)	(0.155)
Beta Ratio			-0.0035
			(0.0074)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.289		0.309
	(0.365)		(0.396)
Acquirer Leverage		0.0506	0.0113
		(0.411)	(0.466)
Target Run-up	-0.0796	-0.0399	-0.0756
	(0.436)	(0.433)	(0.440)
Relative Size	0.0000	-0.0001	0.0000
	(0.0002)	(0.0002)	(0.0003)
Days to Resolution	-0.0015*	-0.0016*	-0.0016*
	(0.0009)	(0.0009)	(0.0009)
Bid Premium	-0.318	-0.281	-0.309
	(0.247)	(0.245)	(0.251)
Toehold Dummy	-0.159	-0.152	-0.119
	(0.564)	(0.569)	(0.567)
Hostile Dummy	-0.902***	-0.867***	-0.898***
	(0.310)	(0.309)	(0.312)
Multiple Bids Dummy	-0.958***	-0.921***	-0.970***
	(0.262)	(0.260)	(0.263)
Cash Deal Dummy	0.185	0.150	0.192
	(0.198)	(0.194)	(0.199)
Constant	0.912	1.205	0.871
	(0.889)	(0.897)	(0.914)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.2042	0.1942	0.2078
Observations	553	553	553

Table 7: Probit Regression on Successful Deal Dummy

Cross-sectional regression analysis (Probit) of deal completion. This table presents the coefficients gathered from the different regressions performed with Successful Deal Dummy as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.2.3 Beta and Days to Resolution

Finally, we conducted a set of tobit regressions to examine the effect of Beta values (Target Beta, Acquirer Beta, and Beta Ratio) on the time it takes to complete a M&A deal, measured by the variable "Days to Resolution." Our results indicate that the coefficients for Beta values were very low and not statistically significant, and their 95% confidence intervals ranged from negative to positive values. This suggests that the Betas did not significantly affect the number of days it takes for a deal to be resolved. These findings provide insight into the factors influencing the completion time of M&A deals. Our study suggests that practitioners should base their investment decisions on something other than the Beta values of the target or acquiring companies, as these values do not significantly impact the time it takes for M&A deals to be resolved. This information can be valuable for investors and financial professionals who seek to make informed decisions regarding their M&A investments.

Concerning the control variables in the analysis, the target free cash flow and bid premium were found positively significant at the 0.05 and 0.01 level of significance, respectively, to the days to resolution, indicating that an increase in these variables increases the number of days to resolution. Hostile deal dummy was also found positively significant to the days to resolution at the 0.05 level of significance, whereas the cash deal dummy was found negatively related to the days to resolution at the 0.01 level of significance.

VARIABLES	(1) Days to Resolution	(2) Days to Resolution	(3) Days to Resolution
Target Beta	2.599		1.174
	(5.099)		(5.371)
Acquirer Beta		3.417	3.091
		(5.822)	(6.089)
Beta Ratio			0.0613
			(0.294)
Target FCF	0.0000**		0.0000**
	(0.0000)		(0.0000)
Target Leverage	-2.283		5.611
	(13.66)		(14.76)
Acquirer Leverage		-14.47	-23.04
		(15.54)	(17.05)
Target Run-up	9.733	7.189	7.182
	(16.56)	(16.69)	(16.63)
Relative Size	0.0029	0.0029	0.0036
	(0.0036)	(0.0037)	(0.0037)
Successful Deal Dummy	-22.86*	-23.96**	-23.98**
	(11.80)	(11.90)	(11.89)
Bid Premium	27.94***	27.48***	28.98***
	(10.08)	(9.953)	(10.10)
Toehold Dummy	-14.78	-12.88	-14.20
	(20.13)	(20.20)	(20.14)
Hostile Dummy	34.08**	33.48*	32.59*
	(17.22)	(17.26)	(17.24)
Multiple Bids Dummy	2.094	3.072	2.861
	(13.81)	(13.86)	(13.82)
Cash Deal Dummy	-75.16***	-74.55***	-74.66***
	(7.012)	(7.029)	(7.012)
Constant	224.0**	231.2**	231.8**
	(92.88)	(93.26)	(92.93)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.0240	0.0235	0.0242
Observations	673	673	673

Table 8: Tobit Regression on Days to Resolution

Cross-sectional regression analysis (Tobit) of days to resolution. This table presents the coefficients gathered from the different regressions performed with days to resolution as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.2.4 Sensitivity Analysis

Branch and Wang (2008) conducted their regressions for cash deals and stock deals separately as two subsamples. Thus we divided our dataset into two, one that only included cash deals and one that only included stock deals. We then proceeded to run our regressions on those datasets separately. The output from the regressions on the cash deals is presented in Table 9-11 in the appendix. In the output, we could see a slight increase in the value of the coefficient and a decrease in the level of significance of the target beta in Table 10 compared to Table 7. Table 11 shows that the target beta is significant and has a positive effect of 10.77 and 12.13 in the different regressions. We also find a distinct increase in R-squared and pseudo R-squared in Tables 9 and 10, which shows that the regressions made on cash deals explain the variability better compared to the original regression. The output from the regressions on stock deals is presented in Table 12-14 in the appendix. In that output, we found that the variable for target beta became significant in regression 1 in Table 14, and the variable for acquirer beta became significant in regression 2 in the same table. Both showed a coefficient of -20.

