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AN EMPIRICAL EXAMINATION OF THE MARKETABILITY DISCOUNT ON CLOSELY HELD COMPANIES

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ABSTRACT

This paper measures the marketability discount for closely held companies and provides new evidence regarding the size of this discount. The comparison of ratios between private and public companies of a certain industry will estimate the discount. Although the ten factors of the Mandelbaum case are the basis of this examination. Furthermore, the paper examines key variables that impact the size of this discount. The result due to the data set of private and public transactions in the last three years is a premium of 45,58%. The premium reflects the fact that an overall or benchmark marketability discount with a few assumptions cannot perfectly predict a marketability premium or discount.

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INTRODUCTION

One of the key differences between public and privately traded companies is the marketability or liquidity. It is an indicator of how easy respectively owned shares or companies can be sold quickly, with minimal transaction cost or minimal price concessions. This paper focuses on the marketability discount for closely held companies.

The sale of listed shares is a simple implementation. Between contacting the broker and the final sale of the share normally takes a minute or even a few seconds. On the other hand selling a closely held company or shares with a non-existing market, is a difficult process. The most difficult part is to indicate the fair market value of a private company because the key data of private translated companies are mostly not published. There are three accepted methods to calculate the fair value of a closely held company: the income approach, the asset approach and the market approach. After an investor arrives at a fair value of a closely held company they must then adjust that value for a marketability discount and a minority shareholder discount. The fair value minus these two discounts results in a fair market value of the firm. The existing literature indicates that this value ranges from 5% - 50%. This paper examines the magnitude of the marketability discount and provides new evidence regarding the size of this discount. The paper also examines key variables that impact the size of this discount.

It is very difficult to examine the marketability discount since data on closely held companies is not readily available. It is also nearly impossible, to find a set of comparable private transactions which has the same company parameters like sales or earnings in a similar industry.

The discount mostly reflects the lack of liquidity. The discount could include transaction cost, lack of marketability or minority interest. The discount for minority interest or especially for lack of marketability is placed at the end of many private company valuations. The transaction costs are mostly included in one of the discounts and not listed separate. The minority discount reflects an

investment stake of a company less than 50%. This paper focuses on the discount for lack of marketability. In the business world, a discount for lack of marketability, as mentioned above, is applied to privately held companies, especially companies which are not traded regularly. Marketability discount considers the expected higher financial and time expenses etc. (Koeplin et al,2000).

Some valuation approaches like the income approach already include some kind of “discount for lack of marketability” in their valuation process. In that case it is called market risk. The Capital Asset Pricing Model (CAPM) is a component of the cost of capital used in the income approach. Furthermore the cost of capital is a function of beta and beta is a multiple for the market risk. One could imagine that the discount for illiquidity could be subtracted twice, once in the market risk and secondly in the discount for lack of marketability. The beta shows the level of systematic risk in a particular asset, relative to the average. Therefore it doesn´t reflect a specific uncertainty of the market related to a private held company.

A discount for a closely held company is a non-fixed figure which has changed over the last decades. Still many private company valuations contain a fixed illiquidity discount or discount rate. These fixed discounts are related to handbooks or former court cases which have discussed private company valuations.(Damodaran, 2005). Before determining an actual discount it is advisable to understand the movement of the discount during the last years.

According to research using restricted stocks and pre-IPO prices the average discount for private firms between 1999 and 2006 was 20%-25%. (Block, 2002). Lance S. Hall (2011) illustrates, due to the benchmark method an average discount of 35% during 1980 and 1996. In previous years, it was common in business valuations to use a 35% marketability discount for all closely held firms. Today the U.S Tax Court does not except any kind of “standardized” discount. Consequently, the court asks a business appraiser to justify his or her discount and consider the companies; financial risk, management, dividend policy, industry, business risk, revenue and assets. This leads to a range of

marketability discounts for closely held firms. (Paschall, 2005). The marketability discounts tend to fall into the 15% - 25% range.

The goal of this paper is to measure the marketability discount for closely held companies. The method to indicate the discount will be based on transaction data of German, UK, and US private companies. Finally, the comparison of ratios between private and public companies of a certain industry will estimate the discount. Another goal is to indicate the factors of the discount size. Factors could be a function of size, industry, profit, type of assets or region for example. A multiple regression of the transaction data will find and indicate the impact of the factors. In the literature review many factors will be summarized which have impacted the discount for lack of marketability in the past. It will be interesting to figure out if factors like financial risk have a bigger impact at the discount then company size.

LITERATURE REVIEW

The literature review part of this paper is very important. This part includes factors for lack of marketability, different approaches to indicate the marketability discount and court cases of the marketability discount which have been discussed and caused a stir in the past. Due to the difficulties, experiences and assumptions of the cases it might help to figure out a new approach or would improve an already existing approach with new assumptions.

Factors for Lack of Marketability

The explanation of some factors for lack of marketability will define the higher financial and time expenses.

Availability and accessibility of corporate information:

A restriction in obtaining information of corporates increases the uncertainty and therefore influences the marketability. (Cheridito, Y. et al 2008). The case of uncertainty, regarding the asset´s

value for example, will increase the discounts claimed by investors. Uncertainty for investors is consistent with risk, thus expensive for the owner. (Bajaj, M. et al 2002)

Company size:

A company size is an important indicator for the size of the discount. A big and profitable company entails mostly larger sales and larger net income etc. compared to smaller firms. Therefore larger companies tend to have a smaller discount. More liquidity is the key factor of this statement. (Block, 2007)

Control Component:

A stake of a private company smaller than 50% is less-attractive investment. Less-attractive investment reflects a big discount, due to illiquidity. More than 50% on the hand is more liquid and therefore more expensive. (Damodaran, 2005).

