Aalto University
School of Economics

Private Company Discounts in Mergers and Acquisitions. Evidence from U.S.A

Accounting

Master's thesis

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ABSTRACT
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PRIVATE COMPANY DISCOUNTS IN MERGERS AND ACQUISITIONS Evidence from U.S.A

Purpose of the thesis

The purpose of this thesis is to examine whether privately held companies are on average sold at a discount compared to publicly traded peer companies, and whether the possible discounts can be explained by factors related to company size, performance, industry it operates or acquisition time.

Data

The research sample consists of U.S. based acquisitions between the years 1989 and 2008. The initial sample consists 23,872 companies, from which is sorted the final sample of 242 companies. The final sample consists 121 acquisition pairs of where the acquisitions have similar characters.

Research Methods

The research design involves calculating four valuation multiples for each acquisition in order to determine valuation differences and the possible private company discount. Further on these valuation differences are studied with multiples regression models that include variables related to company's status, size, performance, industry, and acquisition time.

Results

The results suggest that privately held companies, on average, are sold at a lower price compared to publicly traded peer companies. Company's Net assets, Net debt and acquisition time can partly explain these transaction price differences.

Keywords

Valuation, private company discount, mergers & acquisitions, marketability, multiples

AALTO-YLIOPISTON KAUPPAKORKEAKOULU TIIVISTELMÄ
Laskentatoimen tutkielma 11. 5. 2010
Janne Björklund

PÖRSSILISTAAMATTOMIEN YRITYSTEN ARVOSTUS VERRATTUNA PÖRSSILISTATTUIHIN YRITYKSIIN YRITYSKAUPPATILANTEISSA

Aineistona Yhdysvaltalaiset yrityskaupat

Tutkimuksen tavoite

Tämän tutkimuksen tavoitteena on selvittää arvostetaanko pörssilistaamattomat yksityiset yritykset samaan arvoon verrattuna vastaavanlaisiin pörssilistattuihin yrityksiin yrityskauppahetkellä. Lisäksi tavoitteena on selvittää voidaanko arvostuseroja selittää yrityksen listautumattomuuteen, kokoon, kannattavuuteen, toimialaan, tai yrityskaupan ajankohtaan liittyvillä tekijöillä.

Aineisto

Tutkimuksen aineisto koostuu Yhdysvalloissa toteutuneista yrityskaupoista vuosien 1989 ja 2008 välillä. Aineisto käsittää yhteensä 23872 yritystä, joista erotetaan 242:n yrityksen otos. Tämä lopullinen otos käsittää 121 yrityskauppa-paria jossa toisena osapuolena on yksityinen yritys ja toisena julkinen yritys. Nämä yrityskaupat ovat luonteeltaan mahdollisimman samanlaisia.

Tutkimusmenetelmät

Tutkimuksen aluksi lasketaan neljä eri tunnuslukua, taseen ja tuloslaskelman pohjalta, jokaiselle yrityskaupalle sekä lisäksi keskiarvo ja mediaani tulokset yksityisille sekä julkisille transaktioille. Tämän jälkeen yksityisten yritysten keskiarvo ja mediaani tunnuslukuja verrataan julkisten yritysten vastaaviin, arvostuserojen saavuttamiseksi sekä yksityisten yritysten hinnanalennuksen selvittämiseksi. Tämän jälkeen mahdollisesti ilmennyttä hinnanalennusta tutkitaan regressiomallien avulla. Hinnanalennusta pyritään selittämään yrityksen listautumattomuudella, koolla, kannattavuudella, toimialalla, ja/tai yrityskaupan ajankohdalla.

Tulokset

Tulosten perusteella voidaan todeta, että Yhdysvaltalaiset pörssilistaamattomat yritykset keskiarvollisesti myydään alennettuun hintaan verrattuna vastaavanlaisiin pörssilistattuihin yrityksiin. Yritysten arvostuseroja voidaan osittain selittää yrityksen nettovarallisuudella, nettovelalla sekä yrityskaupan ajankohdalla.

Avainsanat

Arvonmääritys, yrityskauppa, markkinakelpoisuus, hinnoittelukerroin

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TERMINOLOGY

APV	= Adjusted Present Value
CCF	= Capital Cash Flow
CEO	= Chief Executive Officer
CFE	= Cash Flow to Equity
DCF	= Discounted Cash Flow
DLOC	= Discount for Lack of Control
DLOM	= Discount for Lack of Marketability
EBIT	= Earnings Before Interest and Taxes
EBITDA	= Earnings Before Interest, Taxes, Depreciation and Amortization
ECM	= Economic Component Model
FCFF	= Free Cash Flow to Firm
FMV	= Fair Market Value
IPO	= Initial Public Offering
LTM	= Last Twelve Months
M&A	= Mergers & Acquisitions
NOPAT	= Net Profit After Taxes
NPV	= Net Present Value
QMDM	= Quantitative Marketability Discount Model
RIM	= Residual Income Model
SIC	= Standard Industrial Classification
STD.	= Standard Deviation
VIF	= Variance Inflation Factor
WACC	= Weighted Average Cost of Capital

1 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVE

In everyday life we often face the question: What is the value of a particular asset to me? Whether the asset is the amount of leisure-time with your loved ones or a family business, the problem remains same. How do we define the true value?

The valuation of companies is one of the most studied topics among the area of finance and accounting. Therefore finance and accounting literature offers numerous amounts of theories for analysts and management to help among the valuation process. One of the most widely used approaches is the discounted cash flow method. However this method contains parameters that can only be one's best estimations of future success, such as projections of interest rates, growth rate, capital structure and timing of cash flows. These values are often difficult to predict for public companies and even far more difficult to estimate for private companies. Therefore to put a price tag on a company is not that easy and the valuation process itself often takes months of job.

When it comes to valuation of privately held companies, it gets even more difficult than with public ones and usually represents subjective characteristics. Unlike publicly traded companies, a private company has no observable market price to serve as an objective measure of the value. Added to this, publicly traded companies have to publicly disclose a lot of financial information about performance, future prospects etc. This could be seen as an advantage for private companies over public ones, but also it means the available information concerning privately held companies is often inaccurate or nonexistent. Due to these facts, a critical aspect in determining the fair market value (hereinafter FMV) of private company is the discount for lack of marketability (hereinafter DLOM). The lack of marketability means the inability of an investor or an owner to convert his or hers equity into cash quickly and at a reasonably low and predictable cost (Pratt, Reilly et al. 2000, 392). In Dictionary of Business Terms (Friedman 2000, 410) marketability is described as follows; "*speed and ease with which a particular product or investment may be bought and sold"*.

Previous studies concerning private company discounts (e.g. Block 2007, Sarin 2001, Kooli, Kortas et al. 2003, Emory 2002, 1997) have shown that privately held companies suffer from a discount in price for reasons relating to marketability and/or liquidity. The lack of marketability is costly to investors not only because of cash flow considerations, but also because it can cause them to miss opportunities to rebalance their portfolios and allocate capital to alternative marketable assets (Kooli, Kortas et al. 2003).

Nonetheless, on the other side of the coin are the premiums paid in acquisitions. Usually these premiums are paid for already publicly traded companies and in order to gain control. The latter can be defined, as an amount the buyer is willing to pay over the current market price to gain a control of the firm (Pratt 2001, 45). This type of control premium is often justified by the expected performance improvements, or by the expected synergies, such as cost savings and excess cash flows, or the fact that buyers are often strategically motivated and therefore the price they pay is not equivalent to FMV (Nath 1997). On the other hand, if control transactions are used as a starting point for valuing something less than a controlling interest, then normally some discount for lack of control (hereinafter DLOC) is warranted (Pratt 2001, 31). Despite the fact that control and marketability are highly intertwined, I will mainly focus on the marketability point of view in this thesis.

The objective of this study is to measure the average amount of discount in acquisitions for private U.S.-based companies and to further analyse what are the factors behind this phenomenon.

1.2 MOTIVATION AND CONTRIBUTION

There are many occasions when valuation is needed. Traditionally these occasions include stock investments and venture capital investments. Other circumstances are for example initial public offerings (hereinafter IPO's), share repurchases, granting of credit and mergers and acquisitions (hereinafter M&A). This study focuses only on M&A, since the objective is to find out the valuation differences between public and private acquisitions. For this studying purpose the best method is to examine historical acquisitions. I am also highly motivated in finding significant explanatory factors that could explain the causes leading valuation differences.

The sale of private companies and subsidiaries has become an increasingly important source of liquidity and restructuring for corporations, with almost two-thirds of acquisitions reported by the Securities Data Corporation (SDC) being of unlisted targets (Officer 2007). This implies the fact that M&A market for private companies is at least as important as the M&A market for public companies. However studies related to corporate valuation have concentrated mainly on publicly traded firms and yet to date academics have little to say about prices, premiums, or discounts in the M&A market for unlisted companies.

Another emerging problem in Finland relates with already retiring generation, born after the Second World War. This means there are a lot of small business entrepreneurs who will need to find an outside buyer, if no continuator is found for their companies and family businesses. Needless to say, these companies are not able to go public, which would indeed make the selling process a whole lot easier. In such situations, I find it very important for these entrepreneurs to know how the valuation of a company is carried out and also what amount of discount is acceptable and why, when compared to public peer group companies. Therefore, I find this topic to be very current and important for us Finns, even though I will be studying only U.S-based companies instead of Finnish ones. The reasons to use only U.S.-based companies are explained in the following chapter.

To sum up the previous, this thesis focuses on studying the private company discount with quantitative examination of U.S.-based acquisitions. Further on, I will analyse the data sample of historical acquisitions with regression models in order to find relevant explanatory factors for discounts (premiums). My desire is to find generalizable answers to explain the causes, which leads to lower (higher) prices in private company acquisitions compared to public ones. I believe in this way small business entrepreneurs could get indicates of what to expect when planning of selling their businesses and even possibility to make this gap of discount smaller.

This thesis builds on previous studies of the private company discount by examining the phenomenon from M&A point of view. I find this perspective to give the most reliable and valid answers to my research problem, since I don't need to make any assumptions concerning the data, but to study already realized acquisitions.

In the following chapter, I will describe how the study is done, the methods I will use, and what sort of companies and data I will use.

1.3 RESEARCH DESIGN

According to Kooli, Kortas et al. (2003), there are at least four different approaches to investigate the private company discount; the IPO approach, the restricted stock approach, exit multiple approach and acquisition approach. The acquisition approach is the one chosen for this study. Furthermore, all of these approaches are discussed in Chapter 3 Theories to Approach Discount for Lack of Marketability. However, acquisition approach to study DLOM means that the aim is to gather and examine an adequate amount of data on acquisitions, for both, U.S.-based private and U.S.-based public companies. The purpose of this is to find comparable transactions of private and public companies.

The process itself starts by identifying a set of acquisitions of private companies. Then for each of these transactions the aim is to find (1) a publicly traded company in the same industry, (2) is acquired at around the same time, and (3) is close to the size of a private company. The first two tasks are unambiguous, however company's size can be measured in many ways, e.g. by the amount of assets, net sales, market value of equity or by number of employees. In this study, I will use net assets (total assets minus total liabilities) as an indicator of size. If such companies, which fully fills all these requirements, are to be found more than one, the one closest in size is to be chosen. This study examines only domestic U.S.-based companies and leaves out all the non-U.S. companies. Reason for this limitation is the fact that in order to build a comparable set of companies, the companies must operate in the same market area, and within the same nation. This way geographical nor economical disparity will not affect the results. In addition, also different accounting standards would have affect on the chosen measures. Furthermore, financial institutions and regulated public utilities are excluded from the study because these organisations have unique characteristics and may not be compared to the rest of the companies involved. To make my point, banks often have highly liquid assets, which can be easily converted into cash and due to this it is likely that the discount for illiquidity is smaller than for "traditional" private companies. Whereas public utilities, such as electricity, gas and water rarely face any competition and therefore they are

often monopolies. Based on the facts mentioned, I believe taking such companies into the study would most likely bring down the quality of results.

An ideal situation would be to examine Finnish companies, but unfortunately under current circumstances this is not possible. Finnish law does not regulate markets to publish the data of private company acquisition, contrary to U.S. law, and therefore the information needed for studying DLOM is not public. The sample is selected from the SDC platinum and includes the years 1989 – 2008. After sorting the data sample and finding the matching companies, the total number of companies is 242 (121 pairs).

The acquisition approach estimates the marketability discount by calculating the purchase price multiples of various relevant financial parameters. In all of the multiples the numerator is the acquisition price of that particular company. Finally the amount of discount (premium) can be viewed by comparing the mean and median valuation multiples between public companies and private companies and the percentage difference between these two is the discount (premium). It is important to use potential measures of performance and size, which can be applied reliably to both the private and the public companies. The indicators I will use in this study to measure performance are earnings before interest and taxes (EBIT), and earnings before interest, taxes, depreciation, and amortization of intangibles (EBITDA). The reason I will use EBIT and EBITDA, rather than after tax measure, is because this way different capital structures of acquired companies will not have affect on valuation multiples. Hence, two companies with ideal profit flows may have different earning ratios due to differences in their capital structure. Therefore this would distort the comparability of the two companies. Both EBIT and EBITDA provide a measure of company's free cash flow available for debt payments and dividends (taxes are considered to be dividends). The difference between EBIT and EBITDA is that EBIT is net from depreciation and amortization, which are non-cash expenses, whereas EBITDA adds back depreciation and amortization. This way EBITDA eliminates the chance of different depreciation policies from affecting the multiples. The indicators to measure size will be net assets and total sales. The rationale for using purchase price to sales multiple is that companies seeking to expand their operations, according to Koeplin, Sarin et al. (2000), are often interested in the price paid per additional dollar of sales. It is interesting to see whether acquirers have paid higher prices for public companies and if they have, can we conclude

that the acquirers consider one dollar of sales of public company to be more valuable than one dollar of private company sales?

In the second stage of the study, the possible discounts are further analysed with multiple linear regression models. This phase focuses on examining the purchase price differences between the private and public targets, what causes these differences, and possible explanatory factors leading to private company discounts. Explanatory factors are expected to relate to company's size, performance, capital adequacy, industry and acquisition time.

Previous studies (see e.g. Officer 2007, Koeplin, Sarin et al. 2000, Bajaj, Denis et al. 2001) that have estimated the discount for private companies have used relatively same method as described above. However, I find these studies to somewhat lack in the specific examination of the causes to discount. This study will bring additional value to previous studies by examining the causes behind the valuation differences with regression models.

I will not examine purchase prices, nor try to do any corrections to it. Therefore, I will use exact figures as given from the data sources. The reasons why no adjustments will be made to these figures are firstly due to the big sample size and secondly because it would require special firm-specific knowledge of all the companies and enormous amount of time to do the adjustments. However, the most common valuation methods will be described briefly in Chapter 2.4 Valuation Methods. This way the reader will understand the basics of valuation, the complexity with different methods, and how the valuation multiples approach is carried through in the empirical analysis phase.

The main reason why multiples analysis is chosen to measure the discounts (premiums) is its usability. When considering company valuation process, multiples valuation unlike the discounted cash flow and discounted dividend model, do not require detailed multiple-year forecasts about a variety of parameters, including growth, profitability, and cost of capital (Palepu, Healy et al. 2004). Another reason why multiple analyses is chosen is because valuation based on price multiples is still very commonly used method by appraisers and therefore, I felt it would bring real life practicality into this study.

1.4 RESULTS

The received results using the multiples valuation method suggest that private company discounts exists on average, where the magnitude of discount varies, depending on the valuation multiple used. The smallest amount of discount was found when measured by the Transaction price-to-EBIT multiple; 13.2% and the largest discount was found when the depreciations and amortizations was added back to EBIT. The Transaction price-to-EBITDA multiple yielded a hefty discount of 28.7%. The remaining two multiples, Transaction price-to-Net assets and Transaction price-to-Sales, yielded discounts of 15.2% and 17.3% respectively. Although each of the mean values presented discounts, Transaction price-to-Net assets and Transaction price-to-Sales median values were -35.1% (premium) and -50.5% (premium) respectively. These results are quite controversial and due to the premiums presented, it was insufficient to say that private company discounts exist based on the multiples valuation analysis. Multiples valuation method, however, provided strong evidence that private company valuation differs drastically from public companies.

Regression analysis found several explanatory variables affecting to the transaction price and causing the transaction price gap between private and public companies. It seems that the amount of net assets, sales, and EBITDA had statistically significant, positive association to the transaction price paid by the acquirer. Moreover, if the acquired company operated in one of the following industries, it was expected to suffer transaction price discount, compared to the benchmark industry: Wholesale & Retail Trade, Computer Integrated Systems Design, and Engineering & Management Services. However, in general, no evidence could be found that neither the targets status, nor the acquisition time would affect the acquisition price paid. Therefore, it is safe to say that private company discounts do not exists when studied with regression analysis.

The acquisition price difference, between private and public targets, could be argued to occur due to the size differences among the net assets, sales, and EBITDA. Additionally, in the following industries the transaction price differences, between the private and public targets, were larger than in the benchmark industry: Manufacturing, Computer Integrated Systems Design, and Computer Related Services & Business Services.

The independent variables, causing the private companies to sell at a lower price, compared to public peer companies, were revealed in the final regression model. The evidence suggests that both net assets and net debt have decreasing effects on the transaction price gap. There could not be found any causal relationships between the industries and the transaction price gap. However, the acquisition year 2000 proved significant and positive association to the transaction price gap, meaning the companies acquired on that particular year did not suffer as substantial price reduction as did the companies acquired on the benchmark year.

1.5 STRUCTURE OF THE STUDY

This thesis is divided into 7 Chapters. Chapter 2 discusses the motives for mergers and acquisitions, reviews valuation theories, and theories that explain the characters of M&A. Chapter 3 present different theories of how to approach discount for lack of marketability. Chapter 4 presents theoretical hypotheses, of which will be tested in this thesis. Chapter 5 presents the research design, which includes the sample description, variable definition, and the methodology that will be applied. Chapter 6 will be dedicated to empirical testing of the hypotheses with correlation coefficients, multiples valuation analysis, and various multiple regression models. The findings are presented in this chapter. Chapter 7 summarises the findings, offers conclusions, presents the shortcomings and weaknesses of this thesis, and offers implications for future research.

2 MERGERS AND ACQUISITIONS IN A THEORETICAL PERSPECTIVE

In this chapter, I will review some of the most widely known M&A and valuation theories presented in financial literature.

2.1 MERGERS AND ACQUISITIONS IN GENERAL

Mergers and acquisitions have long been a popular form of corporate investment, particularly in countries with Anglo-American forms of capital markets (Palepu, Healy et al. 2004). Diversification to a new geographical market area, or to a new area of operation, can often be easier by buying a company that is already operating in that particular area, than to start from scratch. Previous studies have shown that there is no question the target firm shareholders are clearly winners in merger transactions (see e.g. Antoniou, Arbour et al. 2008 and, Andrade, Mitchell et al. 2001). However, the case with private companies is not as obvious as with publicly traded companies. Not even a decade ago, we witnessed how this so-called Dot-Com bubble burst. During this stock market bubble, numerous internet-based Dot-com companies engaged in unusual and daring business practices with the hopes of dominating the market. Somewhat surprising was that investors were willing to invest large sums of money into this risky business. IPO studies during the Dot-com bubble show clearly the mispricing that took place. First-day returns on IPO's for Internet companies averaged a stunning 89 percent during 1999 and 2000 (Ljungqvist and Wilhelm 2003).

Probably the most common way to look mergers is from an efficiency point of view. An obvious explanation for mergers is that companies are seeking for efficiencies in mergers in the ways of gaining synergies operating together, compared with situation where merger and acquirer both would be individual entities.

2.2 MOTIVES FOR MERGERS AND ACQUISITIONS

Creating new economic value for shareholders should be considered the ultimate motive for M&A. Palepu, Healy et al. (2004, 11-1 - 11-2) lists that new economic value can be created by taking advantage of the economies of scale, improving target management, combining complementary resources, capturing tax benefits, providing low-cost financing to a financially constrained target,

and increasing product-market rent. As we can see, there are many possible ways to create additional value.

Berkovitch and Narayanan (1993) summarize the management's motives of M&A, advanced in the literature, into three main categories. These three motives for M&A are the synergy motive, the agency motive, and hubris. Probably the most common motive, synergy, suggests that takeovers occur because of economic gains that result by merging the resources of two companies. The synergy motive assumes the managers of both, targets and acquirers, are to maximize shareholder wealth, and therefore will engage in takeover activity only if it results gains to both parties. The agency motive considers mergers to be merely management's way to build their own image and empire at the expense of shareholders. The hubris hypothesis suggests that managers make mistakes in evaluating target firms, and engage in acquisitions even when there is no synergy. The hubris hypothesis assumes that the management will engage in takeovers only when it overestimates the gains. The higher the target gain means lower the bidder gain and higher the price that shareholders of acquirers have to carry (Berkovitch and Narayanan 1993). Typically these gains are measured by calculating the abnormal stock returns at the announcement of the acquisition. The motives, gains, correlations, and value changes are summarized in Table 1 as shown.