Secondly, we decided to divide the dataset into one set that includes observations for deals done across two different industries (the target company and the acquiring company belonging to two different types of industries specified in Table 2) and one dataset that includes deals done within the same industry. We decided to do this because it is plausible to expect companies looking for an acquisition to have more information on potential targets within the same industry than they do on potential targets in other industries. The output from these regressions is presented in Table 15-17 for deals across industries and Table 18-20 for deals within the same industry. In Table 16, we found that the variable for target beta lost its significance compared to Table 7, and the coefficient for target beta in Table 19 increased from about 0.3 to about 0.44. We found an increased R-squared and pseudo R-squared, compared to the original regressions, in all the regressions for deals across industries.

We have previously specified the arbitrage spread as the percentage disparity between the offer price and the target's closing price one day following the offer announcement. However, Branch and Wang (2008) suggest that using the price two days after the offer announcement may be more fitting as it could enable the market to assimilate the transaction information fully. Thus, we chose to run the same regression as the one we did initially but changed the calculation for the arbitrage spread by using the target and acquirer closing price two days after the announced deal, as shown in Table 21. The output from these regressions showed no significant effect of any beta variable. This regression also decreased the R-squared value from 0.59 in Table 6 to 0.1.

5 Discussion and Conclusion

5.1 Discussion

The overall aim of the thesis was to analyze the relationship between beta and arbitrage spread. The regression analysis presented mixed results, where several of the variables included in the study revealed several intriguing outcomes.

Previous research suggests potential links between systematic risk and various factors that could impact the arbitrage spread. Damodaran (2012) suggests that a higher beta could aggravate a firm's ability to receive financing through the fundamentals of the CAPM, while Bo, Lensink, and Sterken (2003) provides empirical evidence that more risky firms are confronted with more strict capital market constraints than relatively less risky ones. Easley et al. (1996), Aslan et al. (2011) and Martins and Paulo (2014) suggests that a higher stock beta generates a higher level of information asymmetry, which were expected to influence the arbitrage spread. The outcomes, however, deviated from what was initially hypothesized, as no significant relationships were found between beta, arbitrage spread, and the days to resolution. The insignificant results could depend on many factors, where one potential reason could be connected to the efficient market hypothesis. Fama (1970) explains that a market in which prices fully reflect available information is called efficient. This may however not be the case for the stock prices in the study, where the efficient market hypothesis falls short in the sense that the stock prices fails to reflect all the available information in the market. Since beta is calculated by the stock prices, it could have the implication that the beta values fails to reflect the true risk in the firm. This will, in turn, make it harder to predict the arbitrage spread solely based on the beta values, since they are lacking information that the investors have in mind when forming their expectations regarding the deal.

The target beta were however found positively significant with the successful deal dummy as a higher beta tends to increase the probability that a deal succeeds. While previous research as Paulson (2000) suggest that the financing of a deal can present significant risk to the completion of the deal, where we expected that a higher beta could amplify these risks, this seemed not to be the case. One possible explanation could be that the hypothesized link that a higher risk would create a higher required return from the investor and, in turn, make it harder for a firm to receive financing could go the other way around. Specifically, a higher risk could create a higher expected return, making the firm more attractive to risk-seeking investors and consequently increasing the possibility of receiving financing.

Target Beta was the only variable that showed a significant effect, but it only influenced the probability of deal completion. Therefore, there was insufficient evidence to support a link between higher beta values and higher arbitrage spreads. However, a handful of the control variables were found significant, contributing to additional research in the risk arbitrage literature.

More specifically, we found that the cash deal dummy significantly negatively affected the arbitrage spread and the number of days to resolution, which aligns with both Jetley and Ji (2010) and Redor (2019). These findings suggest that cash offers may provide more certainty to market participants and potentially result in a faster deal resolution.

In addition, we discovered that the coefficient for hostile dummy was found to be significant. This is also in line with previous literature, where Wang (2017) suggests that hostile takeovers may increase the days to resolution as the management of the target company may initiate a bidding war by contacting other potential bidders in the event of receiving a hostile bid.

Given the findings from Wang (2017), one might expect a positive relationship between the hostile dummy variable and the multiple bids dummy variable in our regression analysis, as a hostile offer may trigger a bidding war among potential bidders. However, our results do not support this assumption, as we found a weak positive correlation of only 0.22 between the two variables. This suggests that the effect of a hostile bid on multiple bidders is not as significant as previously assumed by Wang (2017).

We also found that the successful deal dummy and hostile dummy had a significant effect on days to resolution but not arbitrage spread. However, previous research suggests that there is a significant positive relationship between the arbitrage spread and the number of days to resolution, where Jindra and Walkling (2004) explain that the days to resolution are proportionally connected to the holding costs that the risk arbitrageurs carry and that the spread is expected to increase with the duration and the cost of funds of the deal. It is, therefore, possible that there is an indirect relationship between hostile bids and the arbitrage spread through the effect of days to resolution. Our findings suggest that hostile bids may increase the days to resolution, potentially leading to higher holding costs for risk arbitrageurs and an increase in the arbitrage spread. While we did not find a significant direct effect of hostile bids on the arbitrage spread in our regressions, the potential indirect effect through days to resolution should not be discounted.

