

# Important variables to calculate the Small firm premium for Dutch SMEs

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## Preface

This is the thesis that marks the concluding chapter of the study Master Business Administration at the University of Twente. I have learned new insights and enjoyed my time at the University of Twente. I started this thesis in April with a lot of joy and enthusiasm.

During my thesis, I received support from my supervisors Jeroen Sempel and Jan-Willem Bullee from the University of Twente. They helped me with guidance and provided good advice. Their insights lead to improving the quality of this study. I am grateful for their help.

I would also like to thank Ferdi van Benthem and Roman Berkel for their thinking along and their critical perspective. In addition, I have a great appreciation for the organisation KroeseWevers Corporate Finance for giving me a chance to experience the different facets of corporate finance. Also, I want to thank my colleagues at KroeseWevers Corporate Finance for giving their opinions and input.

Lastly, I want to thank my friends and family that supported me through this journey.

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Kim Hua Tang

## Abstract

This research has been carried out in collaboration with KroeseWevers. KroeseWevers is an accountancy company with a corporate finance branch. The corporate finance branch accompanies entrepreneurs with buying a company, selling a company and valuing a company. There are different approaches to valuing a company. The majority of these methods require the cost of equity. KroeseWevers uses the Build-Up Approach to calculate the cost of equity.

The Build-Up Approach in practice consists of the following variables risk-free rate, equity market premium and Small firm premium. This research focuses on the Small firm premium. The model that is used to calculate the Small firm premium stems from 2010. The model is also called the BDO model. This model consists of seven variables. Each variable has a percentage premium. By adding all those seven variables together it will result in a Small firm premium.

As previously mentioned the model stems from 2010. The model is more than a decade old. There could be a discussion if the variables that are used in the model are still relevant today. A research question has been formulated to answer that: Which variables (risk factors) are important to calculate the cost of equity for non-listed small medium enterprises in the Netherlands?”.

To answer this research question, the first step was to dive into the literature that was needed to identify variables. In total 33 variables were identified. However, between these variables, a certain correlation was discovered. So variables were removed which reduced the total variables to 24.

The second step is validating these 24 variables. Validating was done by interviewing experts in the valuation field. With the inclusion of the experts’ input, 14 variables were removed and 4 were added. In total 14 variables were going to be assessed in the survey. In Table 1 the 14 variables are illustrated.

Table 1

### *Variables assessed in the survey*

Variables		
- Cybersecurity risk	- Entry barriers	- Regulatory and compliance with legal risk
- Company cycle	- Flexibility	- Spread of activities
- Dependence on customers	- Human Capital	- Supply chain
- Dependence on management	- Internal manageability	- Track record
- Dependence on suppliers	- Location	

The third step was determining the importance of each variable. A survey was constructed to assess the importance of each variable. To inform respondents Brookz 2022 was used. Brookz 2022 is a magazine about the M&A market with 234 corporate finance companies. In total 876 emails have been sent out with a link to the survey. This resulted in a total of 203 responders of which 43 were incomplete.

The results of 160 respondents have been analysed by using SPSS. The mean score is used to determine the importance of each variable. The total mean is used as a baseline. In addition, to preserve the usability and complexity of the prototype seven variables will be used. This corresponds with the BDO model. The variables above the baseline are used to make a new model. The variables under the baseline are removed.

The results were comparable with the BDO model from 2010, however, there is a shift in the order of importance. In addition, the variable “human capital” is new. The variable entry barrier has diminished in importance and is removed in the new model. The maximum height of the Small firm premium has been adjusted to 13,22% based on the European study led by Erik Peek 2019. In this research, four studies have been taken into consideration to determine the maximum Small firm premium. One study has been conducted in the Netherlands in 2010. Two studies have been conducted in the United states in 2016. The last study was conducted in Europa in 2014 however has been further updated with data till 2019.

It is important the Small firm premium is applicable for the Netherlands and is also up to date. By taking these two conditions into account the most suitable is the European study. As it is the most recent and applicable to the Netherlands. The two studies conducted in the United States are deemed not suitable because of the location and are outdated. The Dutch study has been determined not suitable because the study is not up to date.

The decision is made to use the European study. The total Small firm premium of 13,22% needs to be divided between the seven variables. By dividing the score of a variable by the total score of all the variables multiplied by 13,22. The maximum value of the seven variables has been calculated.

The new model also added weight factors per variable. Weight factors are added to assess the amount of risk a company is exposed to per variable. The weight factors can be a score between 0 and 1. This method is inspired by the BDO model. At KroeseWevers the distinction was made between no risk (0,00), low risk (0,25), average risk (0,50) above average risk (0,75) high risk (1,00).

The new model has been tested by comparing results with the real-life example provided by KroeseWevers. Overall, the new model predicts that the Small firm premium is about 1% higher than the BDO model. This study has provided a new Small firm premium model that is transparent and incorporates the most recent changes. In Table 2 the new model is presented. The new model can be used to estimate Small firm premium for Dutch SMEs.

Table 2

*The new model*

Variables	Weight factors	Maximum SFP
Dependence on management	...	2,27%
Dependence on customer	...	2,13%
Human Capital	...	1,84%
Dependence on suppliers	...	1,79%
Track record	...	1,76%
Spread of activities	...	1,74%
Flexibility	...	1,69%

# 1. Introduction

This research has been carried out in collaboration with KroeseWevers. KroeseWevers is an accountancy company with a corporate finance branch. The corporate finance branch accompanies entrepreneurs with buying a company, selling a company and valuing a company. There are different approaches to valuing a company.

Throughout history, different methods for valuing a business have been developed. Most of those methods are used to value publicly listed companies. Public listed companies are a minority compared to non-listed companies. In the Netherlands, the most known index is the Amsterdam Exchange Index (AEX), which represents the 25 biggest companies in the Netherlands (Euronext, n.d.). The other two indexes Amsterdam Midcap Index (AMX) and Amsterdam Small Cap Index (AScX) also contain 25 companies each (Euronext, n.d.-b) (Euronext, n.d.-c). So, only in the Netherlands, there are 75 companies listed on the Amsterdam stock exchange compared to over 7 million non-listed companies (Centraal Bureau voor de Statistiek, 2022).

One method in particular, the “Build-Up Approach”, could be used to calculate the cost of equity of a non-listed company. In theory, the Build-Up Approach consists of a risk-free rate, equity risk premium, specific company risk, industry risk premium and size premium. The cost of equity is used by corporate finance companies to assess the value of a company for sell or buy purposes.

The most used methods are the Build-Up Approach and CAPM. The variables risk free-rate and equity risk premiums in the methods are well researched in the academic literature. However, in practice Corporate finance companies use additional variables. The added variables can be defined as Small firm premium or size premium and specific company risk. Because an SME is exposed to more risk than big established companies.

In the past, different studies have been conducted on the Small firm premium and the size premium. However, all these studies focused on small companies that are listed on stock exchanges with exception of the Small firm premium. The smallest companies on the stock exchanges are still quite big compared to the average non-listed Dutch SME.

KroeseWevers and most of their peers use the BDO model to assess the Small firm premium. The BDO model finds its origin in 2010. It is more than 10 years old.

Corporate finance companies and other financial companies calculate the cost of equity of SMEs for valuation purposes to sell or buy companies. The variables that are used in the BDO model may be possibly not up to date. The other method to incorporate additional risk is the size premium, however the method to calculate the size premium is based on stock-listed companies. The size of the smallest listed company is still bigger than the average non-listed Dutch SME. This could lead to less accurate estimation for non-listed Dutch SMEs. In this research, variables are going to be explored and a prototype is going to be constructed to calculate the Small firm premium for Dutch SMEs.

## 1.2 Research goal

The goal of this research is to discover additional risk factors (variables) that Dutch non-listed SMEs are prone to. These variables will be used to design a prototype based on the Build-Up Approach to calculate the cost of equity for Dutch SMEs. To meet the research goal, a specific research question will be constructed which will be the central point of this research. The research question is: “Which variables (risk factors) are important to calculate the cost of equity for non-listed small medium enterprises in the Netherlands?”.

## 1.3 Theoretical contribution

In the academic literature, there are different methods to calculate the size premium and the Small firm premium. However, these methods are mainly focused on stock-listed companies. In academic literature, there is limited research about determining the Small firm premium/size premium for non-listed companies. This could be defined as a gap in the literature. Hopefully, this study will identify new insights regarding which variables are important to determine the Small firm premium and the size premium for Dutch SMEs.

## 1.4 Practical contribution

The researcher did the research in collaboration with KroeseWevers. KroeseWevers was originally an accountancy firm. After a while, KroeseWevers started to offer corporate finance services. These consist of company sales, acquisitions, business valuations, debt advisory and due diligence.

For their financial services such as company sales and business valuations, the cost of equity plays a major part. The cost of equity consists of different variables depending on the methods. The most used method for KroeseWever is the Build-up Approach. One variable in the Build-Up Approach “the Small firm premium” consists of different risk factors. The BDO model that KroeseWevers uses to calculate the Small firm premium stems from 2010.

This research will deliver a list of risk factors (variables) that are important for calculating the Small firm premium that is up to date. Calculating the Small firm premium with more accuracy will lead to a more precise cost of equity. It will finally result in a better estimation of a company's value.

In addition, a prototype will be designed based on the Build-Up approach with inputs from the list of risk factors (variables). KroeseWevers could use the prototype to further improve their model or KroeseWevers, or they can further build on the proposed prototype.

## 1.5 Definition

In the Netherlands, SMEs are known for midden-klein-bedrijven (MKB). In 2018 1,2 million companies were active in the Netherlands. In total, 99,9% of the 1,2 million companies belong to the category MKB. According to the European Union, an SME is a company with fewer than 250 employees, a balance sheet not presenting more than 43 million and an annual revenue not exceeding 50 million. Within MKB, divisions are made between micro (micro) small (klein) and medium (middelgroot). In Table 3 the divisions are represented by the requirements.

Table 3

*Overview of the different MKB divisions*

Categories	Annual revenue (in millions)	Employees	Balance total (In millions)
Micro (micro)	< 2	< 10	< 2
Small (klein)	< 10	< 50	< 10
Medium (middel groot)	< 50	< 250	< 43

*Note: Based on the European principle*

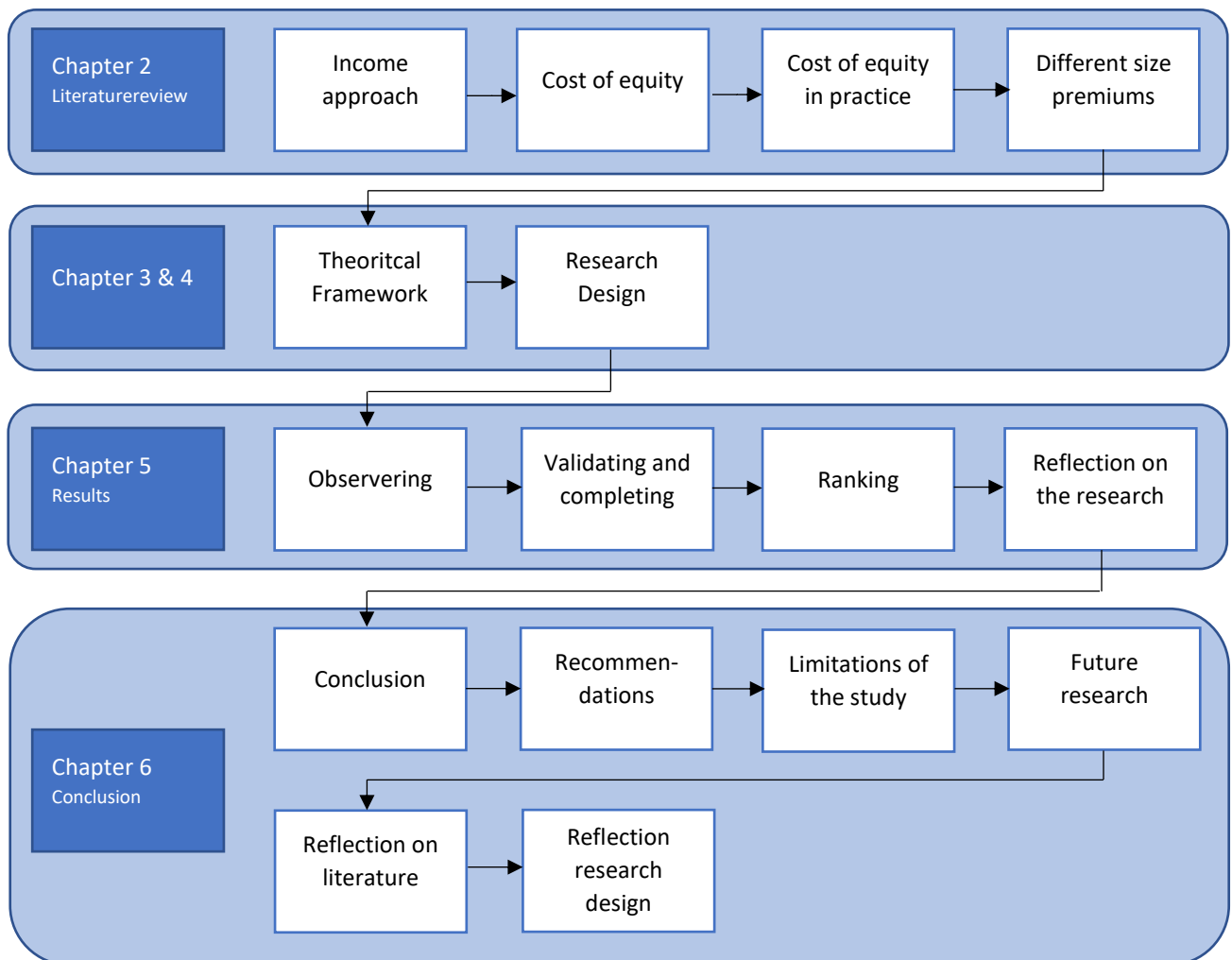


## 1.6 Structure of the research

In Figure 1 the structure of this research is represented.

Figure 1

Structure of the research



## 2 Literature review

This research is about the Small firm premium. The Small firm premium is part of the cost of equity. Before diving into the Small firm premium. The bigger picture is first explained.

Starting with an overview of different valuation methods in Figure 2. The diagram starts with an absolute model and a relative model. The absolute model uses financial numbers to calculate the worth of a company. The relative model uses comparisons to determine the worth of a company. All the valuation methods of the absolute model use the cost of equity. The Small firm premium is part of the cost of equity, however only in cases when the company is an SME.

The methods that incorporate the cost of equity are only further described. Starting with the three different approaches: "Dividends", "Free cash flow" and "Residual income".

After that, the different methodologies for calculating the cost of equity will be described. The last section explains how the additional risk factors "SFP" and "SP" are constructed.

Figure 2 has been constructed by a KroeseWevers predecessor in 2021 based on CFA institute 2019 and Damodaran investment valuation (Berkel, 2021). The researcher made some design modifications.

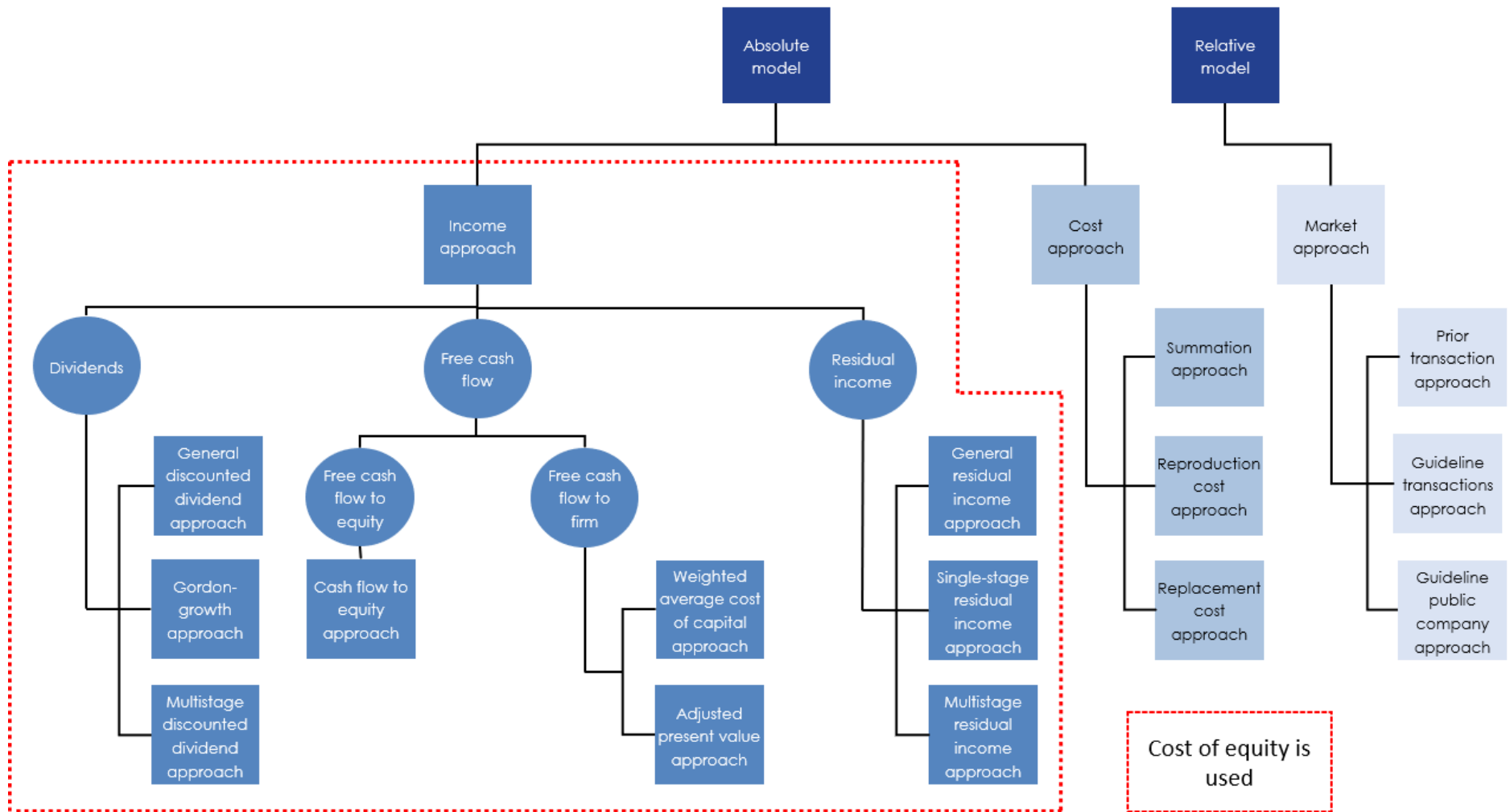


Figure 2: Overview of valuation methodologies

## 2.1 Income approach

The income approach is a methodology that values the future quantity and quality of an income stream. This includes its risk and likelihood of continuity. In the case of a company, the income approach tries to determine the value of a company by examining the net present value of future cash flow (Merriman, 2017). In addition, other aspects can be examined, for example, the dividend and the residual income. In total there are three categories of income approach: dividend, cash flow and residual income.

