Can the Bid Premium Level be Explained by the Individual Accounting Ratios of the Target?

Master's Thesis in Accounting and Financial Management

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ABSTRACT
This thesis studies the relationship between the targets's accounting based key ratios and the bid premium in the American manufacturing industry. The sample consists of 406 public transactions during the period 1999-2009. The main hypothesis is that accounting based key ratios can help to explain the bid premium. A statistical approach has been used and a principal component analysis has been conducted in order to reduce the number of accounting ratios to a smaller sample to include in a multivariate regression model. A number of control variables, based on previous research, have been included in the model to isolate the effect of the accounting key ratios. The study finds support for the hypothesis that accounting based key ratios can help to explain the bid premium even if the explanatory level is low. The results indicate that acquirers pay a lower premium for targets with a larger asset base. It is also found that buyers with high excess cash in relation to the market value of the target tend to pay a higher premium and that transactions conducted during 2003-2007 command a lower premium on average than otherwise.

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1. Introduction

1.1 The Setting

Mergers and acquisitions (M&A) is a natural part of today's business world. Companies increasingly use acquisitions as a strategy to grow and increase profitability. These deals can be worth billions of dollars and shape the future of the companies, CEOs and other employees. A recent example is the 26,3 billion US dollar deal where Warren Buffet's investment company Berkshire Hathaway agreed to acquire US largest railroad operator, Burlington Santa Fe, for a 31 percent premium (Wall Street Journal, 2009). The premiums above the market value in transactions are often motivated by future synergies. Yet research has shown that acquisitions seldom create value for the acquirer (Martynova & Renneboog, 2008).

Since the shareholders of a public listed target never would settle for a lower bid than the trading market value, a lower boundary is fixed. As the acquirer will never pay more than the value of the target and expected synergies a natural range is created.

As a result, the estimation of synergies is vital in a company transaction. The problem with value destruction occurs when an acquirer overestimates the expected synergies and pays an exaggerated premium.[1] Other external factors like multiple bidders, current market conditions and managerial hubris can affect the target's price tag and hence the level of the bid premium. Factors like these have been covered in previous research, but considerable less attention has been given to internal factor like financial characteristics of the target.

By using accounting based key ratios, risk and return measurements can be calculated and evaluated for different companies. Financial ratios are used to make intelligent investment decisions and can provide unique profiles of financial and operating characteristics (White et al. 2003).

1.2 Aim of this study

Much of the existing literature regarding the acquisition premium has been focused on macroeconomic factors, ownership structure and deal specific characteristics such as deal type

[1] In this paper bid premiums, merger premiums, acquisition premiums and premiums is used interchangeably to describe the purchase price above market value.

and method of payment i.e. external factors. Limited research has investigated the relationship between accounting ratios and the bid premium i.e. internal factors. To increase the knowledge of factors that explain the bid premium, the purpose of this thesis is to study if individual accounting key ratios affect the bid premium in the US manufacturing industry during 1999-2009.[2] No previous studies have been found with this focus on accounting based ratios regarding industry and time period.

1.3 Scope of research

This study focuses on listed companies in the US manufacturing industry and is limited to the time period 1999-2009. The limitations are based on the data availability and strive for a consistent and homogenous sample. The study focuses on the question "if" accounting based key ratios can explain the premium and hence less attention will be given to "why" different parameters explain the bid level. The aggregated effect of the key ratios explanatory power will not be addressed. As mentioned above this paper will only focus on the explanatory effect of individual accounting based key ratios and does not aim to explain all determinants of the bid premium nor predict future bid premiums. Other limitations regarding the data set are further described in Section 4.

1.4 Outline

The thesis consists of eight sections which will be presented as following. Firstly, a literature review will be presented. The research regarding the relationship between accounting key ratios and bid premiums is limited so no direct theoretical framework will be applied; instead relevant background on M&A and different studies about the determinants of the bid premium will be accounted for. The hypothesis will be presented in Section 3. In Section 4 the empirical data will be presented and described and the limitations used to derive the final data sample stated. Section 5 will present the dependent and independent variables as well as the method used to investigate the hypothesis. The execution and results will be displayed and tested for robustness in section 6. Section 7 will analyze and interpret the result. The final conclusions will be presented in Section 8 as well as suggestions for future research.

[2] For definition please see section 4.2.2

2. Theory and Previous Research

This section will provide an overview of previous research regarding the causes and drivers of M&A activity and merger waves in order to frame the research question. This will be followed by a summary of the value creating effects of M&A. Finally, research about the known determinants of the acquisition premium will be covered which will provide the theoretical base for the hypothesis.

2.1 What explain acquisition activity and merger waves?

Several authors have highlighted that merger activity occurs in waves within industry sectors. Martynova and Renneboog (2008) review the literature about corporate takeovers and merger waves and structure the theories in three groups; *business and economic shocks* (e.g. Gort (1969), Jensen (1986) and Andrade et al. (2001)), *self-interested and irrational managers* (e.g. Roll (1986), Malmendier & Tate (2008) and Jensen (1988)) and *market misvaluations* (e.g. Shleifer & Vishny (2003) and Rhodes-Kropf et al. (2005)). These theories will be further explained below.

Business and economic shocks

Andrade et al. (2001) argues that a significant level of the merger activity can be explained by industry level shocks. Examples of shocks include supply shocks e.g. a hike in the oil price, technological innovations creating excess capacity or deregulations. Companies within the effected industries react to these shocks by initiating a restructuring process, often through mergers. The shocks affect different industries at different times which explain the variation of acquisition activity among industries over time. The view that merger activity occurs in waves and that waves are the result of industry-shocks is supported by several other authors (e.g. Gort (1969) and Jensen (1986)). These neoclassical explanations are given support by Harford (2005), who also argues that industry-shocks must be combined with sufficient access to capital liquidity in order to facilitate merger waves.

Schoenberg & Reeves (1999) studied factors explaining acquisition activity within 200 industry sectors in the United Kingdom between 1991 and 1995. Deregulation was found to be the most important factor explaining the differences between high and low acquisition activity levels among industries. High industry growth rates and low industry concentration rates were also associated with high acquisition rates whereas profitability and capital intensity did not contribute to explain the differences.

Self-interested and irrational managers

Jensen (1988) suggests that agency costs and the conflict between managers and shareholders over the use of free cash flow (FCF) can be a major cause of takeover activity. Booming financial markets or industrial shocks can lead to excessive FCF at the discretion of management. Self-interested managers are more likely to use the funds for empire building and undertake mergers rather than returning the excess cash to shareholders.

Roll (1986) proposes management hubris as an explanation for why many unsuccessful mergers occur in each takeover wave. Managers are irrational and overconfident and overestimate the amount of synergies to be realized. Malmendier & Tate (2008) analyzes the impact of overconfidence on merger decisions. In firms with abundant resources, using the approximations CEO's over-investment in the company and how the CEOs are portrayed in the media, they conclude that the likelihood of an acquisition is 65 percent higher if the CEO is classified as overconfident. The effect is largest for diversifying acquisitions where the cash availability is good and no external financing is required.

Market misvaluations

Another explanation to takeover activity is market timing by corporate managers who take advantage of perceived valuation errors in the market. Shleifer & Vishny (2003) propose a model where transactions are driven by the relative stock market valuations of merging firms. The market is inefficient and some companies are undervalued which can be exploited by rational managers. The degree of mispricing varies across companies and managers of the bidding firm use the company's overvalued equity to buy mispriced targets. This theory is opposing the hubris argument developed by Roll (1986) and assumes that managers undertake rational merger decisions rather than irrational choices based on hubris, overconfidence or empire-building. Rhodes-Kropf and Viswanathan (2004) argue that market misvaluations have a fundamental impact on merger activity, both affecting the likelihood of an acquisition and the method of payment. Market overvaluation increases the likelihood that a merger will occur and there will also be a larger fraction of stock purchases in an overvalued market as well as more cash-offers in an undervalued market. Rhodes-Kropf and Viswanathan also argue that target managers are rational but make more mistakes when evaluation equity bids in a booming financial market.

Rhodes-Kropf et al. (2005) break down the market-to-book ratio (M/B) into three components; *the firm-specific pricing deviation from short-run industry pricing, sector-wide short-run deviations from firms' long-run pricing* and *long-run pricing to book*. They find that merger intensity is positively associated with short-run deviations in valuation from long-run trends, both for individual firms as well as on aggregated industry level.

2.2 Value creation through Mergers & Acquisitions

There is an ongoing debate on whether M&A transactions create value for shareholders. It can be argued that acquisitions create value for target shareholders based on the fact that the average acquisition premium is 30 percent above the pre-announcement share price (Koller et.al, 2005). Martynova & Renneboog (2008) summarize previous research about value creation in merger activity and find that previous studies indicate that bidding firms earn negative or insignificant CAARs[3] prior to and around acquisition announcements. However, the total share price effect is positive at announcement but most of these value gains are captured by the target shareholders. The evidence for long-term value creation indicates that takeovers lead to a decline in share prices for acquiring firms several years after the transaction. As an example, Mitchell & Stafford (2000) find that acquiring firms underperform their peer group by five percent during the three year-period after the acquisitions. Overall, the evidence suggests that M&A activity creates value for the target shareholders but not necessarily for the bidders.

2.3 Determinants of the acquisition premium

There are extensive research covering M&A in general and the reasons behind acquisition activity as well as the value creation effects of mergers. However, less attention has been given to explanations of variations in the acquisition premium. In theory, the highest price a value-maximizing bidder can bid above the market value would equal the net benefits of the synergies expected from the combined entity. That would result in a net present value transaction of zero for the bidder and therefore the actual bid is expected to be below this level (Walkling and Edmister, 1985). The current market price of the target sets the floor for a bid since the target shareholder would refuse to sell their shares below what is expected in an arm's length

[3] Cumulative Average Abnormal Returns

transaction on the stock exchange, as a result there is a natural range for the bid and the bid premium. Exhibit 2.1 below summarizes the results of selected European and American studies about the determinants of the bid premium. The studies will be presented in more detail after the table below.