Furthermore, our findings do not fully align with the research conducted by Jetley and Ji (2010), who documented a decline in arbitrage spreads since the beginning of the 1990s. Since our data only goes back to 1995, we cannot confirm or refute their claim. However, we did observe a significant decrease in the number of deals announced from 2005 and further, which could suggest a change in the M&A landscape. Additionally, we observed a significant decrease in hostile bids since the early 2000s, with 21 such bids identified between 1995 and 2000 and only 12 between 2001 and 2022. It is worth noting that during the last decade, from 2012 to 2022, only one hostile bid was made. This finding suggests that hostile bids have become less common in recent years.

Lastly, we also conducted regressions in subsamples for both stock and cash deals, where the results for stock deals were largely consistent with Branch and Wang's (2008) findings. Specifically, we found that relative size, target run-up, bid premium, and hostile dummy were significant factors affecting the arbitrage spread. For cash deals, our findings were slightly different from Branch and Wang's. While they found target size significant, we did not include this variable in our analysis. Instead, we found that acquirer leverage, target run-up, relative size, and the bid premium significantly affected the arbitrage spread. In contrast, target leverage was only significant in regression (3) in Table 9. Our findings support and diverge from Branch and Wang's research, highlighting the complexity of factors that can impact arbitrage spreads in M&A deals.

5.2 Conclusion

In this study, we investigated whether a firms beta influences the arbitrage spread as well as the risks connected to M&A deals. This was achieved through a multivariate regression analysis measured on an international sample of 673 observations spanning from 1995-2022. Our hypothesis that beta is associated with arbitrage spread was derived from previous research suggesting potential links with beta and factors such as limited access of financing and information asymmetry. We expected that these factors in turn could influence the arbitrage spread.

The relationship between the beta values and arbitrage spread could however not be truly established where the regression analysis did not reveal any significant links between beta, arbitrage spread, and the days to resolution. One possible explanation to this result could be connected to the failure of beta to reflect the total risk in the firms. The target beta was however found to be positively significant with the successful deal dummy, suggesting that a higher beta for the target tends to increase the probability that a deal succeeds. This link was however only discovered in one of the regression models, providing insufficient support for the claim that beta is associated with higher arbitrage spreads. This have the implication that beta might not be a useful measurement for risk arbitrageurs in predicting the arbitrage spread and the probability of a successful deal, which can be a useful insight for risk arbitrage investors around the world. In addition, several control variables were found to be significant, indicating the importance of considering various factors when predicting the arbitrage spread. This contributes with a more recent understanding of the factors that influence the arbitrage spread and the completion of M&A deals.

5.3 Future Research

Given the significant decline in M&A deals announced from the early 2000s to the mid-2010s and onwards, there is a noticeable reduction in opportunities for risk arbitrageurs to engage in risk arbitrage deals. However, considering the dynamic nature of trends in the world of finance, we anticipate that this trend is likely to shift in the future. Consequently, it is essential to continue investigating the determinants of arbitrage spread, as this area holds valuable insights.

In addition, we propose conducting a similar study to ours but with a focus on dividing the datasets into specific periods, thereby exploring the factors that carry more significance during periods of financial crisis and times of financial stability. For instance, the data could be categorized into subsets representing the years following the 2008 financial crisis, the subsequent stable periods, and the years surrounding the COVID-19 pandemic. Such an approach would yield results illustrating how different variables impact the arbitrage spread across various macroeconomic states.

By undertaking this suggested research, a deeper understanding of the dynamics between variables and the arbitrage spread can be achieved, shedding light on the differential effects in diverse economic climates. This exploration would contribute to expanding the knowledge base in the field and provide valuable insights for risk arbitrageurs and market participants in decision-making processes.

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7 Appendix

Only Cash Deals:

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	-0.0184		-0.0180
	(0.0122)		(0.0125)
Acquirer Beta		0.00581	0.0107
		(0.0149)	(0.0149)
Beta Ratio			-0.0005
			(0.0004)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	-0.0562		-0.0835**
	(0.0347)		(0.0371)
Acquirer Leverage		0.0744*	0.106**
		(0.0383)	(0.0421)
Target Run-up	-0.417***	-0.417***	-0.410***
	(0.0556)	(0.0559)	(0.0548)
Relative Size	0.0000**	0.0000**	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Days to Resolution	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)
Successful Deal Dummy	0.0136	0.00893	0.0132
	(0.0347)	(0.0344)	(0.0347)
Bid Premium	0.629***	0.635***	0.627***
	(0.0377)	(0.0374)	(0.0376)
Toehold Dummy	-0.0419	-0.0438	-0.0421
	(0.0747)	(0.0738)	(0.0753)
Hostile Dummy	0.0162	0.0037	0.0105
	(0.0478)	(0.0471)	(0.0472)
Multiple Bids Dummy	-0.0207	-0.0211	-0.0226
	(0.0314)	(0.0308)	(0.0311)
Constant	-0.0736	-0.129	-0.110
	(0.123)	(0.124)	(0.126)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.711	0.710	0.716
Observations	440	440	440