### 2.1.1 Dividends

If an investor buys shares of a publicly listed company, the cash flow can be defined as the dividend of the share. A simple model to value equity is the dividend discount model. It assumes that the value of a stock is the present value of future dividends. Nowadays, a lot of analysts view the discount dividend model as outdated. In fact, some companies do not provide dividends on their shares, these are mostly tech companies. However, there are still companies where the discount dividend model is a good option to determine the value (Damodaran, 2012).

### 2.1.2 Free cash flow

In general, there is one free cash flow that can be differentiated into two cashflows.

The first one is the free cash flow to equity, whereas the second one is the free cash flow to the firm.

In the paper (Ross et al., 2009), free cash flow is the remaining cash that is available after meeting all the commitments that are required to maintain the operational process of the company. These commitments are regular investments and debt repayments. Free cash flow can be freely distributed to creditors and stakeholders because it is not needed to maintain the working capital and fixed assets (Ross et al., 2009). Free cash flow can be calculated by operating income minus corporation tax, interest expenses and cash dividends. By using this calculation, a company receives insight into their free cash flows. The management can take decisions based on the free cash flow (Wang, 2010).

Free cash flow to equity (hereafter referred to as FCFE) is the amount of money that is generated by the company that is available to the shareholders. One of the starting points for calculating FCFE is starting with the net income. The formula for calculating FCFE is illustrated in equation 1 (Pinto et al., 2010).

$$\begin{aligned} FCFE = & \text{Netincome} - (\text{Capital Expenditures} - \text{Depreciation}) \\ & - (\text{Change in non - cash Working Capital}) + (\text{New Debt Issued} \\ & - \text{Debt Repayments}) \end{aligned} \quad 1$$

Firms can decide how much dividend will be paid out per share. If a company pays out fewer dividends than its available cash flow. The company will have a surplus position of cash, this will appear as an increased position in cash on the balance. The opposite situation is also possible if a company pays out its dividend and exceeds the FCFE. The company must finance the dividend payment. This is possible through existing cash or by issuing new stocks (Pinto et al., 2010).

Free cash flow to the firm (hereafter referred to as FCFF) is the cash flow that is available to the suppliers of capital. FCFF is the cash flow after operating expenses and the crucial investment that has been made into the working capital and fixed capital. The capital suppliers are the common shareholders and bondholders, on occasion preferred shareholders. The calculation is based on the available financial information made by accountants. The formula for calculating the FCFF is mentioned in equation 2 (Pinto et al., 2010).

$$FCFF = CFO + [IE * (1 - TR)] - CAPEX \quad 2$$

*FCFF = Free cash flow to the firm*

*CFO = Cash flow from operations*

*IE = Interest expenses*

*TR = Tax rate*

*CAPEX = Capital expenditures*

Both the methods FCFE and FCFF should in theory result in the same outcome. An analyst may prefer one of the methods. It depends mostly on the characteristics of the valued company. For example, if the company has a stable capital structure using the FCFE to value equity is more convenient than using the FCFF. The FCFF is better when a levered company has a negative FCFE or a levered company that has a changing capital structure (Pinto et al., 2010).

### 2.1.3 Residual income

Residual income is the net income deducted from common shareholders' opportunity costs. It is the remaining income after considering the cost of all firm capital. The benefits of the residual income stem from the fact that traditional accounting has shortcomings. The cost of debt is defined as interest expenses, however the cost of equity capital is not defined in the financial statements. Therefore, a company could have a positive net income, but it does not create any value for the shareholders. On the condition that a company does not earn more than the cost of equity. The formula of the residual income is illustrated in equation 3.

$$RI = NI - EC * K_e$$

3

*RI = Residual income*

*NI = Net income*

*EC = Equity capital*

*K<sub>e</sub> = Cost of equity*

The shortcomings can be solved by a model that became popular last decade. It is called the Residual Income Valuation (hereafter RIV) model. The reason behind this popularity is: that it gives accounting data a key role in determining the cost of equity in valuation. The RIV model is the basic equivalent of the dividend discount model (Konstantinos, 2010).

## 2.2 Cost of equity

The cost of equity is an important factor in this research; therefore it is necessary to define the cost of equity. The cost of equity can be defined as the return rate an investor demands investing with equity. If a company decides to invest in a new project or company, the cost of equity is the minimal amount of return that is required. Therefore, the cost of equity is also used as a discount factor for the future cash flow of investments and earnings. For valuation purposes, a slight change in the cost of equity could have a sizable impact on the value of the investment or company (Damodaran, 2012).

As mentioned by Stewart (1991), the suppliers of equity capital are scarce goods and demand certain compensation. It is limited to the number of people that are willing to invest. So, it is no coincidence that the cost of capital is the market mandate that the company at minimum needs to earn. The cost of capital is the financial structure of a company, it contains the cost of debt and the cost of equity.

In figure 2 the methods that use the cost of equity have been marked. The cost of equity is also used as a discount rate to determine the value of companies. Through time different methodologies have been developed. In the next section, the different methodologies will be discussed.

### 2.2.1 CAPM

A well known model is the Capital Asset Pricing Model (hereafter CAPM). CAPM was constructed by William Sharpe (1964).

CAPM makes it possible to determine the risk and return ratio of an investment. As with every other theory, CAPM has assumptions:

- All the investors are risk averse and maximise their financial returns
- Every investor has a homogeneous expectation of the return from the investments
- Every investor has access to unlimited lending possibilities and can borrow money at the risk-free rate
- Markets are functioning perfectly, there is no transaction cost, no tax and no information asymmetry

Based on the assumptions in CAPM all the investors will select the market portfolio as their optimal portfolio. The market portfolio is made up of all different investments. because all the investors have the same expectations. By investing in the optimal portfolio, the non-systematic risk will be non-existent through diversification. Systematic risk cannot be cleared through diversification. So, in the CAPM model investors will receive an additional return for taking additional risk (Vijverberg et al., 2015).

CAPM is constructed from three variables to calculate the cost of equity; the three variables are the risk-free rate, the beta of a stock and the market risk premium (Bruner et al, 1998). The formula is shown in equation 4.

$$E = R_f + \beta * (R_m - R_f)$$

E = cost of equity

R<sub>f</sub> = risk-free rate

β = beta

R<sub>m</sub> = expected market of return

4

RF stands for the risk-free rate. The risk-free rate should correspond to the country where the investment will be made. For example, if the investment is made in the Netherlands the Dutch bond is most proper to use.

E is the return on investment based on the formula. In corporate finance, the E stands for cost of equity. The rate a company needs to pay the equity investors.

The B (beta) measures the risk of a stock. By measuring the fluctuation in stock price compared to the market index.

5

$$Mp = (R_m) - R_f$$

Mp = market premium

Rm = expected market of return

Rf = risk-free rate

This part of the formula can be defined as the market premium see equation 5. The market premium can be defined as an additional return above the risk-free rate that is for investors that are investing in riskier assets.

One of the downsides of using CAPM is that beta is an essential variable. For private companies, the relevant market data cannot be derived to calculate the beta, therefore CAPM is not valid for these private companies (Britzelmaier et al., 2013). Another downside of CAPM is that valuating assets is not reliable. Under the circumstance that a company has assets on the balance sheet in combination with a low beta compared to the market index. Using CAPM in that circumstance will likely result in a lower return than in reality.

In addition, CAPM suggests that every investor has access to the same information. This is most of the time, not the case (Ross, 1977). Through the years a lot more variables have been discovered that also impact the cost of equity such as variables like size, various price ratios and momentum (Fama & French, 2004).

### 2.2.2 Build-Up Approach

The Build-Up Approach is an alternative method to calculate the cost of equity. The Build-Up Approach does not rely on data that is available for listed companies on the stock market. The Build-Up Approach is derived from the research of Professor Roger Ibbotson. Ibbotson studied the relationship between risk and return among various classes of assets, for example, varied sizes of companies' stocks and government bonds. Ibbotson intended to quantify the benefit of diversification in reducing risk.

The Ibbotson method calculates the cost of equity by adding together the systematic and unsystematic risks. Systematic risk is the market-based rate of return. Unsystematic risk is the risk that is associated with a certain company. In equation 6 the formula is shown for the Build-Up Approach (Ballwieser, 2010).

$$K_e = R_f + ERP + IRP_i + SP + SCR$$

6

$K_e$  = cost of equity

$R_f$  = risk – free rate

$ERP$  = equity risk premium

$IRP_i$  = Industry risk premium

$SP$  = size premium

$SCR$  = specific company risk

The first variable is the risk-free rate which is the same as in the CAPM method. The risk-free rate is the return on long-term government bonds mostly 10, 20 and 30 years. The second variable equity risk premium is the additional return an investor gets by taking more risk in their investment. By summing up the cost of equity and the risk-free rate it will result in the long-term average market rate of return. Ibbotson mentioned that calculating the equity risk premium needs to be based on an extended period. Ibbotson gives the following reasoning:

- Long-term historical returns have stability
- Short-term observations may lead to unreliable forecast
- Focusing on the short term ignores dramatic historical events and their impact on market return
- More observations lead to more accurate forecasting (NACVA, 2008)

The other three remaining variables industry risk premium, size premium and specific company risk are categorised as unsystematic risk. The industry risk premium is a risk that is only applicable in a certain industry. There is information available in the Ibbotson yearbook categorised by the Sic industry code about the height of the industry risk premium (Vertz, 2009).

Ibbotson's size premium and equity risk premium are not affected by the industry. Since not all industries bear the same risk. Including the variable industry, risk will likely result in a more precise estimation of the cost of equity.

Ibbotson has developed a methodology to calculate the industry risk premium. This methodology relies on the full information beta. The full information beta is based on data from companies that operate in an industry to determine the risk and the attributes of that certain industry. The industry risk premium can be calculated as shown in equation 7.

$$IRP_i = (RI_i \times ERP) - ERP$$

7

*IRP<sub>i</sub>* = The expected industry risk premium

*RI<sub>i</sub>* = The risk index for industry *i*

*ERP* = The expected equity risk premium

Another way to determine the industry risk premium is by comparing the general economy with the expectations of a certain industry. In addition, Ibbotson poses key questions that should be answered:

- How has this industry reacted to similar general economic conditions in the past?
- What are the industry forecasts and how do they relate to this company?
- What is its position in the industry?

Answering the mentioned questions alone is inadequate. It is necessary to compare the financial results of the company with the industry's financial results.

Ibbotson also researched the relationship between company size and return. Over lengthy periods the smaller companies have consistently and significantly outperformed the larger companies. The size premium can be defined as the additional return an investor expects by investing in smaller stocks on the NYSE and NASDAQ over the larger stocks. Ibbotson suggested including a size premium because all the privately held companies are most of the time smaller than the smallest company in the S&P 500 (NACVA, 2008).

The specific company risk premium is the last variable in the Build-Up Approach. If the previous variables were correctly filled in. It is possible to gauge the cost of equity in a smaller and more representative company. However, it would be short-sighted of an analyst to not include company-specific risk.

For instance, a company could have a strong track record with a dominant position in the market or it could be a relatively new company. Other characteristics that need to be considered are planning, the quality of management, capital and access to debt. A deep analysis of the company risk ratio and benchmarking it against the industry norms will help to identify the company-specific risks.

These risks above are categorised as unsystematic risks. Normally these risks could be nullified by having a well-diversified portfolio. However, this is incorrect if investments had been made in stocks from private companies.

In the book Guide to business valuation made by Livingstone (2006), they mentioned the following specific company risk:

- Interest-bearing leverage and coverage ratios
- Total leverage ratios, such as total liabilities to equity
- Liquidity ratio, for example, the current- and quick ratio
- Volatility of earnings
- Turnover ratios, such as inventory and receivables turnover
- Diversification of the company's activities

In general, the more a company is diversified in terms of service, products, geographic locations and customer base, the less risk it has compared to other companies.

The last risk that needs to be included is operating characteristics. The analyst should look over all the factors that could result in an extra positive or negative adjustment. Such factors could be key-man issues and management depth and competence (Livingstone, 2006).



### 2.2.3 Dividend discount model

The dividend discount model (hereafter DDM) is used to predict the stock price. The theory is based on discounting the dividend back to present value. By discounting the model tries to calculate the real value of a stock. So, if the value that is received from DDM is higher than the current stock price it means that the share is undervalued (Gordon & Shapiro, 1956).

There are several types of DDM. The most common is the DDM that has been established by Myron J. Gordon in the 1960s. This is also the only model that can be used to calculate the cost of equity. So, there will be a deeper dive into the Gordon DMM also known as the Gordon growth model (hereafter GGM). The formula of GGM is shown in equation 8.

$$P_0 = \frac{D_0}{k - g}$$

8

*P<sub>0</sub> = stands for the present stock price*

*D<sub>0</sub> = the expected dividend per share*

*k = the required return of equity investor*

*g = is the rate of growth of dividend*

It is assumed that the company is paying the dividend forever at a constant growth rate.

To calculate the value of a stock, GMM takes an infinite number of dividends and discounts them to the present value by using the required rate of return.

A weakness of the GMM is that it takes into account that the dividend will have a constant growth rate. Rarely do companies have a constant growth rate. So, this model is only usable for companies that have a constant growth rate of dividends. Another problem with GGM occurs when the required return for equity investors (k) is lower than the rate of growth of dividends (g). It will result in a negative price share (Hayes, 2022).

For calculating the cost of equity this formula in equation 9 can be used:

$$k = \frac{P_0}{D_0} + g$$

9

Using this method to calculate the cost of equity is only relevant for companies that are listed on the stock exchange. Without an estimation of the stock price, this method is merely impossible (Gordon, 1959).

#### 2.2.4 Bond yield plus risk premium

The method of Bond yield plus risk premium (hereafter BYPRP) contains two components: the bond yield and the risk premium. Bond yield is the return an investor receives each year over its term to maturity. The yield is a combination of overall returns that takes into account the remaining interest that needs to be paid. A company or person that issues a bond is also known as an issuer. The issuer needs to pay the bond yield. The bond yield reflects the annual interest payment.

The first time a bond gets issued it is sold on the primary market. The price of the bond depends on several factors: the size of the interest rate payment, the term of the bond and the comparable bonds already on the market. These factors are used to determine the initial yield of the bond. After the bond is issued an investor can trade the bond with other investors. The trading happens on a secondary market. The yield may change depending on the market conditions (Reserve Bank of Australia, n.d.).

The other component is the risk premium. A risk premium can be defined as an additional return above the free risk rate. The investor receives a risk premium because the investor takes an additional risk by investing in something other than the risk-free rate. In the case of bonds, an established company has a lower risk of defaulting than a start-up. Therefore, the payment on the established company bonds is lower than the bonds from a start-up (NACVA, 2008).

By combining the two components the cost of equity can be determined. The formula is shown in equation 10.

$$K_e = Y + RP$$

10

*K<sub>e</sub> = cost of equity*

*Y = yield to maturity on the company's long term debt*

*RP = risk premium*

BYPRP is a quick way to calculate the cost of equity of a company with publicly traded debt. In the United States, the average risk premium is between 3 - 4 per cent. BYPRP can also be used as an additional check.

If the shares of the company have a positive systematic risk, the yield on long-term debt can be used to check the cost of equity (Pinto et al., 2010).

### 2.2.5 Fama and French model

The Fama and French model is a model to determine the value of an asset. The Fama and French model can be seen as an expansion of CAPM. Some studies argued that CAPM is not a good model. As an alternative Fama and French introduced the three-factor model. Where an asset return depends on the difference between market returns also called market sensitivity. In addition, the return in the two portfolios imitates the additional risk factors. The two portfolios are small minus big (hereafter SMB) and high minus low (hereafter HML). SMB portfolio is the difference in return between a small stock and a large stock. HML is the difference in return between stocks with a high book value to market equity and a low book value to market equity (Fama & French, 1997).

Book value to market equity consists of two components: “book value” and “market equity”. Book value can be defined as value as stated in the financial statement. It can be calculated by taking the total assets of a company and deducting the total liabilities. The value that is left is called the book value. it would be the same value the stockholders will receive when they decide to liquidate the company (Shobit, 2021).

The market value also called market equity is the value of the stock market. it can be calculated by taking the current market share times the total outstanding shares. Both variables can be sensitive to change. The current market share is dependent on supply and demand. The total outstanding shares can be changed if the company issues new shares to attract equity, it also can be reduced by buying back shares on the market.

Book to market ratio is a useful indicator to assess the value of the assets. The formula is shown in equation 11.

$$Book\_to\_market = \frac{Common\ Shareholders'\ Equity}{Market\ Cap}$$

11

A company can be classified as undervalued when the book-to-market value is higher than the market value. On the contrary, if the market value is higher than the book-to-market value the company can be assessed as overvalued. A ratio higher than one means undervalued a ratio lower than one means overvalued.

If an investor wants to invest in a company where the book-to-market ratio is below one, it means that the company has a positive prospective future and the investors want to pay additional for the investment. Low book-to-market could be defined as a typical firm with high average returns on capital also called growth stocks, whereas a high Book-to-market is a typical firm that is relativity in a distressed situation (Fama & French, 1995).

The Fama and French model is shown in equation 12 below.

$$E(R_i) - R_f = b_i(E(R_m) - R_f) + s_iE(SMB) + h_iE(HML)$$

12

$E(R_i)$  = Expected total return of a stock

$R_f$  = Risk-free rate

$b_i(E(R_m) - R_f)$  = Excess return on the index

$s_iE(SMB)$  = Size premium (small minus big)

$h_iE(HML)$  = Value premium (high minus low)

(Fama & French, 1997)

The Fama and French model can explain over 90% of the diversified portfolio returns. However, a study done by Griffin shows that the Fama and French model is country-specific. It means that the country-specific three-factor model is more useful in explaining the average returns compared to the international version. So, by incorporating the Fama and French model it is better to base it on country-specific factors (Griffin, 2002).

Other research also shows the same results when the Fama and French model is applied in emerging markets. Where the book-to-market factor retains reliability, but the market-to-equity underperformed (Foye et al., 2016). For calculating the cost of equity, the premium of SMB and HML are needed, in addition to the time series total return of a portfolio of large and small stocks and high and low book-to-market. In a study where the Fama-French model is compared with CAPM; the Fama-French model did perform better in determining the cost of equity of small companies. A reason that has been given is that the Fama-French model accounts for the size. However, the volatility of the cost of equity remains quite high.

## 2.2.6 Overview Cost of equity theories

In the previous sections, the most common methods to determine the cost of equity have been mentioned. Table 4 represents an overview of the benefits, disadvantages and use cases.

