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A study of valuation through multiple methods of top Finnish companies

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Abstract

The principal theme of the thesis is corporate valuation through alternative techniques. The theoretical part included valuation. Several models and methods of value determination were introduced. The information in the theoretical part was applied in the practical part of the research In the stock market; there are many firms whose market value differs from the intrinsic value. The main goal was to figure out, which of the top Finnish 25 NASDAQ OMX Helsinki firms were under-or overvalued. To address this, methods such as Discounted Cash flow, Free cash flow to the firm, Capital Asset Pricing model, Multiples and Tobin's Q were applied.

In the study, secondary data was used. Historical data collected and consisted 10-year sample of firm's historical stock market and accounting data from 2005 to 2018, daily stock performances of each firm daily stock performances of the general stock market and yearly accounting data of each firm. They were analysed by various methods to discover undervalued firms and figure out their intrinsic value. Microsoft Excel was used to perform the valuation tasks. Once the valuation models were successfully applied in practice, it was possible to figure out the undervalued firms and their intrinsic value.

The results exposed that in 2018 among 18 firms, 12 were overvalued and the other six firms were undervalued. Among those, 11 firms had negative real value. The performance-related multiples and Tobin's Q implied that from 2005 to 2018, the firm's that were considered undervalued, their performance had been unstable even though their stock's market price has been relatively stable.

It should be noted that the value of a company cannot be explicitly calculated, but the valuation is always based in part on a subjective assessment. A successful valuation of a company is difficult, and it is one of the most important fundamentals when considering a successful acquisition of a firm's stock -or the whole company.

Keywords (subjects)

Valuation, valuation methods, Free Cash Flow, Tobin's Q, Multiples, Capital Asset Pricing model

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Tiivistelmä

Opinnäytetyön pääsisältö keskittyi yrityksen arvonmääritykseen. Opinnäyte koostui teoreettisesta osasta ja käytännön osasta. Opinnäytetyössä kuvataan arvonmääritystä kokonaisvaltaisena prosessina ja esitellään käytetyimpiä arvonmääritysmenetelmiä, sekä niiden käyttötarkoituksia. Arvonmäärityksen avulla on mahdollista selvittää, määrittävätkö yritykset arvonsa, sekä osakehintansa markkinoilla oikein. Päätavoitteena oli selvittää, mitkä Suomen 25 parhaasta NASDAQ OMX Helsinki -yrityksistä olivat aliarvostettuja tai yliarvostettuja. Osakemarkkinoilla voi olla yrityksiä, joiden markkina-arvo eroaa todellisesta arvosta. Tämän selvittämiseksi yrityksiä tutkittiin seuraavien metodien kautta: Diskontattu kassavirta, Vapaa kassavirta, Capital Asset Pricing -malli, Tobinin Q ja Pörssitunnusluvut (P/E-Luku, P/S-luku ja P/B-luku).

Tutkimusdata koostui kymmenen vuoden otannasta historiallisista kirjanpitotiedoista sekä markkinadatasta ajanjaksolla 2005–2018. Useita yrityksiä analysoitiin eri metodeilla aliarvostettujen yritysten löytämiseksi ja niiden todellisen arvon selvittämiseksi. Tutkimus käsitteli mitä eri arvonmääritysmalleja on olemassa, ja kuinka arvonmääritysprosessi suoritettiin. Useita arvonmääritysmalleja sovellettiin onnistuneesti käytännössä. Tämä mahdollisti yrityksen todellisen taloudellisen arvon arvioinnin luotettavammin.

Tulokset osoittivat, että vuonna 2018, 18 yrityksen keskuudessa 12 oli yliarvostettuja sekä 6 yrityksistä oli aliarvostettuja. Näistä 11 yrityksellä oli negatiivinen todellinen arvo. Pörssitunnusluvut ja Tobinin Q osoittivat, että vuosien 2005 ja 2018 välillä yritysten tulokset olivat olleet epävakaita, vaikka niiden osakekurssi on ollut suhteellisen vakaa.

On huomattava, että yrityksen arvoa ei voida suoraan laskea, mutta arvonmääritys perustuu aina osittain subjektiiviseen arviointiin. Arvonmääritysmallien soveltaminen käytäntöön oli onnistunut. Vaikka yrityksen arvonmääritys on haastavaa, se on yksi tärkeimmistä perusteista ennen osakkeiden ostopäätöstä -tai onnistunutta yrityskauppaa.

Avainsanat (asiasanat)
Yrityksen arvonmääritys, Diskontattu kassavirta, Vapaa kassavirta, Capital Asset Pricing -malli, Tobinin Q ja Pörssitunnusluvut

Muut tiedot -

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1 Introduction

This chapter introduces the background of the thesis and the rationale of the chosen topic. Additionally, the research framework, research objectives and research questions are presented.

1.1 Background

The spotlight on the stock market has always been immense since the day we started trading. In the stock market, publicly traded firms distribute their possession for the general public by issuing shares of stock, and they are freely traded on the stock exchange market. However, a common debate exists on whether the market price of a firm's stock accurately reflects the real value of the company.

In Finance and Corporate governance, the method of determining the true value is called Valuation. The impact of valuation occurs on many levels, regionally, domestically, and globally. An improperly calculated valuation can cause a negative impact on the whole stock market, or in the worst-case lead into a recession. (Damodaran 2002, 6-14.) Valuation assesses whether the stock market correctly values firms. It also serves as an aiding instrument to help determine the real value of a security, an asset, or a firm. The value of a firm can be overvalued or undervalued in comparison to its intrinsic value. Hence, if the firm value is higher than the intrinsic value, it is considered overvalued, and if the firm value is lower, it is seen as undervalued. (Stowe, Robinson, Pinto & McLeavey 2007, 2-28.) Due to the global Financial crisis of 2008 EU and Finland also faced a recession, which made the role of financial analysis even more essential than before. In order to comprehend how the period affected Finnish firms and their value, the top 25 firms in NASDAQ OMX Helsinki were chosen as the sample to perform valuation on.

1.2 Research motivation

The author has chosen these aspects combined with the interest in Finance. It has contributed to the implementation of this research. The research has allowed the author to explore corporate Finance in a more comprehensive and detailed manner as

well as strengthened her knowledge and curiosity towards the field. The thesis can be beneficial for future studies, research, or personal career development. In addition, the research can potentially offer viable results for the firms included in the sample.

The author delved to the topic of valuation, and after studying a considerable number of relevant articles and research, she discovered that a very small portion of the existing literature had studied the effects on the Finnish market. Therefore, the reasoning for selecting firms listed in NASDAQ OMX Helsinki 25, derives from the lack of previous research. Considering the aforementioned points, the author deemed it essential to contribute to the current body of literature by providing a thorough research on the topic.

1.3 Research objectives and questions

When the firm is being evaluated, its performance and growth tend to be vital metrics. Commonly, investors are more focused on the financial aspect of the firm, and consequently, firms with better financial performance records are considered more favourable by investors. If the performance of the stock indicates no growth potential the investors may defiantly abandon aforementioned stocks. When determining the intrinsic values of firms in NASDAQ OMX Helsinki 25, this research could be used as a crucial source of information in assisting firm managers in their decision-making process. It can aid them in choosing the correct stocks or with defining their strategies. If the firm value is higher than their intrinsic value, the firm managers should act on it. Conversely, if a firm is valued lower than the intrinsic value, the firm managers should try to increase firm performance as an act of protecting the firm's investors. (Koller, Goedhart & Wessels 2005, 4-21.)

There is a chance that the firms' market value may not match the intrinsic value; hence the firm performance and probable growth do not match with the market price. This problem is the focus of the current study. Through valuation the author seeks to determine the market value and intrinsic value of the sample firms. Additionally, the results of the research aim to provide an answer on how efficient, or perfect the stock market itself is. This approach will build a bridge between two

sides, the historical side as in market data, and the other side as what is derived from the theoretical calculations, which can also be described as comparing actual values with the theoretical values ”as given by” various valuation techniques. With this, the author attempts to answer these research questions:

1. *What are the values of the top 25 Finnish firms as calculated by various valuation techniques?*

2. *Which of the firms listed in the OMXH25 are undervalued or overvalued?*

3. *What are the implications of under/overvaluation of firms on investors?*

The data collected for the purposes of the current research is numerical, retrieved primarily from the stock market database NASDAQ OMX Nordic and from the yearly annual reports of each firm. Financial data was used as input for various formulas and variables to estimate the intrinsic values of the companies. Data was collected in a 10-year sample of the firms' historical stock market and accounting data for the period of 01.01.2005-31.12.2018. The data has then been processed using the Spreadsheet Software Microsoft Excel in which the methods and measures of valuation have been produced. Multiple methods of valuation have been applied in this study in order to induce objectivity and robustness to support the findings of the research. The research aims to offer precise, unbiased results.

1.4 Structure of the Thesis

Literature review is conducted to entirely understand the methodology and the models used during the research process. Chapter 2 consists introduction of the topics discussed in this thesis with literature review. Chapter 3 contains methodology of the research, data collection, data analysis and the Reliability and Validity. The Chapter 4 summarizes the findings of the research and assesses the credibility of the research and offers possible suggestions to following researchers.

2 Literature Review

This chapter introduces various concepts, definitions, practical functions of valuation, different valuation models, aspects related to the DCF model and the DCF formulation. The author used multiple works of literature which include articles, online publications, soft and hard copies of books. This chapter aids the reader to understand the concept of valuation. This chapter focuses on reviewing the literature. Eleven sub-chapters have been mentioned here, of which are the Chapter 2.1 Value, Chapter 2.2 The concept of firm valuation, Chapter 2.3 Major issues of firm valuation, Chapter 2.4 Valuation models, Chapter 2.5 Discounted cash flow methods (DCF), Chapter 2.6 Capital Asset Pricing Model-CAPM, Chapter 2.7 Tobin's Q, Chapter 2.8 Multiples, Chapter 2.9 Book Value of Equity, Chapter 2.10 Operating profit margin, Chapter 2.11 Net profit margin and Chapter 2.12 Hypotheses.