Table 9: OLS Regression on Arbitrage Spread for Cash Deals
Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price the day after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% cash consideration. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Successful Deal Dummy	(2) Successful Deal Dummy	(3) Successful Deal Dummy
Target Beta	0.336*		0.344*
	(0.200)		(0.207)
Acquirer Beta		0.0584	-0.0321
		(0.212)	(0.220)
Beta Ratio			-0.0012
			(0.0080)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.287		0.331
	(0.504)		(0.525)
Acquirer Leverage		-0.177	-0.168
		(0.582)	(0.637)
Target Run-up	-0.0679	-0.0124	-0.0733
	(0.575)	(0.561)	(0.577)
Relative Size	-0.0002	-0.0002	-0.0001
	(0.0003)	(0.0003)	(0.0004)
Days to Resolution	-0.0025*	-0.0024*	-0.0026*
	(0.0013)	(0.0013)	(0.0013)
Bid Premium	-0.120	-0.0691	-0.121
	(0.333)	(0.318)	(0.335)
Toehold Dummy	0.112	0.0427	0.119
	(0.638)	(0.627)	(0.641)
Hostile Dummy	-0.833**	-0.804**	-0.818**
	(0.338)	(0.337)	(0.342)
Multiple Bids Dummy	-0.781***	-0.763**	-0.783**
	(0.303)	(0.302)	(0.304)
Constant	0.365	0.940	0.449
	(0.974)	(0.992)	(1.046)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Psuedo R-squared	0.2326	0.2180	0.2331
Observations	338	338	338

Table 10: Probit Regression on Successful Deal Dummy for Cash Deals
Cross-sectional regression analysis (Probit) of deal completion. This table presents the coefficients gathered from the different regressions performed with Successful Deal Dummy as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% cash consideration Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Days to Resolution	(2) Days to Resolution	(3) Days to Resolution
Target Beta	12.13**		10.77*
	(6.036)		(6.247)
Acquirer Beta		8.272	5.045
		(7.074)	(7.236)
Beta ratio			0.0472
			(0.289)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	-9.968		-6.834
	(16.37)		(17.22)
Acquirer Leverage		-11.11	-12.16
		(19.50)	(20.84)
Target Run-up	10.22	7.785	8.809
	(19.24)	(19.39)	(19.30)
Relative Size	0.0141	0.0101	0.0152
	(0.0161)	(0.0162)	(0.0166)
Successful Deal Dummy	-27.65**	-27.38*	-27.63**
	(13.94)	(13.99)	(13.93)
Bid Premium	40.27***	42.41***	40.59***
	(11.07)	(10.91)	(11.07)
Toehold Dummy	-16.04	-18.17	-16.77
	(22.79)	(22.90)	(22.81)
Hostile Dummy	20.66	19.34	20.66
	(17.49)	(17.57)	(17.51)
Multiple Bids Dummy	-1.344	-0.462	-0.964
	(14.32)	(14.41)	(14.32)
Constant	160.5*	171.0*	163.3*
	(89.17)	(89.83)	(89.34)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.0206	0.0196	0.0208
Observations	440	440	440

Table 11: Tobit Regression on Days to Resolution for Cash Deals

Cross-sectional regression analysis (Tobit) of days to resolution. This table presents the coefficients gathered from the different regressions performed with days to resolution as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% cash consideration. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Only Stock Deals:

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	-0.0120		-0.0099
	(0.0183)		(0.0192)
Acquirer Beta		-0.0106	-0.0084
		(0.0248)	(0.0259)
Beta Ratio			-0.0015
			(0.0014)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.0364		0.0517
	(0.0403)		(0.0616)
Acquirer Leverage		0.0014	-0.0461
		(0.0699)	(0.100)
Target Run-up	-0.215***	-0.217***	-0.219***
	(0.0630)	(0.0652)	(0.0665)
Relative Size	5.196***	5.153**	5.196***
	(1.933)	(2.018)	(1.952)
Days to Resolution	-0.0001	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)
Successful Deal Dummy	0.0511	0.0504	0.0492
	(0.0513)	(0.0528)	(0.0522)
Bid Premium	0.332***	0.324***	0.335***
	(0.0580)	(0.0580)	(0.0556)
Toehold Dummy	-0.0638	-0.0617	-0.0546
	(0.0503)	(0.0507)	(0.0551)
Hostile Dummy	-0.458*	-0.464*	-0.459*
	(0.266)	(0.272)	(0.267)
Multiple Bids Dummy	0.160	0.165	0.159
	(0.133)	(0.136)	(0.136)
Constant	-0.139	-0.113	-0.109
	(0.0930)	(0.107)	(0.109)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.445	0.441	0.447
Observations	233	233	233

