Terminal value calculations with the Discounted Cash Flow model

Differences between literature and practice

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Preface

This thesis was written as a final task in the Master of Business Administration at the University of Twente. Within this master I have been challenged on multiple areas of business administration and the financial courses stood out for me. The interest I had in especially corporate and entrepreneurial finance made it logical to choose a topic within these courses. The elusive side of valuation was decisive for me to choose this interesting subject to focus upon.

In this I would like to thank my supervisors at the university for advising and guiding me. Especially Henk Kroon who has been my teacher during one of the courses. He stood out as an unconventional but therefore in my eyes a much better teacher. This is why I wanted him as a supervisor for this project, in which he created a good starting point followed by a positive process. I would like to also thank the respondents who have helped me with their time and provided me with the valuable information needed to complete this thesis. At last I thank my parents for their support and encouragement to both start and finish this Master.

Tim ten Beitel

Abstract

This thesis has as goal to gain an insight in the differences in literature and practice regarding the use of the Discounted Cash Flow method in valuation. The popularity of the method does not imply that literature is in agreement over the most suitable calculation for especially the terminal period during valuation.

The aim of this thesis is to find an answer to the research question;" To what extend differs practice from current literature in terminal value calculations for DCF valuations of SME's". The focus in this lies on the focus points and driving factors for authors to improve this model, and the discrepancy between this and the selecting criteria for practitioners. The contributing factor of this to literature has multiple sides to it. Firstly, by providing an overview of the different methods designed. Secondly, by gaining an insight in the different focus points between literature and practice. And thirdly by providing an opinion in whether and how these differences could be approached.

The design of the research could be described as a qualitative study with input from practitioners in the field of valuation. Real life valuation reports together with semi-structured interviews serve as the source out of which the data could be analyzed and from which conclusions on practitioners' points of view can be drawn. The driving factors behind literature improvement in terminal value calculation could be stated as follows: a) an increase in consistency, b) an improvement of transparency, c) the natural pattern of growth rates and d) the better understanding of market analysis. The criteria for practitioners in the selection of the most suitable terminal value method are: a) the dependency towards clients and key management, b) the degree of attribution to current owners, c) the feasibility of the deal in the takeover, and d) the ability to fund this deal. The main finding in this is that the evolution of methods in literature have a value-enhancing effect whereas the criteria for practitioners result in a more conservative approach.

This study is limited due to the sample size and qualitative design of the study. These make it hard to provide a generalizable conclusion. Therefore the reliability of the results should be placed into perspective.

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List of Abbreviations

APV	Adjusted Present Value
CAPEX	Capital Expenditures
CAPM	Capital Asset Pricing Model
CCF	Capital Cash Flow
CVA	Cash Value Added
CFROI	Cash Flow Return On Investment
DCF	Discounted Cash Flow
DDM	Dividend Discount Model
EBIT	Earnings Before Interest and Taxes
EBITDA	Earnings Before Interest and Taxes, Depreciation and Amortization
ECF	Equity Cash Flow
EVA	Economic Value Added
EP	Economic Profit
FCF	Free Cash Flow
FCFE	Free Cash Flow to Equity
FCFF	Free Cash Flow to Firm
GDP	Gross Domestic Product
NOPAT	Net Operating Profit After Taxes
NPV	Net Present Value
NWC	Net Working Capital
RONIC	Return on newly invested capital
SME	Small and Medium Enterprises
TV	Terminal Value
WACC	Weighted Average Cost of Capital

List of Formulas, Tables and Figures

Formulas

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1 Introduction

1.1   Valuation

When it comes to valuating a business one tries to give the most objective view on the present value for a company. However, to derive at this objective view, many different valuation concepts can be used. Valuation concepts are subdivided in five sections by Reis & Augusto (2013) in the following categories: First, there is the category of models which are constructed around the discounting of future cash flows, ranging from future cash flows (FCF) to equity and capital cash flows (ECF)(CCF). Secondly, by the discounting dividends (DDM), which are closely related to the models in category one. The third category focusses on the creation of value. Reis & Augusto (2013) name the Economic Value Added (EVA), Economic Profit (EP), the Cash Value Added (CVA) and the Cash Flow Return on Investment (CFROI) as the most notable. As a fourth group, the goodwill method and multiples method are named, which are based on accounting elements which for instance for the multiples can be seen as rules of thumb between certain numbers such as EBITDA and the corresponding value of the company. The fifth group is identified as the group with sustaining models in real options (Black & Scholes 1973)(Reis & Augusto 2013).

1.2 Research Question

Valuating has several practical purposes but according to Steiger (2008) they all boil down to serving either the owner, the potential buyer or potential other stakeholders by providing an approximate worth for a company.

Although there are different concepts, according to Damodaran (2006) the DCF model is the most frequently used model for valuation in practice. Kaplan & Ruback (1995) argue that the discounting of expected cash flows provide a value which is within a ten percent margin of the market value at that point. Other models could be used simultaneously, but this mostly occurs as a comparative measure to conclude whether or not the DCF outcome is within the reasonable range of values. Even within the DCF model, literature is at variance as how to exercise the optimal valuation. Multiple variations on key input factors such as capital structure, steady-state growth rate and length of

terminal value calculations differ between several renowned authors. This thesis has the aim to find out how the practice in DCF valuation compares to the current state of literature. The entire subject of DCF valuation is very broad, and the combination of all the different components would exceed the scope of this research. Therefore it is the goal to spot a subject which is debated the most in literature when it comes to DCF valuation.

A DCF valuation roughly consists out of 2 different stages, the explicit forecasted period, and the terminal value calculation. Although the outcome of the explicit forecasted period is highly dependent on assumptions which will almost by definition differ between different actors, there is a high consensus when it comes to the process in how to build this part of the valuation and how to derive these assumptions. For the second stage this is completely different, not only do authors disagree on which assumptions to make, but the fundamental structure of the terminal value calculation is debated. The terminal value period is even more suitable for research because this has a large impact on the value. Berkman, Bradbury and Ferguson (1998) state that this second stage of valuation usually is between 53 and 80% of company value, whereas Koller et al. (2010) argues that terminal value calculations typically account for at least 56% of the total company value for a mature tobacco company, topped by the sporting goods industry with 81%, and the terminal value could even exceed 100% in industries which have a potential high growth but have high initial investments which will give a negative free cash flow in the first couple of years. This is why the _research goal_ will be to expose the difference in discounted cash flow terminal value calculations between literature and practice in valuation for small and medium enterprises. The narrowing of the scope in both the subject and the subject group results in the following research question.

Research question: To what extend differs practice from current literature in terminal value calculations for DCF valuations of SME's?

Because the terminal value calculation has limited input factors, the above question could be subdivided into 3 different questions which point out the factors that show possible differences.

The sub questions could be stated as:

1. What are the motivations of researchers in literature to alter or extend terminal valuation models?
2. What are the focus points for practitioners in the decision process of choosing an appropriate terminal valuation model?
3. How could the differences between focus in literature and focus in practice be approached?

1.3 Contributions to practice and literature

When the state of the literature is presented and differences have become clear, the current valuation practices of companies will be investigated. Multiple valuation reports will be examined and obviously especially the assumptions and calculation of the terminal value will be atomized. Guest, Bunce & Johnson (2006) argue that twelve reports will give information saturation and this is therefore the aim to investigate.

- The first intention of the research is to contribute in a practical way for the companies which valuate. The practice companies can see how the academic world views DCF valuations and it will be interesting to debate the different assumptions and practical implications these have.
- Ultimately, practitioners could be influenced and might even alter their practice due to new insights gained from literature.

This research will serve to literature in different ways.

- Firstly, by providing an up to date and coherent overview of the different scenarios concerning the terminal value calculations in the DCF model.
- Secondly, by pointing out differences between what has been researched and what is used in practice.
- Lastly, by examining whether these differences can be overcome with possible new techniques

The results of this research will serve as a stepping stone for future research and publications about the discrepancy will be the ultimate goal.

1.4 Approach and Outline

The research is build out of different stages, these stages will first be described. At first it is necessary to get familiar with the subject of valuation in its broad perspective and investigate the current state of literature regarding DCF valuations. During this stage the different authors are listed and their views on the DCF valuation and, more precisely, their views on the terminal value calculations are explained.