Table 1 Model of takeover motives and gains

This model shows the correlations between target and total gains, as well as the correlations between target gain and acquirer gain, considered from the three alternative motives for M&A presented by Berkovitch and Narayanan (1993).

	Correlation between	
Hypothesis	Target Gain and Total Gain	Target Gain and Acquirer Gain
Synergy	Positive	Positive
Agency	Negative	Negative
Hubris	Zero	Negative

Source: (Berkovitch and Narayanan 1993)

In the following chapters I will discuss these three motives of M&A more detailed. In addition, I will present other theories of M&A, such as neoclassical theory of M&A and market mispricing theory. Finally, I will examine the concept of information asymmetry, which relates with the

problem where one party has more or better information than the other. This is often the case with private companies and looking from M&A point of view, this can lead to adverse selection.

2.2.1 Neoclassical theory of M&A

One of the puzzles in finance is why there are periods when mergers are plentiful and other periods when merger activity is much smaller. The neoclassical explanation for merger activity is that mergers are an efficient response to reorganization opportunities that arise as a result of some underlying economic event (Rhodes–Kropf, Robinson et al. 2005). Several studies (see e.g. Mitchell and Mulherin 1996, Jensen 1993, Morck, Shleifer et al. 1990, Gort 1969) support this view by showing that merger activity is a result of industry-level shocks, such as technological innovations and excess capacity, supply shocks, and deregulation. However, Harford (2005) argues that whether the shock leads to a high merger activity depends on whether there is sufficient overall capital liquidity. Harford also states that this macro-level liquidity component causes industry merger waves to cluster in time, even if industry shocks do not.

The neoclassical theory further suggests that merger and acquisition activity allows for a reallocation of assets from less efficient to users that are more efficient. To support this explanation, Healy, Palepu et al. (1992) showed that merged firms have significant improvements in operating cash flow returns after the merger, resulting from increases in asset productivity relative to their industries. Mergers also offer a chance for efficient managers to take over inefficient ones.

The neoclassical theory of M&A is closely attached to synergy hypothesis. Synergy hypothesis assumes that bidder and target are after mutual interest and managers will take part on takeovers only when profits are positive for both parties. Synergy hypothesis will be reviewed more detailed later on this chapter.

2.2.2 Market mispricing theory

Market mispricing theory is also known as market timing theory. The fundamental assumption of this theory is that financial markets are inefficient and therefore some companies are valued incorrectly. In contrast, managers are completely rational, understand stock market inefficiencies, and take advantage of them, in part through merger decisions. Mergers in this theory are a form of arbitrage by rational managers operating in inefficient markets. (Shleifer and Vishny 2003). Shleifer and Vishny predicts that buyers try to profit either, by buying undervalued targets for cash at a price below fundamental value, or by paying stock for targets that, even if overvalued, are less overvalued than the bidder.

Jovanovic and Rousseau (2002) and Rhodes-Kropf and Wiswanathan (2004) show in their studies that period of high stock valuation correlates with high merger activity. Ang and Cheng (2006) and Dong, Hirshleifer et al. (2006) provide direct evidence that if a company's stock is highly valued/ overvalued, it can create an incentive to become an acquirer and to use stocks as a method of payment, rather than cash. This leads to an interesting question; why would a value-maximizing target knowingly accept overvalued stocks in a takeover offer. To answer this question, Rhodes-Kropf, Robinson et al. (2005) propose a rational theory based on correlated misinformation. They argue that errors in valuing potential takeover synergies correlate with overall valuation error. Alternatively, Shleifer and Vishny (2003) propose a theory based on an irrational stock market and self-interested managers who can cash out quickly. These managers do not maximize long-term shareholder value and instead maximize their own short-run gain.

In their research, Rhodes-Kropf, Robinson et al. (2005) found support to the fact that acquiring firms are significantly priced higher than targets. The valuation difference was roughly 20% of the target's log Market-to-Book ratio. They also found evidence that the method of payment determines whether the target is over- or undervalued. On average cash targets are more undervalued than stock targets and cash acquirers are less overvalued than stock acquirers.

2.2.3 Synergy

The synergy motive is based on an assumption where managers act on behalf of shareholder's interest. As mentioned previously, the principal goal for the managers of target and acquirer is to maximize shareholder wealth, and would engage in mergers activity only if it results gains to both set of shareholders. However, this leads to an important question whether the combined returns for both parties are positive or negative? Healy, Palepu et al. (1992), Jensen and Ruback (1983), and Jarrel, Brickley et al. (1988) found that corporate takeovers generate positive gains, which target shareholders benefit, and that bidding company shareholders do not lose. These studies provide evidence against zero sum game, which means the gains for target company shareholders are not a redistribution resulting from losses to acquiring company shareholders.

Bradley, Desai et al. (1988) defines synergy as an attempt by the bidding firm to exploit a profit opportunity that could be created by a change in economic conditions. This change could be the result of a change in supply and/ or demand, technological innovations, or purposeful investment by the bidding firm. However the synergies created by the merger may result from more efficient management, economies of scale, improved production techniques, the combination of complementary resources, the redeployment of assets to more profitable uses, the exploitation of market power, or any number of value creating mechanisms that fall under the general rubric of corporate synergy (Bradley, Desai et al. 1988).

Financial synergy is obtained from a merger if combined value of the two merging companies exceeds the sum of the market values of the two separate companies. Financial synergy in a merger can happen as far as the cash flows of two firms are not perfectly correlated.

To measure the total synergistic gains of a successful merger is the sum of the change in the wealth of the stockholders of the target and acquiring company:

$$\Delta\Pi = \Delta W_T + \Delta W_A \quad (1)$$

where

$\Delta\Pi$ = Total synergistic gain,
ΔW_T = Change in target-firm shareholders' wealth, and
ΔW_A = Change in acquiring-firm shareholders' wealth.

2.2.4 Hubris

Succeeding in acquisitions is critically important for acquirers, but a successive bid of a target company does not necessarily mean an overall success. The case indeed can be that there are many bidders for a target and a wide range of bids are likely to arise. When it is difficult to estimate the real value of a target, then often the winner is the bidder with the highest, over-optimistic estimate of the target's value. In such situation the bidder is actually paying more than the target is worth and in effect losing money. This kind of management hubris or overconfidence is commonly called the winner's curse.

One of the first major articles to suggest that management hubris could be one of the explanatory factors for M&A activity was written by Roll (1986). Roll questions whether there really exists any takeover gain at all. He argues that at least a part of the large price increase in target firm share price is merely a transfer from the bidding firm, meaning the takeover premium overstates the increase in economic value of the corporate combination. The logic behind Roll's theory is that the valuation, made by the acquirer, can be considered as random variable. More precisely, the true value is considered to be the current stock price (mean) and as a result the valuation output varies around the true value. A valuation output that exceeds the true value leads to an offer; otherwise there is no offer. Therefore, we only observe offers that are too high on average and that the takeover premium is simply a random error, a mistake made by the bidding firm (Roll 1986). One could ask a simple question; why would managers make bids in the first place, if there would not be

any value in takeovers? Roll (1986) suggests that not every individual behaves like a rational economic human being, and therefore management does not necessarily intentionally act against shareholders interests. Intentionally or not, Grinblatt's and Keloharju's recent paper: Sensation seeking, Overconfidence and Trading Activity (2009) shows that different psychological characters can define variances in trading activity between individual investors. For instance sensation seeking, a measurable psychological trait linked to gambling, risky driving, drug abuse, and a host of other behaviors, is more abundant in males (Grinblatt and Keloharju 2009). Sensation seekers search for novel, intense, and varied sensations and experiences generally associated with real or imagined physical, social, and financial risks (Zuckerman 1979, 10). Grinblatt and Keloharju (2009) show that such individuals who are most prone to sensation seeking, and who are most overconfident about their abilities and knowledge, trade stocks the most. Similarly, managers with these attributes described are prone to take excess risks in mergers. This supports Rolls' (1986) suggestion that there is no evidence to indicate that every individual behaves as if he or she is a rational economic human being whose behavior seems revealed by the behavior or market prices. Indeed, one possible definition of irrational or aberrant behavior is independence across individuals.

2.2.5 Agency theory

Schroeder, Clark et al. (2009, 124) defines agency as a consensual relationship between two parties, whereby one party (agent) agrees to act on behalf of the other party (principal). A typical agency relationship is between managers of a corporation and shareholders. The owners may not have the expertise or training to run a company and therefore need to employ someone to represent them. These employees are agents who are entrusted with power to make decisions on behalf of the shareholders' (principals) best interest. However, the shareholders cannot observe every decision made by the agents, and therefore a risk exists that the agents will try to pursue their own interests. The main dilemma indeed is that usually individuals maximize their own expected utilities and by doing so, manager's interest may differ radically from the stockholders' (Schroeder, Clark et al. 2009, 124).

Often referred as the father of modern economics, Adam Smith wrote about agency problem in his well-known book The Wealth of Nations as follows:

> *The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or Iess, in the management of the affairs of such a company.* (Smith 1776, Cannan Edition, Book IV, 264-265).

Agency relationship involves costs to the principal. However, costs to principal can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs designed to limit the aberrant activities of the agent (Jensen and Meckling 1976). Monitoring expenditures by the principal are cost from controlling the agent's behavior (e.g. costs of observing and measuring the agent's behavior, external and internal auditors). In addition to monitoring efforts, the manager can mitigate agency costs through bonding efforts. Bonding cost are those the manager takes upon himself to reduce agency conflicts, that is, efforts undertaken at the expense of his own utility (e.g. management compensation). Management compensation is often stock and option based, meaning the amount of compensation is tied to a stock price. This may lead to a situation where executives try to "manage" earnings in order to push the stock price higher. Bergstresser and Philippon (2006) found evidence in their study that CEO's whose overall compensation were more sensitive to company share prices, were the ones who led the companies with highest level of earnings management. Finally, even with monitoring and bonding expenditures, there will be some amount of reduction in welfare for the principal due to the actions taken by the agent versus the actions principal would take. This type of negative wealth effect is called residual loss (Jensen and Meckling 1976).

Jensen (1986) argues that managers have incentives to cause their companies to grow beyond the optimal size, in order to increase power, by increasing the resources under their control. According

to Jensen, this agency conflict seems to be most severe with companies with largest amount of free cash flow, or cash flows above to meet shareholder payments, and to fund positive net present value (NPV) projects. In such situations, shareholders would prefer these excess cash flows to be paid out. However, managers with excess cash on hands are more likely to spend it on acquisitions than pay it out on dividends, even if an acquisition has a negative NPV. This type of agency cost of free cash flow can be substantial in cash rich companies. Further, Jensen suggests that companies with high cash reserves should pay out all excess cash to reduce managers' ability to destroy firm value. By doing so, the management needs to be more financial market orientated when seeking for additional funding.

As stated by Lambert (2001), the primary way agency theory differs from traditional information economics (see e.g. Stigler 1961) is that multi-person, incentive, asymmetric information, and/ or coordination issues are important in understanding how corporations operate. Lambert argues that agency theory is about evaluating the impacts of interest conflicts that arises from principal-agent relationship. These conflicts occur due to (1) shirking by the agent, (2) diversion of resources for agents private consumption or use, (3) differential time horizons, and (4) differential risk aversion of the agent and principal (Lambert 2001).

2.2.6 Information asymmetry

In a perfect exchange world, market participants would have full information about the securities being exchanged, prices would reflect this information, and bid-asked spreads would be a tiny percentage of the bid price. Thus, the spread would reflect only the production costs of executing a transaction. In this stylized world, there are no information asymmetries. Prices of securities are therefore efficiently priced; that is, security prices reflect all known information about risks and opportunities. In the real world, things are not this tidy.

One of the first papers to discuss information asymmetry was made by the Nobel Prize winner George Akerlof (1970). Akerlof uses the market for second hand cars (The Market for Lemons) as an example to illustrate the problem with uncertainty of quality. Used cars market captures brilliantly the essence of information asymmetry; the owner has more- and better quality

information about the car, than the buyer (e.g. service history, accident history, flaws, previous owners), of which may affect the buyer's willingness to purchase the vehicle. Basically, this means that the individuals buying a second hand car do not know whether the car they buy is a good one, or a bad one (a lemon). What they do know is that with probability *q* the car is good and with probability *(1-q)* the car is a lemon; by assumption, *q* is the proportion of good cars in the market and *(1-q)* is the proportion of lemons (Akerlof 1970).

Similarly, managers normally have an advantage over the market in predicting firm specific events. Obviously, the managers have better quality, or more timely information about the company than the market. This creates an information asymmetry between the managers of the company and the market that can vary over the lifetime of the companies. The information asymmetry of the company is considered high (low) when managers of the company have relatively large (small) amount of firm-specific information (Dierkens 1991).

Myers and Majluf (1984) have developed an equilibrium model, which suggests that management may refuse to invest in valuable investment projects when equity issue is needed. Their model assumes that the managers have varying amount of first hand information the investors do not have and they both realize this fact. The idea behind this model is that given asymmetric information, a company with insufficient financial slack may not undertake all investment opportunities with positive NPV. The model assumes that a stock issue to finance the investment(s) signals that the stock is overvalued, and therefore it tends to push the stock price down. Conversely, investors could take managements decision not to issue shares as "good news" (Myers and Majluf 1984).

2.3 VALUATION THEORY

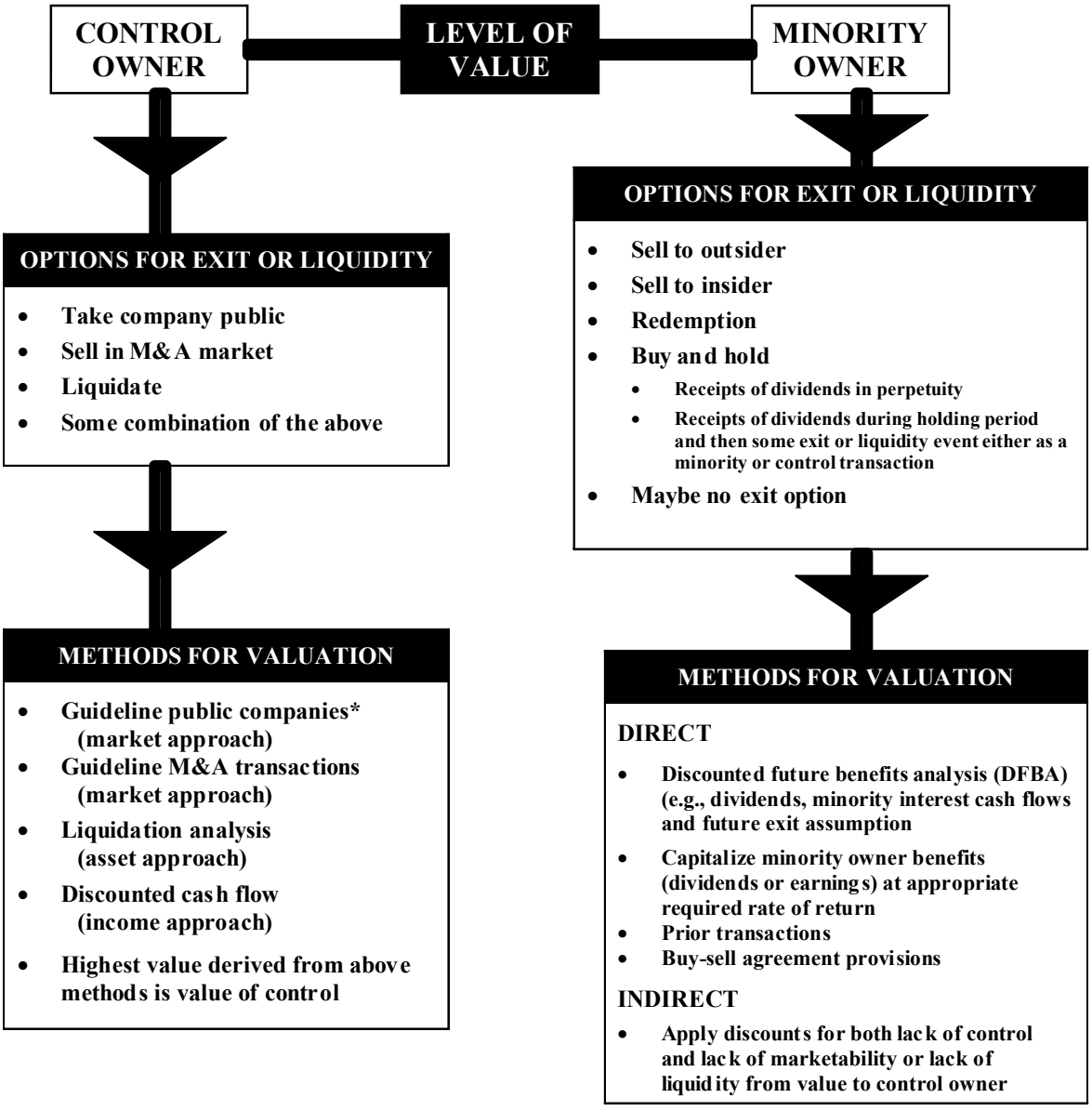
> *The most difficult decision an executive faces in negotiating an acquisition is the price to be paid. The decision is difficult because there are so many factors to consider – the process by which the target company is being sold, the expected competition, the future profitability of the target, expected synergies, complex tax rules, alternate legal forms of effecting a transaction and accounting considerations.* (Marren 1993, p.v).

2.3.1 Valuation in general

As shown in Figure 1, there are many options what control owner and minority owner can do when liquidating, or exiting. A minority owner is one who exchanges money for the right to receive future cash flows, but has no control over the decision the company may take. A control owner has the power to control the assets of the company and to decide when and to what extent of cash flows will be distributed. However, there is no general rule, which method gives the best outcome. It is a sum of many factors, such as economical situation, industrial situation, future prospects, number of potential buyers, and method of payment that should be taken into consideration when choosing the method to liquidate or exit.

Figure 1 Levels of value in private companies

This figure shows the various options for private company owners' for exit or liquidity. Two views are presented: owners' perspective and minority owners' perspective.



* Guideline Public Companies Method entails a comparison of the subject company to publicly traded peer companies.

Source: (Pratt 2001, 7)

2.4 VALUATION METHODS

First in this chapter, the two most commonly used methods; Discounted Cash Flow Method (DCF) and Multiples Valuation Method are presented to carry out valuation. The latter method is often applied, because it is simple to use. The DCF method is more complex, because it requires information on a number of factors. After these two methods, I will describe the models that are more focused to produce values for private companies.

In a perfect world where all information is available, theoretically, a value of a company would be independent of the method used. Meaning, all methods would derive the same result. However, as we know this is not the case in real-life. Therefore different methods produce different valuations. That is why valuation analyst often uses multiple methods side by side and then weights each value to create what is finally an expected value of the target company. As stated earlier, valuation methods include different assumptions and that is why the results between two individuals valuing the same target can be so different. Acquirer's and target's interests are generally different. Where acquirer does not want to overpay, the target naturally aims to get the price as high as possible. To conclude, valuation is always more or less subjective, depending on the assumptions made by the valuation analyst. Therefore it is impossible to point out one method that is ultimately the best for every situation.

2.4.1 Discounted Cash Flow Method

John Burr Williams was amongst the first to present the theory of Discounted Cash Flow based valuation in his dissertation work: The Theory of Investment Value (1940). DCF models build on an idea that a value of an asset today is the sum of all future cash flows discounted at the opportunity cost of capital (Brealey, Myers et al. 2008, 102). According to Oded and Michel (2007), there are four methods to value a company using DCF: 1) Free Cash Flow to the Firm (FCFF), 2) Adjusted Present Value (APV), 3) Capital Cash Flows (CCF), and 4) Cash Flows to Equity (CFE). Main differences between these four models are among the cash flows that are discounted and the particular discount rate.

The following equation expresses the essence of future cash flows discounted into present value:

$$V_0 = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t} \qquad (2)$$

where

V_0 = The value of the asset at time $t = 0$

CF_t = The cash flow (or the expected cash flow) at time t

r = The discount rate or required rate of return

Although the DCF looks simple at the paper, it can be challenging when applying the theory into practice. According to Stowe et al. (2002, 41-42), there are four steps in applying DCF analysis to valuation; (1) choose appropriate DCF model, (2) forecast the cash flows, (3) choose a discount rate methodology, and (4) estimate the discount rate.