Table 4

### *Overview cost of equity theories*

Methods	Benefits	Disadvantages	Use case	Reference
CAPM	One of the most researched methods.	Private companies do not have market data therefore it is not possible to predict the beta.	Companies that are listed on stock exchanges.	Sharpe, W. F. (1964). CAPITAL ASSET PRICES: A THEORY OF MARKET EQUILIBRIUM UNDER CONDITIONS OF RISK
Build-Up Approach	Flexible model, where variables can be added based on a specific situation and available data.	The existence of the small firm effect is being discussed in different papers. There is a split between researchers believing in the existence of the small firm effect and not.  Calculating the industry premium is mostly based on data from the United States.	Small to medium enterprises.	Ballwieser, W. (2010). Cost of capital. In J. Wiese (Ed.), Wiley Guide to Fair Value Under IFRS: International Financial Reporting Standards
Dividend discount model	It is one of the oldest methods.	The prediction growth rate is unreliable.	Companies that pay a dividend.	Gordon, M. J. (1959). Dividends, Earnings, and Stock Prices. The Review of Economics and Statistics
Bond yield plus premium	It is easy to use.	Hard to find the bond yield of private companies. There is also a possibility that the private company does not give out any bonds.	The company has publicly traded debt.	Pinto, J. E., Henry, E., Robinson, T. R., Stowe, J. D., & Cohen, A. (2010). Equity Asset Valuation (2nd ed.). Wiley
Fama and French model	It is an expanded version of CAPM. In addition, it is more accurate to calculate the return.	Fama and French model needs to be made country-specific to get more accurate results. Also, the inputs are hard to acquire from private companies.	It is mostly used to calculate the return on stocks and not so much for calculating the cost of equity	FAMA, E. F., & FRENCH, K. R. (1992). The Cross-Section of Expected Stock Returns. The Journal of Finance

Looking at the overview of the most common methods to calculate the cost of equity. Interestingly, most of those methods are focused on listed companies. It is no coincidence because some of those methods started as a pricing assets model such as CAPM and Fama and French model. For using those methods mostly public information is needed.

On the contrary, the Build-Up Approach is briefly touched in the academic literature. Most of the information about the Build-Up Approach is incorporated into practical books for valuers.

## 2.3 Cost of equity in practice

The previous section described theories that could be used to calculate the cost of equity. In this section, corporate finance companies display how they apply the theories to calculate the cost of equity.

Overall, the companies only use the Build-Up approach or CAPM for calculating the cost of equity. The information in this section is derived from valuation reports of different corporate finance companies. These valuation reports have been acquired or have been shared in meetings by corporate finance companies. The valuation reports are real-life examples for calculating the cost of equity. The companies that provided the valuation reports are anonymized. So their method cannot be tracked back to the company.

As for calculating the SP and SFP the methods will be explained after the application of the companies.

### 2.3.1 KroeseWevers

KroeseWevers uses a Build-Up Approach to determine the cost of equity. KroeseWevers modified the standard Build-Up Approach by Ibbotson for their use. By combining IRP (industry risk premium), SP (size premium) and SCR (specific company risk) into one variable SFP (Small firm premium). The formula is shown in equation 14.

$$K_e = R_f + ERP + SFP + SCR$$

14

$K_e$  = cost of equity

$R_f$  = risk – free rate

$ERP$  = equity risk premium

$SFP$  = small firm premium

$SCR$  = specific company risk

The risk-free rate is derived from the 10 years of Dutch government bonds. The source of ERP is the KPMG Equity Market Risk Premium Research Summary. In this report, KPMG uses the implied Market risk premium methodology. However, this method is sensitive to certain input assumptions.

1. The selection of income
2. The expected growth
3. The trade-off between outcome stability and current relevance concerning certain historical inputs

KPMG argues that the implied Market risk premium is the best method in this case because this model incorporates recent market developments, expectations and is easily constructed based on the observable market data. It includes market information from the market indexes: AEX, S&P 500, FTSE and STOXX600 (KPMG, 2022).

To date, KroeseWevers uses an ERP of 5% based on the report. KroeseWevers uses the KPMG ERP because it is more European focussed (KPMG, 2022). To determine the SFP KroeseWevers uses the BDO-model. The BDO-model is further explained in the upcoming section. In Table 5 the calculation behind the cost of equity is illustrated.

Table 5:

Cost of equity KroeseWevers

Cost of equity	
Variables	%
Risk-free rate	1,50%
Equity risk premium	5,00%
Small firm premium	6,40%
Specific company premium	0,00%
<b>Cost of equity</b>	<b>12,90%</b>

\*It is based on the experience and knowledge of the advisor

### 2.3.2 Company 1

Company 1 is an accountancy company that is active in the SME branch it also has a corporate finance branch. For calculating the cost of equity Company 1 uses the Build-Up Approach. The formula is shown in equation 13:

$$K_e = R_f + ERP + SP + SCR$$

13

$K_e$  = cost of equity

$R_f$  = risk – free rate

$ERP$  = equity risk premium

$SP$  = size premium

$SCR$  = specific company risk

For calculating the risk-free rate Company 1 followed the recommendations of Duff & Phelps. Duff & Phelps recommend using the normalised risk-free rate. The reason that Company 1 is using the normalised risk rate is that with an inflation of 2% the risk-free rate will not cover the inflation rate. The current interest rate is subject to the policy of the ECB and because of market disruption, the risk-free rate is artificially suppressed. A lower risk-free rate affects the valuation.

Duff & Phelps has two methods to calculate the normalised risk-free rate. The first one is the long-term averages. It uses the US treasure 20 years bond as a proxy. Duff & Phelps calculate the 10-year trailing average yield.

The second method tries to estimate normalised risk-free rates. By combining long-term real risk-free rates and expected long-term inflation

The estimated long-term real risk-free rate is based on different factors that have been discovered by academic research. The most used factor according to Duff & Phelps:

- Lower global long-run output and productivity growth
- Shifting demographics (ageing population leading to slower labour force expansion)
- Global “savings glut”
- Safe asset shortage (increased demand for safe-haven assets, accompanied by a declining supply)

Long-term inflation is based on a different forecast by mainly federal reserves, but also universities such as the University of Michigan. Based on these methods Duff & Phelps decide what normalised risk-free rate needs to be used. In Table 6 an example has been represented.

Table 6

*Calculation of normalised risk-free rate (Kroll, 2022)*

Method 1: Long-Term Average			
20 – Years U.S Government Securities <sup>1</sup>			
- Spot Rate	2,6%		
- Long-Term (10-year)	2,5%		
Method 2: Fisher Equation		Range	Median
Estimated Long-term Real Risk-Free Rate <sup>2</sup>		-1,1% to 2,0%	0,6%
Expected Long-term Inflation		1,9% to 3,0%	2,5%
Range of Estimates		0,9% to 5,0%	NMF
Mid Point		2,9%	3,1%
Concluded Normalized Risk-free Rate			3,0%

Notes:

<sup>1</sup> source of the data: Capital IQ

<sup>2</sup> a list that has been used to estimate the Long Real Risk-Free Rate

[https://vasdc8grscoc.blob.core.windows.net/files/20220331\\_real-rate-references.pdf](https://vasdc8grscoc.blob.core.windows.net/files/20220331_real-rate-references.pdf)

The ERP is based on the research that has been done by Duff & Phelps. Duff & Phelps analyse the global economy and the financial conditions to determine the ERP. However, the calculated ERP is for the United States capital market. It does not mean it cannot be used in the European or Asian market, but it could result in less accurate outcomes (Harrington, 2021).

The third component is the size premium. According to Duff Phelps, small companies are exposed to more risk than big companies. Generally, small companies are less diversified and have a harder time protecting against financial setbacks. So, in addition Duff & Phelps advised adding a premium of 5,89% for companies that have less than 17 million EBITDA, based on the risk premium report. Company 1 did not state which risk premium report is used.

As for the components SCR and additional size premium. It is based on the advisor. An additional size premium is implemented because an average Dutch SME is still a lot smaller than the smallest stock-listed company. By adding all the previously mentioned variables Table 7 is constructed. Table 7 does not represent the cost of equity of a real company.

Table 7

*Cost of equity Company 1*

<b>Cost of equity</b>	
<b>Variables</b>	<b>%</b>
Risk free rate	3,00%
Equity risk premium	5,00%
Size premium	5,89%
Additional size premium	0%*
Specific company premium	0%*
<b>Cost of equity</b>	<b>13,89%</b>

\*It is based on the experience and knowlegde of the advisor



### 2.3.3 Company 2

Company 2 uses the Build-Up Approach to calculate the cost of equity. For calculating the RF Company 2 uses a long-term average. The Proxy is the Dutch government bond of 10 years. Company 2 calculates the 10-year trailing yield. The risk-free rate that is used is normalised. The formula is shown in equation 15.

$$K_e = R_f + ERP + SP + SCR$$

15

$K_e$  = cost of equity

$R_f$  = risk – free rate

$ERP$  = equity risk premium

$SP$  = size premium

$SCR$  = specific company risk

The equity risk premium is based on a yearbook from Credit Suisse. The yearbook is a yearly report about global investments. Credit Suisse is a global investment bank, that also offers financial services and is located in Switzerland (Credit Suisse Global Investment Returns Yearbook 2021 Summary Edition).

The ERP that is used is based on the data from the United States, in 2021 the ERP was 5,8%.

The size premium is based on a portfolio study from Duff & Phelps. The study can be examined in the Valuation Handbook 2016. The size premium is a percentage of 11,8%.

The last variable is the specific company risk. In an example that was given the advisors examined external factors such as the weather. Also, internal factors were examined such as the operating sector, cyclical sensitivity, and dependency management. These factors could differ depending on the diverse kinds of companies. The percentage is freely chosen based on the experience and knowledge of the advisor(s). The calculation of the cost of equity can be examined in Table 8.

Table 8

#### Cost of equity Company 2

Cost of equity	
Variables	%
Risk-free rate (10 year average)	3,00%
Equity risk premium	5,80%
Size premium	11,80%
Specific company premium	0,00%*
<b>Cost of equity</b>	<b>20,60%</b>

\*It is based on the experience and knowledge of the advisor

### 2.3.4 Company 3

Company 3 uses the CAPM model to calculate the cost of equity. The risk-free rate that is used by Company 3 is not disclosed. The MRP is taken from KPMG's yearly report about market risk premium, it is the same report KroeseWevers uses. The market risk premium is the same as the equity risk premium. It can be defined as an additional premium for taking additional risks. Company 3 did not disclose any information about the beta, only that it uses a rebalanced beta. The formula Company 3 uses is visible in equation 16.

$$K_e = R_f + \beta * ERP + SCR$$

16

$K_e$  = cost of equity

$R_f$  = risk – free rate

$\beta$  = beta

ERP = equity risk premium

SCR = specific company risk

The additional risk of premium is defined as the risk that is not present by comparable stock-listed companies. If the company is an SME, the small size premium is applied. The height is indicated as 8,8% based on the study done by Ibbotson. Company 3 did not disclose which year of Ibbotson's study was used. Other risks could be an inadequate financial situation or other specific company risks. Table 9 is an example of the cost of equity calculation. The first step in the calculation is the ERP times the rebalanced beta. The outcome is further used to calculate the cost of equity.

Table 9

#### Cost of equity Company 3

Cost of equity	
Variables	%
Equity risk premium	5,50%
$\beta$ (rebalanced)	0,9
New Equity risk premium	4,95%
RF	2,11%
Specific company premium	0,00%*
<b>Cost of equity</b>	<b>7,06%</b>

\*It is based on the experience and knowledge of the advisor

### 2.3.5 Company 4

Company 4 is a financial service company that focuses on the southern part of the Netherlands. Koenen uses the CAPM method to decide the cost of equity of a company. As for calculating the RF Koenen uses the Dutch government bond of 30 years. The ERP is taken from KPMG Equity Market Risk Premium Research. The SFP is calculated by using the BDO model. Company 4 uses equation 17.

$$K_e = R_f + \beta * ERP + SFP$$

17

$K_e$  = cost of equity

$R_f$  = risk – free rate

$\beta$  = beta

ERP = equity risk premium

SFP = small firm premium

As for calculating the  $\beta$  Koenen first analyses the different operations in a company. Koenen determines the different operations in a company by sector. For example, an ICT company does consultancy and software development. Koenen determines that the ICT company does 40% consultancy and 60% software development. The consultancy has a levered  $\beta$  of 1,1 and software development a levered  $\beta$  of 0,8.

Koenen acquired its beta from Damodaran's website. Also, Koenen analyses the debt-equity ratio of these sectors. After that Koenen calculated the average Beta and D/e ratio. Then the beta will be unlevered by using the Harris & Pringle calculation. This formula can be defined as Beta/ (1+ (1-tax rate) (D/E)). The unlevered beta is used in the cost of equity formula. For calculating the SFP the BDO model is used. In Table 10 an example of calculating beta is presented. In Table 11 the calculation of the cost of equity is presented.

Table 10

Calculation of beta Company 4

Industry	Beta	D/e ratio
Consultancy	1,10	24,00%
Software development	0,80	76,00%
Average	0,87	50,00%
Harris & Pringle		
Beta/(1+(1-tax rate)(D/e))		
<b>Unlevered beta</b>	0,63	

Table 11

Calculation of the cost of equity Company 4

Cost of equity	
Variables	%
Equity risk premium	5,50%
$\beta$ (unlevered)	0,63
New Equity risk premium	3,47%
Risk-free rate	2,11%
Small firm premium	6,00%
<b>Cost of equity</b>	<b>11,58%</b>

### 2.3.6 Company 5

Company 5 is an accounting firm that is stationed in Germany. For calculating the cost of equity Company 5 uses the CAPM method. Company 5 states that they use the yield curve of the German Government Bond, however they do not state the duration of the German Government Bond. The market premium is calculated by the market index minus the risk-free rate. The market index that Company 5 uses vary, but they gave DAX as an example. Company 5 calculates the beta as follows. Company 5 searches for listed companies that are comparable to the company that needs to be valued. These comparable companies are the peer group. Sometimes the betas are levered and first need to be unlevered. The unlevered beta of the valuated company is the average unlevered in the peer group. The unlevered beta will be turned levered by the formula from Harris/Pringle. The reason for levering is to reflect the inherent risk in the company's capital structure. This beta is used for calculating the cost of equity. In Table 12 the calculation of the cost of equity is shown in equation 18.

$$K_e = R_f + \beta * ERP$$

18

$K_e$  = cost of equity

$R_f$  = risk – free rate

$\beta$  = beta

ERP = equity risk premium

Table 12

Calculation of the cost of equity Company 5

Cost of equity	
Variables	%
Equity risk premium	5,50%
$\beta$	1,0
New Equity risk premium	5,50%
RF	2,11%
<b>Cost of equity</b>	<b>7,61%</b>

## 2.3.7 Overview of practical methods

Table 13

*Overview of practical usage*

Company name	Method	RF	ERP (MRP)	$\beta$ (Beta)	SFP	SP
KroeseWevers	Build-Up Approach	Dutch Government Bond 30 years	KPMG Equity Market Risk Premium Research	Not relevant	BDO	Not relevant
Company 1	Build-Up Approach	Normalised risk-free rate Duff & Phelps	Based on Valuation insight from Duff & Phelps	Not relevant	Not relevant	Using Duff & Phelps risk premium report
Company 2	Build-Up Approach	Normalised risk-free rate Dutch Government Bond 10 years	Credit Suisse	Not relevant	Not relevant	Size premium Duff & Phelps Valuation book 2016
Company 3	CAPM	Dutch Government Bond 30 years	KPMG Equity Market Risk Premium Research	Rebalance beta	Not relevant	Based on a study from Ibbotson in 2016
Company 4	CAPM	Dutch Government Bond 30 years	KPMG Equity Market Risk Premium Research	Taking the company's $\beta$ per operation. Taking the average and unlever the beta with Harris & Pringle	BDO	Not relevant
Company 5	CAPM	German Government Bonds variates	DAX or other market indices	Peer group Unlevered > Levered	Not relevant	Not relevant

This overview is made to get a quick look at what companies in practice use for calculating the cost of equity. There is a separation between CAPM and Build-Up Approach. Other methodologies that were discovered in theory are not used. As for the RF, it uses government bonds as a proxy this corresponds to theory. As for calculating RF two difference big differences are discovered. One uses the yield of the government bond and the other one takes a trailing average of the government bond. As for the company that are using CAPM the calculation of the beta is different. One company is using the unlevered beta and the other one is using the leveraged beta. If valuation companies use the variable SFP to calculate the cost of equity. The method for SFP will most likely be the BDO model. As for the SP they use the risk premium rapport or the CSRP (Ibbotson) study. Data about the specific company risk is limited as it is the opinion of a corporate finance advisor.

Also, a difference in the cost of equity can be spotted. The first reason, the valuation reports are not made for the same company. For example, a company in healthcare has a lower risk than a company in technology. The second reason is that companies such as Company 2 always add a size premium of 11,80% for SMEs. This will result always in a higher cost of equity. As the ERP will be around 5% and RF around 2%. It will result in a cost of equity of around 20%. A higher cost of equity means that the company is exposed to more risk. Risk has a negative impact on the valuation of a company. How higher the cost of equity the lower the valuation. Company 2 chooses a conservative approach compared to other companies. Company 5 has a lower cost of equity compared to other companies. This is because Company 5 uses the CAPM model from theory. It means that it does not add any size premium or Small firm premium. It could be an indication that Company 5 is valuating stock-listed companies or companies that are comparable to stock-listed companies.

## 2.4 Different size premiums

In the previous section, the practical application of the theory was demonstrated. In this section, there will be a deeper dive into the methods behind calculating the SP and the SFP. As seen in the overview some companies use the Valuation book or the Ibbotson method to decide on the SP. The BDO model is used for calculating the SFP.

### 2.4.1 BDO model

BDO is a model that is used to calculate the Small firm premium. The BDO model is created by the accounting firm BDO. The BDO model has been developed through data collected from 158 surveys. These surveys were completed by valuation specialists in the Netherlands. In total seven risk factors were classified as significant. In Table 14 BDO model Small firm premium is pictured.

- Dependence on customer
  - Businesses that are dependent on a small number of big customers will carry additional risk because if one of these customers leaves or go bankrupt an extensive portion of the revenue will disappear.
- Dependence on suppliers
  - The same can be said for the supplier's side. If a company is dependent on a small number of big suppliers. The company will carry additional risk.
- Dependence on management
  - Companies that are dependent on a small number of people will have additional risk because if one of these people gets in an accident the continuity of the company will be in danger.
- Spread of activities
  - Companies that operate in a niche market are riskier than companies that operate in different markets. If in one market the sales are declining the company has a bigger chance of default than if the company is operating in two or more markets.
- Entry barriers
  - High entry barriers will limit the companies that can enter the market. If the entry barriers are low a lot of companies can enter thus the more competitors. This will result in lower margins.
- Track record
  - Companies that have a history of bad performing periods or fluctuating results will incorporate additional risk.
- Flexibility
  - Companies with high fixed costs or long-term contracts with suppliers are riskier. Considering changes in the market the company cannot or will slowly react to the changes.