The next stage is about the current state of practice. Multiple valuation reports shall be reviewed which in practice where conducted as a part of day to day activities for the companies. Because the process of deriving to the explicit forecasted part of the reports is not really debatable, the focus is predominantly on the calculation of the terminal value, or ending/continuing value. Because valuation reports do not always show the full reasoning behind the numbers, this will become fully clear whilst discussing with the professionals who worked on them. When information will be used which is viewed as too confidential, there will be a random factor applied to the numbers to make it untraceable but simultaneously to preserve the relative value of the numbers. A possible pitfall in this section is the dependency the researcher has towards the people who realized the valuation reports. The next stage in the research is to compare the listed literature approaches with the approaches used in practice. At first the discrepancies in reasoning and assumptions will be made clear in a qualitative way to see how focus points differ between them.

Subsequently the relationship between the differences in focus points are described in an overview which clarifies the results of the research. This section aims to also come up with options as how to approach the differences and to perhaps partly overcome them. The final stage of the research is to discuss the results of this comparison with the valuators in practice to see where they can refute parts of literature, or on the other hand maybe even consider to adopt alternatives provided by one or multiple authors.

2 Theoretical Framework

2.1 Discounted Cash Flow

The Discounted Cash Flow model (DCF) is explained as the most commonly used company valuation model in today's company valuation practices by Hongjiu (2009). The model is based upon forecasted cash flows which therefore consist of assumptions and estimated guesses. This part of the paper will analyze the set-up of a DCF-model and the different factors which construct it.

Design of the DCF

The DCF-Model is constructed such that one can calculate the *Net Present Value* (NPV) of future free cash flows. The NPV can be seen as the current value for gains which have not occurred yet. A free cash flow consists of cash which is not required for operations or reinvestment (Brealey et al, 2010) and can be viewed as the excess gains achieved by the company. To come to the NPV of these future free cash flows, the model discounts these by a discount rate which is determined on the basis of the risks associated with the financing of the company at hand.

Formula 1: DCF Net Present Value (Brealey et al. 2010)

$$Net\ Present\ Value = \sum_{t-0}^{n} \frac{FCF_t}{(1+r)^t}$$

In which the 't' represents the years to which the FCF's are to be discounted, and the 'r' represents the discount rate. The formula for the calculation of the NPV is presented above and is used in multiple finance education books (Hillier, Ross, Westerfield, Jaffe, & Jordan 2012)(Palepu, Healy, & Peek 2013).

Free Cash Flow

As the term DCF already explains, it discounts the cash flows. There are two free cash flows which can be used for valuation, both the *free cash flow to the firm* and the *free cash flow to equity*. The free cash flow to the firm (FCFF) is the cash flow which can be distributed to both the debt and the equity holders whereas the free cash flow to equity (FCFE) is the remaining cash flow distributable to investors after all the cash requirements for operations and debt-financing is satisfied. When discounting both FCF's there is a difference in the value calculated. When FCFE is used, one can only estimate the value of the equity at that point in time, but one is able to estimate the *enterprise value*

when using the FCFF because with this you derive at the total value in excess of operations. The latter is therefore the most used in valuating practices and is therefore also the predominant FCF used in this paper. The FCFF can be assorted in the following order:

Earnings Before Interest and Taxes (EBIT) − Taxes = Net Operating Profit After Tax (NOPAT) NOPAT + Depreciation and Amortization (D&A) − Capital Expenditures (CapEx) − Increase in net working capital (NWC) = Free Cash Flow to Firm (FCFF)

The taxes are subtracted from the company's EBIT firstly, providing an operation profit without requirements outside of the company's debt holders or investors. Secondly, the accounting amount written in depreciation and amortization is added to the profit, this is done because the accounting tool of depreciating assets or amortizing resources does not reflect an actual cash outflow for that year. Thirdly, the capital expenditures in that year are subtracted from the NOPAT. Similar to the D&A previously, although the capital expenditures most likely represent assets which will be used for, and written off in, several years, these expenditures do reflect an actual cash outflow in this year and should therefore be subtracted from the NOPAT. Lastly, the increase in net working capital (NWC) should be subtracted. The NWC consists of the current assets minus the current liabilities, and the requirement of a higher NWC reflects a cash outflow and should therefore be subtracted. The resulting number reflects the free cash flow to the firm which can be used for DCF-valuation.

Discount Rate

When the future cash flows are estimated, they have to be given their current (present) value. This can be done by discounting it using the appropriate discount rate. The appropriate rate is the rate which the investors demand that the value would increase given the risks involved in that investment.

Because companies usually have two types of financing in their capital structure, both the cost of the equity raised, as the cost of the debt taken should be incorporated in the discount rate (Brealey et al. 2010). The 'weight' that both financing options should be given in the calculation depends on the relative magnitude of them, resulting in a weighted average cost of capital, or WACC.

Cost of Debt

Debt is a financing option on which interest has to be paid by the borrower. There are different types of debt which, depending on their duration and source, face different interest payments (costs). A loan with a short duration and with a priority over different loans (senior debt) faces little risk for the lender and it will therefore require a low interest rate, however, long-term debt may face an interest

rate which is significantly higher due to the higher risk. Next to that, the situation of the borrower is a highly influencing factor concerning the cost for debt. If a company is reckoned to be a stable and reliable borrower, the financing source will, again focusing on its' risk, demand a fairly low interest rate, whereas an unstable and volatile company may face high costs regarding their loan. Because the cost of debt can be subtracted from the taxable income, one should use the after-tax cost of debt as the debt-input for the WACC resulting in the following cost of debt:

Formula 2: Cost of Debt (Palepu et al. 2013)

$$Cost\ of\ Debt = r_d * (1 - t)$$

In which the r_d is the pre-tax cost of debt, and the t is the tax rate.

Cost of Equity

The cost of equity can be derived using different models, a frequently used model is the Capital Asset Pricing Model, or CAPM introduced by Sharpe in 1964. The three factors used in this model are the risk-free rate, the market risk premium and the β (Beta). The risk-free rate, is the rate which every investor/lender will get when they invest in the least fallible asset on the market. Damodaran (2008) for example argues the 3 or 6 months T-bills which are backed by the U.S. government as a risk free rate because these are almost non-fallible. The market risk premium are the combined risks to which the asset at hand is exposed and which increase the fallibility of this investment. The systematic risk or β (Beta) reflects the sensitivity of the cash flows to economy-wide market movements (Palepu et al. 2013). The β represents the shift of the economy, and therefore the β of the economy is by definition equal to 1. Companies which are highly sensitive to changes in the economy, such as construction firms or luxury goods will have a β which is larger than 1 whereas less cyclical companies will have a β below 1. These less sensitive stocks will lose less when the industry performs badly, and will gain less when the industry is prosperous. The formula for the CAP-Model can be written as is shown below.

Formula 3: Cost of Equity (Sharpe. 1964)

$$Cost\ of\ Equity = r_f + \beta(r_m - r_f)$$

Both the cost of debt, as the cost of equity will be incorporated in the weighted average cost of capital (WACC) in which the combined cost of financing can be calculated.

The WACC

The term 'Weighted Average Cost of Capital' already describes what it does, namely to weigh the different costs of capital into the overall cost structure of the company. Hereunder one can see the basic equation for the WACC.

Formula 4: Weighted Average Cost of Capital (Brealey et al. 2010)

$$WACC = \frac{Equity}{Debt + Equity} * Cost\ of\ Equity + \frac{Debt}{Debt + Equity} * Cost\ of\ Debt$$

In the first half of the equation the cost of equity is multiplied with the relative size of equity as a financing source, after which the similar calculation is made for debt.