The problem with this method is that it requires quite much estimation about the future. It is difficult, if not impossible to predict company's future cash flows year after year, not to mention the difficulty to estimate a proper discount rate. We have to bear in mind that basically we are estimating future cash flows from here to eternity. To help predicting future cash flows and to value an entire company we can apply Gordon's constant growth model (Gordon and Eli 1956) to our DCF model. This model assumes that FCFF grow indefinitely at a constant rate. FCFF is the cash flow available to the company's suppliers of capital after all expenses have been paid and necessary investments in working capital and fixed capital have been made (Stowe 2002, 115). The appropriate discount rate to use with Gordon model is weighted average cost of capital (WACC). In mathematical terms, we can put this model as:

$$V_0 = \frac{FCFF_0(1+g)}{r-g} \text{ , or } \quad V_0 = \frac{FCFF_1}{r-g} \qquad (3)$$

where

V_0 = The value of the company at time $t = 0$

$FCFF$ = Free Cash Flow to the Firm

g = Expected growth rate

r = The discount rate

The Gordon model is often useful tool for valuing companies with stable growth-rate. However, it does not apply well on young companies with unstable growth. Also a downside with this method is that it is very sensitive to changes in assumed growth rate and discount rate. It is highly advisable to build sensitivity analysis to see how the results may vary if one ore more assumptions are changed.

2.4.2 Multiples Valuation Method

Multiples valuation method is also known as comparable company analysis. Multiples valuation method, like DCF method, is among the most widely used tools in practise to value companies. Probable reasons why multiples valuation is so popular are that it is easy and quick to apply and also very simple to understand. To make multiples valuation more reliable, the analysts often use combinations of multiples, or by calculating several year average values for multiples.

Market multiples are ratios of a stock's market price to some measure of value per share (Stowe 2002, 180). However, it is merely impossible to use stock price as a numerator for private companies, since the stocks may not be marketable and for sure not traded on public stock exchanges. Therefore, I will use purchase price (transaction value) as a numerator instead of stock price. This way a multiple is a proportion of purchase price to some fundamental variable.

DCF models are often emphasized in literature to be the most appropriate techniques for valuation. However, in practise, estimating the cash flows accurately and choosing the appropriate discount rate is difficult, therefore DCF analysis is often abandoned in favour of multiples valuation. Multiples valuation is far more straightforward than DCF model. Company valuation via multiples starts by calculating the multiples for a set of benchmark or public peer group companies. Next the value is estimated by multiplying the calculated (average, median) ratio from the set of companies, which were chosen by the performance measure for the company being valued (Kaplan and Ruback 1995). For example if the average purchase price-to-EBIT multiple for public peer group companies would be four, then the value for a private company would be four times the EBIT of that particular company.

The multiples used in this thesis to measure the valuation differences between public and private companies are purchase price-to-net assets, purchase price-to-sales, purchase price-to-EBIT, and purchase price-to-EBITDA. It is important to notice that different multiples can give more accurate and reliable results for different industries. For example enterprise value to revenue multiple works well with service and high tech industries, while enterprise value to assets multiple is more appropriate for banking and insurance industries. Enterprise value can be defined by multiplying the shares outstanding by the market value and then by adding convertible securities, short-term debt, straight debt, preferred equity minus cash and marketable securities (Koeplin, Sarin et al. 2000).

2.4.3 Residual Income Valuation

The Residual Income Model (RIM), also known as the Clean Surplus Model, was initially introduced in an article made by James A. Ohlson (1995). The essence behind this theory is that the value of a company can be expressed in terms of accounting variables. This is somewhat different way to approach valuation, since traditionally the value of a company is expressed in terms of finance, i.e. present value of dividends (Dividend Discount Model) or present value of expected future cash flows (Discounted Cash Flow). RIM is in fact a variant of the discounted cash flow model, discounting accounting numbers instead of future cash flows. Therefore the same limitations that exist with the DCF model, i.e. sensitivity to changes in growth rate and discount rate, should be taken into consideration when applying RIM.

Under RIM, the value of a company consists of book value and the net present value of expected future abnormal earnings. Feltham and Ohlson (1995) define the abnormal earnings (goodwill) as what the firm earns in excess of its normal earning of the period. The normal earnings are comprised of the risk free rate times the beginning period book value. As DCF model, also RIM model has several assumptions; no arbitrage opportunities, dividends are irrelevant, accounting is unbiased, time horizon is infinite, and all gains and losses go through net income. Needles to say, that this is not quite how the markets operate at present.

Francis, Olsson et al. (2000) expresses the market equity value as a function of book value and abnormal earnings:

(4)

$$V_t^{AE} = B_t + \sum_{t=1}^{T} \frac{AE_t}{(1+r_E)^t}$$
$$AE_t = X_t - r_E B_t$$
$$B_t = B_{t-1} + X_t - DIV_t$$

where

V_t^{AE} = Market value of equity at time t

AE_t = Abnormal returns in year t

r_E = Equity cost of capital

B_t = Book value of equity at the end of year t

T = Forecasted time period, $1 \ldots \infty$

X_t = Earnings in year t

The RIM is indeed a very useful tool in predicting future earnings. The model concentrates on exploring how current financial statement information can be used to improve future predictions. Better earnings prediction enables better estimates of unrecorded abnormal earnings and the quality of financial statement information. However, the RIM model has also been criticized by its lack of implementation to real world situations. Lo and Lys (2000) argues that the model has been developed in the context of perfect capital markets and it does not incorporate the effect of taxes, bankruptcy costs, agency costs, and asymmetric information.

2.4.4 Quantitative Marketability Discount Method

Christopher Z. Mercer created the Quantitative Marketability Discount Model (hereinafter QMDM) and it was formally introduced in his book Quantifying Marketability Discounts (1997). The QMDM is a shareholder-level DCF model that uses a quantitative analysis to precisely calculate the DLOM (Mercer 2008, 3-38). QMDM model has same characters as Gordon's constant growth

model, which I presented earlier, since QMDM also requires estimations about future growth rate and required rate of return.

The model simply estimates a time horizon at which the investment will be liquidated, liquidating price based on annual percentage growth in value from the valuation date, and interim cash flow to the holder (Pratt 2001, 411). An important note to be made is that the focus here is on expected growth rate in value rather than expected growth rate in earnings. The model assumes that all earnings are reinvested at the growth rate of value and not distributed to the holders before liquidation at the end of holding period. Ultimately, an investor wants to know the present value of an investment in question. Therefore, we need to discount the terminal value at the end of holding period to present value. The discount rate that will be applied is investor's required holding period rate of return.

When applying the QMDM, the appraiser first values the subject company at the entity level, resulting in a stock valuation as if the stock was readily marketable. Next, the shareholder value is calculated. The shareholder value represents the non-marketable value of the subject stock. To calculate the shareholder value, the appraiser increases the value of the subject company by the growth rate during the expected holding period. The appraiser next discounts the future company value using the required rate of holding period return. The resulting value equals to shareholder value. From here we can calculate the DLOM according to QMDM, which is one minus the ratio of shareholder value to enterprise value.

The equation to calculate the marketability discount is as follows:

$$MD = \left(1 - \frac{PV}{V_0}\right) \tag{5}$$

where

$$PV = \left(\frac{1+g}{1+r}\right)^n$$

where

MD = Marketability Discount

PV = Present Value to shareholder

V_0 = Base value

g = Expected growth rate

r = Required rate of holding period return

QMDM model itself has some typical flaws common to present value methods. For example, the model is very sensitive for holding period assumption. The appraiser's task is to narrow the ranges of all the assumptions that need to be made. However, QMDM, which is used primarily in valuing privately held companies, develops concrete estimates of expected growth in value of the company and reasonable estimates of additional risk premiums to account for risks faced by investors in non-marketable minority interest of companies (Pratt 2001, 193).

2.4.5 Economic Component Model

Jay B. Abrams originally introduced Economic Component Model (ECM) in his article, Discount for Lack of Marketability: a Theoretical Model (1994). The ECM contains three components that act as "building blocks" in calculating DLOM. The components are (1) delay to sale, (2) buyer monopsony power, and (3) buyers' and sellers' transaction costs. Delay to sale component is the economic disadvantage of the considerable time it takes to sell a privately held business if compared to an almost instantaneous ability to sell stocks of a public company. Basically what this means is a discount due to illiquidity and the risks involved, e.g. changes in the business environment and inability to reinvest the money in other lucrative investments. Monopsony power

of the buyer means when the markets for privately held business is thin a single buyer – a monopsonist – can drive price down by withholding purchase (Abrams 2000, 257). Similarly, in a single seller situation a monopolist can drive price up by withholding production. Therefore, this discount should be applied to small, unexciting companies with only one or few interested buyers. Transaction costs when selling a private company is often substantially higher than for selling stocks in publicly traded company. Transaction costs consists of legal, accounting, and appraisal fees.

We can present the model as a fairly simple equation:

$$DLOM_{CI} = 1 - \left[(1 - D_1)(1 - D_2)(1 - D_3)\right] \tag{6}$$

and

$$DLOM_{MI} = 1 - \left[(1 - M)(1 - D_1)(1 - D_2)(1 - D_3)\right] \tag{7}$$

where

$DLOM_{CI}$ = Total discount for lack of marketability for a control interest
$DLOM_{MI}$ = Total discount for lack of marketability for a minority interest
D_1 = Discount due to delay of the sale
D_2 = Discount due to monopsony power of the buyer
D_3 = Discount due to the uncertainty of the sale
M = Minority interest discount

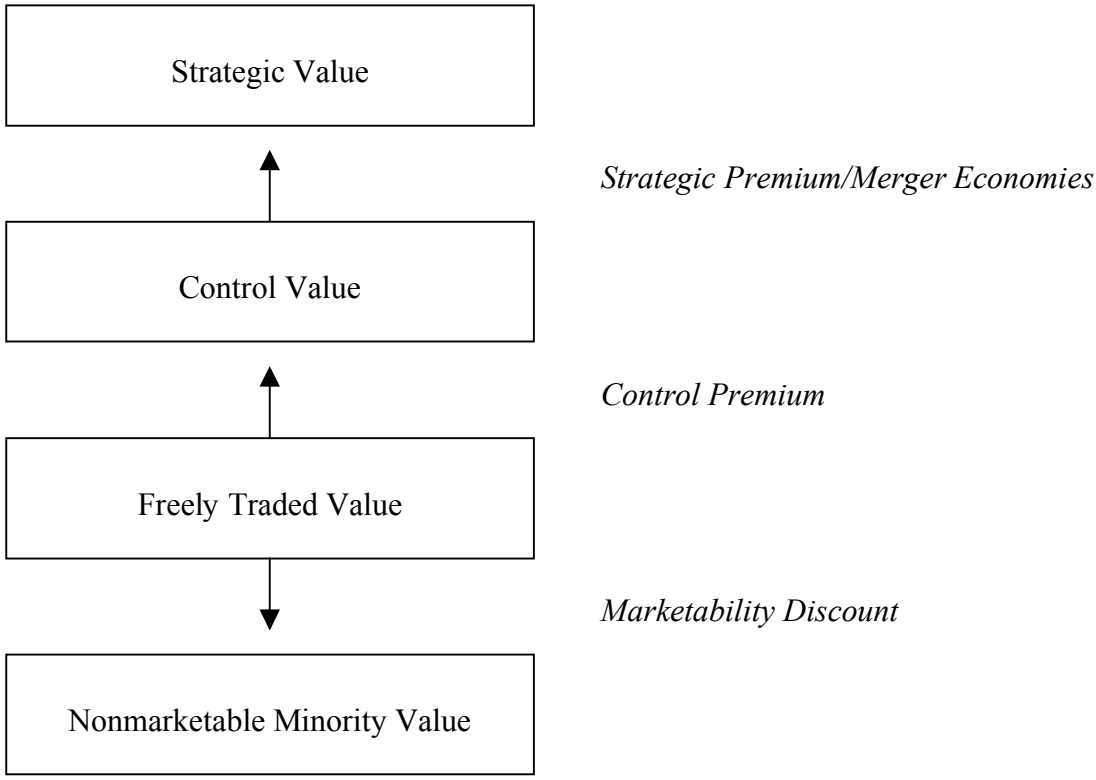
What Abrams (1994) means with the uncertainty of the sale, is that the subject company may not be interesting in the eyes of potential buyers and therefore a discount in FMV needs to be applied.

3 THEORIES TO APPROACH DISCOUNTS FOR LACK OF MARKETABILITY

Adjusting for levels of control and marketability can be very complicated, but still very important topic among understanding the discounts applied to privately held companies. This chapter will discuss different approaches to study how to measure the DLOM in private companies. The focus will be on two of the lowest levels shown on Figure 2. Control premium and strategic premium will be left out from this study, since these two would be hard to measure and study in cases of private companies and these two does not relate substantially to this thesis.

Figure 2 Levels to approach Fair Market Value

This figure demonstrates the levels toward the fair market value (Strategic Value). The lowest level relates closely to private companies and to restricted stocks. On the right side of the figure can be seen the value of discount for the lack of marketability to stockholders and premiums to be paid for controlling the company. Strategic Premiums could come into question if the company is purchased as a whole and/or synergies are gained in the merger.



Source: Pratt et al. (2000, 348)

According to Kooli, Kortas et al. (2003), there are four different approaches to estimate the DLOM: the acquisition approach, the restricted stock approach, the expected exit multiple approach, and the IPO approach. In the following, I will discuss related literature to these four approaches to DLOM.

3.1 ACQUISITION APPROACH

> *The use of comparable publicly held corporations as a guide to valuation, as a practical matter, may be the most important and appropriate technique for valuing a privately held operating business. Obviously finding a business exactly the same as the enterprise to be valued is an impossibility. The standard sought is unusually one of reasonable and justifiable similarity. This degree of likeness is attainable in most cases.* (Burke Jr. 1981, 49)

As stated on the quote above, comparable companies valuation is indeed important technique for valuing a privately held companies, hence I find it also to be of the essence to study DLOM from the perspective where private companies are reflected to publicly traded ones.

Acquisition approach estimates the marketability discount by comparing acquisition prices for public and private companies. Acquisition approach aims to identify a set of acquisitions of private companies and for each of these transactions to find an acquisition of similar publicly traded company. Meaning with similarity, the companies must (1) operate in the same industry, (2) close in size, and (3) acquired around the same time. After identifying the matching pairs the idea is to calculate the purchase price multiples of various relevant financial parameters, such as sales, EBIT, EBITDA, net operating profit after taxes (NOPAT), and assets. Later on, when all multiples have been calculated properly, the DLOM can be viewed by the difference between the multiples of publicly traded companies and privately held companies.

The equation to calculate DLOM from multiples can be shown as follows:

$$DLOM = 1 - \left(\frac{\Pr CM}{PuCM} \right) \tag{8}$$

where,

DLOM = Discount for Lack of Marketability

PrCM = Private Company Multiple

PuCM = Public Company Multiple

In this thesis, the intention is to use the acquisition approach to measure DLOM by gathering substantial data sample and then calculate mean and median multiples for both private and public companies. Table 2 presents an example of the idea how to calculate the mean and median multiples, in order to proceed into the final stage of measuring DLOM.

Table 2 Acquisition approach to DLOM by using multiples

This table illustrates the method using multiples to measure DLOM. In the table, there are six matching pairs (company data's are illustrative), for which have been calculated four individual multiples. T. Price equals Transaction Price, P/NA is Transaction Price-to-Net Assets multiple, P/S is Transaction Price-to-Sales multiple, P/EBIT is Transaction Price-to-EBIT multiple, and P/EBITDA is Transaction Price-to-EBITDA multiple. On the yellow area I have also calculated mean and median results in order to calculate DLOM using the equation (7) above.

Private Company	T. Price	Net Assets	Sales	EBIT	EBITDA	P/NA	P/S	P/EBIT	P/EBITDA
1	100	80	100	35	40	1.25	1.00	2.86	2.50
2	110	85	120	30	35	1.29	0.92	3.67	3.14
3	124	84	143	39	44	1.48	0.87	3.18	2.82
4	90	57	122	44	49	1.58	0.74	2.05	1.84
5	103	67	149	30	35	1.54	0.69	3.43	2.94
6	98	120	200	50	55	0.82	0.49	1.96	1.78
					MEAN	**1.33**	**0.78**	**2.86**	**2.50**
					MEDIAN	**1.39**	**0.80**	**3.02**	**2.66**

Public Company	T. Price	Net Assets	Sales	EBIT	EBITDA	P/NA	P/S	P/EBIT	P/EBITDA
1	125	92	120	37	42	1.36	1.04	3.38	2.98
2	140	98	144	32	37	1.43	0.97	4.38	3.78
3	150	97	172	41	46	1.55	0.87	3.66	3.26
4	155	66	146	46	51	2.35	1.06	3.37	3.04
5	170	77	179	32	37	2.21	0.95	5.31	4.59
6	200	138	240	53	58	1.45	0.83	3.77	3.45
					MEAN	**1.72**	**0.96**	**3.98**	**3.52**
					MEDIAN	**1.50**	**0.96**	**3.72**	**3.35**

3.2 RESTRICTED STOCK APPROACH

Most of the public companies have some stock outstanding, or registered, but from various reasons restricted from public trading. When a company has an IPO, often much of these insiders' stocks are not registered because the underwriters do not want the insiders to "bail out". Unregistered stocks are frequently issued in acquisitions and private financings. Although this unregistered stock cannot be sold on the open market, it can be sold in private placements. The stock is identical in every way to the public traded stock except for the restrictions on its sale. Therefore, the concept of the restricted stock studies is to compare the private block sale prices of the restricted stock to the same-day public trading price, with the difference being a proxy for a discount for lack of marketability. (Pratt 2005, 156). During the past, there have been many researches concerning restricted stock and public stock transactions (see e.g. Bajaj, Denis et al. 2001, Hertzel and Smith 1993, Silber 1991, Wruck 1989). These studies have included hundreds of transactions, covering a time scale from 1966 till the present time. The average discount ranges from 13% to 45%, with most clustered between 31% and 36% (Pratt 2001, 81).

Chaffe (1993) presents an alternative way to calculate the DLOM of restricted stock. He looks DLOM from options point of view. Chaffe argues that if one holds restricted, non-marketable stock, and purchases an option to sell those shares at the market price, then the holder has, in effect, purchased marketability for the shares. Then the discount for DLOM would be the price of a put option (right to sell). A useful tool to define a price for put options is the Black & Scholes (1973) option-pricing model.

The Black & Sholes model has following formula:

$$p = Xe^{-rT}N(-d_2) - SN(-d_1) \quad (9)$$

where

$$d_1 = \frac{\ln(S/X) + (r + \sigma^2/2) \times T}{\sigma\sqrt{T}}$$

and

$$d_2 = d_1 - \sigma\sqrt{T}$$

where,

p	= Put price
X	= Strike price
r	= Risk free interest rate
T	= Time to maturity
N	= Standard normal distribution
S	= Current price of the underlying asset
σ	= Volatility

The general usefulness of restricted stock studies has been questioned because investors in restricted stock are often institutional investors whose time horizon is long and need for liquidity is small. Moreover, the restricted stock researches rely on the discounts at which privately placed shares are sold as a measure of the marketability discount (Block 2007). However, marketability may not necessarily be the solely reason for discount. For example, venture capitalists and private equity investors often expect to provide the issuing company with special consulting, advice, and oversight following their purchase of privately placed shares. In these cases, at least part of the price discount observed in private equity placements may reflect compensation to investors for future services to be rendered, rather than a DLOM (Block 2007).

3.3 EXPECTED EXIT MULTIPLE

Expected exit multiple approach examines the private company discount from another perspective than the other three approaches presented in Chapter 3. This approach focuses on studying private

equity financing from venture capitalists and buyout funds point of view. The expected exit multiple approach aims to estimate the private company discount by comparing the valuation of the private company with the expected value at the liquidity event (Sarin, Das et al. 2002). Sarin, Das et al. (2002) argues that this approach also permits the appraisers to estimate the discount for companies in various stages of their growth cycle, industry, and at different points in time.

The idea is fairly simple, since the private equity valuation discount is reflected in the extra rate of return required on the private firm over the return earned by investing in a public firm (Sarin, Das et al. 2002). The risks of investing into a private company are much higher than investing into a publicly traded marketable firm. Therefore, the required rate of return is higher than it would be with similar public company.

