Estimating the equity premium for non-listed firms using the acquisition multiple approach

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ABSTRACT

Corporate finance boutiques, transaction services and valuators often struggle with the valuation of non-listed firms. Almost 99% of the companies is not listed and the well-known valuation method (DCF) is based on principles which are only available for listed firms. Namely, the determination of the cost of equity and with this also the discount rate for non-listed companies, because there is no stock price information available for non-listed firms. Due to the fact that there are additional risks for investments in non-listed firms, practitioners often use the small firm premium (SFP) to overcome this issue. However, the SFP is only based on the size of the company and its existence is heavily debated in literature. This research discusses four different methods to analyse the premium for non-listed firms and uses the acquisition multiple approach to estimate it (also mentioned in literature as the private company discount). Evidence provided in this study shows the existence of the non-listed firm premium based on three different acquisition multiples (5.33% EBITDA-multiple, 19.32% EBIT-multiple and 13.71% Sales-multiple). In order to compare non-listed and listed firms, this study matches listed firms based on size, industry and timeframe. The study also explores the effect of different firm characteristics, such as size, leverage, growth rate, financial/strategic motive and if it is an cross-border acquisition.

Keywords: Valuation, Non-listed firm premium, Small firm premium, Acquisition multiple approach, Firm characteristics

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1. INTRODUCTION

The aim of this research is to make recommendations to KroeseWevers Corporate Finance to provide insight in their current valuation procedure, more specific the determination of the cost of equity for non-listed firms.

Where most literature is focussed on large companies (Koller, Goedhart, Wessels, 2010), which are often listed firms, this research is focussed specific on non-listed firms. Almost 99 percent of the total businesses in the Netherlands can be categorised as SMEs. These account for more than 60 percent of the added value and 70 percent of the total employment in the Netherlands (MKB service desk, 2017).

For mergers and acquisitions, firm valuation plays an important role. Company valuation is about the process in which the economic value of a company is determined. This deal value is used as a starting point and to substantiate the transaction price for a company. Every firm investment involves a certain risk; the more risk there is, the higher the required return on an investment.

Valuators often struggle with the valuation of unlisted companies. The valuation is often subjective and covered with assumptions, estimations and industry averages. The process of valuing private companies is the same as that of valuing public companies, where a valuator evaluates future cash flows and discounts them to a present value. Discounting is the process of determining the present value of a payment or a stream of payments that is to be received in the future. The higher the discount rate, the lower the value of future cash flows. Therefore, determining a suitable discount rate is essential because it can significantly affect the business value.

The Nobel Prize winning model of Sharp, the capital asset pricing model (Sharpe, 1964; Lintner, 1965) is widely used in estimating the discount rate, often referred to as the cost of capital. However the capital asset pricing model (CAPM) consists of assumptions based on historical stock price information. The question that arises both in literature and in practice is whether this historical information is still the most appropriate measure to discount future cash flows. For non-listed companies, this stock price information is not available and comparable listed companies are often used as a reference.

However, there are additional risks for investments in non-listed companies, which are not included in the capital asset pricing model, such as the illiquidity factor of shares. Several studies (Block, 2007; Koeplin, Sarin & Shapiro, 2000) show that an additional return requirement is needed to determine the cost of equity for privately-held firms. Since there is no consensus how to apply the equity premium for non-listed firms, practitioners use often a Small Firm Premium (SFP) as an additional return requirement. It is a practical application for the extra risk premium that investors demand if investors invest in relatively smaller companies, since the marketability of these shares are less liquid, often called the illiquidity of the shares (Brown, Kleidon and Marsh, 1983). However, it raises the question if the SFP can be applied for non-listed firms, since the determinants for a non-listed firm premium could differ from the determinants of the SFP. Existing literature did not succeed in providing a model which factors determine the equity premium of non-listed firms. Therefore, this research will identify the determinants of the non-listed firm premium and make a comparison with the SFP.

What can be stated is that non-listed firms are bearing more risk due to the illiquidity factor of this investment. This factor is also called the discount lack of marketability (DLOM; Canadas and Ramirez, 2011). Although it is uncertain if the equity premium for non-listed firms only is determined by the DLOM, this research will identify differences in multiple firm characteristics and analyse if these factors affect the equity premium of non-listed firms.

In order to identify the existence of the non-listed firm premium, literature provides several models how to measure this premium and analyses the validity and range of the non-listed firm premium. Within this research the range of the non-listed firm premium will be measured among different sizes of companies and different industries. In order to measure this equity premium, the validity of several approaches will be assessed how to measure the equity premium for private-held companies.

To measure the range of the non-listed firm premium, this research has a specific focus at the acquisition multiple approach (Koeplin, Sarin, & Shapiro 2000). It will be examined how the acquisition multiple approach distinguishes itself from the other approaches, which try to explain the non-listed firm premium. Since there are not conducted many studies on the acquisition multiples approach and often executed with relatively small sample sizes, the external validity of these studies could be questioned. Therefore, this research will use a larger

dataset with an extended timeframe. Since larger datasets provide more accurate mean values, identify outliers that could skew the data in a smaller sample and provide a smaller margin of error.

This leads us to the central question which consists of two parts. Namely estimating the existence of the non-listed firm premium by using the acquisition multiple approach and the effect of firm characteristics within the non-listed firm premium:

To what extent is the non-listed firm premium measurable by using the acquisition multiple approach and to what extent is this influenced by different firm characteristics?

Sample, main results and contributions

In order to conduct this research, the Thomsons One database is used which consists of 28.000 non-listed and 8.000 listed acquisitions and is retrieved during the period 1985 till 2019. By determining the minimal required information of an acquisition and matching these non-listed to listed firms, this research comes up with 2,463 non-listed transactions matched with listed firms. The main result of this research is the documentation of the existence of the non-listed firm premium with a large dataset. On average non-listed firms have an equity premium of 5.3% based on the EBITDA multiple, 19.3% based on the EBIT multiple and 13.7% based on the sales multiple.

This research has an academical contribution by conducting a research with a sufficient dataset due to the high number of firm transactions, where other researches (Koeplin, 2000) do have a smaller dataset. Another contribution is the exploration of several determinants of the non-listed firm premium, such as size, share illiquidity, asset illiquidity and information asymmetry. This research has a specific focus at the different firm characteristics in relation to the non-listed firm premium. The regression results show that the size of the firm and if the acquirer has a strategic motive reduce the non-listed firm premium.

The influence of these firm characteristics give an extra insight for practical valuators who struggle how to value a non-listed firm. The type of industry plays a role in the level of the non-listed firm premium, which partially can be explained by the share and asset liquidity of a firm.

Research overview

The first chapter of the literature review will shortly elaborate the effect of the cost of equity on the firm's value and describe the traditional manner how to estimate the cost of equity

according to the Capital Asset Pricing Model (CAPM). Also the constraints of the CAPM will be analysed.

The second chapter of the literature review will analyse the non-listed firm premium. At first, the non-listed firm premium will be introduced and will be compared with the SFP. The third chapter of the literature review will elaborate on the small firm premium. Firstly, the SFP in relation to the CAPM will be analysed. Next, the validity of the SFP will be investigated throughout a review of several studies (Banz, 1981; Keim, 1983; Lakonishok & Shapiro 1986; Lamoureux & Sanger; Famma & French 2004).

Furthermore this chapter will discuss four different methods how to determine non-listed firm premium within the cost of equity. These approaches are the IPO method of Emory (2002). The second study is the option pricing model (Chaffe, 1993), the restricted stock approach (Silber 1991; Johnson, 1999) and finally the relatively new approach which uses acquisition multiples in order to determine the non-listed firm premium.

On the foundation of the literature review and the acquisition multiple approach, six hypotheses are constructed, which try to prove the existence of the non-listed firm premium and try to explain the role of firm characteristics within the non-listed firm premium. The methodology how to test these hypothesises is elaborated in chapter four, where chapter five and six will discuss the main findings and give the concluding remarks.

2. LITERATURE REVIEW

2.1 Firm valuation

This chapter will shortly introduce the most common way how practitioners determine the value of a company or business unit and which theories are taken into account to come to a certain value. Firstly, this chapter will shortly introduce the discounted cash flow (DCF) method in order to understand the importance of the discount rate.

2.1.1 DCF method

The discounted cash flow method is a well-known and accepted method for valuing companies. According to Koller et al (2005) the discounted cash flow is considered to be the most accurate and flexible approach in order to value a business. Since this study does not focus on the valuation methods, only the DCF method will be elaborated.

In contrary to other valuation methods (e.g. the multiple approach), the method of the DCF is based on future cash flows. The discounted cash flow depends on a basic connection between the present value and the future value. The core elements of this model are risk, cash and time.

Damodaran (2016) defines the discounted cash flow valuation method as following; "In discounted cashflows valuation, the value of an asset is the present value of the expected cashflows on the asset, discounted back at a rate that reflects the riskiness of these cashflows" (Damodaran, 2016, p. 10)

In the DCF method, the forecasted cash flows of each period are assessed separately and divided by a discount rate, which will be discussed in the next paragraph. The basic formula of the discounted cash flow model can be displayed as:

$$NPV(1,n) = \sum_{t=1}^{t=n} \frac{CF_1}{(1+k)^t} + .. + \frac{CF_n}{(1+k)^n}$$

Where:	$NPV(1,n)$	= Net present value of the cash flows in years $(1,n)$
	CF_1	= Cash flow in the first year
	CF_n	= Cash flow in the final year
	k	= Discount rate

2.1.2 Discount rate

In order to use the DCF method for valuing a business, the discount rate has to be determined. As explained in the former paragraph, there are different assumptions and discount rates among several DCF methods. Within this chapter the weighted average cost of capital (WACC) is used to elaborate on the relation between cost of equity and valuations. Other DCF methods use directly the (un)leveraged cost of equity.

Koller et al (2010) defines the WACC as following: "The weighted average cost of capital represents the opportunity cost that investors face for investing their funds in one particular business instead of other with similar risk" (Koller et al, 2010, p. 235). This statement indicates that the WACC is related to the opportunity costs of facing an investment risk. This relation between risk and return will be explored in the following paragraph.

The definition of Damodaran is more detailed: "The cost of capital, in its most basic form, is a weighted average of the costs of raising funding for an investment or a business, with that funding taking the form of either debt or equity" (Damodaran, 2016, p. 2).

As already stated by Damodaran, the discount rate consists out of two components. Firstly the cost of debt, if the company is to a certain amount leverage financed. Secondly, the cost of equity. These two components determine the discount rate. In this research leverage will not be incorporated and a constant discount rate is assumed in order to focus on the concept: the equity premium for non-listed firms.

2.1.3 Cost of equity

There are several methods developed how the measured risk for investing equity capital can be converted into a premium, called the cost of equity. The most frequently used model is the capital asset pricing model (CAPM) (Sharpe, 1965). The CAPM describes the relationship between systematic risk and expected return for assets. The formula of the CAPM is presented below:

$$r_e = r_f + \beta * (r_m - r_f)$$

re	=	cost of equity
rf	=	risk-free rate of interest
rm – rf	=	market risk premium
β	=	market risk or correlation of expected excess asset return to expected excess market return.

2.1.4 Limitations of the CAPM

Since the Nobel prize winning theory of the CAPM can be seen as the most used model in order to derive the equity costs for more than fifty years, it could be stated that this model is a respected concept. However, there are some drawbacks while using the CAPM model. This paragraph will shortly elaborate on the main issues regarding this model.

An assumption of the CAPM is that unsystematic risk can be diversified away. Spreading out the invested capital in a diversified portfolio, investors can minimize the unsystematic risk of a stand-alone investment. However, practice shows that investors often do not diversify in a planned manner. Also the Beta of an asset may not reflect the true risk involved. The Beta may not be reflective for risks in the future (volatility), since it is based on the past performance of the asset. (Blume and Husic, 1973)

Another limitation mentioned in literature is that the CAPM model could be considered as an over simplified representation that assumes a few unrealistic assumptions like market equilibrium (in the actual stock market overvalued and undervalued stocks are present) and investors rationalism. However, investors do not always invest rationally, which implicates that the emotional factors do play a role in investment decisions (Lakonishok, Shleifer, Vishny, 1994). An example of these emotional effects are hype cycles like the 'dot-com bubble' in the period 1995 -2001.

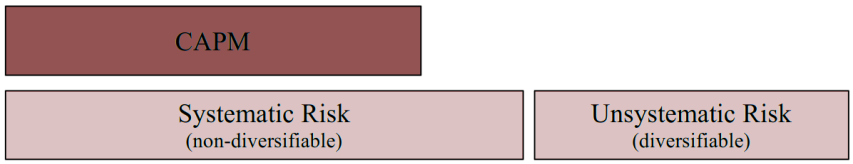

Figure 2.1, Visualization of total risk covered by CAPM

As figure 2.1 visualizes, the CAPM does not cover the total risk of an asset and therefore the prediction of future values can be volatile, since the total risk of an asset can not be predicted. Despite the constraints of the CAPM, this study agrees with the statement of Koller (2006); until a better model presents itself, the capital asset pricing model still is the best model in order to derive the cost of equity and therefore will be taken as directory in this research.

2.2 The non-listed firm premium

The principles of firm valuations are discussed in the former chapter. These models are primarily conducted for listed companies. However, there are several factors to take into account when determining the value of non-listed firms. This chapter will give an insight in which factors do cause the difference between the value of public (listed) versus private firms (non-listed), which is called in literature the private company discount (PCD), first mentioned by Koeplin et al (2000).