With the knowledge of previous sections in this chapter we can refine the basic formula and implement the cost of debt and CAPM formulas, which provides us with the following equation

Formula 5: Weighted average Cost of Capital (Palepu et al. 2013)

$$WACC = \frac{E}{D + E} * \left(R_f + \beta\left(r_m - r_f\right)\right) + \frac{D}{D + E} * r_d * (1 - t)$$

Bear in mind that the (1-t), or tax-shield, only serves for the portion of debt. The WACC serves as the discount rate for the FCF's which have to be determined in the explicit forecast period, as for the terminal value which will follow. A difficulty in the estimation of the WACC is that it is not yet known which capital structure the company will have in these periods to come. Whereas Modigliani & Miller, already in 1958, advocated that capital structure does not affect business this is different in valuation. Literature does not agree on which structure to use. Damodaran (2012) advocates the use of the current capital structure and Bruner, Eades, Harris and Higgins (1998) have proven that almost sixty percent of valuators use the currently available information as to which costs will be incurred in the current financing structure. Others argue that the most optimal or target capital structure will give a more realistic view of the cost of capital for the company in the future (Koller et al. 2010).

As is made clear in the previous sections, both cost of equity and cost of debt (as well as the corresponding WACC) may vary widely depending on internal and external circumstances. The track-record of a company's cash flow, together with industry specific and economy-wide expectations will all influence the costs of raising capital. An internally well organized and stable company in a

doubtful economy may face higher cost of financing than a highly cyclical company in a robust economy. Titman & Wessels (1988) argue that Small and Medium Enterprises take on little debt due to high transaction costs, which should set the above debate in perspective for this research.

Explicit Forecasted Period

The first part of the DCF calculation consists out of the projected value generated in the coming period. The rule of thumb in this is that the explicit forecast should be long enough that the business will have reached a steady state by the end of the period (Levin & Olsson 2000). This means that the length of the initial forecasted period depends upon the investment cycle of the company at hand. When a company has recently invested in new products or production plants there is a projected period in which these investments will grow in output to reach the full potential. Because the ending year of the explicit forecasted period also serves as the starting point of the following terminal period, it is of great importance that investments have matured and the years afterwards do not differ relatively in the way the free cash flow is composed. Typically, this period is 5 to 7 years (Levin & Olsson 2000) but this can only serve as a rule of thumb and should be determined separately for every valuation. It is theoretically possible to avoid using a terminal value by forecasting a very large period, however this will encounter sceptics regarding the viability of an explicitly forecasted year which can be multiple decenniums from now because the term 'explicit' carries an amount of certainty in it. Although one will see that the terminal valuation techniques presented hereafter do in essence not differ from the calculation in the explicit forecasted period, the simplification of the method makes it a more viable solution to the task.

Terminal Value

After the first stage, the explicit forecasted period, the DCF-model continues with the terminal value period. The company will return to a 'steady-state' after a number of years in which each FCF will be determined. This following period is named 'terminal' or 'continuing' and will have an unlimited duration. This all is based upon a known financial management principle that companies have an unlimited lifetime, also called going concern. The terminal value represents the present value from the start of this steady-state until infinity.

2.2 Terminal Value Calculations

The different terminal value calculations are hereunder presented and explained in which the differences are made clear. One should take into account that different terminal value calculations do <u>not</u> by definition result in different valuation outcomes. The techniques are selected based upon the progression made upon the same DCF-idea and the applicability for practitioners. Reis & Augusto (2013) show that there are differences in complexity and the different models are presented in an ascending order of complexity.

Intrinsic value

A basic valuation method is the method in which the intrinsic value of the company is calculated. The value is composed out of the combined sale of all the assets minus the liabilities the company is required to repay to its creditors. If a company is expected to have no added value after the explicit forecasted period, one can use this intrinsic value as a terminal value calculation. Companies for which such a method could be suitable are for example those that serve in an industry which could become obsolete after a certain period due to technological innovation. Also companies which are built to serve for a particular project or a particular period in time might be valued in such a way.

Costs of replacement as a terminal value

In the book "Valuation: Measuring and Managing the value of Companies" the concept of replacement costs as a way to calculate the terminal value has been explained by Koller et al. (2010). The theory is based around the idea that the terminal value is equal to the expected costs to replace the assets of the company. Drawbacks to this theory are that not all tangible and certainly not all intangible assets are replaceable. Next to that, some assets within a company might still add value to a company but will not be replaced in case of malfunction due to the limited added value. This would therefore result in an overestimation of the value of the company. Although both the intrinsic value technique as the cost of replacement are not seen as a traditional terminal value calculation for DCF, these are incorporated in this thesis due to the applicability of these techniques in practice. The fundamental differences in assumptions to the techniques that follow can serve as an example for the different choices made by practitioners.

Basic Perpetuity

A perpetuity is a common model in DCF valuation techniques, the most simple version of which can be stated as follows.

Formula 6: Terminal Value Basic Perpetuity

$$TV = \frac{NOPAT_{t+1}}{WACC}$$

In this the net operating profit after taxes will be divided by the weighted average cost of capital. The perpetuity is a mathematical trick to calculate the outcome of an infinite series, in this case the present value of the net profits of all the years to come. In this method there is no acknowledgement of potential growth so even if the company sees investment opportunities, the return will be equal to the cost of capital. Over a longer period of time companies usually revert to a state of no real growth which therefore makes the assumption reasonable for some industries and mature companies.

Gordon Growth Formula

The following model was first introduced by Gordon in 1959 and is based on the constant growth of dividends in the dividend growth model.

Formula 7: Terminal Value Gordon Growth Formula (Gordon., 1959)

$$TV = \frac{FCFF_{t+1}}{WACC - g}$$

The formula is (similar to the previous model) a perpetuity but has some additions to it. First of all, one uses the free cash flow to the firm after the explicit forecasted horizon as a starting point. As was discussed previously, the FCFF is a logical instrument to capture value. Next to that, the projected growth of this free cash flow in the steady state is taken into account, and is subtracted from the weighted average cost of capital because these two have an opposite effect. The fact that it is simple to understand and to use makes it both popular as well as criticized. The growth rate has mathematically a multiplier effect which increases the overall value. The limitation is that 'g' cannot exceed the WACC because this will result in a value into infinity.

Koller Value Driver Formula

A more detailed approach of the Gordon growth model can be given with the value driver formula of Koller et al (2010).

Formula 8: Terminal Value Koller Value Driver Formula (Koller et al. 2010)

$$TV = \frac{NOPLAT_{t+1}\left(1 - \frac{g}{RONIC}\right)}{WACC - g}$$

In this, the term RONIC needs to be explained, as being the expected rate of return on newly invested capital, which is capital which has not been put in place yet. Although the formula looks more complex, this will result in the same valuation outcome, given that the input parameters are consistent. Where the free cash flow to the firm is the numerator in the Gordon growth model, the numerator in this formula actually represents the same input when the reasoning behind the approach is the same.

The advantage in this model, compared with the Gordon growth model is the use of the RONIC which defines the relationship between the terminal growth and the investment to be put in place to reach this growth. A predefined expected return on newly invested capital means that an increase in growth as an outlook for the firm would therefore require a higher percentage of the operating profit to be invested (or retention rate) and this would therefore lower the free cash flow.

Koller two-stage Value Driver Formula

In addition to the value driver formula, the two-staged formula has been introduced by Koller et al (2010). In this the expected return on newly invested capital 'RONIC' has been introduced in 2 stages A and B, this correlates with the different growth rates in both stages.

Formula 9: Terminal Value Koller Two-stage Value Driver Formula (Koller et al. 2010)

$$TV = \left(\frac{NOPLAT_{t+1}\left(1 - \frac{g_a}{RONIC_a}\right)}{WACC - g_a}\right)\left(1 - \left(\frac{1 + g_a}{1 + WACC}\right)^N\right) + \left(\frac{NOPLAT_{t+1}(1 + g_a)^N\left(1 - \frac{g_b}{RONIC_b}\right)}{(WACC - g_b)(1 + WACC)^N}\right)$$

In this the g_a is the growth-rate in the initial period of the terminal value and is g_b the growth-rate in the stable period. The usefulness of this more complex calculation is more apparent in valuations

for high-growth companies or companies which are expected to yield abnormal returns after the explicit forecasted period. The reasoning behind the usage of two stages lies in the fact that valuators have the possibility for a transitional period between the explicit forecasted period and the terminal period. Growth rates do therefore not need to make an unrealistic drop after the first part of the valuation.