The corporate finance advisors can decide the weight of the score and everything else is confirmed. Most of the time the weight is decided in consultation between two corporate finance advisors. The weight score that can be given is between 0 and 1. Where 0 is no risk and 1 is high risk. The weight scores that are used in Table 14 are fictional.

The lowest possible score is a SFP of 2%. Where it only takes into account the illiquidity premium. The illiquidity premium is fixed at 2%. The highest possible score is a SFP of 11,2%.

The illiquidity premium is always applicable. SMEs are most of the time not listed on the stock market therefore stocks of SMEs are not liquid. As a result, BDO decided to set the illiquidity premium at 2% (Janssen & Sterk, 2006).

Table 14

*BDO model Small firm premium*

Variables	Weight	Maximum	Total
Dependence on customer	0,25	1,57%	0,39%
Dependence on suppliers	0,50	1,26%	0,63%
Dependence on management	0,75	1,74%	1,31%
Spread of activities	0,25	1,26%	0,32%
Entry barriers	0,50	0,94%	0,47%
Track record	0,75	1,37%	1,03%
Flexibility	0,25	1,05%	0,26%
Illiquidity premium	1,00	2,00%	2,00%
Small firm premium SFP			6,40%

*Note: fictive data is used in this table*

BDO is a model that is used in practice to calculate mostly the SFP of SMEs in the Netherlands. It factors are composed of the survey results of 158 Dutch valuers. However, BDO does not disclose any information about the percentage that is given for example why “dependence on customer” has a maximum effect of 1,57% on the SFP. Understandably, BDO does not want to disclose this information as it could be categorised as a trade secret. In contrast for outsiders, it is hard to judge the reliability and the validity of the BDO model with hardly any information available (BDO, 2010).

#### 2.4.2 CRSP (IBBOTSON)

in 1996 Ibbotson started by analysing long-term returns on different asset sets. The study led to the development of new concepts such as equity risk premium and sized premium. The study was incorporated in the Ibbotson Stocks, Bond, Bills and Inflation (SBBI) Classic Yearbook. This book was every year revised and updated over more than 25 years. The data that has been used in the book came from the Center for Research in Security Prices (CRSP) at the University of Chicago (Duff & Phelps, 2016).

A separate version of the Yearbook called the Ibbotson SBBI Valuation yearbook was published from 1999 – 2013. Later in 2013 Ibbotson yearbook was acquired by Morningstar. Morningstar announced that it will no longer publish SBBI Valuation yearbook.

The research of the SBBI valuation yearbook is continued in the 2016 Valuation handbook. The valuation handbook is published by Duff & Phelps (Duff & Phelps, 2016).

CRSP has a methodology to create size-based portfolios. CRSP portfolio excludes:

- Close-end mutual funds
- Preferred stocks
- Real estate investment trust
- Foreign stocks
- American Depository Receipts
- Unit investment trusts
- Americus Trusts

It starts by ranking all the companies on the NYSE by market capitalization of their eligible equity. The companies are split into 10 equally populated groups. Eligible companies on the NYSE MKT and NASDAQ are then assigned to their appropriate groups according to their capitalization concerning the NYSE breakpoints.

The portfolio is reordered every quarter using the closing prices for the last trading day of March, June, September and December. If they are stocks added during the quarter, they are assigned to their appropriate portfolio. The return of a portfolio for one month is calculated by taking the weighted average of the returns for its stocks.



Annual portfolio returns of calculated by compounding the monthly portfolio. CRSP has in total 10 portfolios. The smallest portfolio can be further divided into 10w, 10x, 10y and 10z. Table 15 is the results of the research in 2016 (Duff & Phelps, 2016).

Table 15

*Overview of the portfolio by market capitalisation*

Portfolio rank by size	Market Capitalization of the smallest company (in \$millions)	The market capitalization of the large company (in \$millions)	Size premium
1	22.035.313	629.010.254	-0,36%
2	9.618.053	21.809.433	0,57%
3	5.205.841	9.611.187	0,86%
4	3.195.898	5.199.952	0,99%
5	2.090.566	3.187.480	1,49%
6	1.400.931	2.083.642	1,63%
7	845.509	1.400.208	1,62%
8	448.502	844.475	2,04%
9	209.880	448.079	2,54%
10	1.963	209.406	5,60%
Breakdown of the 10 <sup>th</sup> portfolio			
10 y	64.846	108.598	7,32%
10 z	1.963	64.747	11,79%

*Note: Table 15 is based on the CRSP (Ibbotson) studies from 2016*

Table 15 can be used in CAPM and the Build–Up Approach. Most of the SMEs in the Netherlands are placed in the last group 10z. it means that the company has a size premium of 11,79%. However, a market capitalization of 1963 million is still quite a lot bigger than the average SME in the Netherlands. Company 1 tries to resolve this by adding an additional size premium besides the standard size premium. Other companies resolve this by adding the SCR variable. In the SCR other risk variables are also included.

### 2.4.3 Risk premium report studies

In 1990 Roger Grabowski started to study the relationship between company size and stock returns. Roger first focused on size measured by market capitalization, but quickly expanded to stock returns predicted by measures of risk and stock returns predicted by fundamental risk measured based on accounting data. In 1992 Robert started collaborating with a colleague from CRSP and started to build a database that combined different stock information. The information came from the CRSP database and the Standard & Poor Compustat database. They found that a decrease in company size leads to higher returns. Grabowski and his colleague published an article in 1996 and 1999 that serves as the foundation for the risk premium reports nowadays (Duff & Phelps, 2016).

The risk premium report also excludes firms that are:

- American depository receipts
- Non-operating holding companies
- Financial service companies (SIC code 6)
- Unseasoned companies
- High financial risk companies

Financial service companies are excluded for the following reasons:

1. The financial data has been difficult to apply to companies in the financial sector.
2. Financial service companies tend to have a higher ratio of debt to equity than all the other industries. So, including financial service companies leads to skewed data.

After excluding the firms a portfolio can be created. The next step is determining breakpoints for each of the eight measures:

1. Market capitalization
2. Book value of equity
3. 5-year average net income
4. The market value of invested capital
5. Total assets
6. 5-year average EBITDA
7. Sales
8. Number of employees

In total 25 portfolios are created. The upper and lower boundaries of the portfolio are presented by the largest and the smallest NYSE company in each of the 25 portfolios. The same methods are used in the CRSP portfolios. The breakpoints are determined by companies listed on NYSE. After that companies from NYSE MKT and NASDAQ are added to the appropriate portfolio depending on their size. The portfolios are balanced annually. The returns for each of the 25 portfolios are calculated by using an equal-weighted average of the companies in the portfolio. The returns are further used to determine the size premium and risk premium. The creators of the risk premium rapport recommend using the Smoothed premium. Smoothed premium averages out the scattered nature of the raw averages. Table 16 is an example that has been constructed in 2016 based on the market equity value (Duff & Phelps, 2016).

Table 16

*Overview of the portfolio by average market value*

Portfolio rank by size	Avg. market cap (in \$ millions)	Smoothed avg. risk premium
1	278.925	2,41%
2	60.697	4,57%
3	37.431	5,25%
24	422	11,59%
25	148	13,07%

*Note: Table 16 is based on the Risk premium report studies from 2016*

The risk premium report can be used the same way as the CSRP. However, if the risk premium report example is used the formula of the Build-Up Approach changes, equation 19 illustrates the formula according to the risk premium report.

$$K_e = R_f + RP_{m+s} + ERP \text{ adjustment}$$

19

ERP adjustment is made to adapt the historical data exhibited with the ERP that is chosen by a company or an analyst. The ERP that is used in this report is 4,9. If a company uses a different ERP for example 5,5. The ERP adjustment will be 5,5 – 4,9 = 0,6

In the risk premium report the creators did not make an additional variable, however they merged the size premium into the ERP. For example, a company has a market value of 400 million and using the Dutch Government bond the cost of equity will be illustrated in equation 20:

$$14,19 = 2 + 11,59 + 0,6$$

20

#### 2.4.4 European Size Premium

In 2014 Erik Peek researched the size premium on the European continent. Duff & Phelps commissioned this research. The data comes from the intersection of the Datastream and Worldscope databases. The analysis focused on 17 western European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. In 2019 the data was updated (Peek, 2014).

The research used different variables to quantify the size of a company: market capitalization, book equity, and mv of invested capital. Table 17 was constructed by using the results of the research by Erik Peek. An example will be used to demonstrate the use of Table 17. If there is a company with a market cap of around 5 million. The company belongs to portfolio 16. The small premium for that company is 13,22%. This percentage is added on top of the CAPM formula.

$$E = R_f + \beta * (E(R_m) - R_f) + 13,22$$

21

As for using the Build-Up Approach it will show as:

$$K_e = R_f + ERP + 13,22$$

22

Table 17

*Companies ranked by market capitalisation in Europe*

Portfolio ranked by size	Avg. market cap (in € millions)	Smoothed premium over CAPM	Smoothed Avg. risk premium over RF
1	43019	-0,45%	4,25%
2	8701	0,87%	6,62%
3	4082	1,09%	6,93%
4	2267	1,19%	6,99%
5	1346	1,28%	6,98%
6	845	1,40%	6,99%
7	547	1,57%	7,04%
8	353	1,83%	7,19%
9	240	2,15%	7,42%
10	154	2,62%	7,84%
11	107	3,15%	8,35%
12	71	3,89%	9,12%
13	43	4,96%	10,32%
14	27	6,24%	11,82%
15	14	8,68%	14,81%
16	5	13,22%	20,62%

*Note: Table 17 is based on the results of the research by Erik Peek*

This research is also published in the Valuation book 2019 made by Duff & Phelps, it recommends using this for European companies. Valuation companies that use valuation books to decide the SP will most likely use this table. There is also a possibility that companies use an older version of the Valuation book. There are other variables by which a company can be ranked for example EBITDA, Net income. However, some ranking variables are not available in previous risk premium reports. They require the paid risk premium report version (Peek, 2014).

This chapter started with an overview of valuation methods. To use these valuation methods the cost of equity is an important variable. By diving further into the literature, different methods to calculate the cost of equity have been found. Most of these methods require specific information that only is available if a company is stock-listed. As this research focuses on Dutch SMEs, valuation reports have been used to analyse how companies in practice calculate the cost of equity. A big difference is that the companies use an additional variable the Small firm premium or the size premium. Both these premiums are used to indicate additional risk in dealing with SMEs.

The next step is analysing further analysing the premiums. In total four premiums have been elaborated. With each has its maximum premium. A big difference between the premiums is that the BDO model used a survey to determine the Small firm premium. The remaining three studies used stock data to calculate the size premium. By dividing the stock portfolio into different sizes and comparing it to the biggest size stock portfolio. Also, important factors are where is the study conducted and also how recent is the study. This information is going to be used further in developing the prototype.

### 3 Theoretical Framework

The theoretical framework is the base of this research. In the theory, there are several kinds of methods to calculate the cost of equity. In comparison to corporate finance companies, they only use two methods CAPM and the Build-Up Approach. A plausible reason is that the methods in theory require specific information, which is only available if a company is a stock listed. In theory, CAPM is most suitable for stock-listed companies, however in practice some companies use CAPM to value SMEs. The other method that is used in practice is the Build-Up Approach.

Both methods have their advantages and disadvantages when used to calculate the cost of equity for non-listed SMEs. One big disadvantage of CAPM is the use of the beta. Beta is based on historical price information. A Dutch non-listed SME is not listed, therefore does not have a historical price. It becomes an obstacle to calculating the cost of equity. Some companies as shown in the section “practice” try to solve this issue by comparing SMEs to stock-listed companies. This could be seen as a debatable case. By comparing non-listed SMEs with stock-listed companies, the assumption can be made that SMEs are inherently the same as stock-listed companies. Within this research, this is seen as a key reason to not use CAPM.

The Build-Up Approach according to the researcher’s opinion this method is better suited for this research. The goal of this research is to make a prototype by adding new variables. One of the characteristics of the Build-Up Approach is that adding new variables is convenient. The starting point is  $R_f + ERP$  adding new variables will almost not correlate with  $R_f$  or  $ERP$ . In the case of CAPM, the  $\beta$  measures the risk of a stock compared to the market index. By adding new variables (risk factors) there is a higher chance of correlation with the  $\beta$ . Another benefit is that Build-Up Approach does not require stock-listed information.

In theory the Build - Up Approach consists of the following variables:

$R_f = \text{risk - free rate}$

$ERP = \text{equity risk premium}$

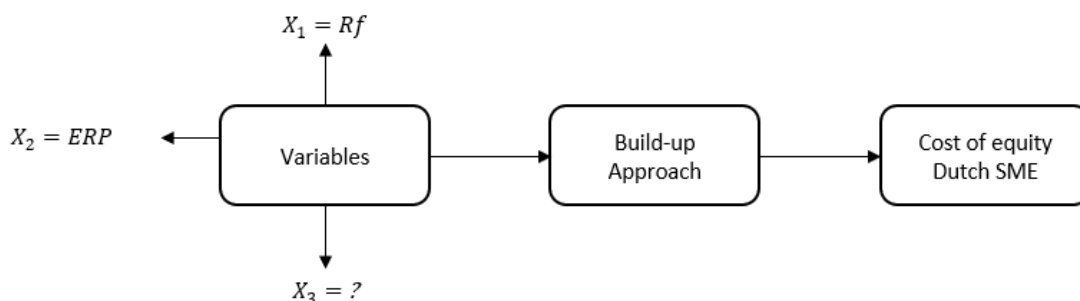
$IRP_i = \text{Industry risk premium}$

$SP = \text{size premium}$

$SCR = \text{specific company risk}$

In practice the  $IRP$  was not used. A reason could be that the Small firm premium correlates with the  $IRP$ . However, It does not mean  $IRP$  is not relevant. To assess the relevancy of the industry variable it will be included in the survey. As for the size premium, this will be removed. Because the size premium looks at the difference between big stock-listed companies and SMEs listed companies. However, the variables that the size premium consists of are not mentioned.

This research will find new variables (risk factors) that apply to Dutch non-listed SMEs. These variables will be further implemented in the Build-Up Approach. A Dutch non-listed SME is exposed to additional risk factors. However, not all the risk factors can be added to the prototype. It will make the use of the prototype too complex and time driven. The researcher decided to add specific company risk as a measure to solve this problem.



## 4 Research design

In this section, the research design will be explained. The goal of this research is to deliver a set of variables and a prototype. These two goals will be combined in the research design. In the literature, there are different methodologies to design a prototype. One of the most known methods is Design Thinking. Design Thinking consists of the following six steps: (Mueller-Roterberg, 2018).

### Steps

1. Understand  
The first phase is about developing an understanding of the problem/challenge. An important part is to acquire knowledge about which technical perspective is necessary.
2. Observe  
The second stage is about detailed research and on-site observations of customer needs/problems. There are different methods to accompany these goals such as interviews and surveys.
3. Point of view  
After the observations have been made the results should be condensed to a single prototypical user whose problem needs to be summarised in a clearly defined question.
4. Ideate  
In this stage, the actual brainstorming process occurs. The idea can be analysed in a customer-oriented way to identify weak points. A selection can already be made based on an idea evaluation.
5. Prototype  
In this phase, the prototype will be designed. The ideas should be visualised as fast as possible, sketched designed and made tangible.
6. Test  
This is the final phase, the ideas are further developed and tested through further experiments and feedback from the customer.

In this research Design Thinking will be followed. Some phases will be merged or will be customised because they will fit the research better.

The following steps will be followed:

1. Defining the goal  
This step has already been completed. The goal of this research is to deliver a list of variables and a prototype for calculating the cost of equity for a Dutch SME.
2. Observing  
In this step the academic literature, valuation reports and books will be observed for additional risk factors. A list will be made up of the observed additional risk.  
In addition, a comparison is going to be made based on the outcome of the research.
3. Validating and completing  
In this phase, the previous outcome from "Observing" is validated. Validation is done by interviews with experts in the field. Additional risk factors will be acquired from the interviews. These additional risk factors will be added to the list.
4. Ranking  
In this phase, the ranking of the risk factors will be conducted.  
This is done by sending out surveys to corporate finance advisors. The final step in this phase is analysing the result in SPSS.
5. Designing the prototype/testing  
In this step, the prototype will be designed. It is important to make a choice in which variables will be taken in the prototype. In addition, it is important to quantify the variables to know when a company is exposed to a risk factor and when not. Also In this step, the testing of the prototype will be done. Testing will be conducted based on historical examples.

### 4.1 Defining the goal

The first step is defining the goal. The goal of this research has already been defined in the section “Research goal” The goal of this research is the deliver a set of variables that are relevant to calculate the Small firm premium for Dutch SMEs. In addition, this set of variables is going to be used to design a prototype to calculate the Small firm premium.

The prototype should be user-friendly and the complexity needs to be comparable to the BDO model that KroeseWevers is using. To ensure complexity and usability the number of variables will be the same. An increase in variables will increase the complexity and decrease the usability.

### 4.2 Observing

The first is analysing literature about SMEs to attain knowledge of important variables for calculating the cost of equity. As already discovered, academic literature focuses on stock-listed SMEs which is quite different from the average SME. The academic literature is limited to the average SME. To solve these additional sources will be used such as practice books and other reports. These books and other sources will complement the academic literature to discover variables (risk factors) for non-listed SMEs. The decision has been made to first focus on non-listed SMEs in general and not specifically in the Netherlands. The focus on Dutch SMEs will be later in the steps.

The second step will be comparing the different literature with each other, to examine which variables are the most common. Table 18 below illustrates an example of how the comparing literature will be displayed.

Table 18

*Example of literature comparing*

Comparing	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5
Literature 1	x		x		
Literature 2	x	x			x
Literature 3			x	x	
Literature 4	x	x			x
Literature 5			x	x	

### 4.2 Validating and completing

In the previous step, a list of common risk factors has been discovered. As mentioned in the previous step, the list of common risk factors is for non-listed SMEs in general. This research is focused on the Dutch non-listed SMEs. Interviews will be held with Dutch Corporate finance advisors to acquire input.

Within KroeseWevers Corporate Finance there are a lot of people with expertise and knowledge. So, choosing an interviewee within KroeseWevers is obvious. Only choosing interviewees within KroeseWevers will increase bias. To reduce the bias additional external experts will be included.

According to Babbie there are three diverse kinds of interviews, unstructured, semi-structured and structured. As for this research the semi-structured interview will be most appropriate. The reasoning behind this is that there are pre-determined topics such as the variable list and additional risk factors of SMEs in the Netherlands. However, there still needs to be an option to ask follow-up questions (Babbie, 2015).

The location will be the interviewee's location. If the interviewee prefers otherwise, it is no problem. If by any means COVID-19 will rise again all the interviews will be performed online through different programs such as Microsoft teams and Zoom.

Beforehand, if an interviewee agrees to an interview, the list of variables will be shared. The reason for this is that the interviewee can already prepare their answers.