Private companies differ in many aspects, such as the level of risk, the capital structure of a firm, the growth rate, the size of the company and the liquidity of the shares. A discount is applied for firms to account for these differences when valuing a non-listed firm (Koeplin et al, 2000).

2.2.1 Illiquidity of shares

Literature stated that liquidity of stocks could be seen as the most prominent factor in the non-listed firm premium, since the shares of unlisted companies are illiquid in comparison to the shares of public firms. Illiquidity can be explained as the time required to sell an asset, and the difficulty level of selling an asset without having a significant loss in value. (Pratt, Reilly, Schweihs, 2000, p.393). For an asset of a publicly-held company it is relatively easy to sell their shares on a ready market, in comparison to privately held firms for whom there is no public market which connects the buyers and the sellers of private stock (Koeplin et al, 2000). Therefore it is considered to be tough in order to find potential acquisition candidates, who are willing to pay the true value of this stock. A result of that is that assets which are rarely traded and therefore need to identify potential investors and negotiate about the price of the stock, do often have a relatively large difference between the offered price and the ask price. The task of identifying potential buyers and negotiating about a deal leads to a certain amount of transaction costs, which indicates that these transaction costs are one of the determinants of the non-listed firm premium.

2.2.2 Firm characteristics in relation to the non-listed firm premium

In the article of Hertzel & Smith (1993), they stated that next to the liquidity factor, there are other unexplained factors which affects the non-listed firm premium. However it remains unclear which factors play a role in the non-listed firm premium. Matthews and Patterson (2016) stated that the existence of the illiquidity factor could be disputed: “A basic

misconception regarding private-company valuations must be addressed. To the extent that there is a private-company discount, it derives not from the fact that its shares are not traded in a public market but, in fact, from the characteristics of the company". This article mentions various firm characteristics of non-listed firms which influence the discount factor. The mentioned characteristics are size, dependence on key man, diversification, quality of earnings and quality of financial reporting.

2.2.2.1 Size

The effect of size in relation to the level of risk is also covered by the small firm premium (SFP) (see chapter 2.3). Size could be considered as the collective term for two kinds of aspects which could influence the riskiness and therefore the value of the firm. Firstly, it partly covers the illiquidity risk of a relatively small firm, which is explained in chapter 2.3.1. It can be stated that the illiquidity factor of shares plays an important role in valuing small firms and non-listed firms. Damodaran (2015) stated that non-listed companies are the least liquid form of assets. Secondly, next to the illiquidity factor of shares, size has an effect on the firm characteristics which could influence the riskiness of a firm. These characteristics are also mentioned by Matthews and Patterson (2016) as determinants for the non-listed firm premium, hence again small firms and non-listed firms do have interfaces when it comes to risks in relation to valuation.

2.2.2.2 Dependence on key man

In valuation literature the risk of dependence on a key man is also called the key-person discount, which could be defined as "an amount or percentage deducted from the value of an ownership interest to reflect the reduction in value resulting from the actual or potential loss of a key person in a business enterprise" (Harter, 2017, p. 3). Since non-listed companies are more often dependent on strategic persons in the organization. The knowledge, network, or other capability of this strategic person could harm the company when this person drops out. However, not every non-listed company bears from the risks on key person dependency. In order to measure the key man dependency, six areas must be taken into account: 1. The management and leadership skills in relation to the operating activities, 2. Dependency of the relationship with key-suppliers, 3. Dependency of the relationship with customers, 4. Ability of the key-person in relation to innovation, 5. Ability of key-person to obtain financial resources, 6. Employee loyalty in relation to key-man. (Harter, 2017). Hence, it could be stated

that analysing the risk of dependency on a key-person, is hardly to measure and is often subjective.

2.2.2.3 Quality of financial reporting

Another determinant of the non-listed firm premium is the aspect of information asymmetry due to the quality of financial reporting. Which could be explained as the reflection of the companies reported earning in comparison to the actual earnings and the extent to which future earning could be predicted. The higher the quality of the reported financials, the less risk the investor has, since the predictability of earning back their investment is more certain (De Franco, Gavious, Jin, Richardson, 2011; Elnathan, Gavious and Hauser, 2010). Therefore the evaluation of earnings could be a crucial factor in the non-listed firm premium, since listed companies need to meet higher standards in comparison to unlisted firms, which could report their key performance indicators (e.g. net income and operating income) in a different way. With the result that information asymmetry could prevail, since the owners/management of a certain unlisted firm has a deeper knowledge about the actual results than a potential investor. A due diligence research is often executed in order to minimize this information asymmetry, however this often does not meet the level of reporting quality for a listed firm and does lead to an extra amount of costs. The information asymmetry could be reduced in two manners. Firstly, improve the quality of financial reporting by hiring a more respected auditor (De Franco et al, 2011). Secondly, Hertzel & Smith (1993) stated that the information asymmetry is affected by the kind of buyer. Management buy-ins should be associated with lower discounts since managers should incur lower information cost, while foreign buyers or financial institutions do have relatively high level of information costs, when investing in non-listed companies. Within this research a division is made in financial and strategic investors. These two types of acquirers will be analysed in relation to the non-listed firm premium.

2.2.2.4 Quality of earnings by diversification

Matthews and Patterson (2016) does mention other firm characteristics which could play a role in the valuation of non-listed firms. These are the quality of earnings and the diversification in product lines, suppliers and customers. Since non-listed firms are often smaller than listed firms, non-listed firms tend to diversify less and bear more risk of being dependent on a product line, key supplier or customer. If one of these vanishes, the relatively less diversified firm could be more harmed than a well-diversified firm. However according to Ushijima (2016) the effect of diversification on firm value has been an intensely debated issue

in finance. Multiple studies find that diversified firms trade at a discount, due to the inefficiency factor caused by diversification (Berger & Ofek, 1995; Lang & Stulz, 1994). Hence, the effect of non-listed firm diversification in relation to the valuation remains unclear.

2.2.2.5 Financial leverage

Another factor which could influence the non-listed firm premium are the financial characteristics of a company. The studied performed by Brav (2009) elaborates on the fact that non-listed firms do have 50% higher leverage ratio's on average, in comparison with listed firms. Non-listed companies face a relatively higher cost of equity compared to the cost of debt capital, which result into higher debt ratios (leverage) for these firms. The other observation within the study of Brav (2009) is that non-listed firms do have less access to other sources of financial capital. The relatively high level of debt and the reduced accessibility of financial resources lead to a higher risk of financial distress (Anagnostopoulou, 2011). This is in line with the research of Andrade & Kaplan (1998), who stated that the most common factor leading to financial distress are the high leverage levels within a firm. If a firms assets are more easily to be liquidated, the risk of financial distress tend to be lower. The industry where a company operates in, could affect the level of asset liquidity and therefore has an effect on the level of financial distress. This brings us to the last observed characteristic, which could influence the non-listed firm premium.

2.2.2.6 Industry characteristic

Liquidity of shares differs per industry. In some industry segments, there are more mergers and acquisitions than others. This indicates that some industry segments are more liquid than others. Schlingemann, Stulz, & Walkling (2002) constructed a model how to measure liquidity of a certain industry, called the liquidity index. Within this concept the value of all transactions in an industry segment is divided by the total book value of the particular industry segment.

Another aspect within the industry characteristics in relation to the non-listed firm premium is that the asset structure of a company differs between the industry segments. Some industry segments are more easily to liquidate than firms in other industry segments, which indicates that the risk for investors is higher when the assets are less liquid. Silbikov (2009) stated in his research that the costs for less liquid assets are much higher.

These two factors within industry segments lead to differences within the non-listed firm premium. This is in line with the study of Shleifer & Vishny (1992). Block (2007) stated in his

study that it would be incorrect to use the same discount in every industry segment, since the risk premium per industry in terms of liquidity could differ significantly.

2.2.3 Concluding remarks on the determinants of the non-listed firm premium

Since there is not much research done about the non-listed firm premium and the research of Matthews and Patterson (2016) is published by a practitioner oriented journal, this research elaborates on the different firm characteristics in relation to the non-listed firm premium. The size of this premium and the effect of these characteristics need to be further investigated, which will be done in this research. However it can be concluded that there are more determinants which influence the discount in value of a privately-held company than only the share liquidity. This is also in line with the statement of Mukesh, Denis, Ferris, & Sarin (2001), who concluded in their research that the discrepancy in valuation between listed and non-listed firms cannot only be explained by the lack of illiquidity of the shares.

2.2.4 Non-listed firm premium in relation to CAPM

Figure 2.2 shows the different components of the cost of equity for privately held firms. As can be concluded, the CAPM-model does not cover the risk premium of privately held companies, nor other unsystematic risks. Next to the Risk-free rate, the Beta and the Equity premium, the non-listed firm premium rate consists of certain risks due to the privately-held structure. As discussed in this chapter, there are several determinants where the non-listed firm premium consists of. The role of these specific determinants need to be further investigated. This research will analyse the impact of this premium and how this premium could be measured and analyse the specific drivers of the non-listed firm premium.

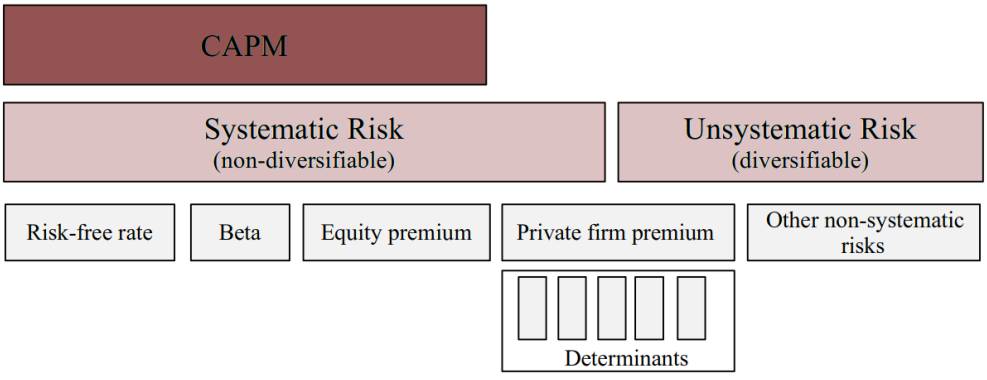

Figure 2.2, Components of the cost of equity, based on the literature review

2.3 The non-listed firm premium versus the small firm premium

Since there are multiple unknown factors regarding the non-listed firm premium, practitioners often add a small firm premium to the cost of eqity of privately-held companies in order to determine the value. The small firm premium (SFP) does have similarities while comparing it with the non-listed firm premium, however it cannot be treated as equal.

2.3.1 The small firm premium

The SFP is relatively easy to measure, since it compares the share prices of smaller and larger firms, which are publicly available. According to Barry & Brown (1984) the availability of information is less for smaller companies in comparison to large companies, which lead to a higher risk perception for the stock of small firms.

In the study of Amihud et al. (2005) it is shown that the illiquidity factor of shares within small firms explains a part of the small firm premium. In other words, the marketability of shares within small firms is decreased, which lead to a risk surplus in the cost of equity of relatively smaller firms. This is also confirmed in the research of Brown et al. (1983), since investors demand a premium to invest in stocks that are less liquid. In the study of Brown et al. (1983) it is also confirmed that stocks with a relatively higher level of illiquidity are relatively smaller firms.

2.3.2 The existence of the SFP

However the application of the SFP to the cost of equity is not undisputed in the literature. Several researches do not find the appearance of a SFP after 1980 (Doeswijk 1997, Dichev 1998) when measuring the stock prices of smaller and larger enterprises. Peek (2016) argues that the SFP only affects the micro firms and it cannot be observed when removing these firms. Also a constant SFP within the cost of equity does not reflect the differences between firms accurately (Damodaran, 2012).

Author	Year	Period	Size premium	Country	Existence
Banz	1981	1926 - 1975	0.4 %	US	Yes
Reinagnum	1981	1963 - 1977	1.8 %	US	Yes
Keim	1983	1963 - 1979	2.5 %	US	Yes
Levis	1985	1958 - 1982	0.4 %	UK	Yes
Lakonishok and Shapiro	1986	1962 - 1981	-	US	Yes
Chan and Chen	1991	1956 - 1985	1,0 %	US	Yes
Fama and French	1992	1963 - 1990	0.6 %	US	Yes
Doeswijk	1997	1976 - 1994	-	NL	No
Dichev	1998	1980 - 1995	-	US	No
Dimson and March	1999	1988 - 1997	-	UK	No
Chan, Karceski, and Lakonishok	2000	1986 - 1998	-	US	No
Horowitz, Loughran, and Savin	2000	1980 - 1996	-	US	No
Schwert	2003	1982 - 2002	-	US	No
Fama and French	2006	1955 - 2004	-	US	No

Table 2.3, Overview of studies related to the small firm premium

2.3.3 Concluding remarks on the SFP in relation to the non-listed firm premium

The SFP can be seen as a practical application which takes into account several complementary risks of non-listed companies such as specific risks for a company or industry, concentration risks that are the result of poor diversification and liquidity risks that lead to the inability to convert to cash for investments. The small firm premium strongly depends on the level of liquidity and the size of a firm (Damodaran, 2015). These factors play also a crucial role in the valuation of private companies, although there are other factors which influence the equity premium in non-listed firm valuations. Next to this, private companies need to be considered as the least liquid stocks, which indicates the illiquidity factor of the SFP can often not be compared to the illiquidity factor of non-listed firms (Damodaran, 2015).