Attractiveness of the industry environment:

Condition and future prospects of the industry, the amount of possible acquirer and competitive situation could have a high and important influence on a company's marketability. (Cheridito et al, 2008)

Duration of restrictions on trade:

The longer a company is on the market for sale, the greater is the loss of value and the stronger the lack of potential buyers. The long duration shows interested investors the non-marketability of an asset, otherwise the asset would be sold straight after being on the trade market. Dropping the value of an asset by increasing its marketability discount, will gain new investors as buyers or shareholders. (Bajaj, M. et al 2002)

Modification to Rule 144A

Rule 144 was implemented in 1934 by the Securities and Exchange Commission (SEC) which states that unregistered securities have a holding period of two years. The holding period was implemented to recover shares from underwriting or distribution. (SEC 2008). In 1990 the SEC modified the rule to 144A. The differences are that the holding period dropped from two to one year and that qualified institutional investors got the provision to deal with unrestricted stocks without the registration certification between each other. In 2008 the holding period, according to SEC, fell further to six months. Due to the shorter holding period the securities got more liquid and the marketability discount increased since the modification.(Duane Morris 2008)

Different techniques to estimate the marketability discount

Not only factors can influence the marketability discount. To indicate the right marketability discount, the right approach can help and cause significant size differences. It always depends on the information which is available to find the right approach and therefore to define the appropriate discount. It is important to understand the differences between the methods.

Benchmark Method

The most famous method is the benchmark method. The difference between a publicly traded stock and an identical restricted stock is the basis of the calculation. Based on the differences of many transactions, the average is used as a measure of the marketability discount. The courts criticized this approach, stating that an average does not compare directly with a specific data. (Hall, 2011)

Quantitative Marketability Discount Model

The benchmark discount doesn´t consider the wide range of different investment characteristics between a privately held company and a public traded company. Therefore the

marketability discount should reflect more the economic characteristics of an asset. Due to the five assumptions of the Quantitative Marketability Discount Model (QMDM), a determination of the marketability discount, under consideration of the economic characteristics, is conceivable. The first factor to consider is the expected growth in value. In case of an illiquid security the growth will be the future value which an investor estimates to achieve. Next the quantification of expected dividends or distributions of the asset has to be incorporated. That is one of the differences between the QMDM and the benchmark analysis. A qualitative comparison of dividends with another investment is not possible. The third factor to take under consideration is the expected growth in dividends or distributions. In this case assumptions are adequate because the growth of an illiquid security may not be that large. The expected holding period for an investment is the fourth factor. That is one of the criticisms of the QMDM because it is impossible to indicate the holding period for an illiquid security. The last factor is the required return. The equation is not relevant for this paper, because as shown under the first four factors the QMDM will not be used for further calculation. The positive aspects of this model are the assumptions but which are on the other hand not really reasonable. (Mercer, 2003)

Restricted Stock Studies

The Restricted Stock Studies, which will be defined next, is the most preferred approach of the Courts. This study has been cited and analyzed by many court decisions. The basic of this approach is quite similar to the benchmark method. As well, the evidence of the marketability discount is the price difference between a restricted private placement and its publicly traded twin. The key of the approach is the comparative analysis. The discount of the Benchmark Method consists of the average of many comparisons, as explained above. Regarding the Restricted Stock Studies the appraiser compares factors like market value, revenue or profitability of the private asset with the public asset. Therefore this approach is more liable then others because the comparison takes only place with companies which have similar factors. (Block, 2007)

Three different approaches have been derived from the Restricted Stock Studies and partly accepted by Courts. They are called the Bajaj Method, the Burns Method and the FMV Method. The explanation of these three methods in this paper will only contain the important difference to the Registered Stock studies and will not be pointed out deeply. The Bajaj Method focuses on the comparison of private stocks that are discounted registered and unregistered. In the opinion of the Bajaj Method there must be other reasons than lack of marketability for private companies selling registered stocks at discount because they could reach the price of the public market. Regarding the Bajaj data, the marketability discount should be under 10 %. (Bajaj et al, 2002). Mr. Burns argued that the marketability discount should be defined into two different parts. One part is the holding period which has changed after the modification of Rule 144 and the second part is market access. Due to Rule 144a a registered stock is more liquid thanks to the shorter holding period. Therefore Mr. Burns indicates that the discount should be lower since 1990. Also he makes the difficult market access for restricted stocks before 1990 responsible for the higher discounts. (Hall, 2011). FMV Opinions, Inc. has carried out a study to find the right marketability discount. Therefore they researched 230 transactions from 1980 to April 1997. The result of the overall study was called FMV Restricted Stock Study. They indicated an average discount of 22.3% for all 230 transactions. One important result of this study is the percentage block size. Due to the information it can be shown that the discount of big block sizes is 10-15 percent higher than for small block sizes. A reason for this statement is probably the longer holding period of big block sizes due to the Rule dribble-out provision.

Pre-IPO studies

The last approach of this paper is called Pre-IPO studies. This approach is a qualified alternative to the restricted stock studies. The price difference of a stock listed as initial public offerings (IPOs) and a stock price of the same company, prior going public, is the indicator for the

marketability discount. Based on the following study of Pratt (Pratt, 2001) the mean discounts can verify between 42 % and 60 % which is quite a lot.

The uncertainty of this approach is recorded very well in the table above. Primary the holding period of a pre-IPO share cannot be set and is therefore critical for investors. It is not even determinate that the shares will be transferred into the publicly traded market. In the time gap between 1995 and 1997 only 91 of 732 transactions into IPOs took place. Due to the uncertainty the price of prior IPOs are too low and the marketability discount too high. Moreover, only information of successful companies are useful for this approach. Another factor for the uncertainty is the financial structure of a company which might change during the years of going public. (IRS, 2009)

Different Court Cases

The following Court Cases show how the marketability discount can influence the company value of private companies.

