The Influence of a Credit Rating on the Payment Method in M&As

A study assessing the importance of a sector perspective

I study the influence of a credit rating on the payment method of public bidders residing in the United States over a period from 2009 – 2019. Contrary to prior research, I have discovered that the mere existence of a credit rating has a positive relationship with the fraction of cash used in acquisitions. This impact on the fraction of cash is facilitated by an increase in the debt capacity following the possession of a credit rating. Furthermore, display the Financial, Health Care and Information Technology sectors considerable deviations in impact from a credit rating compared to the general sample. Ultimately, I reject the statement that a sector perspective supports a general increase in insight, due to solely three of the nine sectors reporting a significant impact.

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1. Introduction

When Freeport-McMoran (FCX) made efforts to acquire Phelps Dodge at the end of 2006, questions were raised about the stability of their credit rating by credit rating agencies (CRAs). It was therefore not a surprise when FCX assigned JPMorgan and Merrill Lynch as their lead book runners, respectively ranked first and third on the 2007 convertibles leaderboard. Instead of incurring 70% of the acquisition – $18 billion – as long-term debt. FCX issued convertible shares, which quickly helped raising $2.88 billion. As a result of these proceeds, effectively 10% of the acquisition had been paid with convertible shares. This increased FCX's credit rating at Moody's from B1 to Baa3 and Standard & Poor's rating from B+ to BBB, over a period of 5 months (Stowell, 2018). Ultimately, the payment method was not directly affected by the mere existence of the credit rating. However, this case does show the influence credit ratings have on the financial structure of corporations. The most widely known CRAs are Moody's, Standard & Poor's and Fitch. They have a significant impact on companies by reducing asymmetric information. Ahead of a lending transaction, the lender can approach one of the rating agencies to assess the borrower's financial stability, financial prospects and track record of previous obligations. Moreover, when both parties commit to a loan, the CRAs stay necessary by informing the lender when the borrower might incur liquidity threats (White, 2013). A requirement of raising debt is almost always the product of cash financing, since companies in general do not have sufficient internal cash to finance the complete consideration. Each option has its benefits. For instance, equity issuances do not increase the interest costs, while debt does not dilute the influence of its current shareholders. Still, prior research has shown that the payment method discloses no information about the future performance of the consolidated company (Heron & Lie, 2002).

The determinants of the payment method in M&As have been widely covered by academics in accredited journals. Concerning this subject, the article from Faccio & Masulis (2005) is often considered to contain the most credible findings. In their paper, several firm characteristics display evidential influence on the payment method. Examples of these characteristics are corporate control, financial constraints and fundamental values like the market-to-book ratio. However, the absence of a credit rating is never mentioned as a source of financial constraint. On the subject of credit ratings, has research from Kisgen (2006) illustrated the effect of a credit ratings on the corporate structure. The study finds that companies close to a possible change in their credit rating, annually decrease a percent in debt-to-equity divided by total assets. Furthermore, Jory et al. (2016) observed evidence that the existence of a credit rating decreases the premium paid in mergers and acquisitions. Ultimately, the research done by Karampatsas et al. (2014) combines the previously discussed subjects. Assessing the influence of a credit rating on the payment method in mergers and acquisitions. The

writers managed to establish a direct link between the credit rating level and the payment method. Concluding that the likelihood of cash is increased when the bidder has a credit rating of higher quality. However, simply the existence of a credit rating – as investigated in this study – did not appear to have a significant impact on the payment method according to the researchers.

The paper from Karampatsas et al. (2014) will serve as the foundation of this research. However, I will expand on their analysis by utilizing a different regression method, as well as including a sector perspective. Multiple aspects have motivated me to start researching this subject. Primarily, I want to determine what degree of influence the CRAs are still capable of exerting upon the financial markets, after the global financial crisis. Moreover, yet little research has been performed on differences in impact on payment method determinants between sectors. This vacuum of academic inter-sector research encourages me to add this extension to the foundation build by Karampatsas et al. (2014). The question, solved in this paper will thus be: *Does a credit rating increase the probability of cash as the payment method in mergers and acquisitions, and does the insight of this impact increase when regressed from a sector perspective.*

To answer the question raised in this paper, a sample of American acquisitions between 2009-2019 will be required. The payment method will be restricted to cash and stock. The essential variables of this study are the Credit Rating variable and dummy variables of the individual sectors. Moreover, will control variables be included based on firm and deal-characteristics. Examples of these control variables are the book-to-market ratio, financial leverage and relative deal size. The data will be obtained from either Thomson One, Thomson Financial SDC M&A Database, Compustat, CRSP, IBES or Datastream. The sectors of the bidders will be sorted utilizing the Global Industry Classification Standard (GICS). Additionally, beta regressions will be utilized, providing a more flexible distribution compared to the more traditionally used probit or logit models. As a result of this method, it will become possible to regress the influence of a credit rating on the fraction of cash used in mergers and acquisitions. To provide initial evidence on the impact of a credit rating within a sector, interaction variables between a credit rating and the individual sectors be included. Subsequently, every sector will be regressed separately. This will demonstrate the specific impact of the credit rating within each sector, as well as differences between specific sectors and particularly the general sample.

The focal point of this research paper embodies the aim of capturing if a sector perspective provides a higher degree of information on the payment method. Considering, I employ a regression method that allows the use of a fractional dependent variable. I expect to find a significant relationship of a credit rating on the payment method in acquisitions. Moreover, do I forecast this relationship between a credit rating and the fraction of cash to be positive, following the rationale that a credit rating increases

the debt capacity. Lastly, I believe that the impact magnitude of a credit rating will vary considerably between different sectors, and in relation to the general sample regression. Ultimately, sector regressions will provide us with an increase in insight into the true credit rating influence of a bidder within a specific sector.

Unprecedented, have I discovered robust statistical evidence that the mere existence of a credit rating has a positive impact on the fraction of cash in the payment method of acquisitions. Illustrating, the degree of influence the CRAs still inhabit in the financial markets. Furthermore, the results from this study provide evidence that a sector approach can increase the insight on the impact of a credit rating on the payment method in acquisitions. However, this increase in insight is bounded to solely the three sectors where significant results of the credit rating were found amid the nine individual sector regressions. Therefore, I conclude that a general increase in insight does not follow from a sector perspective.

2. Theoretical Framework

2.1. Credit Ratings

Especially, after the financial crisis of 2007-2009, controversy has often overshadowed the reputation of credit rating agencies. One may think of cases like Enron and Lehman Brothers, where the CRAs showed their fallible business model. With Enron, the major CRAs held investment-grade[1] credit ratings five days prior to its bankruptcy, while Lehman Brothers' investment-grade credit rating was not downgraded until the day of its announced bankruptcy (White, 2010). Furthermore, the most complicating aspect of CRAs is that they do not only assign a credit rating to companies, but also countries. Therefore, if a country would want to regulate a CRA, a conflict of interest could arise between the two parties, decreasing the trustworthiness of the credit rating (De Haan & Amtenbrink, 2011). Only an organic increase in competition in the rating market is expected to have beneficial effects on the creditworthiness of the ratings. However, as entry barriers remain high, and the question of which party should pay for the rating repeatedly arises. This is far from becoming reality (Utzig, 2010).

Nevertheless, have there been no signs of a decrease in impact on behalf of the CRAs in the capital market. Research from Driss et al. (2019) points out that firms who have been downgraded after

[1] An investment-grade bond rating should indicate a low risk of default, compared to speculative-grade bonds.

a market watch[2] show significantly less ability to borrow from the capital markets. Moreover, firms that have not been downgraded after a market watch experience an increase in investment volume and operating profitability. Illustrating the continued dependence on the CRAs by investors who do not have the skill or time to do their due diligence. Furthermore, firms with a high credit rating possess lower financial constraints, allowing firms to issue debt on shorter notice (Gilchrist & Himmelberg, 1995). However, as the blade cuts both ways, it can also be disadvantageous to request a credit rating. Gopalan et al. (2014) were able to provide evidence that the debt of firms with a lower credit quality trade at a higher yield spread. Indicating, that a low credit rating signals significant rollover risk to the investors. Ultimately, two mutually exclusive arguments exist on the influence of a credit rating on a firm's capital structure. Firstly, Faulkender and Petersen (2006) argued that firms with credit ratings have a higher debt capacity, due to access to public debt markets. This would suggest that firms with a credit rating have the possibility to gain more leverage in order to finance acquisitions, allowing the use of a larger quantity of cash in the payment method. Frank & Goyal supported the rationale of the previous hypothesis, but also proposed an alternative view in their 2009 paper. Looking from a pecking-order perspective, a credit rating decreases the information asymmetry and thus the adverse selection problem between a firm and investors. Following this reasoning, only firms with an undervalued market value would pursue a credit rating, since overvaluation would result in a share price drop after the financial assessment of the company. This lack of information asymmetry regarding the bidder's health leads to target firms being more inclined to accept shares if the acquirer possesses a credit rating. Considering prior evidence regarding the impact of a credit rating change on yield spreads (Gopalan et al., 2014) and how the quality of a credit rating affects financial constraints (Gilchrist & Himmelberg, 1995). In the first hypothesis, I expect that a credit rating has a positive relationship with the relative amount of cash being paid in an acquisition, due to a higher debt capacity as described by Faulkender and Petersen (2006).

2.2. Supporting Model Hypotheses

Through times, the dominating payment method has alternated between cash and equity. Data shows, that after the second world war ended, gradually more financial instruments appeared on the capital market. Eventually, the evolution of these financial instruments resulted in a range of hostile takeovers financed with debt at the start of the 1980s. For the first time since the 1910s, cash was the primary payment method in acquisitions. During the 1990s equity payments prevailed again, as continental Europe replaced the Anglo-Saxon presence in the market. Radical changes in corporate governance

[2] A period where a credit rating agency assesses an entity's creditworthiness

across continental Europe facilitated this shift in corporate behavior. Resulting in, increased liquidity, reductions of takeover barriers, and more legal protection for minority shareholders – for instance regarding the protection against insider trading (Grant & Kirchmaier, 2004). Subsequently, the turn of the century ended this period of European superiority, since the market lost its hostile edge, as companies were preferring friendly negotiations over hostile bidding. Moreover, did events like the Dot-com bubble and the 9/11 terrorist attacks lead to a significant decrease in interest rates. Facilitating a large number of acquisitions to be financed with debt, due to a considerable decrease in borrowing costs (Martynova & Renneboog, 2008). Ultimately, the biggest financial crisis since the depression of the 1930s arrived, the global financial crisis of 2007-2009.

