universität wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„Driving factors of Mergers and Acquisitions premium paid"

verfasst von / submitted by

Christos Chaitas

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien, 2023 / Vienna, 2023

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 066 974
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Banking and Finance
Betreut von / Supervisor:	Univ.-Prof. Mag. Günter Strobl
Mitbetreut von / Co-Supervisor:	Sheran Deng, MSc PhD

Acknowledgement

I am grateful to the professors and every employee of the University of Vienna, who assisted me through my educational journey and succeeded in making the whole experience a pleasant one.

Special appreciation to my supervisor, Günter Strobl, not only for the guidance provided during the writing of this thesis but also as a lecturer who puts a lot of effort into his profession.

Lastly, I want to thank family members and friends for their support.

Abstract (English)

Prior literature documents that a substantial percentage of M&A deals do not reach their expected financial goals. For decades, the average abnormal stock returns surrounding the announcement dates of M&A deals were inclined to be negative for acquirers whereas significantly positive for targets. The question then arises: why are the acquirers willing to make a bid even though they are aware that they are potentially destroying their shareholders' wealth. The purchase price is one of the most important elements that influences the participants' stock returns. In order to gain control over companies, considerable amounts of premiums have been offered, creating a concern regarding the underlying motives. This master thesis examines empirically some of the most crucial variables that affect the premium paid in mergers and acquisitions and additionally tests existing theories. The analysis focuses on a US sample of 2863 observations within the chronological period of 2000-2022, and presents evidence which strongly support the market for corporate control and overvaluation theories as well as the hubris hypothesis. No evidence was found that indicated the presence of the synergistic and empire building theories.

Abstract (German)

Die bisherige Literatur belegt, dass ein erheblicher Prozentsatz der Fusionen und Übernahmen die erwarteten finanziellen Ziele nicht erreicht. Jahrzehntelang waren die durchschnittlichen abnormalen Aktienrenditen rund um die Ankündigung von Fusionen und Übernahmen für die Erwerber eher negativ, während sie für die Zielunternehmen deutlich positiv waren. Es stellt sich also die Frage, warum die Erwerber bereit sind, ein Angebot abzugeben, obwohl sie wissen, dass sie damit möglicherweise das Vermögen ihrer Aktionäre vernichten. Der Kaufpreis ist eines der wichtigsten Elemente, die die Aktienrenditen der Beteiligten beeinflussen. Um die Kontrolle über Unternehmen zu erlangen, wurden beträchtliche Summen an Prämien geboten, was die Frage nach den zugrunde liegenden Motiven aufwirft. In dieser Masterarbeit werden einige der wichtigsten Variablen, die sich auf die bei Fusionen und Übernahmen gezahlten Prämien auswirken, empirisch untersucht und zusätzlich bestehende Theorien getestet. Die Analyse konzentriert sich auf eine US-Stichprobe von 2863 Beobachtungen im Zeitraum 2000-2022 und liefert Belege, die die Theorien des Marktes für Unternehmenskontrolle und der Überbewertung sowie die Hubris-Hypothese stark unterstützen. Es wurden keine Belege gefunden, die auf das Vorhandensein der Theorien der Synergie und des Imperiumsaufbaus hinweisen.

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1. Introduction

A merger or an acquisition is a dominant way to grow a company and has been used globally for a long time. The worldwide volume, according to Statista, reached a peak of 5,9 trillion US dollars in 2021, with 63,215 distinct deals taking place, and there is no clear indication that this upward trend will soon come to an end. Yet, various questions in the literature remain unanswered.

It has been observed in the past that companies are willing to pay huge amounts of premium to their targets (approximately 50% on average) in order to seal the deal, according to Eckbo (2009). This fact is creating doubt on whether decisions like these actually led to overpayment and value destruction for the shareholders of the acquirers. The highest price that bidders are eager to pay should be the stand-alone value of the target company plus the present value of the calculated synergies. Overpayment occurs when the premium paid represents a higher value than the potential synergies. The stock market then reacts to the new announcement information, and if the participants believe that the acquirers have indeed overpaid, negative abnormal returns will be observed as a correction.

Even though the total gains resulting from a M&A activity are usually positive, previous literature has noted that for decades the returns for acquirers were traditionally zero or negative on average (Schwert, 1996), (Houston et al., 2001), (Betton et al., 2008). On the other side, targets have significant positive abnormal returns within the windows of time [-20, close] and [-1, + 1] that range between +16% and +24,8%, depending on the chronology (Andrade et al., 2001). It is quite common that the acquiring firm is more sizeable than the target. The same value addition or destruction for each of the companies would represent completely distinct consequences for their abnormal stock returns. Alexandridis et al. (2017) find out for the first time in history that acquirer returns are significantly positive with a data sample constructed after the 2007 financial crisis and presume that the change is due to an increase in efficiency, which stems from an improvement in corporate governance. Nevertheless, the higher the amount that acquiring companies pay, the smaller the slice of the additional value that accrues to them, and the more likely it is for the market to conjecture that they overpaid.

Two questions arise: why is the additional value, if any, divided unequally between the acquirers and the targets, and why are managements willing to bid even if they know that, on average, M&A transactions will reduce their shareholders' value?

At first glance, engaging in M&A activities would not make sense on behalf of the buyers. There are a few theories that try to justify why acquirers are inclined to pay a premium.

1) ***Synergistic theory:***

   According to this theory, revenue enhancement, cost reduction, and financial synergies cause the post-transaction company's combined worth to exceed the sum of the individual values of the acquirer and the target. The acquiring company is willing to give a percentage of these future synergistic gains to the targets in order to persuade them to undertake the deal. Under this hypothesis and assuming that rational decisions are made, the premium paid cannot exceed the extra add-on value that will be generated.

2) ***Market for Corporate Control:***

   States that the true value of a company could not be fully exploited because of its poor management, which does not possess the required competence or attributes to direct properly. The goal is to obtain control of such a target company and install new management whose decision-making and strategies are more prudent. As a result of the replacement, the true value of the company will surface, which will lead to an increase in the company's stock price and positive returns for their shareholders. Based on this, we must also keep in mind that such cases are not firm-specific but rather that any potential rival bidder could try to obtain badly governed firms (Mueller & Sirower, 2003).

3) ***Hubris Hypothesis:***

   Says that the management of the acquirers is susceptible to overvaluation mistakes as a consequence of hubris, which is essentially overconfidence (Roll, 1986). It is probable for managers to believe that due to their specific own abilities, the synergies or generally any value creation produced by the deal will surely be achieved, even though there is great uncertainty, leading to valuation errors and overpayment. However, this theory does not assume that managers act in their own interests but instead, that they unconsciously take unfavourable decisions that destroy value.

4) ***Empire-building Motives:***

According to this theory, the incentives among ownership and control are conflicting, therefore it is plausible for the management to deliberately take decisions according to their own prosperity (Jensen, 1986). More specifically, the management's compensation is associated with the size of the company (Xu, 2017) and M&A is a more straightforward and rapid way to expand the empire when compared to investing in internal projects. Consequently, negative NPV deals can occur for the acquirers.

5) Overvaluation Theory:

Claims that firms can be erroneously priced in the market by investors for short periods of time. Under this circumstance, profitable opportunities for M&A activity are created. The acquiring firm can either take advantage of their own overvalued stock by paying via equity or, alternatively, by spotting and purchasing underpriced targets which will potentially be corrected by the market in the future (Shleifer & Vishny, 2003).

Most of the previous empirical research done on M&A focuses on the abnormal returns of the participants, which are also used as the dependent variable in regressions. In order to calculate these abnormal returns, models must determine how much the returns would be by excluding the announcement effects and then compare them to the actual returns. Negative abnormal returns for the acquiring firm would indicate that there was an overpayment and the market acknowledged it. That being the case, the dependent variable is exposed to measurement errors. The most crucial issue is that the deal's details by themselves disclose additional information about the true value of both parties, which could lead to a re-evaluation of the companies involved (Fuller et al., 2002). It is not feasible to separate and quantify what portion of these abnormal returns is generated by the M&A announcement versus the re-evaluation. Within the same rationale, independent from the deal news can arise within the window of time that the abnormal returns are calculated (Berkovitch & Narayanan, 1993). Lastly, we cannot know exactly how quickly the market adjusts to new information, and combining that with the fact that a part of the calculated synergies is supposed to effectuate in the future, there is a possibility that the market's adjustment happens outside the time window set for the abnormal returns.

This study analyzes a variety of factors that contribute to the level of premium paid, which is the strongest driver of abnormal stock returns around a M&A deal announcement, while

additionally attempts to provide evidence with respect to several prior theories that have contributed to the literature. The research is structured into five chapters. The first one is the introduction, where the rationale for the topic was explained. Additionally, it consists of a sub-section which addresses the hypotheses along with the variables applied to test them. The second section clarifies the origin of the data and discusses the importance of each variable used in this study. The chapter number 3 comprises of the results. Initially, it presents descriptive statistics, which provide a more detailed understanding of the selected sample. Subsequently, the output of the OLS regression tables is shown, and the results are discussed. Several potential implications concerning the regression models are introduced and resolved in the fourth section, titled robustness. The last section is a summary of the whole study.