The Mandelbaum Case

Until 1976 three Mandelbaum brothers, who had founded the company Big M, Inc., were all equal shareholders. From 1976 the Mandelbaum brothers started to transfer shares to their children. Big M had retail stores along the north and central eastern coast and distributed woman´s apparel. Due to the shareholders´ agreement no specific transfer value of the corporation was set. When 1990 it came to the gift tax return preparation, the freely-traded values of the stock were stipulated at trial, as usual. “A shareholders´ agreement was in effect, providing the corporation with the right of first refusal”. This agreement had an important role in the courts decision later on. However the discount for lack of marketability was committed by family´s experts to 70 % and of the IRS experts to 30 %. Information of other investors were collected by the family experts to underline their decision. As well they considered a holding period of 10 to 20 years because this would be the retiring period of the next generation. The Restricted stock studies and the IPO studies were the basis

of their assumptions. Both were referring to different cases with a median discount of 33 % due to the restricted stock studies and 45% regarding the IPO studies.

The Court stated the following factors should be considered for the proper marketability discount. The first factor to consider is “private vs. public sales of stocks”, which examines the sales of similar companies and their marketability´s. Next, an analysis of financial statements must be conducted to determine the viability of the firm. The third factor to take under consideration is the company´s dividend policy because this helps to determine if the investor will receive a return on his investment. Thus a company that does not pay dividends will have less marketability. Fourth, the marketability discount must attempt to capture the nature of the company, i.e. that firm´s reputation and their position in their specific market, as well as their economic outlook. Executive management is the driving force behind a company, therefore management should be taken under consideration as well. A strong management team can have a positive influence on a company´s value. Moreover, the amount of control that shareholders have over a company is a factor to consider. The more control a shareholder has over a company can increase that value of a company, or in this case, decrease the marketability discount. The seventh factor to consider is the existence of any restriction on the ability of a shareholder to transfer shares of a company. If there are legal roadblocks that hinder the ability of a shareholder to transfer stock, then the value of a company will be reduced. Additionally, the value of a company must be reduced if an investor must hold onto his shares of the company for an extended period of time before he can sell his shares and realize a gain. Companies that have a redemption policy, the company´s right to purchase stock before it is sold to an outsider is also a contributing factor to the marketability discount, because it is common that embedded in a redemption policy is a set price at which the shares must be sold. Finally, the last factor that must be considered is the cost that would be associated with taking the company public. The marketability discount will increase, if the investor must bear the entire cost of registering a private stock. The court concluded, due to the ten factors, a marketability discount of 30 %. The court didn´t accept the 10-20 years holding period and indicated that the family experts shouldn´t only interview venture

capitalists or LBO groups because this kind of investor always want to beat down the prices. (Hawkins et al, 2003)

The Johan Paul Mitchell Systems (“JPMS”) Case

In 1989 the co-founder of the hair-care products company JPMS Paul Mitchell died. He had a minority interest of 49.04 % shares. “On July 21, 1993 the IRS informed the Estate of Paul Mitchell (“Estate”) the deficiency in the federal estate tax in the amount of $45,177,089, and a total of $8,543,643 in penalties”. The accusation of the IRS was that the private accounting firm of the Estate had undervalued the 1,226 shares of JPMS stock. Due to the valuation of the Estate, the stocks had a value of $ 28.5 million and based on the calculations of the IRS the value was $ 105 million. It amounted to a $76.5 million difference of additional tax, which was assessed by IRS. Also the IRS accused the Estate of a delay in tax return. This accusation will not be discussed. Only the difference of the stock value is interesting for this paper. Finally the differences of the stock value proceeded to trial. The experts of the Estate indicated a value for the 1,226 stocks of approximately $20 to $29 million, while the IRS a range of $57 to $165 million. The approach to calculate the value was nearly the same with both experts, they compared the stock price of similar companies. “Basically the Estate indicated that the reputation of the company suffered after John Paul`s death, costs of litigation between the Estate and the co-founder of Paul Mitchell, cash-flow patterns, the competition in the hair- care industry and the marketability of the Estate´s minority”. (Hawkins et al 2001).

Due to the research of the Tax Court in 1997 they defined a stock´s fair market value of $41,532,600. The court weighted their statement under the following assumptions. First the court assigned a value of $ 150 million which was worth the offer from Gillette, Co. for the company. Then they decreased the value by 10 % for the loss of presence and creativity of Mr. Mitchell. Secondly they calculated the 49.04 % shares of the state, minus a 35 % discount for lack of marketability combined with minority interest. Finally a subtraction of $1.5 million of possible lawsuit against the

co-founder. In November 1997, the estate argued that the discount for minority interest and lack of marketability should at least be 45 % due to the expert witness George Weiksner. Even the second motion in July 8, 1998 for reconsideration was rejected by the Tax court. The estate asked for more detailed explanations how it figured out the combined discount. The court replied that "valuation is necessarily an approximation and a matter of judgment, rather than one of mathematics, on which petitioner has the burden of proof".(Hawkins et al 2001).

The tax court made a typical announcement by shifting the burden of proof on the Estate. They didn´t even explain their combined discount. It looked like they used the discount because it was like this in the past, without actual research. Another problem could be that they didn´t distinguish between the marketability discount and the discount for minority interest. Instead they used a combined discount. Due to the Commissioner´s expert, Hanan, she calculated with a 30 % marketability discount and a minority discount of 23.1 % showing combined discount of 46.2 %. The estate´s expert, Weiksner, on the other hand defined his marketability discount with 45% and the minority discount with 30% and his final combined discount was 61.5 %. Regarding the two calculations it is obvious that the combined discount of the tax court was only in the range of the expert's marketability discount alone.