Summary of research about the acquisition premium

Author	Method	Data sample	Premium definition	Significant variables (effect on premium)[4]	Adjusted[5] R^2
Allerth & Åhr (2004)	Regression	92 Swedish takeovers during 1997-2003	Bid price/ Market price 10 and 30 days prior to announcement	SAX-index development (+)*, Toehold (-)**, Foreign buyer (+)**, Transaction value (-)**	0,267
Billett & Ryngaert (1997)	NLS regression	145 cash tender offers during 1980-1989	Bid price/Market value prior to announcement	Multiple bidders (+)*, Liabilities/Equity (+)*, Financial assets/Equity (-)*, Percentage of shares sought (+)***	0,372
Boström & Gustavsson (2000)	Regression	91 Swedish takeovers during 1988-1998	Bid price/Market price 5 days prior to announcement	Toehold (-)*, Majority Holder Target (+)**, Stock payment (+)**, Liquid assets buyer/MV Target (+)*, Tobin´s Q target (-)*, MVB/MVT (-)*, Total capital target (-)**, Relative performance target (-)*, Δ AFGI (-)**	0,477
Flanagan & O´Shaughnessy (2003)	Regression	285 US tender offers in manufacturing industry between 1986-1995	Bid price/Market price 4 weeks prior to announcement	Percent of target held (-)*, White Knight[6] (+)**, Multiple bidders (+)*, Core-related (+)**	0,120
Goncharenko (2001)	Regression	1187 European transactions during 1996-2001	Bid price/Market price 1 day and 1 month prior to announcement	Stock payment (-)*, Hostile bid(+)*, Toehold (-)*,Control of 50% sought (+)*, Horizantal and conglomerate acquisition (-)*, Pre-bid run-up (-)*, Bull market (+)**, Transaction size (-)***, UK (+)*, Scandinavia (+)**, Liberalized industry (-)***	0,231
Henderson & Gart (1999)	Regression	228 US commercial bank deals during 1989-1998	Bid-price to tangible book value	Target P/E (+)*, Target ROA (+)*, Asset/Equity (+)*, Deal value (+)*, Target Efficiency ratio[7] (-)**, Non-performing loans/Total assets (-)*, Buyer P/E (+)*	0,625
Larsson Hanséus & Ullman (2009)	Regression	618 European transactions during 1997-2008.	Bid price/ Market price 1 day prior to announcement	EBIT/Total assets (-)**, Revenues/Total assets (+)**, ln(total assets) (-)**, ln(net revenues) (-)**, MV/EV(-)**	0,069
Moeller (2005)	OLS regression	373 US transactions 1990-1999	Bid price/Market price 6 days prior to announcement	Target shareholder control[8] (+)**, Hostile bid (+)***, Fraction paid with cash (+)**, MV Target/MV Bidder (-)*	0,170

[4] Significance levels * = 1%, ** = 5%, *** = 10%

[5] Adjusted $R^2 = 1 - (1 - R^2) * \frac{(n-1)}{(n-k)}$

[6] White Knights are acquirers that purchase a firm with the approval of the target firm management after the management has urged shareholders to reject a previous offer by another bidder (Flanagan & O'Shaughnessy , 2003).

[7] Efficiency ratio = Non-interest expenses/Total revenue. It is a measure of successful cost control.

[8] Approximated by low target CEO share ownership, low fraction of insider directors and the presence of large outside blockholders.

Author	Method	Data sample	Premium definition	Significant variables (effect on premium)[9]	Adjusted R^2
Palia (1993)	Regression	137 US bank mergers 1984-1987	Bid price to book value of equity	Target ROA (+)*, Target assets/Buyer asset (-)*, Non-performing loans/Assets (-)**, Target Market concentration (+)* , Interstate mergers (+)*, Restricting laws target state (+)**, Manager ownership target (+)**, Manager ownership acquirer (-)**	0,363
Slusky & Caves (1991)	Regression	100 public US transactions during 1986-1988	Bid price/ Market price 20 days prior to announcement	Rival bidders (+)*, Cash (+)**, Target D/E – Buyer D/E (+)*, Fraction of minority shareholders (-)	0,449
Varaiya (1987)	Regression	77 US takeovers during 1975-1980	Bid price/Market price 1 month prior to announcement	Competing buyers (+)*, anti-takeover charters (+)***	0,140
Walkling & Edmister (1985)	Regression	108 US tender offers between 1972-1977	Bid price/Market price 14 days prior to announcement	Debt/Assets (-)* , Market Value/Book Value (-)*, Opposing bidder (+)*, Control of 50% sought (+)*, % of shares controlled (-)***	0,379

Exhibit 2.1. *Overview of research about determinants of the acquisition premium.*

American studies

Walkling and Edmister (1985) analyses the acquisition premium in US tender offers between 1972-1977 and argues that the premium is expected to be a positive function of potential acquisition related benefits and a negative function of the bidder's bargaining power. They construct a regression model including working capital, debt, bargaining-strength variables and valuation-related variables to explain the premium. Targets with increasing leverage and a high market-to-book ratio receive significantly lower bid premiums. The percentage of shares already controlled by the bidder increases the bidder's bargaining strength and reduces the premium whereas the existence of an opposing bid has a positive effect. Premiums are also found to be higher where the bidder seeks majority control in the target.

Varaiya (1987) constructs a similar study on 77 completed acquisitions during 1975-1980 but with a different set of independent variables. The author argues that the observed premium is positively related to the buyer's estimation of acquisition gains and negatively related to the seller's bargaining strength. Three types of acquisition gains are identified; *underpricing gains*, *undermanagement gains* and *synergistic gains*. Underpricing gains assume that the buyer believes that the market is underestimating the standalone value of the target and that an upward revision will be followed after the acquisition. Undermanagement gains arise when the buyer

[9] Significance levels * = 1%, ** = 5%, *** = 10%

believes that by replacing the target management with its own, the utilization of the target's existing assets and the identification of future growth opportunities in the industry can be improved. The last component is synergistic gains that arise because of the presumption that the combined entity will increase the total dividend stream due to the increased revenues and/or reduced costs. Variables for the undermanagement and the underpricing hypothesis are constructed based on market-to-book ratios and ROE relative to the industry average of the target. The seller's relative bargaining strength is approximated by the existence of multiple bidders and the inclusion of anti-takeover amendments in the seller's corporate charter. Both these variables have a significant positive effect whereas the results are mixed for the acquisition gains variables.

Slusky and Caves (1991) use multivariate analysis on a sample of 100 US acquisitions during 1986-1988 to explain the variance in the premium paid. They compute variables for real and financial synergies, managerial effectiveness and the acquirer's relative bargaining strength. Financial synergies, measured as the difference in debt-to-asset ratio between the target and the buyer is found to have a significant positive effect on the premium. The opportunity to infuse additional capital to a capital-constrained or highly leveraged firm is interpreted as a more important source of synergistic gains than operational synergies. The agency situation in both the target and the acquiring firm is found to have a significant effect on the premium. Firms where management owns a larger portion of shares offer a smaller premium and a higher fraction of minority shareholders in the target firm has a negative influence.

Billett and Ryngaert (1997) extend the previous literature by focusing on the effect of the target's capital and assets structure on the observed premium. The premium paid to target shareholders is based on the extent to which the bidder can improve the use of the target's assets. This is in line with the above proposed undermanagement argument by Varaiya (1987). If this value is independent on how the assets have been financed, the dollar takeover premium should increase with the target's leverage-ratio as the dollar value is spread over a smaller equity base. The other hypothesis is that takeover premiums will be smaller for firms with a higher ratio of financial assets to equity. This is motivated by the fact that bidders believe that they can improve the value of non-financial assets through operational improvements whereas it is harder to improve the utilization of financial assets e.g. marketable securities, cash and investments. Their hypotheses

are tested on a sample of 145 US cash tender offer between 1980-1989 and they find support that the premium increase with a target's liability-to-equity ratio and decrease with the target's financial assets-to-equity ratio. This results is somewhat contradictive to conventional wisdom of takeovers that view firms with low debt levels and high ratio of financial assets as attractive targets, see for example the discussion by Walkling and Edmister (1985).

Flanagan and O´Shaughnessy (2003) investigate the relationship between core-relatedness and multiple-bidders on the acquisition premium in 285 tender offers in the US manufacturing industry during 1986-1995. A core-related business means that the buyer's business is vertically integrated, similar to or the same as the operations of the target. They find a significant interaction effect between multiple bidders and core-related acquisitions. In the absence of multiple bidders, the premium is significantly higher when the acquirer is core-related to the target. Multiple bidders increase the premium and the increase is significantly higher when the transaction is not core-related.

Moeller (2005) study the effect of corporate governance structure on the acquisition premium in a sample of 388 US takeovers during 1990-1999. The existence of takeover defenses shifts the power from target shareholders to target managers. Target shareholders risk a reduced acquisition premium if managers trade a lower premium for higher private benefits. This induces incentives for target shareholders to control and influence management, which is easier if shareholders are strong relative to the management. Moeller test the hypothesis that weak target shareholders and strong target CEOs should be negatively correlated with the acquisition premium. High target shareholder control, approximated by low fraction of inside directors and the existence of large outside block holders, has a positive effect while a strong CEO, approximated by the CEO's share ownership, has a negative effect on the takeover premium.

European studies

Boström and Gustavsson (2000) construct a regression model to study the determinants of the bid premium in a sample of 91 Swedish takeovers during 1988-1998. They find that ownership structure and the bidder's future growth opportunities, measured as Tobin's Q ratios,[10] are important factors to explain the premium. Bidders with high Tobin's Q ratios and large amount of liquid assets have a positive impact on the premium. Targets with a large majority shareholder receive higher premiums due to the control motive. The fact that bidders own a toehold position in the target has a significant negative effect as they can influence the target to accept a lower bid. Stock payments have a positive effect even though cash payment is the most common method.

Goncharenko (2001) study the key determinants of the acquisition premium in 1218 European transactions during 1996-2001. Regression analysis is used to determine that pre-announcement run-up in the target's stock price, initial toehold ownership in the target, control consideration, acquisition type and attitude, transaction size, and payment method has a significant effect on the premium. Control motives, in line with Boström and Gustavsson (2000), are found to be the most important determinant.

Allerth and Åhr (2004) focus on the effect of market sentiment on the acquisition premium in 80 acquisitions on Stockholm Stock Exchange during 1997-2003. The hypothesis is that the acquisition premium should be higher in bull markets than in bear markets, which is supported by Gaughan (2002) and Ball (1995). There is a relation between increased M&A activity and a positive economic climate. The competition for potential targets is higher in a boom market which triggers auctions and larger premiums. An expanded capital market with lower interest rates and better access to capital will also lead to more acquisitions to a larger premium. The market sentiment is found to have a significant positive effect in line with the hypothesis. Allert and Åhr (2004) also control for other bid characteristics and find that premiums are higher when the acquirer is foreign, the transaction is relatively small and when the buyer does not hold a toehold position in the target company.

[10] Tobin's Q is defined as (Market value of Equity + Book value of debt) / Book value of all assets.

Larsson Hanséus and Ullman (2009) use regression analysis to examine the relationship between the targets's accounting information and the premium paid in 618 European transactions between 1997 and 2008. The size of the target, measured both in assets and sales, has a negative effect on the premium. Companies with high capital turnover[11] receive a larger premium. Market Value/Enterprise Value has a significant negative effect which is interpreted as a sign that companies with debt financed assets is paid a premium. Operating profitability[12] has a significant negative effect. The study does not use any control variables to take into account the effect of market sentiment and other variables that have been found to have a significant effect in other studies.