2.1 Value

The company's value can be determined differently depending on the buyer, or it can be different for the buyer and the seller. Value is not equivalent to the price. The price is the quantity agreed between the seller and the buyer when considering the sale of a company. There are numerous reasons for determining the difference in a specific company's value. (Fernandez 2015, 2.) A firm can directly relate its decision making to its value, also on which projects it takes, how it finances them, and how they structure their dividend policy. When this relationship is understood, value increasing decisions and financial reforms are less problematic. (Damodaran 2002,12.) The simplest way to explain this is via an example provided by Fernandez (2015, 2);

> *A large and technologically highly advanced foreign company wishes to buy a well-known national company in order to gain entry into the local market, using the reputation of the local brand. In this case, the foreign buyer will only value the brand but not the plant, machinery, etc. as it has more advanced assets of its own. However, the seller will give a very high value to its material resources, as they are able to continue producing. From the buyer's viewpoint, the basic aim is to determine the maximum value it should be prepared to pay for what the company it wishes to buy is able to contribute. From the seller's viewpoint, the aim is to ascertain what should be the minimum value at which it should accept the operation. These are the two figures that face each other across the*

> *table in a negotiation until a price is finally agreed on, which is usually somewhere between the two extremes. A company may also have different values for different buyers due to economies of scale, economies of scope, or different perceptions about the industry and the company.*

Market value is the worth of a company according to the stock market. Market value is derived from the number analysis. Commonly media and investors refer to Market value when they mention the value of the business. The market value does not only rely on the historical cost of the firm's assets, it also relies on investor expectations on how much profit the firm's assets might generate in the future. (Berk, DeMarzo & Harford 2012, 29.) Book value on the other hand, is the value amount of shareholders equity in the balance sheet (capital and reserves) which are stated in the financial statements of a company. From this, the difference between total assets and liabilities is visible, and the surplus of the company's total goods and claims over its total debts with other parties. (Fernandez 2015, 3.) Book value literally means the value of the business according to the "books" as financial statements call the value. Book value is calculated from the balance sheet, which is Historical data. (Damodaran 2002, 40.) Benjamin Graham and David Dodd (1934, 17) discuss the intrinsic value on their Book Security Analysis. In this book, they examine that Intrinsic value was considered equal with Book value before. It was equal to the net assets of the firm. This view of intrinsic value was quite definite, but it proved not to be practical. Since, the average earnings nor the average market price are not demonstrated any tendency to be governed by book value. Later, Damodaran has defined the Intrinsic value of the company by following statement: "The intrinsic value of a company is the present value of the expected cashflows of the company over its lifetime." (2010, 181). Damodaran states (2010, 41), that every asset with intrinsic value reflects its cash flow potential and its risk. The process of estimating intrinsic value causes challenges since there is a tendency to look past market perceptions and asses the intrinsic value of a business or asset. Generally, the intrinsic value of an asset is estimated by conducting a Discounted cash flow calculation (Damodaran 2011,7).

The stock market and the market price of the stock frequently changes. The price of the stock can be considered as undervalued if the market price is below the intrinsic value. If the market price of the stock is higher than the intrinsic value, the stock can be considered overvalued (Rawley & Benton 2010, 294.) Jensen (2004, 554) has

discussed, that if a firm stock is overvalued, they will not generate the financial performance as is required by the market. The result of overvaluing is the firm's capital, both equity and debt become interesting to be acquired by the investors. As this occurs, the result of overvaluation will affect the firm's debt structure, and the importance of the management of the debt rises. Meantime, overvaluation establishes reasons to sanction unnecessary internal spending on operating costs (Jensen 2004, 555-562.) Graham introduced The value Investment principle in the book of 'The Intelligent Investor' (1949), which provides a base for investors whether stocks are undervalued. There, he stated the way investors should respond to overvalued or undervalued stock. If the stock is overvalued, Graham suggests that the stock should not be bought or sold. On the other hand, if the stock is undervalued, the stock should be bought or held on.

2.2 The concept of firm valuation

Views on valuation can be divided into two sides. Others see valuation as "hard science," where is no space for analytic views or human error. At the other side are the visionaries who see valuation as a means to manipulate numbers for any result sought (Damodaran 2016, 2.) In many areas of finance, which include corporate finance, mergers, acquisitions, and portfolio management, valuation plays a key role (Damodaran 2002, 8). Purposes of doing a valuation can be various. A valuation can be done in the following situations.

- In a company that has to buy and sell operations. Regarding the buyer, one valuation method will resolve the highest price that should be paid. For the seller, other valuation will result in the lowest price where they should sell.

- A valuation of publicly listed firms can be used to compare their share price on the stock market, with it to determine and decide if sell, buy, or keep the shares. Also, several valuating firms can be used to choose the securities that the created portfolio should concentrate on to: Ones that seem to be undervalued by the market. Valuation also can be used to make comparisons between firms.

- A valuation can be beneficial to public offerings as well. It is used to rationalize the price at which the shares are offered to the public. This includes the Initial public offerings (IPO's) here, knowing the intrinsic value of the company before entering the share market assists the company's management to justify the new market price.

- In inheritances and wills, the goal of valuation is to compare the share's value with the value of other assets.

- When determining the compensation, the valuation of the whole company or just the business unit is beneficial to determine the value created by the executives- or the business that is being evaluated. As the compensation is based on value creation by the executives.

- The valuation of a company or a business unit is essential when identifying and determining the core value drivers.

- It provides crucial strategic decisions for a company or a business unit to determine the next steps in their existence. A valuation can provide essential information for the company, whether it should stay in business, expand, merge, slow down, or sell itself to some other company.

- The valuation of the whole company or a business unit provides information for determining what areas of business, products, demographic areas, target markets, customers to maintain, expand, or cancel, which makes valuation useful for long-term planning.

- It offers a way to measure the impact of the company's policies and strategies on their value creation and deterioration. (Fernandez 2015, 2.)

Berk and DeMarzo (2017, 61) have stated the valuation principle, where:

> "*The value of a commodity or an asset to the firm or its investors is determined by its competitive market price. The benefits and costs of a decision should be evaluated using those market prices. When the value of the benefits exceeds the value of the costs, the decision will increase the market value of the firm.*"

This statement agrees with this research's statement and objective. Also, Damodaran (2005, 694) has discussed that with valuation, the firm makes the best decisions, and enriches its investors.

Valuation is not considered as an objective activity, and preconceptions and biases brought by the analyst to the valuation process will eventually find their way into the value (Damodaran 2002, 9). There are three significant issues found from valuation, that the analyst should pay attention to when performing the process. Those are the human bias, uncertainty, and complexity and the development of valuation models. (Damodaran 2016, 2.)

2.3 Major issues of Firm Valuation

These are the human bias, uncertainty, and complexity and the development of valuation models (Damodaran 2016, 2). The first issue of human bias, which is always present. We tend to absorb the external information, analyses, and opinions about a firm, which results in not entering a valuation without some bias. There are suggestions on avoiding bias. The first suggestion is to eliminate all bias before starting a valuation. Secondly, strong public positions regarding the value of a company shall be avoided. The aforementioned can result in biased analyses because of the decision on if a company is under-or overvalued heralds the actual valuation and the choice of methods. Third, the involvement in determining if the company is under-or overvalued before the valuation shall be left to a minimum. (ibid., 2-3.)

Uncertainty is continuously related to valuation; consequently, it results from the asset being valued, with the addition of the chosen valuation model and the estimation of the result (Damodaran 2002, 3). Mistakes made with the conversion of information into inputs and them entered into models will result in estimation error, which is a crucial cause in uncertainty. With firms, the pre-vision of the performance can result in any direction. The company can perform better or worse than expected when the estimates in valuation fail. If the company performs in the way expected, the change in the macro-economic environment can cause deviations. An increase or decrease in interest rates, or the economy, in general, can do well or worse than

expected. Changes in the macro-economic environment as these affect value. (Damodaran 2010, 14.)

With technological development over the decades, valuation models have developed into more and more complex. The development and easier access to data allows more detailed valuation, but the fundamental issue is how complex and detailed a valuation should be. (Damodaran 2010, 15.) There is a division of opinion that valuation is done in more detail, it will be more consistent than in less detail, and in detail, the results are more decisive. Valuation done with less detail can be as significant as a valuation with more detail. Considering using detailed data will result in more specific forecasts, but the disadvantage of detailed data is the increased amount of inputs, which increases the potential for error and continues to create complex models. Professionals in valuation suggest endorsing a simple principle in valuation. To avoid valuation issues, value an asset with the simplest model applicable. (ibid., 15-16.)

2.4 Valuation models

There are four main groups of valuation models, balance sheet-based methods, income statement-based methods, mixed methods, and cash flow discounting-based methods. According to Fernandez (2015, 1), the methods based on cash flow discounting are theoretically “correct.”

MAIN VALUATION METHODS					
BALANCE SHEET	INCOME STATEMENT	MIXED (GOODWILL)	CASH FLOW DISCOUNTING	VALUE CREATION	OPTIONS
Book value Adjusted book value Liquidation value Substantial value	Multiples PER Sales P/EBITDA Other multiples	Classic Union of European Accounting Experts Abbreviated income Others	**Equity cash flow** **Free cash flow** **Capital cash flow** **Debt tax shield**	EVA Economic profit Cash value added CFROI	Black and Scholes Investment option Expand the project Delay the investment Alternative uses

Figure 1 Six groups of methods for valuing firms, Damodaran 2009

2.5 Discounted cash flow methods (DCF)

Discounted methods are the group of methods that calculate the estimated attraction in an investment probability (Ruback 2002, 85). The following formula calculates discounted cash flow (DCF):

$$Value = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \cdots + \frac{CF_\infty}{(1+i)^\infty} = \sum_{n=i}^{\infty} \frac{CF_n}{(1+i)^n}$$

CF= Cash flow

i= discount rate

n= time periods from one to infinity

The Discounted cash flow method is used to calculate intrinsic value. Discounted cash flow methods utilize the required annual rate to result in present value estimates, in consequence, to analyse future cash flow projections and discount them. Then, the present value estimate is applied when assessing the potential for investment. The prospect to invest might be promising if the results from Discounted cash flow analysis are higher than the current cost of the initial investment. (Damodaran 2002, 17.) Ruback (2002, 85) states that the purpose of the analysis of Discounted cash flow methods is to assess the money an investor could receive from an investment, within the adjustment for the time value of capital employed. When assessing riskier cash flows, Damodaran (2010, 303-304) suggested them to be assessed with a lower value than when assessing steady cash flows. In traditional cash flow valuation models, the discount rate is the portrayer of how concerned we are of the risk. The common tendency is that higher discount rates are used for riskier cash flows and lower discount rates on more safe cash flows (ibid., 2010, 303-304) The result of DCF

generally is, if the value from the firm is lower than the market value of the firm, DCF estimates the firm to be overvalued. When the value is higher than the market, the estimation is that the firm is undervalued. Issues with the Discounted cash flow come from the complexity, a pre mentioned issue with valuation. The model is sensitive to changes, and the later explained Terminal value is can be difficult to estimate. Often the end result is overvalued. It forces the analyst to decide, if to trust the results- or compare them with other techniques that are closer to the market observations. Often by trusting only the DCF forecast can result the firm to bankruptcy, analysts tend to prefer to apply other techniques. (Damodaran 2016, 15.)