Peracchio Case

Peter S. Peracchio, the petitioner, in due time filed a petition for redetermination. Due to the Judge he has a deficiency in Federal gift Tax for the Year 1997 of $328,317. Regarding many different transfers of partnership units the discount for lack of control is an important factor in this case. As in the cases before the determination of the fair market value is the basic goal. What makes this case different is the change of property between the family members and the family organization. Again this case refers to a combined discount. The combination of lack of marketability and lack of control reflects the discount. The petitioner had sold interest and therefore applied a combined discount of 40 %. The respondent contends a combined discount of 18.74 %. (Hawkins et al 2003).

Both parties confirmed a second discount after using the minority interest discount, which would consider the lack of marketability. The petitioner´s experts, named Dr. Dankoff and Mr. Stryker, analyzed the range of discount with the benchmark, restricted stock studies as basics and finally determined the discount due to the factors of the Mandelbaum case. Mr. Dankoff stated in his analysis that he reviewed the factors which relate to the subject partnership of the Mandelbaum case. Also he analyzed other empirical studies and came to a range of 35% to 45% for the marketability discount. Mr. Stryker states a 40 % discount was applicable. He focused on restricted stock studies and stated that a discount around 30 % would be reasonable. The difference of the additional 10%, he argued, relates to the fact that the Peracchio´s interests are freely traded, not like the ones of the restricted stock studies. Furthermore he used average discount of all the different cases he observed. The problem of Mr. Stryker´s analysis is that he didn´t implement any analytical research, he totally relied on previous restricted stock studies. Another disadvantage of his analysis is that he missed in his benchmark any reliable cases which focused on transferred interests. (Hawkins et al 2003).

Mr. Burns the expert of the respondent offered another interesting “analysis”. In his opinion a discount for lack of marketability discount should be in the range of 5% to 25%. He defines a higher discount would be trivial and writes in his report due to a “conservatively-managed partnership holding highly liquid marketable securities and cash investments.” As well he denies a discount below 5 % because the 5% would include the costs to find a willing buyer. He argued at court that the 5 % limit would be charged by brokers as sales commission. Finally he announced a discount of 15%. Among other things he defended his additional 10% as a discount for the thin nature of the secondary market. (Hawkins et al 2003).

Banister Financial, Inc. analyzed the case and declared a marketability discount up to 25 % to be appropriate. Especially the midpoint range of 15% of Mr. Burns was not accepted as a serious discount announcement. Although they supported Mr. Burns statement that a more than 25%

discount for an entity with the characteristics of the partnership would be overvalued. They accused the petitioners experts of lack of proof.

Selma K. Friedman Case

The petitioners of this case are the minority stockholders. They owned stocks of nine family owned corporations. Each petitioner “had its dole asset a parcel of income-producing office, commercial or residential real estate”. During a voting in 1986 the board of directors and the majority stockholders decided to form a new partnership and therefore transfer all of the corporations’ property. Petitioners did not approve and voted their shares against the transfers. Later the corporation failed to announce a fair value of the petitioners stocks and a judicial determination followed. The valuation occurred in two steps. In the first step the Supreme Court calculated the net value of the leasehold interest of one office building owned by the corporation. Then they summarized all nine net assets values. In the second step of the trial they declared the fair value of all petitioners shares at the sight of the previously fixed net asset values. The petitioners’ experts preferred a fractional corporate stock ownership of the aggregate corporate net asset values. It was rejected by Supreme Court because “valued these shares as if petitioners were co-tenants in the real estate rather than corporate shareholders” and the lack of marketability would be intercepted. Kenneth McGraw was the expert of the corporation and preferred by the court. He finally determined the net asset value due to the hypothetical value of the assets. The illiquidity of the shares for potential investors, regarding the fact that the shares of close corporations cannot be changed immediately into cash, will be replaced by a discount. The corporation expert announced a discount of 30.4% for unmarketability. The court considered that the discount includes a discount for minority interest and subtracted 9.4%. Finally the Supreme Court applied a 21 % discount for lack of marketability against each petitioners´ share interest of the total corporations´ net asset value.

The Supreme Court only relied on the two-step valuation approach of Mr. McGraw. In the first step he took a discount of 9.8% which the court added back under the explanation that it would

reflect a minority discount. In the second McGraw implemented a discount of 30.4 for lack of marketability and the court added back again the minority discount. Therefore the Court added back twice the discount for minority, in every step once. The court defended their preceding example due to the fact that McGraw compared his discount “with restrictive sale provisions and [McGRaw] found that they exhibited a median discount of 30.4 % relative to net asset value”. Also the Supreme Court stated that the analytical data of McGraw were based on minority shares and therefore his unmarketability discount already included a minority status. McGraw defended himself and noted that he actually calculated the discount for lack of marketability by comparing the purchase price of a restricted stock with a public traded share. The public shares had the same features like minority and fit to comparative corporations. In addition he compared share prices of minority and marketable stocks with minority and unmarketable stocks. Therefore he did not contain any discounts for minority. Finally the discount consists of the price differences of the two share classes. Due to the fact the Supreme Court removed a nonexistent minority discount and so overvalued the shares.

In summary, the court cases listed above all have something in common, the courts didn´t except the counterparty’s experts’ valuation decision and mostly reduced the discount for lack of marketability. This occurred due to the fact that the counterparties mostly tried to undervalue their companies to save taxes. The Friedman case is an exception. In that case the reasons are the different valuation methods between the minority and majority stakeholders. The courts decisions often base at discounts of the past which are already outdated. The courts announcement from the Mandelbaum case on the other hand was exemplary. They explained their own decision based at their own research and assumptions. These ten factors were and still are used for court decisions. During the court cases above, the discount for marketability and minority interest were often mixed up. These discounts have to be presented independent. They are not highly related to each other and often caused misunderstandings.