The Three-stage Terminal Value model

The final model presented was introduced by Fuller and Hsia (1984) and served as a Dividend Discount Model with multiple stages. Damodaran (2012) implemented this as a terminal Value technique for a DCF-model in which the terminal value calculation is also subdivided in multiple stages. The previous two-stage TV model assumes a different (lower) growth rate after the first stage. This model assumes the same but with the addition that the growth rate in the first stage gradually declines towards the latter (more definite) stable growth rate. The rationale behind this is that growth does not increase or decline in drastic steps, but that it follows a trend before it stabilizes on a new rate.

**Formula 10: Terminal Value The Three-stage TV model (Damodaran 2012)**

$$TV = \frac{FCFF_0 * (1+g)^t}{(1+r)^t} + \sum_{t=n1+1}^{t=n2} \frac{FCFF_t}{(1+r)^t} + \frac{FCFF_{n+1}}{(r-g_{n)} * (1+r)^n}$$

The 3 different parts of the equation represent the initial high growth part, the transition part and the stable growth-rate part of the terminal value calculation.

2.3 Relative importance of Terminal Value on total value

As this paper focusses on the different techniques regarding the calculation of the terminal value, it is important to stress the relative weight of a terminal value within a valuation. In literature, a terminal value results more often in the bigger number of the 2 valuation stages (Berkman et al., 1998). As it is stated earlier, the explicit forecasted period can be executed with different durations and combined with different possible discount rates and different growth expectations. This can result in different outcomes regarding the present value of the first stage. This therefore gives no guarantee that the terminal value will be the larger number of the 2 calculations. However, Koller et al. (2010) compared terminal value weights in multiple industries, showing that the terminal value period could even exceed the total value of the company at this point in time.

Figure 1: Terminal Value Weights (Koller et al. 2010)
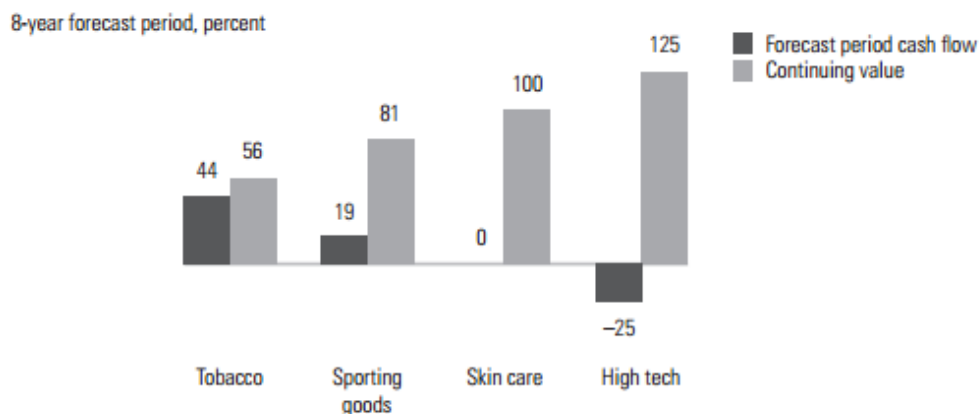
In the above figure one can see that in multiple industries the terminal value outweighs the explicit forecasted period, which in this case is set on 8 years, and in a high tech and possible high growth environment the value of the terminal period could even exceed the total enterprise value. This can be counterintuitive because in most valuations both stages have positive cash flows which result in a positive present value. However, young companies in the high tech sector usually require large capital investments to eventually exploit the high growth potential. The first stage will therefore have negative cash flows which result in a negative present value, the returns gained during the terminal period would therefore count for over 100 percent of todays present value for such a company.

This information shows that terminal value is of great importance for the outcome of the entire valuation and during valuation each input factor should therefore be based upon verifiable information and thorough argumentation.

2.4 Growth Patterns in DCF Terminal Value Calculations

As can be seen in the previous sections, there are multiple terminal value calculation techniques developed in the past decades. The aim of every technique is to valuate a company in a way that is the most comprehensive. Within the calculation of terminal value, the input parameter of growth of great importance, and Martins (2011) explains that any changes, no matter how insignificant, could have a significant influence on the value of the company. As explained in section 2.2 the increase of complexity in the valuation model also translates in 3 different growth patterns.

One-Stage Model

The first growth pattern is used in three models, namely; the basic perpetuity with zero growth, the Gordon growth model and the Value driver formula by Koller. The growth in these cases is limited to the percentage that the company is expected to sustain for the coming infinite amount of years. This is set at the long term expected inflation rate when no real growth of the company is expected (Rotkwoski & Clough, 2013), and according to Damodaran (2012) it can not exceed the long term expected GDP growth because the company will in that case overgrow the economy in the end. A graphical representation can be seen below.

Figure 2: Growth development over time One-Stage Model
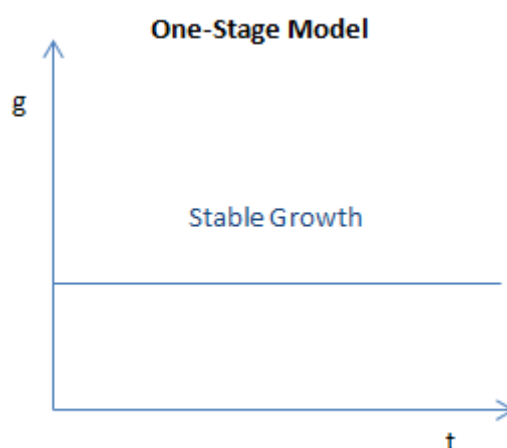
Two-Stage Model

A step further in the complexity was introduced with the Two-stage model of Koller et al. (2010) Reasoning behind the introduction of the second stage lies in the fact that it could well be that a company could enter a steady-state in which it can sustain a high growth percentage for a couple of years after which the company is expected to enter a second and infinite stage in which the growth rate settles at a lower percentage. The drop in the growth rate is sudden and without a transitional period as could be seen in figure below. One should take in mind that, assuming that the explicit forecasted period and stable growth percentage are equal, this would give a higher value than the earlier mentioned single stage model by definition.

Figure 3: Growth development over time Two-Stage Model
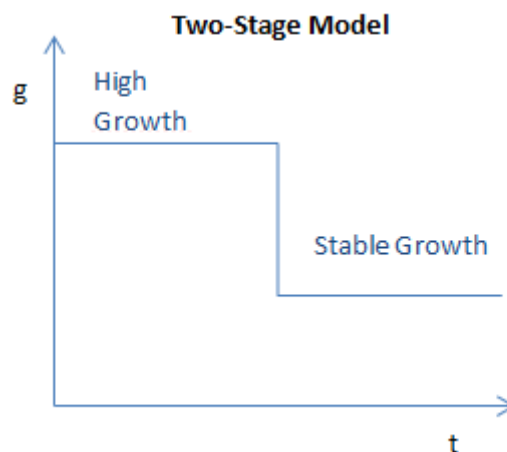
Three-Stage Model

The last addition to growth pattern models was introduced by Damodaran (2012) which divides the 2 stages of the previous model and adds one in between. The rationale behind this approach is that growth patterns usually do not make sudden movements, but that there is a transition period in which the high growth stage gradually declines towards the stable growth stage which will continue into infinity. This is the most extensive calculation of a terminal value and again this will ceteris paribus result in a higher combined value than the single or dual stage calculation techniques.

Figure 4: Growth development over time Three-Stage Model
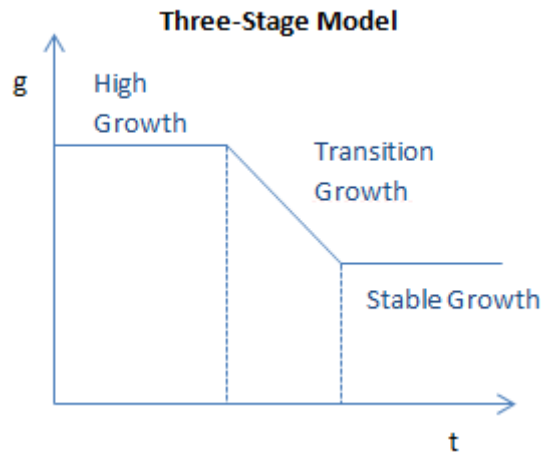
2.5 Conclusions of the Theoretical Framework

The previous sections of this chapter have explained the way the Discounted Cash Flow model is constructed. Next to that, the different approaches regarding the terminal value calculation are explained. Part 2.3 clarified the importance of the terminal value within a valuation by exemplifying the influence that the terminal period could have on total value. Although the aim for every technique is to arrive at a value which seems most suitable, the different techniques could give significantly different outcomes. The amount of techniques to choose from raise a question which is twofold. Firstly, by questioning what researchers focus upon during the development of new terminal valuation techniques. Secondly, by questioning on which grounds a practitioner would decide which technique to prefer and why these two are not identical.