2.4 Various methods to measure the non-listed firm premium

As can be concluded from the former chapter, the small firm premium does not include the whole premium for unlisted firms and can therefore not be applied when valuing non-listed companies. Literature provided us with several approaches in order to measure the non-listed firm premium. The four identified approaches are the restricted stock approach, the initial public offering approach, the options analysis and lastly the acquisition multiple approach. Some approaches do have a focus on specific events and could therefore be seen as incomplete, since some approaches do not contain all the aspects mentioned in chapter 2.2. This chapter will give a background to the four mentioned approaches.

2.4.1 Initial Public Offerings (IPO) approach

The first approach in order to measure the non-listed firm premium, is the Pre-IPO approach conducted by John D. Emory (2002). In his paper he covers different time periods, starting around 1980 till 1997. The different periods with the different sample sizes are reproduced in table 2.4.1.

Emory (2002) has excluded several firms based on the following assumptions. Companies which are in the development stage are not taken into account. This also counts for companies with a history of real operating losses. Companies do also need to have an IPO price higher share price than $5. Lastly, next to foreign companies, banks and investment trusts are also not taken into account. In order to analyze the discount for lack of marketability, Emory (2002) measured the IPO price and the price of which the latest private transaction took place up to five months prior to the IPO. Table 2.4.1 shows the results of Emory (2002), which indicates that the price discount for Pre-IPO transactions can be explained by the risk premium due to the lack of marketability of the shares in comparison to the IPO price. Emory (2002) reports a median price discount for pre-IPO transactions of 47% during the different studies.

Emory Pre-IPO studies

Period	Nr. of prospectuses reviewed	Nr. of qualifying transactions	Indicated price discount	
			Mean	Median
1980-1981	97	12	59%	68%
1985-1986	130	19	43%	43%
1987-1989	98	21	38%	43%
1989-1990	157	17	46%	40%
1990-1991	266	30	34%	33%
1992-1993	443	49	45%	43%
1994-1995	318	45	45%	47%
1995-1997	732	84	43%	41%

Table 2.4.1, Pre-IPO studies done by Emory (2002)

Disadvantages of the Pre-IPO approach

There are several issues while using the Pre-IPO approach in order to understand non-listed firm premium. This approach only measures the illiquidity factor of the shares, namely the discount lack of marketability. However the illiquidity factor does not contain the whole non-listed firm premium, as discussed in chapter 2.3. e.g. the dependency of a key man is not

measured in the pre-IPO approach. Another disadvantage of the Pre-IPO approach is that there are just a few studies based on this approach. These studies are not published in the top finance journals. These factors could question the validity of this approach.

2.4.2 Restricted Stock Approach

The restricted stock approach measures the discrepancy of the price, at which a particular firm issued restricted stock and the publicly traded price of the same firms non restricted stock. The discrepancy between the two share prices represents the liquidity premium of these particular stocks. The definition of restricted stock are shares that are issued by a publicly traded firm with certain restrictions which prevents the resale of the shares. Different regulations proscribe a term of holding in which it cannot be sold publicly by the shareholder of the restricted share. After a certain time this holding term expires. The former restricted shares can now be traded at public markets, only by measuring up to a selling quota, which hinders the shareholder to sell all the restricted stocks in a short period (Silber, 1991). Different studies considered this restriction as a illiquidity premium which can be compared to the illiquidity premium of non-listed firms.

Empirical Study	Years Covered in Study	Number of Transactions	Average Price Discount (%)
SEC overall average (a)	1966-1969	398	25.8
SEC nonreporting OTC companies (a)	1966-1969		32.6
Gelman (b)	1968-1970	89	33.0
Trout (c)	1968-1972	60	33.5
Moroney (d)	N/A	148	35.6
Maher (e)	1969-1973	33	35.4
Standard Research Consultants (f)	1978-1982	28	45.0
Willamette Management Associates (g)	1981-1984		31.2
Silber (h)	1981-1988	69	33.8
Management Planning, Inc. (i)	1980-1996	53	27.1
FMV Opinions, Inc. (j)	1980-1997	230	22.3
Bruce Johnson (k)	1991-1995	70	20.0
Columbia Financial Advisors (l)	Jan 1996-April 1997	23	21.0

Table 2.3.2, Restricted stock studies retrieved from the literature study of Pratt et al. (2000)

Pratt, Reily and Schweihs (2000) did a literature research where they come up with twelve different restricted stock studies in a timeframe of 1966 till 1997. These studies indicates that there is risk premium for restricted stock which result into a price discount. The different studies come up with an average price discount with a range of 20,0% to 45,0%.

The changes in regulation has led to a smaller price discount. Since the illiquidity is reduced

trough an adjustment in the waiting period for the resale of the restricted stock. In the old situation, it was mandatory to wait for two years in order to sell these shares, but later it is changed to one year. According to the study of Trout (1972) and Moroney (1973) the size of the illiquidity discount is influenced by firm characteristics and industry characteristics. Also the range of the discount appeared to be surpassing when the private placement grows in terms of percentual shares outstanding (Silber, 1991).

Disadvantages of the restricted stock approach

The largest drawback is that the restricted stock approach assumes the total price difference between the price of the restricted stock versus the stock price which is publicly traded, can be explained as the liquidity factor. However there are more factors which influence the gap between these stock prices. Firms often deliberately underprice private offerings for multiple reasons. It could include a compensations for future services and it is a manner to pay for services rendered and reward stakeholders by deliberately underprice these restricted stocks.

Another disadvantage of the restricted stock approach is the relatively small sample sizes of these studies, since a large share of the studies does not contain more than hundred transactions. This could questioning the validity of the results measured. Also the most part of these studies are not published in top finance journals

2.4.3 The option approach

An option is the right to buy or sell a quantity of securities, such as shares, within a certain period at a previously agreed price. Options are traded on the stock exchange. When writing a put option, which gives the shareholder the right to sell, the marketability of that particular share will increase. Since the shareholder has an option to sell the share, which could be a relatively illiquid asset. For this reason, the price of a certain option represents the discounted lack of marketability (DLOM), since the shareholder has purchased marketability for the shares according to Chaffe (1993). Hence the price of the put option represents the level of illiquidity, the higher the price of the put option, the less liquid that particular share tends to be.

In literature this research analyzed four different studies which uses the option approach. The discounts related to the option approach varies from 20% to 45% in these studies, depending on the different variables which are the fundamentals in a research. These variables are for example the volatility and the maturity of an asset.

Chaffe (1993) was the first study who used the option approach in order to measure the DLOM. This study is based on the Black Scholes Merton (BSM) option pricing model in order to calculate the value of the option. The Black Scholes Merton model consists out of different variables, which are the stock price, strike price, time to expiration, the interest rate, and finally the volatility of an asset. Chaffe (1993) finds a DLOM ranging from 28% to 41% depending on the volatility and the holding time.

Another study who investigates the option approach is the research of Longstaff (1995), which is built on the study of Chaffe (1993). The main differences between these studies are that Chaffe (1993) is based on avoiding losses, while the research of Longstaff (1995) is based on unrealized gains. Also Longstaff (1995) estimates a maximum limit of the DLOM value. According to the study of Longstaff (1995), the DLOM adds up to 65% and is measured by taking the difference between the upper limit and the option's current value.

The option approach of Finnerty (2003) could be considered as a study which is based upon the research of Longstaff (1995). The main difference between these study is that Finnerty (2003) does not assume a that the option holder has no market-timing ability. In order to measure the value the DLOM is used as the average strike put option. Finnerty (2003) finds in his research a discount range depending on the holding period and the volatility of the stock.

The IPO approach gives an insight in the time horizon and the volatility of the security in relation to DLOM. However, it can be doubted if the option approach can be used in order to measure the DLOM. Since option prices are stated, based on the condition of a no arbitrage. The lack of arbitrage opportunities in the market ensures that investors are not able to gain more than the risk-free rate of return by using a combination of leverage, share and option positions (Rotkowski and Harter, 2013). Another disadvantage is, like earlier mentioned, the option approach tends to measure the DLOM. However, the DLOM does not cover the whole non-listed firm premium, since the non-listed firm premium consist of more factors than the DLOM.

2.4.4 Acquisition multiple approach

In literature there are a few studies which use the acquisition multiples approach in order to determine the price discount for unlisted companies. Koeplin, Sarin & Shapiro (2000) is the first study which uses this approach, they found significant evidence that private companies

sell at a discount in comparison to listed firms by comparing earning based multiples, such as the EBITDA-multiple and the EBIT-multiple. Sales based multiples did not give significant differences within this research. Koeplin et al (2000) also stated that the discount is affected by specific characteristics of non-listed companies and that illiquidity of the shares, previously mentioned the DLOM, only partly explains the size of the non-listed firm discount.

The analysis of Kooli, Kortas & L'Her (2003) elaborates on the model of Koeplin et al (2000). All acquisitions of non-listed firms are classified on the base of time, size and type of industry and are paired with listed firms based on these three criteria. The main findings in this research are that the non-listed firm premium varies due to company characteristics like size and industry differences.

The research of Block (2007) extends on the Koeplin analysis and covers a time period of eight years (1999-2006). The study of Block consist out of 91 transactions, which could be considered as a small sample size. He divided these transactions into eight industry types and comes up with a discount of 24.5% based upon an EBITDA-multiple.

Another research on the topic of acquisition multiples is the study of Officer (2006). He measures the discount for stand-alone non-listed firms as well as subsidiaries. In the study of Officer information asymmetry is taken as an control variable. In order to compare listed and non-listed firms, Officer also requires an equal payment method by the acquirer. The main conclusion within this research is that information asymmetry has a positive impact on the non-listed firm premium, though it only explains the equity premium for a maximum of 25%.

Other research done which uses the acquisition multiples approach to calculate the non-listed firm premium is the research of De Franco, Gavious, Jin, & Richardson (2011). Within this research a remarkable finding is done, since they concluded that non-listed companies which were represented by ‘Big4’ auditors during the acquisition process, negatively effects the non-listed firm premium, because the deal value of these non-listed companies were higher than companies who are not represented by ‘Big4’ auditors. Table 2.4.4 describes the different studies which have used the acquisition multiple approach in order to calculate the discount in value of non-listed firms, called in this research the non-listed firm premium.

Study	Year	Period	Observations	Premium based on multiple		
				EBITDA	EBIT	Sales
Koeplin, Sarin and Shapiro	2000	1984-1998	192	21,10%	17,10%	9,80%
Kooli, Kortas and L'Her	2003	1995-2002	331	34,00%-		17,00%
Block	2007	1999-2006	91	22,50%	24,30%	24,50%
Officer	2006	1979-2003	364	17,20%-	-	
Paglia & Harjoto	2010	1993-2008	431	25,00%-		68,00%
Elnathan, Gavious and Hauser	2010	1991-2006	88	21,70%-	-	
De Franco, Gavious, Jin and Rechardso	2011	1995-2004	664	33,30%-		32,80%

Table 2.4.4, Studies on the non-listed firm premium

According to Paglia and Harjoto (2014) a major drawback of the acquisition multiples approach is the lack of sample sizes. The research of Block (2007) and Elnathan et al. (2010) had both a sample size under 100 observations, therefore it is hard to find a good matching pair for acquisitions. However, the major advantage, regarding to the other three approaches, the acquisition multiple approach tends to cover the whole non-listed firm premium instead of only measuring an illiquidity premium.

3. HYPOTHESES

3.1 Introduction of the hypothesises

Based on the fundamental knowledge of literature review, six different hypotheses are constructed in order to analyse the research question consisting out of two different parts. Firstly, the existence and the range of the non-listed firm premium will be analysed, which is covered in paragraph 3.2. On the basis of this first part, the second part of the research question is covered in paragraph 3.3 with the associated hypotheses. Paragraph 3.3 will focus on the characteristics of non-listed firms in relation to the non-listed firm premium.

3.2 Existence of the non-listed firm premium

The first hypothesis tries to answer the first part of the research question and is based on the existing literature. Studies like Koeplin et al (2000), Officer (2006), Block (2007) document the existence of a risk premium for non-listed firms, which lead to a discount in the acquisition multiples of non-listed firms, compared to listed firms (Officer, 2006). The first hypothesis is:

Hypothesis 1: The equity premium for non-listed firms is different compared to that of listed firms.

The reason for this equity premium is twofold: Firstly, there is a lack of marketability which lead to illiquidity of the shares (Koeplin et al, 2000). Secondly, several studies (Kooli et al, 2003) (Block, 2007) state that next to the illiquidity factor, firm and industry characteristics of non-listed firms effect the non-listed firm premium. This hypothesis is the basis of further research about the different firm characteristics in relation to the non-listed firm premium.

3.3 Firm characteristics

Mukesh et al. (2001) concluded within their research that a discrepancy in valuation between listed and non-listed firms cannot only be explained by the lack of liquidity (DLOM). This indicates that there are other (unexplored) factors that increase the level of the non-listed firm premium. For this reason this study will take into account several differences in company characteristics.

3.3.1 Size

The first firm characteristic taken into account in this research is the size of the company (Koeplin et al, 2000). As discussed in chapter 2.3, the SFP is adapted when valuing listed firms, in order to incorporate several small firm risks. However chapter 2.2.2 concluded that the size of the firm could influence the different (private) firm characteristics, such as the risk of losing key persons within the acquired firm, the information asymmetry factor and the quality of earnings. Therefore, the size of a firm tends to have a negative effect on the non-listed firm premium.

Hypothesis 2: Size reduces the non-listed firm premium.