RESEARCH QUESTION AND HYPOTHESIS

The court in the Mandelbaum case recommends that analysts and researchers examine the sale of private and public stocks to estimate the marketability discount and this is the motivation of this paper. Due to the research above, most courts used an overall discount that did not vary in different industries. The examination of the discount size and the factors that influence the discount is another motivation of this paper. Based on the court decisions of the Madelbaum case (Hawkins et al, 2003) and the restricted stock studies (Block, 2007) the following hypothesis will be verified:

H1: Are marketability discounts for private companies higher than 25%?

H2: Do marketability discounts for private companies vary across countries?

H3: Do marketability discounts vary over time?

H4: Do marketability discounts for private companies vary with size?

H5: Do marketability discounts vary with financial risk?

H6: Do marketability discounts vary between different industries?

DATA

The origin of the Data is Capital IQ. The Capital IQ database provides data about company transactions and is a Standard & Poor´s Business.(www.capitaliq.com). The currency of the Data is the EUR and all figures in the dataset are set at announcement.

To verify the hypothesis, this data takes into consideration companies in Germany, United Kingdom and United States and Canada. The United States and Canada are, due to the database, only on area and cannot be classified independent.

The time horizon reflects the duration from January 22nd 2009 until November 21st 2011. The time horizon makes it possible to indicate a discount which is up to date.

This paper will define the marketability discounts of different primary sectors. They are Industrials, Materials, Energy, Information Technology, Utilities and Healthcare.

To verify the marketability discount, datasets from private and public companies are necessary. This dataset reflects in total 238 observations. 91 observations of private companies and 147 observations of public companies will be the basis.

The dataset consists of M & A in the last two years. Not every transaction reflects a 100 percent M & A. It has to take into consideration that it is difficult to find data from private transactions. Therefore this dataset as well includes transactions of company shares. As mentioned in the court cases above, sales of minority or majority interests are often basis of court decisions.

Hardly every transaction in this dataset lists the classification figures Transaction Value, Revenue and total Assets. These figures will support the research for factors of the marketability discount.

METHODOLOGY

The data set contains transactions of private and public companies. This data is necessary to solve the first hypothesis whether the actual marketability discount is higher than 25%. First the price multiples EV/EBITDA for each transaction will be calculated. To obtain a discount or premium I will compare the EV/EBITDA of private and public transactions. For the comparison I calculated an average public EV/EBITDA of every industry and region as seen in the following table. Every multiple of each industry sector and region will be added and divided by its number, to get a specific industry average. To get more observations I implemented the region Europe. Therefore the regions USA/Canada and Europe are the assumptions. One example of the average EV/EBITDA materials industry can be seen in table 1.

The different industries averages of this paper contain industrials, materials, energy, information technology, utilities and healthcare. Finally to calculate the discount or premium the EV/EBITDA of a private transaction will be subtracted from the public industry average and the result will be divided by the public industry average.

The following model will be used to calculate the discount:

$$D_{T(x)} = \frac{pt\frac{EV}{EBITDA} - ia\frac{EV}{EBITDA}}{ia\ EV/EBITDA}$$

$D_{T(x)}$ = Transaction discount

pt= private transaction

ia= Industry average

The average of all private transactions discounts or premiums of a particular industry will be the industry marketability discount or premium. Finally I added the weighted industry discounts or premium to get the overall Marketability discount. I weighted the industry discount because not every industry has the same amount of transactions.

$D = ID_{T(x1)} * mean_{(x1)} + ID_{T(x2)} * mean_{(x2)} + ID_{T(x3)} * mean_{(x3)} \ldots\ldots\ldots\ldots\ldots\ldots$

$ID_{T(x)}$ = *Industry marketability discount or premium*

D= Marketability Discount

Hypothesis two to six will be defined by a multi regression model. First of all the correlation coefficients of the variables will show us a first small overview and might show us in which direction the marketability discounts tend to orientate. The variables of the hypothesis will be replaced by the following data figures:

H_2: country = the different countries will be replaced by dummy variables

H_3 : time = Time 2011= 1 if 2011, 0 otherwise;

Time 2010= 1 if 2010, 0 otherwise;

Time 2009= 1 if 2009, 0 otherwise;

H_4 : size = revenue

H_5 : financial risk = D/E ratio

H_6 : industries = the different industries will be replaced by dummy variables.

In the regression the premium or discount of each transaction will become the dependent variable and the independent variables will be revenue, announcement date, D/E ratio and the three different dummy variables which reflect the different industries.

$$\text{Discount} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

X_1 = Country

X_2 = Time

X_3 = Revenue

X_4 = D/E ratio

X_5 = Industry

Simple regressions will get a more decent understanding of the effect of each independent variable on the dependent variable and will avoid multicollinearity. This will help to clarify which variable interacts the most the discount or premium.

DISCUSSION AND RESULTS

The public benchmark EV/EBITDA figures which I have used to calculate the discount or premium can be seen in table 2. The first hypothesis proves whether the marketability discount of private transactions is higher than 25%. Due to my transaction data and the equation above I calculated an overall premium of 45.58%. This result occurs due to the different industries and regions. The industry premiums or discounts of table 3 are the basis of the premium.

The companies in the healthcare sector for example have been sold at a premium of 152% and the Information Technology companies on the other hand at a discount of 5%. The calculation is connected to the first factor of the Mandelbaum case which states “Private vs. public sales of the stock”. The different premiums or discounts support the fourth factor of the Mandelbaum case which focuses on the nature of a company, position in the industry and the economic outlook. The only sector with transactions of premiums is the healthcare industry. In all other industries the companies have been sold nearly 50% at premium and nearly 50% at discount. It shows even if the average of an industry has been sold at premium there are still many companies in that industry which are not that liquid. The valuation of discounts or premiums in one industry reflects the second factor of the Mandelbaum case. Different financial statements are the solution of the valuation.