Studies of the banking sector

A few studies have focused solely on the banking industry and the determinants of the premium to book value[13] (P/B) paid in mergers within the industry. According to the industry classifications of this study banks are non manufacturing companies, hence the comparability is limited. The premium definition is different from other more general studies as it relates to the book value of assets rather than the market value. However, most assets and liabilities in the financial industry are marked to market and hence valued at market values. The characteristics of the banking industry vary from the industries studied in the review of previous literature and caution should be taken when comparing the results. See exhibit 2.1 for a summary of the results of selected research about premiums in the banking sector (e.g. Palia (1993), Henderson & Gart (1999) and Glenn (2007)).

[11] Defined as Net Revenues/Total Assets

[12] Defined as EBIT/Total Assets.

[13] P/B = Stock price per share / Book value of equity per share.

3. Hypothesis

In this section the hypothesis of the study will be presented.

In a real acquisition situation the target company's fair value must be determined and hence there is a degree of uncertainty involved in the valuation. This uncertainty is a result of that the value should reflect all future discounted cash flows including expected synergies. In order to determine the value of the target, projections of the future synergy potential must be conducted and hence a certain level of uncertainty will be inflicted in the final valuation. The fair value of the target company can differ depending on a number of external factors and vary between acquirers. Factors that can affect the price are ownership structure, relative size, market timing, cash availability and bargaining power. As stated, all these factors have been proved significant in previous studies.

In order to research how internal factors influence bid premiums and find ways to reduce uncertainty and enhance the accuracy in the determination process of the bid premium level, this thesis aims to test the relationship between different individual accounting ratios and the bid premium.

The hypothesis is stated:

H_0: *The bid premium in the US manufacturing industry cannot be explained by accounting key ratios*

H_1: *The bid premium in the US manufacturing industry can be explained by accounting key ratios*

The null hypothesis will be rejected if any of the accounting based key ratios are shown to have a statistically significant impact on the bid premium.

4. Empirical Data

The following section will account for the data collection method. In order to get consistent data and to further enhance and ensure the quality of the data a number of criteria has been followed.

4.1 Sources and Data Collection

In order to execute this study, information for each pair of target and acquirer has been collected in two separate steps. Firstly, all acquisitions within the time period 1999-2009 were collected from the database Zephyr[14]. This gave a complete list of all acquisitions for the relevant time period. Secondly, all company tickers were manually translated from Zephyr to its corresponding ticker in DataStream[15]. Using DataStream, accounting data for the year prior to the acquisition year was downloaded.

The two step method was due to an insufficient amount of accounting data in Zephyr and hence DataStream was used to extract all accounting data i.e. income statement, balance sheet and cash flow statement. Both Zephyr and DataStream are regarded as reliable sources among professionals and academics. As firms' daily accounting practices tend to show great variations DataStream modify certain line items to fit a framework. Since DataStream handle this in a consistent manner and make the adjustments after a number of strict criteria the distortions of these actions should be insignificant for this thesis. To maintain consistency and to avoid any further distortions in the data sample no further sources has been used to complement missing data.

4.2 The Sample

Choice of the time period

In the tradeoff between a larger data sample over a longer period of time and a smaller sample, more easily used in comparative purposes, the decision was made by the data availability. Zephyr, only track acquisitions back to 1997, but due to lack of data 1997 and 1998 were excluded. Hence the data sample includes acquisitions from the beginning of 1999 to

[14] Zephyr is a part of Bureau van Dijk, Electronic Publishing, and contains information regarding M&A activity, IPOs, joint ventures and private equity deal.

[15] DataStream is a commercial statistical database covering accounting-, market data as well as estimates and other economic indices.

28/07/2009. The period included both the IT-boom and the recent financial crisis (2007-2009) and includes periods of both high and low general market activity.

Choice of the geographical region and industry

This thesis focuses on the US manufacturing industry. The underlying reason for the focus on one country is the wide variation of different accounting practices and laws used by different nations. By using US data important financial relationships avoids distortions, and the quality of the data is more consistent. To find a homogenous group of companies a differentiation can be made between manufacturing and non-manufacturing companies (Skogsvik, 2002). To isolate relevant companies different branch codes and classifications can be used. For this purpose the "manufacturing industry" has been defined as the US SIC codes ranging from SIC 2000 to SIC 3999.[16] This definition is the same as in the study by Flanagan and O'Shaughnessy (2003). However, the US SIC code 283, Drugs, has been excluded due to the large intangible assets within this subgroup which could affect the financial ratios and the bid premium in a misrepresentative way.

Other Criteria

To exclude, irrelevant M&A activity only transactions classified as acquisitions have been included and the classification, "public takeover" has been included as approximation for implicit control i.e. an acquisition exceeding a 50 percent share of the target. This implies that only transactions where a control premium is incorporated in the bid premium are included in the sample. Another requirement is that the transactions are completed and that the bid premium is disclosed.

Revision of data

The data sample has been reviewed manually and data showing obvious errors have been eliminated. Extreme values are defined as observations outside an interval of 3 interquartile ranges (IQR) from the box edge in the box plot in SPSS. This generous definition is a result of the fact that the distribution of key accounting ratios often deviates from the normal distribution (Skogsvik, 2002). 74 extreme values were replaced with the closest non extreme value, in line

[16] The SIC code is the four-digit Standard Industrial Classification system of the US government system for identifying the activities of companies. The most recent update of the SIC code is from 1987. In 1997, the SIC was replaced by the NAICS (North American Industrial Classification System) as the national industry code system for the USA, Canada, and Mexico, although the SIC codes are still commonly used. (Zephyr, 2009).

with the methodology used by Skogsvik (2002).[17] This has been done to be able to keep as much information as possible. Further, observations missing vital information for calculating key ratios have been disregarded from, also data that are distorted by bankruptcy situations or extreme market values, causing negative premiums are crossed out. The search criteria used to retrieve the data sample is summarized below.

Summary of Criteria for selecting Empirical data	**Sample**	**Excluded**
1. Time period (1997-12-31 to 2009-07-28)	674 591	
2. Both the target company and the acquirer is American registered	87 516	587 075
3. Target company is classified in the US SIC code 2000 to 3999 (excl 243)	29 903	57 613
4. Transactions is classed as a "acquisition" and a "public takeover"	841	29 062
5. Transaction is completed	599	242
6. Transactions has a public bid premium	486	113
7. Manual review of data	406	80
8. Final data sample	**406**	

Exhibit 4.1. *Description of screening process (announcement date) for closed acquisitions/public takeovers in the US manufacturing industry during the period 1/1 1999 to H1 2009.*

[17] Representing approximately 0,4 percent of the total sample of key accounting ratios.

Data descriptives

Time interval	Number	Mean	Median	Max	Min	St. Dev
1999-2000	65	41%	37%	118%	1%	26%
2001-2002	91	39%	30%	106%	3%	26%
2003-2004	70	23%	22%	83%	1%	16%
2005-2006	76	27%	20%	121%	1%	23%
2007-2009	104	29%	23%	97%	0%	24%
1999-2009[18]	**406**	**32%**	**26%**	**121%**	**0%**	**24%**

Exhibit 4.2. *Description of final data sample.*

A total numbers of 406 transactions are included in the data sample. To illustrate the sample the time period has been subcategorized, illustrated in Exhibit 4.2. The number of deals varies slightly between the periods. The premium in the sample ranges from 0% to 121% and the total sample have a standard deviation of 24%. Important to note is that the mean premium is 32% but the median is 26%, implying that a number of large premiums raise the mean premium. The bid premiums in the data sample are within the same range as earlier research. For example, Koller et al (2005) claim that the average premium is fairly stable around 30%.[19]

4.3 Quality of the Material

As stated above several methodological decisions have been made to enhance the quality, consistency and comparability of the data. Like Skogsvik (2002), only one industry group has been used to avoid distortions of the financial ratios. To avoid potential distortions due to accounting differences across countries and receive a large consistent data sample, only transactions in the US has been included. No size limitations have been included in the search criteria and therefore size could be a distorting variable. Transaction size could be a problem if the parameter has an impact on the quality of the accounting data, but no such significant relationship has been confirmed.

[18] Including transactions closed before 28/07/2009.

[19] Koller et al. defines the premium as the bid divided by the pre announced price of the target's equity.

It is worth noticing that Zephyr has limited coverage of domestic US deals prior to January 2001 which potentially will reduce the sample of transactions made during the year 1999-2001.

Source of financial information

To best reflect the accounting data available for the acquirer during the acquisition process, the accounting data from the fiscal year before the acquisition have been used to calculate the financial ratios. An alternative, since listed companies in US are obligated to publish and file quarterly reports (10-Q) to the Securities and Exchange Commission (SEC), would have been to use the latest available quarterly data. However, the 10-Q reports are not necessarily audited (SEC, 2009) which reduce the reliability of quarterly information and therefore annual information will be used. Another limitation with quarterly data is potential seasonality effects that can impact the financial ratios. The limitation of annual data is that information that have been published in quarterly reports and hence is known to acquirers will not be included in the analysis. This effect should naturally increase during the year to be largest for transactions made during the last quarter of the fiscal year. It is also important to note that the data has not been annualized to calendar year so the information is taken from the last available fiscal year prior to the transaction date.

5. Method

This section will illustrate the chosen models used to investigate if accounting data, expressed through accounting key ratios, can explain the level of the bid premium. It will describe the dependable, independent variables and the multiple regressions performed. The method has been divided in several steps. First, a principal component analysis (PCA) has been conducted. The results from this analysis have later been used in a linear multiple regression model. Finally, an F test will test if the individual accounting ratios, contribute to explain the level of the bid premium.

5.1 Multiple regression model, the starting point

For a multiple regression, a dependent variable and a number of independent variables are needed. In this study the independent variables are divided in two subcategories, accounting key ratios and control variables. Multivariate regression analysis is suitable to answer the question posed in this thesis. The model type is flexible and can incorporate several variables of different types, this creates a good rational fit, since both quantitative and qualitative control variables will be used to isolate the effect of the accounting ratios (Cohen et al., 2003). Further this regression method has been used in previous studies researching the bid premium. Hence, by using this model a consistent methodology can be ensured and the comparability with other studies will be facilitated.

5.2 The dependent variable

The dependent variable in the study is the bid premium. This variable has different definitions in previous literature but is here defined in accordance with Zephyr's definition.

*Bid premium (%) = (A-B)/B *100*

A = Bid price per share

B = Closing share price the day before announcement of the deal

5.3 The independent variables

Control variables

The independent variables consist of accounting ratios and control variables. Control variables are included to better construct a model with high explanatory power and significant variables. They have all been found significant in previous research testing the bid premium, see Exhibit 2.1. By including control variables in the model it becomes more robust. As the dependent variable, the bid premium, is affected by other parameters than accounting data the control variables are used to keep these factors constant and hence the relationship between accounting based key ratios and the bid premium can be isolated. The control variables have been chosen based on previous studies as well as the availability of data.