Table 12: OLS Regression on Arbitrage Spread for Stock Deals
Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price the day after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% stock consideration. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Successful Deal Dummy	(2) Successful Deal Dummy	(3) Successful Deal Dummy
Target Beta	0.199		0.416
	(0.284)		(0.367)
Acquirer Beta		0.0378	-0.273
		(0.316)	(0.399)
Beta Ratio			-0.0426
			(0.0289)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.746		0.482
	(0.947)		(1.165)
Acquirer Leverage		0.735	0.304
		(0.956)	(1.267)
Target Run-up	-0.450	-0.313	-0.377
	(0.951)	(0.927)	(0.960)
Relative Size	-50.35**	-53.12**	-50.29**
	(23.93)	(23.45)	(24.19)
Days to Resolution	-0.0022	-0.0018	-0.0025
	(0.0023)	(0.0022)	(0.0024)
Bid Premium	-0.579	-0.646	-0.465
	(0.754)	(0.730)	(0.760)
Toehold Dummy	-	-	-
Hostile Dummy	-0.575	-0.0928	-0.571
	(1.535)	(1.452)	(1.627)
Multiple Bids Dummy	-2.287**	-2.237**	-2.366**
	(0.905)	(0.897)	(0.926)
Constant	-0.882	-0.559	-0.599
	(1.206)	(1.225)	(1.326)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Psuedo R-squared	0.4139	0.4032	0.4325
Observations	122	122	122

Table 13: Probit Regression on Successful Deal Dummy for Stock Deals
Cross-sectional regression analysis (Probit) of deal completion. This table presents the coefficients gathered from the different regressions performed with Successful Deal Dummy as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% stock consideration. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Days to Resolution	(2) Days to Resolution	(3) Days to Resolution
Target Beta	-20.03**		-15.42
	(8.786)		(9.550)
Acquirer Beta		-20.00*	-15.66
		(10.16)	(10.99)
Beta Ratio			-1.786
			(1.199)
Target FCF	0.0000		0.0000*
	(0.0000)		(0.0000)
Target Leverage	2.968		22.16
	(23.34)		(26.22)
Acquirer Leverage		-26.83	-58.91**
		(25.80)	(29.76)
Target Run-up	30.81	27.54	25.30
	(28.75)	(29.12)	(28.59)
Relative Size	514.7	451.0	485.2
	(504.5)	(507.2)	(499.6)
Successful Deal Dummy	-19.55	-22.43	-21.74
	(22.45)	(22.46)	(22.23)
Bid Premium	-23.06	-28.59	-20.78
	(21.60)	(21.59)	(21.53)
Toehold Dummy	-2.534	0.630	9.816
	(37.19)	(37.55)	(36.94)
Hostile Dummy	209.3***	200.8***	206.7***
	(62.56)	(63.15)	(62.77)
Multiple Bids Dummy	21.05	22.61	16.97
	(38.13)	(38.57)	(37.87)
Constant	325.7***	361.7***	357.8***
	(89.71)	(90.69)	(89.13)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.0221	0.0213	0.0248
Observations	233	233	233

Table 14: Tobit Regression on Days to Resolution for Stock Deals
Cross-sectional regression analysis (Tobit) of days to resolution. This table presents the coefficients gathered from the different regressions performed with days to resolution as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals made with 100% stock consideration. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Across industries:

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	-0.0271		-0.0299
	(0.0198)		(0.0205)
Acquirer Beta		0.00870	0.0168
		(0.0223)	(0.0229)
Beta Ratio			-0.0015
			(0.0009)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	-0.0502		-0.0699
	(0.0530)		(0.0567)
Acquirer Leverage		0.0623	0.0797
		(0.0527)	(0.0580)
Target Run-up	-0.449***	-0.443***	-0.440***
	(0.0689)	(0.0722)	(0.0702)
Relative Size	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Days to resolution	0.0002	0.0002	0.0002
	(0.0002)	(0.0002)	(0.0002)
Successful Deal Dummy	0.0102	-0.0021	0.0016
	(0.0427)	(0.0422)	(0.0437)
Bid Premium	0.580***	0.593***	0.578***
	(0.0511)	(0.0508)	(0.0518)
Toehold Dummy	-0.135	-0.155*	-0.146
	(0.101)	(0.0918)	(0.103)
Hostile Dummy	-0.0155	-0.0129	-0.0122
	(0.0570)	(0.0526)	(0.0560)
Multiple Bids Dummy	0.0285	0.00981	0.0189
	(0.0477)	(0.0481)	(0.0502)
Cash Deal Dummy	0.0000	0.0050	-0.0055
	(0.0333)	(0.0335)	(0.0333)
Constant	0.106	0.0324	0.0851
	(0.147)	(0.144)	(0.151)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.712	0.709	0.720
Observations	226	226	226

Table 15: OLS Regression on Arbitrage Spread for Deals Across Industries
Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price the day after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company do not belong to the same industry based on the first 2 digits in their SIC code. Robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