Table 4 shows the independent variables USA & Canada and Germany as well as the dummy variable UK. The small adjusted R squared suggests that the regions do not perfectly fit to the premium. USA & Canada show a very low significant level. Germany on the other hand shows more

significance. Regarding the low significance, it is difficult to find any relationship between the premium and an area. The course of the low significant level is the small amount of observations. To find a high level of significance in the USA & Canada region would be really difficult. A big n could only reflect the huge USA & Canada area.

Even, the financial crises in 2008 couldn´t affect the average premium due to my data set. Only the year 2011 indicates significance at the 5% level. The reason for the high level of significance could be that most transactions have been from the USA & Canada area.

Table 6 includes the simple regressions of revenue and the d/e ratio with the premium or discount as the dependent variable. Revenue shows the highest level of significance. It supports the factor that big companies with high revenues have a smaller discount then smaller companies. The second factor of the Mandelbaum case indicates to research the viability of a company. Furthermore, table 6 shows that the d/e ratio has as well impact on the premium or discount and influences the result.

Table 7 shows the independent industry variables with the information technology dummy variable. This multiple regression has the highest adjusted r square. The healthcare industry shows the highest level of significance of 99% and the utility industry of 95%. The reason is that all transactions in the healthcare industry have been sold at premium. It reflects factor 4 of the Mandelbaum case. The nature of the company is the industry sector. The industries with the smallest premium or even discount have the lowest level of significance. It shows that the premium vary with different industries. Therefore an overall or benchmark marketability discount with a few assumptions cannot perfectly predict a marketability premium or discount.

CONCLUSION

This study intended to examine what size of a discount should be placed on privately held companies. Due to the data set of private and public transactions in the last three years the result is a premium of 46%. The premium reflects the fact that an overall or benchmark marketability discount with a few assumptions cannot perfectly predict a marketability premium or discount.

The basis of this study was the Mandelbaum case with its ten assumptions. I didn´t use the factors related to the comparison of restricted stocks. Therefore some factors were invalid. The outcome underlines the approach of the Mandelbaum case to search for related company characteristic features of public companies. Table 7 perfectly shows that related facts like the same industry have a big input to investigate the right marketability discount or premium. Furthermore, table 6 reflects that revenue shouldn´t be a rooter for a company valuation. The debt to equity ratio on the other hand, is a good assumption for the company's nature. It shows that the financial risk influences the discount or premium.

The question of this thesis perfectly originated the problem of benchmark discounts or premiums. Private companies in the information technology industry have been transacted at a discount of 5% and in the healthcare industry on the other hand at a premium of 152%. A company nature as well includes the place of origin. Transnational discounts or premiums shouldn´t be placed as seen in table 4. As shown in the Europe region, it is related to the discount or premium.

The outcome of this study should show every appraiser or court, not to use a benchmark or trend marketability discount. The ten factors of the Mandelbaum court case lead into the right direction to valuate a marketability discount or premium. Every technique to estimate the marketability discount can be a support but at the end the appraiser has to implement his own assumptions and experiences. The setting of a marketability discount or premium should take more time than just to use some benchmark discounts. Finally the right marketability discount or premium, basing on the court cases, can save all interested parties a lot of money and time in court.

TABLES

Table 1
Materials EV/EBITDA

Date	**Country**	**Company Status**	**Industry**	**EV/EBITDA**
05/17/2011	Germany	Public Company	Materials	13.31
11/03/2011	Germany	Public Company	Materials	9.80
02/16/2011	Germany	Public Company	Materials	12.36
02/08/2010	Switzerland	Public Company	Materials	16.06
11/02/2009	Switzerland	Public Company	Materials	4.21
10/30/2009	Germany	Public Company	Materials	4.50
08/26/2009	Germany	Public Company	Materials	6.71
08/25/2009	Germany	Public Company	Materials	6.69
Average				*9.21*

Table 2
The public benchmark EV/EBITDA

Variables	**Energy**	**Healthcare**	**Industrials**	**IT**	**Materials**	**Utilities**
USA & Canada	10.76	9.34	9.2	25.74	15.22	8.94
Europe	7.96	9.72	9.92	23.71	9.21	8.34

Table 3
Weighted Premium/Discount

Industry	**Premium/Discount**	**Mean**	**Weighted Premium/Discount**
Energy	25%	0.228	5.70%
Industrials	17%	0.127	2.16%
Materials	40%	0.114	4.56%
Utilities	51%	0.177	9.03%
Healthcare	152%	0.165	25.08%
IT	-5%	0.189	-0.95%
Total			*45,58%*

Table 4
Descriptive Statistics

Variables	N	Mean	Median	Min	Max	SD
Discount/ Premium	79	0.456	0.287	-0.775	3.832	0.995
Time 2010	79	0.443	0	0	1	0.500
Time 2011	79	0.316	0	0	1	0.468
USA & Canada	79	0.430	0	0	1	0.498
Germany	79	0.152	0	0	1	0.361
Value	79	705.901	181.400	3.280	11119.700	1504.282
Revenue	79	486.082	176.840	10.650	6204.300	896.579
EBITDA	79	62.520	18.003	0.094	710.978	126.653
D/E	79	9.006	0.395	-37.110	710.519	80.080
Energy	79	0.228	0	0	1	0.422
Industrials	79	0.127	0	0	1	0.335
Materials	79	0.114	0	0	1	0.320
Utilities	79	0.177	0	0	1	0.384
Healthcare	79	0.165	0	0	1	0.373