One of the most traditional strategies in approaching the financial leverage decision is the pecking-order theory. This theory suggests that firms prefer internal financing over external financing, primarily due to information asymmetry (Myers, 1984). Furthermore, when a company finances externally, it prefers debt financing to equity financing. Myers (1984) explains that issuing stocks regarding a positive NPV project is flawed by asymmetrical information. Investors often do not have full information concerning the benefits of a particular investment. Therefore, if a manager believes that the stock price is too low, they will reject issuing the equity to protecting their old shareholders. However, this way of thinking results in managers only issuing shares if they are overvalued. Consequently, if the manager proceeds with the share issue, investors are signaled that the company's shares are overvalued. Following the research performed by Myers (1984), Karampatsas et al. (2014) found significant evidence in support of the pecking-order theory. Therefore, the second hypothesis assumes a positive relationship between the pecking-order theory and the fraction of cash in the payment method, in general and among sectors.

An alternative to the pecking-order theory is the trade-off theory. The trade-off theory suggests that firms do not prefer a pecking-order, but always move towards an optimal long-term leverage state. This state is conditioned to the amount of distress costs new debt adds and the increase in interest tax shield. The distress costs increase when a firm takes on more leverage, due to higher bankruptcy risk. Financial institutions are not fond of bankruptcy risk and will therefore require higher financing costs (Kraus & Litzenberger, 1973). In the third hypothesis, I do not expect to find statistical significant results regarding the trade-off theory, in both the general sample and the specific sectors. Primarily, since the theory assumes that profitability has a positive relationship with leverage. However, empirical evidence repeatedly detects that more profitable firms have lower debt ratios (Frank & Goyal, 2009).

Investment opportunities have also been proven to provide a significant influence on the payment method. Growth companies often have significant upside potential, since these companies are capable of disturbing the traditional market through innovation. However, it often remains uncertain if these companies can sustain their growth and eventually turn into mature companies. Therefore, the valuation of growth companies is always to a large degree uncertain. This uncertainty is in academic papers often indicated using the book-to-market ratio, which captures investment opportunities. In their research, Yang et al. (2019) provided evidence in favor of this *opportunity costs of holding cash hypothesis,* by displaying that a bidder prefers using shares if it has significant growth opportunities. Following the rationale that growing firms are often not rich in cash, resulting in higher opportunity costs if the bidder acquirers a target with cash compared to paying with stock. Regarding the fourth hypothesis, it is expected that a significant negative relationship is found between the growth opportunities and the predicted percentage of cash among the general sample and individual sectors.

Lastly, history has shown significant upsides in acquiring a company with debt. When one wants to acquire a company quickly, cash is commonly the solution. Considering, competition is frequently deterred from being able to compete when companies exploit their ability to close the deal quickly using cash (Berkovitch and Narayanan 1990). Besides competition, have academics also observed the role collateral plays in the payment method decision. Collateral increases the value on which firms can securitize their debt at financial institutions. These institutions prefer having their loans secured, to lose as little money as possible if the borrower eventually defaults. Faccio & Masulis (2005) found evidence among European mergers that firms with higher collateral values have a higher debt capacity. Therefore, a positive relationship between the collateral value and the fraction of cash used in acquisitions was discovered. In the fifth hypothesis, it is expected that in general and among sectors higher collateral is positively related to the fraction of cash used in the general acquisitions and individual sectors.

3. Data

3.1 Sample selection

The foundation of this research will consist of data from public North-American mergers and acquisitions. The time frame associated with the data is from December 31, 2009, until December 31, 2019. After the 2008 recession, American GDP began to rise again in June 2009 (Center on Budget and Policy Priorities, 2020), hence that the end of that same year was picked as the starting point. The

sample concerning these transactions has been retrieved from the Refinitiv SDC Platinum M&A database. The original sample consisted of 40,358 deals, as it only required deals to have a transaction value, and to be described as an M&A. Subsequently, the data set was filtered to only include deals that mention a payment method, and of which the bidder is a public firm. However, it remained optional for bidders to have acquired private targets. To further optimize the data set, only deals resulting in the acquisition of at least 50% of the target's shares were included. Moreover, deals under one million dollars and deals less than one percent of the bidder's market value one week prior to the acquisition announcement, were filtered out to avoid noise. Ultimately, a data sample of 8,588 observations is included in this study.

3.2 Principal Variables

The Global Industry Classification Standard (GICS), developed by Standard & Poor's (S&P) and Morgan Stanley Capital International (MSCI), will be used to classify the companies to their respective sectors. This choice comes as a result of multiple studies indicating that the GICS method is most advantageous when conducting financial studies. The problem with using the SIC system is the instability over time. For instance, Kahle and Walkling (1996) found that over a period of twenty years, 24% of their sample had their four-digit SIC code changed. Considering, their sample consisted of 10,000 observations, and almost all inter-industry research utilizes historical industry classification, the SIC classification could induce errors. Moreover, when the different industry classification systems are compared, the GICS more accurately captures industry-level heterogeneity and has a higher statistical inference (Hrazdil et al., 2014). These advantages stay consistent from year-to-year and are more pronounced with larger firms (Bhojraj et al., 2003). Characteristics resulting in this superiority materialize from their data collecting method. The classification system from GICS has a financial-oriented nature. Meaning, it is not focused on the company's technological production, but the demand of professional investors. Furthermore, is a team of specialists from S&P and MSCI responsible for individual classifications, while other classification systems rely on external data vendors (Bhojraj, Lee, Oler, 2003). In this study, 2-digit GICS codes will be used. Mainly, because the reliability of this study is conditioned to a minimal number of observations per sector, which could be endangered with 4-digit GICS codes. Nevertheless, due to a lack of observations when using the 2-digit GICS code, I still had to exclude the Utilities and Real Estate sectors. Considering, these both possessed less than 100 observations in the individual sector beta regressions. The remaining 9 different sectors incorporated in this study are:

- Communication Services
- Consumer Discretionary
- Consumer Staples

- Energy
- Health Care
- Materials
- Financials
- Information Technology (IT)
- Industrials

To combine the credit ratings with the acquiring companies, the Compustat database was used. The Credit Rating variable is a dummy variable, assigning a 1 to a transaction if the bidder owns a credit rating. Specifically, the bidder was required to have an S&P rating on its domestic long-term issuer credit, as Compustat does not include ratings from Moody's. Research from Karampatsas et al. (2014) suggests that just the existence of a credit rating does not have a significant influence on the fraction of cash used in acquisitions.

3.3 Control Variables

3.3.1 Basis Model Variables

Analysts. Measured as the number of analysts following the bidding firm in the year of the acquisition announcement. The data has been retrieved from the IBES database. For firms that have missing observations, the number of analysts was assumed 0. Research from Chemmanur et al. (2009) introduced this variable to proxy for information asymmetry, as more analysts should decrease doubt about the bidder's firm value. In their study, a significant negative relation was found between the number of analysts and the probability of payment with cash. The rationale follows that targets are less likely to accept equity offers when they distrust the bidder's valuation.

Firm Size. The logarithm of the market value of equity from 4 weeks before the acquisition announcement will be used to control for the size effect on the dependent variable. The data has been retrieved from CRSP. The Incorporation of this variable into the data set is a result of research by Hansen (1987). Due to asymmetric information, payment in stock becomes more likely if the size of the target relative to the bidder increases. Therefore, growth in the size of the acquirer, ceteris paribus, should decrease the probability of stock payment.

Firm Run-Up. Defined as the returns of a bidder from 205 trading days until 7 trading days before the acquisition announcement. Each observation has been adjusted with the return on the S&P 500 from

said trading day, and was summed up to create the market-adjusted returns. The stock data has been retrieved from the CRSP database. This variable is present in the research of Faccio and Masulis (2005) and indicates overvaluation. The bidder should encourage acquisition through shares when its share price has risen considerably to exploit the window of opportunity. However, the Firm Run-Up variable also touches on the greater adverse selection risk new equity investors can inhabit after a significant stock price run-up (Korajczyk et al., 1991). Moreover, will current stock owners urge stock as payment method, as the dilution is smaller if the stock price has risen considerably (Faccio and Masulis, 2005).

3.3.2 Variables of supporting model hypotheses

Cash-to-Assets. This variable consists of income before extraordinary items plus depreciation minus dividends, divided by the total assets the year before the acquisition announcement. The Compustat database has been used to match the companies with the aforementioned variables. This variable is used to measure the pecking-order theory from Myers (1984). This theory suggests that firms follow a hierarchy of financing, preferring internal over external financing. However, when external financing is the only option, debt is preferred over equity, mainly due to the costs associated with share payment.

Book-to-Market. Indicated as, the book value one year before the acquisition, divided by the market value of a firm one month prior to the acquisition. The data for the variable was available at the Compustat database. When a firm is considered to have high investment opportunities, it is more likely to finance the acquisition with equity. Considering, these firms do not want to miss on the opportunity of realizing internal growth through other investments (Yang et al., 2019).

Financial Leverage. Defined as the bidder's short-term average debt-to-asset ratio divided by its long-term average debt-to-asset ratio. In the short-term, the quarterly period of (-4, -1) before the acquisition announcement will be used. The long-term period will include the mean of the quarters (-12, -5) before the acquisition announcement. Debt consists of long-term debt plus current short-term debt. The data retrieval has been facilitated by the S&P Compustat database. The Foundation for the use of this variable comes from the static trade-off theory. This states that firms have a long term financial debt ratio, where they trade off tax benefits against the distress costs of leverage (Kraus & Litzenberger, 1973).

Collateral. Measured as a company's Property Plant and Equipment, divided by total assets from the year before the acquisition announcement. The data has been redeemed from Compustat. This variable has been introduced by Faccio and Masulis (2005) to proxy for debt capacity. The researchers

argued that financial institutions should be more willing to lend cash to firms with relatively high PPE, as these companies can provide more security for their debt.

3.3.3 Deal characteristics

Relative Size. Defined as the bidder's market value over the total deal value from 4 weeks before the acquisition announcement. The bidder's market value has been retrieved from Compustat, while the total deal value has been retrieved from Refinitiv's SDC Platinum. Harford et al. (2009) incorporated this variable as a means of a proxy, indicating how much cash a firm would have to raise to acquire a target firm. If the relative size increases, the acquirer should be more likely to use a larger percentage of shares due to the increasing difficulty of raising larger amounts of cash.

Diversification. A dummy variable that assigns a 1 if the 2-digit GICS from the bidder does not correspond with the 2-digit GICS-code from the target. The GICS codes were available from the Compustat database. Faccio and Masulis (2005) discovered evidence that due to uncertainty, targets are more reluctant to agree with equity payment when the bidder is diversifying. This uncertainty sprouts from the possibility of overvaluation by the acquiring firm and the expected inability of the acquirer to thrive in the new sector.