VARIABLES	(1) Successful Deal Dummy	(2) Successful Deal Dummy	(3) Successful Deal Dummy
Target Beta	0.235		0.741
	(0.423)		(0.577)
Acquirer Beta		-0.291	-0.583
		(0.366)	(0.460)
Beta Ratio			-0.111*
			(0.0576)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.112		0.163
	(1.041)		(1.220)
Acquirer Leverage		0.771	0.243
		(1.083)	(1.315)
Target Run-up	1.398	2.046	2.597
	(1.510)	(1.608)	(1.806)
Relative Size	0.114***	0.105**	0.116***
	(0.0421)	(0.0409)	(0.0447)
Days to Resolution	0.0038	0.0037	0.0032
	(0.0044)	(0.0038)	(0.0048)
Bid Premium	0.00787	-0.317	-0.435
	(0.855)	(0.823)	(1.008)
Toehold Dummy	-	-	-
Hostile Dummy	0.568	0.745	1.121
	(0.765)	(0.758)	(0.856)
Multiple Bids Dummy	-2.055**	-2.018**	-2.652**
	(0.864)	(0.823)	(1.043)
Cash Deal Dummy	0.451	0.325	0.145
	(0.717)	(0.673)	(0.799)
Constant	-1.235	-0.605	-0.766
	(2.315)	(1.917)	(2.645)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.4420	0.4391	0.5038
Observations	108	108	108

Table 16: Probit Regression on Successful Deal Dummy for Deals Across Industries
Cross-sectional regression analysis (Probit) of deal completion. This table presents the coefficients gathered from the different regressions performed with Successful Deal Dummy as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company do not belong to the same industry based on the first 2 digits in their SIC code. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

VARIABLES	(1) Days to Resolution	(2) Days to Resolution	(3) Days to Resolution
Target Beta	2.130		2.350
	(6.826)		(7.130)
Acquirer Beta		-3.299	-3.315
		(6.714)	(7.079)
Beta Ratio			0.162
			(0.352)
Target FCF	0.0000		0.0000*
	(0.0000)		(0.0000)
Target Leverage	3.166		9.756
	(16.85)		(17.87)
Acquirer Leverage		-20.39	-27.82
		(20.57)	(21.87)
Target Run-up	-1.943	-3.467	-7.139
	(20.90)	(21.40)	(21.53)
Relative Size	0.0040	0.0039	0.0043
	(0.0035)	(0.0036)	(0.0035)
Successful Deal Dummy	-3.827	-1.660	-1.306
	(15.38)	(15.49)	(15.41)
Bid Premium	28.81**	26.40*	29.19**
	(13.68)	(13.59)	(13.84)
Toehold Dummy	32.82	35.95	34.51
	(36.45)	(36.42)	(36.34)
Hostile Dummy	-16.53	-16.91	-17.63
	(22.18)	(22.13)	(22.12)
Multiple Bids Dummy	32.29*	36.45*	35.65*
	(18.82)	(18.97)	(18.94)
Cash Deal Dummy	-72.01***	-73.02***	-70.97***
	(10.08)	(10.05)	(10.16)
Constant	289.0***	304.9***	298.0***
	(84.53)	(84.76)	(84.82)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.0525	0.0518	0.0533
Observations	226	226	226

Table 17: Tobit Regression on Days to Resolution for Deals Across Industries
Cross-sectional regression analysis (Tobit) of days to resolution. This table presents the coefficients gathered from the different regressions performed with days to resolution as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company do not belong to the same industry based on the first 2 digits in their SIC code. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Same industries:

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	-0.0133		-0.0116
	(0.0132)		(0.0132)
Acquirer Beta		-0.0076	-0.0037
		(0.0192)	(0.0200)
Beta Ratio			-0.0002
			(0.0003)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.0271		0.0190
	(0.0373)		(0.0469)
Acquirer Leverage		0.0362	0.0246
		(0.0492)	(0.0612)
Target Run-up	-0.309***	-0.309***	-0.307***
	(0.0579)	(0.0576)	(0.0589)
Relative Size	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Days to Resolution	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)
Successful Deal Dummy	-0.0023	-0.0031	-0.0012
	(0.0368)	(0.0365)	(0.0370)
Bid Premium	0.569***	0.566***	0.569***
	(0.0464)	(0.0462)	(0.0464)
Toehold Dummy	-0.0016	-0.0012	-0.0018
	(0.0616)	(0.0612)	(0.0620)
Hostile Dummy	0.0008	0.0007	0.0016
	(0.0768)	(0.0768)	(0.0765)
Multiple Bids Dummy	-0.0680*	-0.0679*	-0.0685*
	(0.0378)	(0.0377)	(0.0379)
Cash Deal Dummy	-0.0443**	-0.0450**	-0.0443**
	(0.0212)	(0.0211)	(0.0213)
Constant	-0.197**	-0.201*	-0.204**
	(0.0964)	(0.103)	(0.101)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.580	0.580	0.581
Observations	447	447	447

Table 18: OLS Regression on Arbitrage Spread for Deals Within the Same Industry Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price the day after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company does belong to the same industry based on the first 2 digits in their SIC code. Robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