1.1 Hypotheses

The hypotheses of this research attempt to provide an insightful explanation of why the premiums paid in M&A deals are so immense, while also connecting the findings as much as possible to prior theories that try to explain the same phenomenon.

H1: Operating synergies increase the premium paid.

Since the disclosed synergies calculated by the participating firms can be inflated due to hubris or agency motives, they are not reliable. Therefore, the first hypothesis will be tested with the variables named ‘synergy potential’ and ‘same SIC’.

1. Synergy potential: is a dummy variable that takes the value 1 if the purpose of the deal according to Refinitiv Eikon, contains synergy creation, otherwise 0.
2. Same SIC: Dummy variable that takes the value 1 if the line of business between the acquirer and target are related based on the 4-digit Standard Industrial Classification code, otherwise 0.

H2: Financial synergies increase the premium paid.

The second hypothesis is related to the financial synergies and will be tested with the variable named ‘target debt ratio’, which is calculated as the total debt of the target divided by the total book value of assets. High leverage levels for target companies is an indication that their debt capacity is restricted. The higher their debt levels, the more burdensome it becomes for a firm to find access to capital in order to finance new profitable projects, and most likely with less

favourable interest rates. Hannan & Rhoades (1987) have used debt-to-asset ratios to capture similar effects as well as Ismail (2011). The difference between the debt ratios of the target and the acquirer was also tested in line with prior research (Slusky & Caves, 1991), but the results were alike.

H3: Competition increases the premium paid.

This hypothesis will be tested with the dummy variable named as 'competition' which is a dummy variable that takes the value 1 if at least one additional third party made an offer to gain control of the target within the same period of time. This variable is commonly used in the majority of similar papers, e.g., (Moeller et al., 2004). The detection of a positive coefficient between competition and premium paid is expected.

H4a: Cash payment forces the target company to pay immediate taxes and reveals potential undervaluation of the target, which leads to an increased premium as a form of compensation.

H4b: Stock payment method can take advantage of potential short-term overvaluations of acquiring companies, which lead to increased premium.

Hypotheses 4a and 4b will be tested with the dummy variables 'cash payment' and 'stock payment' which take the value of 1 if the deal was financed purely by cash or stock, but further regressions will be run with the variables called 'percentage of cash' and 'percentage of stock' as a quality check for the results. Practically, it is not feasible for both of these hypotheses to be confirmed simultaneously. The results should either reveal a positive coefficient for cash payment or for stock payment. On the first hand, the target is obliged to pay capital gain taxes when cash is used as a method of payment, which can lead to an increased premium as a form of compensation. On the contrary, an offer made by acquirers can signal that their stock is overvalued. In that case, essentially, the bidding firm is taking advantage of short-term market valuation errors by paying via overvalued equity.

H5a: Overvaluation of the acquirer increases the premium paid.

H5b: Overvaluation of the target decreases the premium paid.

Hypotheses 5a and 5b will be tested with the variables named 'acquirer M/B ratio' and 'target M/B ratio' which are calculated as the market capitalization 4 weeks before the announcement

date over the book values of the acquirer and the target, respectively. Similar analysis has been done by Rhodes-Kropf & Viswanathan (2004). The market to book ratio captures the overvaluation effect. However, high values can also be interpreted as growth opportunities.

H6: Adoption of anti-takeover defences increase the premium paid.

Hypothesis 6 will be tested with the variable named 'poison pill' which is a dummy variable that takes the value 1 if the target company has adopted the use of a poison pill. Poison pills are a popular way to defend against hostile takeover attempts.

H7: A beneficial deal structure decreases the premium paid.

Hypothesis 7 will be tested with the variables named 'toehold' and 'acquirer termination fee'. The former is calculated as the percentage of shares the buyer has in possession before the announcement date and the latter as the percentage of deal value that the acquirer is required to pay if the deal gets cancelled.

H8: Hubris explains premium paid.

Hypothesis 8 will be tested with the variable called 'log salary CEO' which is calculated as by taking the natural logarithm of the acquirer's CEO salary (including bonuses etc). The degree of compensation is believed to represent the amount of overconfidence (Hayward & Hambrick, 1997).

H9: Empire-building motives explain premium paid.

Hypothesis 9 will be tested with the variable named 'relative pay' which is calculated as the value of the acquirer's CEO stockholdings 1 month before the announcement date over his/her most recent annual salary including bonuses. A straightforward solution to incentive problems is implementing a compensation scheme which includes stock payments towards the management, in addition to cash. The personal wealth of the management then depends on the performance of the company. A significant percentage of stock compensation should therefore create a barrier, which prevents involvement in unprofitable deals for empire building motives.

2. Data

The Refinitiv Eikon Datastream served as the source for the data used in this thesis. The database of Refinitiv (formerly known as Thomson Reuters until 2011) offers more than 1,3 million deals for US companies and cross-border deals for transactions that took place after the 1970s in regards to M&A. In previous relative studies about M&A, the SDC Platinum database, which was owned by Thomson Reuters, has been frequently used.

Refinitiv Eikon provides a screener platform, enabling the user to filter out deals according to certain criteria. In our case, the filter was set in a way to track down deals that were announced between January of 2000 until December of 2022. The data will later be further split into two categories, pre and post-crisis of 2007, in order to obtain additional valuable insights. Furthermore, the deal value has been set at a minimum of 1 million dollars, considering that information is usually more reliable and accurate for more considerable values. Likewise, the target and the acquirer must be both US companies due to the fact that premiums paid in Europe are on average lower and also vary according to the shareholder protection of each country (Martynova & Renneboog, 2008). The screener is also filtered to avoid deals whose status are not fully completed (e.g withdrawn). The main scope is to study transactions that transfer control, hence deals in which the acquirer is seeking to possess less than 50 percent of the shares post-transaction are also neglected. Since the premium paid is of outmost importance in this study, deals in which there is no information about this variable are omitted as well. Lastly, the screening process can be directed to search for specifically public companies, taking into account that significant differences have been found based on the status of the firm (Fuller et al., 2002).

Following the extraction of the sample to Excel, the data are managed in Python to create the desirable forms. It is typical to find some observations throughout this process with missing values. Thus, a small number of transactions were also dropped.

Lastly, due to a lack of information concerning the CEO salary and stockholdings, a sub-sample of 213 observations is created. The data used for these specific variables are collected by the S&P Capital IQ platform.

Table 1 is presented below and illustrates a more detailed description of the screening and filtering process.

Filtering Procedure	
Total Number of M&As (2000-2022)	990.952
Deal Value > 1M	-574.220
No Cross-Border	-338.435
Public Status	-71.990
Seeking Control (50%> shares)	-3.021
Premium Paid available	-204
Insufficient Data	-219
Final Sample	2.863

Table 1. Filtering Procedure

2.1 Key variables and Relevant Literature

This sub-section analyzes thoroughly a variety of factors that will be later used in the regression models. Each of the variables is inspected separately and in accordance with previous findings. A more comprehensive view of how the variables are calculated is provided in Appendix B.

Premium Paid:

The premium paid is the main scope of this master thesis. It will be used as the dependent variable in our regression analysis. Its definition is the excess value above the market capitalization that the acquirers pay. Most of the previous literature like Jensen & Ruback (1983) has spotted positive abnormal returns for target firms. According to Andrade et al. (2001) windows of [-20, close] and [-1,+1] both have significantly positive average returns that range from +16% to 24,8%, depending also on the chronology and the method of payment. It is evident that the market possesses the ability to react rapidly to news and rumors with respect to M&As. According to Slusky & Caves (1991), the risk that arises from the development of the target's stock price concerns the target since during a bullish market the premium shrinks, but in a bearish market the acquirer has the alternative to cancel the deal, especially in situations where no termination fees are included in the terms. Perhaps this interpretation justifies, to a certain level, the fact that acquirers pay a premium in the first place.

Nevertheless, the targets market capitalization is usually inflated during these periods so cautious is required when calculating the premium paid. Consequently, the premium paid is calculated 4 weeks, 1 week and 1 day before the announcement date.