Control variable	Definition	Expected Sign
Quantitative variables		
Relative size	Target Total Assets$_t$/Buyer Total Assets$_t$	(-)
Cash Availability$_1$	Buyer Cash and CE$_t$/Buyer Total Assets$_t$	(+)
Cash Availability$_2$	Buyer Cash and CE$_t$/Target Market Value$_t$	(+)
Qualitative variables (Dummy variables)		
Market Timing$_1$	1 = Positive development of S&P Industrials index the six-month period prior to the acquisition date. 0 = Negative development of S&P Industrials index the six-month period prior to the acquisition date.	(+/-)
Market Timing$_2$	1 = Positive development of S&P Industrials index the three-month period prior to the acquisition date. 0 = Negative development of S&P Industrials index the three-month period prior to the acquisition date.	(+/-)
Method of Payment	1 = Cash 0 = Stock	(+/-)

Exhibit 5.1. *Definition of control variables.*

Principal Component Analysis and Accounting variables

In order to gain appropriate independent variables different methods can be used. Previous experiences from both the academic and the professional sphere can be used to find relevant ratios. Another approach is to use a statistical method as a starting point. Skogsvik (2002) has

listed a number of key ratios divided in different dimensions. By extracting a sample consisting of 49 accounting key ratios, covering all listed dimensions, an initial group of key ratios were selected. The accounting key ratios were selected on the criteria of data availability, and can be seen in Appendix A. To be able to proceed with a regression model the total number of variables must decrease as the variable number is constrained by the sample size, [20] thus an exclusion of several parameters are needed. Tabachnick and Fidell (2007) claim that that the sample size requirements can be found by the following formula:

$N > 50+8m$

where m = the number of independent variables

As a result of the above, the final set of accounting key ratios has been derived using a PCA. PCA is a statistical method used to reduce a large number of related variables to a smaller set of variables. The dependent variable is excluded and only the relation between the independent variables is analyzed. This method is used in SPSS on the initial set of 49 ratios to derive the final set of ratios to be included in the regression model, see Section 6.1. The method is consistent with White et al. (2003) who state that using a minor group of key ratios is a satisfactory reflection of a larger group if two criteria are met. Firstly, remaining ratios should have a high correlation with those excluded, this in order to maintain the data as intact as possible i.e. excluding only an as small fraction of information. Secondly, the remaining selected key ratios should have a low or nonexistent correlation.

[20] Keeping all variables (49 accounting ratios and 4 control variables) require a sample size of 474 observations.

The PCA resulted in the following independent variables to be included in the regression model:

	Name	Definition
1.	Current Assets/Net Revenues	$\text{Current Assets}_t/\text{Net Revenues}_t$
2.	Current Ratio	$\text{Current Assets}_t/\text{Current Liabilities}_t$
3.	Equity/Assets	$\text{Equity}_t/\text{Total Assets}_t$
4.	COGS/Sales	$\text{Cost of Goods Sold}_t/\text{Net Revenues}_t$
5.	Capex/Total Assets	$\text{Capital Expenditures}_t/((\text{Total Assets}_t + \text{Total Assets}_{t-1})/2)$
6.	Inventory/Total Operating Costs	$\text{Inventory}_t/(\text{Net Revenues}_t - \text{Operating Income}_t)$
7.	Size Measurement	$\ln(\text{Total Assets}_t - \text{Current Liabilities}_t)$
8.	Change in Equity (1 yr)	$\text{Total Equity}_t/\text{Total Equity}_{t-1} - 1$
9	Capital Turnover	$\text{Net Revenues}_t/((\text{Total Assets}_t + \text{Total Assets}_{t-1})/2)$
10.	ROE	$\text{Net income}_t/((\text{Equity}_t + \text{Equity}_{t-1})/2)$
11.	Cost of debt	$\text{Interest cost}_t/((\text{Total Debt}_t + \text{Total Debt}_{t-1})/2)$
12.	PPE/Total Assets	$\text{Net Property, Plant and Equipment}_t/\text{Total Assets}_t$
13.	Change in Debt (1 yr)	$(\text{Total Debt}_t/\text{Total Debt})_{t-1} - 1$
14.	Cash Conversion	$\text{Net Operating Cash Flow}_t/\text{Funds from Operations}_{t-1}$

Exhibit 5.2. *Independent variables extracted from the Principal Component Analysis.*

5.4 Execution of the Regression Model

As stated in Exhibit 5.2, a number of variables could, after performing the principal component analysis, be derived and included in the regression model together with the control variables. When performing the regression analysis several methodological choices should be considered. In order to reach a final optimal model with high explanatory power, the significant variables must be identified. There are three classical approaches, forward, backward and stepwise elimination. In this thesis the forward and backward regression approach has been used to seek guidance of which variables to include in the model.

The forward selection approach starts with the constant term and adds variables to the model one by one starting with the variable with the highest correlation with the independent variable, the bid premium (Norusis, 2004). The process is stopped, either when all variables are included, or when a variable entering the model is defined as insignificant (Bursac et al., 2008). Backward elimination has the opposite starting point, starting with including all variables in the model and excludes one at the time after ranking the variables by degree of insignificances. This process is terminated when all the variables included are significant or only one variable is left in the model

(Norusis, 2004). The advantage of the backward method is that it captures the possibility that a group of variables have a collective predictive ability even though the individual variables have no significant explanatory power (Menard, 2002). There is a risk that this would not be captured in the forward regression model since the individual variables is not included in the model at the same time. The study use the backward method in line with previous studies based on accounting measurements, for example Skogsvik (1987). The hurdle rate for exclusion was set to 10% in the backward regression model.

A weakness with the backward model is that the number of observations is limited by all initially used variables i.e. only the observations were the data set is complete is used.[21] This renders the number of observations used in the regression to decrease to 130. To increase the number of used observations, the significant variables from the backward regression were used in the enter method. The advantage with this proceeding is that the enter regression can utilize a large amount of data as there are fewer variables constraining the data, a total number of 366 observations is used.

5.5 F test

The F test is performed to conclude if the null hypothesis should be rejected. This tests if none of the chosen independent variables, i.e. accounting key ratios have a linear relationship with the dependent variable, the bid premium, against the hypothesis that at least one of the variables have a linear relationship. The F test is done by linking the variation between the variables which is explained to the variation that is not explained (Lantz, 2009). The final regression model consists of control variables as well as accounting ratios. The purpose of this thesis is to examine the effect of the accounting key ratios. An F test including all the variables will be misleading, as the effect of the accounting variables must be isolated. This is done by creating two nested regression models; one including both control and accounting variables and one with the control variables. The result of these models is used to derive the F value.

[21] Due to the choice of listwise method.

The F test can be expressed as following:[22]

$$F = \frac{(R_{UR}^2 - R_R^2)/m}{(1 - R_{UR}^2)/(n-k)}$$

The term *m* is the number of linear restrictions, *k* is the total number of β-coefficients, parameters, in the unrestricted model and *n* is the total number of observations (Gujarati, 2003).

5.6 Modeling difficulties

How to deal with missing values

Missing values will cause whole observations i.e. transactions to be excluded. In order to avoid losing large amount of valuable data there are several methods to deal with this phenomenon. The first is to replace all missing values with the mean value of the variable, mean substitution. The problem with this procedure is that even if the correlation coefficients are fairly constant the standard error will be underestimated (Cohen et al., 2003). Another method uses interpolation of the other values in an observation (Edlund 1997).

The pairwise method approach uses each element of information and an inter-correlation matrix is predicted. The problem is that the parameters will be based on different number of observations and different standard errors. One method is simply to exclude the variable that contains large amounts of missing values. In this data set the variable Relative size[23] miss 36% of all observations. Removing a variable could create a bias in the model if the variable is important and significant. However this was not the case in Regression 1 (see Exhibit 6.3) and hence the Relative size variable has been excluded, this increases the final sample size to 366.

How to deal with differences over time

This study covers a period from 1999-2009 and it is possible that changes have occurred over the time period that can affect accounting ratios and the bid premium. Time discrepancies can distort the results in the final model. This will be tested for by introducing time dummies for each year during the period as well as dividing the time period into sub periods.

[22] UR stands for unrestricted and R for restricted.

[23] Target Total $Assets_t$/Buyer Total $Assets_t$.

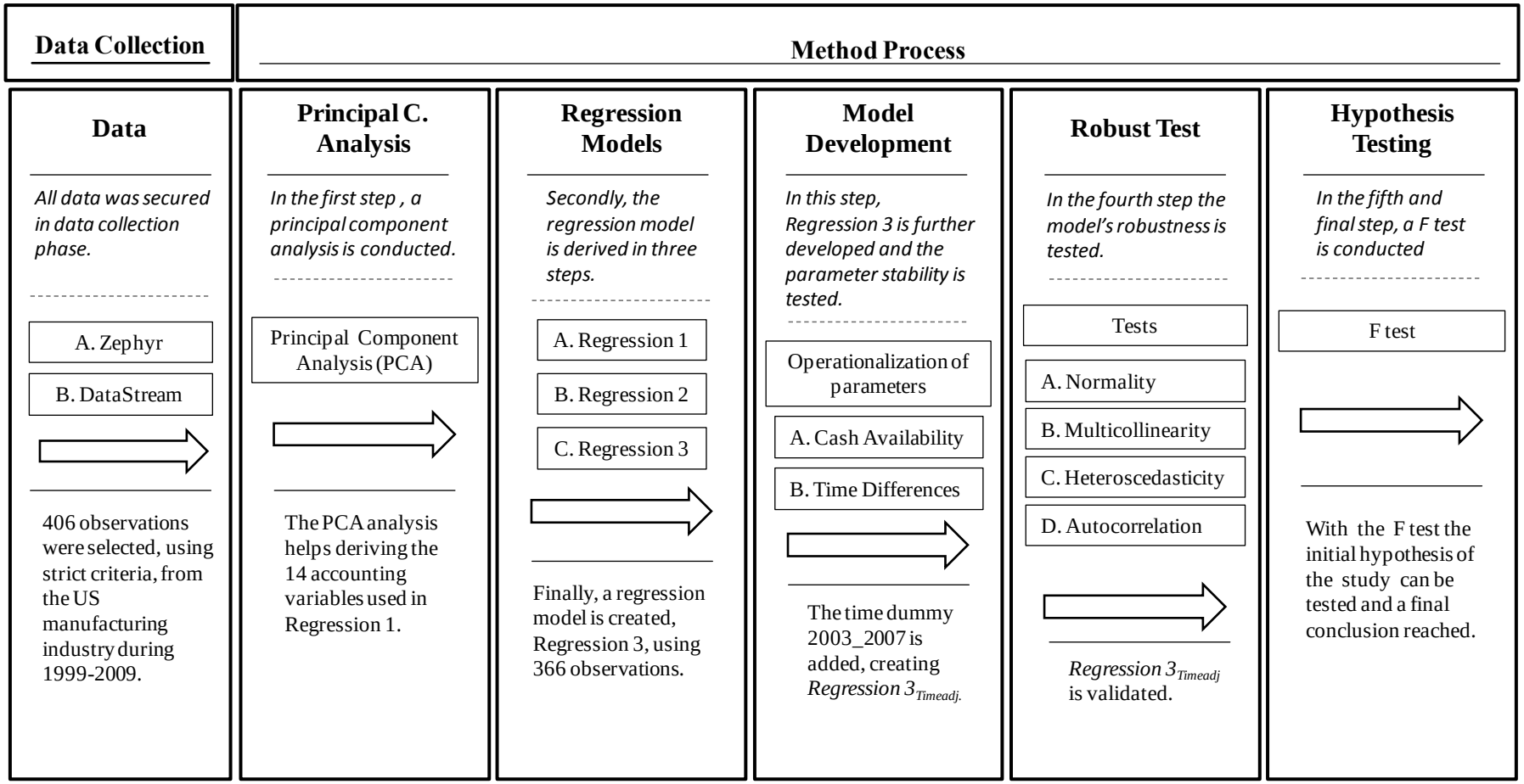

Exhibit 5.3. *Overview of the work process*

6. Results

In this section the results and execution of the study will be described. First, the results from the principal component analysis will be presented and then the results from the regression model. The model will be adjusted and tested in several steps to enhance the quality of the results.