3 Methodology

3.1 Introduction

After the clarification of the theory in valuation as a whole and with a more focused look upon the different techniques regarding the calculation of the terminal value, this section explains how the methodology of this research is constructed. The research design will explain in which manner the goal of the paper is achieved. After the explanation of the aimed target the methodology subsequently will continue with the way the data is collected, and the manner in which the data will be analyzed to come up with the conclusions.

3.2 The Research design

In this section the research design will be introduced. In this, the units of observation , the time scale and the type of analysis are explained. Each design has limitations regarding the reliability of the way it is conducted, and eventually also on the results fort flowing from the research, these will be touched upon in the last part of this section. The goal of this paper is to explain the differences between how practice conducts terminal value calculations, and how theory argues it should be. According to Babbie (2004) this can be viewed as an explanatory research.

When looking at the time horizon (or dimension) the study will have a cross sectional design because the observations that are to be made are all on the same point in time and place Babbie (2004). Gerring, (2012) which views this cross sectional studies as 'non randomized' makes the distinction between large samples which suggest a quantitative study and small samples which suggest a qualitative study. The amount of observations are low and a qualitative design will be opted to explain why the differences occur, and how big the differences are. The valuation reports, together with the interviews which clarify them will be the units of observation and the units of analysis will be the differences at hand. The aim is to investigate the valuation reports and it is expected that these differ from theory. The input factors which account for these differences have to be analyzed. The collection of the data is quite straightforward in this research because valuators have made their reports available. The sample which is used is chosen by both the researcher as the professional valuators to make sure that interesting reports are picked, and differences could be easily spotted which serves the validity of the research. Because the reports are hand-picked this could therefore be described as purposive sampling (Babbie, 2004). The amount of reports and the corresponding

interviews (units of observation) used in order to get a representative sample 12, at which Guest et al. (2006) explain that data saturation is achieved, but in this case a sample of 6 will already give a good insight in the differences. All the chosen reports will consist of a valuation for a small or medium enterprise. Because the sample was purposely chosen, it is impossible to make a generalizable conclusion. The lack of a generalizable conclusion decreases the validity of the research (Gerring, 2012). The lack of quantitative data perhaps lowers the reliability of the results but the use of qualitative data serves as a possibility to find differences which might not have been thought of before. The validity can be viewed as 'high' for internal purposes, but outside the scope of the research the validity is low and it can at most be used as a starting point for other organizations to also conduct such a research.

3.3 Collection and Analysis

The collection of the data which serves as a base for the research is twofold. There is research in both literature as there is in practice. The first is an analysis based around the papers and books which aimed at constructing the best DCF terminal value technique. Literature was analyzed by distilling the reasoning behind the adjustments and differences to the existing terminal value techniques. The main target in this is to describe why researchers try to improve the models and why they think this is a valuable addition. The sections in which authors argue why their model prevails over previous models are most interesting in this case. These quotes are selected and categorized. An overview will be constructed in which the main focus points are listed. This part of the research aims at answering sub-question 1 of the research question.

The second part of the research is focusing on the criteria which compose the choice for the terminal value calculation in practice. The collection of data from which to draw conclusions has two sides to it. Firstly by examining actual valuation reports which describe the chosen method and support this with argumentation. Secondly by having semi-structured interviews with the practitioners which constructed the previously mentioned valuation reports. The interviews are semi-structured to give the researcher the opportunity to extract information which goes beyond the scope of the interview by asking new questions which arise during the conversations. The initial interview questions are developed by connecting the theory to practical difficulties and differences. To gain a more coherent insight in the reasoning of the practitioner, the questions are not limited to the scope of the terminal value period alone.

Interview Questions

The following questions are constructed to gain an insight in the practitioners calculations of the terminal value with the DCF model.

<u>Forecasted period</u>

1: a) Although literature states that it does not affect the value as a whole, what is usual duration of the explicit forecasted period in your calculations? Do you take the investment-cycle and the so called steady-state into account?

   b) When do you deviate from that choice?

<u>WACC</u>

2: a) To what extend is the used WACC in this explicit forecasted period applicable to use for the calculation of the terminal value?

   b) How do you see the option of an 'optimal structure' when there is space for improvement regarding the capital structure?

<u>Terminal value:</u>

Technique:

3: a)Which technique do you use whilst calculating a terminal value?

   b) Do you deviate from this model, if so, when?

4: What focus points serve as a base for this choice?

5: How do you estimate the expected growth for this stage, and in which bandwidth are these percentages usually?

6: To what extend does this deviate on average from the growth-rate used in the explicit forecasted period?

7: Most authors advocate that companies can not outperform the entire economy in the terminal period. This is due to the fact that mathematically the company will eventually outgrow the economy. How do you rate this argument?

8: Between 84 and 94 percent of the terminal value is accumulated in the first 20 years of the terminal period (using a Gordon Growth model with growth between 0 and 5 percent)(Rotkowski & Clough, 2013). Could you imagine that companies <u>are</u> able to outperform an economy for this period? (How does this affect the previous question/answer?)

9: How do you see an extra stage between the explicit forecasted period and terminal period to gradually decrease the growth to the stable rate?

10: How do you rate the value of the terminal period in relation with the value during the explicit forecasted period, and is this too high? (This can exceed 100% for high growth companies)

11: Do you think that the unpredictable nature of a terminal value calculation causes you to use somewhat more conservative input for the calculation?

<u>In General</u>

<u>The following questions could to a certain extend overlap with previous questions but serve to even better understand the train of thoughts behind the chosen techniques.</u>

12: Do you feel that you as a practitioner mainly calculate a 'value' or a 'price' when you supervise a takeover?

13: Does the situation of the seller/buyer sometimes influences the calculation?

14: Do you think that the construction of a 'possible value' (perhaps whilst using a better than actual capital structure) is an addition to the valuation report? Are there more options than the use of a more optimal WACC?

15: In general, how big a portion of the total value could in your eyes be attributable to the seller during a takeover? Does this also represent the difference between 'value' and 'price'? And to what extend is the size of the company a factor in this?

Analysis

The extracted information is rephrased and summarized by the researcher during the interviews to check the validity and decrease the possibility of false interpretations. The semi-structured nature of the interview provides this research with a good representation of the so called 'gut-feeling' of practitioners when it comes to valuation. This qualitative approach is in this case more valuable due to the soft-skill nature of valuations. The aim of the research in valuation reports and interviews is to answer sub-question 2 of the research question and partially gain an insight for sub-question 3. The Dutch version of the interview can be found in Appendix III.

4 Results

4.1 Introduction

The previous chapter has focused upon the way the research could be structured and how data could be collected. This chapter will focus on the outcome of this research. For both literature and practice this research will narrow the amount of factors down to the four most dominant. The four most relevant and frequent issues mentioned by authors are selected and these represent the focus points for literature. The four criteria which were most distinguished and present in valuation reports and interviews will be used for the analysis in practice. At the end of the coming sections, the focus points and criteria will be graded against each other for which a five point scale will serve as a grading measurement. The scores can vary from '++' to '--' and '±' is the middle grade.

4.2 Focus in Literature on Terminal Value Calculations

Within terminal value calculations, literature strives for a model in which uncertainty is as low as possible and in which the resulting value can be argued the strongest. For this, the quality of the key input factors determine the quality of the technique. Although multiple techniques could deliver the same value when the same assumptions serve as a basis for the calculation, the strength of the arguments resulting in these assumptions differ between them.

A separation can be made between internal and external (and a mixed) input for the valuation. A focus point which gives a better view of the company's side of the valuation is an internal analysis focus point. An external focus point is a point which is determined by factors surrounding the company, such as the state of the industry and economy. The third category is a mixed focus point where both company and external factors determine the outcome. This section aims to create an overview of these key focus points for the improvement of terminal value calculations and looks to distinguish the differences between them. A table will summarize the findings in the concluding stage of this section.