Method of payment:

The means of payment for an acquisition are crucial. Companies have the option to pay via cash, a stock exchange, or a mixture of both. From the acquirer's point of view, paying in cash might not always be feasible in cases where they do not obtain enough cash reserves available and their debt capacity is tight. Majluf & Myers (1984) point out that the method of payment additionally transfers information to the target and the market. A stock payment might indicate that the proposed synergies are not definitely achievable, so they do not want to carry the risk. The overvaluation of the acquiring company can be another signal. The acquirer's management has insider information regarding their own valuation. Thus, by paying via a stock exchange, the management could potentially take advantage of an overvaluation, which in the future would be corrected by the market. However, a cash offer could express the fact that the target company is undervalued or trust about the calculated synergies. Slusky & Caves (1991) suggest that paying with cash has trivial effects. The benefit is that the acquirer could potentially face less rivalry by sealing the deal as soon as possible. The side effect is due to tax implications, forcing the target to pay the capital-gain tax immediately versus the option of deferring it until cashing out in the future.

Competition:

When the acquirer engages in the bidding procedure, information is instantly disclosed to the target that there is some potential value creation, otherwise there would be clearly no incentives to make an offer. We can therefore assume, that the target has a grasp on a certain level of bargaining power. Consequently, it is reasonable to suspect that the target will require a percentage of the additional value in order to get involved. According to Varaiya (1987), the existence of rival bids will increase the bargaining position of the target, possibly generating a higher percentage of premium paid to them. Slusky & Caves (1991) also detect that competition has a crucial impact on the extent of overpayment.

Debt Ratio:

A considerable number of companies are facing liquidity issues and struggle to get financed when they attempt to undertake new projects with the goal of growing. In most M&A deals, the size of the acquirer in comparison to the target is significantly bigger. The acquirer is likely to have a substantial superior credit rating and easier access to capital. The above-mentioned

certitude provides an opportunity to further increase the debt capacity of the target firm or receive funding with favourable interest rates which translates to a lower cost of capital. Thus, financial synergies can exist between the two parties and can affect the level of the premium paid.

Management Stockholdings:

According to the agency theory, which Jensen and Mickling (1976) popularized, conflicts of interest develop when ownership and control are separated. Managers, who are supposed to be in pursuit of shareholders value maximization might have different incentives than the owners. As stated by Jensen, managers could pursue to "grow the firm beyond the optimal size" for their personal benefit. (Empire-Building)

A compensation plan via equity can help to minimize the damage caused by this issue because the incentives of the manager are becoming aligned with the shareholders. From the perspective of acquirers, the more shares that a manager holds, the more rational decisions he will take, since his pay-out also depends on them. Hence, we can expect that a high premium paid, does not originate by empire-building motives. Furthermore, from the viewpoint of the targets and according to the theory of market for corporate control, a highly equity-based compensation could imply that there is less value creation by the replacement of the management, since it is more probable that he has performed efficiently enough. On the other hand, a manager who does not have the required skills or attributes to properly run the firm is more likely to resist a takeover attempt due to the fact that the benefit of salary outweighs the profit produced by the deal. We can therefore expect premiums to have a negative correlation with stockholdings of the acquirer's management.

Management Compensation:

It is generally quite perplexing to quantify and measure hubris. Hayward & Hambrick (1997) hypothesizes that the salary of the CEO is strongly linked to the hubris hypothesis. The higher the salary of the management the bigger the overconfidence they possess. Becoming overoptimistic about their own abilities, managers tend to overestimate synergies that in reality are not likely to materialize or make misvaluation errors resulting in high premiums paid.

Size:

In previous literature, the size of the target firm has been reported to affect profitability. Alexandridis et al. (2013) and Travlos (1987) find a negative relation between the acquirers returns and the size of the target. This could be potentially explained by the fact that, for bigger

target companies, there is a less competitive environment to gain control over them since there are not a lot of candidates with adequate cash reserves. This means that they will probably receive fewer bidding offers on average than smaller firms. Another important implication is that sizeable firms are less likely to be owned by a handful of stockholders. With the absence of major stockholders, persuading them to facilitate deal becomes more feasible, and the bargaining strength of the target can be assumed to be inferior. However, there were also instances in prior literature where the opposite relation was reported (Moeller et al., 2004). Jansen & Stuart (2013) suggest that the size simply strengthens the positive returns in cases where the bids are successful and diminishes the negative returns in the antithetical scenarios. We can therefore have to be cautious in assuming that a negative relation exists between the premium paid and the size of the target firm.

Poison Pill:

The poison pill provides an option in favor of shareholders to purchase additional shares on advantageous terms. It is mostly activated when the firm is facing a hostile takeover attempt and became popular during the 80s as a form of anti-takeover defense. The activation and the conditions vary across firms. Poison pills trigger when someone reaches a certain predefined percentage of ownership. In the beginning, triggers were set around to 20-40% of total shares but over time, companies tried to reduce it to around 10%, according to Bruner (1991). When it is initiated, the current shareholders can obtain additional stocks at a reduced price. The new shares cause dilution and achieve a solidified resistance against the bidder. The dilution effect lessens the percentage of shares owned by the hostile bidders, thus making it harder for them to seize control of the company. Supplementary, it could prevent a potential bid ex-ante, considering that bidders are aware that the possibility of success is narrower. Whether poison pills are beneficial from a value maximization point of view is criticized in the literature. DeAngelo & Rice (1983) suggest that poison pills increase the bargaining position of the target, which leads to extensive gains in the form of a higher premium paid to them. The market for corporate control hypothesis states that the results could be reversed due to the fact that incapable or self-motivated management can stay longer in power. Comment & Schwert (1995) report that poison pills are indeed associated with providing a bigger slice of the pie to the target but not necessarily preventing takeovers entirely. Johnson & Rao (1999) find no connection at all between poison pills and premiums.

Hostile Bids:

There is a distinction between the approaches that a bidder can choose in order to gain control of the target firm. On the first hand, he can transfer the conditions of the deal to the target's management and request approval, which is known as a friendly takeover. On the other hand, in the case of a hostile takeover attempt, he could evade the negotiations and address to the shareholders directly via a tender offer, where everyone decides independently whether to accept the terms or not. Hostile takeovers are associated with increased transaction costs. However, the analysis of Offenberg & Pirinsky (2015) suggests that hostile takeovers are more efficient for the bidders in terms of time because they are implemented at a faster pace. Under the market for corporate control hypothesis, the length of negotiations is vital if we assume that other bidders can simultaneously compete to replace the unskilled management or capture the potential synergistic gains. Rival bids could show up as a result of target's undervaluation. Acknowledging that, it is coherent to believe that the bargaining position of the targets increases which translates into a higher inquire of premium. Furthermore, Schnitzer (1996) argues that under asymmetric information between the bidder and target's shareholders, a hostile takeover attempt conveys information that the firm might be underpriced since a friendly method would probably get rejected by the management, especially if it occurs succeeding a friendly attempt. In short, we can expect to reveal a positive correlation between hostile takeovers and the premium paid.

M/B ratio:

The market-to-book ratio or alternatively known as the Tobins Q, has previously been used in studies related to M&As. The primary reason was to detect whether firms are potentially overvalued. In all simplicity, the higher that the market participants value the company in comparison to its book value, the more overvalued the firm is considered to be, and the opposite. There is a general consensus that high M/B acquirers buy low M/B targets. Rhodes–Kropf et al. (2005) demonstrate that this phenomenon is indeed true, yet the targets are also prone to being overvalued when you compare them with average companies. A reasonable explanation for observing targets with high M/B ratios is that they reflect the future growth opportunities of the company (Levine, 2017).

Status:

An additional variable that is decisive for the premiums paid is the status of the target company. The most straightforward reasoning is that a public status is likely to be correlated with firm size positively. Since we already recognized that the relative size of the target has an influence (mentioned above), it is rational to suspect that the status is also crucial.

Moreover, the same logic applies when it comes to major stockholders and public firms. Although a private target has the best defense against a bid, managers of private enterprises sometimes experience greater personal pressure than managers of public firms. Private target management might be the company founders who wish to sell their shares because of competitive conditions or because they want to cash out. Thus, private managers might not have a strong negotiating position. Fuller et al. (2002) separate the acquirer's returns in accordance with the status of the target company and find statistically negative returns for public targets but positive ones for private ones (-1% for the former and +2,08% for the latter). They interpret their results and conclude that the disparity is probably connected to the liquidity theory. The absence of liquidity in the market that private firms are part of encourages the acquirers to demand a discount in the form of a reduction in the premium offered.

Toehold:

Toehold is defined as a strategy implemented by the acquiring company in which they buy a percentage of shares from the target company before the M&A offer is published. By possessing a certain percentage of shares before bidding, the acquirers are able to increase their premium paid because they are essentially not overpaying for the shares that they already own (Bessler et al., 2015). This decreases the impact of rival bidders who are making an effort to capture the add-on value since their valuations have lower bounds. Additionally, even if the bidding war is lost, the pre-acquired shares will provide a decent amount of gains by being sold to the alternative bidder at a premium. The drawbacks of toehold adoption are that a hostile environment is established between the bidders and the target's management. Betton et al. (2009) finds that hostile offers are more likely to occur in the presence of toehold. Other shortcomings include the premature spread of rumors which could inspire an increase of the target's stock price and the establishment of anti-takeover techniques by the management. Lastly, in situations where the M&A transaction is cancelled, it is observed that there is a tendency for the target's stock price to drop below pre-acquisition threshold levels, resulting in negative returns (Strickland et al., 2010).