3.3.2 Financial characteristics

The next firm characteristics taken into account in this research which could influence the non-listed firm premium, are the financial characteristics of non-listed firms. Silbikov (2009) stated that non-listed firms tend to have higher leverage ratios in comparison with listed firms, which increases the risk of financial distress (Andrade & Kaplan,1998). Brav (2009) elaborates on the reason why non-listed firms tend to be more leverage. Non-listed companies face a relatively higher cost of equity compared to the cost of debt capital, which result into higher debt ratios (leverage) for these firms. Brav (2009) also states that non-listed firms do have less access to other sources of financial capital and therefore become more leveraged.

Hypothesis 3: Leverage has a positive effect on the non-listed firm premium.

The other financial characteristic is the asset liquidity of a firm. Not to be mistaken with the share liquidity, which is a different concept. Damodaran (2005) stated that some assets like cash & marketable securities, can be easily converted into cash. Silbikov (2009) stated in his research that the costs for less liquid assets are much higher, since investors bear a higher risk of not earning back their investments. Therefore the asset liquidity could influence the non-listed firm premium. This leads to the following hypothesis.

Hypothesis 4: Asset liquidity reduces the non-listed firm premium.

As concluded in the literature review, the asset liquidity is affected by the industry segment where the firm operates in (Shleifer and Vishny, 1992). For liquid assets discrepancy in liquidation value and the going-concern value will be smaller, compared to illiquid assets. Some industry segments are more easily to liquidate than firms in other industry segments,

which indicates that the risk for investors is higher when the assets are less liquid (Silbikov, 2009).

3.3.3 Industry liquidity index

For an asset of a publicly-held company it is relatively easy to sell their shares on a ready market, in comparison to privately held firms for whom there is no public market which connects the buyers and the sellers of private stock (Koeplin et al, 2000). Since in some industry segments are more mergers than in other, there tend to be a discrepancy in share illiquidity within industry segments. In order to measure the share liquidity within a certain industry Schlingemann, Stulz, & Walkling (2002) constructed a model, called the liquidity index. Within this concept the value of all transactions in an industry segment is divided by the total book value of the particular industry segment. By means of this model it is possible to measure the influence of share liquidity on the non-listed firm premium, which leads to the following hypothesis:

Hypothesis 5: Share liquidity of industries reduces the non-listed firm premium.

3.3.4 Information asymmetry & dependency on key persons

As discussed in the literature review, there are additional risks due to information asymmetry (De Franco, Gavious, Jin, Richardson, 2011; Elnathan, Gavious and Hauser, 2010) and the dependency on key persons (Harter, 2017) within the investments non-listed firms. Hertzel & Smith (1993) stated that the information asymmetry is affected by the kind of buyer. The key-person discount (Harter, 2017) could also be reduced if the acquirer is a strategic party, since the risk of losing certain capabilities is less. Hence, the type of investor, within this research strategic or financial, influences the risk of information asymmetry and the dependency on key persons and therefore has an impact on the non-listed firm premium. Therefore, the last hypothesis within this research is:

Hypothesis 6: Strategic buyers reduce the non-listed firm premium, in comparison to financial buyers.

4. DATA AND METHODOLOGY

4.1 Dataset

In order to execute this research, a specific kind of data is needed which is limited available. The database Thomson One is one of the few databases which contains the financial information of listed and non-listed firms, more specific it contains financial details about listed and non-listed transactions. This information makes it possible to investigate the acquisition multiples of these groups.

The database has more than 30 years of data collected and contains information of more than 35.000 acquisitions, from which roughly 75% of these acquisitions are privately held firms. This indicates that the sample size of this research should be sufficient. However the availability data which is required in order to conduct this research, leads to a reduction in the number of non-listed firms (presented in table 4.1). The data used in this research is from 1985 till 2019. Officer (2006) stated that the dataset prior 1985 not gives reliable acquisition data of non-listed companies, therefore 1985 is taken as a starting point. At the end of chapter four the final dataset (after pairing and robustness tests) is published.

Request	Operator	Search criteria	N
Database	Include	All Mergers & Acquisitions	
Deal Value ($ Mil)	Between	0.5 to HI	514.396
Date Announced	Between	01/01/1985 to 01/06/2020	492.045
Target Public Status (Code)	Include	Public AND Private	305.782
Total Assets Last Twelve Months ($ Mil)	Between	0.1 to HI	142.814
EBIT Last Twelve Months ($ Mil)	Between	0.1 to HI	97.070
EBITDA Last Twelve Months ($ Mil)	Between	0.1 to HI	85.255
Percent of Shares Owned after Transaction	Between	50.1 to HI	23.383
Deal status	Include	Completed deals	23.078

Table 4.1, Dataset of acquired firms and search criteria

4.1.1 Data cleaning

In order to get reliable results, which can be used to compare the acquisition multiples of non-listed firms and listed firms, this research has chosen to clean the data in two manners. Firstly the observed acquisitions with the lowest 5% EBITDA-multiples and the upper 5% EBITDA multiples are cleaned out of this dataset. Since the deal value multiples of these acquisitions

do not reflect correctly the financial performance of this firm. This is also done by companies with an EBIT multiple higher than 100 or a sales multiple higher than 25. If this is the case, this study has chosen only to remove the observations of the EBIT-multiple and the Sales-multiple.

4.2 Pairing method to match listed and non-listed firms

This paragraph will elaborate on the applied method how to measure the non-listed firm premium. The Thomsons One dataset consists of transactions including non-listed and listed firms. In order to measure the risk premium of non-listed versus similar listed companies, Damodaran (2012) named three criteria in order to identify matching firms. These criteria are also in line with the studies of Kooli et al. (2003) and Officer (2006). To measure these criteria the non-listed firm is taken as a reference. When a non-listed firm and a listed firm meet these three criteria it is classified as a matched pair of companies. Every non-listed firm needs to have two or more matching listed firms.

4.2.1 Industry criteria

The first criterion is that the non-listed and listed firm requires to operate in the same industry. In order to classify the industry types where an organization operates in, the SIC (standard industrial classification) code will be used. Within this research, 10 general types of industries are classified, based on the first two digits of the SIC-code with the classification provided by the US securities & exchange commission (2019). This leads to the following industry classifications:

SIC-code	Type of industry
01 - 09	Agriculture, Forestry, Fishing;
10 - 14	Mining;
15 - 17	Construction;
20 - 39	Manufacturing;
40 - 49	Transportation & Public Utilities;
50 - 51	Wholesale Trade;
52 - 59	Retail Trade;
60 - 67	Finance, Insurance, Real Estate;
70 - 89	Services;
91 - 97	Public Administration;

Table 4.2, Industry classifications reported by the SEC (2019) based on two digits

The drawback of classifying the industry of a firm based on the first two digits leads to generalizations, since the four digit SIC-code gives a more detailed industry where a firm operates in. However the use of the four digit SIC-code leads to a significant reduction in matching non-listed and listed firms and therefore a significant reduction in the sample size.

4.2.2 Timeframe criteria

The second criterion, in order to classify a non-listed and listed firm as a matching pair, is in line with the criteria used by Kooli et al. (2003). The acquisitions of both firms need to be in a reasonably timeframe, since the (macro-)economic events influences the value of a firm. Within this research is chosen for a three-year timeframe which is allowed in order to be classified as a matching pair.

4.2.3 Size criteria

The third and last criterion is the size of the firm. When there is an discrepancy in size between the non-listed and the listed firm, the transaction value of a firm could be effected due to the effect of size, which is in line with the small firm premium as discussed in the literature review. Within this research a deviation in size, between the non-listed and listed firms up to 25% is allowed in order to be classified as a match. This is in line with the study of Officer (2006), who used a size criterion of 20%. This study uses a slightly higher deviation, in order to create more matches, which lead to a larger sample size. Within this study size is measured by the net sales of a firm.

4.3 Non-listed firm premium

In order to measure the risk premium of non-listed firms, the method of Koeplin et al. (2000) is taken as a basis. Within the Koeplin study, the risk premium for non-listed firms is calculated and could be used as an extra discount after the determination of the firms value e.g. by means of the DCF-method. In order to make it comparable with the Small Firm Premium, within this research the discrepancy in firm value between listed and non-listed firms is seen as a risk premium, which need to be added up in the cost of equity (see figure 2.2) and therefore can be added up in the discount rate. This is in line with the study of Damodaran (2012) who stated that the fact of discounting the non-listed firm premium of the firms value (e.g. determined by the DCF method) should equal when the premium is added up in the cost of equity (e.g. can be used within the discount rate of the DCF formula).

In order to calculate the discrepancy in firm value, actual deal value multiples will be analysed of listed and non-listed firms, which will be further explained in 4.3.2.

Within this research, the average multiple of matching listed firms is used as reference point, which differs from the Koeplin study (2000), where the median multiple of listed firms is used to exclude outliers. However this research wants to address importance of numerical multiples which do not exclude listed firms, who are classified in an earlier stage as a matching company. Next to the data cleaning, these matching firms are already dealt with outliers. This research makes use of two types of formula to investigate the non-listed firm premium. Firstly, the discrepancy of the non-listed firm multiple and the matching average listed acquisition multiple is measured for each observation, which leads to the following formula:

Non-listed firm premium =
(Average listed firm acquisition multiple) – (Non-listed firm acquisition multiple)

This formula has the advantage that it uses absolute values, which is more applicable to analyse the regression results than scaled formulas (see Appendix II for the limitations of the scaled formula). However this research also uses the scaled formula for hypothesis 1, in order to make the non-listed firm premium visual in percentages and to make it comparable with the Small Firm Premium. The scaled formula of the non-listed firm premium is as follows:

$$\textit{Non-listed firm premium} = \frac{\textit{Average listed firm acquisition multiple}}{\textit{Non-listed firm acquisition multiple}} - 1$$

4.3.1 Acquisition multiples

This research will apply three different acquisition multiples: deal value of an acquisition divided by the EBITDA, deal value divided by the EBIT and lastly the deal value divided by net sales. Since these values often are used as a performance indicator in order to determine the value of a company. By using these different acquisition multiples, the non-listed firm premium can be analysed by means of the above mentioned deal value multiples. In order to use these acquisition multiples it is important to elaborate on the definition of deal value. According to Koeplin et al. (2000) the deal value could be defined as the number of actual target shares outstanding multiplied by the offering price, including the book value of the total debt and subtracting the value of all cash equivalents. Deal value could next to the enterprise

value be seen as a measure of a firm's total value. This leads us to the three different acquisition multiples used in this research:

Deal Value / EBITDA
Deal Value / EBIT
Deal Value / Net Sales

4.4 Type of analysis

The non-listed firm premium of each pair of non-listed and listed firms will be tested by conducting bi-variate analyses (two sample t-test of non-listed and matching listed acquisition multiples) and multivariate analyses (regression based on the non-listed firm premium). Firstly, this research will elaborate on the regression formula and the used variables.

The previously discussed hypothesises lead to the following regression formula:

$$\textit{Non-listed firm premium}_j = \beta_0 + \beta_1 * \textit{Size}_j + \beta_2 * \textit{Leverage}_j + \beta_3 * \textit{Asset Liquidity}_j + \beta_4 * \textit{Share Liquidity}_j + \beta_5 * \textit{Type of Buyer}_j + \beta_n * \textit{Control Variables} + \sum_{i=1}^{9} \delta_i * \textit{Industry}_i + \sum_{t=1985}^{2019} \emptyset_t * \textit{Year}_t + \varepsilon_j$$

4.4.1 Type of variables

The non-listed firm premium is the dependent variable and the structure of this premium is extensively discussed in chapter 4.3.

Non-listed firm premium:	(Average listed firm acquisition multiple) – (Non-listed firm acquisition multiple) *(EBIT, EBITDA and Net Sales)*

The independent variables used to measure the non-listed firm premium and how this variable can be tested is described below:

• Size:	Net Sales
• Leverage:	Book value of total debt / Total Assets
• Asset Liquidity:	Current Assets / Total Assets
• Share Liquidity:	Transaction value of an industry / Total assets of an industry
• Type of Buyer:	Dummy variable: 1 = strategic buyer / 0 = financial buyer
• Industry Type:	The different types of industry where a firm operates in (3.1.1)

Control variables used in this research are:

• Growth rate:	Cumulative growth in net sales three years prior to the acquisition
• Profitability:	EBITDA / Net sales
• Non-listed acquirer:	Dummy variable: 1 = acquirer is non-listed / 0 = acquirer is listed
• Target and acquirer in same Industry:	Dummy variable: 1 = Yes / 0 = No
• Cross border:	Dummy variable: 1 = Yes / 0 = No

Appendix I gives the result of the correlations between the independent variables. As can be concluded there is no correlation between the independent variables since the values of the Pearson Correlation test varies between -0.45 and 0.3.

4.4.2 Paired T-test

In order to analyse the different hypotheses, this paper will use bi-variate and multivariate analysis. Univariate involves the analysis of a single variable, which is applicable for hypothesis one. Since the first hypothesis this research analyse the centre of the distribution. This is done by conducting a paired t-test in order to analyse the mean of the dependent variable, the acquisition multiples of non-listed companies and acquisition multiples of publicly traded companies. By using the paired t-test we analyse if the acquisition multiples of non-listed firms are statistically different compared to the acquisition multiples of listed firms, which indicates if there is a non-listed firm premium.