In the previous step list of variables has been discovered from the literature. There is a chance that there could be a correlation between them. The problem could also occur when interviewees recommend new variables. To solve this problem, the interviewees will be asked about the correlation between the variables. This will be noted and further analysed. The researcher makes the final decision on which variables will be eliminated.

After the interviews have been conducted the interviews will be transcribed. The next step is analysing the transcriptions. Open coding will be used to start the analysis.

Open coding is dividing the transcriptions into various parts and labelling various parts. The labelling is based on the different concept that arises from the transcriptions. The follow-up step is Axial coding. Axial coding uses the outcome of open coding. Axial coding reanalysis the open coding purpose is to identify the important general concepts (Babbie, 2015). After the steps are finished it will result in a list of variables that are relevant for the cost of equity in the Netherlands.

### 4.3 Ranking

The next step will be determining which risk factors has the most priority. There are different options to measure it. A survey is the best method according to Babbie to describe a too large population to observe directly. In addition, it is also a good method to measure the attitudes and orientations in a large population. Based on these reasons a survey is going to be used in this research (Babbie, 2015).

According to Babbie a survey involves the following three steps (Babbie, 2015).

1. Questionnaire construction
2. Sample selection
3. Data collection

The first step is constructing a questionnaire. For the questionnaire statements will be used. Statements are great if the researcher is interested in determining the extent to which a respondent has a particular attitude or perspective on a subject. In this study, the researcher is interested in which risk factors are the most important for calculating the cost of equity. The respondent will be presented with a statement and the respondent will either agree or disagree (Babbie, 2015).

A great tool to facilitate this method is the Likert scale. It is one of the most used tools in surveys. The Likert scale consists of three, five or seven answer categories. Where "1" stands for strongly disagree and "7" strongly agree. The respondent will assign a score that agrees with his/her perspective. The survey will be constructed in the Dutch language. It is more convenient for the respondents. The 7-point Likert scale will be used, so there is more spread among the data (Babbie, 2015).

The second step is sample selection. In this research cost of equity for valuing a company is an important part. Corporate finance advisor plays a significant role in this part. So, for this survey the focus will be laid on corporate finance advisors in the Netherlands.

A survey is the best option, it gives corporate finance advisors the freedom to rank the list with risk factors. Interviews also have been taken into consideration, however with an interview the maximum sample size is lower than a survey cause of the time constraint. In the Netherlands, the biggest platform for mergers and acquisitions is Brookz. Brookz releases a book called Brookz 500 with 500 of the most important financial services every year (Brookz, 2021). In the 2022 version, there are in total 234 M&A companies. The website of these companies will be visited and a list of email addresses of corporate finance advisors will be drafted. The contact will be through an email with a link to the survey. By using this method, it will be most likely that the target audience will be reached.



The last step is about collecting data. Corporate advisors will fill in the survey provided by Qualtrics. The data will be anonymised, so it cannot be tracked to a certain person.

Qualtrics is survey software that is provided by the University of Twente. Qualtrics is a web survey tool that allows the creation of online surveys and forms. Qualtrics has been chosen because the researcher is also a student at the University of Twente and therefore has free access. In addition, Qualtrics stores its data in a data centre in Europe. Therefore, they also are in accordance with the General Data Protection Regulation (GDPR). In Figure 3 an example has been represented.

Q1

Ben je het er mee eens dat variabele x een belangrijke risicofactor is?

Enigszins
Niet mee eens
Enigszins mee
Volledig mee  
Volledig oneens
Oneens
oneens
of oneens
eens
Mee eens
eens

Figure 3: Example survey question

When the respondents filled in the surveys the data is extracted via Qualtrics. The data will be transferred into SPSS. The quantification can start. Quantification is defined as the process of converting data to a numerical format. But first data needs to be cleaned. After that cleaning, the data quantification can start. This is done by changing the answer “Volledig oneens” (completely disagree) into a value of 1 and “Volledig mee eens” (completely agree) into a value of 7. The same will be done with the remaining answers. The data should be ready to be analysed. This will be done with SPSS because the data cleaning was also done in SPSS. In addition, the researcher had already used SPSS for analysing data in the past, so it will be the most suitable. The data analysis will focus mainly on the central tendency. The central tendency consists of the mean, mode and median. Other methods of data analysis could also be done. The central tendency is used to give insights into which risk factors are high and which ones are low.

The next step will be deciding which variables are important. As previously mentioned in the section “Defining the goal” the number of variables is comparable to the BDO model. In total seven variables will be selected. This is done by taking the average of all the risk factors. The average will be used as a baseline. If an individual risk factor falls under the baseline, it will be removed. It means that the risk factor is determined as not important. An important assumption will be made that the highest-scoring variable has the most impact on The Small firm premium. In Figure 4 there is an example. On the x-axis, there are the risk factors located and on the y-axis is the 7-point Likert Scale. The black dotted line is made up of all the average scores of the risk factors and functions as a baseline.

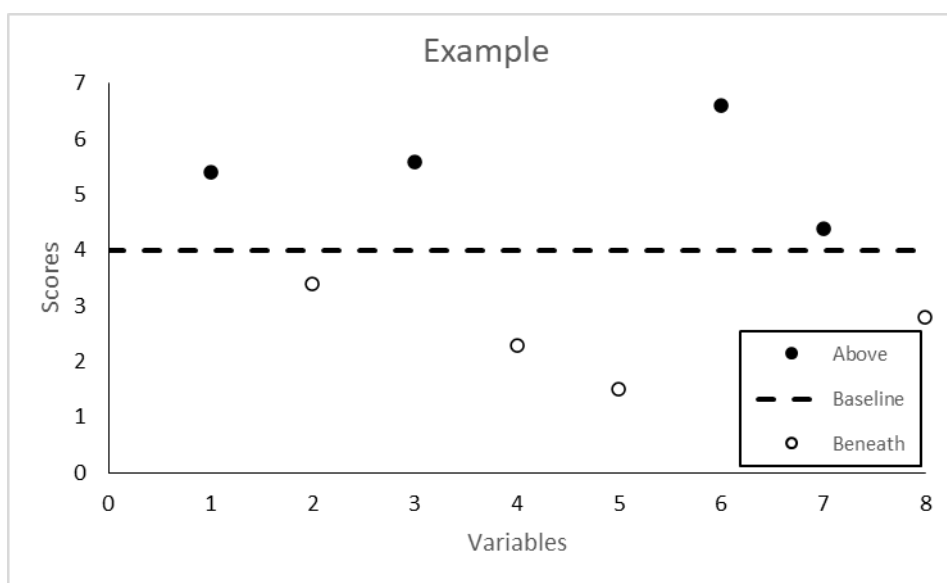


Figure 4: Example selection process

After the previous steps, there will be a list of the most important risk factors. The risk factors need to be quantified. Quantifying is needed because then the researcher will know how to measure certain risk factors. The first that will be done is literature research about how the risk factors will be measured. For measuring risk factors data will certainly be required. Firstly, the data of CBS will be used. If that is not suitable, the next step will be European datasets. If that is not even suitable global data sets will be looked at. If a risk factor still cannot be measured input will be asked from Corporate finance advisor from KroeseWevers.

#### 4.4 Designing prototype

The next step is measuring the risk factor with the data set. The researcher wants to know how much a company is affected by certain risk factors. So, if a company meet a certain condition the company is susceptible to that risk factor, for example, the risk factor “track record”. In the past, a company has had consistent revenue growth. An average of the revenue can be calculated over 5 years. So, if the last year’s revenue of the company differentiates more than 25% from the mean it will receive a higher risk score. Brackets will be made so, that lower than 25% corresponds to a risk score of 0,25 50% to a risk score of 0,65 and further.

The next step is to decide the border of the brackets. There are different methods in statistics to divide a variable into categories. One of the methods is the normal distribution. This method will only be used if a data set is available and a normally distributed assumption can be made.

The normal distribution is one of the most widely known distributions. In Figure 5, the normal distribution is illustrated. The normal distribution can be used to decide where the borders of the brackets will be. The red line is where the border is placed. The decision was made to merge the group with a standard deviation less than -1 and more than 1 standard deviation more than the mean. The brackets will look like this:

- < -1 Standard deviation = 0,25
- -1 > 1 Standard deviation = 0,5
- 1 > Standard deviation = 0,75

A standard deviation between -1 > 1 means that the company is average exposed to a risk factor. It also will be the most common occurrence.

A standard deviation lower than < -1 means that the company is below average and exposed to a risk factor. There the risk score it gets is below 0,25.

A standard deviation higher than 0,75 > means that the company is above average exposed to a risk factor. Because it is exposed higher than average the risk score will be above 0,75.

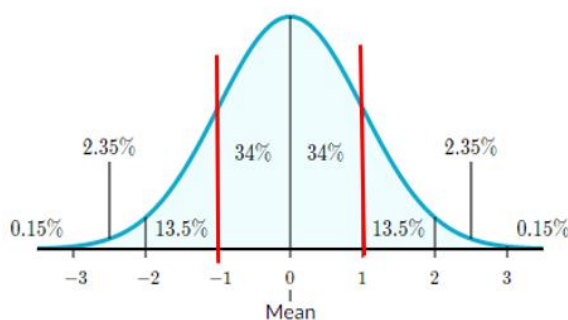


Figure 5: Normal distribution

However, the data set needs to be assessed for normal distribution first. In reality, not every data set is normal distributed. It is sufficient when a data set has a Nearly normal condition, which means that the shape of the data’s distribution is unimodal and symmetric. This can be tested by making a histogram and looking at the shape. Another method is making a normal probability plot (Figure 6). If the probability plot follows a straight line, it means it is almost normally distributed and meets the condition “nearly normal”. If the data set is not normally distributed the previously described method cannot be used (Veaux et al., 2015).

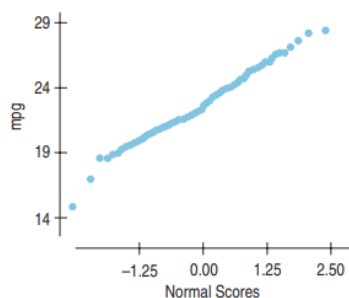


Figure 6: Probability plot

Another way to divide a variable into subgroups and decide borders is a method called K-mean. The method K mean requires the amount of cluster beforehand. In this case three clusters are needed. We are also dealing with numerical data, so K-mean is the most suitable for this research. K-mean can be used as a backup when the first method does not work.

After completing the previous step. A list with different risk factors and a corresponding bracket to the data. A table can be constructed with different brackets. This example (Table 19) has been simplified to make the explanation clearer. On the left side, the risk factors have been presented based on the previous example. On the right, the various levels of risk are shown.

Table 19

*Example of brackets*

Variables	0 – 0,24	0,25 – 0,50	0,51 – 0,75	0,76 – 1,00
Risk factor 1	<250	250 > 500	500 > 750	750 > 1000
Risk factor 3	<850	850 > 1200	1200 > 1550	1550 > 1800
Risk factor 6	<2500	2500 > 3000	3000 > 3500	3500 > 4000
Risk factor 7	<5000	5000 > 6000	6000 > 7000	7000 > 8000

Table 19 is used to assess the exposure to various risk factors. For example, a company has the following characteristics.

Risk factor 1 – 400 = Medium risk (0,5)

Risk factor 3 – 1400 = High risk (0,75)

Risk factor 6 – 1800 = Low risk (0,24)

Risk factor 7 – 3950 = Low risk (0,24)

The next step is deciding the weight of the risk factors. An assumption is made that the highest-rank risk factor has the most impact on the cost of equity. In Table 20 an example is shown.

Table 20

*Example risk Small firm premium*

Variables	Weight	%	Weight * %
Risk factor 1	0,50	4,00%	2,00%
Risk factor 3	0,75	3,50%	2,63%
Risk factor 6	0,25	3,00%	0,75%
Risk factor 7	0,25	2,50%	0,63%
Small firm premium			6,00%

The risk factor premium will be used further to calculate the cost of equity. The cost of equity will be calculated by using equation 23.

$$K_e = R_f + ERP + \textit{Small firm premium (SME)} + SCR$$

23

#### 4.5 Testing prototype

The next step would be testing the prototype. The testing will be based on historic examples. These historic examples will consist of historic valuation reports of companies. These valuation reports will be provided by KroeseWevers. Additional documents that are needed for the calculation of the cost of equity with the prototype will also be provided by KroeseWevers. The additional documents could be financial statements or HR documents; however they will be determined through the process. The documents and valuation reports will be from KroeseWevers because other companies will not provide such reports. As these reports contain sensitive information and could hurt the company if this information got leaked to the public. All the reports that are going to be used to test the prototype will be made anonymous. So, no company can be traced back on the base of the data.

Testing the prototype in real-time has been considered however, a valuation process can take up to two to four months. It is highly dependent on the entrepreneur for delivering documents. The valuation process takes too long, so it has been decided to base it on historic examples.

## 5 Results

This chapter will feature the results of the literature review of the variables, the results of the interviews, the results of the survey, the results of the new model and the comparison between the new model and the model used by KroeseWevers.

### 5.1 Observing

In the world of valuation, risk has a negative impact on the price. A risky company has a higher cost of equity, which leads to a lower price. An SME is also exposed to all kinds of risks. In this paragraph the risk an SME is exposed to will be introduced.

According to Mc Neil (et al., 2005) risk is defined as the measurable probability of loss or reduced expected return. By analysing academic papers, books and reports different SME risk factors were discovered. In total 21 different sources were consulted. In total there were 33 risk factors discovered. Also, the risk factors of the BDO model have been included. See the appendix “discovering risk factors” for a more extensive overview and the appendix “ Source of Discovering factors” for the sources.

The result is illustrated in Table 21. However, some factors overlap with each other. To solve this problem some factors have been removed because of correlation. In Table 21 correlation is illustrated by  $C^x$ . The x shows which variables correlate with each other. For example, finance risk  $C^1$  correlates with  $C^1$  liquidity ratios. The least mentioned variable by literature will be removed. So the decision is made to remove liquidity ratios.

A plus (+) or a minus (-) is to indicate which variables are going to be validated in the upcoming interviews. In total 24 variables are going to validate by corporate finance advisors.

In total four interviews will be conducted. Two interviews with KroeseWevers Corporate finance advisors the remaining two will be conducted with corporate finance advisors outside of KroeseWevers.

Table 21

*Overview variables identified by analysing the literature*

Variables	Mentioned in literature	Final decision
Finance risk	11	+ (C <sup>1</sup> )
Operational risk	11	+ (C <sup>2</sup> )
Human Capital risk	9	+
Supply Chain risk	8	+
Regulatory and compliance risk	8	+
Economic risk	7	+
Market risk	7	+
Reputational risk	6	+
(Cyber)Security risk	6	+
Technological	5	+
Strategic risk	5	+
Environmental risk	4	- (C <sup>3</sup> )
Interest rate risk	4	+ (C <sup>4</sup> )
Hazard risk	4	- (C <sup>3</sup> )
Liquidity ratio's	4	- (C <sup>1</sup> )
Legal risk	3	+ (C <sup>5</sup> )
Track record	3	+
Leverage ratio	3	- (C <sup>4</sup> )
Raw material risk	2	+
Spread of activities	2	+
Entry barriers	2	+
Intellectual property risk	1	- (C <sup>5</sup> )
Business assets risk	1	- (C <sup>2</sup> )
Geopolitical	1	- (C <sup>3</sup> )
Societal	1	- (C <sup>3</sup> )
Growing risk	1	+
Dependence on customers	1	+
Dependence on suppliers	1	+
Flexibility	1	+ (C <sup>6</sup> )
Length operating business	1	+
Turn over	1	+
Customer contracts	1	- (C <sup>6</sup> )
Location	1	+
External risk	0	+ (C <sup>3</sup> )

*Note: C<sup>x</sup> stands for correlation*

## 5.2 Validating and completing

In total, four interviews have been conducted. These interviews have been conducted online through Microsoft Teams. The respondents have a lot of experience in corporate finance and have a Register Valuator certificate. Register Valuators are experts in the valuation of different businesses. To become a Register Valuator, they must complete a two-year post-master. Register Valuators are also used to give an independent opinion in a court.

Two respondents were employed at KroeseWevers. The remaining two respondents were employed at different companies. In the interviews, the respondents were asked to validate the variable list. First, the interview was transcribed. The step after is applying open coding. The last step was axial coding.

The results have been presented in Table 22. In Table 22, a plus (+) or a minus (-) is used to indicate the opinion of the experts about a certain variable. If all the experts were negative about a certain variable. The variable is removed and not further evaluated in the survey. If an expert gave a plus (+) and the remaining experts a minus (-), the variable will be further evaluated in the survey.

Table 22

### *Overview selection variables through interviews*

Variables	R1	R2	R3	Final decision
Dependence on customers	+	+	+	+
Dependence on suppliers	+	+	+	+
Cyber security risk	+	+	+	+
Economic risk	-	-	-	-
External risk	-	-	-	-
Finance risk	-	-	+	Changed
Flexibility	+	+	+	+
Human Capital Risk	+	+	-	+
Interest rate risk	-	-	-	-
Legal risk	-	-	-	Merged <sup>2</sup>
Length operating business	-	-	-	-
Location	-	+	-	+
Market risk	-	-	-	-
Operational Risk	-	-	-	-
Raw material risk	-	-	+	Merged <sup>1</sup>
Regulatory and compliance risk	-	-	+	Merged <sup>2</sup>
Reputational risk	-	-	-	-
Spread of activities	+	+	+	+
Strategic risk	-	-	-	-
Supply Chain risk	-	+	+	Merged <sup>1</sup>
Technological	-	-	-	-
Entry barriers	+	+	+	+
Track record	+	+	+	+
Turn over	-	-	-	-

*Note: Variables that will be merged are identified with a number*

On basis of the interviews, 10 variables of the variable list belong to the Small firm premium.

One advisor recommends changing finance risk to internal manageability. Internal manageability is about the financial information that is available to the owner(s). In a small company the financial information is lacking

compared to big companies. Because of the information lacking decision making becomes more difficult. Internal manageability is more applicable to SMEs. For that reason the variable finance risk is changed to internal manageability. The researcher decided to include “internal manageability” in the survey to test its importance. Another recommendation was to merge raw material risk with supply chain risk. According to the advisors, it correlates with each other. Another variable that will be added to the list is the company cycle. Two advisors indicated that is variable is often encountered. About the variable “location” every respondent gave a different answer. To know the relevancy of this variable, it will be included in the survey. An advisor recommends merging the variables “regulatory and compliance” with “legal risk”. By merging two variables it needs to be evaluated in the upcoming survey.

All the remaining variables are removed from the list because of correlation or because they are not relevant for the Small firm premium. In Table 23 an overview is shown.