Termination fees:

When deals are cancelled, it is common for the stock market to react negatively to the target's stock price since the hefty premium will not be secured. Another drawback of cancelled M&A deals is that the commissions paid to the advisors who set and executed the deal are essentially not recovered. Lastly, to facilitate a successful transaction, substantial amounts of time and effort have to be contributed. Termination fees are a way to compensate the target shareholders for these issues and they have been notably applied recently. Additionally, the

adoption of termination fees signals the acquirer's determination and increases the likelihood of a deal ending up with a completed status (Butler & Sauska, 2014). On the grounds that termination fees provide extra protection for the shareholders of the targets, it is expected that when they are incorporated into the features of the contract, they can also benefit the acquirers by reducing the amount of premium paid. A negative coefficient between termination fees and premium paid is expected to be observed.

3. Results

This chapter begins by displaying and interpreting the overall descriptive statistics. The first interesting conclusion we can draw from Table 2 is that the average premium in our sample is at 42,3%. The mean in recent studies was similar, ranging between 35% and 50% depending on the timeline of the data. There are a few deals with a negative premium paid. Even though negative premiums are observed rarely, such circumstances are legitimate and signify that the target companies in those cases were dramatically overvalued (Weitzel & Kling, 2018). The highest premium in the sample is 1337%, which proves that companies are occasionally willing to pay massive amounts of extra value to acquire their target. The payment method is equally weighted between cash, stock and mixed, since their dummy variables have a mean which range from 31,9% - 34,9%. The synergy potential variable indicates that 69,1% of the deals are expected to create synergies, which is also the most common justification to engage in M&A, whereas the businesses were related 41,6% of the time according to the 4-digit SIC code. The bidding process was hostile in 3% of the offers, which is significantly lower than samples taken in the pre-2000 period. The increase in cooperation between the two sides can possibly create an environment that allows for smoother integration and a higher probability of accurately capturing synergistic gains. The acquirer's termination fee is scaled by deal value and has a mean of 1%, which is within the usual brackets but relatively low (approximately 3% in similar studies). The adoption of termination fees in contracts takes place in 718 deals, which translates to 25% of the sample. The difference between the targets and the acquirer's M/B ratios suggests that, on average, the acquirers are more overvalued than the targets. On the other side, it could also represent high growth expectations from the market participants. Almost 10% of the offers were challenged by a third party, which proves that competition in the M&A market is present. Acquirers obtain on average 3,2% of target's shares before the announcement date. Toehold was present in 182 deals in total. Poison pill as an anti-takeover technique was adopted as much as almost half percent of the time. An interpretation regarding the scarcity of poison pills is the reduction of hostile bidding in recent years. The levels of leverage for the target companies are, on average, 22,7% in terms of total debt to total book value of assets. The highest observation almost reaches 400%. The relative size variable displays that the acquiring firms are approximately three times bigger than the target companies.

The variables which consist of profitability metrics indicate that the targets are struggling on average in terms of operating efficiency. Target's return on equity mean is -6,8%, where a negative value is observed in only 801 observations out of 2901, which shows that the variable

is left skewed due to outliers. The negative ROE datapoints tend to be extremely high, with the minimum value being -3,4. On the other side, acquirers ROE has a mean of 13.8%, which is significantly higher than the target. Additionally, acquirers OCF/total assets are also greater, with a mean of 6,6% in comparison with 2,3% for the target companies.

Variables	Count	Mean	Min	Max	Standard Deviation
Premium Paid	2863	0,423	-0,958	13,307	0,589
Synergy Potential	2863	0,691	0	1	0,462
Same SIC Industry	2863	0,416	0	1	0,493
Relative Size	2863	0,339	0,0003	3,002	0,417
Cash Payment	2863	0,332	0	1	0,471
Stock Payment	2863	0,319	0	1	0,466
Mixed Payment	2863	0,349	0	1	0,477
Toehold	2863	0,032	0	0,953	0,141
Target Debt ratio	2863	0,227	0	3,951	0,285
Target M/B ratio	2863	1,095	0,000	9,676	1,374
Acquirer M/B ratio	2863	1,320	0,003	42,552	2,234
Acquirer OCF/Total Assets	2863	0,066	-0,548	0,626	0,097
Target OCF/Total Assets	2863	0,023	-0,832	0,821	0,142
Hostile	2863	0,030	0	1	0,172
Poison Pill	2863	0,004	0	1	0,065
Competition	2863	0,096	0	1	0,295
ROEt	2863	-0,068	-14,741	4,677	0,703
ROEa	2863	0,138	0	1,197	0,104
Acquirer Termination Fee	2863	0,010	0,000	0,381	0,023
Log Salary	214	15,767	11,870	17,821	1,023
Log Stock Ownership	214	0,941	-2,917	5,353	1,245

Table 2. Descriptive Statistics

3.1 Deal Statistics by Industry

According to Table 3, within the used sample, a considerable number of deals materialized in the financial, technology and healthcare industries. Even though the financial industry takes the lead in terms of number of deals, the energy industry and healthcare surpass it according to value. The sample is similar with Alexandridis et al. (2012) who find that there was a substantial increase of deals within the industries of financials and healthcare during the 6th merger wave, which is of course chronologically included in our sample. He further explains that the only notable difference in terms of industry classification post-2007 crisis is the further increase in healthcare.

Industry	Number of Deals	% of Total	Deal Value (Billions)	% of Total
Consumer Products and Services	121	4,23%	172,16	2,64%
Consumer Staples	69	2,41%	160,83	2,47%
Energy and Power	237	8,28%	991,62	15,22%
Financials	938	32,76%	1.002,53	15,39%
Healthcare	338	11,81%	1.319,51	20,25%
High Technology	543	18,97%	900,94	13,83%
Industrials	172	6,01%	390,23	5,99%
Materials	88	3,07%	245,15	3,76%
Media and Entertainment	104	3,63%	649,41	9,97%
Real Estate	100	3,49%	247,04	3,79%
Retail	62	2,17%	96,18	1,48%
Telecommunications	91	3,18%	339,36	5,21%
Total	2863	100%	6.514,95	100%

Table 3. Deal Statistics by Industry

3.2 Premium paid by Industry

The whole sample was also categorized by industry, in order to verify whether companies in specific industries tend to overpay or underpay for their targets.

Industry	Premium Paid
Consumer Products and Services	45,650%
Consumer Staples	39,787%
Energy and Power	29,801%
Financials	38,677%
Healthcare	55,776%
High Technology	48,894%
Industrials	47,503%
Materials	40,028%
Media and Entertainment	35,670%
Real Estate	20,878%
Retail	41,826%
Telecommunications	42,729%

Table 4. Premium by Industry

As reflected by Table 4, the premium paid varies across the industries. The smallest average of premium paid is in the industry of real estate with 20,878% but incorporates only a small percentage of the sample. On the other side, the highest is in healthcare with 55,766%.

The financial industry comprises a significant part of the sample (Table 3) and also has a relatively low average of premium paid, at 38,67%. The financial sector is generally believed to be a sector where premium paid is low. Alexandridis et al. (2012) report financials as the industry in which the acquirer pays the least, with an average of 38,17% of an observed sample of 902 deals between 1993 and 2006.

Since we can safely say that merger waves can impact different industries and the premium paid by industry varies within the sample, the results of the regressions can be disrupted. To

avoid this, fixed industry effects in the form of dummy variables will be included in the regressions.

3.3 Deal Statistics by Year

As is shown in Table 5 below, even though the filters and screening process could potentially neutralize the impact of M&A waves, we can still detect an increased quantity of deals during the 6th merger wave (2003-2007) and during what is considered the 7th wave (2013-2017). The deal value also outlines similar remarks, with peeks of 384 billion in 2005 and 450,53 billion in 2018. Above all, the sample's observations are generally evenly spread across the years. The reasoning behind the low quantity and deal value for 2022 is probably that some additional time is required for the data to be introduced into the Refinitiv platform.