2.5.1 Free cash flows and Weighted average cost of capital (WACC)

The cash that is generated from the flow of the firm's business operations can be termed as the free cash flow. One of the Discounted cash flow models is the Cash flow of firm (FCFF), and a variation of the free cash flow. It is another option to do equity valuation, where you do the valuation of entire business. The value of the firm is calculated by discounting the free cash flow to the firm at the weighted average cost of capital (WACC). Included in this value are tax benefits of debt, and the expected additional risk related with debt. (Damodaran 2005, 718.) According to Damodaran (2002, 542), firms with relatively high leverage are best suited for FCFF approach. Hence, in situations when the debt and the value of Equity are affected to the firm volatility, results in the firm to be more sensitive to assumptions regarding their growth and risk. As Ruback (2002, 85) has stated, the purpose to analyse these is to assess the money an investor could receive from an investment. The most common of numerous variations of free cash flow to the firm is calculated by:

$$\begin{aligned} &Free\ cash\ flow\ to\ Firm \\ &\quad = After\ tax\ operating\ income \\ &\quad - (Capital\ expenditures - Depreciation) \\ &\quad - Change\ in\ non\ cash\ working\ capital \end{aligned}$$

First, the cash flows to the firm for both equity and debt holders are measured. The discount rate of Free Cash flow of firm is Weighted average cost of capital (WACC), it is used to discount the future cash flows. WACC is not a cost or a required return for the firm, it is a weighted average of cost and of the required return. WACC is calculated by the following calculation.

$$WACC = \left(K_e \frac{E}{D+E}\right) + \left(K_t \frac{D}{D+E}\right)$$

E= Market value of the equity

Ke=The required return to equity

D= Market value of the debt

Kt=After tax cost of debt

There are common errors with WACC. First, if the wrong tax rate is applied. The rate should be applied yearly. Second error derives if the Book value of debt and equity are used instead of market values. (Fernandez 2019, 1-3.)

$$Value\ of\ Firm = \sum_{t=i}^{\infty} \frac{CF\ To\ Firm_t}{(1+WACC)^t}$$

Damodaran (2002, 19) has stated that it is crucial not to mix cashflows and their respective discount rates, if that is done, it will lead to a biased estimate of the value. Free cash flow can be considered more challenging than only analysing dividends. Hence, with free cash flow the cash flows from the firms' operations should be integrated with the firms investing, and financing activities.

According to Damodaran (2005, 720), there is two factors to note about this model. The first, that it is general enough for the market. The value of the firm is remaining as the present value of the after-tax operating cash flows, and here the cost of capital changes as the debt ratio changes. Second, there is a widely held presumption that the cost of capital approach requires to include the theory of a constant debt ratio, this approach is open for debt ratios that change over time. Stowe, Robinson, Pinto and McLeavey (2007, 110) states that a firm with a history of leverage changes, the analysis of a growing rate of free cash flow to firm can be meaningful to analyse.

Stowe, Robinson, Pinto & McLeavey (2007,109) states that, the value of the firm's equity is found by subtracting the value of debt from the value of the firm. The value

of equity can be found on DCF by taking the enterprise value which is calculated by using FCFF minus the Market value of debt (Damodaran 2016, 12).

2.5.2 Forecasting cash flows

Forecasting is an important step when determining intrinsic value. The past of the firm's growth should be examined in order to forecast the firm's value. When forecasting, three things should be considered—first, the length of the growth period. Second, the actual forecast of the cash flows in the period and, finally, the calculation of the firm's terminal value. (Damodaran 2002,58.)

The forecasting is complex. When the firm is large, the development will most likely be stable, or it will not be liquid enough to survive. The survival depends if the company has a higher return on their capital than their cost of capital, or the return on equity is higher than the cost of equity. Commonly, the period is five years. Three factors should be considered when identifying the timeframe. First, the size of the company should be considered. Generally, small, and new firms tend to grow faster than acknowledged firms. A large firm can still grow rapidly if the market capacity can be increased. Second, if the firm generates rapid growth and their excess returns are gained. It can cause their status to reinforce and remain the same for many years. Finally, the firm's competitive advantages should be considered. If the firm is visibly more competitive than other firms, it can maintain high growth for longer. (Damodaran 2016, 238-241.) Cash flows can be estimated in two ways. Estimation can be done based on the historical performance of the business. The second way of estimating includes considering the predictions of the firm, or from other analysts. (Damodaran 2002,383-393.)

2.5.3 Terminal value

The terminal value offers closure for the valuation. Following the forecasting of cash flows for a specified period, the terminal value has to be estimated. It illustrates the firm’s value ahead these years since the future of the cash flows cannot be estimated endlessly. There are three ways of estimating terminal value. The first option is to estimate what would be the value other investors would pay for the firm's assets if it were terminated. The second method applies the multiples to estimate the terminal

value. The third model assumes that after the forecast, the growth is continuous, and that the growth rate of the firm is constant. (Damodaran 2002, 475.)

2.6 Capital Asset Pricing Model- CAPM

The Capital Asset Pricing Model is widely used, but also critiqued model. The reason why is because the model assumes that investors do not face transaction costs and have no means of separating good and bad investments (Damodaran 2010, 26). Numerous scientists have tested whether the CAPM will hold, for example, Levy and Stevenson in 1992. In order to calculate CAPM, three components are required: risk-free rate of the market, stock's beta, and risk premium. These will be introduced in the following chapters. Capital Asset Pricing Model calculates the expected return of assets based on beta and expected market returns. (Fama et al. 2004, 28.) Capital asset pricing model also states that the risk premium equals the investment's beta times the market risk premium does (Berk et al. 2012, 366). Capital asset pricing model is calculated by:

$$CAPM = r_f + \beta(r_m - r_f)$$

In this formula $\mathrm{r_f}$ =the risk-free rate

$\mathrm{r_m}$= described as the expected market return. (Fama et.al. 2004, 29.)

2.6.1 Expected rate of return

The Expected rate of return is defined in the book of Fundamentals of Corporate Finance (Berk, DeMarzo & Harford 2012, 366) as the return that is expected of a stock to be earned after a determined period. In order to measure the results, the Expected rate of return applies prospects of possible outcomes of the investment. (Berk, DeMarzo & Harford 2012, 366.) Expected return can be calculated by following calculation:

$$Expected\ return = \sum (R_i \times P_i)$$

In this formula R_i =possible return, and P_i as the measure of probability. (Erickson 2014, 4.)

2.6.2 Risk free rate

A risk-free asset theoretically holds no risk. In stock markets, bonds, treasury bills are considered as risk-free assets. They are distributed by governments, and they contain a certain yield rate and a redemption period. (Koller, Goedhart & Wessels 2005, 300-301.) The risk-free rate is the bond's yield or treasury bills rate. The risk-free asset is not practical in reality as it carries a small amount of risk; the risk-free rate is still considered valid in investment. The risk-free rate can be easily retrieved from the internet. (ibid. 2005, 301-302.) Damodaran has discussed (2008, 16-23) the issues in estimating risk-free rates. If a country does not issue long term bonds there is an issue what risk-free rate can be chosen. Commonly, then analysts tend to choose incorrect rate and result in currency mismatches in valuation. The changes in risk free rate cause also bias to the valuation result, and if the long-term interest rate is wrong, it causes the valuation end result to be incorrect as well.

2.6.3 Beta

Beta is the measure of the systematic risk of an investment (Berk et.al. 2012). Beta represents how the stock can diversify the market portfolio (Koller, Goedhart & Wessels 2005, 299). Beta is calculated by the following formula (Vernimmen et al. 2009).:

$$\beta = \frac{Covariance\ (R_e, R_m)}{Variance\ (R_m)}$$

Where, R_e = Return from stock,

R_m = Expected return from the market,

Covariance = A measure of the stock's return relative to the market

Variance= a measure of how the market changes relative to its mean

By this calculation will get the slope of a regression line. The regression line illustrates how the stock moves in response to the general market movements. (Ehrhardt & Brigham 2008, 211-212.) In practice, the stock is often used as a proxy for the market portfolio. (Damodaran 2012,182).

Results of Beta tend to centralize around one, a stock with a beta above one has risk above average, and stock with a beta below one is lower than average (Damodaran 2010, 26). If a stock has negative beta, it will result in the company on which concentrated on, to have an expected return below the risk-free rate. There are results that negative beta related stock is likely to do well on the downturn of the stock market. The reason why is that it will protect against the systematic risk of other stocks within the portfolio. (Berk, DeMarzo & Harford 2012, 379.) If stock with beta is more than one, it could be profitable for investors as long as the market is rising. In that case, stock returns outperform the market returns. Although the stock there lies possible profitability, such stock also poses a threat when the market is falling, as in that case, the stock's losses will exceed market losses. (Mankiw & Shapiro 198, 422-25.)

Beta can be different due to branch, when firms are more sensitive to changes in the market, for example, luxury car manufacturers that have high betas. The firms that relate to goods and services are more likely in demand of the volatile economic cycle, for example, the food manufacturers, have lower betas. (Lynch 2004.)

2.7 Tobin's Q

Tobin's Q was first introduced by Kaldorin in 1966 and popularised by Tobin in 1977. When defined, Tobin's Q is the ratio of the market value of firms in relation to the replacement costs of the company's assets (Damodaran 2002, 753-754). In history, Tobin's Q has developed to its most common version, and the one used in this research. Bartlett and Partnoy (2018, 1-20) have discussed different versions of Tobin's Q in their Research. Chung and Pruitt (1994, 1) agree that Tobin's Q was created to explain numerous corporate-related phenomena, such as cross-sectional differences in investment and diversification decisions, in the relationship between managerial equity ownership and firm value, the relationship between managerial performance and tender offer gains, investment opportunities, and tender offer responses and financing, dividend, and compensation policies. In order to make this calculation offer authentic results, it is crucial to have the data needed for calculation available and current. Also, it is seen as a practical measure of value for a mature firm that has most or all of its assets in order, where replacement cost can be estimated for the assets (Damodaran 2002, 756). Tobin's Q is influenced by a firm's growth opportunities

(Hundal 2017, 155). As one of the intentions of this research is to see the value of a company, and as Tobin's Q calculates the growth opportunities in a company, the ratio will show as a result whether the company is undervalued or overvalued. (Damodaran 2002, 755.)