4.4.3 Ordinary Least Squares

For hypothesis two to six multivariate analysis is chosen since it examines two or more variables. Most multivariate analysis involves a dependent variable and multiple independent variables. In order to test hypothesis two to six, it is required to know if the impact of the different firm characteristic variables on the non-listed firm premium is statistically significant. The method used to measure this outcome, will be the OLS (ordinary least squares) method. OLS-regression is a statistical method of multivariate analysis that can estimate the relationship between the dependent variable and one or more independent variables. Other studies (Kooli et al, 2003; Block, 2007) use quantile regression in order to cope up with the problem of having outliers in their data set. However, this research has set several criteria in

order to match with a non-listed firm. Since the pairing selection are already dealt with outliers and the data is cleaned, there is no need to use the median and quantile regression.

4.5 Robustness tests

Within this research the independent variables will be tested on multicollinearity, which means that the between variables by looking at the correlation between all the variables that are included in the various regressions.

Another topic which is could influence this research is heteroscedasticity. The problem arises when the variability of a variable is unequal across the range of values of an independent variable (the predictor). This problem can be prevented by applying robust standard errors within the ordinary least squares regression model.

The following challenge to be dealt with in this study is serial correlation. This issue occurs in time-series studies when the errors associated with a given period carry over into future periods. The effect of this is that the standard errors can be biased and makes the model less efficient. By adding dummy variables of specific industries and specific years when an acquisition took place, this research controls for serial correlation.

Because of the pairing selection, this research already dealt with outliers. However the dataset deals with extraordinary deal values in relation to the EBITDA, EBIT and sales. In order to clean the dataset, this research has chosen to erase the bottom 5% and the upper 5% values, based on the EBITDA multiple and clean the value of the EBIT and Sales multiple when it is higher than the determined maximum (100 for EBIT multiple and 25 sales multiple).

Next to the regression analysis where all industries have been added, this research also performs individual regressions of the upper three industries with the most observations, in order to analyse if the effect of the firm characteristics on the non-listed firm premium differs per industry type.

5. EMPIRICAL FINDINGS

5.1 Descriptive statistics

Figure 5.1.1 shows the distribution of deals within the dataset throughout the period 1985-2020. As can be concluded from this dataset, there seems to be merger waves in 1999-2000 (maximum of 1000 deals per year) and 2007-2008 (maximum of 1200 deals per year). There are less deals reported in the first years (1985-1991) of the dataset. There are only two actual deals reported yet for 2020 in the dataset, this does not reflect the acquisitions done in 2020, since it takes time to process the data of these acquisitions.

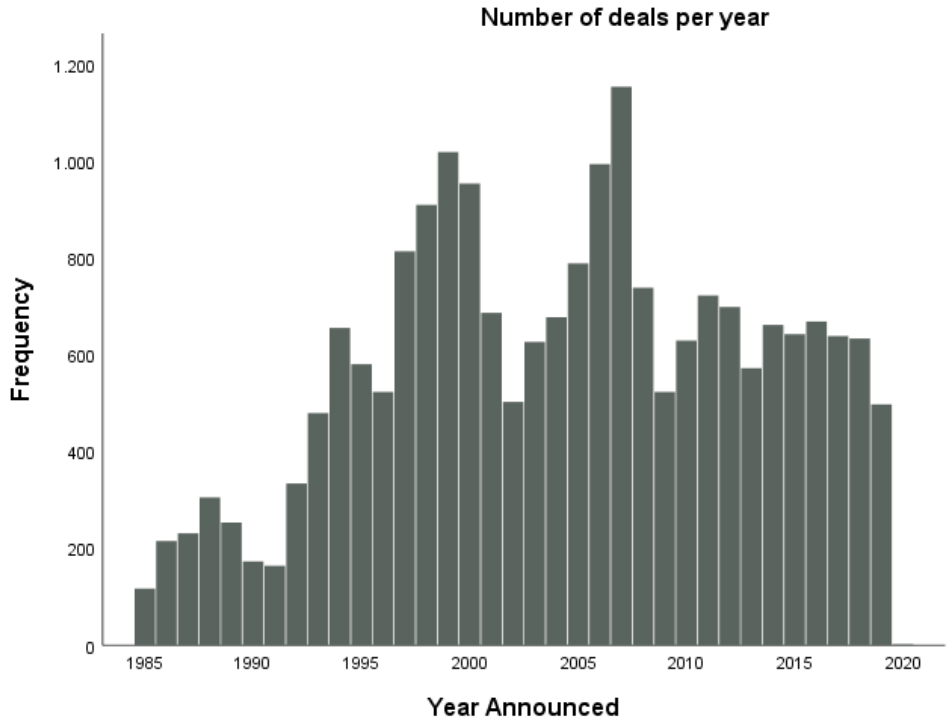

Figure 5.1.1, Number of acquisitions per year

5.1.1 Descriptive of the deal value multiples

In order to get a qualitative dataset of acquired firms, the lowest 5% EBITDA-multiples and the upper 5% EBITDA multiples are eliminated from this dataset. The reason for erasing these samples is that the EBITDA performance in relation to the deal value does not reflect the real value of the firm, since other factors next to the financial performance, could have influenced the deal value of these firms. These factors cannot be retrieved out of this dataset. After the data-cleaning of the lower 5% and the upper 5% with the EBITDA-ratio as reference, table

5.1.1 shows the distribution of the EBITDA-ratio within the dataset of listed and non-listed firms.

	N	Minimum	Maximum	Mean	Std. Deviation
EBITDA multiple	20,770	1.99	36.12	10.6243	6.73433
EBIT multiple	20,770	2.00	8647.51	21.4791	81.51548
Sales multiple	20,598	.01	515.27	2.1092	5.52928
Valid N (listwise)	20,598				

Table 5.1.1, Descriptive of the multiples before cleaning the EBIT and Sales multiple

As can be seen in the descriptive statistics of the EBIT, EBITDA and Sales multiple, the maximum value of the EBITDA multiple is 36.12 due to the correction in the dataset of the upper 5% on the basis of the EBITDA multiple. However, this is not the case for the EBIT and Sales multiple, which result in outliers with a maximum of 8647.51 as EBIT multiple and 515.27 for the Sales multiple. For these outliers the value of EBIT-multiples will be cleared, when the value is above 100. For the Sales multiple this research uses a maximum value of 25. Above these maximum values these multiples do not correctly reflect the value of these firms.

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
EBITDA multiple	20770	1,99	36,12	10,6243	6,73433	1,346	,017	1,705	,034
EBIT multiple	20420	2,00	100,00	17,1976	13,77529	2,318	,017	6,995	,034
Sales multiple	20574	,01	24,50	2,0005	2,24982	3,275	,017	16,423	,034
Valid N (listwise)	20224								

Table 5.1.2, Extended descriptive statistics

After deleting the abnormal outcomes for the EBIT and Sales multiple, table 5.1.2 gives us the finalized descriptive statistics of the multiples in the dataset. The observations of each individual multiple are still more than twenty thousand. However, the most significant difference is the mean statistic of the EBIT multiple which decreases from 21.48 to 17.1976. Also, the standard deviation of the mean decreases significantly due to the data cleaning. Figure 5.1.2 shows us the distribution of the different multiples. The multiple histograms show a right skewed distribution within the dataset.

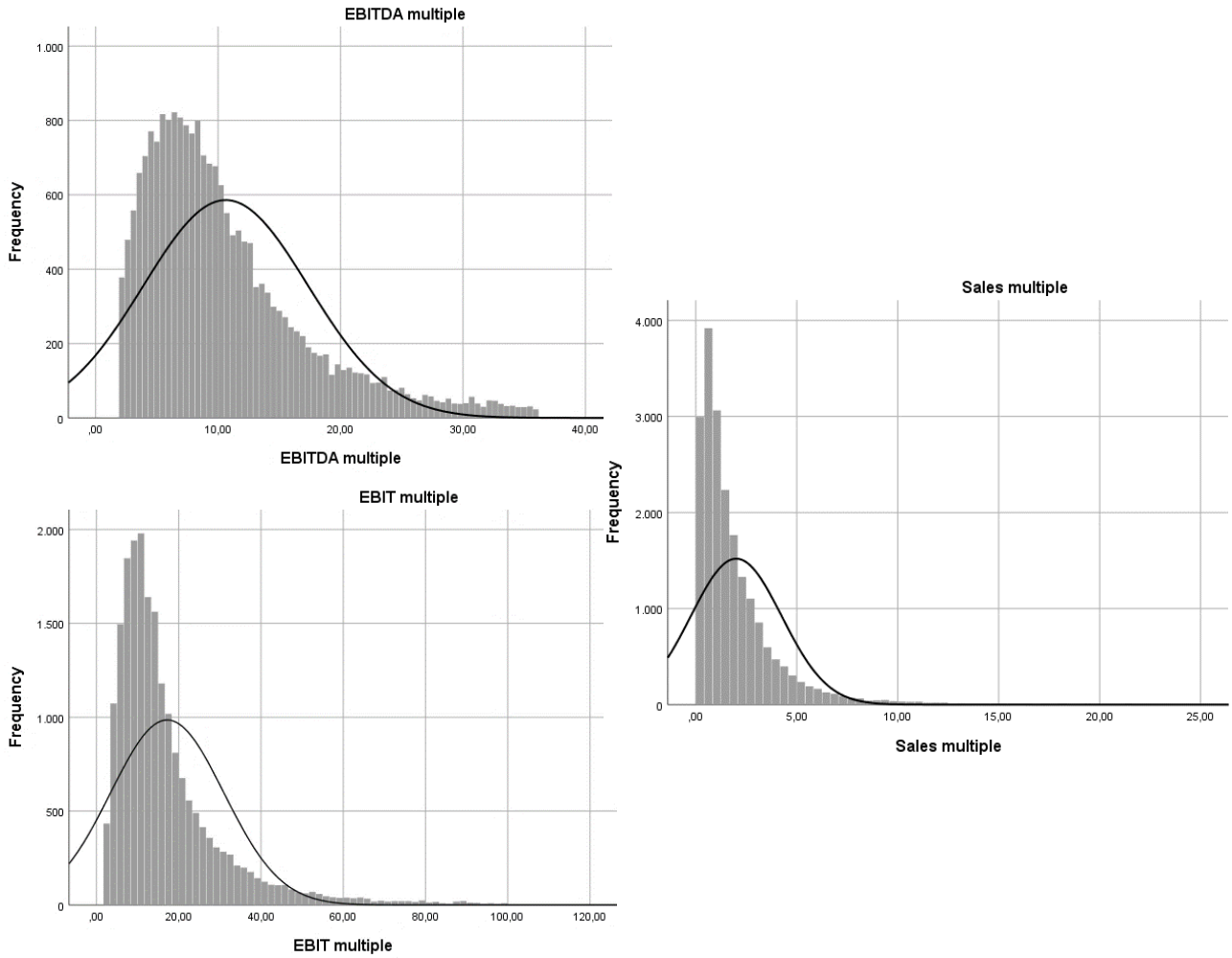

Figure 5.1.2, Histograms of the different acquisition multiples

The next step is to split the acquisition multiples based on the public status of the firm. Table 5.2.2 shows the mean and median multiple (EBITDA, EBIT and sales) of the total dataset. The median of listed firms is higher for all three multiples, where the mean of non-listed firms (10.77) gives a higher value compared to listed firms (10.59). Appendix II shows the distribution of the multiples per industry.

		Mean	Median	Minimum	Maximum	N
EBITDA multiple	Non-listed	10,77	8,78	1,99	36,03	3735
	Listed	10,59	8,93	1,99	36,12	17035
EBIT multiple	Non-listed	15,29	11,29	2,00	95,91	3707
	Listed	17,62	13,53	2,04	100,00	16713
Sales multiple	Non-listed	1,90	1,24	,01	21,89	3572
	Listed	2,02	1,32	,01	24,50	17002

Table 5.1.3, Acquisition multiples of firms sorted by public status

5.1.2 Descriptive of the non-listed firm premium

The non-listed firm premium is measured by the deal value multiple difference of the non-listed firm and the average matching listed firms multiple. Since these observations only contain non-listed firm which do have sufficient matches with listed firms, the number of observations to report the non-listed firm premium is much smaller than the observations of the total dataset.

	Mean	Median	Minimum	Maximum	N
Non-listed Firm Premium (EBITDA)	,68	1,66	-28,28	22,82	2463
Non-listed Firm Premium (EBIT)	3,05	4,84	-86,47	58,70	2435
Non-listed Firm Premium (Sales)	,26	,38	-16,32	20,13	2461

Table 5.1.4, Descriptive of the non-listed firm premium based on deal value multiple differences

Table 5.1.4 shows us the descriptive of the non-listed firm premium based on the discrepancy of the deal value multiples (EBITDA, EBIT and Sales) of non-listed firms and average matching listed firms. All three multiples do have a positive mean, which indicates the positive non-listed premium. Within this study there are 2435-2463 observations which measure the equity premium for non-listed firms based on deal value multiples.

As can be retrieved from table 5.1.4 the median non-listed firm premium is higher than the mean non-listed firm premium for all three multiples. This is also presented in figure 5.1.3, which shows the distribution of the non-listed firm premia. Table 5.1.5 presents the mean non-listed firm premium by industry type. Since there are no matching observations within the industry 'Public Administration', no values can be presented.