Date Announced	Number of Deals	% of Total	Deal Value (Billions)	% of Total
2000	293	10,23%	620,91	9,53%
2001	237	8,28%	249,06	3,82%
2002	139	4,86%	116,74	1,79%
2003	166	5,80%	159,08	2,44%
2004	174	6,08%	252,38	3,87%
2005	160	5,59%	384,65	5,90%
2006	160	5,59%	365,14	5,60%
2007	170	5,94%	182,94	2,81%
2008	93	3,25%	145,54	2,23%
2009	78	2,72%	269,21	4,13%
2010	104	3,63%	135,25	2,08%
2011	70	2,44%	226,01	3,47%
2012	85	2,97%	96,95	1,49%
2013	92	3,21%	147,16	2,26%
2014	116	4,05%	382,48	5,87%
2015	118	4,12%	450,14	6,91%
2016	116	4,05%	379,65	5,83%
2017	103	3,60%	367,55	5,64%
2018	119	4,16%	450,53	6,92%
2019	96	3,35%	571,39	8,77%
2020	51	1,78%	238,74	3,66%
2021	89	3,11%	233,34	3,58%
2022	34	1,19%	90,12	1,38%
Total	**2863**	**100,00%**	**6514,95**	**100,00%**

Table 5. Deal Statistics by Year

3.4 Premium paid by Year

On similar grounds as the analysis of the premium paid by industry, premiums are also categorized by year. Recognizable patterns exist in Table 6. Firstly, premiums appeared to be relatively low during the sixth merger wave, as reported in similar studies as well.

Furthermore, the years exceeding the 2007 crisis show high premiums which, later on decreased again during the 2013-2018 period. Corona-Virus might be accountable for M&A activity changes during 2020-2022 but the effects are not analysed in this study. Fixed year effects will be also included alongside the industry effects in the form of dummy variables for the regressions, when deemed appropriate.

Date Announced	Premium Paid
2000	49,995%
2001	44,664%
2002	43,112%
2003	46,602%
2004	33,098%
2005	31,528%
2006	35,701%
2007	31,582%
2008	42,016%
2009	57,753%
2010	57,320%
2011	54,156%
2012	55,505%
2013	38,705%
2014	38,664%
2015	34,270%
2016	44,282%
2017	30,854%
2018	26,546%
2019	35,760%
2020	38,584%
2021	35,513%

Table 6. Premium by Year

3.5 Post-Crisis Comparison

The existence of merger waves is reported in depth in the literature and is verified (Mitchell & Mulherin, 1996). The reasoning behind the paradox of waves is debated by various hypotheses. One of the views is the neoclassical theory, which states that the occurrence of waves is explained by shocks that affect specific industries. Such shocks are technological, regulatory and economic (Harford, 2005).

The sample used in this research contains observations from a variety of chronological points. The starting point is 2000 and lasts until 2022. Within this time interval, the sixth merger wave occurred (2003-2007), together with the period of (2013-2018), which is assumed to be the seventh. The variables used in the regression models could be drastically impacted, since waves are events that impact certain industries and have unique characteristics each time. For that reason, the sample is also split into two categories according to the date of announcement.

Alexandridis et al. (2017) find for the first time in literature positive returns for acquirers for the post-2009 period. The data are split in a similar fashion in order to inspect for divergences between the studies. To accomplish that, the means of our variables will be compared between the pre-crisis and post-crisis sub-samples, while two-tailed t-tests are performed. Later on, regressions will also be run on the sub-samples.

T-TEST for the subsamples

	Pre-Crisis	Post-Crisis	Diff	5% Significance
premium_month	0,424	0,420	-0,0036	***
synergy potential	0,551	0,887	0,3353	***
samesdc	0,378	0,470	0,0924	
relative size	0,326	0,358	0,0316	
cash payment	0,323	0,345	0,0226	***
stock payment	0,324	0,311	-0,0130	***
hostile	0,032	0,028	-0,0047	***
competition	0,037	0,031	-0,0061	***
toehold	0,038	0,024	-0,0144	
debtratiotarget	0,234	0,218	-0,0165	***
target m/b ratio	1,113	1,069	-0,0434	***
acquirer m/b ratio	1,447	1,142	-0,3049	***
ROEt	-0,084	-0,044	0,0405	***
ROAt	-0,041	-0,024	0,0174	
ROEa	0,139	0,137	-0,0020	***
poisonpill	0,005	0,003	-0,0029	***
acquirer ocf/total assets	0,062	0,070	0,0084	
target ocf/total assets	0,016	0,032	0,0157	
cash/total assets acquirer	0,121	0,098	-0,0236	
target termination fee	0,027	0,027	-0,0002	
acquirer termination fee	0,008	0,013	0,0054	***

Table 7. T-test

The *** stars denote the significance of the 5% confidence intervals.

The hypotheses of this t-test are:

H0: mean (Pre-Crisis variable) = mean (Post-Crisis variable)

H1: mean (Pre-Crisis variable) ≠ mean (Post-Crisis variable)

As we can infer from Table 7, the premium paid for the Post-Crisis subsample turns out to be smaller and is significant, but not by a great margin. The percentage of deals that contain synergistic potential increases impressively. These results are in line with Alexandridis et al. (2017).

The percentage of deals that are financed solely with cash also increases significantly. A combination of this with a decrease in the average M/B ratio of the acquirer and the stock payment can signify that acquirers are taking less advantage of their overvalued stocks.

The adoption of poison pills as a defensive mechanism is significantly lower, which is coherent with the fact that fewer bidders are trying to gain control of the target without the approval of the management. Hostile bidding tends to become smaller over the years, which is conventional.

The targets M/B ratios also experience a decline which could be stemming from the fact that the pre-crisis sub-sample captures the sixth merger wave (2003-2007) which is reported to be a high overvaluation period (Rhodes-Kropf & Viswanathan, 2014).

The amounts of fee in percentage of the deal value that the acquirer is obliged to pay in case of abandoning the deal becomes statistically bigger and reach 1,3%, which is within the typical range (1-3%). However, this table does not provide any information about whether the adoption of a termination fee becomes more frequent.

3.6 Regressions

This sub-section presents the findings of the regression models. Table number 8 contains three different models based on the timeline on which the premiums were calculated. The stars represent the significance level of 10% ,5%, and 1%. The bottom of the table also makes apparent the application of fixed effects and robust-standard errors where required. The difference between the debt ratios of the target and the acquirer has also been tested in addition to the debt ratio target, but the results were also insignificant, so they are not reported in this output table.

	Premium Month	Premium Week	Premium Day
synergy potential	-0.026	-0.033	-0.023
	(0.031)	(0.024)	(0.022)
same SIC	0.028	0.012	0.016
	(0.025)	(0.022)	(0.022)
relative size	-0.039*	-0.016	-0.004
	(0.023)	(0.021)	(0.021)
cash payment	0.097***	0.106***	0.104***
	(0.032)	(0.030)	(0.029)
stock payment	-0.056**	-0.053***	-0.047***
	(0.023)	(0.019)	(0.018)
hostile	0.057	0.111*	0.116*
	(0.058)	(0.059)	(0.061)
competition	0.206***	0.111**	0.138***
	(0.058)	(0.044)	(0.044)
toehold	-0.296***	-0.225***	-0.186***
	(0.066)	(0.059)	(0.059)
debtratiotarget	-0.029	0.006	0.005
	(0.056)	(0.049)	(0.042)
target m/b ratio	-0.067***	-0.053***	-0.048***
	(0.012)	(0.008)	(0.008)
acquirer m/b ratio	0.014***	0.014***	0.013***
	(0.004)	(0.004)	(0.003)
ROEt	0.008	-0.004	-0.013
	(0.018)	(0.018)	(0.018)
ROEa	0.099	0.063	0.045
	(0.091)	(0.065)	(0.064)
poisonpill	0.000	-0.034	0.039
	(0.126)	(0.107)	(0.095)
acquirer ocf/total assets	0.307**	0.210*	0.185
	(0.156)	(0.122)	(0.119)
target ocf/total assets	-0.253*	-0.312***	-0.262**
	(0.134)	(0.119)	(0.117)
acquirer termination fee	-0.012***	-0.012***	-0.013***
	(0.004)	(0.004)	(0.004)
const	0.454***	0.376***	0.340***
	(0.079)	(0.072)	(0.068)
Year Effects	YES	YES	YES
Industry Effects	YES	YES	YES
Robust-standard errors	YES	NO	NO
R-squared	0.117	0.106	0.093
R-squared Adj.	0.101	0.090	0.076
N	2863	2863	2863

Table 8. Regression model 1

The same regressions are utilized after some modifications are done to the variables concerning the method of payment. In the models below, cash and stock payments take the form of a percentage instead of a dummy variable.