Tobin's Q is calculated by taking the book value of debt, and the book value of assets in place of market values (Hundal 2017, 155).

$$Tobin's\ Q = \frac{Market\ value\ of\ equity + Book\ Value\ of\ Debt}{Book\ Value\ of\ Assets}$$

Below all headlines Market value of Equity; Book value of Debt; and Book value of Assets are discussed. Measures are related to the calculation of Tobin's Q. They can also be used as separate company success, income, and profit measures.

Market Value of Equity

As before mentioned, the market value does not only rely on the historical cost of the firm's assets, and it also relies on investor expectations on how much profit the firm's assets might generate in the future (Berk, DeMarzo & Harford 2012, 29). The market value of Equity is commonly known by the term Market capitalization. It defines the market price of the firm's outstanding shares. This measure determines the proportion of capital financed in Equity in the firm. (Koller, Goedhart & Wessels 2005, 330.) The market value of Equity can be calculated by the following calculation.

$$Market\ value\ of\ Equity = Market\ price\ per\ Share \times Total\ Number\ of\ shares$$

Here, the Market price per share is the price at which one share of the company can be bought at the stock exchange. Investors strictly follow this indicator to figure out when to acquire shares at the lowest price. (Stowe, Robinson, Pinto & McLeavey 2007, 29.) Total Number of shares can be calculated from the financial data of a firm.

Book Value of Debt

Financial debt can be considered as non-operational debt that a firm has. Debt can be categorised into the following categories: Current liabilities and Non-current liabilities. Current liabilities include all obligations that the firm has due in the next

accounting period. Non-current liabilities are long-term financial obligations. Non-current debt can be considered as non-critical for the firms' operations, but as it increases, it becomes more and more crucial, which justifies why it needs to be examined. It can be found on firms Book value statement. The book value of debt is the amount that a company owes its creditors. Changes in interest rates do not affect the book value of debt. As the market interest rates increase, the present value of the obligations decreases. Firms do not update this to the balance sheet. If the book value of debt is too high compared to available assets, the company may have trouble paying back new loans. For this reason, creditors often look at a company's debt ratio, their liabilities are divided by assets. This gives the firm the rate at which to lend capital. More debt means a higher interest rate or possibly no loan to the company at all. Debt paid before the limited period is marked as outstanding gain or loss and marked on the income statement. Book value of debt is equal to the Financial debt. (Damodaran 2002, 49-53.)

Book Value of Assets

This measure is equal to the indication of Total Assets found in financial statements by the firms using financial reporting.

2.8 Multiples

According to Fernandez (2001, 1), Multiples can be considered useful when doing the second stage of the valuation. They offer a comparison after preforming the valuation with another method. Which then enables us to assess the valuation, which has been already done. Differences between valued firms can be detected.

The multiples can be allocated in three groups: Ones based on the company’s capitalization, based on the company’s value, and Growth-referenced multiples (ibid., 1). In this research the focus will be on the multiples based on the company’s capitalization, which are Price to earnings ratio, Price to sales ratio, and Price to book value ratio.

Price to Earnings ratio

The Price to Earnings ratio is a standard ratio used in the stock market. The price-earnings ratio indicates the monetary amount that investors can expect to invest in a company to receive one euro of that company's earnings. (Ruback 2002.) The ratio also describes the expected growth and Pay-out risk on the company indicated. (Damodaran 2002, 657-659). The formula can calculate the ratio:

$$Price\ to\ earnings\text{-ratio} = \frac{Market\ value\ of\ Equity}{Earnings\ per\ Share}$$

The factors that are inputted into the ratio are out of the firm's control. Such are variations in the interest rates, substantial business risk, firm's growth, and the return on investments—the Price to earnings ratio increases in the following situations. If the interest rates fall, if the company's risk decreases, and if the firm's profit after tax increases. The Price to equity increases with growth if the return on the firm's investments is higher than the expected return to equity. (Fernandez 2019, 1.) Damodaran has stated that previous research debate that, stocks with low price-to-earnings ratio or low price-to-book value ratio, tend to earn higher stock returns than other. (2002, 714).

Price to Sales ratio

Price to sales ratio can be considered as an increasing and a positive function to the profit margin, to pay-out-ratio, and the growth rate of the company. It generates a decreasing function towards the riskiness of the firm. For a high growth firm, this ratio can be associated to the first principles of evaluating the growth of the company. (Damodaran 2002,764.) The issue with this ratio is the issue that it does not include firms' expenses or debt. The ratio divides the firms Market value of equity by Total revenue. (McClure 2019.)

$$Price\ to\ sales\text{-}ratio = \frac{Market\ value\ of\ Equity}{Total\ Revenue}$$

Price to Book value- ratio

This multiple is profoundly consistent, in the formula, the numerator and denominator are both equity values. Market value of Equity is equal to market price per share. (Damodaran 2002, 719-723.)

$$Price\ to\ book\ value\text{-}ratio = \frac{Market\ value\ of\ Equity}{Book\ value\ of\ Equity}$$

Bias result is probable if the calculation and computing are not made careful enough. Also, in this multiple, the fact of the difference between firms must be considered. Some firms allow research expenses to be capitalized, and others do not. In this case, the firms who do not allow expense capitalisation, the price to book value is lower than in the others, the reason why, is that the book value of equity in this formula, will be higher as the result of the increased value of the research asset. (Damodaran 2012, 719.)

2.9 Book Value of Equity

Book value of Equity is commonly also known as Shareholder's Equity. Firms provide a summary of changes in shareholder's equity during the period (often a year), the changes that occurred to the accounting of the firm (book value) measure of equity value are summarized into their financial statements. It describes how a firm manages its assets. (Damodaran 2002, 54.) Book value of equity can be calculated by subtracting Total liabilities from the Total Assets:

$$Book\ value\ of\ Equity = Total\ assets - Total\ liabilities$$

Firms tend to reissue their stock by buying them back for short intervals, and then visualise the repurchase as treasury stock, and this decreases the Book value of Equity. Losses or substantial stock buybacks can result in a negative number. This measure can be compared with the market value commonly. The value of a firm is easily determined by the stock market. When the book value of Equity is greater to its market value, the market is not assured that the firm can generate future profits.

(Damodaran 2002, 54-55.) Value investors pay attention in a firm to both, balance sheet factors as to the income statement factors (Hayes 2019).

Book value per share

The measure includes historical costs. It should be noted, as Book value per share only estimates the book value, other value affecting changes are not incorporated. Firms with low tangible assets but with high intellectual property are not included in the book value of equity calculation. Hence, the Book value per share may not see the entire value. Firm's Book value per share can be compared with the Market price per share. It offers investors a comparison to Market price per share, and aids in evaluating the stock price. (Hayes 2020) Book value per share is calculated with Book value of Equity divided by the number of common shares outstanding. It is essentially the book net worth of the company per equity share. (Stowe, Robinson, Pinto & McLeavey 2007, 72.) The Book value per share can be calculated by:

$$Book\ value\ per\ share = \frac{Book\ value\ of\ Equity}{Total\ Number\ of\ Shares}$$

2.10 Operating profit margin

This ratio indicates the result after paying variable costs and how much profit is made. Additionally, it describes how efficiently the firm controls its costs and expenses regarding business operations. The issue with operating profit margin is that it is advised to be only used with firms operating in the same industry. Hence firms in various industries have different business models and year-end results. (Tulsian 2014.) The operating profit margin can be calculated by dividing the firms Operating profit from the firm's Total revenue.

$$Operating\ profit\ margin = \frac{Operating\ profit}{Total\ Revenue}$$

Another limitation with the ratio considers the debt, and it is not included in its formula. Substantial debt is not included, and comparable firms may have the same ratio, but considerable differences in the amount of debt. (Murphy 2020.)

Total Revenue

Total revenue is a determinant of the sales made in the firm. It refers to the total earnings from sales of the firm's goods or services. For valuation, it gives a firm measure for success and progress. It can be found on the company's financial statement.

2.11 Net profit margin

Net profit embodies the firm's revenue after taxes. It can be described as one of the core indicators of the firm's success. Net profit also expresses how much excess funds a firm can pay out to its owners, shareholders or invest back into the business. Net profit margin calculates how much profit in currency is outlying after all expenses are subtracted. Expenses include all operating expenses, interest, and income taxes. The Net profit margin for a firm can be calculated by dividing Net income by Total Revenue of the firm:

$$Net\ profit\ margin = \frac{Net\ income}{Total\ Revenue}$$

The higher the net profit margin is, the firm is more profitable. (Fischer 2007,55.) Net profit margin is advised to be compared with firms operating in the same industry, due to variance in industries. (Maverick 2019.)

2.12 Hypotheses

Hypotheses are considered an experimental assumption. They are compulsory for research. Hypotheses should be tested to find rational and pragmatic significances. They are established from available data, previous findings and also derived from noted possible trends, associations over the research objectives. Therefore, they should be related to the research questions, as they should be examined. (Saunders, Lewis & Thornhill 2009, 124-125.)

Hypotheses aid the researcher to retain the research towards more essential aspects of the research (Saunders, Lewis & Thornhill 2009, 124-125). This subchapter focuses on the hypotheses that can be considered suitable for the research. These remarks

are impartially tested in the research by the various methods introduced above. The review of literature, prior research assume that the firm value and the market price are not equal with their intrinsic value. Hence that represents, that the potential firm's growth is not described effectively enough. As market value does not only rely on the historical cost of the firm's assets, it also relies on investor expectations on how much profit the firm's assets might generate in the future. The investors make often decisions based on the deviations in the market value of the firm. Inclined these facts, the hypotheses for this research are:

H1 The value derived by various valuation methods vary significantly from each other.

H2 The extrinsic (Market value) and intrinsic value (derived by valuation methods) of firms differ from each other.

H3 Deviation between the extrinsic and intrinsic vales affects the investors decision-making.

3 Methodology

In this chapter, the author discusses the methodology behind the research. The author explains the logic behind the research, how the results are achieved, and how they are evaluated. The methodology consists of the actual science and philosophy behind the research. It allows the researcher to understand various alternatives of how new knowledge can be created. This will provide answers to the research questions. (Adams et.al. 2014, 5). According to Ghauri and Grønhaug (2005, 56-57), the proper selection of research design can aid in achieving the desired result. As the strategy is chosen, it will determine the selection and collection of the data.