6.1 Principal Component Analysis

According to Pallant (2007), there are two main issues to consider when determining the suitability of a particular dataset for a principal component analysis; sample size and the strength of the relation between the independent variables. Tabachnick and Fidell (2007) conclude that a comforting sample size should be between 150-300 cases at minimum and the relation between observations and variables should be at least 5.0. The sample consists of 406 observations with the ratio of observations to variables of 8.3 which suggest that the sample size is suitable for the analysis.

The strength of the relationship between the variables must be assessed. The correlation matrix should show at least some correlations of 0.3 or greater, Bartlett's test of Sphericity should be statistically significant at $p < 0.05$ and the Kaiser-Meyer-Olkin value should be 0.6 or above (Pallant, 2007). For this dataset, the Kaiser-Meyer-Olkin value is 0.655 and Bartlett's Test of Sphericity is significant. A review of the correlation matrix also shows several correlations above 0.3. Principal component analysis is therefore appropriate.

Pallant (2007) notes that the number of variables to include is subjective and depends on the research context. Using Kaiser's criterion, variables with an eigenvalue[24] of 1.0 and above should be extracted. The analysis generated 14 components with an eigenvalue above 1.0, these together explained 80.52% of the variance, see Appendix C. In order to confirm the number of extracted components the method proposed by Pallant (2007) was followed and the screeplot provided by SPSS was further analyzed. Changes in the shape of the plot should be studied and only components above the "break" should be retained. There is a clear break after 3 components in the screeplot in Exhibit 6.1 below but for the purpose of studying accounting based key ratios,

[24] The eigenvalue of a factor represents the amount of the total variance explained by that factor.

the 14 components using the Kaiser's criterion have been retained to be able to keep ratios that capture several aspects of target characteristics.

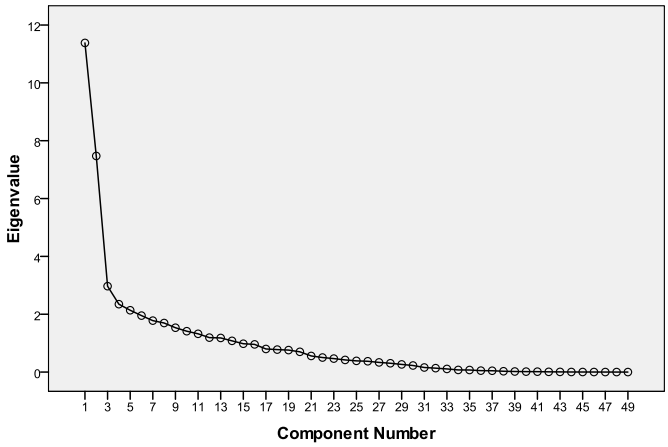

Exhibit 6.1 *Screeplot output from SPSS*

To determine which variables each of the 14 components represents, the components are rotated. There are two methods commonly used for rotation, the Direct Oblimin and the Varimax method[25]. The 14 extracted components have low correlation (all below 0.3) so similar results from both methods can be expected (Pallant 2007). Both rotations were conducted and resulted in the same extracted variables. The variable with the highest loading for each of the components have been retained for the regression model e.g. the variable that capture the largest part of the variance. The extracted ratios can be seen in Exhibit 5.2 and the complete results of the Direct Oblimin rotation[26] can be found in Appendix B.

6.2 Regression results

A backward regression, *Regression 1*, was first conducted including all 14 accounting variables and all control variables. The model with the most significant variables was kept. To increase the number of observations, the Relative size variable was excluded[27] and another backward regression, *Regression 2*, was conducted with a total number of 222 observations. As a third step,

[25] Direct Oblimin is an oblique method that allows for the factors to be correlated and Varimax is an orthogonal method that assumes that the underlying factors are uncorrelated.
[26] For simplicity, only the results from the Direct Oblimin will be reported.
[27] The variable was not significant at the 10% level.

the significant variables from the backward regression was tested in a enter regression, *Regression 3*, for a final sample of 366 observations.

A forward regression was also conducted as an alternative method of identifying which variables to include in the initial regression model. However, it resulted in the same significant variables and hence only the results from the backward regression will be reported. In this thesis the measurement *adjusted*[28] R^2 has been used, since the *standard* R^2 measurement is not adjusted for the number of parameters in the model. R^2 almost invariably increases and almost never decreases when adding a parameter. This implies that R^2 tends to give an excessively optimistic picture of the regression model's fit to the reality (Gujarati, 2003). The results from the initial regression analysis are summarized in table 6.2.

	Regression 1	**Regression 2**	**Regression 3**
	(Backward All)	*(Backward Excl.*[29]*)*	*(Enter)*
		Standardized Coefficients[30]	
Liquid Asset (buyer)/MV target	0,221*	0,187*	0,132**
S&P_Industrials_6months	-0,140***	-0,198*	-0,166*
ln(Assets-Short term liabilities)	-0,237*	-0,182*	-0,156*
Change in Debt 1yr	0,167**		
Current Assets/Short-term liabilities	-0,200**	-0,157**	-0,064
Adj. R^2	0,223	0,147	0,085
Number of cases	130	222	366

Exhibit 6.3. *Summary of the regression results.*[31]

In the next section, *Regression 3* will be further developed and tested for parameter stability regarding definitions of the dependent and independent variables.

[28] Adjusted $R^2 = 1 - (1 - R^2) * \frac{(n-1)}{(n-k)}$

[29] Backward regression excluding the variable Relative size.

[30] Standardized coefficients are shown to be able to compare the relative contribution between each variable and model.

[31] Significance levels * = 1%. ** = 5%, *** = 10%

6.3 Model development

Parameter stability

One problem that arises in the data sample is time discrepancies. Factors that change over time, for example industry shocks and deregulations, will make the model suboptimal for each specific year if these factors are not accounted for in the regression model. A method to control if the model is stable over time is to divide the sample in two subgroups, 1999-2003 and 2004-2009 and run the enter model, *Regression 3*, for these groups. The number of used observations in the two periods is relative similar, see Exhibit 6.4. The total number of transactions is relatively stable over time which can be seen in Exhibit 4.2. The models with the two sub periods generated results with reduced explanatory power, see Exhibit 6.4.

However, there are large differences between the two periods, both regarding significant variables and explanatory power. This implies that the data set is inconsistent over time and that *Regression 3* is suboptimal, especially for the period 1999-2003.

This study has not identified specific factors explaining the differences; instead timing dummies for each year are added to the model[32] to compensate for the effects that origin from time discrepancies. The advantage of this method is that it tests each individual year for significant effects. This approach resulted in an increase of the explanatory power but reduced the original number of significant variables.

Independent variable	Enter	Enter (including time dummies)	Period 1 (1999-2003)	Period 2 (2003-2009)
Liquid Asset (buyer)/MV target	0,132**	0,15**	0,167**	
S&P_Industrials_6months	-0,166*			-0,119**
ln(Assets-Short term liabilities)	-0,156*	-0,176*		-0,196*
Current Assets/Short-term liabilities	-0,064			
Dummy 2003		-0,203**		
Dummy 2004		-0,243**		
Dummy 2005		-0,223***		
Dummy 2007		-0,232***		
Adj. R^2	0,085	0,113	0,024	0,072
Number of cases	366	366	163	203

Exhibit 6.4. *Enter regression including time dummy variables.*[33]

[32] 1999 was used as the base year.

[33] Significance levels * = 1%. ** = 5%, *** = 10%

As can be seen in Exhibit 6.4, timing variables have a positive impact on the regression model's explanatory power. All the significant timing variables have about the same standardized beta coefficient. Reviewing the years which are significant the period 2003-2007[34] stand out as different. Since there is a shift in level of the data a dummy variable is included. The dummy variable is defined as:

Name	Definition
Dummy 2003_2007	*1 = Transaction took place under 2003-2009*
	0 = Transaction toke place under 1999-2002 or 2008-2009

Exhibit 6.5. *Definition of time dummy2003_2007 variable*

When adjusting the regression models by adding this new dummy variable following results were achieved:

Independent variable	Regression 1 *(Backward All)*	Regression 2 *(Backward Excl.)*		Regression 3 *(Enter)*	
			Time Adj.		*Time Adj.*
	Standardized Coefficients				
Liquid Asset (buyer)/MV target	0,221*	0,187*	0,174*	0,132**	0,135*
S&P_Industrials_6months	-0,140***	-0,198*		-0,166*	
ln(Assets-Short term liabilities)	-0,237*	-0,182*	-0,191*	-0,156*	-0,156*
Change in Debt 1yr	0,167**				
Current Assets/Short-term liabilities	-0,200**	-0,157**	-0,143*	-0,064	-0,053
Dummy 2003_2007			-0,275*		-0,238*
Adj. R^2	0,223	0,147	0,183	0,085	0,114
Number of cases	130	222	222	366	366

Exhibit 6.6. *Enter regression including dummy 2003_2007 (Time d..)*

As can be seen the model is improved when the time dummy (dummy 2003_2007) is added, hence it will be included in *Regression 3*. Hereafter, the regression model including the dummy2003_2007 variable will be referred to as *Regression 3*$_{Timeadj.}$

Test of control variables

The definition of the buyers' cash availability can be altered even if the different definitions reflect the same underlying factor. Therefore two definitions of cash availability have been tested, buyer's liquid assets over the target's market value (1) versus the buyer's liquid assets over the buyer's total assets (2). However, if cash availability is defined by the second definition,

[34] Year 2006 it is significant on 29.3 %.

the variable acts as a constraint on the number of observations which are reduced to 235, as a result this definition is not applied.