Unlisted. This is a dummy variable that takes on 1 if the target is unlisted. The variable has been incorporated from Refinitiv's SDC Platinum. Due to the frequently concentrated nature of a private company's portfolio, cash is frequently preferred over illiquid shares when an unlisted subsidiary is sold. Moreover, when a private target is acquired by a public firm, the acting manager will often retire from the firm, resulting in the manager's desire to be paid in cash (Faccio and Masulis, 2005).

Hostile Deals and **Competition.** One dummy variable assigns a 1 if the deal attitude was hostile and another dummy variable assigns a 1 if multiple bidders were involved in the transaction. This data has been retrieved from Refinitiv's SDC Platinum. Both variables imply a type of urgency, which results in the bidder trying to close the transaction a quickly as possible. Therefore, if the transaction attitude is hostile, or if there is competition, the bidder will be more inclined to prefer cash as the exchange medium (Berkovitch and Narayanan, 1990).

3.4. Descriptive statistics complete sample

Table 1 provides descriptive statistics regarding the complete sample of this study. Across 8,588 firm acquisitions in the United States over the 2009 to 2019 period, a total of 77% of the combined total

transaction value was paid using cash. However, only 36% of the bidders possessed a credit rating during the acquisition of the target. Furthermore, did the average market-adjusted stock price of the bidders rise by 1.1% prior to the acquisition, and is the average cash flow 3% relative to total assets. The average book value is generally twice as small – 57% to be specific – compared to the market value. Moreover, one can observe in the Financial Leverage variable, that the average debt-to-asset ratio in the short-term is almost 1.2 times as large as the long-term debt-to-assets ratio. Around 39% of the target firms is unlisted, and from the complete sample, less than 1% has been acquired in a hostile manner. Looking at the sector distribution of the bidders, one can observe the Financial and IT sectors having the largest number of acquisitions, with respectively 24% and 18% of the total sample. The sectors with the fewest number of acquisitions are the Materials, Communication Services and Consumer Staples sectors, each containing 4% of the total sample.

Table 1: The table presents summary statistics from the complete sample. The sample is based on North American acquisitions dating from December 31st, 2009 till December 31st, 2019, conditioned on the Consumer Discretionary sector's 2-digit GICS code. The data has been retrieved from the Thomson Reuters SDC Mergers and Acquisitions, Compustat, CRSP and IBES. Each variable is described using the mean, standard deviation, minimum and maximum.

	Mean	Standard Deviation	Minimum	Maximum
FractionCash	0.77	0.38	0.00	1.00
Credit Rating	0.36	0.48	0.00	1.00
Analysts	9.58	8.15	0.00	55.00
Firm Size	7.38	1.89	1.07	13.66
Firm Run-Up	0.02	0.15	-2.78	1.50
Cash-to-Assets	0.03	0.15	-4.84	1.18
Book-to-Market	0.57	0.39	0.1	4.64
Financial Leverage	1.19	1.14	0.06	14.75
Collateral	0.31	0.26	0.01	1.00
Relative Size	0.20	0.91	0.01	1.39
Diversification	0.01	0.12	0.00	1.00
Unlisted	0.39	0.49	0.00	1.00
Hostile	0.00	0.03	0.00	1.00
Competition	0.01	0.09	0.00	1.00
Energy	0.07	0.25	0.00	1.00
Materials	0.04	0.20	0.00	1.00
Industrials	0.15	0.36	0.00	1.00
Consumer Discretionary	0.12	0.33	0.00	1.00
Consumer Staples	0.04	0.20	0.00	1.00
Health Care	0.12	0.33	0.00	1.00
Financial	0.24	0.42	0.00	1.00
Information Technology	0.18	0.39	0.00	1.00
Communication Services	0.04	0.20	0.00	1.00
Observations	8588			

The correlations of can be observed in tables 6-8 of the Appendix. A general lack of correlation close to 1 implies minimal multicollinearity obstacles. The significant correlations with the highest value are between the Fraction of Cash and Unlisted (-0,434), Firm Size and Analysts (0,779), Credit Rating and Analysts (0,428), and, Credit Rating and Firm Size (0.553). It is understandable why firms with a greater size attract more analysts, for the benefits of private information increase with the size of firms (O'Brien & Bhushan, 1989). Moreover, are firms with a credit rating more susceptible to be tracked by a large number of analysts, due to demand from information by fixed-income investors. Furthermore, firms with a large size gain more advantage to obtain a credit rating. A high credit rating could decrease the interest rate significantly, which large firms are more capable to obtain due to diverse revenue streams. Lastly, when looking at the variables Fraction of Cash and Unlisted, the highly significant correlation could give a first indication of private targets preferring to be paid out in equity.

3.5. Descriptive Statistics of Individual Sectors

In table 2, I have summarized the acquisitions with respect to their bidder's 2-digit GICS code. To find the most considerable deviations from the general sample, I have included a t-test between the individual sector and the overall sample. Based on the t-test statistics, considerable deviations from the general sample mean are observable. The lowest average percentage of cash used to acquire a target can be observed in the Energy sector, with only 61%, while the highest average can be observed in the Materials, Consumer Discretionary and Consumer Staples sectors, with 85%. The Financial and IT sectors have obtained the lowest percentage of credit ratings in their sector. In the IT sector, 21% of the bidders possess a credit rating, compared to 24% of the financial firms having a credit rating.

The highest deviation from the cash flow relative to assets compared to the average sample is displayed in the Industrials sector. The Financial sector has the lowest Cash-to-Assets variable, with a cash flow of 1% relative to the assets. Furthermore, the Book-to-Market variable reports conventional results, where the IT and Health Care sectors possess the highest growth opportunity value. Traditional value sectors like the Energy and Financial sector can be observed to have the highest book-to-market value. From the sectors with significant deviation in financial leverage compared to the general sample, one can identify that the Financial sector has the smallest average of short-term leverage compared to long-term leverage. The highest average in financial leverage can be observed in the IT and Health Care sectors. As expected, traditionally capital-intensive sectors like the Energy and Material sectors possess the greatest amount of collateral compared to the general sample. In both sectors, 59% of the assets consist of Property, Plant and Equipment. The Financial, IT and Health Care sectors report the lowest collateral, resulting from their less capital-intensive nature.

Regarding the deal characteristics, the highest deviation of relative size in relation to the overall sample is exhibited in the Energy sector. In this sector, the take-over consideration averages 36% of the acquirer's market value. The highest t-statistic following the relative size can be observed in the IT sector. In this sector, the relative size is only 14%, suggesting that IT firms generally acquire firms of a smaller nature. Furthermore, the highest average of unlisted targets was acquired by the Energy sector, with 61% of the targets being unlisted. The Financial sector reports the lowest percentage of targets being unlisted, with 29%. This could potentially be spill-over from the financial crisis, where listed firms were not able to recoup their pre-crisis performance and had to look for a buyer.

Table 2: The table presents the descriptive statistics of the individual sectors.
The sample is based on North American acquisitions dating from December 31st, 2009 till December 31st, 2019, conditioned to each sector's 2-digit GICS code. Each variable is described using the mean and standard deviation. Moreover, a t-test is included, indicating significant deviation from the general sample. The b presents the regression coefficient and t the t-test statistic.

	Energy				**Materials**				**Industrial**			
	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t
FractionCash	0.61	0.43	0.14***	(7.58)	0.85	0.32	-0.11***	(-6.18)	0.81	0.36	-0.08***	(-6.96)
Credit Rating	0.53	0.50	-0.19***	(-8.57)	0.63	0.48	-0.29***	(-11.02)	0.44	0.50	-0.10***	(-6.74)
Analysts	10.61	8.58	-1.73***	(-4.64)	8.73	6.05	0.26	(0.79)	9.01	6.70	-0.03	(-0.16)
Firm Size	7.74	1.70	-0.40***	(-5.22)	7.75	1.44	-0.41***	(-5.13)	7.47	1.79	-0.13*	(-2.30)
Firm Run-Up	0.00	0.20	0.02	(1.75)	0.02	0.12	-0.00	(-0.19)	0.03	0.16	-0.02**	(-3.11)
Cash-to-Assets	-0.01	0.18	0.04***	(4.53)	0.05	0.08	-0.03***	(-5.39)	0.04	0.07	-0.02***	(-7.95)
Book-to-Market	0.77	0.44	-0.21***	(-7.83)	0.48	0.31	0.10***	(4.91)	0.52	0.35	0.07***	(5.54)
Financial Leverage	1.19	0.83	-0.02	(-0.49)	1.15	0.74	0.02	(0.47)	1.21	1.17	-0.05	(-1.31)
Collateral	0.59	0.24	-0.29***	(-22.77)	0.59	0.22	-0.29***	(-21.23)	0.34	0.23	-0.03***	(-3.70)
Relative Size	0.36	1.04	-0.17***	(-3.85)	0.30	2.24	-0.10	(-0.83)	0.16	0.34	0.04**	(2.88)
Diversification	0.01	0.12	-0.00	(-0.06)	0.02	0.15	-0.01	(-1.12)	0.03	0.16	-0.01**	(-2.83)
Unlisted	0.61	0.49	-0.19***	(-9.08)	0.34	0.47	0.10***	(3.74)	0.45	0.50	-0.02	(-1.11)
Hostile	0.00	0.00	0.00***	(3.32)	0.00	0.05	-0.00	(-0.61)	0.00	0.06	-0.00	(-1.80)
Competition	0.01	0.08	0.00	(0.20)	0.01	0.09	-0.00	(-0.14)	0.01	0.09	-0.00	(-0.01)
Observations	560			9567	353			9567	1270			9567