The research context is defined as the situation or status of an industry, a nation, or a sector that the research is based on. The approach for the thesis research is quantitative. All the data utilized in the research is numerical data, which can be described as quantifiable (Lewis, P. et al. 2009. 418). The purpose of the research is exploratory.

An Exploratory study finds new insights to assess a common phenomenon in a new light. The goal is to discover and present the relationship between the historical data (Stock market) and the data derived from the variables (Saunders, Lewis & Thornhill 2009, 169-171).

3.1 Data Collection

This research is conducted using secondary data. Data are chosen by a range of qualities, which are viability, abstractness, and closeness to the phenomenon of the research. (Lewis, P. et al. 2009, 272-275.) Data collected for the research, are numerical data, retrieved primarily from the stock market database from NASDAQ OMX Nordic. Then other numerical data required for calculations were retrieved from a firm's yearly balance sheet, cash flows, and income statement, which were retrieved from each firm's personal website. The retrieved data is then used as input material for several mathematical formulas to estimate values.

This research has a number of characteristics which are common:

1. Data are collected systematically.

2. Data are interpreted systematically.

3. There is a particular purpose: to find things out

The research will require an explanation of the methods that were used to collect the data. It will argue why the results gathered are meaningful, and it will explain any limitations that are related to them. The reason for the research is 'To find out things,' which indicates that there is a variety of possible objectives for research. These include describing, explaining, understanding, criticising, and analysing (Ghauri and Grønhaug 2005.)

Data was collected in a determined timeframe of pre-crisis (01.01.2005-31.12.2007), Post-crisis (01.01.2008-31.12.2010), Recovery phase (01.01.2015-31.12.2018). In a total of 10 -years. This was done to capture the changes in the market when it is normalised. Also, when the market is under stressed conditions, the data is observed during the recession caused by the financial crisis. Approximately a total of 53500

pieces of data was collected for this research. The variables in this research are ratios, which are calculated out of the data. The data collected was considered reliable and accurate.

From 25 firms that suit the criteria of the research, 17 firms were used in the sample in this research. Outlier firms have the value that makes the data to be abnormal. Resulting, these firms were excluded from this research.

Firms represent the industries of oil and gas, materials production, industrials, consumer goods and services, healthcare, telecom, utilities, financials, and technology. Banks and financial institutions were not included in the sample due to the difference in the leverage and valuation regulations for these firms. Once the data is acquired, Microsoft Excel was used to make the calculations.

3.2 Data Analysis

The quantitative analysis aids analysts to explore, describe, and examine our data (Lewis, P. et al. 2009, 410). Descriptive statistics of data will enable, describe, and compare the research variables numerically. They help to manage all numerical data and present the core results in research. (ibid., 2009, 444.)

In this research, different ratios were executed to conduct the analysis. To understand and review the data, all ratios were processed through the descriptive statistics. The research and valuation are divided into two parts, market value, and derived value, and if the market value is greater than the derived value in comparison, the company is overvalued. If the market value is smaller than the derived value in comparison, the company is undervalued. These statistics will be interpreted in the results. As a result of the data analysis by comparing actual values with the theoretical values by various valuation techniques, there will be an answer on, “How efficient /perfect the stock market itself is.”

Data collected for the research, retrieved primarily from the stock market database from NASDAQ OMX Nordic for the 10-year period. Other numerical data required for calculations were retrieved from a company’s balance sheet, cash flows, and income statement, which were retrieved from each firm’s personal website. Approximately

6460 pieces of financial data were collected from the firm's annual financial over the 10-year period 01.01.2005-31.12.2007,01.01.2008-31.12.2010, 01.01.2015-31.12.2018.

Daily market data was collected for these firms for the same before mentioned 10-year period. The data was applied to calculate Beta. Approximate 25 800 pieces of daily market data were included. The number is an estimate; hence not all firms were listed in the stock market at the beginning of the research timeframe, and the data was not available. Data included trading prices, including the Opening price, Closing price, High price, and Low price. Also, as input for Tobin's Q, the yearly average price per share (100 pcs) was calculated from the daily market closing price.

Likewise, daily market data was collected to calculate the Market risk premium(100pcs). The 10-year Finnish government bank yield as the risk-free rate was collected from the Interest rates of Finnish Government bonds. The daily rate for HEL 25 Index was retrieved from NASDAQ OMX Nordic. To measure the expected market, return accordingly, the yearly return for the HEL25 index was calculated.

For financial statements total 38 of different measures per firm were collected; Net Profit/ Net income; Total Revenue; Operating profit; Earnings per share; the total number of shares; earnings before interest; depreciation; amortization; earnings before interest and taxes; investments current; trade and non-trade receivables; inventory; current assets; property, plant, and equipment; goodwill and intangible assets; non-current investments; non-current assets; total assets; non-current debt; trade and non-trade payables; current liabilities; tax liabilities; non-current liabilities; total liabilities; shareholders equity; investments; total debt; net cash flow from operations; capital expenditure; net cash flow from investing; repayments of short term borrowings; repayments of long- term borrowings; investments in fixed assets; net cash flow from the financing; interest paid; income taxes paid; the cost of debt; and corporate tax rate.

In this research out of six main groups of valuation, following three were applied: Balance sheet methods, Income statement methods, and Cash flow discounting methods.

Discounted cash flow method

Discounted methods are the group of methods that calculate the estimated attraction in an investment probability. (Ruback 2002, 85). Half of the data was retrieved from the Annual financial reports of the firm's, and the forecasts were calculated. Net income depreciation, amortization, inventory, property, plant, and equipment, net cash flow from operations, capital expenditure, net cash flow from investing, repayments of short term borrowings, repayments of long- term borrowings, investments in fixed assets, net cash flow from financing, interest paid, income taxes paid, cost of debt, and corporate tax rate were retrieved from the financial statements for the years 2005,2006,2007,2008,2009,2010,2015,2016,2017 and 2018.

Free cash flow to firm and WACC

First, the cash flows to the firm for both equity and debt holders were measured. The author measured how much cash flow was from operations, investing activities, and financing activities. (Damodaran 2006, 79-80.) The cash flow of operations consisted of the firm's yearly Net income, Depreciation, Accounts receivable, Inventories, and the Accounts payable. The Cash flow from investing activities was calculated from Proceeds from sales of fixed assets, acquisitions or investment made to Property Plant and Equipment. Cash flow from financing activities was calculated by adding Repayments of short-term borrowings and Repayments of long-term borrowings. After this, the Capital expenditure was subtracted.

The discount rate of Free Cash flow of firm is Weighted average cost of capital (WACC), it is used to discount the future cash flows if they are calculated. The following formula calculated WACC:

$$WACC = \left(K_e \frac{E}{D+E}\right) + \left(K_t \frac{D}{D+E}\right)$$

E= Market value of the equity

K_e=The required return to equity

D= Market value of the debt

K_t=After tax cost of debt

The tax rate was obtained from the corporate tax rates table of Finland and confirmed from each company's financial statement. Cost of debt used in the model was the lending rate in Finland, acquired from lending interest rate by the European Central Bank (Euribor). The required return to equity was calculated by the Capital asset pricing model. The calculation of the Capital asset pricing model can be found below from Subchapter Capital asset pricing model. The Market value of Debt was calculated by

$$Market\ value\ of\ Debt = C \times \left(\frac{1 - \frac{1}{(1+K_d)^t}}{K_d} \right) + \left(\frac{FV}{(1+K_d)^t} \right)$$

C= the interest expense

K_d= the current cost of Debt

t= the weighted average maturity

FV=the total debt (Erickson 2014, 12.)

The intrinsic value was derived by this formula: (Damodaran 2002, 19.)

$$Value\ of\ Firm = \sum_{t=i}^{\infty} \frac{CF\ To\ Firm_t}{(1+WACC)^t} + \frac{Terminal\ Value_t}{(1+WACC)^t}$$

A positive value of FCFF indicates the amount of cash the firm has remaining after the business expenses. If the FCFF is negative, the firm has not enough revenue to cover the costs of business and investment activities. If the FCFF is relatively high, it can indicate that the company is not reporting their expenses properly. (Hayes 2019) For each firm, FCFF and WACC was calculated yearly to years 2005,2006,2007,2008,2009,2010,2015,2016,2017 and 2018.

Terminal Value

The Author assumes that the cash flows of the firm will grow at a constant rate forever at as table growth rate. With stable growth, the terminal value can be estimated using a perpetual growth model. A terminal growth rate is in line with the long-term rate of inflation, but not higher than the gross domestic product (GDP) growth rate.

(Damodaran 2002,425-429.) The estimation of growth in 2019, 2020,2021,2022,2023 and forecasting, the author assumed, of that the firms are stable, and by that their growth is stable of 2%. The Finnish risk-free rate of long-term government bank yield was in 2018 0,75% and the Gross domestic Product was 1,6%. (Statistics Finland 2019).

$$Terminal\ Value = \sum_{t=i}^{\infty} \frac{FCFF \times (1+g)}{WACC - g}$$

FCFF=Free cash flow for the last forecast period

g=Growth rate

WACC=discount rate

The Terminal value of the firms were calculated by assuming this, by the perpetual growth model. The terminal value can be also calculated by a multiple to earnings, (Damodaran 2002, 425). Then, the enterprise value can be calculated by adding the Sum of present values of FCFF to Present value of terminal value (Koller, Goedhart &Wessels 2015, 135-138). Following that, the value of equity in DCF can be found by taking the enterprise value which is calculated by using FCFF and subtracting the Market value of debt. (Damodaran 2016, 12). For the years 2005,2006,2007,2008,2009,2010,2015,2016,2017 and 2018 the Equity value was calculated by deducting year-specific Market value of debt from the FCFF. For the forecasted period, 2019, 2020,2021,2022 and 2023 according to the forecasted cash flow.

The intrinsic value of the firm is undervalued if the value in FCFF higher than the Market value of Equity. The intrinsic value of the firm is overvalued if value in FCFF is lower than the Market value of Equity. The intrinsic value of the firm is the same as value if the FCFF is equal to the Market value of Equity.

Capital Asset Pricing Model- CAPM

Capital asset pricing model was calculated by the previously stated calculation:

$$CAPM = r_f + \beta(r_m - r_f)$$

In this formula r_f =the risk-free rate

r_m= described as the expected market return. (Fama et.al. 2004, 29.) The author used the 10-year Finnish government bank yield as the risk-free rate.

Expected rate of return

Expected return was calculated by previously stated calculation:

$$Expected\ return = \sum (R_i \times P_i)$$

In this formula R_i =possible return, and P_i as the measure of probability. (Erickson 2014, 4.)