Test of dependent variable

The dependent variable, the bid premium, is defined as the bid price over the closing market price on the day prior to announcement of the bid/transaction. The announcement day is either the day when the bidder announces that a formal offer has been made or when the companies involved in a deal confirm the transaction process. Other studies have used different definitions ranging from one day to one month prior to announcement to capture rumours and potential leakage of information that can have an impact on the share price. The advantage of using an extended time period to calculate the premium is counterbalanced by the risk that other information or events will affect the share price during the time period. If information about an upcoming bid is leaked to the market, the share price will experience a pre-bid run up and the calculated premium, based on the day before announcement, will be lower than otherwise. Therefore a regression with the bid premium at rumour date as the dependent variable was conducted to compare the results and verify the robustness of the initial model and definition. Rumour date is taking from the database Zephyr and is defined as when a story related to a deal, which has not been formally announced to the stock exchange, has been picked up by any of its sources[35].

Independent variable	**Regression 2$_{Timeadj}$** *(Backward Excl.)*	**Regression 3$_{Timeadj}$** *(Enter)*
	Standardized Coefficients	
ln(Assets-Short term liabilities)	-0,164**	-0,108**
Liquid Assets(buyer)/Market Value (target)	0,155**	0,118**
Current Assets/Short-term liabilities	-0,140**	-0,760
Time Dummy (2003-2007)	-0,157**	-0,109**
Adj. R^2	0,097	0,042
Number of cases	222	366

Exhibit 6.7. *Summary of regression results using premium at rumour date as dependent variable.*[36]

[35] Zephyr has more than 60,000 news sources.
[36] Significance levels * = 1%. ** = 5%, *** = 10%.

The overall adjusted R^2 is lower when using rumour date as the dependent variable compared to when announcement date is used, see exhibit 6.7. Both *ln(Assets-Short term liabilities)* and Liquid Assets(buyer)/Market Value (target) are significant in *Regression* $3_{Timeadj}$ but the adjusted R^2 is only 4.2%. The results support announcement day, where both the adjusted R^2 and the number of significant variables are higher, as the premium definition.

6.4 Test of the model

As a result of the model development above, *Regression* $3_{Timeadj}$ is stated as:

Bid premium[37] $= \alpha_i + \beta_1 \times$ *Liquid Asset (buyer)/MV target* $+ \beta_2 \times$ *Dummy2003_2007* $+ \beta_3 \times$ *ln(Assets-Short term liabilities)* $+ \beta_4 \times$ *Current Assets/Short-term liabilities* $+ \varepsilon_i$

α_i = intercept
ε_i = error term

This developed model will be tested for multicollinearity, heteroscedasticity, autocorrelation and normality of the dependent variable in the next section.

Test of the normality of the dependent variable

The dependent variable residuals should follow a normal distribution and have a straight-line relationship with the predicted score of the dependent variable in order to have a suitable sample for multivariate regression analysis. Using the residual scatterplot function in SPSS a histogram and a normal P-P plot is constructed.

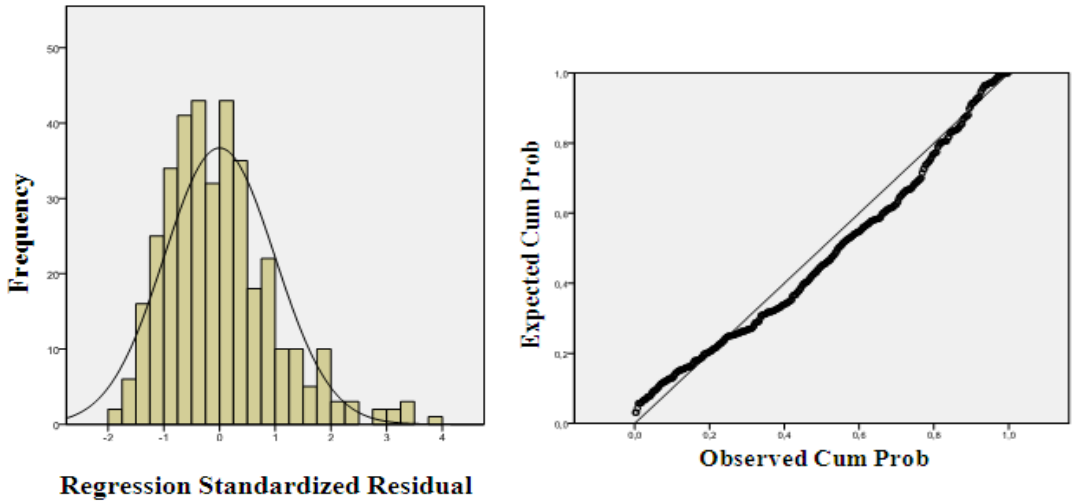

Exhibit 6.8 and 6.9. *Distribution and Normal P-P plot of the standardized residuals of the premium.*

[37] Bid premium at announcement date.

The histogram suggests that the residuals are roughly normally distributed with a slight skewness which is often the case with accounting ratios (Skogsvik, 2002). The P-P plot indicates a reasonably straight predictive relationship even though a certain deviation can be detected. The deviations motivate further tests. A modified version of the Kolmogorov-Smirnov test, the Lilliefors test, was conducted in SPSS which showed that the null hypothesis, normally distributed sample, could be rejected at the 5% level. However, the residuals are assumed to be normally distributed in the further testing since the sample size is above 30 (366) and the Central Limit Theorem comes into effect.

Multicollinearity

One of the assumptions of a linear multivariate regression model is that there is no multicollinearity between the independent variables. Multicollinearity exists when independent variables are highly correlated and could distort the regression results. A bivariate correlation between the independent variables larger than 0.7 (Pallant 2007) indicate collinearity. The Pearson correlation shows no sign of collinearity as all independent correlations were below 0.7. Another indicator of multicollinearity is the variance inflation factor (VIF) which can be found in SPSS Collinearity diagnostics. A high VIF value is a sign of collinearity. If a variable's VIF >10 it is highly collinear and if VIF = 1 no multicollinearity is included in the model (Gujarati, 2003). The variables in the model have VIF values ranging from 1,023 to 1,071 and hence multicollinearity is not a problem.

Heteroscedasticity

Another assumption is that the variance for each disturbance (error) term is constant and independent of the explanatory variables. If this is not the case, the regression function is heteroscedastic which will affect the reliability of the regression results. Heteroscedasticity can be detected by plotting the estimated squared residuals against the predicted dependent variable and search for systematic patterns.

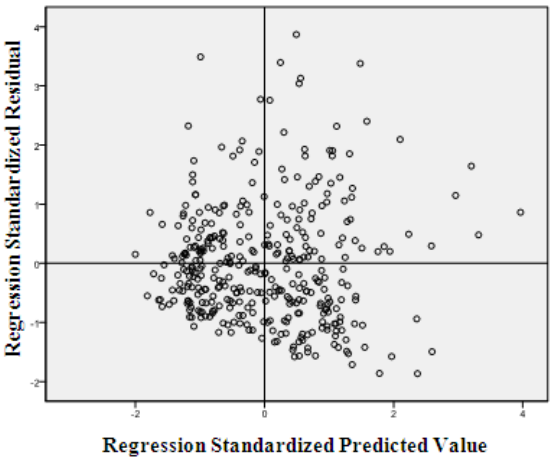

Exhibit 6.10. *Scatterplot of estimated squared residuals.*

Exhibit 6.10 shows no systematic patterns between the two variables which suggest that the data is not seriously affected by heteroscedasticity. To confirm this, White's general heteroscedasticity test will be conducted in SPSS using the method proposed by Edlund (2007).

H_0: The variance of the error term is homoscedastic
H_1: The variance of the error term is not homoscedastic

The residuals, $\hat{u}i_t$, and the squared residuals, $\hat{u}_{it}^2$, from the original regression are saved. A new model is constructed with the squared residuals as dependent variable and the variables from *Regression $3_{Timeadj}$*, their squared values and their cross products as independent variables[38].

Under the null hypothesis that there is no heteroscedasticity, the sample size (n)× the observed R^2 in the regression above asymptotically follows the chi-square distribution (χ^2) with degrees of freedom equal to the number of regressors (excluding the constant term). The decision rule is: Reject H_0 at the desired significance level if $\chi^2_{obs} > \chi^2_{df.}$

The 1% critical value for the $\chi^2_{df=14}$ is 29,141 and the χ^2_{obs} is 41,724[39]. Since $\chi^2_{obs} > \chi^2_{df=14}$ the reject the null hypothesis that the variance of the error term is homoscedastic is rejected at the 1% level. By using White's general heteroscedasticity test it is found that the data is heteroscedastic, which can affect the reliability of hypothesis testing using the F test. However, White's test can be sensitive to specification errors and show signs of heteroscedasticity while in fact the problem is omitted variables (Gujarati, 2003). This is likely the case in this model where previously proven significant variables have been excluded due to the scope of the study. Edlund (2007) proposes a weight estimation of the coefficients to handle the problem with heteroscedasticity in the regression model. The model was tested with weighted coefficients

[38] $\hat{u}_i^2 = \alpha_i + \beta_1 \times$ *Liquid Asset (buyer)/MV(target)* $+ \beta_2 \times$ *Dummy2003_2007* $+ \beta_3 \times$ *ln(Assets-Short term liabilities)* $+ \beta_4 \times$ *Current Assets/Short-term liabilities* $+ \beta_5 \times$ *(Liquid Asset(buyer)/MV(target))*$^2 + \beta_6 \times$ *(Dummy2003_2007)*$^2 + \beta_7 \times$ *(ln(Assets-Short term liabilities))*$^2 + \beta_8 \times$ *(Current Assets/Short-term liabilities)*$^2 + \beta_9 \times$ *(Dummy2003_2007×Liquid Asset(buyer)/MV(target))* $+ \beta_{10} \times$ *(Dummy2003_2007×ln(Assets-Short term liabilities))* $+ \beta_{11} \times$ *(Dummy2003_2007×(Current Assets/Short-term liabilities))+* $\beta_{12} \times$ *(ln(Assets-Short term liabilities))×(Current Assets/Short-term liabilities))* $+ \beta_{13} \times$ *(ln(Assets-Short term liabilities))×(Liquid Asset(buyer)/MV(target))* $+ \beta_{14} \times$ *((Liquid Asset(buyer)/MV(target))×(Current Assets/Short-term liabilities))* $+ \varepsilon_i$

[39] $R^2 = 0{,}114$ and $n = 366$

without improved results. This supports that the problem is not heteroscedasticity but rather omitted variables and therefore the F test is still appropriate.

Autocorrelation

Autocorrelation exists when there is correlation between members of series of observations ordered in time (time-series data) or in space (cross-sectional data) (Gujarati, 2003). It is an underlying assumption that no autocorrelation exists in the error terms in the linear regression model. Autocorrelation can be detected with a Durbin-Watson d statistics test. This was conducted in SPSS resulting in a d value of 2,014 for the final model. As a rule of thumb, it can be assumed that there is no autocorrelation if the d value is around 2,0 (Gujarati, 2003). Hence, autocorrelation is not a problem in the final model.