Startup companies, as well as expanding companies, often need an outside source of financing to provide the critical resources to survive and grow. It is typical that these companies go through different stages of funding over the course of its lifecycle. According to Dean and Giglierano (1990), there are five stages of venture financing; (1) founders' round, (2) seed round, (3) second stage, (4) mezzanine stage, and (5) IPO. Sarin, Das et al. (2002) categorized each financing rounds in their study into five categories based on the stage of the firm that was being financed: early-stage, expansion stage, later-stage, buyout/acquisitions stage and others. They investigated over 52.000 rounds of financing, over the period of 1980 to 2000, and followed each of these investments and estimated the probability of the companies being acquired, or having an IPO. The probability of exiting via IPO was roughly 20-25% and was fairly constant for companies financed in an early stage, expansion stage, or later stage. Equally, they found that exiting via acquisition was approximately 10-20% and the probability of an acquisition was much higher for companies financed in later stages. Therefore, the total probability of exit lies in the range of 30-45%.

Venture capitalists take voluntarily substantial risks by investing into companies where exit and maturity date is unknown. Therefore, they tend to think their initial investment more in terms of multiples, rather than in terms of steady, annual rates of return. Hence, part of the value creation comes from the venture capitalists ability to negotiate discounted price. To estimate the expected exit multiples and discounts, Sarin, Das et al. (2002) capture the multiples and concomitant

discounts that the private equity purchasers get on their investments relative to the expected value at the exit.

Firstly, the equation of how to define the exit multiple will be presented, and secondly, more complicated version of it, the expected exit multiple equation.

$$Exit\ multiple = \frac{X_{raw}}{X_{ind}} \tag{10}$$

where,

$$X_{raw} = \frac{Exit\ Valuation\ (at\ IPO\ or\ Acquisition)}{Financing\ Valuation}$$

and

$$X_{ind} = \frac{Industry\ Index\ (at\ IPO\ or\ Acquisition)}{Industry\ Index\ at\ Financing}$$

This equation is widely used by venture capitalists since it assesses the payback ratio of the initial investment. The excess return to investor is the difference between X_{raw} and X_{ind}. Sarin, Das et al. (2002) found that the multiples for acquired firms are usually lower than those for IPO. Average multiples varied from 10 for early stage companies to 4.6 for later stage companies.

As mentioned earlier, estimating expected exit multiple is more complicated than calculating the exit multiple with equation (9). First we need to calculate two different multiples from the data sample, the expected exit multiple in year *t* and the expected exit multiple in industry *k*.

The equations to calculate expected exit multiples are as follows:

$$Expected\ Exit\ Multiple_{jt} = E\left(X_{jt} \middle| IPO\ or\ Acquisition\right) = p\left(j,t \middle| IPO\ or\ Acquisition\right) \times \frac{\sum_i X_{ijt}}{N_{jt}} \quad (11)$$

where,

j = Stage of the company

t = Year of financing

p = Probability of an IPO or Acquisition

i = ith multiple

N_{jt} = Number of financing in stage j in year t

and

$$Expected\ Exit\ Multiple_{jk} = E\left(X_{jk} \middle| IPO\ or\ Acquisition\right) = p\left(j,k \middle| IPO\ or\ Acquisition\right) \times \frac{\sum_i X_{ijk}}{N_{jk}} \quad (12)$$

where

k = Industry

Note that the expected exit multiple is an equally weighted multiple.

Finally, as we can define the expected exit multiple, Sarin, Das et al. (2002) have provided a guideline to estimate the appropriate amount of marketability discount by using the following equations:

$$D_{jt} = 1 - \frac{1}{E\left[X_{jt}\right]} \quad (13)$$

$$D_{jk} = 1 - \frac{1}{E\left[X_{jk}\right]}$$

3.4 IPO APPROACH

Another widely used approach to study private company discounts is the IPO approach. The IPO approach attempts to quantify the discount associated by comparing the post-IPO share prices with transaction prices in the same shares prior to the IPO. John D. Emory has done numerous studies (1994, 1997, 2000, and 2002) about the value of marketability using the IPO approach. Emory's initial thought in year 1980 was that if the prices, at which private transactions took place before the IPO, could be related to the price, at which the stock was offered subsequently to the public, another gauge as to the magnitude of the value of marketability might be available. Indeed, it is possible to establish the prices due to a prospectus is obliged to identify securities transactions between principals and insiders, since the registrants last fiscal year prior to the offering. In order to provide a reasonable comparison of prices before and at the IPO, Emory felt necessary both for the company to have been reasonably sound and for the private transaction to have occurred within a period of five months prior to the offering date. In eight of his studies, over 2.200 prospectuses were reviewed and 310 qualifying transactions were found. The mean discount for the 310 transactions, in eight studies was 44% and the median was 43% (Emory 1997). In Emory's latest study, where he has expanded the time frame from the previous 1980-1997 to 1980-2002, 543 qualifying transactions were found. The mean discount for the 543 transactions was 46% and the median was 47% (Emory Sr., Dengel III et al. 2002).

However, these studies suffer from several problems. Koeplin, Sarin et al. (2000, 96) states that the transactions used are with insiders and are generally not arm's length. One way to see it, would be management compensation plans, which are build in a way that enables managers to buy these stocks below fair value or market value. Secondly Koeplin, Sarin et al. (2000, 96) argue that most of the transactions observed are for restricted options issued to management and do not represent an exchange of shares for cash. Finally, Emory's studies suffer from a serious selection bias. Studied companies represent only the better half of an apple and therefore the sample does not include any "unsuccessful" companies. An obvious reason for this is that no investor wants to purchase stocks of a company that has no potential, and that is why only good companies go public.

4 HYPOTHESES

The goal of this study is to measure the average private company discount in merger situations and to find generalizable answers to the question of what is causing this phenomenon. Hence, I am using only U.S.-based companies, I believe the results are generalizable due to a fairly large sample size and a variety of companies involved.

Prior studies on private company discounts have derived broad range of results. Studies conducted using the restricted stock approach, Hertzel and Smith (1993) found an average discount of 13.5%, Wruck (1989) found 17.6%, and Silber (1991) found an average of 33.75%. Using the IPO approach with a sample of 543 transactions and covering the years 1980-2002, Emory Sr., Dengel III et al. (2002) found a staggering average discount of 46% for private companies prior to an IPO. Using the expected exit multiples method, Sarin, Das et al. (2002) found that financing in late stage companies leads to private equity discounts of approximately 11% and for early stage companies the discounts are as high as 80%. Finally, the acquisition approach studies made by Kooli, Kortas et al. (2003), Koeplin, Sarin et al. (2000) and Block (Block 2007) resulted discounts of approximately 34%, 25% and 17%, respectively. As can be noticed, the results are dispersed into a broad range, however, all of these studies report a significant discount for private companies.

Based on previous researches I set the first hypothesis to analyze the topic as follows:

H1: On average privately held companies sell at discount to comparable public targets.

Acquirers may benefit from the discount applied on private companies on merger situations. After testing the H1 hypothesis, the next phase is to examine whether the transaction price differences of private and public companies can be explained with firm-specific and industry-specific factors related to company status, company size, earning power, capital adequacy, industry, and/or acquisition date. Therefore, I present the following hypotheses:

H2: The possible discount between private companies and public companies can be explained by the status the company represents.

$H3_A$: The possible transaction price difference between private and public companies can be explained by the size of a company.

$H3_B$: The possible transaction price difference between private and public companies can be explained by the performance of a company.

$H3_C$: The possible transaction price difference between private and public companies can be explained by the amount of debt a company has.

$H3_D$: The possible transaction price difference between private and public companies can be explained by the industry in which a company operates.

$H3_E$: The possible transaction price difference between private and public companies can be explained by the time when a company is acquired.

$H4_A$: The possible discounts of which private companies suffer can be explained by the size of a company.

$H4_B$: The possible discounts of which private companies suffer can be explained by the performance of a company

$H4_C$: The possible discounts of which private companies suffer can be explained by the amount of debt a company has.

$H4_D$: The possible discounts of which private companies suffer can be explained by the industry in which a company operates.

$H4_E$: The possible discounts of which private companies suffer can be explained by the time when a company is acquired.

5 RESEARCH DESIGN

This chapter presents the sample description, variables definition and methodology used in this thesis. This chapter gives a detailed description of how the data was obtained and the variables chosen. Finally, the methodology used in this thesis and the methodology used in the previous studies will be discussed.

5.1 SAMPLE DESCRIPTION

The initial sample consisted of astonishing 158,453 mergers and acquisitions over the 20-year period between 1989 and 2008. The sample was extracted from SDC Platinum database and includes all U.S.-based transactions between the years 1989-2008. SDC Platinum database includes corporate finance related data concerning global new issues, M&A, corporate governance, corporate restructuring, securities trading, industry specific, and public finance dated back to the year 1962 (M&A 1979 - present). All firm-specific information is obtained from this database and no adjustments have been made to it.

The sample contains all U.S. SIC (Standard Industrial Classification) code categories, except Finance and Insurance, and Public Administration. From the initial sample, there were found 30,608 transactions classified to be public- and 76,439 transactions classified to be private, with 931 different SIC. After the transaction was required to have deal value, the number of hits reduced to 25,633 public- and 24,728 private acquisitions. The deal status was chosen to be completed and unconditional, which decreased the number of public hits to 12,919 and private to 21,519. Finally, the deal type was chosen as “disclosed value mergers & acquisitions”, which led the sample to consist of 5,815 public- and 19,779 private transactions. Moreover, in order to get net sales, net assets, EBIT, and EBITDA from the last 12 months, the sample had to be sorted, which further decreased it to have 4,093 public companies and only 1,556 private companies. All in all, the sample ended up including a grand total of 5,649 U.S.-based transactions over the 20-year period between 1.1.1989 and 31.12.2008. The following two tables (Table 3 and Table 4) summarize the data gathering process from SDC Platinum database, before the final manual sorting procedure.

Table 3 SDC-session details concerning public companies

The table shows the criteria's of how the sample of 5,815 public U.S.-based mergers and acquisitions, over a time period between 1.1.1989 and 31.12.2008, was gathered. The first column lists the number of request, the second column points the number of hits found for each additional request, and the third column briefly describes the request in question. This sample was further sorted to exclude all the companies lacking the information on net sales, net assets, EBIT, and EBITDA. Finally the sample consisted of 4,093 public companies.

Request	Number of hits	Request description
0	-	DATABASES: U.S. (domestic) M&A, 1979-present (MA, OMA)
1	-	Date announced: 01/01/1989 to 31/12/2008 (Custom)
2	158 453	Target All SIC: Finance & Insurance and Public. Admin. excluded
3	158 450	Target Nation: U.S.
4	30 608	Target Public Status: Public
5	25 633	Deal Value: LO to HIGH
6	12 919	Deal Status: Completed and unconditional
7	5 815	Deal type: Disclosed Value Mergers & Acquisitions

Table 4 SDC-session details concerning private companies

The table is identical with Table 3, except it presents the criteria's of how the sample of 19,779 private U.S.-based mergers and acquisitions was gathered.

Request	Number of hits	Request description
0	-	DATABASES: U.S. (domestic) M&A, 1979-present (MA, OMA)
1	-	Date announced: 01/01/1989 to 31/12/2008 (Custom)
2	158 453	Target All SIC: Finance & Insurance and Public. Admin. excluded
3	158 450	Target Nation: U.S.
4	76 439	Target Public Status: Private
5	24 728	Deal Value: LO to HIGH
6	21 519	Deal Status: Completed and unconditional
7	19 779	Deal type: Disclosed Value Mergers & Acquisitions

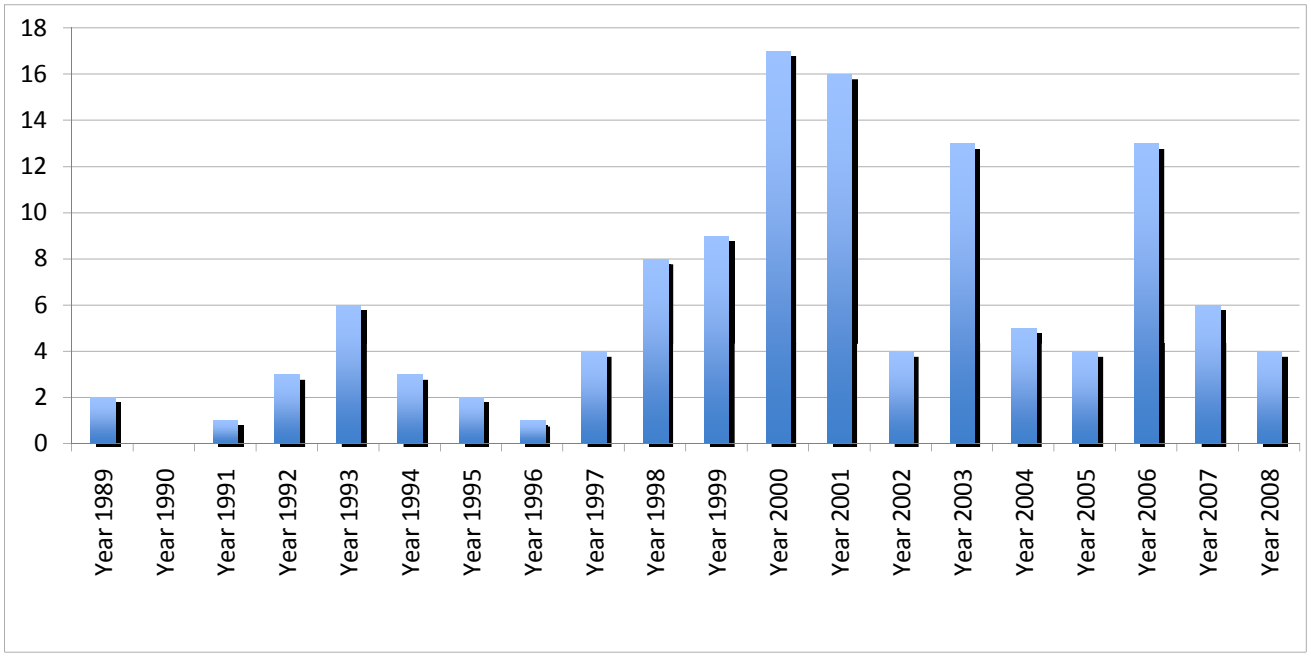
After data gathering, started the actual sorting in order to find the matching pairs. The objective was to find as similar transactions as possible, from both groups - private and public. The following criteria's was chosen to define the final number of matching pairs.

Firstly, all the acquisitions used in this study were acquired for 100 per cent of shares outstanding, since the examination of minority interests would require another study. Secondly, the focus was on the primary four-digit SIC code, as these codes had to be exactly the same for both companies. Thirdly, the date when the transaction of private company took place had to be within 12 months (plus or minus) with the public company in question. Fourthly, the size of net assets of private

company had to be within 20 per cent (plus or minus) with the public company in question. This led to a grand total of 242 companies matching with these three criteria's, in other words 121 pairs. The following figure (Figure 3) describes the yearly distributions of the matching pairs.

Figure 3 Timely distributions of acquisitions among the chosen companies

This figure illustrates the distribution of acquisitions between the timescale of 1989 and 2008. As can be seen, it is clear that the years 2000 and 2001 had the most acquisitions, possibly due to the dot-com boom.



5.2 VARIABLE DEFINITION

Appendix 1 presents a detailed definition of all the independent and dependent variables used in generating the multiples to calculate the discount and applied to the regression models. Koeplin, Sarin et al. (2000) are guided in the choice of valuation ratios by the valuation basics discussed previously in the literature review. They chose ratios that can be applied to private as well as public companies, and therefore avoid using market-based variables. The variables for calculating the valuation multiples based discount are for the most part the same as Koeplin, Sarin et al. (2000) uses, except in this thesis the transaction value will be applied as a numerator instead of enterprise value. Koeplin, Sarin et al. (2000) uses enterprise value to judge the appropriateness of the price paid, hence in this thesis the purpose is not to judge whether the price paid was appropriate or not,

but to study already realized transaction. In their calculations, enterprise value is defined by multiplying the shares outstanding by the offer price and then by adding convertible securities, short-term debt, straight debt, preferred equity, minus cash and marketable securities. Next, the valuation multiples and all the dependent and independent variables are presented.

Valuation multiples:

Transaction Price-to-Net Assets – This multiple indicates the ratio of the price paid against the book value of equity. The letters PNA is short for Transaction Price-to-Net Assets.

Transaction Price-to-Sales – This multiple indicates the ratio of what the acquirer paid against each dollar of acquired company's sales. The letters PSA is short for Transaction Price-to-Sales.

Transaction Price-to-EBIT – The EBIT variable is a measure of performance, and therefore this multiple shows the amount what the acquirer paid against acquired company's last twelve month's performance. The letters PEBIT is short for Transaction Price-to-EBIT.

Transaction Price-to-EBITDA – This multiple is same as previous one, except that into the EBIT variable, depreciation and amortization are added back. The letters PEBITDA is short for Transaction Price-to-EBITDA.

Furthermore, there are various additional variables that will be used when measuring correlation coefficients and applying the three multiple linear regression models. Net assets (short for NA) divide all of the dependent variables and independent variables related to size, performance, and risk. Hence, the differences among the companies are taken into account.

Dependent variables:

Transaction Price – This variable is the transaction price-to-net assets ratio. The letter P is short for Transaction Price.

Transaction Price$_{private}$ – Transaction Price$_{public}$ – This variable is an empirical measure of the differences between the transaction prices of a private and a public peer company.

(Transaction Price$_{private}$ – Transaction Price$_{public}$) <0 – This variable concentrates on those individual private companies, whose price-to-net assets ratio is smaller relative to a public peer company.

Independent size-, performance-, and risk variables:

Net Assets – This variable is an empirical measure for the size of a company. Net assets are the difference between total assets and total liabilities. Net assets are based on the information at the time of acquisition. The letters NA is short for net assets.

1/Net Assets – This variable is a reciprocal of net assets. In order to use net assets as a measure of company's size, this conversion is needed, since the net assets divide the dependent variables. With this, the differences in the transaction price are taken into account. Net assets are based on the information at the time of acquisition. 1/NA is short for the reciprocal of net assets.

Sales – This variable is an empirical measure for the size of a company. Sales are based on the last twelve months information prior to acquisition.

EBITDA – This variable is an empirical measure for the performance of a company. EBITDA is an important measure of performance, since it takes into account companies' different depreciation and amortization methods. EBITDA is based on the last twelve months information prior to acquisition.

Net Debt – This variable is an empirical measure of company's risk. Net debt is derived from total debt deducted with cash and cash equivalents. Net debt is based on the information at the time of acquisition. The letters ND is short for net debt.

Sales$_{private}$ – Sales$_{public}$ – This variable is an empirical measure of the differences between the sales of a private and a public peer company. The letter S is short for sales.

$EBITDA_{private}$ – $EBITDA_{public}$ – This variable is an empirical measure of the differences between the performance of a private and a public peer company.

Net $Debt_{private}$ – Net $Debt_{public}$ – This variable is an empirical measure of the differences between the riskiness of a private and a public peer company.

Independent company status-, industry-, and acquisition time variables:

Private – This variable is an indicator variable. It is 1 if the company status is private, otherwise 0.

Industry 1 – This variable is an indicator variable. It is 1 if the company's SIC-code is between 1000 and 1499, otherwise 0. All of the companies are grouped into eleven categories based on the SIC-codes (see Appendix 2A). For the remaining ten industry variables, the indications are made similarly. The letters IND is short for industry.

Year 1 – This variable is an indicator variable. It is 1 if the company was acquired in the year 2008 or 2007, otherwise 0. All of the acquisitions are grouped into ten categories based on the acquisition date (see Appendix 2B). For the remaining nine acquisition year variables, the indications are made similarly. The letters YO is short for year.

5.3 METHODOLOGY

The methodology is divided into two parts. Firstly, I will compare the acquisitions of private and public targets by comparing the chosen variables described earlier. The objective is to measure the differences of valuation ratios between private and public targets. Hopefully, these calculations will generate answers where private company discounts exist and the full extent of it. The multiples I use will generate four different indicators of discount or premium, applied to the sample's 242 acquisitions.

Secondly, I examine with three multiple linear regression models, whether or not there can be found explanatory factors, which are causing discounts (premiums paid) in acquisitions. Before applying

regression models, I will find out the correlation coefficients between the transaction price and other independent variables. I will be using Pearson's correlation and Spearman's rank correlation coefficients and will apply these for both set of acquisitions. Furthermore, all the variables, except company status, industry and acquisition time are divided by Net Assets, in order to scale all the companies and rule out the size factor. Scaled variables will also be used in the regression models as stated before.