Risk free rate

The author has used the 10-year Finnish government bank yield as the risk-free rate. As by following the guidance Damodaran (2008, 30-33) provided in his paper. Finland has A long term government bond denominated in Euros.

Beta

Beta was calculated in Excel by using the Linear regression equation on Excel. And follows the following formula (Vernimmen et al. 2009).:

$$\beta = \frac{Covariance\ (R_e, R_m)}{Variance\ (R_m)}$$

Where, R_e = Return from stock,

R_m = Expected return from the market,

Covariance = A measure of the stock's return relative to the market

Variance= a measure of how the market changes relative to its mean

This calculation, we got the slope of a regression line. The regression line illustrates how the stock moves in response to the general market movements. (Ehrhardt, Brigham 2008, 211-212.) In this research, the proxy used was the HEL25 Return.

HEL25 Return was calculated from the retrieved stock market database NASDAQ OMX Nordic.

Tobin's Q

Tobin's Q was calculated by taking the book value of debt, and the book value of assets in place of market values. (Hundal 2017, 155.)

$$Tobin's\ Q = \frac{Market\ value\ of\ equity + Book\ Value\ of\ Debt}{Book\ Value\ of\ Assets}$$

If the result is an undervalued company, the ratio with a numeral result under one (1), can be attractive for potential purchasers, if the intention is to purchase the company, not create a similar one. It can also result in a positive interest in the company and increase the stock price. Result higher than one (1) interprets that the company is overvalued. The ratio indicates that the company earns more than its replacement cost. (Damodaran 2002, 755.) If the result is equal to 1 then the firm's book and market values are in equivalent. Beneath all headlines Market value of Equity; Book value of debt; and Book value of Assets are concerning the calculation of Tobin's Q and are related in the calculation of the following ratio.

Market Value of Equity

Is known commonly by the term of Market capitalization. Market value of Equity calculated by the formula:

$$Market\ value\ of\ Equity = Market\ price\ per\ Share \times Total\ Number\ of\ shares$$

First, to calculate the Market value of equity, the yearly Net profit of a firm was retrieved from the income statements. Earnings per share were calculated in the case if it was not included in the financial statement. (Berk, DeMarzo & Harford 2012, 34).

$$Earnings\ per\ Share(EPS) = \frac{Net\ Profit}{Common\ Shares}$$

The total number of shares was then calculated by dividing the Net profit from the EPS.

$$Total\ number\ of\ Shares = \frac{Net\ Profit}{Earnings\ per\ Share\ diluted(EPS)}$$

After the total number of shares was calculated, the Market price per share, the yearly average price per share was calculated from the daily market closing price.

The intrinsic value of the firm is undervalued if the value in FCFF higher than the Market value of Equity. The intrinsic value of the firm is overvalued if value in FCFF is lower than the Market value of Equity. The intrinsic value of the firm is the same as value if the FCFF is equal to the Market value of Equity.

If the Market value of Equity is higher than the Book value of Equity, it indicates that the assets of the firm generate higher value to the firm, and the investors expect the firm to grow. A profitable company usually has a Market value of Equity greater than the Book value of Equity. (Seth 2020.)

Book Value of Debt

Book value of debt was calculated by adding the following numbers from the Balance sheet; interest bearing liabilities; borrowings; loans from banks; or loans from financial institutions.

Book Value of Assets

This measure is equal to the indication of Total Assets and was retrieved from the firm's Balance sheet.

Price to Earnings ratio

Was calculated by the formula where the previously calculated Market value of Equity was divided by Earnings per share:

$$Price\ to\ earnings\text{-ratio} = \frac{Market\ value\ of\ Equity}{Earnings\ per\ Share}$$

The price-earnings ratio indicates that if the result is high, the firm's stock's price is high relative to earnings and overvalued. On the other hand, a low result can indicate that the stock price is undervalued in comparison to the firm's Earnings. If a firm has

no earnings or they have negative earnings, in both instances, P/E is not applicable. (Hayes 2020.)

Price to Sales-ratio

Price to sales ratio was calculated by the formula where the previously calculated Market value of Equity was divided by the total Revenue retrieved from the firm's financial statement:

$$Price\ to\ sales\text{-}ratio = \frac{Market\ value\ of\ Equity}{Total\ Revenue}$$

A low ratio of 1 or less can indicate that the stock is undervalued. Price to sales ratio is beneficial in recovery situations and to verify that the firm is not overvalued. A high ratio states that the firm is overvalued. Price to sales-ratio should not be used individually. The comparison with Price to sales ratio is most valid when it is compared with firms of the same industry. (McClure 2019.)

Price to Book value- ratio

This multiple is profoundly consistent; in the formula, the numerator and denominator are both equity values. The calculation of price to book ratio was done by the formula following, where the Market value of Equity calculated is divided by the Book value of Equity. To clarify, the Market value of Equity is equal to the market price per share. (Damodaran 2002, 719–723.)

$$Price\ to\ book\ value\text{-}ratio = \frac{Market\ value\ of\ Equity}{Book\ value\ of\ Equity}$$

A low value under 1 of Price to book value can indicate that the stock is undervalued. Ratio higher than 1 indicates that the amount to be paid for the firm exceeds the net assets of the firm. The Price to book value ratio indicates what remains if the company bankrupts abruptly. (Hayes, 2020.)

Book Value of Equity

To calculate Book value of Equity, from a firm's balance sheet Total Assets and Total liabilities were retrieved. Book value of equity was calculated by subtracting Total liabilities from the Total Assets. If the Book value of Equity is higher than the Market

value of Equity, it indicates that the firm may be in trouble financially. The investors are not assured that the firm is worth invested in. Price to Book value ratio is implemented to see if the values are equal. (Seth 2020.)

Book value per share

Book value per share is calculated with Book value of Equity divided by the number of common shares outstanding. It is essentially the book net worth of the company per equity share. (Stowe, Robinson, Pinto & McLeavey 2007, 72.) Total number of shares was calculated by dividing the Net profit of the firm from the EPS. This measure was compared with the market price per share.

$$Book\ value\ per\ share = \frac{Book\ value\ of\ Equity}{Total\ Number\ of\ Shares}$$

Firm's Book value per share can be compared with the market price per share. If the Book value per share is higher than Market price per share, the firm's stock can be considered undervalued. If the Book value per share grows, the market price should increase correspondingly. (Hayes 2020.)

Operating profit margin

The operating profit margin was calculated by dividing the firms Operating profit from the firm's Total revenue. Total revenue gives firm measure for success and progress. The measure was retrieved from the firm's financial statement. Operating profit was retrieved from the firm's financial statement.

$$Operating\ profit\ margin = \frac{Operating\ profit}{Total\ Revenue}$$

A high operating profit margin indicates that the company produces sufficient revenue to cover the cost of their operations. If the ratio increases, it implies that the profitability of the firm is increasing. (Murphy 2020). It should be noted that the Operating profit margin it is advised to be only used with firms operating in the same industry. Hence firms in the various industry have different business models and year-end results. (Tulsian 2014.)

Net profit margin

Net profit margin was calculated by dividing Net income of a firm by the total revenue of a firm. Both values were retrieved from a firm's financial statements.

$$Net\ profit\ margin = \frac{Net\ income}{Total\ Revenue}$$

The higher the net profit margin is, the firm is more profitable. (Fischer, 2007. 55). When evaluating Net profit margin, a higher margin is preferred. A high Net profit margin indicates that the firm generates more profit from their business. A negative or comparatively low margin indicates that the firm has high momentary costs or loss of profit. (Maverick 2019.)

3.3 Reliability and Validity

The sample in this research was chosen precisely to ensure validity and avoid statistical errors. Data were collected only from sources that are official, such as annual reports published by the firms. The reports offer the authentic financial data of the company on a yearly basis. The six-year timeline was precisely considered. All data was retrieved with precision, with no overlapping dates. The data sample was not varied during the whole research.

The ratios in this research are universal, as researchers around the world can use the same ratios as is used in this research. Professionals recommend the use of the concepts. All ratios have been discussed in detail this paper. They are chosen according to confirmed theories and defined by concepts.

The interpretations made were based on the data sample, and it is stated in this paper. The interpretations made will clarify, by what means the conclusions of the research results were made.

4 Results

In the following chapters, the results of the analysis are presented and interpreted. This research will report the result of ten years divided to the samples of Pre-crisis

(01.01.2005-31.12.2007) 4.1., Post-crisis (01.01.2008-31.12.2010) 4.2. and Recovery phase (01.01.2015-31.12.2018) 4.3. Each year will be illustrated by two tables detailing all values, including, Market value of Equity/Market Capitalisation, Book value of Equity, Equity value, Market price per share and Book value per share. The second tables include Tobin's Q, the multiples, Operating profit, and Net profit margin. These tables answer the given research questions. Analyses and interpretations are given out to evaluate the results and associations. The final chapter is the central part of the results, makes the conclusions about the research and of the made research questions.

4.1 Pre-crisis

The results for years 2005-2007 will be discussed individually. Each year has their own subchapter.

Year 2005

In Table 1, 17 companies in the year 2005 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 1 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 2), for clarity purposes, their values are fully presented within these tables.

Table 1 All values of 2005 part 1

2005	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	1626,8	766,7	1465,5	25,01	11,79
ELISA	1995,9	1349,3	240,8	13,70	9,26
FORTUM	13101,7	7411,0	2050,0	14,22	8,04
HUHTAMÄKI	1738,7	820,1	36,6	12,95	6,11
KESKO	2145,7	1510,4	710,0	21,21	14,93
KONECRANES	128,4	153,0	126,9	8,90	10,60
KONE	870,6	782,0	1420,8	6,81	6,12
METSO	2473,0	1292,0	3090,5	17,63	9,21
NESTE	6005,7	1612,0	2535,0	23,31	6,26
NOKIA	57827,6	12360,0	35631,7	13,27	2,84
NOKIAN RENKAAT	1695,3	471,4	591,2	13,94	3,88
OUTOKUMPU	4933,8	2151,0	353,1	27,32	11,91
STORA ENSO	9264,0	7740,0	3608,4	11,00	9,19
TIETO	2080,6	502,0	1185,6	26,38	6,37
UPM	8483,0	7348,0	-208,3	16,25	14,08
WÄRTSILÄ	1066,8	1163,0	33609,1	11,30	12,32
YIT	881,8	564,0	2301,8	13,91	8,89

All firms, except UPM, have positive values in all categories for year 2005. UPM Equity value is negative. Overall, there are four firms that can be considered undervalued and thirteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued firms are Kone, Metso, Wartsila and YIT. The negative Equity value of UPM implies that negative value is generated due the structure of their earnings and spending in the year.