6.5 Final Regression model

After the model development and the robustness test above, the final model will be referred to as *Regression* $3_{Timeadj}$ and is stated as:

Bid premium[40] $= \alpha_i + \beta_1 \times$ *Liquid Asset (buyer)/MV target* $+ \beta_2 \times$ *Dummy2003_2007* $+ \beta_3 \times$ *ln(Assets-Short term liabilities)* $+ \beta_4 \times$ *Current Assets/Short-term liabilities* $+ \varepsilon_i$

where

α_i = intercept

ε_i = error term

	Beta	*Std. Error*	Beta	t	Sig.
	Unstandardized C.				
Intercept	0,618	0,084		7,321	0,000
Dummy 2003_2007	-0,112	0,023	-0,238	-4,785	0,000
Ln(Assets- Short term Liabilities)	-0,020	0,007	-0,156	-3,058	0,002
Liquid Assets (buyer)/Market Value (target)	0,003	0,001	0,135	2,678	0,008
Current Assets/Short term liability	-0,008	0,007	-0,053	-1,070	0,285

Exhibit 6.11. *Regression* $3_{Timeadj}$*, with 366 observations and an adjusted* R^2 *of 0,114.*

An F test will be applied to the final model in the next section to test the main hypothesis.

[40] Bid premium at announcement date.

6.6 Testing the Hypothesis - The F test

To be able to reject or accept the thesis' hypothesis an F test will be conducted. This will give an indication if the accounting key ratios contribute to increase the explanatory power of the model and explain the level of the bid premium.

By using the F test both individual variables and whole groups of variables can be tested. This gives us following hypothesis:

$$H_0: \beta_{ln(Assets\text{-}Short\ term\ liabilities)} = \beta_{Current\ Assets/Short\text{-}term\ liabilities} = 0$$

$$H_1: \beta_{ln(Assets\text{-}Short\ term\ liabilities)} \neq 0 \text{ or } \beta_{Current\ Assets/Short\text{-}term\ liabilities} \neq 0$$

The decision rule is: if the computed F value exceeds $F_{0.01}$ (2,362) = 4.61, where 4.61 is the critical point at 1% level of significance, the null hypothesis should be rejected, otherwise it should be accepted.

The test is conducted by comparing two nestled regression models, the unconstrained model (A), *Regression* $3_{Timeadj}$, and the constrained model (B). The constrained model (B) excludes the accounting variables as they are under the constraint that at least one of the coefficients is equal to zero. The logic is to test the "difference in explanatory power" between the two models.

(A) $Yi = \alpha i + \beta 1 \times Liquid\ Asset\ (buyer)/MV\ target + \beta 2 \times Dummy\ 2003\_2007 + \beta 3 \times ln(Assets\text{-}Short\ term\ liabilities) + \beta_4 \times Current\ Assets/Short\text{-}term\ liabilities + \varepsilon_i$

(B) $Y_i = \alpha_i + \beta_1 \times Liquid\ Asset\ (buyer)/MV\ target + \beta_2 \times Dummy\ 2003\_2007$

Solving expression for F gives an F value of 6.03[41] so the null hypothesis can, according to the decision rule, be rejected at a 1% level of significance, meaning that the accounting key ratios have a significant impact on the bid level.

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Data for F test		
A.	Unconstrained regression R^2	0,124
B.	Constrained regression R^2	0,097
	m	2
	k	4
	n	366

7. Analysis

In this section the results from the regression models will be analyzed with emphasis on the final model. The findings will be related to earlier research and other potential explanations to the acquisition premium will be mentioned.

7.1 Main hypothesis

The F test validates the hypothesis that individual accounting key ratios can help to explain the bid premium in the US manufacturing industry.

7.2 Independent variables

The regression results on which the analysis is based upon can be seen in Exhibit 6.6.

Cash Availability

Liquid Assets (buyer)/ Market Value (target) has a significant positive effect on the bid premium in all three models and the variable is significant on the 1% level in the final enter model, *Regression 3*$_{Timeadj}$. Buyers with a high degree of liquid assets in relation to the market value of the target tend to pay a higher premium. A large cash position is no indication of higher synergies that can explain a higher premium, instead it is more reasonable that the results supports the FCF argument as proposed by Jensen (1986). Jensen argues that managers with access to a large amount of free cash flow are more inclined to invest in projects with negative net present value and the argument also holds for liquid assets where managers with a large amount of cash and cash equivalents are more likely to use the funds for acquisitions at a higher premium.

An alternative interpretation would be that the buyer's excess cash and cash equivalents can be used to exploit investment opportunities/synergies in a cash-constrained target, which could explain a higher premium. The results are in line with Boström & Gustavsson (2000) who also find a positive relation between the premium and the cash availability of the buyer in relation to the market value of the target.

Market timing and Time variable

Dummy2003_2007 has a negative effect at 1% significance level in the final model. This means that acquisitions made during 2003-2007 commands a lower premium than acquisitions in the other time periods (1999-2002 and 2008-2009) in the sample. Signs of this can be seen when comparing the medians in the data descriptive table in Exhibit 4.2. The period 1999-2002 included the IT-boom which could be an explanation to the higher observed average premium level. The financial crisis and the volatile stock markets during 2008-2009 pushed down valuations to a lower level which could give room for higher premiums given that buyers view target as underpriced.

S&P_Industrials_6months is negative and significant at 1% level before the *Dummy2003_2007* is introduced. This means that targets pay a lower premium in periods where the S&P Industrial index has experienced a positive development the six months period prior to the acquisition. A positive market can lead to a situation where targets are perceived as overvalued and closer to the buyer's intrinsic value and therefore have a limited upside potential which would explain the lower premium level. This result is in line with Boström & Gustavsson (2000) who find a negative relationship between the stock market[42] development the six-month period prior to the acquisitions date. However, several authors have reached the opposite conclusion and find that premiums are higher in a positive market (e.g. Allerth & Åhr (2003), Ball (1995) and Gaughan (2002)). The result is dependent on how the market timing variable is defined and loses significance when introducing a broader time dummy variable. This suggests that time in a long-term perspective is a more important determinant than the short-term development of the stock market prior to acquisition. The definition used in this thesis differs from other studies which could explain the different results.

Size Measurement

Ln(Assets-Short term liabilities) has a significant negative effect on the 1% level in all models. This variable is a measure of size and indicates a lower premium level for targets with larger asset base. One interpretation is that it is harder to incorporate the acquirer's culture, control- and information systems in a large target company. If the integration process takes longer time, the synergies can be lower and hence explain why the premium is lower for larger target firms.

[42] Measured as Affärsvärldens Generalindex, AFGX.

Another explanation could be that a percentage increase/decrease in the premium has a larger absolute effect in larger transactions which can deter buyers from paying a high premium for large targets. Further, firms with a higher degree of short-term liabilities, e.g. accounts payables, tax payables and financial short-term debts, in relation to total assets receive a higher premium. By increasing the short-term liabilities, the company releases more capital and if the accounts payables increase, free cash flow will increase correspondingly which could potentially motivate a higher premium. However, the FCF and the capital requirements of the target should already be reflected in the share price and should not affect the premium according to the definition used in the thesis. Larsson Hanseus & Ullman (2009) also find a negative relation between size, ln(Total assets), and the acquisition premium. Allerth & Åhr (2003) and Goncharenko (2001) study the transaction size and establish that larger transactions are associated with a lower premium.

Change in Debt

Change in debt (1yr) is positive and significant on the 5% level in *Regression 1*, with a sample of 130 transactions. This means that an increase in debt in the target company a year prior to the acquisition is associated with a higher premium. Previously, authors have reached mixed conclusions about leverage and the bid premium. Walkling & Edmister (1985) find that firms with declining debt levels command a higher premium, partly because targets are interested in latent debt capacity. Henderson & Gart (1999) find a positive relation between the leverage ratio and premium in US banking mergers. A high leverage ratio signals that the company has a lower risk portfolio. Traditionally, a highly leveraged target in a traditional industry could be seen as unattractive due to a higher bankruptcy risk and limited additional debt capacity. The banking industry is clearly different from the manufacturing industry but the signaling effect of leverage argument can potentially be applied to manufacturing firms as well, which could explain the positive effect of the premium. If the premium is based on potential value improvements from better asset utilization, and if this improvement is independent of how the assets have been financed, the premium should increase with a higher leverage ratio in the target as the dollar value is spread over a smaller equity base (Billet & Ryngaert, 1997). However, the change in debt variable is no longer significant, and not included, in the models with the larger sample.

Current Ratio

The current ratio[43] coefficient is negative and significant in both *Regression 1* and *Regression 2* but lose significance in the final enter model, *Regression 3*$_{Timeadj}$, with the larger sample. The current ratio is a liquidity measure and the result indicates that targets with a higher degree of current assets in relation to short-term liabilities receive a lower premium. Previous studies have not found any relation between target liquidity and the acquisition premium. It is hard to argue that a good liquidity status should motivate a lower premium or vice versa. However, excess cash and/or a large inventory will increase current assets. Buyers are unlikely to pay a premium for cash and a large inventory can indicate potential future write-downs which can motivate a lower premium.

7.3 Other explanations to the premium

As can be seen in the result section the explanatory power of the final model *Regression 3*$_{Timeadj}$ is quite low, and even if the initial hypothesis is accepted many other factors have a large impact. The variable *Relative size*, was excluded after the initial backward regression including 130 variables, *Regression 1*, this since the variable strongly constrained the data set as it contained a large number of missing values[44]. The existence of omitted variables explains why the explanatory power is relatively low compared to other studies. Examples of omitted factors with previous proven significance are ownership structure (i.e. toehold), the number of other bidders, managerial effectiveness and general attitude to acquisitions. Mentioned factors are time consuming to incorporate in a model and have due to the scope of the study been excluded.

7.4 Difficulties with Key accounting ratios

The hypothesis in this thesis takes its starting point in individual key accounting ratios. The problem with this is the underlying construction of key ratios and the simplifications of real economic relationships are implied. Some of these issues have been solved by the structure of the data and method, like the initial focus on only the manufacturing sector, in order to avoid distortions between different industries. A constructional problem with key ratios is the

[43] Current Assets/Short-term liabilities.

[44] Relative size missed 40% of observations.

proportionality assumption an example is margin measurements as the key ratio implies only variable costs. In reality there are also semi-variable and fixed costs (White et. al., 2003). Another dimension should also be added when analyzing a company's capital structure. Even if the debt to equity ratio could be considered as linear other factors should be taken into account when leverage reaches a high level. A healthy leverage is positive for a company as it can use the leverage principal to increase their returns, however, leverage that reaches too high levels are often followed by different distress costs (Brealey et al, 2006). These matters of ambiguity and complexity are difficult to implement in an explanatory model of the sort constructed for the purpose of this thesis. It could also be argued that there is an inherent lagged effect in accounting data, meaning that accounting data to a large extent represent past events whereas acquirers are interested in the future potential of the target. This effect is enhanced by the choice to use yearly data rather than the latest available quarterly data. However, the importance of reliability supports the use of yearly data.