6 EMPIRICAL ANALYSIS

In this chapter, the empirical results of the study are presented. The main purpose of the analysis in this chapter is to determine the differences in the multiples between private and public companies, and further to determine the possible discounts and explanatory factors behind this. I begin with descriptive statistics and continue to present the correlation coefficients between the transaction price and other dependent variables for both sets of companies.

Next, the calculations and the obtained results are presented, using the multiples valuation method. After this part, I will then concentrate on examining the differences between the private and public target multiples, industries and acquisition time. Three different multiple linear regression models are applied, in order to find causal relationships between the dependent variables and independent variables. Each of the regression models are described comprehensively in the Chapter 6.4 Regression Analysis

6.1 DESCRIPTIVE STATISTICS

Table 5 presents the summary statistics of the variables chosen to multiples valuation and two additional variables measuring the risks of companies. This table reveals some interesting facts about the companies involved. Value of transaction, on average, was larger with public companies, however the median figure was higher in private companies. Net sales could be stated to be fairly equal on both categories, on average, private category has the upper hand; higher median figure goes to public category. The latter statement also applies to net assets, except the parts have turned to opposite. The most interesting part was the moment when EBIT from the last twelve month (LTM) was revealed. As can be seen, the average and the median EBIT for public companies are both negative (-4.8 and -0.9 respectively). The factors behind these results remain unknown. What makes it interesting is that EBIT should reflect company's financial performance and with these figures, one could argue that negative EBIT could affect acquirers desire to purchase such a company. One reasonable answer could be that these companies are executing some sort of tax planning for future benefits. Furthermore, when depreciation and amortization are added back to EBIT, the EBITDA on average ends up being positive for public companies; hence the median

remains slightly negative. Private companies outplay public ones on both measures, EBIT and EBITDA. Finally, the figures reflecting risks reveals that, median and on average, total debt for public companies are higher. When cash and cash equivalents, in other words liquid assets are deducted from total debt, the positions turn the other way around. This implies that on average public companies hold more liquid assets than private ones, based on the net debt. Lastly, the mean and median figures do not match quite well, which can be explained due to high standard deviations (Std.). High standard deviation indicates the observations are fractioned into a wide scale.

Table 5 Descriptive statistics of sample transactions

This table captures the differences between the 242 private and public companies.

	Private					Public				
	Mean	*Median*	*Std.*	*Min*	*Max*	*Mean*	*Median*	*Std.*	*Min*	*Max*
Value of Transaction ($mil)	178.3	74.1	405.9	0.4	4094	202.0	50.5	519.8	0.6	4465
Net Assets ($mil)	29.5	11.7	41.8	0.5	230.2	29.7	11.2	41.9	0.6	210.6
Net Sales LTM ($mil)	66.9	23.7	113.3	0.1	707.5	59.6	24.5	105.4	1.6	697.2
EBIT LTM ($mil)	3.3	0.8	26.8	-143.4	166.2	-4.8	-0.9	28.1	-210.4	115.7
EBITDA LTM ($mil)	7.2	1.9	26.8	-121.9	148.0	1.5	-0.2	27.9	-144.3	163.5
Total Debt ($mil) *	20.2	2.2	49.1	0.01	271.1	25.7	2.8	81.0	0.01	448.1
Net Debt ($mil)	13.7	0.9	55.1	-139.2	288.3	1.2	-1.1	69.7	-184.4	442.4

* Data not available for 28 private- and 37 public companies

In addition, the industry distributions are presented in Appendix 3.

6.2 CORRELATIONS BETWEEN THE DEPENDENT AND THE INDEPENDENT VARIABLES

Correlation analysis is a univariate test, which is set to measure the dependences between two or more variables. Correlation analysis is particularly useful since it can give predictive relationships between the dependent and independent variables. However, correlation analysis does not provide information whether the dependent and the independent variables are causally related. Causal relationships will be studied with regression models. Another important purpose is to test whether the independent variables are mutually correlated in case, which would cause multicollinearity problems in the regression analysis phase.

Table 6 and Table 7 present the correlation matrix of the variables for both groups of acquisitions, private and public. The Pearson correlations are presented below the diagonal and the Spearman rank correlations are above the diagonal. The nominal scale indicator variables are not included into the correlation matrix. This is not advised since the Pearson correlation assumes the variables to be interval scale and Spearman rank correlation requires that the variables are at least ordinal scale (Ghauri and Grønhaug 2005, 181). However, indicator variables are applied into the regression models and therefore correlation coefficients are stated to indicator variables in Appendixes 4 and 5. Correlations between indicator variables and dependent variable are not presented in the correlation matrixes (Table 6 and 7), due to the large amount of it. Nonetheless, possible significant correlations between indicator variables and dependent variable are presented in the chapters 6.2.1 and 6.2.2.

6.2.1 Correlation coefficients of private acquisitions

Pearson correlations measured for private companies, sales (SNA), net debt (NDNA), and acquisition year 2000 (YO_6) are positively and significantly correlated with transaction price (PNA). Acquisition years 2003 and 2002 (YO_4) correlates negatively with transaction price. The results gathered from Spearman rank correlation prove evidence that net assets (1/NA), sales, and acquisition year 2000 are positively and significantly correlated with transaction price. Interestingly, company's performance (EBITDANA) has no significant correlation with transaction price. Moreover, as could be expected sales correlate positively and significantly with EBITDA, where net debt correlate negatively and significantly with EBITDA.

Pearson correlation and Spearman rank correlation provide evidence that independent variables are not too powerfully mutually correlated. The highest Spearman rank correlation is indeed between sales and EBITDA (0.511). Lind, Marchal et al. (2010, 528) suggest that if the correlation between two independent variables is between -0.70 and 0.70 there likely will not appear multicollinearity problems when applying regression models.

Table 6 Correlation between estimation variables of private acquisitions

This table presents the correlation coefficients between the dependent variable and the independent variables for the private companies acquired. *PNA* is the transaction price divided by net assets of the particular company, *1/NA* is a reciprocal of net assets, *SNA* is sales divided by net assets, *EBITDANA* is EBITDA divided by net assets, and *NDNA* is net debt divided by net assets. Pearson correlation coefficients are presented below the diagonal and the Spearman rank correlation coefficients are above the diagonal. Correlation coefficients with significance level of 5% (0.05) and greater are **bolded**. P-values are reported in parenthesis. Correlations for all independent variables, see Appendix 4.

	PNA	*1/NA*	*SNA*	*EBITDANA*	*NDNA*
PNA		**0.260**	**0.344**	0.164	0.087
		(0.004)	**(0.000)**	(0.072)	(0.341)
1/NA	0.105		**0.284**	-0.082	0.081
	(0.252)		**(0.002)**	(0.373)	(0.375)
SNA	**0.297**	**0.181**		**0.511**	-0.011
	(0.001)	**(0.047)**		**(0.000)**	(0.908)
EBITDANA	0.088	-0.035	**0.182**		**-0.241**
	(0.335)	(0.706)	**(0.046)**		**(0.008)**
NDNA	**0.288**	-0.009	0.108	**-0.239**	
	(0.001)	(0.921)	(0.239)	**(0.008)**	

6.2.2 Correlation coefficients of public acquisitions

Pearson correlations measured for private companies indicated that sales (SNA), net debt (NDNA), and acquisition year 2000 (YO_6) was positively and significantly correlated with transaction price (PNA). Results for public companies present some similarities, since sales and acquisition year 2000 are positively and significantly correlated with transaction price. In addition to these, the reciprocal of net assets (1/NA) seem to correlate positively and significantly with transaction price.

The results gathered from Spearman rank correlation proves evidence that only sales are positively and significantly correlated with transaction price. However, industry wholesale and retail trade (IND_4), acquisition years 2003 and 2002 (YO_4), as well as acquisition years 1992, 1991, 1990 and 1989 (YO_10) are negatively and significantly correlated with transaction price. Moreover, again it is interesting to find out that company's performance (EBITDANA) has no significant correlation with transaction price. According to these preliminary results, net debt does not seem to correlate with transaction price, however, we cannot argue based on these results that there is a

causal relationship. As mentioned earlier, regression models will be applied later on to provide information whether causal relationships between variables appear to be.

Also for public acquisitions, Pearson correlation and Spearman rank correlation provide evidence that independent variables are not too powerfully mutually correlated. The highest Spearman rank correlation is between sales and reciprocal of net assets (0.581).

Table 7 Correlation between estimation variables of public acquisitions

This table presents the correlation coefficients between the dependent variable and the independent variables for the private companies acquired. *PNA* is the transaction price divided by net assets of the particular company, *1/NA* is a reciprocal of net assets, *SNA* is sales divided by net assets, *EBITDANA* is EBITDA divided by net assets, and *NDNA* is net debt divided by net assets. Pearson correlation coefficients are presented below the diagonal and the Spearman rank correlation coefficients are above the diagonal. Correlation coefficients with significance level of 5% (0.05) and greater are **bolded**. P-values are reported in parenthesis. Correlations for all independent variables, see Appendix 5.

	PNA	*1/NA*	*SNA*	*EBITDANA*	*NDNA*
PNA		0.171	**0.288**	0.012	-0.093
		(0.060)	**(0.001)**	(0.900)	(0.309)
1/NA	**0.318**		**0.581**	**-0.258**	-0.012
	(0.000)		**(0.000)**	**(0.004)**	(0.895)
SNA	**0.414**	**0.331**		0.027	0.069
	(0.000)	**(0.000)**		(0.770)	(0.455)
EBITDANA	0.155	**-0.378**	0.021		**0.218**
	(0.090)	**(0.000)**	(0.817)		**(0.016)**
NDNA	-0.115	-0.175	-0.162	0.153	
	(0.210)	(0.054)	(0.076)	(0.093)	

6.3 MULTIPLES VALUATION ANALYSIS

In this chapter I will present the obtained results from multiples valuation. Multiples valuation method was used to produce answers whether private companies suffer from DLOM or not. I analyzed all 242 acquisitions and calculated four valuation multiples based on companies size (sales- and net asset multiples) and performance (EBIT- and EBITDA multiples). This method is mainly based on previous similar type of studies conducted by Kooli, Kortas et al. (2003), Koeplin, Sarin et al. (2000) and Block (2007). Additionally, the valuation multiples of private targets

associated with industry classifications and acquisition times are compared to the sample including public targets' mean and median valuations. The results are presented in three parts. In the first part the private company discount (premium) is measured by comparing the valuation multiples of private targets to public targets. This is the most important part in order to reveal whether the private company discount phenomena actually exist or not. In the second part, the extent of the discount (premium) based on industry classifications, for eleven different industries are presented. In the third and final part, the amount of discount (premium) based on acquisition times is revealed.

Results associated with industry classifications (Table 9) and acquisition times (Table 10) gives predictive indications of whether these two variables can cause the private companies to sell at a discount, or not. However, the results obtained here are not sufficient to conclude the suggestion that industries and/or acquisition times are causally related to private company transaction price. Hence, in the regression phase these two variables are tested in order to find causal relationships.

Findings reported in Table 8 indicate that on average public company valuations are on a higher level, measured by these four valuation multiples. The results, however, are not statistically significant, measured by t-test. The average discount for private targets ranges from 13.2% (Price-to-EBIT) to 28.7% (Price-to-EBITDA). However, where all average multiples yields answers leading to discounts, median price-to-Net assets and price-to-Sales produces quite heavy premiums, 35.1% and 50.5% respectively. Additionally, each of the median multiples is statistically significant, measured by the Wilcoxon's matched-pairs signed rank test.

The results presented in Table 8 are somewhat controversial from what was to be expected initially. Average multiples present private company discounts, although the figures are not statistically significant. Median multiples in the other hand present both discounts, as well as hefty premiums for private companies and these figures are statistically significant. To conclude, the statement whether private company discounts occur or not, differs based on what multiple are we looking at. However, it is safe to say that private company valuation differs drastically from public companies. Furthermore, based on the average multiples, it is justified to say that at this point the hypothesis H1 holds.

Table 8 Multiples Valuation, Discounts and Premiums

This table presents the mean and median valuation multiples, as well as minimum and maximum figures for all 121 acquisition pairs. Valuation multiples are further on used to calculate the private company discounts (premiums) for lack of marketability. Private company discount is calculated as: 1 – (Private Company Multiple / Public Company Multiple)

	Private					Public					DISCOUNT	
	Mean	*Median*	*Min*	*Max*	*Std.*	*Mean*	*Median*	*Min*	*Max*	*Std.*	*Mean*	*Median*
Price-to-Net Assets	9.4	4.9	0.1	56.3	11.3	11.1	3.6	0.4	177.8	24.2	**15.2%**	**-35.1%** **
Price-to-Sales	8.3	2.9	0.0	110.7	17.0	10.0	1.9	0.0	288.4	36.3	**17.3%**	**-50.5%** ***
Price-to-EBIT [1)]	24.7	13.4	0.9	326.7	43.4	28.4	17.3	3.5	159.1	29.8	**13.2%**	**22.6%** **
Price-to-EBITDA [2)]	21.7	10.4	0.7	184.4	31.4	30.4	12.5	1.9	587.5	78.8	**28.7%**	**17.2%** **

[1)] 53 private companies and 73 public companies excluded due to negative EBIT.

[2)] 40 private companies and 65 public companies excluded due to negative EBITDA.

*** and ** denote statistical significance at the 0.01 and 0.05 levels, respectively.

Results presented in Table 9 suggest that nine out of eleven industries appear to have at least six out of eight of the average and median valuation multiples below the benchmark public value. Only the industries Transportation and Computer Related Services & Business Services appear to outperform each corresponding public multiple. Therefore, predictive indications show that private companies in these nine industries have been sold at a discount, compared to an average or median corresponding public peer company. Additionally, this suggests that private companies in Transportation and Computer Related Services & Business Services have been acquired at a premium, compared to an average or a median public company.

Table 9 Valuation multiples associated to industry classifications

This table presents the extent of discount, associated to eleven different industries and to four different valuation multiples. PNA is Transaction price-to-Net assets, PSA is Transaction price-to-Sales, PEBIT is Transaction price-to-EBIT, and PEBITDA is Transaction price-to-EBITDA.

	PNA		PNA		PSA		PSA		PEBIT		PEBIT		PEBITDA		PEBITDA	
	PRIVATE		PUBLIC		PRIVATE		PUBLIC		PRIVATE		PUBLIC		PRIVATE		PUBLIC	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Mining	3.5	2.8	17.7	2.2	4.6	4.1	5.1	2.8	25.1	13.4	32.5	11.3	12.1	8.0	19.6	4.9
Manufacturing	10.7	4.3	6.2	3.1	5.0	1.8	12.6	2.0	16.8	10.5	29.4	14.1	12.1	7.4	50.2	15.3
Transportation	128.3	3.7	6.7	5.0	25.0	4.8	2.2	2.7	128.3	30.1	23.9	25.8	24.8	17.7	12.0	14.1
Wholesale & Retail Trade	3.5	3.5	1.5	0.9	0.5	0.6	0.5	0.2	15.3	11.4	25.5	25.5	9.2	8.6	21.0	21.0
Business Services	13.4	10.1	23.2	5.0	10.6	3.5	2.9	2.0	10.5	10.5	17.3	17.3	54.7	11.1	9.7	12.6
Prepacked Software	10.8	8.0	13.3	4.0	12.8	3.9	15.6	1.8	17.6	17.6	23.3	28.2	31.5	16.5	34.9	23.2
Computer Integrated Systems Design	6.8	4.6	6.4	4.3	1.9	0.8	2.8	1.8	33.0	11.8	31.7	37.7	26.7	12.9	19.3	19.5
Computer Retrieval Services	15.7	9.0	25.8	10.8	10.0	6.6	10.3	2.1	22.4	22.4	98.2	98.2	9.2	9.2	16.0	16.0
Computer Related Services & Business Services	14.4	12.2	2.9	1.7	4.7	3.8	0.6	0.7	27.3	20.7	10.0	10.0	21.8	19.8	7.1	7.1
Health Services	5.7	6.0	4.6	4.3	1.7	1.5	4.1	1.9	9.1	9.1	19.4	19.4	40.3	10.0	14.5	14.5
Engineering & Management Services	5.8	5.8	6.0	6.0	0.6	0.6	1.2	1.2	19.7	19.7	-	-	7.0	7.0	-	-

Table 10, where the acquisition years are associated to four valuation multiples, shows that seven acquisition year categories appear to have at least six out of eight of the average and median valuation multiples below the corresponding public benchmark. These acquisition time categories include the years from 1989 to 1999, 2001, and the years from 2004 to 2008. Predictive indications show that private companies acquired during these years have been sold at a discount, compared to an average or median public peer company. Furthermore, the results show that three acquisition year categories appear to have at least six out of eight of the mean and median multiples above the public benchmark figure. During the year 2000 and the years from 2002 to 2005, the results suggest that private companies have been acquired at a premium, compared to an average or a median public company.

Table 10 Valuation multiples of private companies associated to acquisition year

This table presents the extent of discount, associated to ten different acquisition time categories and to four different valuation multiples. PNA is Transaction price-to-Net assets, PSA is Transaction price-to-Sales, PEBIT is Transaction price-to-EBIT, and PEBITDA is Transaction price-to-EBITDA.

	PNA		PNA		PSA		PSA		PEBIT		PEBIT		PEBITDA		PEBITDA	
	PRIVATE		PUBLIC		PRIVATE		PUBLIC		PRIVATE		PUBLIC		PRIVATE		PUBLIC	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Years 2008, 2007	9.4	7.1	8.5	5.5	5.3	2.1	3.3	2.1	72.8	28.8	41.6	36.8	14.7	12.9	20.3	19.2
Year 2006	11.9	4.8	4.8	4.1	4.6	4.1	19.4	1.5	17.2	10.3	32.4	28.0	19.6	10.3	41.5	17.0
Years 2005, 2004	16.1	8.5	10.2	5.0	3.5	2.5	2.1	1.9	28.2	11.4	14.7	14.7	52.9	21.8	10.3	12.4
Years 2003, 2002	4.3	4.3	10.0	2.5	5.3	3.2	2.3	1.4	26.1	16.8	17.4	12.5	14.2	10.8	16.5	7.2
Year 2001	6.3	3.3	11.1	3.4	12.9	5.1	2.9	2.4	17.1	14.0	17.8	6.4	17.4	12.2	16.9	7.9
Year 2000	17.7	14.3	15.9	4.9	27.4	8.1	36.6	2.2	19.7	20.7	12.3	12.3	13.2	14.1	9.8	9.8
Year 1999	8.2	4.3	12.9	4.1	5.5	2.4	13.3	5.8	44.2	19.1	32.0	32.0	49.5	23.4	304.6	304.6
Years 1998, 1997	1.4	5.3	1.4	4.1	1.4	1.0	3.4	1.2	17.3	17.9	44.4	25.5	27.1	15.2	31.5	19.7
Years 1996, 1995, 1994, 1993	6.3	5.9	10.8	3.0	1.5	1.4	2.5	2.3	13.6	10.8	23.4	20.5	17.1	8.2	15.7	12.9
Years 1992, 1991, 1990, 1989	5.5	3.5	2.8	2.4	2.1	1.8	1.5	1.3	11.5	7.8	36.2	19.7	7.5	6.9	12.3	7.5

These results presented here are somewhat in line with previous studies. Block (2007) found that companies in Manufacturing industry suffer higher price discounts than other industries on average. Block also argues that Finance companies on average are valued higher than companies in other industries. In this study financial companies are excluded due to their unorthodox balance sheet structure (highly liquid assets). Compared to the acquisition time, Kooli, Kortas et al. (2003) argues similarly that acquisition year 2001, measured by median discount has been worse than the other years and the year 1999 has been better than the other years in the sample.

Multiples valuation method is insufficient to determine causal relationship between the variables, although it gives suggestive assumptions, and therefore regression analysis is needed. The following chapter brings more insight into these results, since with regression models it is possible to test whether there are statistically significant causality among the independent and dependent variable or not.

6.4 REGRESSION ANALYSIS

The multiple linear regression analysis is the main estimation method in this study. Multiple linear regressions reveal relationships between the independent variables and the dependent variable, where its main purpose is to unveil how powerfully the independent variables explain the total variance of the dependent variable. Correlation analysis gave preliminary predictions on possible associations between the variables. Those predictions are now further tested with multiple regression models in order to find causal relationships the correlation analysis did not provide.

Earlier the mutual correlations were measured for independent variables in avoidance of multicollinearity problems in the regression analysis phase. In order to be sure that such problems are avoided, an additional test is carried through together with regression calculations. The measure, of which will be calculated is a variance inflation factor. Variance inflation factor or VIF analyzes the magnitude of multicollinearity. Neter, Wasserman et al. (1990, 409) suggest that a VIF value exceeding 10 should be taken as an indication that multicollinearity may be unduly influencing the regression estimates.