Table 23

*An overview of which variables will be tested in the upcoming survey*

Through selection	New added (not in the variable list)	Removed
- Dependence on customers	- Internal manageability	- Economic risk
- Dependence on suppliers	- Company cycle	- Finance risk
- Cybersecurity risk	- Dependence on management	- Interest rate risk
- Flexibility	- Regulatory and compliance with legal	- Market risk
- Human Capital	risk	- Operational risk
- Spread of activities		- Reputational risk
- Supply chain		- Strategic risk
- Entry barriers		- Technological
- Track record		- Turn over
- Location		

*Note: Through selection 10, new added 4 variables and removed 9 variables*

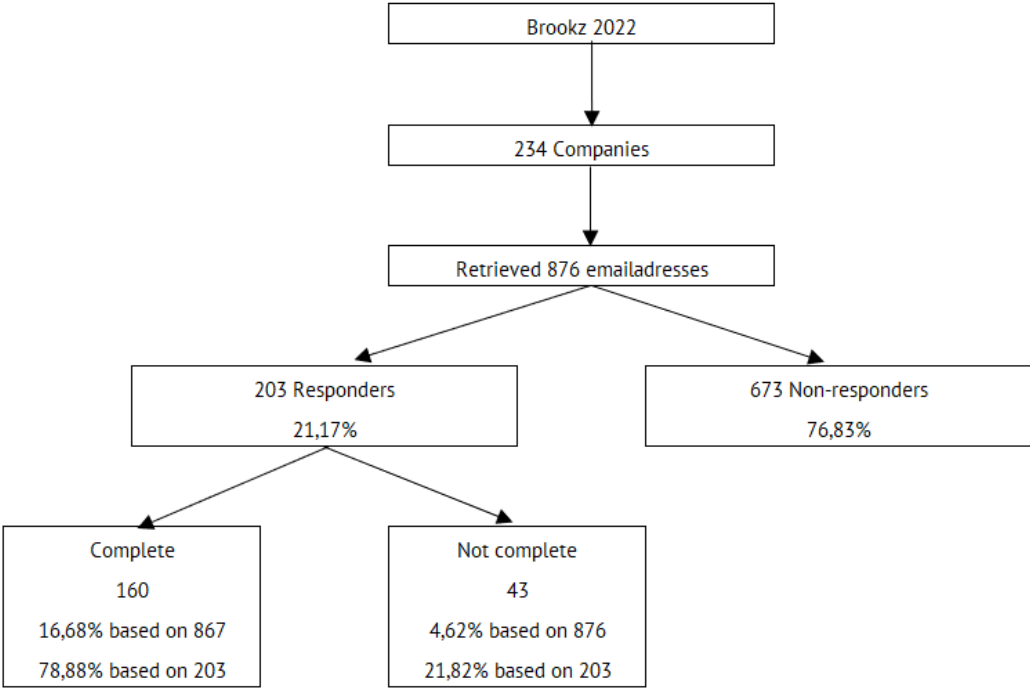
One respondent did not use a Small firm premium where the additional risks of SMEs are combined into a risk surcharge. Instead, they create different scenarios if an additional risk is valid. They analyse how the additional risk impacts the cash flow. In addition, probabilities are integrated to determine how likely a scenario will occur. As the respondent was not familiar with the BDO model the respondent did not give an opinion about the variable list. In total 14 variables are going to be tested in the survey. On a Likert scale of 1 to 7.

### 5.3 Ranking

In this step, the ranking of the variables will be carried out. The variables will be ranked through a survey that is made with Qualtrics. The population consist of corporate finance companies published in Brookz 2022. To contact these companies, email addresses are needed. The retrieval of email addresses was done by looking at the company’s website. If there were no emails, the website of Brookz was consulted. Finally, when Brookz did not have any email addresses the companies were not included. In total 876 email addresses were retrieved. All these email addresses received a link to the survey. The survey started on 12 October and was closed on 22 October. In total 203 responses have been gathered. Of those 203 responses, 43 surveys were not complete. By further analysing these respondents only filled in the demographic questions. As these responses have no value. These respondents will be removed before starting the analysis. In figure 6 the steps are illustrated.



Figure 6

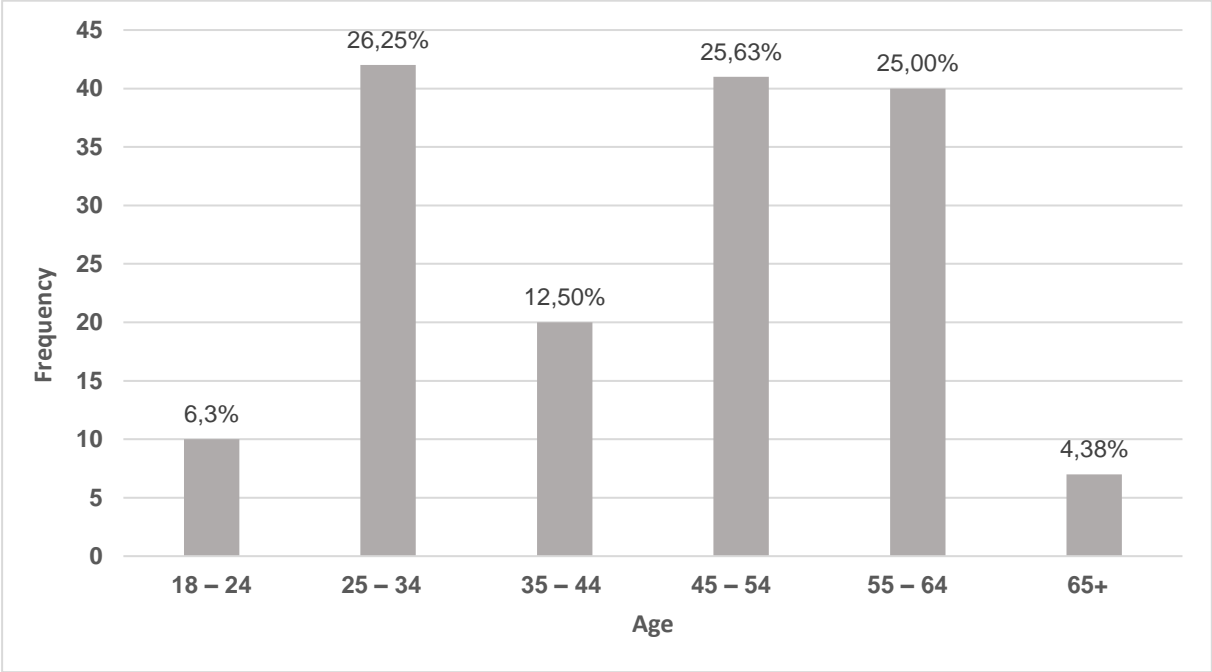


5.3.1 Characteristics of the Sample

In this section, the characteristics of the sample will be described. Starting with age, then the working experience and lastly the working location. In figure 7 the age distribution of the respondents is shown. Most of the respondents are in the 25-34 age bracket.

Figure 7

Age distribution

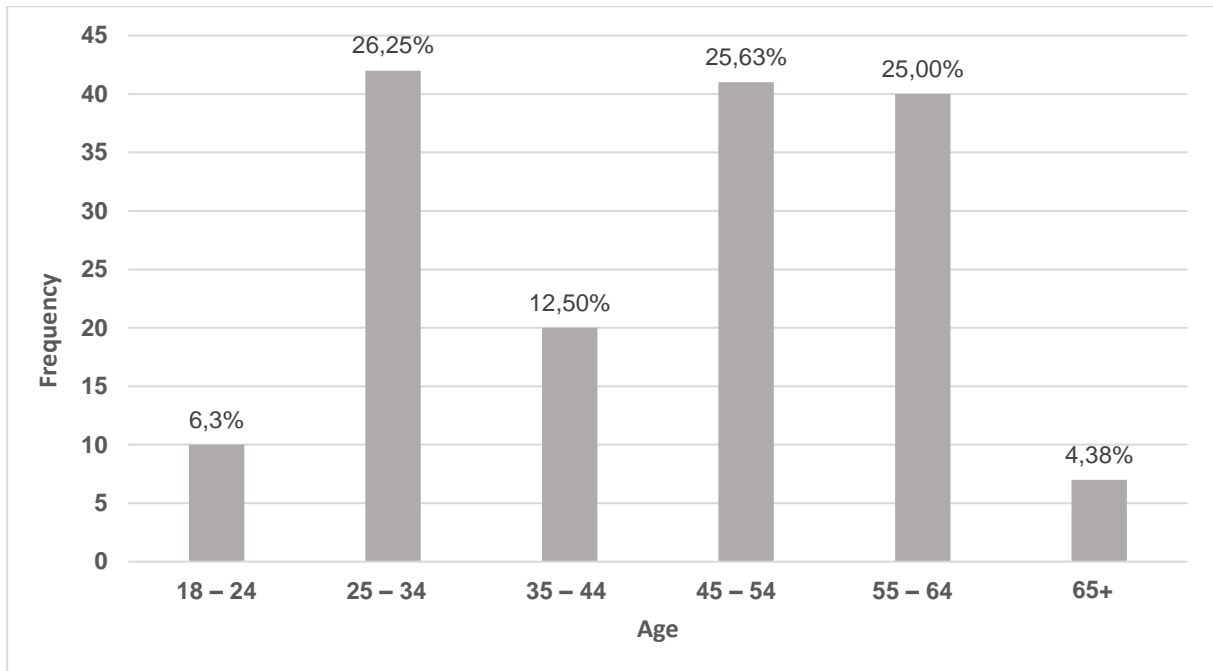


Note: Total number of participants N = 160

Another characteristic of the respondents is many years of working experience. As shown in figure 8 more than 50% of the respondent has 8 or more years of experience in Corporate Finance.

Figure 8

Years of working experience in Corporate Finance



Note: Total number of participants N = 160

The working place of respondents is mostly based in the West or East with fewer in the south and the fewest in the North. The grouping of the province is based on the European Nuts principle. The Nuts-principle was designed to easily compare the region with each other. In Table 24 the distribution of the respondents is shown.



Table 24

*Working Place*

Locations	Frequency	% Of total
North (North)	11	6,88%
East (East)	42	26,25%
South (South)	37	23,13%
West (West)	70	43,75%
Netherlands (Total)	160	100,00%

Note: Grouping is based on the European Nuts-principle

The results of the survey are represented in Table 25 In total the respondents ranked fourteen variables. Two variables stand out “Dependence on customer” and “Dependence on management”, these two variables score high.

Table 25

*Results of the variables*

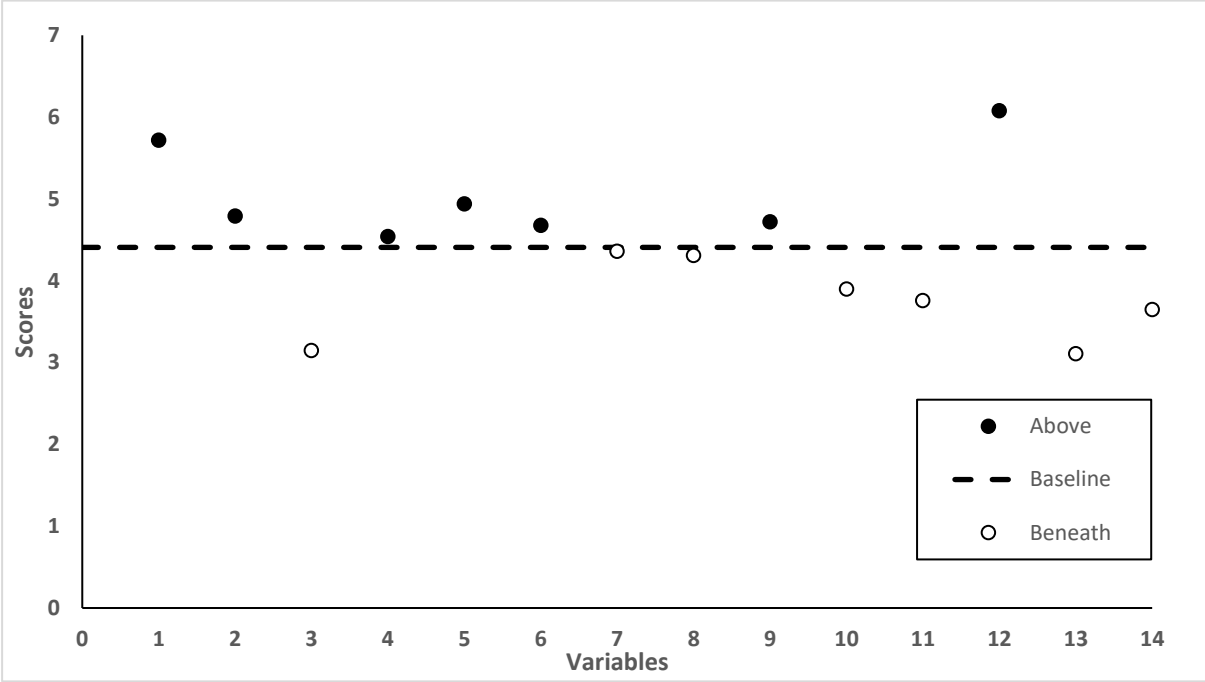
Variables	Mean	Standard deviation
Dependence on customer (1)	5,72	1,177
Dependence on suppliers (2)	4,79	1,383
Cyber security (3)	3,15	1,351
Flexibility (4)	4,54	1,233
Human Capital (5)	4,94	1,363
Spread of activities (6)	4,68	1,465
Supply chain (7)	4,36	1,399
Entry barriers (8)	4,31	1,347
Track record (9)	4,72	1,538
Internal manageability (10)	3,90	1,309
Company cycle (11)	3,76	1,447
Dependence on management (12)	6,08	1,009
Location (13)	3,11	1,353
Rules and legislation (14)	3,65	1,351

To make the picture clearer, a scatterplot has been made in figure 9. The variables are plotted on the X-axis according to the numbering in Table 25 the mean scores are plotted on the Y-axis. The baseline has been constructed by summing up all the mean scores of the variables and dividing them by the number of variables. The mean is 4,4 and will be used as a baseline. As mentioned in the research design section the number of variables will stay the same as in the BDO model. In that case it means seven variables in total.

Variables that are marked black are located above the baseline. Variables that are marked white are located beneath the baseline. According to the baseline, seven variables are above the baseline. These seven variables will be further used to design a prototype.

Figure 9

Scatterplot variables



Note: All the variables plotted that were in the survey in the scatterplot

In Table 26 the variables are presented in an overview which is above and beneath the baseline.

Table 26

Variables above and beneath the baseline are sorted based on the mean score

Variables above	Variables beneath
Dependence on management (12)	Supply chain (7)
Dependence on customer (1)	Entry barriers (8)
Human Capital (5)	Internal manageability (10)
Dependence on suppliers (2)	Company cycle (11)
Track record (9)	Rule and legislation (14)
Spread of activities (6)	Cyber security (3)
Flexibility (4)	Location (13)

Note: The variables are numbered the same as in Table 25 and also sorted based on the mean score

Table 27

*Variables above the baseline based on years of experience in Corporate Finance*

0 – 2 years	2 – 5 years	5-8 years	8+ years
Dependence on management	Dependence on management	Dependence on management	Dependence on management
Dependence on customer	Dependence on customer	Dependence on customer	Dependence on customer
Human Capital	Human Capital	Human Capital	Human Capital
Dependence on suppliers	Dependence on suppliers	Dependence on suppliers	Track record
Entry barriers	Supply chain	Spread of activities	Dependence on suppliers
Track record	Spread of activities	Flexibility	Spread of activities
Flexibility	Track record	Track record	Flexibility

*Note:*

*0 – 2 years n = 21*

*2 – 5 years n = 23*

*5 – 8 years n = 21*

*8 + years n = 95*

In Table 27 the variables are sorted based on years of experience. The distribution is based on the junior, medior, senior and senior+ distribution. This distribution is widely used in recruitment to distinguish between knowledge, experience and skill level. The distribution is used to analyse the difference between each group.

There are some differences in the order of the variables. The top 3 variables are all the same in the different experiences group. Almost all the groups have the same variables except for groups 0- 2 years and 2 – 5 years. In group 0 – 2 years “Entry barriers” is a newcomer. As for group 2 – 5 years, the newcomer is “supply chain”.

Table 28

*Variables above the baseline based on the location of work*

North	East	South	West
Dependence on customer	Dependence on management	Dependence on management	Dependence on management
Dependence on management	Dependence on customer	Dependence on customer	Dependence on customer
Track record	Dependence on suppliers	Human Capital	Human Capital
Dependence on suppliers	Human Capital	Track record	Dependence on suppliers
Human Capital	Spread of activities	Spread of activities	Track record
Internal manageability	Track record	Dependence on suppliers	Spread of activities
Flexibility	Entry barriers	Flexibility	Flexibility

*Note:*

*North n = 11*

*East n = 42*

*South n = 37*

*West = 70*

In Table 28 the variables are sorted based on the working location. Looking at Table 28 overall there is some difference in order. In the group North “internal manageability” shows for the first time. This could be because the sample size of North is a lot smaller. In the East group “Entry barriers” claims the top seven instead of the variable “flexibility”.

Table 29

*Statistics of the missing variables*

Variable missing	Respondents	%
No missing variables	113	71%
Missing one variable or more variables	47	29%
Total	160	100%

*Note: Overall results*

In the survey, respondents were also asked if they were variables missing. According to Table 29 around 71% of the respondent agree with the variables. However, there is also a part of 29% that argues that the list of variables needs to be complemented with one or two more variables. In Table 30, more insight will be given.

Table 30

*Missing variables according to the survey.*

Missing variable	Frequency	Total score	Mean
Sustainability	7	33	4,71
Illiquidity premium	6	36	6,00
Sector	5	26	5,20
Innovation	3	17	5,67
Key personnel	3	15	5
Cashflow	2	11	5,5
Dependence on director-major shareholder	2	13	6,5
International orientated	2	8	4
Profitability	2	12	6
(Future) business model	2	12	6
Capital structure	2	12	6
Government regulation	2	11	5,5

*Note: only the variables with a frequency higher than 2 are included.*

Table 30 gives insight into which variables are missing. The top 3 variables are the most mentioned in the survey. Analysing Table 30 should be mindful of the fact that the sample size is not sufficient. Therefore, any conclusion needs to be taken warily. However, Table 30 can be used to gauge which variables are also interesting. This could be further assessed in future research. For the complete table see Appendix "Table of missing variables".

### 5.3.2 Determining the SFP per variable

In the previous section, the results of the survey were analysed. First, there will be a comparison made between the BDO model and the results of the analysis. After that, the maximum Small firm premium is decided. At last, the Small firm premium per variable is calculated. The most important variables according to corporate finance advisors are presented in Table 31.

Table 31

*Comparing BDO with the new variables*

BDO	%	Variable list	%
Dependence on management	1,74	Dependence on management	?
Dependence on customer	1,57	Dependence on customer	?
Track record	1,37	Human Capital	?
Dependence on suppliers	1,26	Dependence on suppliers	?
Spread of activities	1,26	Track record	?
Flexibility	1,05	Spread of activities	?
Entry barriers	0,94	Flexibility	?