	Premium Month	Premium Week	Premium Day
synergy potential	-0.026	-0.033	-0.024
	(0.032)	(0.022)	(0.022)
same SIC	0.028	0.011	0.014
	(0.025)	(0.019)	(0.018)
relative size	-0.042*	-0.022	-0.010
	(0.023)	(0.024)	(0.023)
Percentage of Cash	0.108*	0.088*	0.099*
	(0.065)	(0.053)	(0.052)
Percentage of Stock	-0.037	-0.057	-0.041
	(0.064)	(0.053)	(0.052)
hostile	0.053	0.107*	0.112*
	(0.058)	(0.058)	(0.057)
competition	0.202***	0.108**	0.135***
	(0.058)	(0.052)	(0.051)
toehold	-0.293***	-0.220***	-0.182***
	(0.066)	(0.067)	(0.066)
debtratiotarget	-0.033	-0.001	-0.001
	(0.056)	(0.034)	(0.034)
target m/b ratio	-0.067***	-0.052***	-0.048***
	(0.012)	(0.008)	(0.008)
acquirer m/b ratio	0.014***	0.015***	0.013***
	(0.004)	(0.005)	(0.005)
ROEt	0.006	-0.005	-0.015
	(0.018)	(0.015)	(0.015)
ROEa	0.094	0.055	0.038
	(0.090)	(0.090)	(0.089)
poisonpill	0.002	-0.030	0.042
	(0.122)	(0.143)	(0.141)
acquirer ocf/total assets	0.301*	0.209**	0.185*
	(0.157)	(0.107)	(0.105)
target ocf/total assets	-0.252*	-0.312***	-0.262***
	(0.133)	(0.091)	(0.090)
acquirer termination fee	-0.012***	-0.011***	-0.013***
	(0.004)	(0.004)	(0.004)
const	0.433***	0.379***	0.332***
	(0.092)	(0.094)	(0.093)
Year Effects	YES	YES	YES
Industry Effects	YES	YES	YES
Robust-standard errors	YES	NO	NO
R-squared	0.117	0.105	0.092
R-squared Adj.	0.101	0.088	0.075
N	2863	2863	2863

Table 9. Regression model 2

Table 10 presents the results of the regressions used to test the relative pay and log salary variables based on 214 observations. The application of year effects was not a requisite since the deals took place between 2021 and 2022.

	Premium Month	
relative pay	0.025	
	(0.025)	
log salary		0.088***
		(0.033)
synergy potential	-0.200	-0.235
	(0.132)	(0.130)
samesdc	0.132**	0.130**
	(0.066)	(0.064)
relative size	-0.200*	-0.190*
	(0.111)	(0.109)
cash payment	0.307***	0.294***
	(0.088)	(0.087)
stock payment	0.002	-0.007
	(0.075)	(0.074)
hostile	-0.680**	-0.687**
	(0.331)	(0.325)
competition	0.923**	0.884**
	(0.403)	(0.397)
toehold	0.015	0.089
	(0.273)	(0.269)
debtratiotarget	-0.288**	-0.330***
	(0.128)	(0.127)
target m/b ratio	-0.031	-0.043*
	(0.023)	(0.023)
acquirer m/b ratio	0.051***	0.045***
	(0.017)	(0.017)
ROEt	-0.168	-0.169*
	(0.104)	(0.101)
ROAt	0.006	0.015
	(0.298)	(0.292)
ROEa	0.315	0.251
	(0.348)	(0.343)
acquirer ocf/total assets	0.910***	0.817**
	(0.338)	(0.330)
target ocf/total assets	-0.745**	-0.813**
	(0.343)	(0.336)
target termination fee	0.463	0.883
	(1.818)	(1.788)
acquirer termination fee	0.223	0.163
	(1.371)	(1.349)
const	0.381**	0.396*
	(0.161)	(0.507)
Year Effects	NO	NO
Industry Effects	NO	NO
Robust-standard errors	NO	NO
R-squared	0.358	0.378
R-squared Adj.	0.291	0.314
N	214	214

Table 10. Regression model 3

3.7 Discussion

The first notable diagnosis is that both of the variables ‘synergy potential and ‘same SIC’, which are proxies for measuring the effect of synergies on premiums paid, are insignificant statistically at all levels. This is consistent on all the various models, which combine different timings for premium calculations. The variable that expresses the financial synergies is also not significant at any level among the models. The results are similar to Ismail (2011) despite the fact that he uses calculated synergies in his analysis.

The relative size has a negative coefficient on a 10% confidence level for the first model, which is consistent with the idea that sizeable targets are receiving less offers due to capital capacities. A secondary explanation is that the absence of major block holders deteriorates the bargaining position of the targets. The results are consistent with Moeller et al. (2004) even though they use the natural logarithm of the target’s size to draw conclusions on the same effect.

The method of payment for both cash and stock variables also appear to be a significant factor at a 10% level in every tested model. The evidence suggests that the capital gain tax outweighs the overvaluation effect, which means that the target companies prefer to be paid by potentially overvalued shares in order to defer taxes, since the former variable has a positive coefficient whereas the latter a negative one. These findings align with Slusky & Caves (1991).

Competition in the market turns out to be significantly positive at the 1% level in all models and is of paramount importance since it increases the premium by 20,3% on average. The results are identical with Varaiya (1987) who finds a positive coefficient of (18,75%-21,04%) depending on the model specification.

The market-to-book ratio variables are used to capture the overvaluation effect of the acquirer and the target firms and are both significantly positive at the 1% level in all the models. The negative coefficient of ‘target M/B ratio displays that buyers are not willing to pay as much for potentially overvalued targets. Likewise, the antithetical sign of the ‘acquirer M/B ratio’ suggests that targets demand extra compensation when purchased by overvalued targets. The results are analogous to Alexandridis et al. (2013).

Pre-acquiring shares before reaching the table of negotiations seems to have a beneficial impact for acquirers, as the coefficient is significantly negative at the 1% level. It is reasonable to believe that toeholds indeed successfully repel competition, which apparently increases the premium paid. Including a discipline mechanism in cases of deal cancellation, like termination fees, also reduces the premium paid at a 1% confidence level. Acquirers can gain substantially more if they include beneficial bidding approaches.

The dummy variable 'hostile' has a positive coefficient, but only at the 10% significance level. The lack of statistical significance could stem from the fact that have not been a lot of hostile takeovers in recent years, appearing in only approximately 3% of observations in the sample used. Nevertheless, a positive but insignificant coefficient is frequently reported in prior literature (Ismail, 2011), (Moeller et al., 2004), (Alexandridis et al., 2013).

The variable that contains the operating free cash flows of the acquirers scaled by their total book asset value is significantly positive at the 5 and 10% significant levels conditional on the model. This result implies that the availability of free cash flow might be an element that increases agency problems (Jensen and Mickling, 1976).

Moreover, there is no evidence that support the idea that financial synergies are a compelling reason that acquirers pay high premiums. Equivalently, the adoption of poison pills is unquestionably insignificant, but its implementation has become rare in companies. No connection was established between premiums paid and the profitability ratios for acquirers and targets, which were tested in terms of return on equity.

Model modifications regarding the chronology that the premiums are calculated were applied in pursuance of consistency checking, but there are no pivotal distinctions apart from attaining some variation regarding the significance level of variables hostile and relative size.

The same OLS models are adopted by including a method of payment in terms of percentages instead of dummy variables. The coefficients still have indistinguishable signs and values, but the stock payment variable becomes insignificant.

The regressions used for the pre-crisis (2000-2009) and post-crisis (2010-2022) which are located in Appendix B, do not show remarkable distinctions except on deal features like toehold and termination fees, which influence premiums less in the post-crisis period, along with the insignificance of the relative size variable for the pre-crisis period.

Lastly, the regressions shown in Table 10 are carried out to test the variables relative pay and log salary. The results indicate no significance for the former but a positive significant coefficient for the latter.

A variety of hypotheses were formed in the first chapter. If the coefficient which tests a hypothesis is statistically significant and has the appropriate sign, it is categorized as 'accepted'. Contrarily, if the sign of the coefficient is antithetical to the expectations, the corresponding hypothesis is characterized as 'rejected'. Finally, if the models show no statistical significance for a variable, the analogous hypothesis is classified as 'no evidence'. The results of the hypotheses are the following:

H1: Operating synergies increase the premium paid. (No Evidence)

There is no evidence regarding the first hypothesis since the output of every applied regression model, with respect to the variables 'synergy potential' and 'same SIC', shows no significance at any of the 1%, 5% or 10% levels.

H2: Financial synergies increase the premium paid. (No evidence)

Similarly, the predictor 'target debt ratio' is insignificant, so the second hypothesis provides zero evidence as well.

H3: Competition increases the premium paid. (Accepted)

Competition in the market has been found to be one of the most impactful elements which influences the premium paid in M&A. Hypothesis 3 is accepted without any doubt based on the results.

H4a: Cash payment forces the target company to pay immediate taxes and reveals potential undervaluation of the target, which leads to an increased premium as a form of compensation. (Accepted)
H4b: Stock payment method can take advantage of potential short-term overvaluations of acquiring companies, which lead to increased premiums. (Rejected)

Hypotheses 4a and 4B cannot be both accepted simultaneously since the target firms will either prefer to defer paying capital gain taxes or guarantee that they will not get paid via

overvalued stock. The findings suggest that hypothesis H4a is accepted whereas H4b is rejected.

H5a: Overvaluation of the acquirer increases the premium paid. (Accepted)
H5b: Overvaluation of the target decreases the premium paid. (Accepted)
The variables M/B ratio for both the acquirer and the target play a role in determining the level of premium paid significantly at the 1%. Therefore, both of the hypotheses are accepted.