There is a possibility that the impact of individual ratios is lower than different combinations of accounting ratios i.e. the resulting components from the PCA. One approach, to capture a larger fraction of the variance, would be to use these components to derive a regression model. However, this would be beyond the scope of this study and has not been conducted.

8. Conclusions

This section will include the conclusions as well as a discussion about the reliability and validity of the study. Finally, some ideas for future research will be proposed.

The purpose has been to study whether individual accounting based ratios can explain the acquisition premium in the US manufacturing sector during 1999-2009. This has been done with a statistical approach through a principal component analysis to identify variables then used in a multivariate regression model with individual accounting ratios and control variables. Evidence from the F test supports the hypothesis that accounting ratios can explain the premium. As seen in *Regression* $3_{Timeadj}$[45], the explanatory power is relatively low compared to previous studies.

More specifically the following variables have a significant effect on the premium in the final model:

- *Ln(Assets-Short term liabilities)* has a negative effect on the premium. Acquirers pay a lower premium for larger targets, possibly because of the difficulties with post-transaction integration.
- *Liquid Asset (buyer)/Market Value (target)* has a positive effect. Buyers with excess cash in relation to the size of the target pay a higher premium, possibly because of the FCF argument.
- *Dummy2003_2007* has a negative effect. Acquisitions made during the period 2003-2007 are associated with a lower premium than acquisitions during other periods in the sample.

Only one accounting based variable, *Ln(Assets – Short term liabilities)*, has a significant effect on the premium. One explanation is that it is hard to capture determinants of the acquisition premium in one or several individual accounting ratios. It is likely that investors evaluate several different metrics when deciding about a potential bid and that accounting information is only one of several factors that determine the acquisition premium. The final model does not seek to explain all factors influencing the acquisition premium and hence several variables that have found to influence the premium in previous studies have been purposely left out e.g. governance, ownership structure and multiple bidders.

[45] Adjusted R^2 0,114

8.1 Reliability

In this study, previous literature has been used to find appropriate approaches and procedures regarding the methodology. All methodology choices have been described and motivated and therefore it should be possible to replicate the study with the same results. The data has been collected from sources with high credibility and has been controlled with random tests. Even if the quality of the data is regarded as high, the data set comes with issues such as extreme values and missing data which has in some cases generated incorrect key ratios. The proceedings and criteria used to exclude data are also motivated and described in detail. As conclusion, the possibility to replicate this study with the same result is considered as high.

8.2 Validity

A statistical approach has been taken to conduct this study. The main building blocks in this thesis are the PCA, the linear multiple regressions and finally the F test. Through these blocks strict methodology has been applied, which should result in a small systematic error of measurement. All methodology steps have been well documented and frequently used in previous studies. One disadvantage with the regression model is that implies linear relationships, which can be seen as a strong assumption dealing with accounting based key ratios. Another aspect that can be questioned is the operationalization of the dependent and the independent variables. The assumptions made in this matter could cause distortions and affect the results. The study tested for two definitions of the bid premium. This has been controlled for in section 6.3. However, the use of another definition e.g. 10 or 30 days prior to announcement, could potentially give other results. Only one ratio for each component was extracted from the PCA. Consequently there is a possibility that other financial ratios related to a certain component in the PCA, which was not extracted, could better explain the bid premium.

8.3 Inference

The inference shows to which extension the results can be used to draw conclusion regarding the whole population. This study has been conducted on 406 acquisitions in the American manufacturing industry during 1999-2009. Extreme values are adjusted and the empirical data sample has been adjusted for incorrect and missing data. Accounting data is dependent on law, regulations, tax regimes and industry specific characteristics. This study is conducted on

American data and the results would not be applicable to other countries, sectors or time periods. Overall, the inference of the study is considered to be low.

8.4 Proposals for future research

The results are specific to the manufacturing sector in the United States during 1999-2009. It would be interesting to study the effect of accounting ratios on the acquisition premium in other sectors as well as in different regions. One phenomenon which has not been touched upon is the effects of changes in accounting policies and tax regimes. This could be further investigated and incorporated in this study's final model.

An alternative would be a qualitative approach and conduct a case-study on a small number of transactions. One approach could be to interview decision makers and analysts to see how and if they evaluate accounting data to determine the bid premium.

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Databases

Zephyr

Datastream

Appendix A - Initial set of Accounting Ratios

Dimension	Definition
Profitability	EBIT/Net Revenues
	Gross Income/Net Revenues
	Pretax income/Net Revenues
	Net income/Net Revenues
	EBITDA/Net Revenues
	Net income/((Eq $_{O.B}$ + Eq $_{C.B}$)/2)
	EBIT/(Total Assets-Non Interest Bearing Liabilities)
	EBIT/(Total Assets O.B+Total Assets C.B/2)
Cost Ratios	Interest Cost/((Total Debt O:B+ Total Debt C.b)/2)
	SGA/Net Revenues
	COGS/Sales
	D&A/Sales
Capital Turnover	Net Revenues/Total assets
	Receivables/Sales
	Inventory/Sales
	Inventory/Total operating costs
	(Cash & CE)/Sales
	(Current assets - Inventories)/Sales
	(Current assets - Short-term liabilities)/Inventory
	Current assets/Sales
Liquidity ratios	(Cash & CE) / Short term liabilities
	(Cash & CE + Short term investments)/Total assets
	(Current Assets - Inventory)/Assets
	Current Assets/ Short-term liabilities
	(Current Assets-Inventory)/Short-term liabilities
	(Cash + investments+receivables)/Short term liabilities
	EBIT/Total liabilities
Assets structure	Inventory/Assets
	PPE/Total Assets
	Inventory + PPE /Total Assets
	ln(Total Assets)
	ln(Total Assets - Short term liabilities)
	(Current Assets - Current liabilities)/Total Assets
Financial Structure	Equity/Assets
	Short-term liabilities/Total Assets
	Total financial debt /Assets
	Total Debt/Equity
	Total Liabilities/Assets
Growth	Change in Assets 1 yr
	Change in Equity 1 yr
	Change in Short-term liabilities
	Change in Debt 1 yr
	Change in Inventory 1yr
Cash Flow Ratios	Net income/Operating cash flow
	Cash flow Conversion (Net operating CF/Funds from Operations)
	Operating Cash flow/Assets
	Operating Cash flow/Total liabilities
	Capital Expenditures/Total assets
	Capital Expenditures/Depreciation

Appendix B - Pattern Matrix table rotated with the Direct Oblimin method

	Component													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Current assets / Sales	-,945													
(Current assets - inventories) / Sales	-,923													
Cash & CE / Sales	-,921													
Net income/Net Revenues	,872													
SGA/Net Revenues	-,857													
Pretax income/Net Revenues	,855													
EBIT/Net Revenues	,724													
EBITDA/Net Revenues	,647													
Op cash flow / Assets	,509						,328							
EBIT/(Total Assets O.B+Total Assets C.B/2)	,486									-,335				
Cash&CE / Total assets	-,475	,395												
Operating Cash flow / Total liabilities	,453	,388									,381			
Current Assets/ Short-term liabilities		,987												
(Cash+investment+receivables)/Short-term liab		,974												
(Current Assets-Inventory)/Short-term liabilities		,971												
Cash&CE / Short-term liabilities		,932												
(Current Assets - Current liabilities)/Total Assets		,511												
EBIT/Total liabilities		,410								-,334				
Equity/Assets			-,867											
Total Debt/Equity			-,737						-,322					
COGS/Sales				,835										
Gross Income/Net Revenues				-,824										
Receivables/Sales				,551		,386								
D&A/Sales				-,398										
Capital expenditures / Total assets					-,879									
Capital expenditures / Depreciation					-,872									
Inventory / Total operating costs						-,800								
Inventory/Sales						,755								
Inventory/Assets		,311				,445								
ln (Total Assets - Short term liabilities)							,891							
ln(Total Assets)							,865							
Change in inventory							,449							
Short-term liabilities / Total Assets		-,395			,310		-,433							
(Current Assets-Inventory)/Assets		,325					-,370							
Change in equity 1 yr								,841						
EBIT/(Total Assets - Non-interest liabilities)								,673		-,312				
Change in assets 1 yr								,654					,320	
Net Revenues/Total assets									,903					
Total financial debt /Assets									,902					
Total liabilities/Assets								,304	,510	-,385				
Net income/ ((Eq O.B + Eq C.B)/2)										-,848				
Net operating cash flow/Funds from operations											,898			
Interest cost/((Total Debt O:B+Total Debt C.B)/2)												,809		
(Current assets - short-term liabilities)/Inventory												,650		
PPE/ Total Assets													,741	
Inventory + PPE / Total Assets				,321	-,457								-,496	
Change in debt 1 yr														-,709
Net income / operating cash flow						,327								-,558
Change in short-term liabilities														,498

Appendix C - Total Variance Explained table output from PCA

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	**11,381**	**23,227**	**23,227**	**11,381**	**23,227**	**23,227**	**9,948**
2	**7,472**	**15,249**	**38,476**	**7,472**	**15,249**	**38,476**	**6,917**
3	**2,969**	**6,060**	**44,536**	**2,969**	**6,060**	**44,536**	**1,908**
4	**2,347**	**4,791**	**49,327**	**2,347**	**4,791**	**49,327**	**3,180**
5	**2,137**	**4,361**	**53,688**	**2,137**	**4,361**	**53,688**	**3,388**
6	**1,952**	**3,984**	**57,672**	**1,952**	**3,984**	**57,672**	**2,187**
7	**1,779**	**3,630**	**61,302**	**1,779**	**3,630**	**61,302**	**4,515**
8	**1,696**	**3,462**	**64,763**	**1,696**	**3,462**	**64,763**	**2,205**
9	**1,533**	**3,129**	**67,892**	**1,533**	**3,129**	**67,892**	**3,659**
10	**1,413**	**2,883**	**70,776**	**1,413**	**2,883**	**70,776**	**2,442**
11	**1,323**	**2,700**	**73,476**	**1,323**	**2,700**	**73,476**	**2,029**
12	**1,191**	**2,430**	**75,906**	**1,191**	**2,430**	**75,906**	**3,350**
13	**1,180**	**2,408**	**78,314**	**1,180**	**2,408**	**78,314**	**2,708**
14	**1,080**	**2,203**	**80,517**	**1,080**	**2,203**	**80,517**	**2,057**
15	,980	1,999	82,517				
16	,957	1,953	84,469				
17	,799	1,630	86,099				
18	,777	1,586	87,685				
19	,760	1,551	89,235				
20	,700	1,429	90,664				