Consistency

The first factor described in literature as to improve the terminal value techniques is consistency. As consistency is a very broad and widely used term in most research, the term is not used as a fashion term in this thesis. Although the intrinsic value and replacement cost techniques are consistent with the accumulated value of the individual items, there is usually no consistency between these values and the expected value forth flowing from operations of a company. Multiple authors have aimed to approach this problem. Whereas the basic perpetuity already incorporates the going concern principle in the fact that the terminal value calculation is a perpetuity, the Gordon growth model takes this a step further. Gordon (1959) makes use of a stable growth rate after the explicit forecasted period to valuate according to expectations even in the distant future. This already is a new step in consistency because from growth in the initial period to zero growth hereafter without explanation or valid argumentation decreases the validity of the valuation. Koller et al. (2010) takes consistency a step further in both its single and two-stage model. This is due to the introduction of the return on newly invested capital (RONIC) and the relationship with the terminal growth rate. Koller argues that although under the same assumptions the value driver formula is equivalent to the Gordon growth model, but the latter increases the chance of a conceptual error by not taking into account the level of free cash flow which is consistent with the growth rate. The three stage model by Damodaran (2012) improves consistency by adding a natural pattern in growth rates. The transitional stage creates an opportunity to better argument the expected growth pattern. These statements implicate that a terminal value calculation should be consistent in assumptions made and should respect the interdependent relationships between numbers. A growth rate should be in accordance with forecasted investments, their returns and WACC.

Transparency

The second factor that literature tries to constantly improve with new models is the level of transparency. Similarly to the term 'consistency' the term transparency may seem somewhat obvious. However, there are some differences in transparency regarding different terminal value techniques.

Koller et al. (2010) proved with the value driver formula that the relationship between growth and investment needed for that growth could be seen prominently in the terminal value calculation. The addition of this reduces space for questions regarding assumed growth rates. The introduction of the third stage by Damodaran (2012) increases transparency between the growth rates chosen.

From this it can be concluded that a terminal value should be transparent in the sense that the result is a logical outcome from the logically argued input factors. The transparency is increased when the terminal value leaves little space for questions. An increase in the amount of input parameters forces the valuator to strengthen its argumentation and results in a higher transparency. The increase in complexity and amount of input factors also increases the amount of argumentation with which a valuator supports the assumptions. This puts the value driver formula and the two- and three-stage models in a better position regarding the level of compliance with this focus point.

Sensible Growth

A third element in which authors try to improve their models can be summarized as sensible growth. Whereas the basic perpetuity does not even take growth into account, Gordon (1959) already explained that growth can be expected even beyond the explicit forecasted period. The addition of a stable growth rate for the terminal period was introduced by him. After this idea settled, multiple authors sought ways of improving this idea. Koller et al. (2010) argues that terminal growth rates should follow a natural pattern and have to be argued in a logical manner, with which he adds that in certain situations, you may want to break up the continuing value. This is executed in his two-stage model, by introducing a first high-growth stage which is followed by a second stable-growth stage. Arguably this results in a more logical situation for companies which have an expected growth difference somewhere in the future. A model which requires more thought about future growth rates increases the validity and trustworthiness of the terminal value. Damodaran (2012) argues that the implementation of a transition period follows an even more natural pattern. In this the two-stage model is extended towards a three-stage model with a gradual decline in growth rate from high to stable. Obviously, both intrinsic value and replacement costs as a way of computing the terminal value do not take growth into account, therefore both score a minimum in this literature standard. The basic perpetuity also does not take growth into account for the terminal period, but because in some cases zero growth could be advocated as the best growth rate this is slightly less failing. From the Gordon growth model onwards, the increase in complexity gives valuators a broader set of opportunities at the starting point and therefore increasingly comply with the sensible growth rate focus point.

Extensive market analysis

A company moves within an industry and this industry moves in an economy, therefore there is a relation between the state of the economy and the state of the company. Valuators should therefore not only investigate the expectations of the company, but also the expectations of the economy as whole. For instance the expected growth rate of the entire economy could influence the expected growth rate for the company at hand. Shaked and Kempianen (2009) state that there is a close link between growth rates in the terminal period and inflation of the economy. Damodaran (2006) adds that a company can not sustain a higher growth than the expected growth of the economy in the terminal period because mathematically the company should outgrow the size of the rest of the economy. From these statements one can conclude that the optimal model should force a valuator to also investigate the industry and economy. Whereas intrinsic value barely is influenced by the market analysis, replacement costs are just slightly more applicable. One can argue that the state of the economy influences prizes which affect the replacement costs. However, no extensive analysis is required for these two techniques. The basic perpetuity could be used for a valuation during stagnation of the economy but the Gordon growth model forces the valuator to take the state of the economy into account because of the stable growth rate which has to be computed for the terminal period and which partially is influenced by it. The two and three-staged models provide opportunities for valuators to increase the level of detail regarding the influence of the economy on the value, and therefore score higher points.

The following table provides an overview of the different techniques and their scores tested to the 4 focus points and relative to the other techniques.

Table 1: Degree of fulfillment to literature standards				
	Internal analysis		Mixed	External analysis
Technique	Consistent	Transparent	Growth rate	Market analysis
Intrinsic Value	--	+	--	--
Replacement Cost	--	±	--	-
Basic Perpetuity	-	±	-	±
Gordon Growth	±	±	±	+
Value Driver Formula	++	++	+	+
Two-stage VDF	++	++	+	++
Three-stage Model	++	++	++	++

4.3 Focus of Practitioners on Terminal Value Calculations

Now that it is clear on which grounds literature tries to increase the validity and trustworthiness of the terminal value calculation, this section reviews the motivations of valuators in practice to come up with a terminal value for the customers they support. The following is based upon a review from practice-case valuation reports and from supporting (semi-structured) interviews with those who constructed these reports. The goal is to identify the reasons behind the choices of valuators with respect to the technique they prefer. In this process it is possible to distinguish between different categories of analysis. The category "Internal Analysis" represents the focus-points that practitioners have regarding the valuation of the company at hand. In the category "External Analysis" the practicality of the (to be determined) value is checked for other parties which are involved. The third category "Mixed" represents the focus which lies on the intersection of both the company at hand, and the counterpart. The goal of this section is to construct a table which tests the applicability of the different terminal valuation techniques to the focus of practitioners.

Dependency

A major focus point that came forward in the valuation reports and the supporting interviews is the dependency of the (to be valuated) company towards both its management and its customers. A company which is conceived to be largely dependent to either one of them faces uncertainty which has a depressing effect on price.

Respondent: "Companies which are very dependent of the manager or certain key figures within the company could not be valued solely based on prospects created by this management"

A different practitioner added:

Respondent: "An entrepreneur who does not care for his successor destroys part of the value of the firm"

A second dependency factor can be found in the spectrum of customers from the company. Are customers solely based within one industry, and does a change in that industry therefore affect the company directly. Does the firm has multiple small customers or does it rely on 1 or 2 large clients. A valuator declared:

Respondent: "Dependency of one or few customers decreases the price of the company because the risk of decreasing income is higher"

This therefore clarifies that dependency on both the quality or network of its key figures, or dependency of its clients will influence the price of the firm in a negative way. Whilst using the intrinsic value or replacement cost technique, the dependency factor does not play a role. This is totally due to the company as such. For a basic perpetuity or the Gordon growth model, the fact that this is based on future cash flows makes that valuators already apply a more conservative approach. The value driver formula, the two- and three-stage model imply a higher value for the distant future which makes the practitioner more hesitant. These are therefore not seen as the best options.

Attribution

Within the process of valuation of small and medium enterprises, the valuators faces the question which portion of the future cash flows and corresponding value could be attributed to the manager shareholder(s) which sell or leave the company at this moment in time. Should the entire portion of value forth flowing from (especially more distant) future cash flows be taken into account. Although this again creates the gap between 'value' and 'price' a respondent described the situation as follows:

Respondent: "During the takeover process a buyer sees future growth as a gain he or she can collect, because this is up to them to achieve"

Whereas literature sees future growth as a logical outcome from the path set by the current owners, SME entrepreneurs see this more as their own achievements. This therefore creates a practical problem for valuators to use a growth factor in the terminal value period. This problem does not occur for the first three terminal value techniques. But from the Gordon growth model onwards there is a decrease in applicability for the more complex models due to the higher portions of value corresponding with the growth.