H6: Adoption of anti-takeover defences increase the premium paid. (No Evidence)

Hypothesis 6 is tested via the anti-takeover mechanism 'poison pill' but it is found to be insignificant at any level within the regressions.

H7: A beneficial deal structure decreases the premium paid. (Accepted)

Including deal characteristics such as a termination fee clause for the acquirer and the use of the toehold bidding strategy reduces on average the premium paid by acquirers.

H8: Hubris explains premium paid. (Accepted)

Hypothesis 8 is accepted because the variable 'log salary' which captures the overconfidence level of the acquiring firm's management, appeared to have a significant positive coefficient.

H9: Empire building motives explain premium paid. (No Evidence)

The variable 'relative pay' was used to test H9. The regression of the sub-sample shows no relation between the amount of compensation paid to the acquiring management scaled by their salary and the premium paid.

4. Robustness

A pivotal step in studies which involves the use of regressions is the robustness check. In this section, the detection methods and resolution techniques for various econometrical complications are discussed.

4.1 Multicollinearity

Multicollinearity is an occasion when there is a notable correlation among two or more of the explanatory variables. In that case, the explanatory variables embody indistinguishable information, causing them to become excessive. The OLS coefficients do not suffer from miscalculation bias under multicollinearity. Nevertheless, the variables are unable to be assessed properly as a consequence of having inadequate precision (Harvey, 1977). Multicollinearity generates large standard errors for the accountable variables, which creates doubt regarding the significance levels. Despite that, the overall significance of the model is not affected.

4.2 Correlation Matrix

The Pearson correlation matrix can be a powerful tool to diagnose multicollinearity problems which is presented under the Appendix B section. Nevertheless, the variables in the regression models do not have a strong correlation between them. The general consensus states that a correlation between two variables below the 0,5 level does not indicate multicollinearity problems.

4.3 Variance Inflation Factor

In an effort to ensure that the regression models are correctly specified, certain methods exist. One technique that is really popularized in order to detect multicollinearity problems and its severity, is the variance inflation factor (Salmerón et al., 2018).

The VIF measures the degree to which the specific 'x' variable's variance is higher than its correlation with other independent variables. The limits that would indicate collinearity problems are generally considered to be greater than 10 in value in most studies, while in others 5 is used as a baseline (Wooldridge, 2012).

	VIF
const	11,19
synergy potential	1,08
same SIC	1,04
relative size	1,21
cash payment	1,54
stock payment	1,39
toehold	1,13
debtratiotarget	1,09
target m/b ratio	1,44
acquirer m/b ratio	1,31
acquirer ocf/total assets	1,27
target ocf/total assets	2,02
hostile	1,26
poisonpill	1,09
competition	1,14
ROEt	1,38
ROEa	1,09
acquirer termination fee	1,12

Table 11. Variance Inflation Factors

As demonstrated by Table 11 and in accordance with the correlation matrix under the Appendix B section, there are no cues that suggest the existence of multicollinearity.

4.4 Heteroscedasticity

Heteroscedasticity points out the complication of a model whose residuals do not have equal variance. Heteroscedasticity does not produce implications regarding bias or inconsistency for the OLS variables, however, it affects their standard errors. Incorrectly specified standard errors can produce imprecise confidence intervals, which can mislead our interpretation of whether a variable is significant or not. A way to resolve this issue is to use robust-standard errors which modify the process of calculating the standard errors (Wooldridge, 2012). Similarly, regression models in this study that suffer from heteroscedasticity are corrected by using robust-standard errors.

The Breusch-Pagan test is used to find heteroscedasticity in the models. The alternative hypothesis of this test reveals heteroscedasticity, in contrast to the null hypothesis, which confirms the presence of homoscedasticity. We reject the **H0** hypothesis if the p-value is less than the significance thresholds.

4.5 Breusch-Pagan test

Table 12 shows the results of the Breusch-Pagan test and makes visible that the first regression model (Table 8), which is constructed with the premium paid calculated 1 month before the announcement date, suffers from heteroscedasticity problems.

Breusch-Pagan Test			
	Premium Month	Premium Week	Premium Day
Statistic	87,165	54,427	53,270
P-value	0,002153	0,41992	0,463750

Table 12. Breusch-Pagan Results

4.6 Endogeneity

Endogeneity occurs when a single or multiple regressors are correlated with the error terms. In this circumstance, the explanatory variables are labeled as 'endogenous' and the output of the linear regression models is then biased and inconsistent. There are three recognizable scenarios when endogeneity problems thrive.

1. ***Omitted Variable Bias:***
   This bias arises when one or more regressors which potentially affect the dependent variable are not included in the model. The aforementioned variables are omitted and embodied within the error terms, which are correlated with the endogenous regressors.

2. ***Simultaneity:***
   This bias arises when a regressor explains the dependent variable, but the dependent variable can also determine the same regressor concurrently.

3. ***Measurement Error:***
   This bias arises when there are obstacles in collecting the required observations and thus the true values are not equivalent to the values of the sample.

A potential remedy to the biased statistical inference caused by endogeneity problems is the two-stage least squares estimation method (Min, 2019). In this approach and during the first stage, an instrumental variable is used to obtain the fitted values, which are used to replace the endogenous variable in the second stage regression. If a variable correlates with the endogenous regressor but is unrelated to the error term, it can be regarded as a suitable instrument.

In light of this study's regression models, the variable termination fees may generate endogeneity problems in the form of simultaneity. Equivalently, the acquirers could agree on what percentage of the deal value to include as a compensation to the target as fees, depending on the amount of premium they are willing to pay. In other words, premium paid might also drive termination fees.

A two-stage least squares model will be performed to verify the significance of the acquirer's termination fee variable. A suitable instrument is the natural logarithm of the target's size.

4.7 Regression 2SLS

Table 13 shows the results of the two-stage least squares regression for the endogenous variable acquirer termination fee using the variable 'log size target' as an instrument. Termination fees remain significant at the 1% confidence level.

	Premium Month
acquirer termination fee	-0.727***
	(0.229)
synergy potential	0.202*
	(0.104)
same SIC	0.200**
	(0.010)
cash payment	0.039
	(0.084)
stock payment	0.284*
	(0.149)
hostile	0.038
	(0.164)
competition	0.495**
	(0.250)
toehold	-0.010***
	(0.002)
debtratiotarget	0.186
	(0.157)
target m/b ratio	-0.056***
	(0.022)
acquirer m/b ratio	0.048***
	(0.016)
ROEt	-0.066
	(0.060)
ROEa	0.061*
	(0.350)
poisonpill	0.993
	(0.058)
acquirer ocf/total assets	-0.031
	(0.478)
target ocf/total assets	-0.406
	(0.303)
const	0.699
	(0.111)
N	2863

Table 13. 2SLS Regression

5. Conclusion

This study questions the motivation of the acquiring firms that engage in M&A activity, even though it is recognizable that their shareholders value will not benefit on average. The focus of the study was on the premium paid, which is one of the most important contributors to the abnormal stock returns.

The first step was to retrieve data and convert it into the desired form, which was described under the Data section. The sample consisted of cross-sectional data, meaning that there was a single observation (deal) at a particular point in time. The filtering allowed data points between 2000-2022, which is a considerable window of time. That led to a sizable amount of observations, even though other requirements were set as well.

Afterwards, we chose and defined variables that could possibly influence the premium paid by companies in a theoretical framework. The intuition was thoroughly and objectively explained in accordance with previous literature.

The next step was to analyze the data with descriptive statistics, which is a suitable way of interpreting the basic characteristics of the sample. Furthermore, tables that contain deal statistics were categorized by industry and year to provide a deeper insight of the sample's nature. The most important variable in this study was the premium paid by acquirers. Thus, it was also classified according to industries and chronology as well. Descriptive statistics showed comparable values with samples from similar studies. The application of fixed effects regarding the industries and years, emerged from the analysis of the deal statistics.

An OLS regression is a popular method that effectively captures the relationship between the independent variable and the dependent variables. To obtain the desired results, multiple regressions with the selected variables were executed. Additional models were created by sub-samples to inspect the discrepancies after the 2007 financial crisis as well as the agency and hubris motives. The outputs of the regression models were then displayed and discussed.

In addition, a number of econometric tests were used to confirm the validity of the findings and to determine whether any revisions were required. Apart from the existence of heteroscedasticity, which was dealt with by using robust standard errors, no significant issues were found.

Overall, the investigation of this study provides strong results in line with the market for corporate control and overvaluation theories while there are also signs for the hubris hypothesis, which was tested via the sub-sample. On the other hand, the results do not provide sufficient evidence to support the synergistic and the empire-building theories.