	Non-listed Firm Premium (EBITDA)	Non-listed Firm Premium (EBIT)	Non-listed Firm Premium (Sales)
Agriculture, Forestry, Fishing	-8,47	-18,43	-1,18
Construction	1,13	6,34	,23
Finance, Insurance, Real Estate	1,27	1,42	,50
Manufacturing	,34	2,53	-,06
Mining	-1,62	2,01	-,21
Public Administration	.	.	.
Retail Trade	-,69	,41	-,11
Services	,65	4,71	,50
Transportation & Public Utilities	-,34	2,56	,23
Wholesale Trade	1,60	3,56	,36

Table 5.1.5, Average non-listed firm premium per industry type

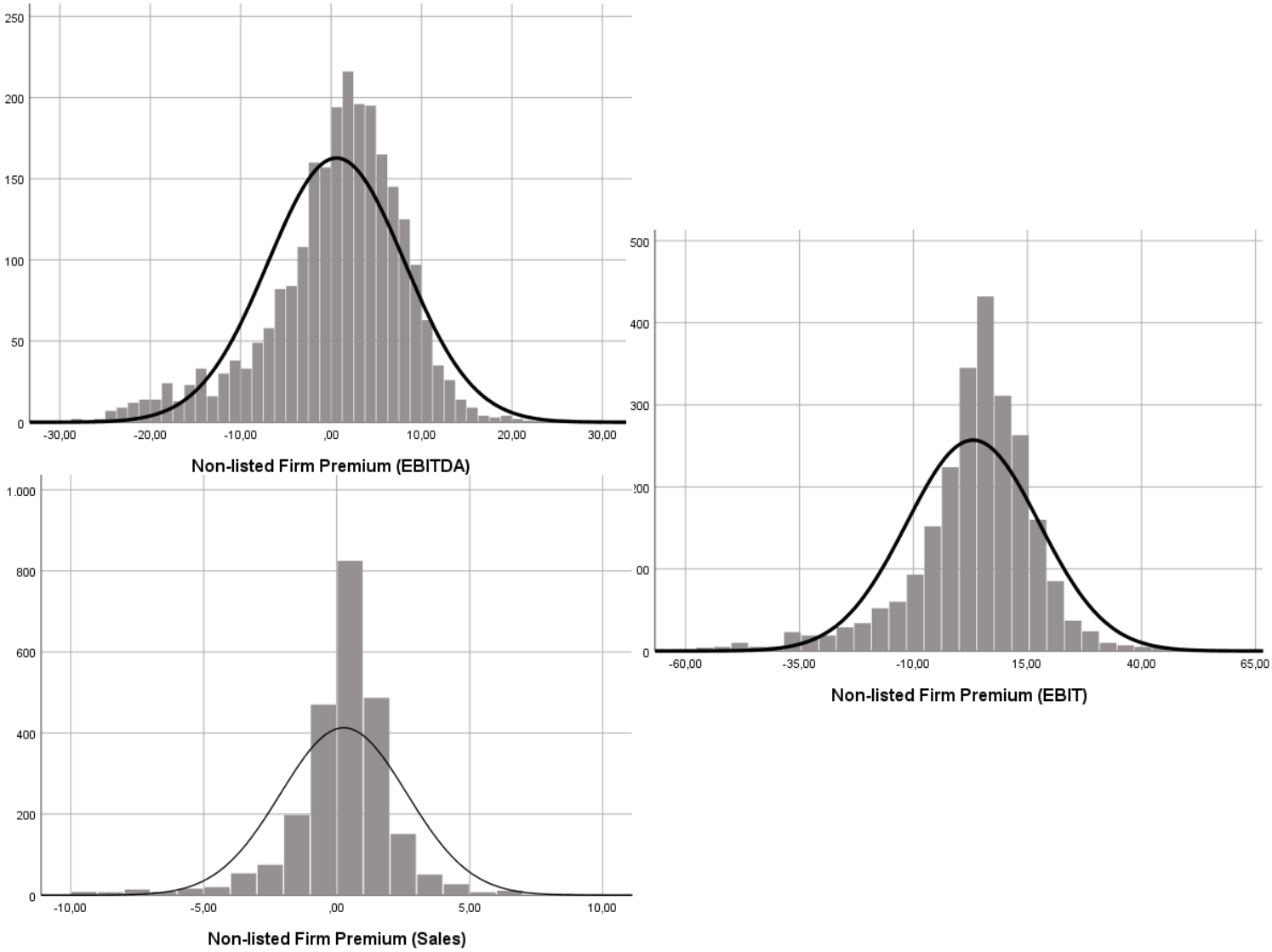

Figure 5.1.3, Histograms of the non-listed firm premium

5.2 Bivariate analysis

In order to compare the deal value multiples of non-listed companies with the deal value multiples of listed companies, this research has constructed different criteria to be a matching firm (see 4.2). Table 5.2.1 shows the results of the non-listed firm multiple and the average matching listed firm multiple. The dataset includes 2463 non-listed firms, which are matched with two or more listed firms. Since some deals did not include the EBIT and/or Sales multiple, there are slightly less matching observations based on the EBIT and Sales multiple (resp. 2435, 2461).

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	EBITDA multiple (unlisted)	11,0683	2463	7,13495	,14377
	EBITDA multiple (average matching listed firms)	11,6588	2463	3,70470	,07465
Pair 2	EBIT multiple (unlisted)	15,7956	2435	13,01944	,26384
	EBIT multiple (average matching listed firms)	18,8477	2435	7,48316	,15165
Pair 3	Sales multiple (unlisted)	1,9095	2461	2,10732	,04248
	Sales multiple (average matching listed firms)	2,1713	2461	1,66385	,03354

Table 5.2.1, paired sample statistics

Table 5.2.1 shows us the mean deal value multiples of unlisted firms and matching listed firms (based on the size, time and industry criteria). It can be concluded that on average the multiples of unlisted firms are lower than the matching firms, since the EBITDA multiple is 11.07 for non-listed firms and 11.66 for listed firms. Analysing the EBIT and the Sales multiples for non-listed and listed firms, there is a mean difference of 3.05 (EBIT multiple) and 0.26 (Sales multiple) in favour of the average matching listed firms. This indicates that the deal value in relation to the EBITDA, EBIT and sales multiple, is lower for non-listed firms when comparing these to matching listed firms.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	EBITDA multiple (unlisted) - EBITDA multiple (average matching listed firms)	-,59045	7,54473	,15202	-,88855	-,29234	-3,884	2462	,000
Pair 2	EBIT multiple (unlisted) - EBIT multiple (average matching listed firms)	-3,05213	14,53525	,29456	-3,62975	-2,47452	-10,362	2434	,000
Pair 3	Sales multiple (unlisted) - Sales multiple (average matching listed firms)	-,26176	2,37774	,04793	-,35574	-,16777	-5,461	2460	,000

Table 5.2.2, Difference in acquisition multiples of unlisted firms and matching listed firms

Table 5.2.2 presents next to the mean difference also the significance of this difference of all three multiples (<0.05). These results are supporting hypothesis one, which calls: “The equity premium for non-listed firms is different compared to that of listed firms”.

5.2.1 Non-listed firm premium

Next to the formula of measuring the discrepancy between non-listed firms and the average matching listed firms, the scaled formula (presented in 4.3) is used to visualize the percentual non-listed firm premium in order to make it applicable for practitioners and compare it to the Small Firm Premium. Based on the results presented in Table 5.2.1 and Table 5.2.2 we can derive the non-listed firm premium based on the mean acquisition multiples of non-listed firms and matching average listed firms. Since these values do differ statistically significant from each other (significance is presented in table 5.2.2), there is a profound basis to claim that the non-listed firm premium of each acquisition multiple is representable. Based on the scaled formula, the following equity premiums are calculated for non-listed firms:

Type of acquisition multiple	Non-listed firm premium (%)	Non-listed firm premium
EBITDA multiple	5.33%***	0.59045***
EBIT multiple	19.32%***	3.05213***
Sales multiple	13.71%***	0.26176***

Table 5.2.3, Average non-listed firm premium based on matching sample

5.2.2 Small firm premium

Traditional literature (Koeplin et al., 2000) did not use the size criteria in order to match non-listed firms with listed firms, this study also performs the test without the size criteria in order to see if there are differences with the size criteria included test. This indicates that listed firms can only be 25% smaller or 25% larger than un-listed firms in order to be a match. The table presented below (Table 5.2.4) only used the timeframe criteria and the industry criteria to be a match with non-listed firms. As can be concluded the EBITDA multiple of matching listed firms is lower on average. The EBIT and Sales multiple are higher on average for matching listed firms, where only the EBIT multiple gives a significant difference (<0.05). Hence it can be concluded that adding size criteria to match unlisted and listed firms, does have a significant impact on the result of the non-listed firm premium. This indicates that there is no small firm premium measurable, while removing the size criteria.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	EBITDA multiple - EBITDA multiple (average matching listed firms)	,08941	7,09570	,11639	-,13878	,31759	,768	3716	,442
Pair 2	EBIT multiple - EBIT multiple (average matching listed firms)	-2,19478	12,67266	,20868	-2,60391	-1,78564	-10,518	3687	,000
Pair 3	Sales multiple - Sales multiple (average matching listed firms)	-,05594	2,21829	,03720	-,12888	,01701	-1,503	3554	,133

Table 5.2.4, Difference in acquisition multiples of unlisted firms and matching listed firms (size criteria excluded)

5.3 Multivariate analysis

This paragraph analyses the effect of specific firm and deal characteristics in relation to the non-listed firm premium. As can be concluded form chapter 5.2 the non-listed firm premium can actually be measured by the dataset used and is considered to be statistically significant. This section uses the Ordinary Least Squares regression method in order to analyse the effect of the different drivers, which is the basis to discuss hypothesis two to six. To test the robustness of the results, this research has constructed has constructed five different models (A-E). The first three models (A, B, C) are based on the independent variables used in this research, where control variables are excluded. For model B, C and E the specific industry or year dummy variables are included. In order to save space, these dummy variables are not visually presented in the model.

This research constructs three regression analyses to present the different acquisition multiples (EBITDA, EBIT and Sales), which are measured by the difference between non-listed firm multiple and the matching listed firms' multiple. The definition of the independent and control variables is discussed 4.3.1. Since the Share Liquidity variable is based on industry results, it correlates with the different industry dummy variables. In order to overcome multicollinearity, the Share Liquidity variable is excluded when the Industry dummies are included.

Table 5.3.1, Different factors in relation to the Non-listed firm premium (EBITDA)

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (EBITDA) is subtracted from the matching listed firm acquisition multiple (EBITDA). The dummy variables Industry and Year are not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (EBITDA)				
	A	B	C	D	E
(Constant)	1,993**	3,177***	3,908***	-4,877*	-5,025
	(2,076)	(3,295)	(3,462)	(-1,794)	(-1,508)
LogSize	-0,929***	-1,008***	-0,870***	-0,550	-1,119
	(-3,219)	(-3,241)	(-2,698)	(-0,842)	(-1,341)
Leverage	0,026	-0,237	-0,244	3,852*	4,509*
	(0,038)	(-0,333)	(-0,008)	(1,783)	(1,780)
Asset Liquidity	1,203	0,476	0,670	3,423*	2,285
	(1,524)	(0,578)	(0,019)	(1,713)	(0,958)
Share Liquidity	0,345	-	-	-0,972	-
	(0,625)	-	-	(-0,698)	-
Strategic Acquirer	-1,206***	-1,389***	-1,437***	2,051*	2,401
	(-2,953)	(-3,080)	(-0,081)	(1,679)	(1,468)
Same Industry				-0,527	-0,510
				(-0,539)	(-0,462)
Profitability				13,215***	16,492***
				(4,052)	(4,221)
Non-listed Acquirer				3,219***	3,340***
				(2,658)	(2,277)
Growth Rate				-0,001	0,001
				(-0,099)	(-0,064)
Cross Border				-3,295***	-3,606***
				(-3,576)	(-3,609)
Dummy Industry	No	Yes	Yes	No	Yes
Dummy Year	No	No	Yes	No	Yes
N	1958	1958	1958	317	317
R square	0,008	0,011	0,015	0,083	0,053

Table 5.3.2, Different factors in relation to the Non-listed firm premium (EBIT)

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (EBIT) is subtracted from the matching listed firm acquisition multiple (EBIT). The dummy variables Industry and Year are not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (EBIT)				
	A	B	C	D	E
(Constant)	2,602	5,190***	6,664***	-13,673**	-13,495**
	(1,383)	(2,742)	(3,009)	(-2,426)	(-1,999)
LogSize	-1,970***	-2,007***	-1,760***	0,501	-0,703
	(-3,486)	(-3,285)	(-2,790)	(0,372)	(-0,415)
Leverage	-2,395*	-2,168	-1,776	5,167	10,921**
	(-1,751)	(-1,550)	(-1,244)	(1,137)	(2,089)
Asset Liquidity	8,389***	7,555***	7,712***	11,587***	7,095
	(5,411)	(4,655)	(4,640)	(2,787)	(1,461)
Share Liquidity	2,162	-	-	-0,511	-
	(2,003)	-	-	(-0,177)	-
Strategic Acquirer	-1,912**	-2,606***	-2,483***	3,153	4,070
	(-2,388)	(-2,940)	(-2,774)	(1,240)	(1,225)
Same Industry				-0,721	-1,353
				(-0,352)	(-0,599)
Profitability				30,565***	32,824***
				(4,532)	(4,130)
Non-listed Acquirer				4,914**	4,632**
				(1,969)	(1,563)
Growth Rate				0,009	0,018
				(0,364)	(0,667)
Cross Border				-4,732**	-5,537***
				(-2,484)	(-2,734)
Dummy Industry	No	Yes	Yes	No	Yes
Dummy Year	No	No	Yes	No	Yes
N	1937	1937	1937	313	313
Adjusted R square	0,026	0,026	0,037	0,070	0,076