*Note: BDO variables are sorted on the % score and the variable are sorted on the highest mean score*

By comparing BDO and the variable list with each other. There are some similarities and some differences. A notable similarity is that “dependence on management” and “dependence on customer” are still the most important variables. The biggest difference is the replacement of “entry barriers” with “human capital”. In addition, some variables become less important for example “track record”, “flexibility” and “spread of activities”.

The next step is deciding the upper band of the Small firm premium for the variable list. This is conducted by taking into account other models. Starting with the BDO model the maximum Small firm premium is 11,2% including the illiquidity premium of 2%. The most recent publicly available research is from 2010. The European size premium amounts to 13,22%. The European size premium research was conducted in 2019. The Risk premium report for the smallest quartile companies has a size premium of 13,07%. The CSRP (IBBOTSON) report a premium of 11,79 for the smallest quartile companies. In Table 32 a comparison is made between different studies/models.

Table 32

*Comparison of different studies/models of Small firm premium*

Study/models	Maximum SFP %	Origin	Publication date
BDO	11,20	Netherlands	2010
European Size Premium	13,22	Europe	2019
Risk premium report	13,07	United States	2016
CRSP (IBBOTSON)	11,79	United States	2016

*Note: The SFP is taken from the smallest quartile in each of the study/models*

Considering every study/model in Table 32 European Size Premium is considered the most viable. For this reason, the European Size Premium is the most recent research and also focused on Europe including the Netherlands. So, the upper band of the prototype will be a Small firm premium of 13,22%.

The next step is determining what the maximum percentage is for each of the variables. As written in the research design the highest-scoring variable will receive the highest percentage.

Table 33

*Variables with new percentage*

Variables	Total score by survey	% Of the total score	% * SFP
Dependence on management	973	17,15%	2,27%
Dependence on customer	915	16,12%	2,13%
Human Capital	790	13,92%	1,84%
Dependence on suppliers	767	13,52%	1,79%
Track record	755	13,30%	1,76%
Spread of activities	748	13,18%	1,74%
Flexibility	727	12,81%	1,69%
Total variable score	5675	100,00%	13,22%

*Note: The scores of the eliminated variables are not included in the total score.*

In Table 33 a percentage of the Small firm premium is allocated to each variable above the baseline. The allocation is based on score distribution. The highest rated variables receive the most SFP. In the survey different variables were rated by corporate finance advisors. The rating is based on the 7-Likert scale.

First, the total score of each variable that is above the baseline is imported from the survey results. The next step is adding those scores together. It results in a total score of 5675.

The next step is calculating the percentage of the total score. This is carried out by dividing the “variable score” by “total variable score”.

The last step is to calculate how much weight a variable has in the Small firm premium. This is carried out by multiplying the % of the total score with SFP 13,22%. It is now clear how much Small firm premium is allocated to each of the variables.

Table 34

*Comparison % between the new and the BDO model*

Variable list	% Of total SFP (New)	% Of total SFP (BDO)	Positive/negative
Dependence on management	17,15%	18,93%	-1,78%
Dependence on customer	16,12%	17,08%	-0,96%
Human Capital	13,92%	Na	Na
Dependence on suppliers	13,52%	13,71%	-0,19%
Track record	13,18%	14,91%	-1,73%
Spread of activities	13,30%	13,71%	-0,41%
Flexibility	12,81%	11,43%	+1,38%

*Note: Human Capital is a new variable therefore a comparison could not be made*

In Table 34 a comparison is made between the new variables and the BDO model. The calculation is conducted by taking the maximum premium of the specific variable divided by the maximum SFP. Almost all the variables became percentages less important except for “human capital” and “flexibility”.



### 5.3.3 Scorecard valuation

In the previous step, the bandwidth of the variables was determined. In the next step, the variable is to determine how the variables can be quantified. First, two other valuation models are going to be described that are used by business angels and venture capitalists.

Business angels use Scorecard valuation to evaluate a target company. The method compares the target company with similar companies in the industry. The first step in the method is to determine the average pre-money valuation. The pre-money valuation varies through different countries and regions. After the pre-money has been determined the next step is determining the weight of the several factors (Payne, 2011). The factors in the Scorecard valuation are presented in Table 35

Table 35

#### *Scorecard valuation method*

Factors	Maximum weight percentage
Strength of the Management team	0 – 30 %
Size of opportunity	0 – 25%
Product/Technology	0 – 15%
Competitive environment	0 – 10%
Marketing/ Sales channels/ Partnerships	0 – 10%
Need for additional investment	0 – 5%
Other factors	0 – 5%

To further demonstrate the use of the Scorecard valuation an imaginary company will be used. The variables are compared to a benchmark company. Therefore percentages can exceed 100%, it will mean that the analysed company is better than the benchmark company.

Assume a company with the strength of the management team (145%), Size of opportunity (120%), Product/Technology (100%), Competitive environment (65%), Marketing/Sales channels/ Partnerships (70%), Need for additional investment (100%), other factors (95%) and assume an average pre-money valuation of 1,5 million.

Table 36

#### *Demonstration Scorecard valuation method*

Factors	Maximum percentage	Target company	Factor
Strength of the Management team	0 – 30 %	145%	0,4350
Size of opportunity	0 – 25%	120%	0,3000
Product/Technology	0 – 15%	100%	0,1500
Competitive environment	0 – 10%	65%	0,0650
Marketing/ Sales channels/ Partnerships	0 – 10%	70%	0,0700
Need for additional investment	0 – 5%	100%	0,0500
Other factors	0 – 5%	95%	0,0475
Total			1,1175

The total sum of the factors is 1,1175. The next step is multiplying the factor with the pre-money valuation shown in equation 24. It results in a valuation of 1676250.

$$1,1175 * 1.500.000 = 1676250$$

### 5.3.4 Risk factor summation method

Another widely used valuation method by business angels and venture capital is the Risk Factor Summation Method (RFSM). RFSM was designed by the Ohio Techangels. The method consists of 12 risk factors and risk scoring (Rahardjo & Sugiarto, 2019).

Table 37

Description variables RFSM

Variable	Description
Risk of management	It refers to the quality of the management and its capabilities. Good management is essential for the success of a start-up.
Stage of business	This variable is comparable to the variable "Company Cycle" that was assessed in the survey. It measures how mature the business is. This is measurable by evaluating the growth of the stakeholder.
Political Risk	This variable refers to the risk that is involved in government policies, laws and regulations. It is important to analyse how a company relates to the government and is regulated.
Supply chain or Manufacturing risk	This variable refers to the risk of the production and supplier. The quality of the goods is related to how well the supply chain is managed.
Sales and Marketing	Sales and marketing are important for a start-up company. The risk that the company is exposed to needs to be carefully monitored.
Capital Raising Risk	This refers to raising capital for the start-up. How much capital can be invested greatly influence how a start-up can progress in the future.
Competition Risk	A start-up that is facing competition adds additional risk because competition will pressure the user base and profit margins.
Risk of Technology	This risk refers to how fast a start-up can adapt to new changes in technology.
Risk of Litigation	It refers to the possibility of facing a lawsuit. A lawsuit can occur through a violation of law or consumer protection, breach of a patent or unfair competition.
International Risk	With today's globalisation and increase in competitors, international risk can impact the business.

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Risk of Reputation	Reputation risk refers to the image that has been built in the industry. Reputation is important to get more stakeholders on board.
Exit value Risk	This risk refers to the asking price of the start-up. Familiarity with the risks that can influence the price.

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Each risk factor can be graded with the following scores (Rahardjo & Sugiarto, 2019):

- +2 very positive increase of 500.000
- +1 positive increase of 250.000
- ±0 neutral no increase
- -1 negative decrease of 250.000
- -2 very negative decrease of 500.000

In Table 38 the method is demonstrated.

Table 38

*Demonstration Risk Factor Summation Method*

Variables	Score	Valuation
Risk of management	+1	+250.000
Stage of business	±0	0
Political risk	-1	-250.000
Supply chain or manufacturing risk	+1	+250.000
Sales and marketing	-1	-250.000
Capital raising risk	+2	+500.000
Competition risk	-2	-500.000
Risk of Technology	+1	+250.000
Risk of Litigation	+1	+250.000
International Risk	±0	0
Risk of Reputation	+1	+250.000
Exit value risk	-1	-250.000
Total		+500.000

Assume that the pre-money valuation is the same as in the previous example, so 1,5 million. The results of the evaluation of the risk factors will result in a valuation of 2,0 million. Overall, the RSFM is an easy method to calculate the pre-money valuation. However, in this model, every risk factor has the same weight.

### 5.3.5 The new variables

#### Dependence on management

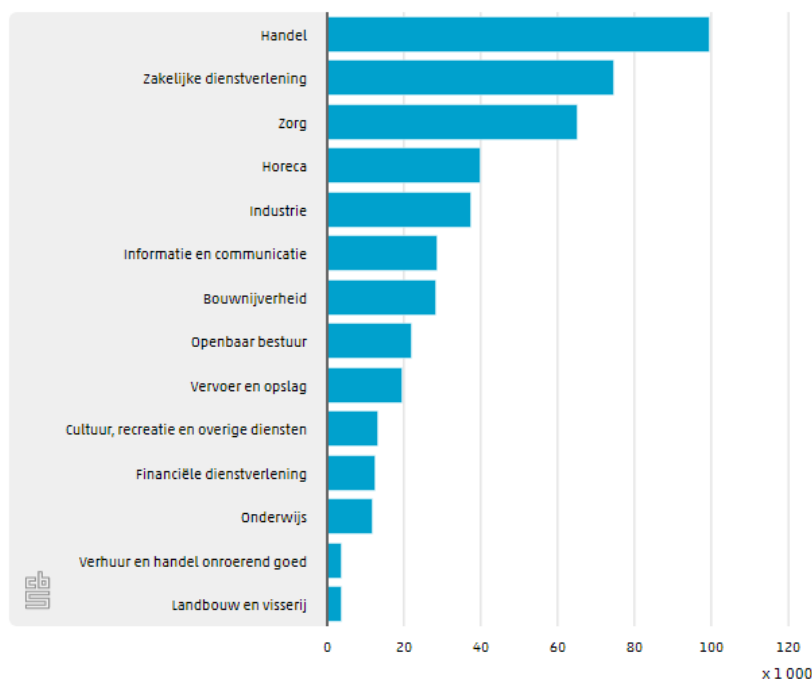
This variable is hard to quantify. Dependence on management has a lot of subjective factors, however there are objective measurements. Most management will set a yearly, or quarterly goal for a company in the form of goals or milestones. A measurement can be made of how far a goal or performance has been reached. In a small company, the owner(s) (management) have most of the time more than one function. For example, some owners take up financial administration and sales next to their management function. Another option is to gauge how many tasks for distinct functions a manager is conducting.

#### Dependence on customer

A company is more vulnerable to risk if a company is dependent on a high concentration of a sparse number of customers. To make this variable measurable, the top 5 can be constructed of the customers. The raw data can be requested from an accountant or bookkeeper. It is also important to know what kinds of customers a company has. A government as a customer is different from any other business.

#### Human Capital

Humans are central to a company. Growing a company needs more human capital. In a time where staff shortage is a real problem, this becomes a challenge. A way to measure how a company is affected by this shortage in human capital. This is to make clear how many vacancies still need to be filled in a sector. CBR acquires these statistics in the Netherlands. If a company belongs to one of the sectors with high open vacancies it could be argued the company is more exposed to human capital risk.



Note: <https://www.cbs.nl/nl-nl/nieuws/2022/33/spanning-op-de-arbeidsmarkt-loopt-verder-op>

#### Dependence on supplier

As of now, a supply chain crisis is among us. A lot of companies are affected. Productions are halted or delayed. This has an impact on the profitability and stability of a company. A company with a high concentration of small amount suppliers is more exposed to this risk. To measure this component a top five supplier needs to be constructed.

### **Track record**

A company without a track record carries more risk because there is more uncertainty. In addition, a company with no profit for the last three years carries also more risk. There could be a focus on the net income or the EBITDA. Most of the time EBITDA is more appropriate to use because EBITDA is used to make a statement about the potential earnings of a company. The first step is to determine if there is a track record. The second step will be analysing the track record; how did the company perform in the last three years.

### **Spread of activities**

A company that has one main activity or one main product is more susceptible to risk. An external or internal factor could hinder the main activity or hold the production of the product. One product or activity can be sold in different markets. If a product is only getting sold on the retail market it is more carries more risk than being in more markets such as automotive, retail and wholesale. To measure this variable, it is important to analyse the different sales markets.

### **Flexibility**

Flexibility is the pace of change within a company. The pace of change is based on the ratio between fixed cost and variable cost. A company with a more variable cost than fixed cost has to capability to change faster based on the market environment.

### **5.3.6 Comparison**

By comparing the variables that are used in the methods. There are some similarities. The first noticeable thing is that management variables are the most important. In the Scorecard method, variable management is quantified by four variables. Does the management team have experience in this business sector, previous work experience, the founder's agreeableness to stepping down from the company, the coachability of the founder and the completeness of the management team. Also, the RSFM takes into account the management. Another variable that appears in every model is the variable "sales". Sales is one of the more important variables to continue business operations.

An interesting point is that some variables of the RSFM method such as "technology", "stage of business" and "supply chain" have also been tested in the survey. However, these variables were deemed less important by the corporate finance advisors. A substantial difference between the models is that RSFM is weighting the variables equally, compared to the Scorecard and the new model.

Overall, the Scorecard method and the RSFM are more focused on the company in an early stage, the model is more focused on a company that has been in business for a few years.

## 5.4 Reflection on the research

In the previous sections, the structure of the data analysis is explained. In this section, the reliability of the research will be discussed. Starting with identifying variables through literature. In total 33 variables have been found. The literature that has been used comes from various sources, for example, academic papers, risk reports and websites. Since the lack of academic papers on this subject, other sources have been consulted. These sources are less reliable. This could have an effect. To counteract this problem experts in the field were interviewed. The experts gave their input about the variable list. The experts that are chosen have a lot of experience in the field and also acquired additional certificates (register valuator).

The location of experts is mainly in the East of the Netherlands. This could factor in a bit of biased, however it should not be a problem as the survey has respondents from all over the Netherlands. A crucial point of the survey is that it is filled in by corporate finance advisors. As a result, corporate finance advisors have been approached through their work email addresses. The researcher does not have an overview of the respondents who sent the email to other non-corporate finance employees.

The ranking of the variable is based on the total score. Different analyses have been made based on demographic data. Uncompleted data has been removed beforehand. In total the results of 160 respondents have been analysed by using SPSS.

The next step is deciding the maximum Small firm premium. This is done by comparing previous reports about size premium and Small firm premium. The choice has been made to choose the most recent and the Small firm premium needs to be applicable in the Netherlands. That is why the European study has been chosen. However, the European study conducted in 2019 does not take into consideration the corona crisis and the increases in interest.

Based on the manner this research is carried out, the researcher considers the outcome of this research useful to make the first step for creating a prototype.

## 5.5 Designing/testing prototype

In the previous section, the quantifying of the variables is described. In this section that information will be incorporated to design a prototype. In this section, the first step to designing a prototype will be carried out. Also, the prototype will be assessed in real-life situations. In the research design it was mentioned that quantifying variables will be based on quantitative analysis of databases. On second thoughts the available data about SMEs is minimal. To solve this problem input from corporate finance advisors is incorporated.

In Table 39 the variables have been quantified. Table 39 gives the advisor a starting point for choosing a risk level. Choosing an appropriate risk level based on based quantitative data, will not present the true risk level. In practice, advisors will interview the owner of the companies and most of the time the employers. After interviewing the advisors will make a judgement per variable.

Table 39

### *Quantified variables*

Variables	0 – 0,25	0,25 – 0,5	0,5 – 0,75	0,75 – 1
Dependence on management	1 function	2 functions	3 functions	4 functions
Dependence on customer	The top 5 have 0 – 25%	The top 5 have 25 – 50%	The top 5 have 50 – 75%	The top 5 have 75 – 100%
Human capital	- Agriculture and Fisheries - Rental and trading real estate - Education - Financial services - Culture recreation and others	- Transport and storage - Public administration	- Construction industry - Information and communication - Industry - Catering industry	- Trade - Business services - Healthcare
Dependence on supplier	The top 5 have 0 – 25%	The top 5 have 25 – 50%	The top 5 have 50 – 75%	The top 5 have 75 – 100%
Track record	One negative EBITDA year	Two negative EBITDA years	Three negative EBITDA years	No track record
Spread of activities	4 Active markets	3 Active markets	2 Active markets	1 Active market
Flexibility	0 – 25% of the cost are fixed costs	25 – 50% of the cost are fixed costs	50 – 75% of the cost are fixed costs	75 – 100% of the cost are fixed costs

Table 39 can be used to point in the right direction. However, some variables are hard to quantify for example “Dependence on management”. The risk level of the variable cannot only be decided quantitatively. In addition, a qualitative way is needed to assess the risk level. Examples of important question that needs to be asked are:

- How easy is it to find a substitute for (the management in the company)?
- What kinds of customers does this company have?
- How many kinds of products/services is this company selling?
- In how many markets is this company active?

In Table 40 a fictive example is demonstrated.

- Management has 2 functions
- The top 5 customers take up 50% of all the customers.
- The company is active in the construction
- The top 5 suppliers take 75% of all the suppliers
- The company has a loss the previous year
- The company has in total 3 activities
- 25% of the total contracts are long-term

Table 40

*Demonstrating the new model*

Variables	Weight score	Maximum %	Weight score * %
Dependence on management	0,25	2,27%	0,57%
Dependence on customer	0,5	2,13%	1,07%
Human Capital	0,5	1,84%	0,92%
Dependence on supplier	0,75	1,79%	1,34%
Track record	0,25	1,76%	0,44%
Spread of activities	0,5	1,74%	0,87%
Flexibility	0,25	1,69%	0,42%
Total			5,63%

The total SFP will be 5,63%. Using the Build-Up Approach is presented in equation 25:

$$K_e = R_f + ERP + 5,63 + SCR$$

25

As mentioned in the previous section it is not possible to capture all the risks in this model. Therefore, an additional variable will be added "specific company risk". In this variable, the advisors have the freedom to choose the premium based on their experience and knowledge.

### 5.5.1 Testing the prototype

In this section, the new model will be tested based on the BDO model that is used by KroeseWevers. These examples provided by KroeseWevers are real-life examples. To guarantee anonymity only the sector of the company is mentioned. The examples that were provided are operational in the sectors: IT, interior construction, automotive, wholesale and construction. The new model incorporates the quantifying Table 39 to choose an appropriate risk level. The comparison between the new model and the old model is shown in Table 41 The new adjusted results are based on the SFP values of the old model but are incorporating the quantifying Table for determining the risk level.