VARIABLES	(1) Successful Deal Dummy	(2) Successful Deal Dummy	(3) Successful Deal Dummy
Target Beta	0.459**		0.414**
	(0.192)		(0.210)
Acquirer Beta		0.209	0.0474
		(0.212)	(0.238)
Beta Ratio			0.0026
			(0.0139)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.314		0.603
	(0.539)		(0.596)
Acquirer Leverage		-0.788	-0.933
		(0.659)	(0.742)
Target Run-up	-0.730	-0.462	-0.679
	(0.591)	(0.576)	(0.597)
Relative Size	-0.0002	-0.0002	-0.0001
	(0.0003)	(0.0002)	(0.0003)
Days to Resolution	-0.0013	-0.0015	-0.0015
	(0.0011)	(0.0011)	(0.0012)
Bid Premium	-0.623*	-0.637*	-0.678*
	(0.356)	(0.355)	(0.371)
Toehold Dummy	0.155	0.116	0.189
	(0.662)	(0.674)	(0.677)
Hostile Dummy	-1.301***	-1.164***	-1.294***
	(0.441)	(0.439)	(0.451)
Multiple Bids Dummy	-1.239***	-1.206***	-1.259***
	(0.362)	(0.363)	(0.372)
Cash Deal Dummy	0.490*	0.467*	0.541*
	(0.278)	(0.274)	(0.287)
Constant	0.705	1.519	1.020
	(1.166)	(1.181)	(1.217)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Psuedo R-squared	0.2951	0.2780	0.3021
Observations	332	332	332

Table 19: Probit Regression on Successful Deal Dummy for Deals Within the Same Industry Cross-sectional regression analysis (Probit) of deal completion. This table presents the coefficients gathered from the different regressions performed with Successful Deal Dummy as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company does belong to the same industry based on the first 2 digits in their SIC code. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

VARIABLES	(1) Days to Resolution	(2) Days to Resolution	(3) Days to Resolution
Target Beta	2.294		-1.074
	(6.609)		(6.974)
Acquirer Beta		9.336	9.229
		(8.471)	(8.979)
Beta Ratio			-0.0950
			(0.410)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	-17.09		-1.826
	(18.97)		(20.68)
Acquirer Leverage		-42.92**	-46.98*
		(21.40)	(23.92)
Target Run-up	20.95	18.65	20.27
	(22.92)	(22.83)	(22.92)
Relative Size	-0.0009	0.0000	0.0023
	(0.0134)	(0.0133)	(0.0136)
Successful Deal Dummy	-26.05	-28.34*	-27.91*
	(15.95)	(15.85)	(15.88)
Bid Premium	26.60**	26.40**	26.75**
	(13.31)	(13.03)	(13.24)
Toehold Dummy	-15.83	-12.75	-13.48
	(23.89)	(23.81)	(23.85)
Hostile Dummy	72.05***	69.43***	69.75***
	(23.45)	(23.42)	(23.45)
Multiple Bids Dummy	-13.24	-12.23	-13.31
	(18.31)	(18.26)	(18.30)
Cash Deal Dummy	-72.76***	-70.84***	-71.51***
	(9.152)	(9.115)	(9.128)
Constant	137.7**	143.1**	146.8**
	(56.18)	(56.42)	(56.77)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Pseudo R-squared	0.0249	0.0255	0.0258
Observations	447	447	447

Table 20: Tobit Regression on Days to Resolution for Deals Within the Same Industry
Cross-sectional regression analysis (Tobit) of days to resolution. This table presents the coefficients gathered from the different regressions performed with days to resolution as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression with all variables, including Beta Ratio. The regression analyses were conducted using data exclusively from deals announced where the acquiring company and the target company does belong to the same industry based on the first 2 digits in their SIC code. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

T+2 prices:

VARIABLES	(1) Arbitrage Spread	(2) Arbitrage Spread	(3) Arbitrage Spread
Target Beta	0.0206		0.0086
	(0.0495)		(0.0484)
Acquirer Beta		0.0065	0.0076
		(0.0901)	(0.0944)
Beta Ratio			0.0008
			(0.0008)
Target FCF	0.0000		0.0000
	(0.0000)		(0.0000)
Target Leverage	0.376		0.509
	(0.268)		(0.386)
Acquirer Leverage		-0.152	-0.405
		(0.283)	(0.436)
Target Run-up	-0.239	-0.256	-0.276
	(0.381)	(0.392)	(0.389)
Relative Size	0.0000	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)
Days to Resolution	-0.0003	-0.0003	-0.0003
	(0.0006)	(0.0006)	(0.0006)
Successful Deal Dummy	0.138	0.147	0.139
	(0.107)	(0.110)	(0.108)
Bid Premium	0.870***	0.814***	0.882***
	(0.190)	(0.182)	(0.191)
Toehold Dummy	-0.111	-0.0693	-0.0985
	(0.116)	(0.101)	(0.116)
Hostile Dummy	-0.113	-0.0775	-0.122
	(0.130)	(0.138)	(0.134)
Multiple Bids Dummy	-0.179	-0.170	-0.164
	(0.183)	(0.183)	(0.185)
Cash Deal Dummy	-0.348*	-0.353*	-0.347*
	(0.183)	(0.186)	(0.182)
Constant	0.163	0.344	0.298
	(0.295)	(0.375)	(0.357)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.095	0.093	0.096
Observations	673	673	673