Lastly, several improvements can potentially increase the quality of results. The biggest issues in this study arise from the applied data. The method used to measure the acquiring management businesses' level of overconfidence may not be the most effective one. The dataset can be more representative in the future, if some sort of direct surveying is possible with the management in order to more accurately estimate the level of confidence.

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Appendix A: Calculation Methods

Variables	Description
Relative Size	The relative size variable is calculated by dividing the deal value to the acquirer market capitalisation 4 weeks prior the announcement date.
Premium Paid	The premium paid is calculated as the percentage excess value paid over the market capitalisation of the target.
Cash payment	Dummy variable that takes the value of 1 if the acquirer pays fully in cash and 0 otherwise.
Stock payment	Dummy variable that takes the value of 1 if the acquirer pays fully in stock and 0 otherwise.
Mixed payment	Dummy variable that takes the value of 1 if the acquirer pays fully in a mixed form (cash and stock) and 0 otherwise.
Target M/B ratio	The M/B ratio is calculated as the Market Capitalisation of the target 4 weeks prior to the announcement date divided by the targets total book value of assets.
Acquirer M/B ratio	The M/B ratio is calculated as the Market Capitalisation of the acquirer 4 weeks prior to the announcement date divided by the acquirer total book value of assets.
Hostile	Dummy variable that takes the value of 1 if the deal is hostile and 0 otherwise.
Poison Pill	Dummy variable that takes the value of 1 if the target has applied a Poison Pill defence mechanism and 0 otherwise.
Competition	Dummy variable that takes the value of 1 if at least one third party is bidding for target company the and 0 otherwise.
Toehold	The percentage of shares that the acquirer had in his possession before the announcement of the deal.
Target Debt Ratio	The target debt ratio is calculated as the Total Debt of the target company divided by the Total Assets
Acquirer OCF/Total Assets	The Acquirer OCF/Total Assets variable is calculated as the acquirer's operating cash flows divided by the acquirer's total assets.
Target OCF/Total Assets	The Target OCF/Total Assets variable is calculated as the target's operating cash flows divided by the target's total assets.
Acquirer Cash/Total Assets	Acquirer Cash/Total Assets variable is calculated as the acquirer's net cash last 12 months divided by the acquirer's market capitalisation.
Synergy Potential	Dummy variable that takes the value of 1 if the purpose of the deal according to Refinitiv Eikon database includes the creation of synergy and 0 otherwise.
Same SIC Industry	Dummy variable that takes the value of 1 if the acquirer and the target are in the same industry according to their SIC(Standard Industrial Classification) and 0 otherwise.
ROEa	Acquirer ROE variable is calculated as the acquirer's Net Income divided by the acquirer's shareholder equity.
ROEt	Target ROE variable is calculated as the target's Net Income divided by the target's shareholder equity.
ROAt	Target ROA is calculated as the target's Net Income divided by the targets Total Assets
Target Termination Fee	Target termination fee is calculated as the amount of fees in USD millions the target would be obliged to pay in case of deal cancelation divided by the total Deal Value.
Acquirer Termination Fee	Acquirer termination fee is calculated as the amount of fees in USD millions the acquirer would be obliged to pay in case of deal cancelation divided by the total Deal Value.

Appendix B: Pearson Correlation Matrix

	synergy potential	samesdc	relative size	cash payment	stock payment	toehold	debtratiotarget	target m/b ratio	acquirer m/b ratio	acquirer ocf/total assets	target ocf/total assets	hostile	poisonpill	competition	ROEt	ROEa	acquirer termination fee
synergy potential	1,000	0,078	0,125	-0,057	-0,012	-0,157	-0,010	0,077	0,025	0,126	0,111	-0,045	0,008	0,011	0,056	0,029	0,083
samesdc	0,078	1,000	0,122	-0,110	0,022	-0,043	0,032	0,001	-0,006	0,045	-0,023	0,016	-0,011	0,022	-0,043	-0,015	0,070
relative size	0,125	0,122	1,000	-0,295	0,096	-0,104	0,106	-0,076	-0,059	-0,045	0,127	0,032	0,039	0,080	0,073	0,014	0,171
cash payment	-0,057	-0,110	-0,295	1,000	-0,482	0,048	-0,118	0,186	0,048	0,240	-0,017	0,052	0,023	0,033	-0,028	0,000	-0,092
stock payment	-0,012	0,022	0,096	-0,482	1,000	0,063	0,009	-0,071	0,039	-0,261	-0,087	-0,047	-0,021	-0,064	-0,006	-0,022	0,107
toehold	-0,157	-0,043	-0,104	0,048	0,063	1,000	0,038	0,013	-0,022	-0,030	0,029	0,173	0,018	-0,018	0,010	0,059	-0,069
debtratiotarget	-0,010	0,032	0,106	-0,118	0,009	0,038	1,000	-0,184	-0,085	0,039	0,064	-0,006	-0,007	0,036	-0,014	0,071	0,039
target m/b ratio	0,077	0,001	-0,076	0,186	-0,071	0,013	-0,184	1,000	0,462	0,205	-0,040	0,016	0,010	0,015	-0,060	0,166	0,002
acquirer m/b ratio	0,025	-0,006	-0,059	0,048	0,039	-0,022	-0,085	0,462	1,000	0,139	-0,061	0,014	0,011	0,029	-0,062	0,051	0,037
acquirer ocf/total assets	0,126	0,045	-0,045	0,240	-0,261	-0,030	0,039	0,205	0,139	1,000	0,254	0,051	0,021	0,031	0,025	0,094	-0,028
target ocf/total assets	0,111	-0,023	0,127	-0,017	-0,087	0,029	0,064	-0,040	-0,061	0,254	1,000	0,030	0,021	0,034	0,353	0,104	0,008
hostile	-0,045	0,016	0,032	0,052	-0,047	0,173	-0,006	0,016	0,014	0,051	0,030	1,000	0,272	0,312	0,019	-0,003	-0,003
poisonpill	0,008	-0,011	0,039	0,023	-0,021	0,018	-0,007	0,010	0,011	0,021	0,021	0,272	1,000	0,017	0,012	0,018	0,033
competition	0,011	0,022	0,080	0,033	-0,064	-0,018	0,036	0,015	0,029	0,031	0,034	0,312	0,017	1,000	0,013	-0,028	0,030
ROEt	0,056	-0,043	0,073	-0,028	-0,006	0,010	-0,014	-0,060	-0,062	0,025	0,353	0,019	0,012	0,013	1,000	0,153	-0,005
ROEa	0,029	-0,015	0,014	0,000	-0,022	0,059	0,071	0,166	0,051	0,094	0,104	-0,003	0,018	-0,028	0,153	1,000	0,029
acquirer termination fee	0,083	0,070	0,171	-0,092	0,107	-0,069	0,039	0,002	0,037	-0,028	0,008	-0,003	0,033	0,030	-0,005	0,029	1,000

Appendix C: Sub-sample Regressions

	Pre-Crisis	Post-Crisis	All Sample
synergy potential	-0.024	-0.013	-0.026
	(0.034)	(0.061)	(0.031)
same SIC	0.023	0.020	0.028
	(0.031)	(0.039)	(0.025)
relative size	-0.010	-0.105***	-0.039*
	(0.030)	(0.035)	(0.023)
cash payment	0.073**	0.118*	0.097***
	(0.034)	(0.064)	(0.032)
stock payment	-0.005	-0.100***	-0.056**
	(0.032)	(0.034)	(0.023)
hostile	0.037	0.088	0.057
	(0.065)	(0.088)	(0.058)
competition	0.212***	0.201**	0.206***
	(0.074)	(0.091)	(0.058)
toehold	-0.328***	-0.170*	-0.296***
	(0.087)	(0.091)	(0.066)
debtratiotarget	-0.045	0.023	-0.029
	(0.060)	(0.100)	(0.056)
target m/b ratio	-0.097***	-0.039***	-0.067***
	(0.017)	(0.014)	(0.012)
acquirer m/b ratio	0.024***	-0.008	0.014***
	(0.004)	(0.013)	(0.004)
ROEt	-0.004	0.057	0.008
	(0.020)	(0.039)	(0.018)
ROEa	0.182	0.029	0.099
	(0.122)	(0.121)	(0.091)
poisonpill	-0.071	0.328	0.000
	(0.116)	(0.233)	(0.126)
acquirer ocf/total assets	0.354*	0.458*	0.307**
	(0.201)	(0.245)	(0.156)
target ocf/total assets	-0.063	-0.592**	-0.253*
	(0.136)	(0.249)	(0.134)
acquirer termination fee	-0.018**	-0.006	-0.012***
	(0.007)	(0.005)	(0.004)
const	0.461***	0.601***	0.454***
	(0.086)	(0.102)	(0.079)
Year Effects	NO	NO	YES
Industry Effects	YES	YES	YES
Robust-standard errors	YES	NO	YES
R-squared	0.100	0.132	0.117
R-squared Adj.	0.083	0.109	0.101
N	1670	1193	2863