Table 5.3.3, Different factors in relation to the Non-listed firm premium (Sales)

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (Sales) is subtracted from the matching listed firm acquisition multiple (Sales). The dummy variables Industry and Year are not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (Sales)				
	A	B	C	D	E
(Constant)	-1,449***	-1,843***	-2,113***	-0,031	0,419
	(-4,946)	(-6,278)	(-6,152)	(-0,054)	(0,628)
LogSize	-0,177**	-0,068	-0,030	-0,363***	-0,330**
	(-2,004)	(-0,718)	(-0,307)	(-2,625)	(-1,973)
Leverage	1,265***	1,190***	1,215***	1,066**	1,178**
	(5,956)	(5,503)	(5,487)	(2,328)	(2,323)
Asset Liquidity	1,884***	2,014***	2,042***	0,168	-0,008
	(7,821)	(8,020)	(7,910)	(0,396)	(-0,016)
Share Liquidity	0,314*	-	-	0,591	-
	(1,865)	-	-	(2,000)	-
Strategic Acquirer	-0,196	0,055	0,020	0,472*	1,064***
	(-1,571)	(0,404)	(0,144)	(1,823)	(3,249)
Same Industry				-0,127	-0,278
				(-0,614)	(-1,257)
Profitability				-3,269***	-4,936***
				(-4,728)	(-6,309)
Non-listed Acquirer				0,586**	0,875***
				(2,283)	(2,980)
Growth Rate				-0,001	0,001
				(-0,337)	(0,549)
Cross Border				-0,652***	-0,781***
				(-3,338)	(-3,902)
Dummy Industry	No	Yes	Yes	No	Yes
Dummy Year	No	No	Yes	No	Yes
N	1957	1957	1957	317	317
Adjusted R square	0,050	0,057	0,081	0,169	0,235

When interpreting the results in view of the hypothesises. It can be concluded that size has a negative effect on the non-listed firm premium, since the Size variable shows negative statistically significant values for all three regression analyses (EBITDA, EBIT and Sales). This indicates for Table 5.3.1, column A, when the Size variable increases by 1%, the non-listed firm premium decreases by 0.93%. By adding the control variables for the EBITDA- and EBIT-multiples, the variable is not significant, due to the fact that the number of observations significantly decreased. For the Sales-multiple, this difference is just more statistically significant when adding the control variables. Hence the null-hypothesis can be rejected and the conclusion can be made that firm size negatively effects the non-listed firm premium. Which is also in line with the Small Firm Premium (SFP), where smaller firms tend to have a higher equity premium.

When analysing the Leverage variable, the formulated hypothesis "Leverage has a positive effect on the non-listed firm premium" can be partially confirmed. Only for the Sales-multiple there is a statistically significant difference (<0.05) , when the Leverage increases, the equity premium for non-listed firms also increases. Within the regression analysis of the EBITDA- and EBIT-multiple, there are no significant values measured, except from the EBIT-multiple within column E. Hence there is no ground to reject the null-hypothesis and this research does not give enough evidence to conclude that leverage has a positive effect on the non-listed firm premium.

Hypothesis four stated that asset liquidity reduces the non-listed firm premium. However, when analysing the results, this research finds the opposite direction for the EBIT- and Sales-multiple. The more liquid the assets are (measured by current assets / total assets), the higher the non-listed premium is. This difference is statistically significant for the EBIT- and Sales-multiple at a level of <0.01. Within the regression analysis of the EBITDA-multiple no significance can be measured for the asset liquidity variable. Hence, it can be concluded that asset liquidity has an influence on the non-listed firm premium. However, instead this research expected, this relation is positive.

The share liquidity index variable, is expected to have a negative effect in relation to the non-listed firm premium. This research finds no significant values within all three regression tables. Therefore, the null-hypothesis cannot be rejected.

The last hypothesis investigates the relation of strategic/financial acquirers and the non-listed firm premium. As presented in table 5.3.1 and table 5.3.2, within the EBITDA and EBIT-multiple, strategic buyers do negatively influence the non-listed firm premium. This difference is significant at the <0.01 level when the control variables are excluded. When looking at the Sales-multiple within table 5.3.3, column E gives a statistically significant positive value. However, this model has less observations (317).

The significance of variables in all three regression models vary per column, when the control/dummy variables are added. Two explanations can be given for this effect. The independent variables can correlate with each other, which can result in different outcomes for the dependent variable. Also is the sample size significantly reduced when adding control variables, which could affect the outcomes of the non-listed firm premium.

In appendix IV till appendix VI the regression results of the three largest industries (based on observations) are presented individually. Within the Services industry model, the size variable has a significant negative effect on the non-listed firm premium for all three variables. For all three industries profitability has a positive effect on the non-listed firm premium for the EBITDA and EBIT multiple, where it does have a negative effect on the non-listed firm premium of the Sales multiple. The external validity of the regression models could be questioned, when the control variables are added. Since the number of observations is reduced significantly, particularly for the industry Finance, Insurance and Real estate.

At last, this research analysis the control variables. There is no statistically significant value within the acquisition multiples of all three regression models, if the target firm and the acquirer operate in the same industry. This is similar for the Growth Rate variable, where also no significant values are presented. Non-listed acquirers tend to have a positive effect on the equity premium for non-listed targets, which indicates that the value of acquired firms is lower when the acquirer is non-listed. Cross-Border acquisitions do have a negative influence on the non-listed firm premium for all three multiple models (significance levels <0.01).

5.4 Limitations

This research used the acquisition database Thomson One as dataset to analyse the difference between acquisition multiples of non-listed firms and matching listed firms. Even though this

research made use of strict matching criteria (timeframe, size and industry), it possible that some matches are not realistic. However, there is limited information available about acquired companies.

Another limitation is that the acquisitions of micro-firms are not represented proportionally, since these acquisitions are often not reported in this dataset, which only present approximately 2% to 3% of the total acquisitions being made. The available financial information about acquisitions is a good starting point, however this dataset does not consider specific factors or the level of competition to acquire a certain company. Acquisition multiples are based on financial multiples (EBITDA, EBIT and Sales) achieved in the past. However, investors are often searching for growth and opportunities and look future performances.

6. CONCLUSION

This research has a specific focus how to determine the equity premium for non-listed firms. Practitioners often struggle how to value non-listed companies, since there is no stock information available for private firms. This is the reason why practitioners often add a Small Firm Premium as an alternative to overcome the problem of being non-listed, since there is a lack of information available about the effect of being non-listed in the valuation. This research used the acquisition multiple approach in order to analyse the non-listed firm premium. This leads us to the following research question:

'*To what extent is the non-listed firm premium measurable by using the acquisition multiple approach and to what extent is this influenced by different firm characteristics?*'

By using the matching criteria, this research found a statistically significant value, which confirms the existence of the non-listed firm premium for all three acquisition multiples:

Type of acquisition multiple	**Non-listed firm premium**
EBITDA multiple	5.33%***
EBIT multiple	19.32%***
Sales multiple	13.71%***

Table 6.1, Average non-listed firm premium based on matching sample

As can be concluded from appendix III, the acquisition multiples and the non-listed firm premium differs between the different industries.

When analysing the different factors which influence the non-listed firm premium. It can be concluded that the size of a firm has a negative effect on the non-listed firm premium. Hence, there are similarities to when comparing the non-listed firm premium to the non-listed firm premium. However, the size factor is just of the drivers within the non-listed firm premium.

This negative effect also applies if the acquirer is strategically motivated, which reduces the equity premium for non-listed firms. While leverage seem to have a positive effect on the non-listed firm premium, although it gives only statistically significant results for the regression model where the Sales-multiple is used as a reference point.

Asset liquidity gives opposite results than expected, since it has positive effect on the non-listed firm premium. Where the share liquidity measured by the industry liquidity index does not give statistically significant results.

REFERENCES

Anagnostopoulou, S. (2011). Financial Distress: Public vs. Private Firms. SSRN Journal: https://ssrn.com/abstract=1726463

Andrade, G., S. Kaplan (1998). How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed. Journal of Finance, Vol.53, No.5 (October), pp.1443-92

Banz R.W. (1981) The relationship between return and market value of common stocks. Journal of Financial Economics. Volume 9, Issue 1, March 1981, pp. 3-18

Berger, P.G., Ofek, E. (1995). Diversification's effect on firm value. Journal of Financial Economics Vol. 37, pp. 39-6

Block, S. (2007). The liquidity discount in valuing privately owned companies. Journal of Applied Finance, Vol. 17(2), pp. 33-40.

Blume, M., Husic, F. (1973). Price, beta, and exchange listing. Journal of Finance 28, pp. 283-299.

Boer en Croon (2015) Additioneel onderzoek naar de Small Firm Premium. ACM Dossiernummer: 103967.

Brav, O. (2009), Access to capital, capital structure, and the funding of the firm. Journal of Finance, Vol. 64, No.1 (February), pp. 263-308.

Brown, P., Kleidon, A.W., and Marsh, T.A. (1983). New evidence on the nature of size-related anomalies in stock prices. Journal of Financial Economics.

Canadas, J.A. and Ramirez A. (2011). The discount rate in valuing privately held companies. Business Valuation Review, Volume 30, Number 2.

Chaffe III, D. B. H. (1993). Option pricing as a proxy for discount for lack of marketability in private company valuations. Business Valuation Review, 12(4), pp.182-188.

Damodaran, A. (2005). Marketability and value: Measuring the illiquidity discount. New York University - Stern School of Business.

Damodaran, A. (2012). Investment valuation: Tools and techniques for determining the value of any asset. Hoboken, N.J: Wiley.

De Franco, G., Gavious, I., Jin, J. Y., and Richardson, G. D. (2011). Do private company targets that hire Big 4 auditors receive higher proceeds?. Contemporary Accounting Research, 28(1), pp. 215 262.

Dichev, I.D. (1998). Is the risk of bankruptcy a systematic Risk? Journal of Finance, 53, pp. 1131 1147

Emory J., Dengel A, John D. Emory J. Jr (2002). Discounts for lack of marketability, Emory Pre-IPO Discount Studies 1980–2000.

Elnathan, D., Gavious, I., and Hauser, S. (2010). An analysis of private versus public firm valuations and the contribution of financial experts. The International Journal of Accounting, 45(4), pp. 387-412.

Fama, E. F., and French, K. R. (1992). The cross-Section of expected stock Returns. The Journal of Finance 47, pp. 427-465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. Journal of financial economics, 33(1), pp. 3-56

Finnerty, John D., (2013). Using put option-based DLOM models to estimate discounts for lack of marketability," Business Valuation Review 31.

Harter, M.A. (2017). Evaluating key person risk when valuing a closely held company for marital dissolution purposes. Family Law Valuation Insights.

Hertzel, M., and Smith, R. L. (1993). Market discounts and shareholder gains for placing equity privately. The Journal of Finance

Johnson, B. A. (1999). Restricted stock discounts. Shannon Pratt's Business Valuation Update, 5(3).

Keim, D. B. (1983). Size-related anomalies and stock market seasonality: further empirical evidence. Journal of Financial Economics, 12, pp. 13-32.

Koeplin, J., Sarin, A., and Shapiro, A. C. (2000). The private company discount. Journal of Applied Corporate Finance, 12(4), pp. 94-101.

Koller, T., Goedhart, M., and Wessels, D. (2010). Valuation: measuring and managing the value of companies (Vol. 499). John Wiley and Sons

Kooli, M., Kortas, M., and L'Her, J. (2003). A new examination of the private company discount: The acquisition approach. The Journal of Private Equity, 6(3), pp. 48-55.

Lakonishok, J., and Shapiro, A. C. (1986). Systematic risk, total risk and size as determinants of stock market returns. Journal of Banking & Finance, 10(1), pp. 115-132.

Lakonishok, Shleifer & Vishny (1994). Contrarian investment, extrapolation and risk. The Journal of Finance, Volume 49, Issue 5, pp 1541–1578.

Lamoureux, C.G., and Sanger, G.C. (1989). Firm size and turn-of-the-year effects In the OTC/NASDAQ market. The Journal of Finance 44(5), pp. 1219-1240.

Lang, L., Stulz, R. (1994). Tobin's q. corporate diversification, and firm performance. Journal of Political Economy 102, 1248-1

Lintner, John (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. Review of Economics and Statistics. 47:1, pp. 13–37.

Matthews, G.E. and Patterson, M. (2016). Private company discounts are not caused by lack of marketability. Business Valuation Update.

Mukesh, B., Denis, D. J., Ferris, S. P., & Sarin, A. (2001). Firm value and marketability discounts. The Journal of Corporation Law.

Officer, M. S. (2007). The price of corporate liquidity: Acquisition discounts for unlisted targets. Journal of Financial Economics 83, pp. 571-598.

Paglia, J. K., and Harjoto, M. (2010). The discount for lack of marketability in privately owned. Journal of Business Valuation and Economic Loss Analysis, 5(1), pp. 1932-9156.

Peek, E. (2016). A study of differences in returns between large and small companies in Europe. Erasmus University Rotterdam - Rotterdam School of Management.

Pratt, Reily and Schweihs (2000). Valuing a business, 4th Edition.

Sharpe, William F. (1964). Capital asset prices: "A theory of market equilibrium under conditions of risk". Journal of Finance. 19:3, pp. 425– 429.

Sibilkov, V. (2009). Asset liquidity and capital structure. The Journal of Financial and Quantitative Analysis, 44(5), pp. 1173-1196.