Table 21: OLS Regression on Arbitrage Spread Using t+2 Prices
Cross-sectional regression analysis (OLS) with robust standard errors of arbitrage spreads, calculated using closing price two days after the deal's announcement. This table presents the coefficients gathered from the different regressions performed with arbitrage spread as the dependent variable and the standard errors for the variables in brackets below the value of the coefficient. (1) is the regression with all variables except variables connected to the acquiring company. (2) is the regression with all variables except variables connected to the target company. (3) is the regression made with all variables, including Beta Ratio. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Correlation Heatmap	*Arbitrage Spread*	*Beta Ratio*	*Target 5-Year Beta*	*Acquiror 5-Year Beta*	*Target FCF*	*Target Leverage*	*Acquiror Leverage*	*Target Run-up*	*Relative Size*	*Days to Resolution*	*Deal Successful Dummy*	*Bid Premium*	*Toehold Dummy*	*Hostile Dummy*	*Multiple Bids Dummy*	*100% Cash Deal*
Arbitrage Spread	1															
Beta Ratio	-0,033	1														
Target 5-Year Beta	-0,029	0,064	1													
Acquiror 5-Year Beta	-0,048	0,002	0,322	1												
Target FCF	-0,011	0,008	0,097	0,015	1											
Target Leverage	-0,111	-0,004	-0,035	-0,001	0,198	1										
Acquiror Leverage	0,032	0,037	-0,081	0,011	0,247	0,465	1									
Target Run-up	-0,081	-0,003	0,058	0,034	-0,018	-0,082	-0,102	1								
Relative Size	0,020	0,004	-0,004	-0,013	-0,030	-0,077	0,043	-0,002	1							
Days to Resolution	0,063	0,002	0,021	0,005	0,076	-0,013	-0,053	0,027	0,047	1						
Deal Successful Dummy	-0,047	-0,009	0,028	0,004	-0,016	0,032	0,013	-0,048	0,009	-0,114	1					
Bid Premium	0,681	-0,032	0,040	-0,042	-0,047	-0,211	-0,092	0,282	0,004	0,057	-0,123	1				
Toehold Dummy	-0,025	0,040	0,000	0,037	0,036	0,039	0,063	-0,057	-0,003	-0,013	-0,017	-0,018	1			
Hostile Dummy	0,051	-0,011	0,010	0,015	-0,005	0,022	0,000	-0,019	-0,022	0,069	-0,267	0,137	0,037	1		
Multiple Bids Dummy	0,032	-0,028	0,046	-0,014	-0,017	-0,039	0,005	0,133	-0,011	-0,008	-0,238	0,148	-0,035	0,222	1	
100% Cash Deal	0,010	-0,028	-0,008	-0,014	0,015	-0,034	0,014	0,067	-0,051	-0,365	-0,008	0,133	-0,018	0,136	0,113	1

1

-1

Figure 2: Correlation Matrix

Correlation matrix (heatmap) that shows the correlation between the variables used in our regressions. Correlation equal to -1 is shown in dark blue while correlation equal to 1 is shown in dark red.

Variable	Definition
Arbitrage Spread	Arbitrage spreads calculated from cash and stock deals.
Beta Ratio	The value for Target Beta divided by the value for Acquirer Beta
Target Beta	This variable is calculated by collecting monthly beta values for the target company from six years prior to the announcement until one year before the announcement. The average of these beta values is then used as the Target Beta for the observation.
Acquirer Beta	This variable is calculated by collecting monthly beta values for the acquiring company from six years prior to the announcement until one year before the announcement. The average of these beta values is then used as the Acquirer Beta for the observation.
Target FCF	Measured as cash & cash equivalents in millions, collected 1 year prior to announcement.
Target Leverage	Calculated as total liabilities divided by total assets collected 1 year before the announced deal. Measured in millions.
Acquirer Leverage	Calculated as total liabilities divided by total assets collected 1 year before the announced deal. Measured in millions.
Target run-up	Stock price for the target the day before the announced deal divided by the stock price 42 days before the announced deal.
Relative Size	Calculated as the the size of the acquirer divided by the size of the target one year before the announcement.
Days to Resolution	Number of days between the announcement date and the date the deal is completed, withdrawn, rejected or otherwise resolved.
Successful Deal Dummy	Dummy variable that equals 1 if the deal is successful and 0 otherwise.
Bid-premium	Calculated as: (offer price - average price before bid) / average price before bid. Average price before bid is the average stock price of the target company between t-30 and t-10.
Toehold-dummy	Dummy variable that equals 1 if the acquirer holds a minimum of 5 percent of the target shares prior to the announcement and 0 otherwise.
Hostile-dummy	Dummy variable that equal 1 if the offer is considered hostile and 0 otherwise.
Multiple Bids	Dummy variable that equals 1 if there are multiple bids and 0 otherwise.
Cash-dummy	Dummy variable that equals 1 if the offer is 100% in cash and 0 otherwise.

Table 22: Variable List

Variable	**VIF**	**1/VIF**
Beta Ratio	1.04	0.96
Target Beta	1.24	0.81
Acquirer Beta	1.19	0.84
Target FCF	1.28	0.78
Target Leverage	1.55	0.65
Acquirer Leverage	1.51	0.66
Target Run-up	1.21	0.82
Relative Size	1.10	0.91
Days to Resolution	1.32	0.76
Successful Deal Dummy	1.22	0.82
Bid Premium	1.32	0.76
Toehold Dummy	1.06	0.95
Hostile Dummy	1.47	0.68
Multiple Bids Dummy	1.21	0.83
Cash Deal Dummy	1.37	0.73

Table 23: VIF Test

VIF test ran after regression (3) with Arbitrage Spread used as the dependent variable where all variables are included.