	Con. Discretionary				**Con.Staples**				**Health Care**			
	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t
FractionCash	0.85	0.33	-0.12***	(-10.36)	0.85	0.33	-0.11***	(-5.90)	0.76	0.38	-0.01	(-0.93)
Credit Rating	0.47	0.50	-0.13***	(-7.84)	0.52	0.50	-0.17***	(-6.29)	0.36	0.48	0.00	(0.05)
Analysts	11.01	8.78	-2.27***	(-7.99)	10.74	7.31	-1.82***	(-4.52)	11.26	8.07	-2.56***	(-9.76)
Firm Size	7.38	1.69	-0.02	(-0.36)	8.16	2.03	-0.83***	(-7.40)	7.71	2.15	-0.39***	(-5.64)
Firm Run-Up	0.02	0.14	-0.00	(-0.36)	-0.00	0.16	0.02*	(2.09)	0.03	0.18	-0.01	(-1.58)
Cash-to-Assets	0.05	0.16	-0.03***	(-5.60)	0.05	0.09	-0.02***	(-4.64)	-0.01	0.29	0.04***	(3.86)
Book-to-Market	0.51	0.37	0.08***	(5.52)	0.44	0.37	0.15***	(6.62)	0.45	0.36	0.15***	(10.89)
Financial Leverage	1.22	1.32	-0.05	(-1.03	1.11	0.60	0.06	(1.67)	1.25	1.20	-0.09*	(-2.09)
Collateral	0.42	0.29	-0.12***	(-11.75)	0.40	0.26	-0.09***	(-5.71)	0.22	0.20	0.11***	(14.94)
Relative Size	0.19	0.43	0.01	(0.54)	0.21	0.71	-0.01	(-0.27)	0.20	0.81	-0.00	(-0.14)
Diversification	0.01	0.08	0.01***	(3.48)	0.01	0.08	0.01*	(1.98)	0.01	0.10	0.01	(1.58)
Unlisted	0.30	0.46	0.15***	(10.09)	0.38	0.49	0.05	(1.90)	0.48	0.50	-0.05***	(-3.33
Hostile	0.00	0.03	0.00	(0.22)	0.00	0.00	0.00***	(3.32)	0.00	0.03	0.00	(0.23)
Competition	0.01	0.08	0.00	(0.95)	0.01	0.12	-0.01	(-1.06)	0.01	0.09	0.00	(0.11)
Observations	1050			9567	344			9567	1058			9567

	Financial				**IT**				**Comm. Services**			
	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t	Mean	Standard Dev.	b	t
FractionCash	0.70	0.42	0.05***	(5.18)	0.83	0.33	-0.10***	(-10.97)	0.73	0.40	0.02	(0.95)
Credit Rating	0.24	0.43	0.15***	(13.45)	0.21	0.41	0.17***	(14.70)	0.43	0.50	-0.08**	(-2.95)
Analysts	6.93	6.76	2.60***	(14.65)	10.96	9.51	-2.36***	(-9.32)	9.35	9.54	-0.38	(-0.74)
Firm Size	6.86	1.80	0.64***	(13.92)	7.42	1.90	-0.07	(-1.36)	7.25	2.15	0.11	(0.94)
Firm Run-Up	0.01	0.10	0.01***	(4.08)	0.02	0.15	-0.01	(-1.35)	0.04	0.18	0.02*	(-2.39)
Cash-to-Assets	0.01	0.05	0.02***	(6.79)	0.03	0.14	-0.01	(-1.33)	0.04	0.11	-0.01*	(-2.15)
Book-to-Market	0.83	0.36	-0.34***	(-32.30)	0.43	0.30	0.18***	(18.05)	0.59	0.47	-0.01	(-0.41)
Financial Leverage	1.10	0.92	0.09***	(3.50)	1.32	1.57	-0.17***	(-3.35)	1.10	0.83	0.07	(1.35)
Collateral	0.07	0.11	0.27***	(43.90)	0.22	0.18	0.13***	(20.74)	0.30	0.24	0.02	(1.31)
Relative Size	0.20	1.22	-0.00	(-0.13)	0.14	0.27	0.07***	(5.63)	0.34	0.45	-0.14*	(-2.51
Diversification	0.01	0.10	0.01*	(2.00)	0.01	0.09	0.01**	(2.62)	0.05	0.22	-0.04**	(-3.11)
Unlisted	0.29	0.45	0.18***	(15.95)	0.41	0.49	0.03*	(2.21)	0.47	0.50	-0.04	(-1.57)
Hostile	0.00	0.00	0.00***	(3.32)	0.00	0.04	-0.00	(-0.14)	0.00	0.00	0.00***	(3.32)
Competition	0.00	0.04	0.01***	(4.99)	0.01	0.10	-0.00	(-1.01)	0.02	0.14	-0.01	(-1.68)
Observations	2021				9567	1584		9567	348		9567	

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4. Methodology

To answer the main question of this thesis, I seek the probability of paying with cash conditional on possessing a credit rating per sector. Cash payment will be displayed as a fraction of the total deal consideration. Considering, this means the dependent variable has to be bound between 1 and 0, an ordinary linear regression will not be sufficient. Instead, a Generalized Linear Model (GLM) would be more fit, as it does not require the errors of the dependent variable to be normally distributed (Brooks, 2019). However, the main problem arising when looking at the possible GLMs, i.e. probit and logit models, is that the outcome variable is dichotomous. Meaning, either 1 or 0. The reason for this comes from the fact that it uses a binomial distribution, which would be appropriate for dependent variables consisting of Bernoulli trials (McCullagh & Nelder, 1989). Considering, the sought-after dependent variable for this study consists of a continuous fraction, ordinary GLMs will not work. Therefore, the beta regression, a model akin to GLMs, will be applied.

The beta regression is part of the two-parameter exponential family and operates using standard maximum likelihood estimation. It is applied to a beta distribution, which is much more flexible than a normal or binomial distribution since it can appear in different shapes (Ferrari, Silva & Cribari-Neto, 2004). The shape is influenced by the combination of the parameters μ and ϕ, resulting in different beta densities. As commonly seen with fractional data, heteroscedasticity and skewness are also inherently present when one uses a beta regression (Cribari-Neto & Zeileis, 2010). Moreover, does the beta regression require observations of the dependent variable to not be equal to either 1 or 0. Therefore, the cash fractions from the sample will be transformed to conform to formula 1 proposed by Smithson & Verkuilen (2006), using weighted averages.

Formula 1) $$x' = \frac{x(N-1)+s}{N}$$

Where x is the fraction of cash, N is the sample size and s acts as if from a Bayesian perspective, priors are taken into consideration. The authors suggest using an s of 0.5. Comparable with GLMs, the coefficients of beta regressions are covariates of an estimated parameter, conditional on a certain distribution. To interpret these coefficients, margins will be used. This will report the marginal effects of the independent variable on the dependent variable, by using the model's covariates.

The beta regressions will be performed over the general sample and individual sectors. In the general sample, the model with the highest degree of explanatory power will be identified using step-wise

model building and the Bayesian Information Criteria (BIC). This statistic will measure the goodness of fit of each specification mainly based on the likelihood function. Considering, this likelihood function depends on the sample size, regressions with large differences in observations should not be compared. Step-wise model building implies that each model will consist of multiple regressions. The first specification will be the basic model. Each following specification, new variables will be included to determine the combination of variables producing the highest degree of explanatory power. Subsequently, interaction variables between the Credit Rating variable and the individual sector variables will be included in the specification with the highest degree of fit. Margins will be used to observe interpretable products of the interaction variables, with the remaining variables being incorporated at the mean. The results of the regression will provide initial insight into the impact on the method of payment of possessing a credit rating within the different individual sectors. Additionally, identical beta regressions utilizing step-wise model building will be performed, but conditioned to each sector's 2-digit GICS code. Therefore, each sector will have a specific model, providing a more excessive and concentrated analysis into the impact of a credit rating, compared to the interaction variables.

5. Results

5.1 Beta Regressions of the General Sample

Table 3 presents the marginalized results of the beta regressions covering the complete sample. Across all specifications, the results indicate a robust positive relationship between a credit rating and the percentage of cash in the payment method. As a result of large differences in observations, only the fifth and sixth specifications can be directly compared using the BIC statistic. The sixth specification will be used to determine the credit rating impact, since the BIC statistic decrease suggests it has the best fit. Therefore, one can observe that the estimated fraction of cash used in acquisitions increases by 2.9% if the bidder possesses a credit rating.

The control variables observable in specification (1) are the Analyst, Firm Size and Firm Run-Up variables. The Analysts variable shows strong statistical significance across all specifications, with a sign indicating a positive relationship with the cash fraction in acquisitions. The Firm Size variable only possesses a significant impact in the first specification. Consequently, the Firm Size variable internalized significance relating to the Cash-to-Assets variable, due to relatively high correlation (0,221). Similarly, the Firm Run-Up variable appears to be highly significant in the first five specifications. However, once the deal-related variables are added in the sixth specification, the Firm

Run-Up variable becomes highly insignificant. Therefore, the underlying correlation between the Firm Run-Up variable and one or more deal-related variables forced it to embody significance unassociated with its true impact.

The first variable included to observe evidence of the supporting hypotheses is the Cash-to-Assets variable. The variable has a sign denoting a significant positive relationship between a firm's cash-to-assets ratio and the predicted cash fraction used in acquisitions. The Book-to-Market variable displays a similarly strong significance across all specifications. Firms with a higher book-to-market ratio are observed to utilize a higher cash fraction to finance acquisitions. Regarding the Financial Leverage variable, it first appears to have no significant influence on the method of payment. However, once the deal-related variables are included, it becomes evident that noise surrounded the variable prior to specification (6). Revealing a more unbiased influence after including the deal-related variables. The coefficient of the variable implies that firms experiencing an increase in their financial leverage ratio, are discovered to use a higher percentage of cash. Concerning the Collateral variable, in neither the fifth nor the sixth specification was a result found indicating a significant impact on the method of payment in acquisitions.

In the sixth specification, deal-related variables have been included. Among these variables, strong significant results have been found regarding the Relative Size, Unlisted and Competition variables. The Relative Size variable produces a significant negative coefficient, which indicates that acquisitions higher in relative size are expected to use a higher share fraction. Furthermore, has the condition of a target firm being unlisted also a highly significant influence on the payment method. The direction of the coefficient implies that an unlisted target decreases the fraction of cash paid in an acquisition. Lastly, show the results of the beta regressions, that competition moves the bidder to utilize a higher degree of equity as the acquisition method, while the Hostile variable displays strong insignificance.