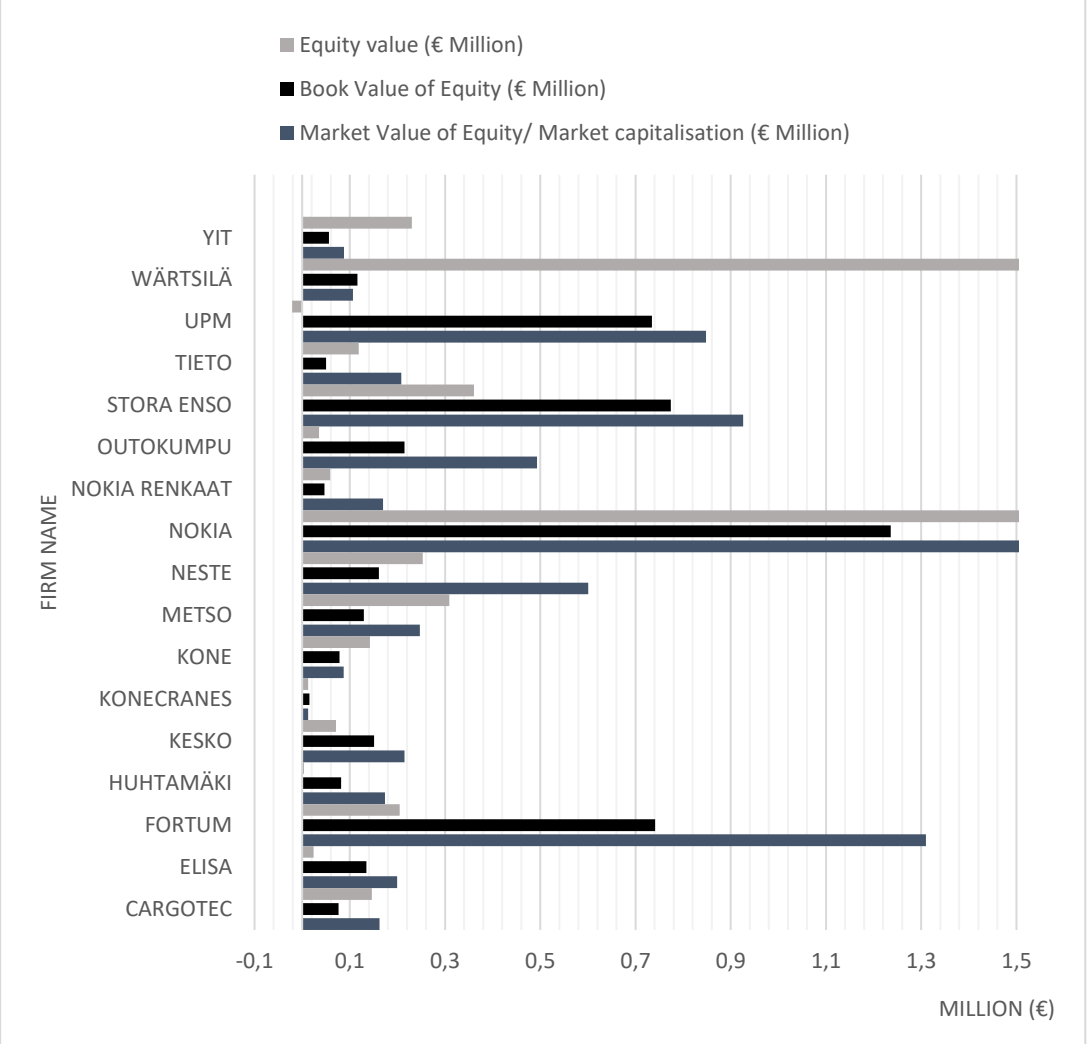

Figure 2 Year 2005 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted two firms to be undervalued. Undervalued firms are Konecranes and Wärtsilä. (See Table 1.) Buying the stocks of these undervalued firms should be considered, because their share prices may increase in the future. Correspondingly, there are two firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued companies are Konecranes and Wärtsilä.

Table 2 All values of 2005 part 2

2005	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	1,053	11,909	0,690	2,122	0,083	0,058
ELISA	1,136	11,226	1,492	1,479	0,174	0,133
FORTUM	1,212	9,292	3,379	1,768	0,347	0,364
HUHTAMÄKI	0,935	184,966	0,775	2,120	0,026	0,004
KESKO	0,808	11,341	0,258	1,421	0,030	0,023
KONECRANES	0,424	5,328	0,132	0,839	0,051	0,025
KONE	0,479	7,021	0,414	1,113	0,093	0,059
METSO	0,826	10,435	72,163	42,700	0,079	0,056
NESTE	1,797	8,964	0,602	3,726	0,079	0,067
NOKIA	2,611	15,992	16,914	4,679	0,136	1,058
NOKIAN RENKAAT	2,333	20,625	2,470	3,596	0,169	0,120
OUTOKUMPU	1,287	13,592	0,889	2,294	0,015	0,065
STORA ENSO	0,848	-73,349	0,817	1,197	0,018	-0,011
TIETO	1,777	15,077	1,238	4,145	0,109	0,082
UPM	0,887	32,502	0,907	1,154	0,030	0,028
VALMET	0,826	10,435	0,586	1,914	0,079	0,056
WÄRTSILÄ	0,512	6,350	0,404	0,917	0,085	0,064
YIT	0,720	5,653	0,292	1,563	0,075	0,052

Table 2 summarises all information of 17 companies in the year 2005, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are nine undervalued and eight overvalued firms in year 2005 of Tobin's Q. Undervalued firms are Huhtamaki, Kesko, Konecranes, Kone, Metso, Stora Enso, UPM, Wärtsilä and YIT. Konecranes can be considered as the most undervalued firm with the lowest result.

For Price to earnings ratio, all values have an average of 17. Alas, Stora Enso has a negative value, which implies that their value cannot be considered. Three firms have a value higher than average. This implicates that their stock is overvalued. These firms are Huhtamaki, Nokian Renkaat, and UPM. There are four firms that are significantly low and can be considered as undervalued. These firms are Konecranes, Neste, Wärtsilä and YIT.

Price to sales ratio resulted six firms to be overvalued. Eleven firms are undervalued. Within year 2005, overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat, and Tieto. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone, Neste, Outokumpu, Stora Enso, UPM, Wärtsilä and YIT. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted in two undervalued firms. Fifteen firms indicated that they are overvalued. Undervalued firms are Konecranes and Wärtsilä. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, and YIT.

Operating profit for year 2005, the highest Operating profit margin ratio resulted for three firms. These firms are Elisa, Fortum, and Nokian Renkaat. Fortum has the highest Operating profit margin. Outokumpu and Stora Enso had the lowest result.

Year 2005 regarding Net profit margin, the highest ratio resulted for two firms. These firms are Fortum and Nokia. If a firm has a negative result, it indicates of loss of profit. In 2005 Stora Enso had a negative result. Huhtamaki had the second lowest ratio with result 0,04.

Year 2006

In Table 3, 17 companies in the year 2006 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 3 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 3), for clarity purposes, their values are fully presented within these tables.

Table 3 All values of 2006 part 1

2006	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	2250,1	876,8	9890,3	34,68	13,51
ELISA	2821,9	949,8	-268,2	16,96	5,71
FORTUM	18897,0	8161,0	-2003,9	20,42	8,82
HUHTAMÄKI	1487,8	859,8	489,2	14,32	8,28
KESKO	4782,7	1776,9	915,0	30,88	11,47
KONECRANES	899,3	223,0	3392,7	15,08	3,74
KONE	1118,5	770,0	2687,5	8,84	6,09
METSO	4277,5	-829,0	-7471,3	30,15	-5,84
NESTE	6604,5	2097,0	6661,8	25,55	8,11
NOKIA	65427,0	12060,0	18088,0	15,95	2,94
NOKIAN RENKAAT	1657,5	556,5	877,2	13,28	4,46
OUTOKUMPU	8026,2	3144,0	-116875,7	44,09	17,27
STORA ENSO	9384,6	7904,0	4375,2	11,79	9,93
TIETO	1876,4	625,7	568,8	24,69	8,23
UPM	10225,1	7289,0	3942,9	18,11	12,91
WÄRTSILÄ	1527,6	1231,0	-21660,4	16,06	12,94
YIT	2522,8	674,0	3963,8	19,46	5,20

Twelve firms have positive values in all categories for year 2006. Six firms have negative Equity value. Overall, there are five companies that can be considered undervalued and thirteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued firms are Cargotec, Konecranes, Kone, Neste and YIT. The negative Equity value implies that negative value is generated due the structure of their earnings and spending in the year. Overvalued firms are Elisa, Fortum, Huhtamaki, Kesko, Metso, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet and Wärtsilä.