Table 5
Correlation Coefficients

	Discount/ Premium	*Time 2010*	*Time 2011*	*USA & Canada*	*Germany*	*Value*	*Revenue*	*EBITDA*	*D/E*	*Energy*	*Industrials*	*Materials*	*Utilities*	*Healthcare*
Discount/Premium	1													
Time 2010	0.218	1												
Time 2011	-0.305	-0.607	1											
USA & Canada	-0.183	-0.106	0.563	1										
Germany	0.195	-0.164	-0.136	-0.368	1									
Value	-0.029	-0.085	0.208	0.100	-0.165	1								
Revenue	-0.214	-0.177	0.108	-0.139	0.086	0.263	1							
EBITDA	-0.170	-0.078	0.169	0.001	-0.168	0.894	0.345	1						
D/E	-0.018	0.118	-0.075	-0.108	-0.044	-0.039	-0.044	-0.049	1					
Energy	-0.109	-0.241	0.214	0.076	-0.230	0.205	0.132	0.269	-0.057	1				
Industrials	-0.110	0.274	-0.177	-0.023	0.051	-0.076	0.215	-0.076	-0.041	-0.207	1			
Materials	-0.021	0.001	0.184	0.010	-0.041	-0.047	-0.053	-0.002	-0.041	-0.195	-0.137	1		
Utilities	0.024	-0.014	-0.102	0.065	-0.196	0.065	0.042	0.073	-0.059	-0.252	-0.177	-0.166	1	
Healthcare	0.478	0.085	-0.155	-0.041	0.193	-0.072	-0.160	-0.149	-0.054	-0.241	-0.169	-0.159	-0.206	1

Table 6
Regression Analysis

Variables	**Coefficient (P-Value)**
Intercept	-0.288 (0.36)
Time 2010	0.396 (.15)
Time 2011	-0.120 (.73)
USA & Canada	-0.320 (.23)
Germany	0.622 (.05)**
Value	0.00 (.01)***
Revenue	0.000 (.01)***
EBITDA	-.005 (.01)***
D/E	0.000 (.82)
Energy	0.903 (.01)***
Industrials	0.331 (.36)
Materials	0.815 (.02)**
Utilities	0.942 (.01)***
Healthcare	1.477 (0.00)***

Regression Statistics	
Multiple R	0.689
R Square	0.475
Adjusted R Square	0.370
Standard Error	0.790
Observations	79

Note: A * indicates significance at the 10% level, a ** indicates significance at the 5% level and a *** indicates significance at the 1% level.

Table 7
H_2: Multiple Regressions: Dependent Variable Discount/Premium

Variables	**Coefficient (P-Value)**
Intercept	0.505 (.01)***
USA & Canada	-0.257 (.29)
Germany	0.408 (.22)

Regression Statistics	
Multiple R	0.229
R Square	0.053
Adjusted R Square	0.028
Standard Error	0.981
Observations	79

Note: A * indicates significance at the 10% level, a ** indicates significance at the 5% level and a *** indicates significance at the 1% level.

Table 8
H_3: Multiple Regressions: Dependent Variable Discount/Premium

Variables	**Coefficient (P-Value)**
Intercept	0.595 (.01)***
Time 2010	0.103 (.71)
Time 2011	-.581 (.05)**

Regression Statistics	
Multiple R	0.308
R Square	0.095
Adjusted R Square	0.071
Standard Error	0.959
Observations	79

Note: A * indicates significance at the 10% level, a ** indicates significance at the 5% level and a *** indicates significance at the 1% level.

Table 9

H_4, H_5: Simple Regressions: Dependent Variable Discount/Premium

	H4:	*H5*
Variables	**Coefficient (P-Value)**	**Coefficient (P-Value)**
Intercept	*0.571 (.01)****	*0.458 (.01)****
Revenue	*-0,001 (.06)****	
D/E ratio		*-0.001 (.87)*

Regression Statistics H4	
Multiple R	0.214
R Square	0.046
Adjusted R Square	0.033
Standard Error	0.978
Observations	79

Regression Statistics H5	
Multiple R	0.018
R Square	0.001
Adjusted R Square	-0.013
Standard Error	1.001
Observations	79

Note: A * indicates significance at the 10% level, a ** indicates significance at the 5% level and a *** indicates significance at the 1% level.

Table 10
H_6: Multiple Regressions: Dependent Variable Discount/Premium

Variables	**Coefficient (P-Value)**
Intercept	*-0.049 (.83)*
Energy	*0.306 (.32)*
Industrials	*.218 (.55)*
Materials	*0.448 (.23)*
Utilities	*0.555 (.10)**
Healthcare	*1.569 (.01)****

Regression Statistics	
Multiple R	0.511
R Square	0.261
Adjusted R Square	0.210
Standard Error	0.884
Observations	79

Note: A * indicates significance at the 10% level, a ** indicates significance at the 5% level and a *** indicates significance at the 1% level.