Multiple linear regression models have three purposes in this research. Firstly, to find out whether the company's status, performance, size, capital adequacy, industry, and/or acquisition time has had impact on the transaction price, of which the acquirer have historically paid. Secondly, has the differences between private and public companies had had affects to the transaction price. Thirdly, to study those private companies, which have been sold at a discount and to find out whether performance, size, capital adequacy, industry, and/or acquisition price has had anything to do with it?

The first multiple linear regression equation is as follows:

$$PNA = \alpha_1 + \alpha_0 \times \frac{1}{NA} + \alpha_2 \times SNA + \alpha_3 \times EBITDANA + \alpha_4 \times NDNA + \alpha_5 \times \Pr ivate + \sum_{n=1}^{11} \alpha_n \times IND_n + \sum_{n=1}^{10} \alpha_n \times YEAR_n \quad (14)$$

Table 11 presents the regression results for transaction price variable. Table values show the estimated coefficients along with standard error and accompanying P-values. Additionally, the variance inflation factors are presented on the right side column. Standard error describes the standard deviation of the regression coefficients. P-values with significance level of 5% and greater are **bolded**. Model F-values describe the fit of a regression model and adjusted R^2 values reflect how many percent of the total variation in the dependent variable can be explained with chosen independent variables (Neter, Wasserman et al. 1990, 519, 241).

The findings in Table 11 suggest that the first model is statistically significant with P-value of 0.000 and F-value of 4.22. The adjusted R^2 for the model is 0.243. This model was build in order to find associations between transaction price and company specific factors. In this model, positive regression coefficient increases the transaction price, i.e. one unit increase in net assets increases the transaction price by approximately 11.788 units.

Regression results demonstrate that net assets, sales and EBITDA associate positively with transaction price. In addition, the following industries can be stated to have negative associations with transaction price: Wholesale & Retail Trade (IND_4), Computer Integrated Systems Design (IND_7), and Engineering & Management Services (IND_11). Interesting and unforeseeable was that no evidence could be found that company's status or acquisition year would have associations

to transaction price. Therefore, the association between private acquisition and transaction price, (hypotheses H2) could be overruled. This finding signifies statistically that private company discounts does not exist and this leads to overruling the previous assumption that H1 holds. Interesting was also that acquisition years 2000 (YO_6) and 2001 (YO_5) did not have positive association to transaction price, when generally markets suffered heavy overpricing during the Dot-Com bubble.

Table 11 Regression results for Transaction price

This table reports the results for the entire sample of 242 companies. The dependent variable here is the *PNA*, which indicates the transaction price paid by acquirer. PNA is the transaction price divided by net assets of the particular company. The independent variables could be group into company status, size, performance, riskiness, industry and acquisition time. *1/NA* is a reciprocal of net assets and *SNA* is sales divided by net assets. These both represent the size variable. *EBITDANA* is EBITDA divided by net assets and it is the performance variable. *NDNA* is net debt divided by net assets and it is the risk variable. *Private* is an indicator variable for the company status. *IND_1-11* are indicator variables for the industry. *YO_1-10* are indicator variables for the acquisition year. P-values with significance level of 5% and greater are **bolded**. In addition, the highest VIF value is **bolded** as well.

Independent variables	*Coefficient*	*Standard error*	*P-value*	*VIF*
Intercept	14.126	5.770	**0.015**	0.000
PRIVATE	-1.504	2.199	0.495	1.086
1/NA	11.788	4.185	**0.005**	1.385
SNA	0.864	0.138	**0.000**	1.246
EBITDANA	2.017	0.630	**0.002**	1.240
NDNA	0.193	0.227	0.394	1.178
IND_2	-6.109	4.241	0.151	3.079
IND_3	-13.004	6.626	0.051	1.563
IND_4	-16.355	7.997	**0.042**	1.389
IND_5	-7.293	6.594	0.270	1.548
IND_6	-4.525	4.165	0.279	**3.449**
IND_7	-14.198	5.444	**0.010**	2.019
IND_8	0.459	6.260	0.942	1.659
IND_9	-15.080	7.980	0.060	1.384
IND_10	-9.522	7.319	0.195	1.538
IND_11	-22.609	9.511	**0.018**	1.321
YO_2	-1.794	5.447	0.742	2.293
YO_3	-5.727	5.537	0.302	2.552
YO_4	-7.442	5.185	0.153	2.917
YO_5	-5.178	5.334	0.333	2.616
YO_6	7.336	4.965	0.141	2.805
YO_7	1.239	5.865	0.833	2.236
YO_8	-1.128	5.839	0.847	2.635
YO_9	-6.683	5.877	0.257	2.459
YO_10	-6.902	6.194	0.266	2.004
Model F-value	4.22			
Model P-value	0.000			
Adjusted R^2	0.243			
Nobs	242			

The second multiple linear regression can be expressed by the following equation: (15)

$$PNA_{Private} - PNA_{Public} = \alpha_1 + \alpha_0 \times \left(\frac{1}{NA_{Private}} - \frac{1}{NA_{Public}} \right) + \alpha_2 \times (SNA_{Private} - SNA_{Public}) + \alpha_3 \times (EBITDANA_{Private} - EBITDANA_{Public}) +$$
$$\alpha_4 \times (NDNA_{Private} - NDNA_{Public}) + \sum_{n=1}^{11} \alpha_n \times IND_n + \sum_{n=1}^{10} \alpha_n \times YEAR_n$$

Table 12 presents the regression results for price differences between private and public companies. Second model was build in order to reveal causal relations between differences in transaction prices of private and public companies, and differences between independent variables of private and public companies.

The second regression is again statistically significant with P-value of 0.002 and F-value of 2.33. The adjusted R^2 is approximately 4.0 percent lower than in the first regression model, being exactly 0.203. In this model, positive regression coefficients mean that the particular independent variable increases the transaction price gap between private companies and public companies. Negative associations have inverse affects to the transaction price difference.

The results suggest that differences between private company's sales and public company's sales have positive and significant association to the transaction price difference between the private and public companies. Similar positive association can be found in the differences between EBITDA of a private company and a public company. Finally, the following two industries have significant positive relationship with transaction price gap: Manufacturing (IND_2) and Computer Integrated Systems Design (IND_7). Again it was interesting to see that acquisition time did not have any significant association with transaction price difference. One could have expected that during the economic boom there would not exist huge, or any price differences whether the company is private or public. Therefore, the expectations could have been that acquisition years 2000 (YO_6) and 2001 (YO_7) would have yielded negative causal relationships with transaction price gap.

Table 12 Regression result for the price difference between private and public targets

This table reports the results for the 121 acquisition pairs. The dependent variable here is the $P_{Private}/NA_{Private}$-P_{Public}/NA_{Public}, which indicates the difference between the transaction price of a private and public company. The independent variables could be group into company status, size difference, performance difference, difference in riskiness, industry and acquisition time. $1/NA_{Privatte} - 1/NA_{Publiv}$ is a reciprocal of net assets of private company minus corresponding figure for public company and $SNA_{Private}$-SNA_{Public} is private company's sales divided by its net assets minus public company's sales divided by its net assets. $EBITDANA_{Private}$-$EBITDANA_{Public}$ is private company's EBITDA divided by its net assets minus public company's EBITDA divided by its net assets. $NDNA_{Private}$-$NDNA_{Public}$ is private company's net debt divided by its net assets minus public company's net debt divided by its net assets. *IND_1-11* are indicator variables for the industry. *YO_1-10* are indicator variables for the acquisition year. P-values with significance level of 5% and greater are **bolded**. In addition, the highest VIF value is **bolded** as well.

Independent variables	*Coefficient*	*Standard error*	*P-value*	*VIF*
Intercept	-9.704	10.614	0.363	0.000
$1/NA_{Private}$ - $1/NA_{Public}$	0.843	10.336	0.935	1.242
$SNA_{Private}$ - SNA_{Public}	0.979	0.184	**0.000**	1.098
$EBITDANA_{Private}$ - $EBITDANA_{Pu}$	1.876	0.926	**0.046**	1.195
$NDNA_{Private}$ - $NDNA_{Public}$	-0.666	0.349	0.060	1.315
IND_2	17.144	8.338	**0.042**	3.200
IND_3	11.853	13.487	0.382	1.741
IND_4	18.705	15.451	0.229	1.394
IND_5	12.006	12.945	0.356	1.603
IND_6	11.976	8.102	0.143	**3.509**
IND_7	25.026	10.590	**0.020**	2.054
IND_8	8.318	12.564	0.510	1.797
IND_9	20.233	15.211	0.187	1.351
IND_10	19.349	14.522	0.186	1.628
IND_11	3.665	18.234	0.841	1.305
YO_2	0.450	10.060	0.964	2.344
YO_3	2.263	10.960	0.837	1.998
YO_4	-0.903	9.625	0.925	2.702
YO_5	-0.977	9.566	0.919	2.536
YO_6	1.526	9.371	0.871	2.562
YO_7	-15.051	11.208	0.183	2.089
YO_8	-19.405	10.728	0.074	2.483
YO_9	-10.142	10.791	0.350	2.513
YO_10	2.266	12.476	0.856	1.772
Model F-value	2.33			
Model P-value	0.002			
Adjusted R^2	0.203			
Nobs	121			

Third and final multiple linear regression equation is as follows: (16)

$$(PNA_{\mathrm{Private}} - PNA_{Public}) = \alpha_1 + \alpha_0 * \frac{1}{NA} + \alpha_2 * (SNA_{\mathrm{Private}} - SNA_{Public}) + \alpha_3 * (EBITDANA_{\mathrm{Private}} - EBITDANA_{Public}) +$$
$$\alpha_4 * (NDNA_{\mathrm{Private}} - NDNA_{Public}) + \sum_{n=1}^{11} \alpha_n * IND_n + \sum_{n=1}^{10} \alpha_n * YEAR_n$$

Table 13 presents the regression results for private companies, of which were sold at a lower price compared to a public peer company. This final model was build in order to reveal relationships between the private companies, of which were sold at a lower price compared to a public peer company, and the independent variables used along the regression phase. The companies to which the regression analysis is implemented are chosen from the equation where private company transaction price (divided by its net assets) is deducted with public company transaction price (divided by its net assets). Those acquisition pairs that yield a negative answer are chosen, leading to a total of 49 pairs.

The third regression is again statistically significant with P-value of 0.0141 and F-value of 2.48. Furthermore, the adjusted R^2 is approximately 16.1 percent higher than in the first regression model and approximately 20.1 percent higher than in the second model, being exactly 0.404. This indicates that the independent variables in this model have the highest abilities to predict the variation of the dependent variable, compared to the previous ones. In this model positive regression coefficients mean that the particular independent variable decreases the transaction price gap between the private and public companies. Negative regression coefficient naturally increases the transaction price gap.

The results suggest that net assets and the difference between net debt of private and public company have a positive and statistically significant relationship between the transaction price gaps. The net debt variable shows that when the net debt gap decreases by one unit, the transaction price gap decreases as well. This is in line with the result found by Kooli, Kortas et al. (2003). Interesting, however, is when net debt increases by one unit the transaction gap decreases by approximately 0.446 units. In addition, the acquisition year 2000 (YO_6) have positive and statistically significant association with transaction price gap. Meaning that the gap in that particular year was smaller than it was compared to years 2008 and 2007 (YO_1). The latter relationship was

as expected. Interestingly, it seems that the industry where companies are operating does not have any significant affects on the discount applied to private companies.

Table 13 Regression results for private company discount

This table reports the results for the 49 private acquisition of where private company's transaction price-to-net assets are smaller than the peer public company's. The dependent variable here is the $(P_{Private}/NA_{Private}-P_{Public}/NA_{Public},)<0$, of which the companies are selected based on the negative outcome criteria. The independent variables could be group into size, performance, riskiness, industry and acquisition time categories. *1/NA* is a reciprocal of net assets of private company and *SNA* is private company's sales divided by its net assets. These both represent the size variable. *EBITDANA* is private company's EBITDA divided by its net assets and it is the performance variable. *NDNA* is private company's net debt divided by its net assets and it is the risk variable. *IND_1-10* are indicator variables for the industry. *YO_1-10* are indicator variables for the acquisition year. P-values with significance level of 5% and greater are **bolded**. In addition, the highest VIF value is **bolded** as well.

Independent variables	*Coefficient*	*Standard error*	*P-value*	*VIF*
Intercept	-0.766	5.788	0.896	0.000
1/NA	11.182	5.011	**0.035**	2.280
$SNA_{Private}$ - SNA_{Public}	0.608	0.458	0.196	2.546
$EBITDANA_{Private}$-$EBITDANA_{Public}$	-2.378	2.585	0.366	3.618
$NDNA_{Private}$-$NDNA_{Public}$	0.446	0.166	**0.012**	2.641
IND_2	0.732	5.017	0.885	4.554
IND_3	2.242	5.695	0.697	2.527
IND_4	-11.491	9.410	0.233	1.840
IND_5	-1.437	8.749	0.871	1.591
IND_6	2.736	4.655	0.562	**4.785**
IND_7	0.142	5.732	0.980	3.669
IND_8	-9.985	7.036	0.168	2.957
IND_9	-1.977	6.724	0.771	1.840
IND_10 *	-17.587	9.587	0.078	1.910
YO_2	1.001	5.483	0.857	2.342
YO_3	-8.042	6.469	0.225	2.500
YO_4	-3.350	5.348	0.537	3.640
YO_5	2.312	5.118	0.655	3.333
YO_6	11.038	5.299	**0.047**	3.574
YO_7	4.485	5.500	0.422	2.881
YO_8	-1.918	6.071	0.755	4.117
YO_9	1.160	6.205	0.853	3.000
YO_10	0.266	6.917	0.970	1.947
Model F-value	2.48			
Model P-value	0.0141			
Adjusted R^2	0.404			
Nobs	49			

* Industry Engineering & Management services (IND_11) is excluded since it had zero observations

6.5 INTERPRETATION OF THE RESUTS

The findings, using relatively same methods as Kooli, Kortas et al. (2003), Block (2007) and Koeplin, Sarin et al. (2000), suggest that on average private companies are sold at a discount compared to publicly traded peer companies. The private company discount was measured by calculating four different multiples for the 242 companies in the sample. Kooli, Kortas et al. (2003) found that on average the private companies suffer a quite substantial discount of 34 percent. Block presents results where private company discounts vary from 16.25 percent to 27.1 percent whereas Koeplin, Sarin et al. (2000) suggest that private company discounts are somewhere between -2.28 (premium) percent and 28.26 percent. The results obtained in this research are fairly consistent with the results yielded from the previous studies (for detailed description, see Appendix 6). The results from valuation multiples demonstrate that the discount do exists on average, yet two median multiples presented quite hefty premiums.

After the valuation multiples expressed valuation differences between private and public companies and correlation coefficients showed that there exist correlations between the transaction price and the independent variables, it was logical to build regression models, to analyze the data, and in order to find causal relationships. The results from the first regression model demonstrate clearly that the following independent variables have significant relationship with the transaction price the acquirers have been willing to pay: net assets, sales, and EBITDA. Also companies in the wholesale & retail trade industry, computer-integrated systems design industry, and engineering & management services industry have significant negative associations with transaction price. Interestingly, no evidence could be found to prove that company status would have affects on the transaction price and therefore private company discounts do not exist. This was measured by private company indicator variable, which had a P-value of 0.4947, and is not statistically significant. Neither any statistically significant evidence could be found to prove that acquisition time would have causal relations with transaction price. Conclusion is that company status does not have any influence on transaction prices contrary to the hypotheses H1 and H2. One reasonable answer for this could be found from information asymmetries that exist. Selling party has an advantage, compared to possible acquirers, in the name of sufficient and appropriate information. If

this is the case, then the company's fundamental factors may have little weight compared to acquirer's subjective predictions.

Further analysis of the transaction price differences between private and public companies reveals that company's size indeed can explain variation in it. As a size indicator, sales have an increasing effect on the transaction price gap. This is as hypothesized in the hypothesis $H3_A$. In addition to previous, company's performance has also increasing effect on the transaction price gap as hypothesized in the hypothesis $H3_B$. Hypothesis $H3_C$ can be ruled out since there is no significant association between the net debt and transaction price gap. Hypothesis $H3_D$ holds since the industries Manufacturing and Computer Integrated Systems Design have significant negative relationship with transaction price gap. However, the acquisition time again shows no statistical significance, and therefore the hypothesis $H3_E$ can be ruled out.

Finally, the third and last regression model concentrated on finding factors to explain the transaction price gaps between private and public companies. The results suggest that net assets together with the net debt gap between private and public companies have positive and significant relationship with transaction price gap, meaning that these two independent variables have decreasing effects on the transaction price discount of private companies. This is in line with the results found by Kooli, Kortas et al. (2003) and Koeplin, Sarin et al. (2000). Based on the results of this study, the hypothesis $H4_A$ and hypothesis $H4_C$ holds. Furthermore, it seems that the acquisition year 2000 have been beneficial for sellers of private companies, since on that year the transaction price gap has been significantly smaller than compared to the year 2008. This leads to a conclusion that hypothesis $H4_E$ holds. However, neither the performance, nor the industry the company operates has any association to the price gap. This is quite interesting, since at least past performance should play an important role in the valuation phase. Besides, Kooli, Kortas et al. (2003) and Block (2007) found significant evidence that the industry where company operates indeed can have impacts to the size of the price gap. Nevertheless, based on this study the hypotheses $H4_B$ and $H4_D$ can be ruled out.

7 SUMMARY AND CONCLUSIONS

7.1 SUMMARY

The purpose of this thesis is to analyze whether private companies are sold at a discount compared to public peer companies and if so, could this be explained by variables related to company's size, performance, riskiness, industry, and/or acquisition time. The sample consists of U.S.-based privately held and publicly traded companies, acquired between the years 1989 and 2008.

A number of previous studies have examined the private company discount for lack of marketability. The previous literature offers at least four different approaches to study this phenomenon; the acquisition approach, IPO approach, restricted stock approach, and exit multiple approach. These studies provide evidence that privately held companies suffer from illiquidity discounts compared to publicly traded peer companies (see e.g. Block 2007, Officer 2007, Kooli, Kortas et al. 2003, Emory 2002, 2000, 1997, 1994, Sarin, Das et al. 2002, Bajaj, Denis et al. 2001, Koeplin, Sarin et al. 2001, Hertzel and Smith 1993, Silber 1991, Wruck 1989). This thesis concentrates on studying the private company discount from acquisition point of view. Koeplin, Sarin et al. (2001), Block (2007), and Kooli, Kortas et al. (2003) studies private company discounts using relatively same method as chosen for this thesis; however the perspectives of these studies are narrower than applied here. This thesis is an extension of these studies as it analyses acquisitions by taking more extensive amount of explanatory variables into account and by applying various regression models to find causal relationships affecting the acquisition prices. Furthermore, only Kooli, Kortas et al. (2003) studies private company discounts by taking acquisition time into analyses. In addition, the sample period of this research is more recent and wider, compared to Kooli, Kortas et al. (2003), which consists the years from 1995 to 2002.

The research design involves examining all the unconditional, completed, and disclosed U.S.-based acquisitions between the years 1989 and 2008. The aim is to build a sample consisting comparable pairs of private and public acquisitions. The initial sample consists 23,872 companies. This sample is then sorted in order to identify similar private and public acquisitions to build acquisition pairs. These pairs have to meet the following three criteria's: targets operate in the same industry, targets

are close in size, and they are acquired around the same time. To be more exact, all the acquisitions have to be acquired for 100 percent of shares outstanding, the primary four-digit Standard Industrial Code (SIC) have to be exactly the same for both companies, the date when the transaction of private company took place has to be within 12 months (plus or minus) with the public company in question, and finally the size of net assets of private company has to be within 20 percent (plus or minus) with the public company in question. After sorting the initial sample, the grand total of companies matching with these criteria's is 242, i.e. 121 pairs.

After the sample is gathered, the multiples valuation method is applied in order to define whether the private companies have indeed sold at a discount or not. The multiples valuation includes four multiples, Price-to-Net Assets, Price-to-Sales, Price-to-EBIT, and Price-to-EBITDA. These multiples are calculated for each of the companies and later on the mean and median values are gathered for both group of targets. After this, the discount (premium) is calculated simply by dividing the private targets mean and median multiples with public ones (i.e. Private companies Price-to-Net Assets (mean) / Public companies Price-to-Net Assets (mean) – 1). The essence of further analysis on the valuation differences is to find causal relationships of different variables causing this. This involves estimating a series of multiples regression models.