Silber, W.L. (1991). Discounts on restricted stock: The impact of illiquidity on stock prices. Financial Analysts Journal. Volume 47, 1991 - Issue 4

Schlingemann, F. P., Stulz, R. M., & Walkling, R. A. (2002). Divestitures and the liquidity of the market for corporate assets. Journal of Financial Economics, 64, pp. 117-144.

Ushijima, T. (2016). Diversification, organization, and value of the firm. Financial Management, Vol. 45, No. 2 (Summer 2016), pp. 467-499

APPENDIX

Appendix I. Pearson Correlation Independent Variables

The table presents the Pearson Correlation matrix of the different predictors of the non-listed firm premium.

Correlations

	Size	Leverage	Asset Liquidity	Share Liquidity	Strategic / Financial Motive	Growth Rate	Profitability	Acq. Public Status	Same Industry	Cross Border Transaction
Size	1,00									
Leverage	,00	1,00								
Asset Liquidity	,00	-,21	1,00							
Share Liquidity	-,01	-,08	-,04	1,00						
Strategic / Financial Motive	,00	-,03	,00	,21	1,00					
Growth Rate	,01	-,02	-,03	,11	,02	1,00				
Profitability	,00	-,05	-,05	,02	-,01	,01	1,00			
Acq. Public Status	,01	-,02	-,01	,04	-,45	-,02	-,02	1,00		
Same Industry	-,01	,01	-,01	-,22	,30	,00	,03	-,43	1,00	
Cross Border Transaction	,00	-,03	,02	,00	,12	,02	,00	-,05	,02	1,00

Appendix II. Disadvantage of the scaled formula

The scaled formula of the non-listed firm premium is a perfect way to calculate the average equity premium of the whole sample size. Which is done for hypothesis one (see 5.2.1). However, when calculating the non-listed firm premium for each matching pair, the formula cannot be used to analyse the effect of different characteristics. To clarify why this method fails, we will use an example.

Sample of non-listed firms	EBITDA multiple non-listed firms	EBITDA multiple matching listed firms	Non-listed firm premium
Firm 1	10	2	-0,8
Firm 2	5	15	2,0
Firm 3	15	10	-0,333
Firm 4	2	5	2,5

The traditional method in order to calculate the non-listed firm premium cannot give results lower than -1, while the maximum value can be theoretically more than 50. Therefore the results of negative non-listed firm premia and positive non-listed firm premia cannot be compared. The average result of the non-listed firm premium of the sample is 0,84 based on the traditional method. However the average result of the actual premium is zero (based on the formula: ((2-10) + (15-5) + (10-15) + (5-2)) / 4).

Appendix III. Acquisition multiples of non-listed and listed firms per industry type

			Mean	Median	Minimum	Maximum	N
Agriculture, Forestry, Fishing	EBITDA multiple	Non-listed	10,51	8,57	2,16	20,08	22
		Listed	9,98	7,63	2,05	35,13	123
	EBIT multiple	Non-listed	17,04	14,94	2,40	46,85	22
		Listed	15,77	11,63	2,35	64,46	121
	Sales multiple	Non-listed	1,97	1,69	,10	6,07	20
		Listed	1,77	,98	,08	16,27	123
Construction	EBITDA multiple	Non-listed	9,11	6,80	2,01	33,36	116
		Listed	8,96	6,86	2,01	34,62	368
	EBIT multiple	Non-listed	10,63	8,57	2,07	42,85	114
		Listed	15,16	10,43	2,30	93,89	364
	Sales multiple	Non-listed	1,09	,59	,08	10,57	111
		Listed	1,12	,53	,05	22,03	368
Finance, Insurance, Real Estate	EBITDA multiple	Non-listed	11,25	9,82	2,05	35,27	580
		Listed	12,46	11,18	2,00	36,09	3502
	EBIT multiple	Non-listed	14,69	11,61	2,08	88,69	575
		Listed	16,37	13,43	2,08	97,68	3451
	Sales multiple	Non-listed	2,63	1,98	,01	21,58	575
		Listed	3,12	2,27	,01	24,50	3486
Manufacturing	EBITDA multiple	Non-listed	10,30	8,11	2,03	36,03	1168
		Listed	10,12	8,43	1,99	36,12	5860
	EBIT multiple	Non-listed	14,68	10,67	2,14	93,12	1157
		Listed	17,18	13,14	2,14	100,00	5746
	Sales multiple	Non-listed	1,55	1,11	,03	17,16	1092
		Listed	1,44	,99	,01	20,85	5858
Mining	EBITDA multiple	Non-listed	9,34	7,71	2,62	31,51	67
		Listed	8,36	6,64	2,01	35,22	1018
	EBIT multiple	Non-listed	18,26	12,71	2,91	85,18	67
		Listed	18,81	13,37	2,04	97,01	984
	Sales multiple	Non-listed	3,75	2,87	,22	21,89	65
		Listed	3,45	2,80	,04	20,26	1012
Public Administration	EBITDA multiple	Non-listed	11,25	12,53	2,41	16,61	5
		Listed	13,21	9,52	7,74	33,58	8
	EBIT multiple	Non-listed	13,94	15,49	2,78	19,05	5
		Listed	22,54	18,32	7,93	38,67	8
	Sales multiple	Non-listed	,80	,93	,19	1,31	5
		Listed	3,05	1,73	,95	7,86	8
Retail Trade	EBITDA multiple	Non-listed	10,54	8,88	1,99	35,16	187
		Listed	9,22	7,77	2,00	35,96	932
	EBIT multiple	Non-listed	15,83	11,94	2,21	80,43	185
		Listed	16,91	13,01	2,28	89,89	915
	Sales multiple	Non-listed	,98	,64	,04	7,03	181
		Listed	,83	,56	,04	15,75	930
Services	EBITDA multiple	Non-listed	11,92	9,57	2,06	35,91	1040
		Listed	11,94	10,20	2,00	36,11	2886
	EBIT multiple	Non-listed	16,64	12,36	2,00	95,91	1035
		Listed	20,68	16,11	2,22	99,96	2829
	Sales multiple	Non-listed	2,11	1,49	,03	18,13	996
		Listed	2,00	1,42	,05	21,35	2881
Transportation & Public Utilities	EBITDA multiple	Non-listed	10,42	8,52	2,03	34,79	312
		Listed	9,14	7,63	2,01	35,77	1688
	EBIT multiple	Non-listed	17,32	13,23	2,24	90,11	309
		Listed	18,36	13,26	2,26	99,75	1651
	Sales multiple	Non-listed	2,32	1,25	,06	20,45	300
		Listed	2,31	1,69	,05	19,40	1686
Wholesale Trade	EBITDA multiple	Non-listed	8,70	7,01	2,05	30,62	238
		Listed	9,13	7,70	2,08	35,26	650
	EBIT multiple	Non-listed	12,06	8,84	2,22	89,07	238
		Listed	13,78	10,93	2,41	97,38	644
	Sales multiple	Non-listed	,86	,54	,04	9,15	227
		Listed	,76	,42	,03	12,34	650

Appendix IV. Different factors in relation to the Non-listed firm premium based on the industry 'Services'

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. This regression is based on the specific industry 'Services'. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (EBITDA/EBIT/Sales) is subtracted from the matching listed firm acquisition multiple (EBITDA/EBIT/Sales). The dummy variable Year is not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (deal value multiples)					
	EBITDA		**EBIT**		**Sales**	
	A	B	C	D	E	F
(Constant)	6,697***	-1,161	13,532***	-3,503	-0,720	3,657**
	(3,676)	(-0,175)	(4,011)	(-0,319)	(-1,178)	(2,483)
LogSize	-2,207***	-3,750**	-5,334***	-6,605**	-0,491**	-1,079***
	(-3,471)	(-2,237)	(-4,513)	(-2,434)	(-2,301)	(-2,902)
Leverage	-0,415	3,699	-1,971	2,999	0,738**	1,491
	(-0,388)	(0,697)	(-0,992)	(0,319)	(2,059)	(1,266)
Asset Liquidity	0,068	-1,265	8,066***	1,723	1,803***	-0,841
	(0,045)	(-0,267)	(2,837)	(0,228)	(3,523)	(-0,800)
Strategic buyer	-1,534*	3,997	-2,572	6,958	-0,011	0,049
	(-1,695)	(0,882)	(-1,534)	(0,953)	(-0,037)	(0,049)
Same Industry		4,180		5,699		0,012
		(1,573)		(1,297)		(0,020)
Profitability		34,691***		57,048***		-6,681***
		(3,990)		(4,039)		(-3,464)
Non-listed acquirer		7,542*		12,820**		-0,125
		(1,974)		(2,101)		(-0,148)
Growth Rate		0,002		0,086		0,005
		(0,037)		(1,051)		(0,470)
Cross Border		-5,063**		-9,692***		-0,449
		(-2,485)		(-2,919)		(-0,993)
Dummy Year	Yes	Yes	Yes	Yes	Yes	Yes
N	633	78	628	77	632	78
Adjusted R square	0,029	0,276	0,086	0,360	0,039	0,226

Appendix V. Different factors in relation to the Non-listed firm premium based on the industry 'Manufacturing'

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. This regression is based on the specific industry 'Manufacturing'. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (EBITDA/EBIT/Sales) is subtracted from the matching listed firm acquisition multiple (EBITDA/EBIT/Sales). The dummy variable Year is not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (deal value multiples)					
	EBITDA		**EBIT**		**Sales**	
	A	B	C	D	E	F
(Constant)	5,993***	-7,214	9,203**	-38,225***	-1,358**	0,986
	(2,740)	(-1,117)	(2,182)	(-2,896)	(-2,551)	(0,985)
LogSize	-1,222**	0,959	-1,709	5,599*	-0,059	-0,254
	(-2,057)	(0,614)	(-1,506)	(1,752)	(-0,407)	(-1,047)
Leverage	0,701	3,963	0,509	11,084	2,292***	1,265
	(0,422)	(0,774)	(0,160)	-1,060	(5,673)	(1,595)
Asset Liquidity	-0,627	0,030	3,827	3,873	0,629	-0,750
	(-0,345)	(0,006)	(1,103)	(0,361)	(1,421)	(-0,922)
Strategic buyer	-2,810***	-0,244	-4,158***	0,797	-0,576***	0,653
	(-3,642)	(-0,074)	(-2,812)	(0,118)	(-3,067)	(1,278)
Same Industry		-0,013		1,028		-0,408
		(-0,005)		(0,208)		-1,091
Profitability		19,757**		79,596***		-6,348***
		(2,088)		(4,113)		(-4,328)
Non-listed acquirer		2,529		5,334		0,324
		(1,049)		(1,080)		(0,867)
Growth Rate		-0,086**		-0,059		-0,021***
		(-2,168)		(-0,721)		(-3,451)
Cross Border		-2,697		-4,088		-0,600**
		(-1,598)		(-1,173)		(-2,292)
Dummy Year	Yes	Yes	Yes	Yes	Yes	Yes
N	709	136	698	134	709	136
Adjusted R square	0,035	0,046	0,042	0,123	0,030	0,308

Appendix VI. Different factors in relation to the Non-listed firm premium based on the industry 'Finance, Insurance and Real estate'

The table presents the results based on the OLS (Ordinary Least Squares) regression model regarding to the non-listed firm premium of company acquisitions, reported by the SEC (Thomson One) in the period 1985-2020. The total sample consist of 20.770 acquisitions. When matching non-listed firms with listed firms, the matching sample of non-listed firms consist of 2.463 acquisitions. This regression is based on the specific industry 'Finance, Insurance and Real estate'. Adding different variables lead to a smaller sample size. To compute the non-listed firm premium the non-listed firm acquisition multiple (EBITDA/EBIT/Sales) is subtracted from the matching listed firm acquisition multiple (EBITDA/EBIT/Sales). The dummy variable Year is not presented in the table. The level of significance can be identified as following: *>10%, **>5% and ***>1%.

	Non-listed firm premium (deal value multiples)					
	EBITDA		**EBIT**		**Sales**	
	A	B	C	D	E	F
(Constant)	0,070	-16,921"	0,701	-11,201	-2,183**	-0,072
	(0,024)	(-3,328)	(0,157)	(-0,904)	(-2,161)	(-0,074)
LogSize	1,392	3,322*	1,834	3,057	0,130	-0,163
	(1,297)	(1,768)	(1,095)	(0,667)	(0,343)	(-0,455)
Leverage	0,158	25,266***	-0,129	14,776	1,984**	2,630**
	(0,057)	(3,737)	(-0,030)	(0,896)	(2,018)	(2,044)
Asset Liquidity	-0,249	3,182	-1,899	8,673	3,713***	1,294
	(-0,099)	(0,657)	(-0,485)	(0,735)	(4,201)	(1,405)
Strategic buyer	2,857*	2,310	3,982*	1,030	0,985**	1,213*
	(1,883)	(1,428)	(1,682)	(1,203)	(1,840)	(1,640)
Same Industry		-13,572***		-15,187		-2,528***
		(-3,600)		(-1,653)		(-3,524)
Profitability		18,336**		45,016*		-5,581***
		(1,793)		(1,805)		(-2,868)
Non-listed acquirer		-0,771		-1,495		1,214**
		(-0,279)		(-0,222)		(2,309)
Growth Rate		0,085		0,126		0,047***
		(1,080)		(0,662)		(3,150)
Cross Border		4,326		15,726		0,359
		(0,849)		(1,266)		(0,370)
Dummy Year	Yes	Yes	Yes	Yes	Yes	Yes
N	188	42	187	42	188	42
Adjusted R square	0,043	0,805	0,094	0,444	0,268	0,889