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APPENDIX

	Discount/ Premium	Date	Primary Sector	Locations	Revenue	D/E
1	-0.523	11.10.2011	Energy	United States and Canada	1882,31	2.401
2	-0.157	01.08.2011	Energy	United States and Canada	174,41	0.184
3	0.454	07/14/2011	Energy	United States and Canada	1338,12	1.031
4	0.359	11.07.2011	Utilities	United Kingdom	835,36	5.214
5	0.496	06/24/2011	Materials	Germany	119,37	0.454
6	-0.483	06/22/2011	Materials	United States and Canada	68,62	-0.691
7	-0.422	06/20/2011	Materials	United States and Canada	264,67	2.876
8	0.542	6/17/2011	Energy	United States and Canada	10,79	0.432
9	-0.721	6/15/2011	Materials	United States and Canada	202,29	0.018
10	-0.424	6/13/2011	Materials	United States and Canada	1873,32	-5.492
11	0.334	06.10.2011	Energy	United States and Canada	10,65	0.129
12	0.671	5/24/2011	Energy	United States and Canada	15,44	0.174
13	-0.700	05.11.2011	Energy	United States and Canada	55,9	0.367
14	1.176	05.06.2011	Healthcare	United States and Canada	114,28	-5.443
15	0.725	05.02.2011	Energy	United States and Canada	792,22	0.445
16	-0.050	4/19/2011	Energy	United States and Canada	21,46	1.971
17	-0.486	03.11.2011	IT	United States and Canada	545,72	0.307
18	0.049	03.04.2011	Utilities	United States and Canada	392,23	0.560
19	-0.413	03.03.2011	IT	United States and Canada	36,59	0.415
20	-0.580	03.03.2011	Industrials	Germany	6204,3	0.545
21	1.599	2/21/2011	Healthcare	United Kingdom	116,67	-7.161
22	-0.523	02.01.2011	IT	United States and Canada	95,02	-4.143
23	-0.129	1/27/2011	IT	United States and Canada	248,67	10.768
24	-0.023	1/20/2011	Utilities	United States and Canada	211,16	1.273
25	-0.439	1/18/2011	IT	United States and Canada	65,74	0.060
26	-0.775	12/31/2010	IT	Germany	91,45	0.249
27	1.207	12.12.2010	Healthcare	United States and Canada	322,59	0.067
28	1.673	11/23/2010	Utilities	United States and Canada	39,56	-37.110
29	0.559	10/18/2010	Materials	United Kingdom	163,08	0.408
30	1.305	10.06.2010	Energy	United Kingdom	389,82	0.417
31	1.161	9/28/2010	Healthcare	United States and Canada	215,41	2.364
32	2.588	9/27/2010	Healthcare	Germany	18,15	0.042
33	-0.732	9/24/2010	IT	United Kingdom	176,84	0.002
34	0.995	9/13/2010	Materials	United Kingdom	164,79	0.394
35	0.153	08.11.2010	Healthcare	United Kingdom	189,07	0.175
36	0.004	7/30/2010	Utilities	United Kingdom	913,05	1.332
37	1.955	7/26/2010	Materials	United Kingdom	163,47	0.394
38	1.636	7/19/2010	Materials	United Kingdom	163,47	0.394
39	0.040	6/28/2010	Utilities	United States and Canada	440,56	0.569
40	-0.413	6/21/2010	Energy	United Kingdom	1847,63	0.508
41	0.092	6/17/2010	Utilities	United States and Canada	427,83	0.566
42	0.334	6/17/2010	Energy	United Kingdom	447,77	0.322

43	-0.027	06.10.2010	IT	United Kingdom	17,81	0.480
44	3.029	06.09.2010	Energy	United Kingdom	11,45	0.019
45	-0.631	06.02.2010	IT	United Kingdom	64,77	0.375
46	-0.340	06.02.2010	Industrials	United Kingdom	138,78	0.756
47	2.340	06.01.2010	Healthcare	United States and Canada	384,33	0.008
48	0.050	5/28/2010	Industrials	United Kingdom	1517,59	0.431
49	-0.026	5/24/2010	Industrials	United Kingdom	357,91	0.934
50	0.385	5/14/2010	IT	United Kingdom	117,62	710.519
51	-0.085	05.03.2010	Utilities	United States and Canada	71,6	0.475
52	0.838	05.03.2010	IT	United Kingdom	208,48	1.791
53	1.281	4/27/2010	Healthcare	United States and Canada	178,75	-5.424
54	1.160	4/23/2010	Industrials	United Kingdom	376,99	0.545
55	2.397	04.09.2010	Healthcare	Germany	17,74	0.033
56	1.319	03.12.2010	Utilities	United States and Canada	25,98	0.708
57	-0.197	2/16/2010	Industrials	United States and Canada	78,22	0.169
58	0.709	02.01.2010	Industrials	United States and Canada	466,75	0.395
59	0.147	01.08.2010	Industrials	United States and Canada	133,04	0.054
60	0.287	01.08.2010	Industrials	United States and Canada	494,72	0.057
61	0.627	11/16/2009	Utilities	United Kingdom	337,48	2.885
62	0.484	11/16/2009	Industrials	Germany	115,76	0.394
63	0.022	11.10.2009	Utilities	United Kingdom	747,45	4.041
64	1.284	10.07.2009	Utilities	United Kingdom	42,73	1.791
65	1.044	10.06.2009	Utilities	United Kingdom	42,73	1.791
66	0.334	08.12.2009	Energy	United Kingdom	69,3	0.091
67	-0.407	7/13/2009	IT	Germany	364,44	0.144
68	-0.425	07.10.2009	Energy	United Kingdom	516	1.096
69	-0.427	07.10.2009	Energy	United Kingdom	621,09	0.910
70	3.507	07.03.2009	IT	Germany	116,65	0.049
71	0.298	06.05.2009	Healthcare	United Kingdom	49,5	0.245
72	-0.160	5/26/2009	Energy	United Kingdom	2156,87	0.187
73	0.688	05.10.2009	Utilities	United Kingdom	3404,92	0.112
74	3.832	05.08.2009	Healthcare	Germany	432,95	1.644
75	0.309	05.08.2009	Healthcare	Germany	82,28	3.425
76	-0.237	4/23/2009	Energy	United Kingdom	2291,3	0.187
77	-0.426	3/27/2009	IT	Germany	310,86	0.460
78	1.426	1/30/2009	Healthcare	United Kingdom	25,39	0.178
79	-0.474	1/22/2009	IT	Germany	140,41	1.737