Table 41

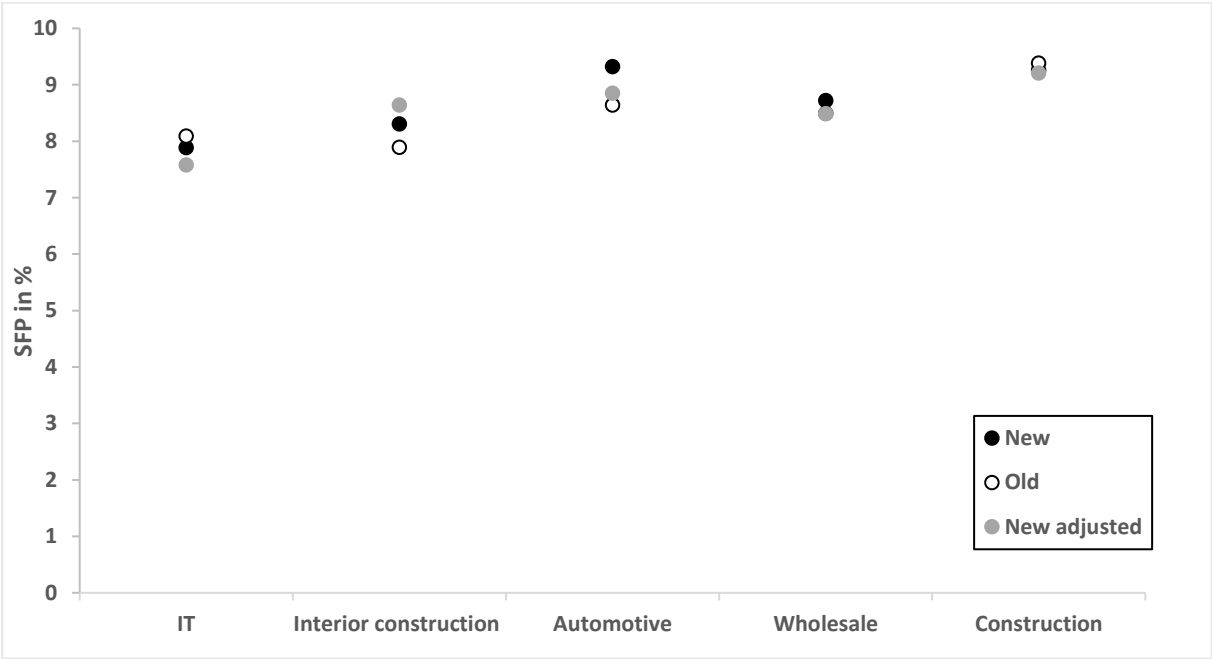
*Comparison between the old and the new model*

Sector	New	New adjusted	Old
IT	7,88	7,58	8,09
Interior construction	8,30	8,64	7,89
Automotive	9,32	8,85	8,64
Wholesale	8,72	8,49	8,49
Construction	9,26	9,21	9,38



Figure 10

Plotted results of the comparison Table 41



In Figure 10 the results of those Table 41 are compiled. Overall, there are some discrepancies between the old and the new model. However, the difference is a maximum of 1%. A 1% difference is at first sight small; however it does have a big impact on the valuation. For example, if a company is valued at 1 million a difference of 1% in the cost of equity could result in a difference of up to 100.000 depending on the used method.

The discrepancies in Figure 10 are small. Statistical methods can be used to test the significance of those discrepancies. Because the data sample is rather small, there is not enough information available to assume a normal distribution. In addition, the samples are related to each other. Therefore the choice has been made to use Wilcoxon Signed-Rank Test.

Table 42

Hypothesis Wilcoxon Signed-Rank test

Null hypothesis	Significance	Decision
The median of the difference between Old and New = 0	0,225	Do not reject the null hypothesis
The median of the difference between Old and New adjusted = 0	0,715	Do not reject the null hypothesis

Note: P = 0,05

Based on the statistical test Wilcoxon Signed-Rank test there is no difference between the data. However, only 5 samples are used to compare. In addition, not all the sectors have been covered. To further analyse the results more samples are required. Because of time constraints, only five samples have been analysed.

## 6 Conclusion & Recommendations

After testing and analysing the results, a conclusion can be drawn and the research question can be answered. In addition, recommendations will be given based on the results of this study. At last limitations of this study will be mentioned and a subject for further research will be given.

### 6.1 Conclusion

A dive into the literature has been conducted to identify variables. These variables have been validated and complemented through interviews with experts in the field. This resulted in variables that have an impact on the cost of equity of SMEs. However, not all these variables have the same importance. To solve this problem a survey has been conducted among corporate finance advisors in the Netherlands. The results of the survey gave new insight into the importance of different variables. In total 7 variables were going to be incorporated into a new model. This new model has been compared to the BDO model. Incorporating real-life examples provided by KroeseWevers. Overall, the new model calculates the Small firm premium as an average of 1% higher than the BDO model. Using a higher cost of equity will result in a lower valuation of a company. In Table 43 the variables with their maximum % are shown.

Table 43

*Final variables with their corresponding % premium*

Variable list	%
Dependence on management	2,27%
Dependence on customer	2,13%
Human Capital	1,84%
Dependence on suppliers	1,79%
Track record	1,76%
Spread of activities	1,74%
Flexibility	1,69%

The research question within this research is: “Which variables (risk factors) are important to calculate the cost of equity for non-listed small medium enterprises in the Netherlands?”. Table 42 shows the most important variables. However, more variables could be implemented into the new model but it would take longer to use the model and also add more complexity. Therefore, the choice has been made to reduce the variable to seven. This model is more recent and therefore should give a more precise estimation of the Small firm premium for SMEs in the Netherlands.

Corporate finance companies can incorporate this new model to calculate the cost of equity for SMEs in the Netherlands. However, this model is designed to be a general model. In specific situations, this model will not cover most of the aspects therefore it is advisable to add a premium for example specific company risk.

### 6.2 Recommendations

In this section, recommendations will be given based on the results of this study. Also, a section is dedicated to short-term steps KroeseWevers can take. The model that KroeseWevers uses to calculate the Small firm premium is outdated. In this research a new model has been developed. The new model captures the most recent variables that are important for calculating the Small firm premium. In this study, the new model was tested based on historical examples. However, the examples were limited. I recommend testing the new model further with real-life examples. The testing needs to include companies from all sectors. By testing the new model the accuracy of the model can be better assessed.

In this study it has been decided to use the European premium as the maximum. Europe itself is quite different. It is better to have a Small firm premium that is focused only on the Netherlands. However, to this day there is no research except for the BDO research in 2010. Keep an eye open for new Small firm premium studies that are focused on the Netherlands. A Dutch premium will likely increase the accuracy of the new model.

Based on the research I recommend KroeseWevers modify its existing model. The Small firm premium needs to be changed because it is outdated. The most suitable choice will be the European premium. The second change that is recommended is adding the new variable "Human Capital". This study reveals that Human capital is one of the most important variables. This is validated by the interviews and also confirmed by the results of the survey. By implementing the changes, the existing model will be more representative of the present. This will result in a higher accuracy calculation of the Small firm premium. Therefore will result in a more accurate cost of equity.

#### 6.2.1 What should KroeseWevers do tomorrow?

The first thing that needs to be carried out is reevaluating the BDO model. This research shows that the variable "human capital" has risen in importance. The opposite also happened, the variables "spread of activities", "track record", "flexibility" and "entry barriers" are deemed less important. It means that the BDO model does not match the research results. KroeseWevers Corporate finance should modify the existing model to incorporate the most recent results. As it would lead to a more accurate estimation of the Small firm premium.

Another important factor to take into consideration is the maximum Small firm premium. In this research different Small firm premium have been researched with heights. Choosing the most suitable is important because it will have an impact on the cost of equity. Therefore will affect the valuation of a company. To conclude this research has shown new insights that KroeseWevers can use to improve its existing model.

#### 6.3 Practical relevance

In this research different variables were researched that are relevant for calculating the cost of equity for SMEs in the Netherlands. Those variables are combined into one variable The Small firm premium. These variables were validated and rated by people in the field of corporate finance. In addition, these variables are up to date. This research leads to new insights into which variables are important to include in the Small firm premium.

By incorporating these variables into a model. The Small firm premium can be calculated with higher accuracy and will lead to a better estimate of the cost of equity. In practice, Corporate finance companies can use the results of this research for constructing or improving their model.

In addition, these variables could be useful as an interview topic it gives new insight. It also makes the early risk assessment more complete. After that, a section in the information memorandum can be dedicated to these variables.

#### 6.4 Scientific relevance

In this research different methods to calculate the cost of equity have been explained. The existing methods are mainly focused on stock-listed companies. The Build-Up Approach and CAPM are mainly used for calculating the cost of equity for valuating purposes. In this research, the main focus is Dutch SMEs. Dutch SMEs are exposed to additional risk, therefore a Small firm premium or size premium is added.

This study research which variables are part of the Small firm premium in Dutch SMEs. The existing theory about Small firm premium/size premium of Dutch SMEs is limited. It consists mainly of the BDO studies carried out in 2010. In this research different variables have been found and validated that are part of the Small firm premium. The scientific literature is supplemented further with variables to calculate the Small firm premium/size premium for Dutch SMEs.

## 6.5 Limitations of the study

In this section, the limitations of the study will be covered. The first limitation was to get a presentable sample. In this study, the sample size is limited to Brookz 2022. In total there were 234 corporate finance companies in Brookz 2022. Not all corporate finance companies were included in the research. It could affect the results because the samples in Brookz 2022 do not represent the population.

For determining the maximum SFP different studies have been used. The first two studies were described in the valuation handbook from 2016. It was unfortunate that the research did not have access to more recent studies from the valuation handbook. In addition, the European study is focused on Europe. There are also differences between countries in Europe. The best way would be a Size/SFP for the focussed on the Dutch market. These two limitations had an impact on the design of the prototype. In addition, it could also have an impact on the height of the Small firm premium.

The reliability of this study is also limited. During the study, interviews and a survey have been held. A change in the environment or world economics will likely steer the results. In addition, different subjects that are trending in society will also affect the variables. As of writing, there is a shortage of labour, non-functioning supply chains and sky-high energy cost. If this research is repeated in another 5 years there is a chance that other subjects are trending.

The comparison between the new and the old model is based on five samples. Five samples are too few to make accurate statements, and it also does not cover all the sectors. However, it gives a first glance at the performance of the new model.

## 6.6 Future research

While this study focuses on variables in the present, it is also important to look to the future. As for future research, a segment was included in the survey. Respondents were asked what variable(s) were missing. Sustainability was the most mentioned variable. Sustainability is becoming more important every year. Future research could dive further into the subject of sustainability for SMEs. The variable sustainability needs to be tested to determine if it needs to be included in the new model.

This study was solely focused on the Netherlands. For future research, other countries could also be concluded. Starting with the bordering countries Germany and Belgium.

In this research, the variables of the BDO model have been included. After conducting the surveys there have been remarks of other lesser-known models to calculate the Small firm premium. These lesser-known models could have valuable input. For future research, these models could be used as input to receive a complete picture.

In interviews, the respondents mentioned that some variables are only used in a specific situation. There could be more research into these specific variables. In addition, these variables could also be combined into a new model, however more research is needed in this aspect.

Future research should include the most recent studies about Size/SFP premium. This will result in a more accurate comparison between the studies. Also, when in the future a study is published about the Size/SFP premium of the Dutch market, that study should be used to determine the maximum SFP.

## 6.7 Reflection on literature

The literature in this research started broad. Further along the way, the literature scoped down to the different Small firm premium/ size premiums. This gave the researcher a better idea of how Small firm premium could have an impact on the bigger picture.

The literature about the income approach gave the researcher insights into which valuation methods used the cost of equity. In addition, which methods do exist and the use case of those methods. Besides, it became clear to the researcher that most of these methods were focused on stock-listed companies, because of the information requirements.

By analysing the cost of equity methods in practice. It became clear that the theoretical theory does not match the practical methods for SMEs. In the practical methods additional variables were added for example Small firm premium or Size premium and specific company risk. The practical methods were discovered by analysing valuation reports of corporate finance companies. In total five reports have been analysed from five different companies. More would give a better however I think the impact on the research would be minimal. It cannot be ruled out that there would be another variable similar to the size premium or Small firm premium.

The next step was to dive further into the size premium and the Small firm premium. I quickly stumbled across paywalls to access the information behind the size premium. After searching for a while there was a valuation book from 2016 which contained two studies about the size premium. I recognise it is quite outdated however, I included it because it would be valuable to know how the size premium is constructed. I learned that two size premiums originated in the United States.

My study is about SMEs in the Netherlands. I quickly realised that those two size premiums were not fully applicable to Dutch SMEs, so I searched further. I stumbled across one study about the European size premium from Erik Peek in collaboration with Duff & Phelps. This research was further updated in 2019 so the data was more recent and also more applicable to the Netherlands.

Articles about the Small firm premium was limited. As the methods to calculate the Small firm premium in the Netherlands has been developed by BDO. The last publication stems from 2010. However the variables that were used to construct the Small firm premium could be valuable. These variables were tested in the survey most were deemed important. The way how BDO calculates the Small firm premium shaped the design for this research.

Overall, the literature that was gathered provided me with guidance even if the literature was not up to date. As for gathering the literature, it became harder with each step closer to the Small firm premium.

## 6.8 Reflection research design

The research started with a dive into the literature to explore variables. The sources that have been used are academic papers, reports, books and websites. At first, I wanted to focus only on academic papers because the sources are of higher quality. After a while, I made to decision to include reports books and websites because the information was limited. It resulted in a long list of variables.

The next step was reducing the number of variables. I first analysed which variables correlate with each other, this is based on knowledge. After that, I looked at how much variable a/b is mentioned in the literature and remove the variable that is less mentioned in the literature. The correlation was met when two variables had similar descriptions in the literature.

The reason for the reduction was that the list was too comprehensive to be validated in an interview. It would take a lot more time. So the decision was made to reduce the variables. The method that was used to remove variables could be more defined, as now the bias of the researcher is taken into account.

The next step was validating and completing the variable list in interviews. At first four interviews were going to be used. However, one interviewee mentions that their company did not use Small firm premium, so the interviewee could not validate the list. The three remaining did validate the list and further completed it.

The step after is ranking the variables. In this research, a survey was used to rank the variables. The method that was used to rank the variables was clear and easy to process. SPSS was used to analyse the results. An easier program could be used for example Qualtrics or Excel. The analysis that needed to be made was not very complicated. The sample is based on Brookz 2022. As manually searching most of the corporate finance companies in the Netherlands is time intensive. Using Brookz as a sample is a good choice because I received a fast and clear overview of corporate finance companies. A disadvantage is that companies need to pay to get noted in Brookz 2022. Therefore a certain bias is developed.

The next step is designing the prototype. The first step was determining the maximum Small firm premium. Different studies have been analysed. In this research, the European premium is seen as the most suitable. On

second thoughts, including questions about the height of the Small firm premium in the survey would be better. I would get insight into how respondents in the field think about the Small firm premium. These insights would be valuable to this research. As the results could determine the height of the Small firm premium for the Dutch SME. By using the Dutch Small firm premium the estimation would be more accurate than by using the European size premium.

The second step is allocating a Small firm premium to each of the seven variables. To come up with objective criteria the most scored variable also has the most effect on the Small firm premium. Now every variable has a Small firm premium allocated. I still think this is one of the best methods to allocate the Small firm premium. Another idea was to keep the allocation of the Small firm premium the same for all variables. However, by doing that an assumption is made that all variables are equally important. In addition, it does not match the survey results.

The next step is deciding on the brackets. At first, the brackets were decided based on datasets. However, there were limited datasets available to decide the brackets. Therefore the decision has been made to change the method. Also the K-neighbour is not used because datasets were not used. Instead, the input of corporate finance advisors has been used to construct the brackets of the prototype.

In the next step, weight factors are added for each of the variables. Weight factors need to be added because there needs to be a distinction between low-risk and high-risk. If there is no weight factor the only decision that can be made is whether a company is exposed or not exposed to a certain risk. Even when a company has a small exposure to the risk the maximum amount of the Small firm premium of the variable will be included. In my opinion, this would affect the estimation of the cost of equity in a negative way. Therefore it has been decided to add weight variables.

I also searched for other methods but it was very limited. The other methods were valuation methods used for start-ups but most of the SMEs that get valuated have grown out of the start-up phase. Another method that incorporates weight factor is the BDO model. The BDO model is widely used in the Dutch valuation field for SMEs.

The next step is testing the prototype. five different real-life examples have been used provided by KroeseWevers. The results were quite similar. On average the outcome of the prototype determines a Small firm premium 1% higher. The sample of five is quite low. On second thought it would be better to have more samples at least one of each sector. However, this was not possible because of the time constraint. Also, it would be valuable to get real-life examples provided by other corporate finance companies. More samples would lead to a more accurate comparison between the prototype and the BDO model.

By conducting this research in combination with an internship at KroeseWevers I learned a lot about this topic. In addition, the experience I got through my internship will be of great value to my career.

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# Appendix

## Discovering risk factors

Risk factors	Sources																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Finance risk	X	X			X	X				X	X		X			X	X	X		X	
Reputational risk	X											X				X	X	X			X
Legal risk	X											X					X				
Supply Chain risk	X			X							X	X	X					X	X		X
Operational risk	X	X			X	X					X	X	X			X	X		X	X	
Human Capital risk	X			X										X	X		X	X	X	X	X
Regulatory and compliance risk	X									X		X		X	X				X	X	X
(Cyber)Security risk	X													X		X	X		X		X
Intellectual property risk	X																				
Business assets risk	X																				
Economic risk		X	X												X			X	X	X	X
Market risk		X													X		X	X	X	X	X
External risk																					
Environmental risk			X											X					X	X	
Geopolitical			X																		
Societal			X																		
Technological			X	X													X	X			X
Interest rate risk				X					X									X		X	
Raw material risk				X														X			
Growing risk				X																	
Hazard risk					X							X							X		X
Strategic risk					X						X	X	X				X				
Track record							X		X	X											
Dependence on customers							X														
Dependence on suppliers							X														
Spread of activities							X		X												
Entry barrier							X														X
Flexibility							X														
Length operating business								X													
Leverage ratio									X	X											X
Turn over									X												
Liquidity ratio									X	X						X		X			
Customer contracts														X							
Location																		X			

## Source discovering risk factors

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Table of missing variables

Missing variables	Frequency	Total score	Mean
Sustainability	7	33	4,71
Illiquidity premium	6	36	6,00
Sector	5	26	5,20
Innovation	3	17	5,67
Key personnel	3	15	5
Cashflow	2	11	5,5
Dependence on director-major shareholder	2	13	6,5
International orientated	2	8	4
profitability	2	12	6
(Future) business model	2	12	6
Capital structure	2	12	6
Government regulation	2	11	5,5
Currency rate	1	7	7
Liquidity	1	7	7
Healthy balance sheet	1	5	5
Growth of a company	1	7	7
Dependence on geopolitics	1	4	4
Age of the company	1	5	5
Size of the company	1	6	6
Dependence on customer	1	6	6
IT robustness	1	6	6
Binding director after-sale	1	7	7
Different kinds of contracts with customers	1	6	6