Deal making

A third decision criteria for practitioners is the amount of practicality when it comes down to making a deal. Next to the valuation process, corporate finance companies also serve as dealmakers, and even though valuation outcomes only serve as a starting point for negotiation according to Svetlova (2012), the valuation outcome which discourages either the seller or the buyer in this process will frustrate the creation of a deal. Both very low as very high valuation outcomes could therefore be seen as undesirable. One of the respondents commented as follows:

Respondent: "During the process of a takeover we usually are at the middle of a rope which is pulled from both sides."

And even though this is the most classical issue in the gap between 'value' and 'price' practitioners do have to take their position into account.

Respondent: "When several deals fail due to the gap in value in the valuation report and expected prices by both parties, we have not done a good job"

But, as was touched upon, this has implications for both sides of the value spectrum. The use of the intrinsic value and replacement cost as a terminal value could seem interesting for buyers and could be seen as too little value for sellers, whereas the Koller et al. (2010) and Damodaran (2012)models may lead to an insurmountable price for the buyers. Practitioners therefore tend to choose the golden mean in the basic perpetuity or the Gordon growth model.

Ability to fund

Related to the previous "deal making" section, the valuators are involved in the entire process of for instance take-overs or buy-outs. The process does most of the times not end with a deal between the different actors and it is more the rule than the exception that the buying side of the deal needs financing for this business. The perceived difficulties that practitioners would encounter in this stage could have a price depressing effect on the valuation. A lower price would normally result in easier fundability. During the interviews, some of the respondents made the following or similar statements:

Respondent: " When the agreed price is perceived as 'too high' by possible financiers, the deal could (even in that stage) be put to a hold, and ultimately fail"

When asked if this is only taken into account during the talks about the takeover, one of them responded:

Respondent: "I do take rules of thumb regarding the ability to fund into account during the construction of the valuation report"

The order in which the terminal value techniques are listed have increasingly high outcomes in value, this therefore has a contrariwise effect on the ability to fund for external financiers.

The following table provides an overview of the different techniques and their scores tested to the 4 criteria and relative to the other techniques.

Table 2: Degree of fulfillment to practice standards				
	Internal analysis		Mixed	External analysis
Technique	Dependency	Attribution	Deal making	Ability to fund
Intrinsic Value	++	++	--	++
Replacement Cost	++	++	--	++
Basic Perpetuity	+	+	+	+
Gordon Growth	+	±	++	+
Value Driver Formula	±	-	±	±
Two-stage VDF	--	--	-	-
Three-stage Model	--	--	--	--

4.4 How to approach differences between Literature and Practice

The tables in the previous sections show some striking differences in the points (plusses) that the same techniques score in focus points for literature and in criteria for practice as in how to decide the most suitable technique to use. In literature, authors try to improve the models on four pillars. The four pillars of transparency, consistency, sensible growth rates and a better market analyses score higher when models become more complex. These, more complex, models result in higher output with similar input. On the other hand, there seems to be a certain reluctance for practitioners to impose a terminal value calculation model which results in a high outcome. Although the input factors most severely determine this outcome, these have to be supported by solid argumentation and by choosing a different model these do not have to be altered. Whereas these conclusions seem straightforward, the approach on how to bridge this gap is more difficult. The following results are a combination of the ideas of the researcher and responses of practitioners. Valuators may want to provide the various parties involved with more scenario based valuation calculations. One of the respondents argued:

Respondent: "From our last 50 valuation reports, approximately 48 of them would contain the same terminal value model. Only in cases of high exceptions we deviate from our dominant model "

Because it is highly unlikely that 48 out of 50 valued companies were in the same position during the valuation the predominant model used in practice might be chosen as the safe choice. To extend this, valuators could also consider to incorporate sensitivity tables throughout the valuation report to serve a dual purpose. First of all, a respondent claimed that an owner/director of a small or medium enterprise is most likely not financially literate. And this hardens the process of explaining the derived value.

Respondent: "A director (general owner) of a small company is more an entrepreneur than a financial expert, the fact that he does not fully understand how the calculated value is build up makes it harder to move him in a direction away from the targeted price he has in mind"

The sensitivity tables could possibly (partially) bridge this gap by clarifying how the different input parameters influence the calculated value. Next to that, different values could at that point in time be derived by explaining the different scenarios for the company and their respective consequences for the input factors. This decreases the importance of the value derived in the valuation report and gives the various parties involved a more 'fluid' starting point (Svetlova, 2012) in which argumentation between the parties could influence the input parameters and, consequently, the resulting value.

5 Conclusions

This paper has gone through a couple of stages. The first stage aimed in creating an overall goal for the thesis by stating a research question with sub-questions. After this, the theoretical framework was constructed to put the theory in perspective and to be able to see the scope of the research. This framework has showed several different DCF terminal value techniques. Most techniques are based around the same line of thought but differ in terms of complexity. The theoretical framework was concluded with the explanation of the importance of the terminal value in the overall value, and the clarification around the different growth-rate patterns. The methodology sector explained that this research has a qualitative design which has as goal to gain an insight on how literature and practice differ in terminal value approaches. The latter was based around real life valuation reports and semi-structured interviews. Both approaches were characterized by 4 pillars against which the terminal value techniques were tested and graded. The results have created the following two tables:

Table 1: Degree of fulfillment to literature standards				
	Internal analysis		Mixed	External analysis
Technique	Consistent	Transparent	Growth rate	Market analysis
Intrinsic Value	--	+	--	--
Replacement Cost	--	±	--	-
Basic Perpetuity	-	±	-	±
Gordon Growth	±	±	±	+
Value Driver Formula	++	++	+	+
Two-stage VDF	++	++	+	++
Three-stage Model	++	++	++	++

Table 2: Degree of fulfillment to practice standards				
	Internal analysis		Mixed	External analysis
Technique	Dependency	Attribution	Deal making	Ability to fund
Intrinsic Value	++	++	--	++
Replacement Cost	++	++	--	++
Basic Perpetuity	+	+	+	+
Gordon Growth	+	±	++	+
Value Driver Formula	±	-	±	±
Two-stage VDF	--	--	-	-
Three-stage Model	--	--	--	--

Both tables represent a scoresheet with the same techniques tested against each other. In this, one can see that table 1 provides increasing scores towards the more complex models. The conclusion from this is that the more complex models better meet the intentions from authors in how to improve a terminal value calculation. Table 2 however shows different scores for the same techniques. In this practice-approach there is a tendency to the more simple models which result in a more conservative outcome. The overall research question was formulated as follows: *"To what extend differs practice from current literature in terminal value calculations for DCF valuations of SME's?".* It can be concluded that the tables provided a clear answer in the fact that the two move in an opposite direction. There is no clear answer as how to approach this differences. Valuators make clear that the complex nature and high-value outcomes of the more sophisticated models create practical issues whilst constructing a valuation report. The gap might partially be bridged by creating a more scenario-based valuation report. Combining this with sensitivity-information regarding the different input parameters might increase the 'feeling' one must have regarding the numbers. This would allow practitioners to use multiple techniques during the same valuation whilst increasing the clearness of the outcome.

6 Discussion, implications, limitations and future research

Discussion

The results give an insight in the logical development of literature, but also in the practical difficulties the valuators have with these more complex models. The situation arises, that the value (whilst using the more complex models) is in most cases very far of the price that may seem to be the 'fair' price. This does, in my eyes, not take away the duty of the valuator to approach the 'true value' of the company to the best of their abilities with the knowledge at hand. Having a conservative approach is appropriate to a certain extent, but deliberately choosing models and input factors to come up with a commercially more interesting value has some negatives to it which may harm not only the trustworthiness of the valuator at hand, but also the reliability of the financial services as a whole. On the other hand, the practical contradictions which are faced by the practitioners, may not serve as an insurmountable burden which makes the practice of a SME-valuation company impossible. I would argue that this development for both literature and practice is a logical one, but it is better for both if this difference is mitigated in a way.