Table 3: Beta regressions of the payment method on the credit rating variable using the complete sample
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification, Unlisted and Hostile variables.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.042***	0.041***	0.039***	0.043***	0.036***	0.029***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.004)
Analysts	0.005***	0.003***	0.003***	0.003***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.010)
Firm Size	-0.006*	-0.004	-0.001	0.002	0.006	-0.001
	(0.052)	(0.747)	(0.155)	(0.686)	(0.176)	(0.748)
Firm Run-Up	-0.078***	-0.082***	-0.094***	-0.089***	-0.071**	-0.005
	(0.001)	(0.000)	(0.000)	(0.003)	(0.028)	(0.878)
Cash-to-Assets		0.242***	0.289***	0.384***	0.330***	0.242***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Book-to-Market			0.027**	0.036***	0.040***	0.030**
			(0.011)	(0.002)	(0.004)	(0.021)
Financial Leverage				0.003	0.002	0.007**
				(0.465)	(0.624)	(0.032)
Collateral					-0.015	-0.026
					(0.377)	(0.105)
Relative Size						-0.022***
						(0.019)
Diversification						-0.050
						(0.115)
Unlisted						-0.192***
						(0.000)
Hostile						-0.008
						(0.941)
Competition						-0.112**
						(0.012)
BIC Measure	-85157.45	-63795.21	-59455.10	-51191.43	-39541.45	-39785.27
Observations	8,580	6,581	6,142	5,277	3,981	3,963

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.2 Beta regression with interaction terms

In table 4, dummy variables relating to the individual sectors, and interaction terms between the Credit Rating variable and individual sector variables, are included in the specification with the highest degree of fit. Incorporation of the interaction terms has not induced a decrease in significance of the original variables from table 3. Moreover, does the BIC measure increase compared to the previous table, indicating that the seventh specification possesses less explanatory power. Regarding the individual sector variables, the majority shows no significant impact relative to the reference, the Energy sector. Only if the bidder belongs to the Materials sector, the payment method differs in relation to the Energy sector. Concerning the interaction terms, the reference of each coefficient is the impact on the payment method within a sector if the bidder does not possess a credit rating. Therefore, each interaction term has its individual reference variable. The results of table 4, display a significant adjustment to the payment method if the bidder carries a credit rating within every sector. To interpret the direction of the results, the coefficients of the interaction variables are required to be marginalized, with the control variables kept at their means. This provides the opportunity to plot the marginal effect of possessing a credit rating within each individual sector. As observable in figure 1, almost every sector indicates an increase in the conditional mean of the cash fraction if the bidder possesses a credit rating. Only the Materials sector shows a result contrary to the overall outcome, illustrating why it was the sole sector variable displaying significant deviation from the Energy sector.

Table 4: Beta regressions of the payment method on the credit rating variable with interaction variables
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The added variables in specification (7) are the individual sectors, and interaction variables between the existence of a credit rating and the sectors. To reduce the size of the tabel, the control variables from the previous specifications have been excluded. Incorporation of the new variables did not alter their significance.

	(7)
FractionCash	
CreditRating	1.313***
	(0.000)
Control Variables	———
Materials Sector	0.370*
	(0.092)
Industrial Sector	0.089
	(0.609)
Consumer Discretionary Sector	0.055
	(0.764)
Consumer Staples Sector	0.153
	(0.461)
Health Care Sector	0.118
	(0.506)
Financial Sectors	0.208
	(0.279)
IT Sector	0.221
	(0.201)
Communication Services Sector	-0.055
	(0.802)
1.Credit Rating x Energy Sector	-1.201***
	(0.004)
1.Credit Rating x Materials Sector	-1.449***
	(0.000)
1.Credit Rating x Industrial Sector	-1.036***
	(0.005)
1.Credit Rating x Consumer Discretionary Sector	-1.148***
	(0.002)
1.Credit Rating x Consumer Staples Sector	-1.059***
	(0.007)
1.Credit Rating x Health Care Sector	-1.177***
	(0.001)
1.Credit Rating x Financial Sectors	-1.238***
	(0.001)
1.Credit Rating x IT Sector	-1.228***
	(0.001)
1.Credit Rating x Communication Services Sector	-1.226***
	(0.003)
_cons	0.849***
	(0.000)
BIC Measure	-39,655.66
Observations	3,963

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

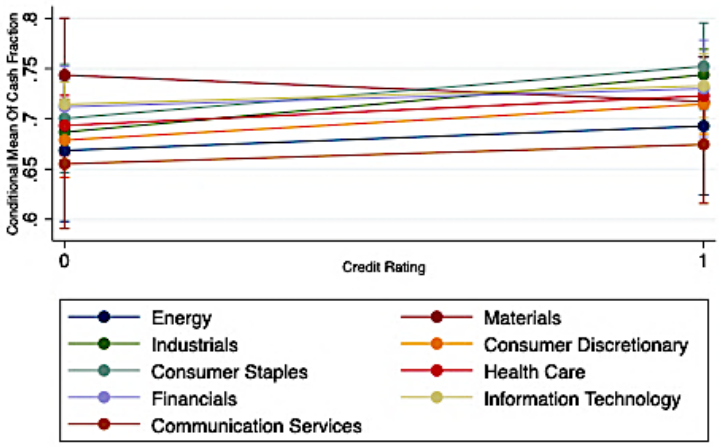

Figure 1: Visual representation of the marginal impact of a credit rating within each specific sector.

5.3 Individual Sector Beta Regressions

Table 5 provides the marginalized beta regressions of the sixth specification of each sector. In almost every sector, solely specifications (5) and (6) can be directly compared due to large sample size differences between the other specifications. Ultimately, approximately all sector models, except the Energy and Communication Services sectors, show an increase in fit when deal characteristics are included. Therefore, specification (6) was chosen to represent the individual sectors in table 5. The appendix provides the complete models of the sector regressions in tables 9-17. Additionally, STATA was unable to perform all six previously outlined specifications in certain sectors. One can exclude the absolute number of observations as the reason for this error, since almost every consecutive specification decreases in observations. Looking at the results of the corresponding tables, models with fewer significant parameters appear to experience the inability to complete the regression. Therefore, it appears that STATA rejects beta regressions below a certain magnitude of power. Consequently, by adding parameters the error disappears in table 9-17.

Statistical significance of the Credit Rating variable on the payment method can be observed in the Industrial, Financial and Health Care sectors. According to table 5, a credit rating increases the fraction of cash by 5.8% in the Industrial sector. The beta regression over the Financial sector reports a similar positive association to the cash fraction. However, the Financial sector demonstrates a considerably larger impact compared to the Industrial sector. Displaying, that the percentage of cash in the acquisition consideration increases by 7.9% if the acquirer carries a credit rating. Lastly, provides the Health Care sector also evidence of a significant impact by a credit rating. While its significance is not

as strong compared to the aforementioned sectors, a credit rating increases the cash fraction to acquire a target by 4.8%.

Significance concerning the number of analysts can be observed in the Industrial and Financial sectors. In both sectors, the coefficient illustrates a positive relationship between the number of analysts and the fraction of cash used in acquisitions. Furthermore, can significance regarding the Firm Size variable, be observed in the Energy, Financial, Health Care and IT sectors. Notably, the coefficients of the Financial sector and the remaining sectors display opposite signs. However, considering the variable never remains significant after addition of the deal characteristics, it is believed that statistical confounding resulted in its significance. Lastly, statistical significance of the Firm Run-Up variable is displayed in the Financial sector, where it displays a robust negative impact across all specifications. In the Health Care and Industrial sectors, significant results are likewise observed, but disappear with the addition of new variables. In correspondence with the general beta regression, the Firm Run-Up variable indicates biased significance due to underlying correlation with one or more deal characteristics in these sectors.

Consecutive to specification (1), I add the pecking-order parameter –Cash-to-Assets variable– creating the second specification. Statistically significant results for the Cash-to-Assets variable are found in the Energy, Industrial, Health Care, Financial and IT sectors. The coefficients of the sectors all imply a positive relationship with the percentage of cash used to acquire a target. To test for the *opportunity cost of holding cash hypothesis*, the Book-to-Market variable is incorporated in the model, composing the third specification. Significant robust coefficients can be observed in the Industrials and Information Technology sectors. In both sectors, the direction indicates a positive relationship with the relative use of cash as payment method. Concerning, the Financial and Health Care sectors, significance can be observed until deal characteristics are included in specification (6). Suggesting underlying correlation between the Book-to-Market variable and one or more deal-related variables. After including the Financial Leverage variable to the model in specification (4), one can observe significant products in the Energy and Communication Services sectors. The Energy sector reports significance of the coefficient across all specifications, while the variable is only significant in the sixth specification of the Communication Services sector. Both sectors possess a similar direction of the coefficient. Indicating a positive relationship between the financial leverage and the percentage of cash in the payment method. In specification (5) the collateral variable is included to represent an alternative proxy to the debt capacity of companies. No sector reports significance once the Collateral variable is introduced in the fifth specification. However, the variable becomes significant in the Industrial sector when the deal characteristics are added in the sixth specification. Ultimately,

providing evidence of a negative relationship between the Collateral variable and the relative cash amount of a take-over in the Industrial sector.

Lastly, deal characteristic variables are included to create specification (6), the specification with the highest degree of explanatory power. The deal-related variables are comprised of the Relative Size, Diversification, Unlisted, Competition and Hostile variables. Following table 5, significance of the relative size variable can be observed in the Health Care, Financial and IT sectors. The coefficients of these sectors all share a direction implying a negative association with the fraction of cash in the payment method. Looking at the Diversification variable, evidence of significant influence can be detected in the Communication Services and Financial sectors. However, the direction of the coefficients between both sectors conflict with each other. Considering, the Financial sector suggests a positive impact on the fraction of cash in acquisitions, while the sign of the Communication Services sector implies the contrary. The Unlisted variable displays consistent evidence of a robust influence on the payment method across all sectors. All coefficients demonstrate a negative relationship between the Unlisted variable and the fraction of cash. Lastly, variables concerning a necessity of swiftness in closing the acquisition are incorporated. In certain sectors, the hostile variable has been excluded, since the number of hostile takeovers was not sufficient to provide any explanatory power. Ultimately, solely the IT sector provides evidence of a significant influence. Displaying a positive association between a Hostile variable and the fraction of cash. Regarding the Competition variable, significant impact is observable in the Communication Services and Energy sectors. The sign of both variables implies a negative impact on the fraction of cash in the payment method.

Table 5: The beta regression margins of each sector's sixth specification

The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table includes the sixth specification, as in most sectors it provided the highest degree of explanatory power. The Hostile variable has been excluded in certain variables due to a lack of observations.