The results from valuation multiples analysis demonstrate that privately held companies in the U.S. are on average sold at a lower price, compared to their comparable publicly traded companies. Out of the four valuation multiples used in this thesis, the outcome was that every one of them yielded a discount. However, there is a variance among the multiples, since two median multiples yielded quite strong premiums. These results are somewhat as expected and fairly consistent with the three previous studies presented earlier.

Further analysis of the existing valuation differences reveals that the acquisition prices in general can be partly explained by factors related to company size, performance and the industry it operates. The findings from regression analyses, however, did not yield any evidence backing the assumption that company status would be causally related with acquisition price, meaning private company discounts does not exist when studied by regression analysis. The explaining factors increasing the price gap between the two groups are Sales, EBITDA and the following two industries:

Manufacturing and Computer Integrated Systems Design. Finally, the most interesting part was when the factors explaining the private company discount (based on the valuation multiples) were revealed. The variables decreasing the transaction price gaps between the private and public companies are Net Assets and Net Debt and the variable increasing it was the acquisition year 2000.

These results are of interest to private company owners when considering the sales of a company, as well as investors, in deciding of whether to invest into a privately held company and to assessing the valuation of such company compared to public one.

7.2 SHORTCOMINGS AND WEAKNESSES

In this thesis the study sample sets its limitations on the generalization of the results. The sample size is somewhat small and exceptional due to the economic boom in 2000 (Dot-Com) and downturn in 2007 (Subprime-crisis). In addition, the variance of the variables is considerably significant, meaning the mean and median variables are quite dispersed which lowers the credibility of the results presented in this thesis.

In this thesis, the potential validity threats relate to the validity of the variables, meaning the quality of the empirical measures. One potential validity threat is the market variables, since these variables are per the reporting year-end or the last twelve months prior to acquisition. Therefore, the general market development during the study period cannot be controlled. Additionally, the variance and characteristics between the acquisitions in chosen pairs can be substantially significant, since the time of acquisition can be up to one year apart from the other, and the net assets to differ up to 10 percent. Furthermore, the intention was to select three or five year average accounting and market values, but this proved out to be impossible due to the large raw-sample of acquisitions and the data limitations.

7.3 SUGGESTIONS FOR FURTHER RESEARCH

This thesis concentrated on studying U.S.-based mergers and acquisitions using the acquisition approach. Future research could potentially widen the region to consist companies from other countries. It would be interesting to investigate how the transaction prices differ among private and public targets, for example in Europe, Asia, South America, and/or the Baltic region. The region effect could be controlled by pooling the acquisitions and adding an indicator variable for each of the regions. However, in many countries, like Finland, the data concerning private company acquisitions is not public. Therefore, first should be ensured that the data needed for study could be collected with reasonable effort.

Future research could also include possible ex-post angle in viewing the private company discount. It would be interesting to study whether the results obtained by valuation multiples approach still hold, for example after one year from acquisition. Basically, is the discount long lasting or just a passing phenomena at the time of acquisition.

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9 APPENDICES

APPENDIX 1
VALUATION MULTIPLES DEFINITION

Variable	Description
Value of Transaction	Total value of consideration paid by the acquiror, excluding fees and expenses. The dollar value includes the amount paid for all common stock, common stock equivalents, preferred stock, debt, options, assets, warrants, and stake purchases made within six months of the announcement date of the transaction.
Sales Multiple	Ratio of Transaction Value to Sales. Sales are the primary source of revenue after deductions of returned goods and price reductions for the last 12 months ending on the date of most current financial information prior to the announcement of the transaction.
Asset Multiple	Ratio of Transaction Value to net assets. Net assets is defined as a differnce between total assets and total liabilities.
EBIT Multiple	Ratio of Transaction Value to EBIT. EBIT is defined as earnings before interest income, interest expense and taxes for the 12 months ending on the date of the most current financial information prior to the announcement of the transction
EBITDA Multiple	Ratio of Transaction Value to EBITDA. EBITDA is defined as earnings before interest income, interest expense, taxes, depreciation, and amortization for the 12 months ending on the date of the most current financial information prior to the announcement of the transaction

APPENDIX 2A

INDUSTRY CLASSIFICATIONS

VARIABLE	SIC-CODES	INDUSTRY TITLE	HITS
IND_1	1000-1499	Mining	24
IND_2	2000-3999	Manufacturing	62
IND_3	4000-4999	Transportation	10
IND_4	5000-5999	Wholesale & Retail Trade	6
IND_5	7322-7371	Business Services	10
IND_6	7372-7372	Prepackaged Software	80
IND_7	7373-7373	Computer Integrated Systems Design	20
IND_8	7375-7375	Computer Retrieval Services	12
IND_9	7379-7389	Computer Related Services & Business Services *	6
IND_10	8000-8099	Health Services	8
IND_11	8700-8799	Engineering & Management Services	4

* Not Elsewhere Classified

APPENDIX 2B

ACQUISITION YEAR CLASSIFICATION

VARIABLE	ACQUISITION YEARS	HITS
YO_1	2008, 2007	18
YO_2	2006	23
YO_3	2005, 2004	25
YO_4	2003, 2002	34
YO_5	2001	28
YO_6	2000	36
YO_7	1999	19
YO_8	1998, 1997	23
YO_9	1996, 1995, 1994, 1993	21
YO_10	1992, 1991, 1990, 1989	15

APPENDIX 3

INDUSTRY DISTRIBUTIONS

CATEGORIES	SIC CODES TWO DIGIT SUB-HEADINGS	HITS
Agriculture, Forestry, Fishing	**01-09**	**0**
Mining	**10-14**	**24**
Oil and Gas; Petroleum Refining		24
Construction	**15-17**	**0**
Manufacturing	**20-39**	**62**
Food and Kindered Products		2
Wood Products, Furniture and Fixtures		2
Drugs		12
Rubber and Miscellaneous Plastic Products		2
Machinery		2
Computer and Office Equipment		2
Communications Equipment		8
Electronic and Electrical Equipment		10
Transportation Equipment		2
Measuring, Medical, Photo Equipment;Clocks		20
Transportation & Public Utilities	**40-49**	**10**
Air Transportation and Shipping Telecommunications		2
Telecommunications		8
Wholesale Trade	**50-51**	**2**
Wholesale Trade-Durable Goods		2
Retail Trade	**52-59**	**4**
Retail Trade-Eating and Drinking Places		2
Retail Trade-Miscellaneous Retail Trade		2
Finance, Insurance, Real Estate	**60-67**	**-**
Services	**70-89**	**140**
Consumer & Mercantile Credit Reporting Agencies		2
Direct Mail Advertising Services		2
Equipment Rental & Leasing (Not Elsewhere Classified)		2
Computer Programming Services		4
Prepackaged Software		80
Computer Integrated Systems Design		20
Information Retrieval Services		12
Computer Related Services (Not Elsewhere Classified)		2
Business Services (Not Elsewhere Classified)		4
Skilled Nursing Care Facilities		2
Medical Laboratories		2
Home Health Care Services		4
Engineering Services		2
Management Consulting Services		2

APPENDIX 4

This table presents the correlation coefficients between the dependent variable and the independent variables for the private companies acquired. PNA is the transaction price divided by net assets of the particular company, *1/NA* is a reciprocal of net assets, *SNA* is sales divided by net assets, *EBITDANA* is EBITDA divided by net assets, and *NDNA* is net debt divided by net assets. *IND_1-11* are indicator variables for the industry (see Appendix 2A). *YO_1-10* are indicator variables for the acquisition year (see Appendix 2B). Pearson correlation coefficients are presented below the diagonal and the Spearman rank correlation coefficients are above the diagonal. Correlation coefficients with significance level of 5% (0.05) and greater are **bolded**. P-values are reported in parenthesis.

	PNA	*RNA*	*SALES*	*EBITDA*	*NDEBT*	*IND_2*	*IND_3*	*IND_4*	*IND_5*	*IND_6*	*IND_7*	*IND_8*	*IND_9*	*IND_10*	*IND_11*	*YO_2*	*YO_3*	*YO_4*	*YO_5*	*YO_6*	*YO_7*	*YO_8*	*YO_9*	*YO_10*
PNA		**0.260**	**0.344**	0.164	0.087	0.025	-0.100	-0.103	0.127	0.097	-0.035	0.065	0.143	-0.034	-0.028	0.070	0.068	-0.171	-0.102	**0.277**	-0.029	-0.055	-0.037	-0.070
		(0.004)	**(0.000)**	(0.072)	(0.341)	(0.786)	(0.276)	(0.259)	(0.164)	(0.290)	(0.701)	(0.476)	(0.118)	(0.708)	(0.762)	(0.449)	(0.458)	(0.061)	(0.266)	**(0.002)**	(0.753)	(0.552)	(0.685)	(0.447)
RNA	0.105		**0.284**	-0.082	0.081	**-0.196**	-0.140	0.088	0.068	0.174	-0.038	0.095	0.100	0.081	0.127	-0.123	**0.222**	-0.144	-0.025	0.109	-0.153	**0.196**	0.069	-0.023
	(0.252)		**(0.002)**	(0.373)	(0.375)	**(0.032)**	(0.125)	(0.340)	(0.460)	(0.057)	(0.681)	(0.298)	(0.273)	(0.375)	(0.165)	(0.180)	**(0.014)**	(0.115)	(0.787)	(0.234)	(0.094)	**(0.032)**	(0.453)	(0.799)
SALES	**0.297**	**0.181**		**0.511**	-0.011	0.115	-0.146	**0.204**	0.031	-0.126	0.159	-0.013	0.081	0.062	**0.187**	-0.006	0.133	-0.119	**-0.273**	-0.165	-0.009	**0.240**	**0.203**	0.078
	(0.001)	**(0.047)**		**(0.000)**	(0.908)	(0.207)	(0.110)	**(0.025)**	(0.737)	(0.168)	(0.082)	(0.887)	(0.379)	(0.498)	**(0.040)**	(0.947)	(0.147)	(0.193)	**(0.002)**	(0.071)	(0.922)	**(0.008)**	**(0.026)**	(0.392)
EBITDA	0.088	-0.035	**0.182**		**-0.241**	0.142	-0.081	0.043	-0.017	**-0.198**	-0.001	-0.124	0.158	0.075	0.108	**0.222**	-0.035	-0.034	-0.102	**-0.287**	-0.060	0.055	**0.207**	0.090
	(0.335)	(0.706)	**(0.046)**		**(0.008)**	(0.120)	(0.378)	(0.643)	(0.856)	**(0.030)**	(0.993)	(0.175)	(0.083)	(0.411)	(0.240)	**(0.015)**	(0.702)	(0.711)	(0.266)	**(0.001)**	(0.510)	(0.552)	**(0.023)**	(0.324)
NDEBT	**0.288**	-0.009	0.108	**-0.239**		0.014	-0.034	0.097	0.056	-0.063	0.010	0.149	-0.152	-0.036	-0.085	**-0.241**	0.059	0.144	-0.012	0.089	0.010	-0.039	-0.072	0.044
	(0.001)	(0.921)	(0.239)	**(0.008)**		(0.883)	(0.707)	(0.288)	(0.543)	(0.490)	(0.911)	(0.102)	(0.096)	(0.697)	(0.352)	**(0.008)**	(0.523)	(0.114)	(0.897)	(0.331)	(0.914)	(0.673)	(0.432)	(0.635)
IND_2	0.064	**-0.194**	0.038	0.111	-0.025		-0.122	-0.094	-0.122	**-0.412**	-0.176	-0.134	-0.094	-0.109	-0.076	0.163	0.050	0.035	-0.117	-0.128	0.050	-0.005	0.059	-0.047
	(0.483)	**(0.033)**	(0.682)	(0.227)	(0.788)		(0.183)	(0.307)	(0.183)	**(0.000)**	(0.053)	(0.143)	(0.307)	(0.236)	(0.407)	(0.074)	(0.585)	(0.702)	(0.200)	(0.161)	(0.585)	(0.959)	(0.523)	(0.610)
IND_3	-0.099	-0.058	-0.101	-0.008	-0.044	-0.122		-0.033	-0.043	-0.146	-0.062	-0.047	-0.033	-0.038	-0.027	0.062	-0.059	-0.084	0.164	-0.084	-0.059	-0.069	-0.069	-0.047
	(0.278)	(0.527)	(0.273)	(0.929)	(0.629)	(0.183)		(0.719)	(0.639)	(0.110)	(0.497)	(0.606)	(0.719)	(0.676)	(0.770)	(0.499)	(0.521)	(0.360)	(0.072)	(0.360)	(0.521)	(0.453)	(0.453)	(0.606)
IND_4	-0.084	0.080	0.173	0.030	-0.015	-0.094	-0.033		-0.033	-0.112	-0.048	-0.036	-0.025	-0.029	-0.021	-0.055	-0.045	0.088	-0.062	-0.064	-0.045	**0.303**	-0.053	-0.036
	(0.359)	(0.385)	(0.058)	(0.743)	(0.868)	(0.307)	(0.719)		(0.719)	(0.221)	(0.602)	(0.692)	(0.782)	(0.748)	(0.822)	(0.547)	(0.623)	(0.335)	(0.498)	(0.482)	(0.623)	**(0.001)**	(0.564)	(0.692)
IND_5	0.074	0.006	**0.239**	0.018	-0.026	-0.122	-0.043	-0.033		-0.146	-0.062	-0.047	-0.033	-0.038	-0.027	0.062	-0.059	-0.084	-0.081	0.036	0.099	0.070	0.070	-0.047
	(0.421)	(0.950)	**(0.008)**	(0.848)	(0.773)	(0.183)	(0.639)	(0.719)		(0.110)	(0.497)	(0.606)	(0.719)	(0.676)	(0.770)	(0.499)	(0.521)	(0.360)	(0.377)	(0.699)	(0.278)	(0.445)	(0.445)	(0.606)
IND_6	0.085	**0.187**	-0.156	-0.118	-0.042	**-0.412**	-0.146	-0.112	-0.146		**-0.211**	-0.161	-0.112	-0.130	-0.091	-0.017	**0.203**	0.019	0.037	0.120	-0.132	-0.116	-0.057	-0.080
	(0.354)	**(0.041)**	(0.088)	(0.198)	(0.647)	**(0.000)**	(0.110)	(0.221)	(0.110)		**(0.020)**	(0.079)	(0.221)	(0.156)	(0.320)	(0.854)	**(0.026)**	(0.834)	(0.688)	(0.189)	(0.148)	(0.207)	(0.536)	(0.386)
IND_7	-0.070	-0.083	0.164	0.026	-0.050	-0.176	-0.062	-0.048	-0.062	**-0.211**		-0.069	-0.048	-0.056	-0.039	-0.104	-0.085	-0.035	-0.117	-0.035	**0.258**	**0.202**	-0.100	0.070
	(0.447)	(0.364)	(0.072)	(0.776)	(0.585)	(0.053)	(0.497)	(0.602)	(0.497)	**(0.020)**		(0.455)	(0.602)	(0.545)	(0.672)	(0.256)	(0.354)	(0.703)	(0.201)	(0.703)	**(0.004)**	**(0.027)**	(0.277)	(0.447)
IND_8	0.127	0.045	-0.009	-0.106	**0.421**	-0.134	-0.047	-0.036	-0.047	-0.161	-0.069		-0.036	-0.042	-0.030	-0.079	-0.065	0.017	0.023	**0.236**	-0.065	-0.076	-0.076	-0.052
	(0.164)	(0.624)	(0.920)	(0.246)	**(0.000)**	(0.143)	(0.606)	(0.692)	(0.606)	(0.079)	(0.455)		(0.692)	(0.646)	(0.747)	(0.388)	(0.480)	(0.851)	(0.800)	**(0.009)**	(0.480)	(0.409)	(0.409)	(0.570)
IND_9	0.071	**0.184**	-0.004	0.082	-0.056	-0.094	-0.033	-0.025	-0.033	-0.112	-0.048	-0.036		-0.029	-0.021	0.116	-0.045	-0.064	-0.062	0.088	-0.045	-0.053	-0.053	**0.208**
	(0.441)	**(0.044)**	(0.965)	(0.370)	(0.542)	(0.307)	(0.719)	(0.782)	(0.719)	(0.221)	(0.602)	(0.692)		(0.748)	(0.822)	(0.204)	(0.623)	(0.482)	(0.498)	(0.335)	(0.623)	(0.564)	(0.564)	**(0.022)**
IND_10	-0.062	0.034	-0.016	0.058	-0.035	-0.109	-0.038	-0.029	-0.038	-0.130	-0.056	-0.042	-0.029		-0.024	-0.064	-0.052	-0.075	-0.072	-0.075	0.124	-0.061	**0.403**	-0.042
	(0.497)	(0.709)	(0.864)	(0.526)	(0.702)	(0.236)	(0.676)	(0.748)	(0.676)	(0.156)	(0.545)	(0.646)	(0.748)		(0.794)	(0.485)	(0.568)	(0.415)	(0.431)	(0.415)	(0.176)	(0.504)	**(0.000)**	(0.646)
IND_11	-0.042	0.073	0.159	0.081	-0.034	-0.076	-0.027	-0.021	-0.027	-0.091	-0.039	-0.030	-0.021	-0.024		-0.045	-0.037	-0.052	-0.051	0.134	-0.037	-0.043	-0.043	-0.030
	(0.645)	(0.426)	(0.081)	(0.378)	(0.714)	(0.407)	(0.770)	(0.822)	(0.770)	(0.320)	(0.672)	(0.747)	(0.822)	(0.794)		(0.624)	(0.689)	(0.568)	(0.582)	(0.143)	(0.689)	(0.639)	(0.639)	(0.747)
YO_2	0.076	-0.097	-0.081	**0.260**	-0.094	0.163	0.062	-0.055	0.062	-0.017	-0.104	-0.079	0.116	-0.064	-0.045		-0.098	-0.140	-0.135	-0.140	-0.098	-0.115	-0.115	-0.079
	(0.408)	(0.289)	(0.379)	**(0.004)**	(0.307)	(0.074)	(0.499)	(0.547)	(0.499)	(0.854)	(0.256)	(0.388)	(0.204)	(0.485)	(0.624)		(0.283)	(0.125)	(0.139)	(0.125)	(0.283)	(0.209)	(0.209)	(0.388)
YO_3	0.168	**0.318**	0.065	-0.007	0.037	0.050	-0.059	-0.045	-0.059	**0.203**	-0.085	-0.065	-0.045	-0.052	-0.037	-0.098		-0.115	-0.111	-0.115	-0.080	-0.094	-0.094	-0.065
	(0.065)	**(0.000)**	(0.476)	(0.940)	(0.688)	(0.585)	(0.521)	(0.623)	(0.521)	**(0.026)**	(0.354)	(0.480)	(0.623)	(0.568)	(0.689)	(0.283)		(0.211)	(0.227)	(0.211)	(0.381)	(0.305)	(0.305)	(0.480)
YO_4	**-0.184**	-0.077	-0.063	-0.024	0.003	0.035	-0.084	0.088	-0.084	0.019	-0.035	0.017	-0.064	-0.075	-0.052	-0.140	-0.115		-0.158	-0.163	-0.115	-0.134	-0.134	-0.092
	(0.043)	(0.403)	(0.491)	(0.792)	(0.972)	(0.702)	(0.360)	(0.335)	(0.360)	(0.834)	(0.703)	(0.851)	(0.482)	(0.415)	(0.568)	(0.125)	(0.211)		(0.084)	(0.073)	(0.211)	(0.142)	(0.142)	(0.314)
YO_5	-0.108	0.014	**-0.179**	**-0.191**	-0.039	-0.117	0.164	-0.062	-0.081	0.037	-0.117	0.023	-0.062	-0.072	-0.051	-0.135	-0.111	-0.158		-0.158	-0.111	-0.130	-0.130	-0.089
	(0.237)	(0.881)	**(0.050)**	**(0.036)**	(0.674)	(0.200)	(0.072)	(0.498)	(0.377)	(0.688)	(0.201)	(0.800)	(0.498)	(0.431)	(0.582)	(0.139)	(0.227)	(0.084)		(0.084)	(0.227)	(0.157)	(0.157)	(0.331)
YO_6	**0.298**	0.060	-0.099	-0.152	**0.212**	-0.128	-0.084	-0.064	0.036	0.120	-0.035	**0.236**	0.088	-0.075	0.134	-0.140	-0.115	-0.163	-0.158		-0.115	-0.134	-0.134	-0.092
	(0.001)	(0.515)	(0.282)	(0.096)	**(0.020)**	(0.161)	(0.360)	(0.482)	(0.699)	(0.189)	(0.703)	**(0.009)**	(0.335)	(0.415)	(0.143)	(0.125)	(0.211)	(0.073)	(0.084)		(0.211)	(0.142)	(0.142)	(0.314)
YO_7	-0.032	-0.135	-0.068	0.001	-0.045	0.050	-0.059	-0.045	0.099	-0.132	**0.258**	-0.065	-0.045	0.124	-0.037	-0.098	-0.080	-0.115	-0.111	-0.115		-0.094	-0.094	-0.065
	(0.728)	(0.141)	(0.456)	(0.991)	(0.626)	(0.585)	(0.521)	(0.623)	(0.278)	(0.148)	**(0.004)**	(0.480)	(0.623)	(0.176)	(0.689)	(0.283)	(0.381)	(0.211)	(0.227)	(0.211)		(0.305)	(0.305)	(0.480)
YO_8	-0.054	0.111	**0.359**	0.059	-0.064	-0.005	-0.069	**0.303**	0.070	-0.116	**0.202**	-0.076	-0.053	-0.061	-0.043	-0.115	-0.094	-0.134	-0.130	-0.134	-0.094		-0.110	-0.076
	(0.556)	(0.225)	**(0.000)**	(0.519)	(0.484)	(0.959)	(0.453)	**(0.001)**	(0.445)	(0.207)	**(0.027)**	(0.409)	(0.564)	(0.504)	(0.639)	(0.209)	(0.305)	(0.142)	(0.157)	(0.142)	(0.305)		(0.229)	(0.409)
YO_9	-0.094	-0.003	0.129	0.119	-0.045	0.059	-0.069	-0.053	0.070	-0.057	-0.100	-0.076	-0.053	**0.403**	-0.043	-0.115	-0.094	-0.134	-0.130	-0.134	-0.094	-0.110		-0.076
	(0.305)	(0.977)	(0.159)	(0.194)	(0.626)	(0.523)	(0.453)	(0.564)	(0.445)	(0.536)	(0.277)	(0.409)	(0.564)	**(0.000)**	(0.639)	(0.209)	(0.305)	(0.142)	(0.157)	(0.142)	(0.305)	(0.229)		(0.409)
YO_10	-0.081	-0.078	-0.008	-0.101	-0.012	-0.047	-0.047	-0.036	-0.047	-0.080	0.070	-0.052	**0.208**	-0.042	-0.030	-0.079	-0.065	-0.092	-0.089	-0.092	-0.065	-0.076	-0.076	
	(0.378)	(0.398)	(0.928)	(0.272)	(0.893)	(0.610)	(0.606)	(0.692)	(0.606)	(0.386)	(0.447)	(0.570)	**(0.022)**	(0.646)	(0.747)	(0.388)	(0.480)	(0.314)	(0.331)	(0.314)	(0.480)	(0.409)	(0.409)	