Implications & contribution

One of the first intentions of the research was to contribute in a practical way for the companies which valuate. With the theoretical framework, practitioners can see how the academic world improves the models designed to be used by them. Next to that, the valuators have the opportunity to reconsider the criteria used for choosing a terminal valuation technique. Authors could on the other hand use this research as a fair warning concerning the applicability of their models. The complexity of some techniques makes it hard to understand in practice. Next to using the model as such, the practitioner also has a task in explaining it to both the selling and buying part of the take-over. For this, a more complex model is less desirable.

The research contributes to literature in several ways. As was touched upon in one of the previous chapters, researchers can find an overview which is created around the different terminal valuation techniques within the DCF model. Subsequently, the differences regarding focus between literature and practice are pointed out and listed in a table. These serve literature in the way that this enables future research to take the difficulties in practice into consideration and try to diminish these whilst constructing a new technique.

Limitations and Future Research

There are certain limitations with respect to the validity and generalizability of the main results and corresponding conclusions. First of all, the research has a qualitative character for which a small sample size is used. This sample size was constructed using similar corporate finance companies mostly within the same region, with little diversity in the economy. The practitioners have their area of expertise in corporate finance for Small and Medium Enterprises (SME) mostly. This forces readers to place the outcomes into perspective and limit them regarding the valuation processes around large companies. The literature techniques which were considered were limited to the discounted cash flow method (DCF) and do not give a comprehensive image of all valuation techniques.

This research has constructed tables (table 1 and 2) for both practitioners and literature points of view regarding terminal value techniques within the DCF model. The focus points and criteria listed do not include every option because this research is limited to the 4 most relevant and frequently addressed. Even with the limitations as they are posted, these tables do present an addition to literature in the sense that such overviews are unique. An important starting point regarding future research would therefore be to verify and broaden these tables. This could be done by verifying whether these conclusions hold in other regions and industries. Subsequently this could be researched for larger (public) corporations. Next to that it will be interesting to see to what extend the different focus points have influence on the process of developing models. Similarly, it will be an interesting addition to see how much weight is addressed to the four, and perhaps more, decision criteria for practitioners. To achieve that, future researchers could aim at making a model with input parameters as variables, and percentages filled in by practitioners.

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Appendix 1 Formulas

$$Net\ Present\ Value = \sum_{t-0}^{n} \frac{FCF_t}{(1+r)^t}$$

$$Cost\ of\ Debt = r_d * (1-t)$$

$$Cost\ of\ Equity = r_f + \beta(r_m - r_f)$$

$$WACC = \frac{Equity}{Debt + Equity} * Cost\ of\ Equity + \frac{Debt}{Debt + Equity} * Cost\ of\ Debt$$

$$WACC = \frac{E}{D+E} * \left(R_f + \beta(r_m - r_f)\right) + \frac{D}{D+E} * r_d * (1-t)$$

$$TV = \frac{NOPAT_{t+1}}{WACC}$$

$$TV = \frac{FCFF_{t+1}}{WACC - g}$$

$$TV = \frac{NOPLAT_{t+1}\left(1 - \frac{g}{RONIC}\right)}{WACC - g}$$

$$TV = \left(\frac{NOPLAT_{t+1}\left(1 - \frac{g_a}{RONIC_a}\right)}{WACC - g_a}\right)\left(1 - \left(\frac{1+g_a}{1+WACC}\right)^N\right) + \left(\frac{NOPLAT_{t+1}(1+g_a)^N\left(1 - \frac{g_b}{RONIC_b}\right)}{(WACC - g_b)(1+WACC)^N}\right)$$

Terminal Value Calculations with DCF

$$TV = \frac{FCFF_0 * (1 + g)^t}{(1 + r)^t} + \sum_{t=n1+1}^{t=n2} \frac{FCFF_t}{(1 + r)^t} + \frac{FCFF_{n+1}}{(r - g_{n)} * (1 + r)^n}$$

Appendix 2 Tables

Table 1: Degree of fulfillment to literature standards				
	Internal analysis		Mixed	External analysis
Technique	Consistent	Transparent	Growth rate	Market analysis
Intrinsic Value	--	+	--	--
Replacement Cost	--	±	--	-
Basic Perpetuity	-	±	-	±
Gordon Growth	±	±	±	+
Value Driver Formula	++	++	+	+
Two-stage VDF	++	++	+	++
Three-stage Model	++	++	++	++

Table 2: Degree of fulfillment to practice standards				
	Internal analysis		Mixed	External analysis
Technique	Dependency	Attribution	Deal making	Ability to fund
Intrinsic Value	++	++	--	++
Replacement Cost	++	++	--	++
Basic Perpetuity	+	+	+	+
Gordon Growth	+	±	++	+
Value Driver Formula	±	-	±	±
Two-stage VDF	--	--	-	-
Three-stage Model	--	--	--	--

Appendix 3 Interview Questions (Dutch)

Interview vragenlijst Nederlands

De volgende vragen hebben betrekking op de praktijk berekening van de terminal value met een DCF techniek.

<u>Forecasted period</u>

1: a) Hoewel het in feite geen effect hoort te hebben op de uiteindelijke waarde, over hoeveel jaar berekend u normaalgesproken de explicit forecasted period? Houdt u hierbij rekening met de investeringscyclus en de zogenaamde 'steady-state' hierop volgend?

   b) wanneer wijkt u af van het bovengenoemde antwoord?

<u>WACC</u>

2 : a) U berekend en gebruikt een bepaalde WACC voor deze explicit forecasted period, in hoeverre gebruikt u deze zelfde WACC in de berekening van de terminal period?

   b) Hoe kijkt u aan tegen het gebruik van een 'optimal structure' als u kansen ziet voor verbetering in de capital structure?

<u>Terminal value:</u>

Techniek:

3: a)Welke techniek past u toe bij het berekenen van een terminal value?

   b) Wijkt u hier wel eens van af, zo ja, wanneer?

4: Welke drijfveren gebruikt u voor deze keuze?

5: Hoe bepaalt u een groei-prognose voor deze fase, en in welke orde van grootte liggen de percentages die u in de groei heeft berekend?

6: Hoeveel wijkt deze gemiddeld genomen af van de groei die u meeneemt in de explicit forecasted period?

7: In de literatuur zijn de meeste auteurs het erover eens dat een bedrijf niet sneller dan de economie kan groeien in de terminal period (mathematisch zou het bedrijf dan op termijn groter worden dan de economie) hoe kijkt u hier tegen aan?

8: Tussen 84 en 94 procent van de terminal value komt van de eerste 20 jaar in de terminal value periode(Gordon Growth model met groei tussen 5 en 0 procent) (Rotkowski & Clough, 2013). Kunt u zich voorstellen dat een bedrijf in zo'n periode een economie wél kan 'outperformen'? (Hoe valide is dan de vorige vraag/antwoord?)

9: Hoe kijkt u aan tegen een extra fase tussen de explicit forecasted en terminal period om de groei geleidelijk af te laten nemen naar de stabiele waarde?

10: Hoe kijkt u aan tegen de waarde van de terminal period relatief ten opzichte van de explicit period, is deze te groot in uw ogen? (kan voor een high growth bedrijf oplopen tot boven 100% van de waarde)

11: Denkt u dat het onvoorspelbare karakter van een terminal value berekening er voor zorgt dat u wat conservatievere cijfers meeneemt in de berekening?

Algemeen

De komende vragen kunnen in meer of mindere mate een vergelijkbaar karakter hebben maar hebben als doel om de rationele achter de gekozen technieken te begrijpen.

12: Heeft u het idee dat u voorál een 'waarde' of vooral een 'overnameprijs' berekend als u de verkoop van een onderneming begeleid?

13: Hangt de berekening soms deels af van de situatie van de koper (of soms zelfs verkoper)?

14: Denkt u dat het construeren van een 'mogelijke waarde' (wanneer een bedrijf een betere kapitaal structuur aanneemt) een goede aanvulling is voor het waarderingsrapport? Zijn hier ook verschillen mogelijk naast de WACC?

15: In algemene zin, hoeveel van de waarde kunt u in uw ogen toeschrijven aan een verkopende partij in geval van een overname, zit hem daarin ook het verschil tussen 'waarde' en 'prijs' in uw ogen? En speelt hierbij de omvang van de onderneming een rol?