	(Energy)	(Material)	(Industrial)	(Con. Discretionary)	(Con. Staples)	(Health Care)	(Financial)	(IT)	(Comm. Services)
Fraction of Cash									
Credit Rating	0.067	-0.047	0.058**	0.013	0.060	0.048*	0.079***	0.018	0.029
	(0.276)	(0.283)	(0.017)	(0.590)	(0.219)	(0.067)	(0.004)	(0.395)	(0.558)
Analysts	-0.000	0.003	0.005**	-0.000	-0.002	0.001	0.004*	0.000	0.004
	(0.950)	(0.613)	(0.044)	(0.991)	(0.677)	(0.549)	(0.099)	(0.726)	(0.389)
Firm Size	0.000	0.010	-0.005	0.013	0.014	-0.005	-0.015	0.007	-0.024
	(1.000)	(0.710)	(0.617)	(0.259)	(0.434)	(0.591)	(0.114)	(0.438)	(0.311)
Firm Run-Up	-0.109	0.126	0.024	-0.019	0.020	-0.111	-0.230***	0.019	0.060
	(0.483)	(0.462)	(0.742)	(0.806)	(0.854)	(0.156)	(0.009)	(0.764)	(0.656)
Cash-to-Assets	0.438*	-0.040	0.180***	0.075	0.446	0.389***	0.522**	0.193*	0.637*
	(0.052)	(0.920)	(0.010)	(0.496)	(0.225)	(0.000)	(0.049)	(0.082)	(0.094)
Book-to-Market	0.031	0.102	0.108***	0.010	0.089	0.046	0.044	0.065*	-0.058
	(0.676)	(0.119)	(0.003)	(0.776)	(0.159)	(0.149)	(0.118)	(0.051)	(0.278)
Financial Leverage	0.064**	-0.020	0.004	-0.007	0.002	0.005	0.011	0.007	0.053**
	(0.036)	(0.419)	(0.686)	(0.962)	(0.849)	(0.545)	(0.273)	(0.171)	(0.066)
Collateral	-0.118	0.038	-0.082*	0.018	-0.020	0.050	0.010	-0.008	0.080
	(0.280)	(0.643)	(0.055)	(0.630)	(0.793)	(0.339)	(0.606)	(0.869)	(0.377)
Relative Size	-0.021	0.083	0.009	-0.032	-0.022	-0.092**	-0.224***	-0.184***	0.013
	(0.310)	(0.321)	(0.744)	(0.221)	(0.253)	(0.043)	(0.000)	(0.000)	(0.650)
Diversification	-0.076	-0.106	-0.028	-0.065	-0.015	0.013	0.171*	-0.100	-0.213*
	(0.657)	(0.295)	(0.669)	(0.585)	(0.949)	(0.886)	(0.077)	(0.294)	(0.065)
Unlisted	-0.125**	-0.187***	-0.205***	-0.252***	-0.142***	-0.156***	-0.207***	-0.171***	-0.313***
	(0.016)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hostile	-	-	-0.034	-0.096	-	0.011		0.591*	
			(0.860)	(0.716)		(0.964)		(0.082)	
Competition	-0.501*	-0.057	-0.189	0.083	-0.034	0.032	0.183	-0.037	-0.230*
	(0.064)	(0.806)	(0.208)	(0.582)	(0.765)	(0.812)	(0.358)	(0.682)	(0.055)
BIC Measure	-1057.179	-2165.017	-8059.207	-5757.381	-2184.403	-5953.611	-10534.85	-8551.992	-1558.938
Observations	135	215	804	526	226	647	983	855	171

p-values in parentheses

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

6. Discussion

6.1. Supporting Hypotheses

The first hypothesis revolved around two mutually exclusive theories denoting the possible impact of a credit rating with regard to a firm's capital structure. I expected that the increase in access to the public debt markets (Faulkender and Petersen, 2006) would overshadow the decrease in adverse selection (Frank and Goyal, 2009). A decrease in adverse selection would result in a higher degree of share payment following a credit rating. However, the results of the general beta regressions provide consistent evidence that a credit rating has a positive relationship with the cash fraction in acquisitions. Therefore, supporting the hypothesis by Faulkender and Petersen (2006), that a credit rating increases the debt capacity of firms.

The second hypothesis was directed at the pecking-order theory. I expected that a relatively higher Cash-to-Assets variable would result in a higher cash fraction in the payment method, among both the overall sample and specific sectors. The beta regression over the overall sample showed highly significant results with a sign corresponding to prior literature by (Myers, 1984). Regarding the specific sectors, I found statistical significance in the IT, Financial, Health Care and Energy sectors. Similar to the general beta regressions, all these sectors show significant coefficients implying the existence of the pecking-order theory. Firms with higher relative internal cash generation, prioritize the use of these internal funds. Resulting in the utilization of a higher fraction of cash in their payment methods by these firms. Ultimately, the variable has clear explanatory power and supports the payment method determination model.

In the third hypothesis, I did not expect to observe a significant impact of the Financial Leverage variable on the payment method in acquisitions. As a consequence of academic literature repeatedly providing empirical evidence suggesting that a positive relationship between profitability and leverage does not exist. However, the results did not follow this narrative, as a significant impact could repeatedly be observed once the deal-related variables were included in the model. This became apparent in the general sample beta regressions, as well as in the Communication Services and Energy sectors. Nevertheless, anytime the variable displayed significance, the direction was contrary to the rationale of the trade-off theory (Kraus & Litzenberger, 1973). The results suggest that firms do not adhere to a long-term debt target, but simply ramp-up leverage in the short term to acquirer a target. Therefore, I do not reject the third hypothesis. As expected, no evidence in favor of the static trade-off theory was observable in the general and the sector specific beta regressions. However, the variable provides a significant impact on the payment method, and should thus not be removed from

future models. Instead, future research should attempt to explain the impact of the variable on the payment method.

The fourth hypothesis was based on the *opportunity costs of holding cash hypothesis*. I expected a positive relationship between the book-to-market ratio and the fraction of cash in the general sample regression and across sectors. In the general sample regressions, highly significant results relating to the book-to-market ratio were observable. Moreover, the coefficient displayed a positive sign in each regression, supporting the *opportunity costs of holding cash hypothesis* (Martin, 1996). However, the evidence was less strong in the individual sectors, due to the variable occasionally becoming insignificant after incorporation of deal-related variables. Nevertheless, I do not reject the hypothesis, since the variable displayed a robust impact in the general beta regression, as well as in two individual sectors. High opportunity costs move bidders to utilize a higher percentage of shares in the payment method. The variable should not be removed from future models to determine the payment method.

Lastly, the Collateral variable was expected to have a significant impact on the payment method. After performing the beta regressions on the general sample, the variable appeared insignificant in all of the specifications. Suggesting, that either the Collateral variable is not a fitting proxy for a firm's debt capacity, or that firms do not assess the collateral during the payment method decisions. The only individual sector where I encountered statistical significance is the Industrial sector. However, the sign appears to be negative, which is contrary to prior literature (Faccio & Masulis, 2005). It implies that firms in the Industrial sector do not exploit an increase in collateral to obtain more debt. Instead, firms in this sector utilize a higher fraction of equity in the exchange method. Consequently, observing the Collateral variable from a general and a sector perspective does not provide evidence to accept the hypothesis. Due to a lack of significant evidence, the variable should be removed from future payment method determination models.

6.2. Main research question

The research question I composed at the start of this study was: *Does a credit rating increase the fraction of cash as the payment method in mergers and acquisitions, and does the insight of this impact increase when regressed from a sector perspective.* Following the robust results of the general beta regressions and the sector regressions, I affirm the first part of the question. A credit rating makes it easier for firms to access debt markets, resulting in a higher fraction of cash in the exchange method. This result is contrary to prior research by Karampatsas et al. (2014), who were not able to provide evidence of an impact on the payment method by the mere existence of a credit rating. Subsequently, the interaction variables provided initial awareness that a sector perspective could assign significant

impact to a credit rating. Ultimately, the detailed results were produced in the individual sector regressions, where the Credit Rating variable displayed statistical significance in the Financial, Health Care and Industrial sectors. The coefficients indicated that a credit rating has a positive relationship with the use of cash in these sectors. Additionally, the coefficients of the individual sectors displayed notably larger impact magnitudes compared to the coefficient found in the general sample regression. The individual sectors provided an impact on the payment method between 7.9% and 4.8%, while the general sector displayed a magnitude of 2.9%. Resulting in considerable differences in expectations on the impact of a credit rating, when a general approach is applied to acquisitions within the three aforementioned sectors. However, this increase in insight is solely conditioned to three sectors, while nine sectors have been analyzed. Therefore, a general claim confirming that a sector-specific perspective increases our insight cannot be made.

6.3. Additional findings

The Unlisted variable was the singular variable significant in every sector regression. Providing robust evidence of a negative relationship with the fraction of cash in the payment method. Suggesting that managers and shareholders of unlisted firms want to reap the fruits of future growth by the consolidated entity. This result is contrary to previously performed research by Faccio and Masulis (2005). Besides the Unlisted variable, have the Relative Size and Competition variables also repeatedly demonstrated a significant impact on the payment method. Moreover, displayed the BIC statistic generally an increase in explanatory power after incorporation of the deal-related variables. Ultimately, these findings indicate that one or more deal characteristic variables should always be present in models that try to determine the payment method.

7. Conclusion

In this study, I have researched the impact of a credit rating on the payment method both from a general perspective, and a sector perspective. Multiple facets motivated me to research this subject. Primarily, I was interested in the current authority of the credit rating agencies. Considering their role in the global financial crisis, I wondered if they had lost their authority in the financial markets. Furthermore, prior research was unsuccessful in defining a clear impact regarding the mere existence of a credit rating. Motivating me to find a significant impact by building on their studies. Lastly, was there a lack of inter-sector research of magnitude differences in payment method determinants. Therefore, stimulating me to introduce an alternative perspective on the impact of a credit rating.

To test the main research question, a data sample of acquisitions from bidders based in the United States ranging from December 31st, 2009, until December 31st, 2019 was gathered. The acquisitions were sorted respective to the bidders 2-digit GICS code, based on academic research. Beta regressions were utilized to detect a significant impact of a credit rating, primarily due to its flexible distribution. The first regressions were executed to find a robust influence of a credit rating on the complete sample, using step-wise model building. After finding highly significant results, interaction variables between the sectors and the Credit Rating variable were included in the regression with the highest degree of fit. Ultimately, to discover the precise impact of a credit rating within each sector. Individual sector regressions were performed over each sector, utilizing the identical method of step-wise model building conform the general beta regression.

My findings indicate a statistically significant influence of a credit rating on the payment method in acquisitions. Specifically, it supports the rationale from Faulkender and Petersen (2006), that a credit rating increases a firm's debt capacity due to access to public debt markets. In general, possessing a credit rating increases the cash fraction of an acquisition by 2.8%. However, in the Financial, Industrial and Health Care sectors, a general perspective would underestimate the impact of a credit rating considerably. Nevertheless, could a general statement of an increase in insight not be made. The increase in awareness of a credit rating is exclusively bound to the three sectors where a significant influence was displayed. Despite the fact that a total of nine sectors were examined. Additionally, I found a significant influence of the pecking-order theory and the *opportunity costs of holding cash hypothesis*. Lastly, displayed the beta regressions a significant impact of deal-related characteristics on the payment method.