APPENDIX 5

This table presents the correlation coefficients between the dependent variable and the independent variables for the public companies acquired. PNA is the transaction price divided by net assets of the particular company, *1/NA* is a reciprocal of net assets, *SNA* is sales divided by net assets, *EBITDANA* is EBITDA divided by net assets, and *NDNA* is net debt divided by net assets. *IND_1-11* are indicator variables for the industry (see Appendix 2A). *YO_1-10* are indicator variables for the acquisition year (see Appendix 2B). Pearson correlation coefficients are presented below the diagonal and the Spearman rank correlation coefficients are above the diagonal. Correlation coefficients with significance level of 5% (0.05) and greater are **bolded**. P-values are reported in parenthesis.

	PNA	*1/NA*	*SNA*	*EBITDANA*	*NDNA*	*IND_2*	*IND_3*	*IND_4*	*IND_5*	*IND_6*	*IND_7*	*IND_8*	*IND_9*	*IND_10*	*IND_11*	*YO_2*	*YO_3*	*YO_4*	*YO_5*	*YO_6*	*YO_7*	*YO_8*	*YO_9*	*YO_10*
PNA		0.171	**0.288**	0.012	-0.093	-0.041	0.067	**-0.183**	0.158	0.045	0.042	0.069	-0.096	0.046	0.019	0.137	-0.062	**-0.280**	0.068	0.134	0.009	0.088	0.029	**-0.179**
		(0.060)	**(0.001)**	(0.900)	(0.309)	(0.658)	(0.468)	**(0.045)**	(0.083)	(0.622)	(0.647)	(0.454)	(0.296)	(0.614)	(0.840)	(0.135)	(0.498)	**(0.002)**	(0.458)	(0.143)	(0.926)	(0.337)	(0.753)	**(0.050)**
1/NA	**0.318**		**0.581**	**-0.258**	-0.012	**-0.196**	-0.139	0.088	0.065	0.165	-0.037	0.102	0.095	0.091	0.135	-0.106	-0.016	0.051	-0.056	0.007	-0.055	**0.209**	0.032	0.036
	(0.000)		**(0.000)**	**(0.004)**	(0.895)	**(0.031)**	(0.128)	(0.340)	(0.476)	(0.070)	(0.684)	(0.264)	(0.299)	(0.319)	(0.141)	(0.247)	(0.861)	(0.576)	(0.543)	(0.941)	(0.549)	**(0.021)**	(0.727)	(0.698)
SNA	**0.414**	**0.331**		0.027	0.069	-0.155	0.109	0.075	0.109	0.066	0.070	0.046	0.087	-0.020	0.132	0.110	-0.038	0.015	-0.019	-0.064	**-0.200**	**0.229**	-0.017	-0.099
	(0.000)	**(0.000)**		(0.770)	(0.455)	(0.090)	(0.232)	(0.416)	(0.232)	(0.469)	(0.448)	(0.618)	(0.344)	(0.829)	(0.150)	(0.230)	(0.676)	(0.871)	(0.836)	(0.483)	**(0.028)**	**(0.012)**	(0.852)	(0.279)
EBITDA	0.155	**-0.378**	0.021		**0.218**	0.030	0.068	-0.120	**0.178**	**-0.258**	0.000	-0.161	0.119	0.017	-0.052	0.065	0.054	-0.055	-0.121	-0.156	-0.163	0.053	0.115	**0.216**
	(0.090)	**(0.000)**	(0.817)		**(0.016)**	(0.741)	(0.460)	(0.189)	**(0.050)**	**(0.004)**	(1.000)	(0.077)	(0.195)	(0.851)	(0.571)	(0.477)	(0.558)	(0.548)	(0.186)	(0.087)	(0.074)	(0.566)	(0.211)	**(0.017)**
NDNA	-0.115	-0.175	-0.162	0.153		-0.007	0.064	0.003	0.163	**-0.450**	0.010	0.060	0.091	**0.201**	-0.007	**-0.193**	-0.073	-0.121	**0.194**	-0.059	-0.037	0.147	0.119	**0.194**
	(0.210)	(0.054)	(0.076)	(0.093)		(0.944)	(0.484)	(0.974)	(0.074)	**(0.000)**	(0.911)	(0.514)	(0.319)	**(0.027)**	(0.936)	**(0.034)**	(0.424)	(0.188)	**(0.033)**	(0.524)	(0.687)	(0.109)	(0.194)	**(0.033)**
IND_2	-0.119	**-0.193**	-0.143	0.064	-0.022		-0.122	-0.094	-0.122	**-0.412**	-0.176	-0.134	-0.094	-0.109	-0.076	0.030	**0.218**	-0.074	-0.131	-0.045	0.030	-0.054	-0.022	0.050
	(0.192)	**(0.034)**	(0.119)	(0.484)	(0.814)		(0.183)	(0.307)	(0.183)	**(0.000)**	(0.053)	(0.143)	(0.307)	(0.236)	(0.407)	(0.743)	**(0.016)**	(0.421)	(0.151)	(0.623)	(0.743)	(0.557)	(0.810)	(0.585)
IND_3	-0.039	-0.065	0.020	0.071	0.064	-0.122		-0.033	-0.043	-0.146	-0.062	-0.047	-0.033	-0.038	-0.027	0.088	-0.081	-0.084	-0.069	0.139	-0.062	-0.066	-0.059	-0.059
	(0.674)	(0.476)	(0.831)	(0.438)	(0.485)	(0.183)		(0.719)	(0.639)	(0.110)	(0.497)	(0.606)	(0.719)	(0.676)	(0.770)	(0.335)	(0.377)	(0.360)	(0.453)	(0.129)	(0.497)	(0.474)	(0.521)	(0.521)
IND_4	-0.064	0.100	-0.023	-0.039	-0.008	-0.094	-0.033		-0.033	-0.112	-0.048	-0.036	-0.025	-0.029	-0.021	-0.048	-0.062	0.088	-0.053	-0.069	-0.048	**0.319**	-0.045	-0.045
	(0.487)	(0.276)	(0.804)	(0.669)	(0.927)	(0.307)	(0.719)		(0.719)	(0.221)	(0.602)	(0.692)	(0.782)	(0.748)	(0.822)	(0.602)	(0.498)	(0.335)	(0.564)	(0.453)	(0.602)	**(0.000)**	(0.623)	(0.623)
IND_5	0.104	0.012	0.125	**0.208**	**0.329**	-0.122	-0.043	-0.033		-0.146	-0.062	-0.047	-0.033	-0.038	-0.027	0.088	-0.081	-0.084	0.070	-0.090	0.088	0.079	0.099	-0.059
	(0.257)	(0.898)	(0.172)	**(0.022)**	**(0.000)**	(0.183)	(0.639)	(0.719)		(0.110)	(0.497)	(0.606)	(0.719)	(0.676)	(0.770)	(0.335)	(0.377)	(0.360)	(0.445)	(0.328)	(0.335)	(0.390)	(0.278)	(0.521)
IND_6	0.062	0.173	0.059	**-0.268**	**-0.288**	**-0.412**	-0.146	-0.112	-0.146		**-0.211**	-0.161	-0.112	-0.130	-0.091	0.108	0.037	0.171	-0.057	0.083	-0.083	-0.100	0.002	-0.132
	(0.502)	(0.058)	(0.521)	**(0.003)**	**(0.001)**	**(0.000)**	(0.110)	(0.221)	(0.110)		**(0.020)**	(0.079)	(0.221)	(0.156)	(0.320)	(0.238)	(0.688)	(0.061)	(0.536)	(0.365)	(0.364)	(0.275)	(0.986)	(0.148)
IND_7	-0.059	-0.090	0.169	0.025	0.020	-0.176	-0.062	-0.048	-0.062	**-0.211**		-0.069	-0.048	-0.056	-0.039	-0.090	-0.117	-0.035	0.001	-0.130	**0.237**	**0.218**	-0.085	0.029
	(0.519)	(0.325)	(0.064)	(0.785)	(0.831)	(0.053)	(0.497)	(0.602)	(0.497)	**(0.020)**		(0.455)	(0.602)	(0.545)	(0.672)	(0.326)	(0.201)	(0.703)	(0.993)	(0.157)	**(0.009)**	**(0.016)**	(0.354)	(0.750)
IND_8	0.139	0.065	-0.016	-0.034	0.052	-0.134	-0.047	-0.036	-0.047	-0.161	-0.069		-0.036	-0.042	-0.030	-0.069	-0.089	0.017	**0.179**	0.111	-0.069	-0.072	-0.065	-0.065
	(0.129)	(0.478)	(0.865)	(0.711)	(0.570)	(0.143)	(0.606)	(0.692)	(0.606)	(0.079)	(0.455)		(0.692)	(0.646)	(0.747)	(0.455)	(0.331)	(0.851)	**(0.050)**	(0.227)	(0.455)	(0.431)	(0.480)	(0.480)
IND_9	-0.054	**0.194**	0.010	0.054	0.039	-0.094	-0.033	-0.025	-0.033	-0.112	-0.048	-0.036		-0.029	-0.021	-0.048	0.095	-0.064	-0.053	0.077	-0.048	-0.050	-0.045	0.157
	(0.554)	**(0.033)**	(0.917)	(0.558)	(0.673)	(0.307)	(0.719)	(0.782)	(0.719)	(0.221)	(0.602)	(0.692)		(0.748)	(0.822)	(0.602)	(0.302)	(0.482)	(0.564)	(0.400)	(0.602)	(0.583)	(0.623)	(0.085)
IND_10	-0.050	0.024	-0.036	0.021	0.134	-0.109	-0.038	-0.029	-0.038	-0.130	-0.056	-0.042	-0.029		-0.024	-0.056	-0.072	-0.075	-0.061	-0.080	0.112	-0.058	**0.300**	0.124
	(0.587)	(0.792)	(0.696)	(0.819)	(0.144)	(0.236)	(0.676)	(0.748)	(0.676)	(0.156)	(0.545)	(0.646)	(0.748)		(0.794)	(0.545)	(0.431)	(0.415)	(0.504)	(0.384)	(0.220)	(0.524)	**(0.001)**	(0.176)
IND_11	-0.028	0.087	0.010	0.009	-0.010	-0.076	-0.027	-0.021	-0.027	-0.091	-0.039	-0.030	-0.021	-0.024		-0.039	-0.051	-0.052	-0.043	0.122	-0.039	-0.041	-0.037	-0.037
	(0.764)	(0.341)	(0.917)	(0.924)	(0.916)	(0.407)	(0.770)	(0.822)	(0.770)	(0.320)	(0.672)	(0.747)	(0.822)	(0.794)		(0.672)	(0.582)	(0.568)	(0.639)	(0.182)	(0.672)	(0.655)	(0.689)	(0.689)
YO_2	-0.014	0.023	-0.006	0.066	-0.038	0.030	0.088	-0.048	0.088	0.108	-0.090	-0.069	-0.048	-0.056	-0.039		-0.117	-0.121	-0.100	-0.130	-0.090	-0.095	-0.085	-0.085
	(0.875)	(0.803)	(0.951)	(0.475)	(0.680)	(0.743)	(0.335)	(0.602)	(0.335)	(0.238)	(0.326)	(0.455)	(0.602)	(0.545)	(0.672)		(0.201)	(0.185)	(0.277)	(0.157)	(0.326)	(0.300)	(0.354)	(0.354)
YO_3	-0.106	-0.063	-0.080	0.060	-0.027	**0.218**	-0.081	-0.062	-0.081	0.037	-0.117	-0.089	0.095	-0.072	-0.051	-0.117		-0.158	-0.130	-0.168	-0.117	-0.123	-0.111	-0.111
	(0.249)	(0.489)	(0.382)	(0.512)	(0.772)	**(0.016)**	(0.377)	(0.498)	(0.377)	(0.688)	(0.201)	(0.331)	(0.302)	(0.431)	(0.582)	(0.201)		(0.084)	(0.157)	(0.065)	(0.201)	(0.177)	(0.227)	(0.227)
YO_4	-0.025	0.107	0.140	-0.136	**-0.225**	-0.074	-0.084	0.088	-0.084	0.171	-0.035	0.017	-0.064	-0.075	-0.052	-0.121	-0.158		-0.134	-0.175	-0.121	-0.128	-0.115	-0.115
	(0.786)	(0.243)	(0.126)	(0.137)	**(0.013)**	(0.421)	(0.360)	(0.335)	(0.360)	(0.061)	(0.703)	(0.851)	(0.482)	(0.415)	(0.568)	(0.185)	(0.084)		(0.142)	(0.056)	(0.185)	(0.162)	(0.211)	(0.211)
YO_5	-0.057	-0.105	-0.080	-0.042	0.041	-0.131	-0.069	-0.053	0.070	-0.057	0.001	**0.179**	-0.053	-0.061	-0.043	-0.100	-0.130	-0.134		-0.143	-0.100	-0.105	-0.094	-0.094
	(0.535)	(0.253)	(0.385)	(0.651)	(0.658)	(0.151)	(0.453)	(0.564)	(0.445)	(0.536)	(0.993)	**(0.050)**	(0.564)	(0.504)	(0.639)	(0.277)	(0.157)	(0.142)		(0.117)	(0.277)	(0.252)	(0.305)	(0.305)
YO_6	**0.180**	0.133	-0.061	-0.017	-0.005	-0.045	0.139	-0.069	-0.090	0.083	-0.130	0.111	0.077	-0.080	0.122	-0.130	-0.168	-0.175	-0.143		-0.130	-0.136	-0.122	-0.122
	(0.049)	(0.145)	(0.505)	(0.855)	(0.959)	(0.623)	(0.129)	(0.453)	(0.328)	(0.365)	(0.157)	(0.227)	(0.400)	(0.384)	(0.182)	(0.157)	(0.065)	(0.056)	(0.117)		(0.157)	(0.136)	(0.181)	(0.181)
YO_7	-0.043	-0.113	-0.089	-0.011	-0.024	0.030	-0.062	-0.048	0.088	-0.083	**0.237**	-0.069	-0.048	0.112	-0.039	-0.090	-0.117	-0.121	-0.100	-0.130		-0.095	-0.085	-0.085
	(0.637)	(0.216)	(0.334)	(0.909)	(0.792)	(0.743)	(0.497)	(0.602)	(0.335)	(0.364)	**(0.009)**	(0.455)	(0.602)	(0.220)	(0.672)	(0.326)	(0.201)	(0.185)	(0.277)	(0.157)		(0.300)	(0.354)	(0.354)
YO_8	0.126	0.139	**0.184**	-0.168	0.061	-0.054	-0.066	**0.319**	0.079	-0.100	**0.218**	-0.072	-0.050	-0.058	-0.041	-0.095	-0.123	-0.128	-0.105	-0.136	-0.095		-0.090	-0.090
	(0.167)	(0.128)	**(0.044)**	(0.066)	(0.507)	(0.557)	(0.474)	**(0.000)**	(0.390)	(0.275)	**(0.016)**	(0.431)	(0.583)	(0.524)	(0.655)	(0.300)	(0.177)	(0.162)	(0.252)	(0.136)	(0.300)		(0.328)	(0.328)
YO_9	0.029	-0.016	0.044	0.147	**0.264**	-0.022	-0.059	-0.045	0.099	0.002	-0.085	-0.065	-0.045	**0.300**	-0.037	-0.085	-0.111	-0.115	-0.094	-0.122	-0.085	-0.090		-0.080
	(0.749)	(0.861)	(0.632)	(0.107)	**(0.004)**	(0.810)	(0.521)	(0.623)	(0.278)	(0.986)	(0.354)	(0.480)	(0.623)	**(0.001)**	(0.689)	(0.354)	(0.227)	(0.211)	(0.305)	(0.181)	(0.354)	(0.328)		(0.381)
YO_10	-0.100	-0.065	-0.058	0.087	0.047	0.050	-0.059	-0.045	-0.059	-0.132	0.029	-0.065	0.157	0.124	-0.037	-0.085	-0.111	-0.115	-0.094	-0.122	-0.085	-0.090	-0.080	
	(0.274)	(0.481)	(0.528)	(0.344)	(0.605)	(0.585)	(0.521)	(0.623)	(0.521)	(0.148)	(0.750)	(0.480)	(0.085)	(0.176)	(0.689)	(0.354)	(0.227)	(0.211)	(0.305)	(0.181)	(0.354)	(0.328)	(0.381)	

APPENDIX 6
RESULTS FROM MULTIPLES VALUATION ANALYSIS

This table presents the results yield from this research and two previous researches. In this thesis the valuation multiples differ, as the numerator is transaction price instead of enterprise value. Enterprise value is defined by multiplying the shares outstanding by the market value and then by adding convertible securities, short-term debt, straight debt, preferred equity minus cash and marketable securities (Koeplin, Sarin et al., 2000). The sample in Block's study (2007) consists of 182 acquisitions or 91 acquisition pairs, where Koeplin, Sarin et al. (2000) research gathered 84 acquisition pairs.

	Thesis		**Block**		**Koeplin, Sarin et al.**	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
Price-to-Net assets	15.20%	-35.06%	n.a.	n.a.	n.a.	n.a.
Price-to-Sales	17.30%	-50.46%	n.a.	n.a.	n.a.	n.a.
Price-to-EBIT *	13.22%	22.63%	n.a.	n.a.	n.a.	n.a.
Price-to-EBITDA **	28.70%	17.21%	n.a.	n.a.	n.a.	n.a.
Ent.Val-to-Book value	n.a.	n.a.	16.25%	14.47%	17.81%	-7.00%
Ent.Val-to-Sales	n.a.	n.a.	26.35%	24.49%	-2.28%	0.79%
Ent.Val-to-EBIT	n.a.	n.a.	27.10%	24.29%	28.26%	30.62%
Ent.Val-to-EBITDA	n.a.	n.a.	24.56%	22.49%	20.39%	18.14%

* 53 private companies and 73 public companies excluded due to negative EBIT.
** 40 private companies and 65 public companies excluded due to negative EBITDA.