The product of this study brings us one step closer to a complete model capable of determining the payment method in acquisitions. Providing evidence on the relevance of including certain variables, as well as the appropriate perspective of the regressions. Therefore, the results are mainly applicable to researchers dedicated to creating models in an acquisition context. However, one could argue that this result is highly relevant for companies as well. Target firms should take advantage of the tendencies acquirers possess in deciding on the payment method, following certain firm and/or deal characteristics. Additionally, is this paper evidence to society for the sustained authority credit rating agencies are able to bestow on financial markets. However, the magnitude of the impact differs per sector.

This study should be repeated, but with a more consistent underlying data sample. Due to clustering of observations, some sectors had substantially more acquisitions in their respective sample compared

to others. Furthermore, should this research be a stimulant for academics to perform more extensive research on theories that were assumed valid or invalid in the past. Considering, this study does not only provide unprecedented evidence on the significance of a credit rating. It also reports contrary associations on widely researched conditions, like a target firm being unlisted. Lastly, should research expand on categorization alternatives, that might fit the sample better. Academic literature recommended the use of the GICS method to investigate financial data. However, alternatives besides sector categorizations could provide an increase in explanatory power, as more firms are starting to apply their knowledge into different fields. This is especially relevant for high-tech companies. For instance, Google which is making advances in the Health Care sector, or Tesla which is diversifying into solar panels.

8. References

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9. Appendix

Table 6: Part 1 of the correlation table on the complete sample variables.
The table presents correlation values between variables from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The data has been retrieved from the Thomson Reuters SDC Mergers and Acquisitions Database, Compustat, CRSP, IBES.

	Fraction of Cash	Credit Rating	Analysts	Firm Size	Firm Run-Up	Book-to-Market	Cash-to-Assets	Financial Leverage	Collateral
Fraction of Cash	1								
Credit Rating	0.146***	1							
Analysts	0.170***	0.434***	1						
Firm Size	0.153***	0.553***	0.779***	1					
Firm Run-Up	-0.0671***	-0.0141	-0.0164	0.0322**	1				
Book-to-Market	-0.00993	-0.0532***	-0.268***	-0.362***	-0.165***	1			
Cash-to-Assets	0.167***	0.0812***	0.136***	0.221***	0.0144	-0.143***	1		
Financial Leverage	0.00124	-0.0709***	-0.0119	-0.0315**	-0.0101	-0.0361**	-0.0607***	1	
Collateral	0.00330	0.172***	0.0132	0.0358**	-0.0358**	0.00590	0.0602***	-0.0457**	1
Relative Size	-0.0996***	-0.00981	-0.0623***	-0.0901***	-0.0317**	0.0891***	-0.169***	0.00658	0.00694
Diversification	-0.00875	0.0398***	0.0287**	0.0421***	0.00300	-0.0185	-0.0165	-0.0105	-0.00385
Unlisted	-0.434***	-0.118***	-0.137***	-0.139***	0.105***	-0.0643***	-0.108***	0.0763***	-0.0547***
Hostile	0.00446	0.0311**	0.00345	0.0180	0.0168	0.0152	-0.00161	-0.00821	-0.00527
Competition	-0.0192	0.0260*	0.0240*	0.0529***	0.0140	-0.0268*	-0.00511	-0.000842	0.0206
Energy	-0.113***	0.0933***	0.0334**	0.0488***	-0.0280*	0.107***	-0.0616***	-0.000316	0.277***
Materials	0.0420***	0.117***	-0.0215*	0.0408***	0.0000781	-0.0480***	0.0335**	-0.00756	0.236***
Industrial	0.0411***	0.0708***	-0.0289**	0.0194	0.0337**	-0.0609***	0.0500***	0.00825	0.0584***
Consumer Discretionary	0.0734***	0.0839***	0.0654***	-0.000528	0.000815	-0.0636***	0.0640***	0.00762	0.175***
Consumer Staples	0.0400***	0.0684***	0.0291**	0.0841***	-0.0268*	-0.0758***	0.0317**	-0.0146	0.0801***
Health Care	-0.0181	-0.00470	0.0776***	0.0650***	0.0180	-0.122***	-0.0819***	0.0195	-0.145***
Financial	-0.104***	-0.141***	-0.180***	-0.154***	-0.0392***	0.368***	-0.0449***	-0.0464***	-0.275***
IT	0.0729***	-0.147***	0.0805***	0.00975	0.0114	-0.178***	0.0120	0.0457***	-0.195***
Communication Services	-0.0265*	0.0306**	-0.00565	-0.0139	0.0301**	0.00660	0.0168	-0.0152	-0.00850

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

Table 7: Part 2 of the correlation table on the complete sample variables.

	Relative Size	Diversification	Unlisted	Hostile	Competition	Energy	Materials	Industrials
RelativeSize	1							
Divers	0.0375***	1						
Unlisted	0.0454***	-0.0880***	1					
Hostile	0.0388***	0.0552***	-0.0275*	1				
Competition	0.0359***	0.108***	-0.0608***	0.0771***	1			
Energy	0.0462***	0.00178	0.120***	-0.00902	-0.000597	1		
Materials	0.0210	0.0164	-0.0225*	0.0101	0.00282	-0.0547***	1	
Industrials	-0.0182	0.0422***	0.0462***	0.0339**	0.00263	-0.110***	-0.0863***	1
Consumer Discretionary	-0.00516	-0.0252*	-0.0733***	-0.00232	-0.00709	-0.0986***	-0.0773***	-0.155***
Con. Stap	0.00128	-0.0136	-0.00393	-0.00697	0.0172	-0.0540***	-0.0423***	-0.0851***
Health Care	-0.000553	-0.0132	0.0675***	-0.00241	0.000991	-0.0990***	-0.0776***	-0.156***
Financial	-0.00105	-0.0174	-0.121***	-0.0189	-0.0348**	-0.147***	-0.115***	-0.231***
IT	-0.0333**	-0.0218*	0.0143	0.00137	0.0154	-0.126***	-0.0985***	-0.198***
Communication Services	0.0302**	0.0629***	0.0341**	-0.00702	0.0308**	-0.0543***	-0.0425***	-0.0856***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Part 3 of the correlation table on the complete sample variables.

	Con. Disc.	Con. Stap	Health Care	Financial	IT	ComServ
Consumer Discretionary	1					
Consumer Staples	-0.0762***	1				
Health Care	-0.140***	-0.0766***	1			
Financial	-0.207***	-0.113***	-0.208***	1		
IT	-0.177***	-0.0971***	-0.178***	-0.264***	1	
Communication Services	-0.0767***	-0.0420***	-0.0770***	-0.114***	-0.0977***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: Margins of the beta regressions on the Energy sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification and Unlisted variables. The Hostile variable has been excluded due to a lack of observations.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.004	0.003	0.011	0.034	0.034	0.067
	(0.916)	(0.891)	(0.822)	(0.510)	(0.588)	(0.276)
Analysts	0.002	0.003	-0.003	-0.003	-0.002	-0.000
	(0.350)	(0.249)	(0.336)	(0.246)	(0.652)	(0.950)
Firm Size	0.006	0.031*	0.024	0.024	0.019	0.000
	(0.691)	(0.087)	(0.196)	(0.202)	(0.421)	(1.000)
Firm Run-Up	-0.026	-0.011	-0.042	-0.059	-0.080	-0.109
	(0.761)	(0.897)	(0.730)	(0.635)	(0.616)	(0.483)
Cash-to-Assets		0.189**	0.273**	0.364***	0.580**	0.438*
		(0.033)	(0.042)	(0.010)	(0.015)	(0.052)
Book-to-Market			0.030	0.029	0.056	0.031
			(0.557)	(0.597)	(0.451)	(0.676)
Firm Financial Leverage				0.067**	0.053*	0.064**
				(0.022)	(0.091)	(0.036)
Collateral					-0.147	-0.118
					(0.168)	(0.280)
Relative Size						-0.021
						(0.310)
Diversification						-0.076
						(0.657)
Unlisted						-0.125**
						(0.016)
Competition						-0.501*
						(0.064)
BIC Measure	-3534.149	-1971.402	-1957.724	-1741.438	-1066.897	-1057.179
Observations	443	242	241	221	135	135

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Margins of the beta regressions on the Material sector

The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table includes the specifications on which STATA was able to run. In specification (5), the Collateral variable was included and in specification (6) the deal-related variables. The deal specific variables are comprised of the Relative Size, Diversification and Unlisted variables. The Hostile variable has been excluded due to a lack of observations.

	(5)	(6)
Fraction of Cash		
Credit Rating	-0.034	-0.047
	(0.458)	(0.283)
Analysts	-0.001	0.003
	(0.794)	(0.613)
Firm Size	0.033	0.010
	(0.221)	(0.710)
Firm Run-Up	0.032	0.126
	(0.855)	(0.462)
Cash-to-Assets	0.138	-0.040
	(0.743)	(0.920)
Book-to-Market	0.104	0.102
	(0.122)	(0.119)
Firm Financial Leverage	-0.026	-0.020
	(0.316)	(0.419)
Collateral	-0.023	0.038
	(0.789)	(0.643)
Relative Size		0.083
		(0.321)
Diversification		-0.106
		(0.295)
Unlisted		-0.187***
		(0.000)
Competition		-0.057
		(0.806)
BIC Measure	-2161.891	-2165.017
Observations	215	215

p-values in parentheses

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

Table 11: Margins of the beta regressions on the Industrial sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification Unlisted and Hostile variables.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.037*	0.043**	0.042*	0.042*	0.055**	0.058**
	(0.061)	(0.036)	(0.073)	(0.081)	(0.031)	(0.017)
Analysts	0.005***	0.006***	0.006***	0.007***	0.007***	0.005**
	(0.004)	(0.003)	(0.005)	(0.004)	(0.005)	(0.044)
Firm Size	-0.006	-0.009	-0.001	-0.001	-0.001	-0.005
	(0.449)	(0.252)	(0.884)	(0.934)	(0.938)	(0.617)
Firm Run-Up	-0.076	-0.085*	-0.046	-0.038	-0.054	0.024
	(0.116)	(0.087)	(0.469)	(0.593)	(0.472)	(0.742)
Cash-to-Assets		0.118	0.234	0.187	0.139	0.180
		(0.362)	(0.142)	(0.282)	(0.449)	(0.292)
Book-to-Market			0.108***	0.111***	0.123***	0.108***
			(0.001)	(0.001)	(0.002)	(0.003)
Firm Financial Leverage				-0.005	-0.004	0.004
				(0.630)	(0.649)	(0.686)
Collateral					0.014	-0.082*
					(0.748)	(0.055)
Relative Size						0.009
						(0.744)
Diversification						-0.028
						(0.669)
Unlisted						-0.205***
						(0.000)
Hostile						-0.034
						(0.860)
Competition						-0.189
						(0.208)
BIC Measure	-11949.15	-9777.813	-9384.222	-8739.526	-8003.914	-8059.207
Observations	1,208	987	952	879	805	804

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Margins of the beta regressions on the Consumer Discretionary sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table excludes the specifications on which STATA was not able to run. In specification (3) the Book-to-Market variable was included with the Cash-to-Assets variable and the starting variables of prior specifications. Subsequently, each specifications will include respectively, the Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification Unlisted and Hostile variables.

	(3)	(4)	(5)	(6)
Fraction of Cash				
Credit Rating	0.010	0.014	0.026	0.013
	(0.658)	(0.555)	(0.329)	(0.590)
Analysts	0.002	0.002	0.002	-0.000
	(0.149)	(0.258)	(0.338)	(0.991)
Firm Size	0.005	0.011	0.008	0.013
	(0.648)	(0.330)	(0.521)	(0.259)
Firm Run-Up	-0.039	-0.063	-0.088	-0.019
	(0.562)	(0.432)	(0.323)	(0.806)
Cash-to-Assets	0.163	0.185	0.164	0.075
	(0.114)	(0.140)	(0.212)	(0.496)
Book-to-Market	-0.003	0.015	-0.006	0.010
	(0.907)	(0.660)	(0.875)	(0.776)
Firm Financial Leverage		-0.003	-0.004	0.000
		(0.707)	(0.664)	(0.962)
Collateral			0.015	0.018
			(0.720)	(0.630)
Relative Size				-0.032
				(0.221)
Diversification				-0.065
				(0.585)
Unlisted				-0.252***
				(0.000)
Hostile				-0.096
				(0.716)
Competition				0.083
				(0.582)
BIC Measure	-8430.484	-6821.052	-5700.632	-5757.381
Observations	776	630	528	526

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Margins of the beta regressions on the Consumer Staples sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification and Unlisted variables. The Hostile variable has been excluded due to a lack of observations.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.034	0.046	0.049	0.053	0.072	0.060
	(0.355)	(0.236)	(0.261)	(0.263)	(0.158)	(0.219)
Analysts	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.386)	(0.468)	(0.547)	(0.534)	(0.638)	(0.677)
Firm Size	0.013	0.009	0.014	0.017	0.014	0.014
	(0.321)	(0.489)	(0.371)	(0.328)	(0.454)	(0.434)
Firm Run-Up	-0.100	-0.070	-0.055	-0.057	-0.060	0.020
	(0.258)	(0.445)	(0.577)	(0.582)	(0.584)	(0.854)
Cash-to-Assets		0.350	0.512*	0.510	0.628	0.446
		0.147	(0.070)	(0.107)	(0.102)	(0.225)
Book-to-Market			0.052	0.065	0.077	0.089
			(0.390)	(0.303)	(0.239)	(0.159)
Firm Financial Leverage				-0.002	0.002	-0.007
				(0.953)	(0.963)	(0.849)
Collateral					0.025	-0.020
					(0.737)	(0.793)
Relative Size						-0.022
						(0.253)
Diversification						-0.015
						(0.949)
Unlisted						-0.142***
						(0.000)
Competition						-0.034
						(0.765)
BIC Measure	-3212.918	-2723.54	-2646.435	-2494.011	-2220.891	-2184.403
Observations	315	272	266	253	229	226

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Margins of the beta regressions on the Health Care sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification Unlisted and Hostile variables.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.034	0.053**	0.048*	0.052**	0.047*	0.048*
	(0.149)	(0.024)	(0.058)	(0.049)	(0.080)	(0.067)
Analysts	0.001	0.002	0.002	0.001	0.002	0.001
	(0.512)	(0.238)	(0.415)	(0.518)	(0.324)	(0.549)
Firm Size	0.019**	0.004	0.006	0.008	0.008	-0.005
	(0.012)	(0.565)	(0.484)	(0.388)	(0.398)	(0.591)
Firm Run-Up	-0.057	-0.130*	-0.130*	-0.158*	-0.156*	-0.111
	(0.327)	(0.067)	(0.065)	(0.053)	(0.055)	(0.156)
Cash-to-Assets		0.214***	0.331***	0.465***	0.451***	0.389***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Book-to-Market			0.063**	0.064**	0.061*	0.046
			(0.040)	(0.049)	(0.062)	(0.149)
Firm Financial Leverage				0.001	0.001	0.005
				(0.908)	(0.873)	(0.545)
Collateral					0.061	0.050
					(0.251)	(0.339)
Relative Size						-0.092**
						(0.043)
Diversification						0.013
						(0.886)
Unlisted						-0.156***
						(0.000)
Hostile						0.011
						(0.964)
Competition						0.032
						(0.812)
BIC Measure	-8907.903	-7333.544	-7076.35	-6034.761	-5945.673	-5953.611
Observations	997	812	786	655	648	647

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: Margins of the beta regressions on the Financial sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table utilises step-wise model building, starting in specification (1) with the Credit Rating, Analysts, Firm-Run Up and Market Size variables. The following specifications will each include respectively, the Cash-to-Assets (2), Book-to-Market (3), Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification and Unlisted variables. The Hostile variable has been excluded due to a lack of observations.

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of Cash						
Credit Rating	0.088***	0.104***	0.102***	0.101***	0.101***	0.079***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
Analysts	0.005***	0.005**	0.006***	0.005**	0.005**	0.004*
	(0.002)	(0.004)	(0.010)	(0.021)	(0.025)	(0.099)
Firm Size	-0.019***	-0.025**	-0.024**	-0.021**	-0.018*	-0.015
	(0.005)	(0.002)	(0.014)	(0.041)	(0.083)	(0.114)
Firm Run-Up	-0.278***	-0.304***	-0.298***	-0.315***	-0.305***	-0.230***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.004)	(0.009)
Cash-to-Assets		0.376	0.573***	0.738***	0.742***	0.522**
		0.031	(0.010)	(0.009)	(0.007)	(0.049)
Book-to-Market			0.056**	0.071**	0.068**	0.044
			(0.049)	(0.018)	(0.029)	(0.118)
Firm Financial Leverage				0.003	0.002	0.011
				(0.793)	(0.805)	(0.273)
Collateral					0.012	0.010
					(0.632)	(0.606)
Relative Size						-0.224***
						(0.000)
Diversification						0.171*
						(0.077)
Unlisted						-0.207***
						(0.000)
Competition						0.183
						(0.358)
BIC Measure	-17791.86	-14012.65	-11260.59	-10715.78	-10528.26	-10534.85
Observations	1,911	1,530	1,246	1,188	984	983

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Margins of the beta regressions on the Information Technology sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table excludes the specifications on which STATA was not able to run. In specification (2) the Cash-to-Assets variable was included with the starting variables of the prior specification. Subsequently, each specifications will include respectively, the Book-to-Market (3), the Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification Unlisted and Hostile variables.

	(2)	(3)	(4)	(5)	(6)
Fraction of Cash					
Credit Rating	0.042**	0.019	0.015	0.016	0.018
	(0.019)	(0.345)	(0.482)	(0.469)	(0.395)
Analysts	0.000	-0.000	-0.001	-0.001	0.000
	(0.736)	(0.875)	(0.499)	(0.536)	(0.726)
Firm Size	0.003	0.016**	0.023**	0.022**	0.007
	(0.611)	(0.029)	(0.012)	(0.013)	(0.438)
Firm Run-Up	-0.093**	-0.068	-0.039	-0.039	0.019
	(0.039)	(0.192)	(0.561)	(0.564)	(0.764)
Cash-to-Assets	0.209***	0.170**	0.229**	0.204*	0.193*
	(0.000)	(0.020)	(0.049)	(0.083)	(0.082)
Book-to-Market		0.079***	0.082**	0.079**	0.065*
		(0.005)	(0.015)	(0.026)	(0.051)
Firm Financial Leverage			0.003	0.003	0.007
			(0.572)	(0.519)	(0.171)
Collateral				0.019	-0.008
				(0.698)	(0.869)
Relative Size					-0.184***
					(0.000)
Diversification					-0.100
					(0.294)
Unlisted					-0.171***
					(0.000)
Hostile					0.591*
					(0.082)
Competition					-0.037
					(0.682)
BIC Measure	-14047.02	-12175.43	-8613.972	-8485.528	-8551.992
Observations	1443	1,236	866	855	855

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Margins of the beta regressions on the Communication Services sector
The table present the results regarding the presence of a credit rating on the payment method from a sample of North American acquisitions dating from December 31st, 2009 till December 31st, 2019. The table excludes the specifications on which STATA was not able to run. In specification (2) the Cash-to-Assets variable is included with the starting variables of the prior specification. Subsequently, each specifications will include respectively, the Book-to-Market (3), the Financial Leverage (4), Collateral (5) and deal-related variables (6). The deal specific variables are comprised of the Relative Size, Diversification and Unlisted variables. The Hostile variable has been excluded due to a lack of observations

	(2)	(3)	(4)	(5)	(6)
Fraction of Cash					
Credit Rating	-0.008	-0.013	0.017	0.026	0.029
	(0.845)	(0.777)	(0.739)	(0.632)	(0.558)
Analysts	0.003	0.002	0.005	0.006	0.004
	(0.448)	(0.642)	(0.218)	(0.221)	(0.389)
Firm Size	-0.010	-0.005	-0.020	-0.024	-0.024
	(0.572)	(0.793)	(0.393)	(0.365)	(0.311)
Firm Run-Up	-0.067	-0.126	-0.064	-0.095	0.060
	(0.501)	(0.272)	(0.635)	(0.501)	(0.656)
Cash-to-Assets	0.272	0.262	0.392	0.409	0.637*
	(0.266)	(0.332)	(0.309)	(0.342)	(0.094)
Book-to-Market		-0.032	-0.028	-0.082	-0.058
		(0.486)	(0.568)	(0.165)	(0.278)
Firm Financial Leverage			0.006	0.009	0.053**
			(0.852)	(0.774)	(0.066)
Collateral				0.018	0.080
				(0.860)	(0.377)
Relative Size					0.013
					(0.650)
Diversification					-0.213*
					(0.065)
Unlisted					-0.313***
					(0.000)
Competition					-0.230*
					(0.055)
BIC Measure	-2814.506	-2311.723	-1857.018	-1642.017	-1558.938
Observations	300	248	201	181	171

p-values in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$