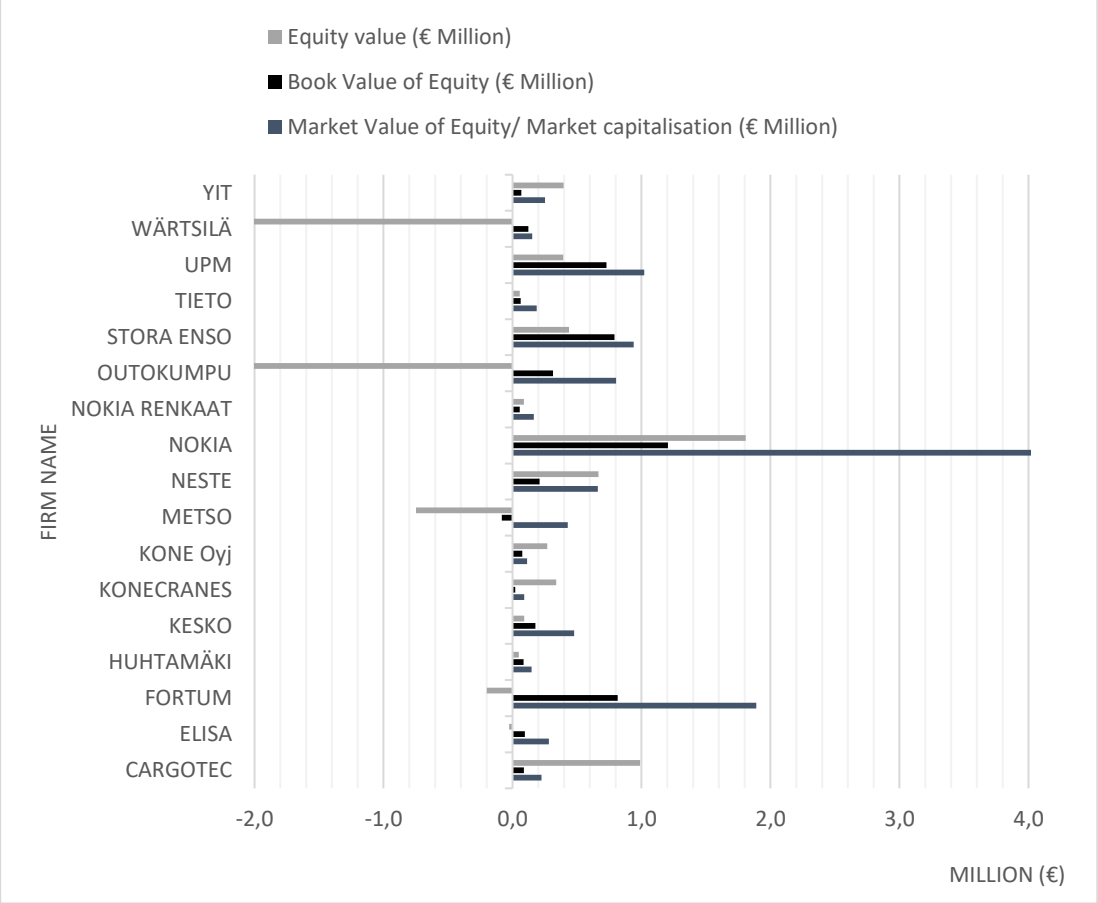

Figure 3 Year 2006 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted no undervalued firms. (See Table 3.) Correspondingly, there are no firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. This implicates that all firms are worth investing to.

Table 4 All values of 2006 part 2

2006	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	1,256	13,547	0,866	2,566	0,093	0,064
ELISA	1,694	17,484	1,858	2,971	0,148	0,106
FORTUM	1,390	16,872	4,208	2,316	0,324	0,249
HUHTAMÄKI	0,813	15,402	0,654	1,730	0,064	0,042
KESKO	1,416	12,606	0,547	2,692	0,041	0,043
KONECRANES	1,168	13,112	0,607	4,033	0,071	0,046
KONE	0,553	4,780	0,311	1,453	0,100	0,065
METSO	1,899	10,433	79,557	27,528	0,092	0,083
NESTE	1,702	10,384	0,519	3,149	0,067	0,050
NOKIA	2,907	15,194	15,911	5,425	0,133	1,047
NOKIAN RENKAAT	2,061	15,447	1,983	2,978	0,183	0,128
OUTOKUMPU	1,555	8,335	1,304	2,553	0,134	0,156
STORA ENSO	0,823	15,928	0,724	1,187	0,057	0,045
TIETO	1,533	7,597	1,140	2,999	0,078	0,150
UPM	1,007	27,861	1,020	1,403	0,053	0,037
WÄRTSILÄ	0,564	4,328	0,479	1,241	0,082	0,111
YIT	1,443	14,416	0,768	3,743	0,079	0,053

Table 4 summarises all information of 17 companies in the year 2006, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are four undervalued and fourteen overvalued firms in year 2006 of Tobin's Q. Undervalued firms are Huhtamaki, Kone, Stora Enso, and Wärtsilä. Kone can be considered as the most undervalued firm with the lowest result.

For Price to earnings ratio, all values have an average of 13. Six firms have a value higher than average. This implicates that their stock is overvalued. These firms are Elisa, Fortum, Nokia, Nokian Renkaat, Stora Enso and UPM. There are two firms that are significantly low and can be considered as undervalued. These firms are Kone and Wärtsilä.

Price to sales ratio resulted eight firms to be overvalued. Nine firms are undervalued. Overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat, Outokumpu, Tieto and UPM. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone,

Neste, Stora Enso, Wärtsilä and YIT. Metso has the highest ratio of 79,5. A high ratio indicates that the investment may be considered risky one. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted no undervalued firm. Seventeen firms indicated that they are overvalued. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet and YIT.

For year 2006, the highest Operating profit margin ratio resulted for two firms. These firms are Fortum and Nokian Renkaat. Fortum has the highest Operating profit margin. There were three firms that had significantly low result. These firms are Huhtamaki, Kesko and Stora Enso.

The highest Net profit margin ratio resulted for four firms. These firms are Fortum Nokia, Outokumpu and Tieto. For year 2006 no firm had significantly low result.

Year 2007

In Table 5, 17 companies in the year 2007 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 5 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 4), for clarity purposes, their values are fully presented within these tables.

Table 5 All values of 2007 part 1

2007	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	2668,8	896,0	18555,2	41,65	13,98
ELISA	3386,9	1034,8	-161,6	21,22	6,48
FORTUM	22451,2	8651,0	-3015,8	24,29	9,36
HUHTAMÄKI	1205,0	793,2	334,5	11,63	7,65
KESKO	5124,7	1963,7	11010,5	43,51	16,67
KONECRANES	1670,7	280,0	-1210,2	27,55	4,62
KONE	1492,0	835,4	4122,6	11,77	6,59
METSO	5980,1	-369,0	-10564,3	41,89	-2,58
NESTE	6554,7	2427,0	2466,1	25,43	9,42
NOKIA	83692,5	18338,0	54599,3	21,26	4,66
NOKIAN RENKAAT	2980,2	712,9	1458,7	23,11	5,53
OUTOKUMPU	10416,8	3389,0	-8839,4	57,20	18,61
STORA ENSO	9996,6	7548,0	7627,9	12,71	9,59
TIETO	1402,2	476,9	1058,1	19,77	6,73
UPM	31823,4	6783,0	2414,2	17,44	3,72
WÄRTSILÄ	2318,6	1325,0	-10045,9	23,89	13,65
YIT	2874,6	819,0	52513,9	22,32	6,36

Eleven firms have positive values in all categories for year 2007. Equity value is negative for six firms. Overall, there are four companies that can be considered undervalued and thirteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued companies are Konecranes, Kesko, Kone and YIT. The negative Equity values of Elisa, Fortum, Konecranes, Metso, Outokumpu and Wartsila indicate that negative value is generated due the structure of their earnings and spending in the year.

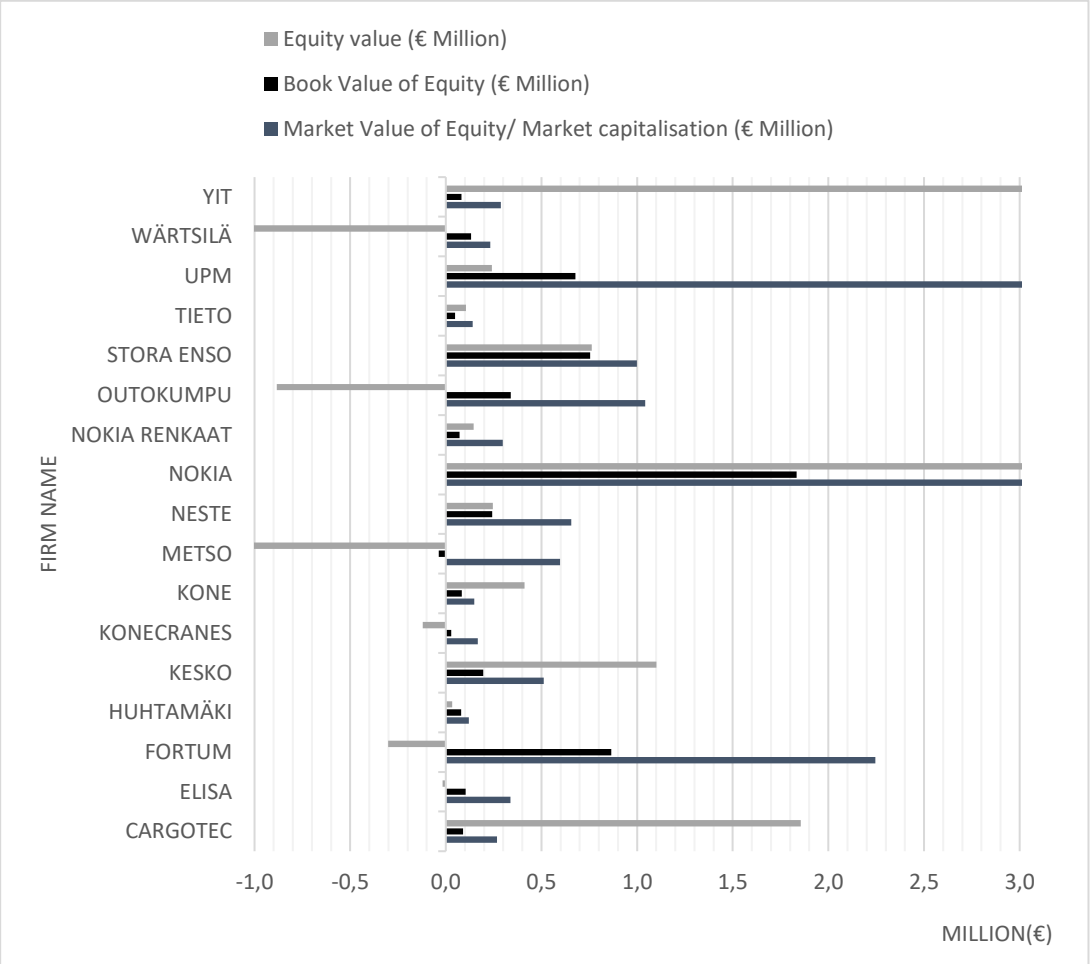

Figure 4 Year 2007 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted no firm to be undervalued. (See Table 5.) Correspondingly, there are no firm that is considered undervalued in this year comparison of Market value of equity versus Book value of Equity.

Table 6 All values of 2007 part 2

2007	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	1,222	19,283	0,884	2,979	0,067	0,046
ELISA	1,904	15,374	2,159	3,273	0,193	0,140
FORTUM	1,547	13,962	5,013	2,595	0,412	0,359
HUHTAMÄKI	0,741	-52,849	0,521	1,519	0,012	-0,010
KESKO	1,405	16,671	0,538	2,610	0,035	0,032
KONECRANES	1,829	12,936	0,955	5,967	0,110	0,074
KONE	0,733	8,289	0,366	1,786	0,079	0,044
METSO	2,050	15,573	46,362	17,235	0,093	0,061
NESTE	1,511	11,301	0,542	2,701	0,066	0,048
NOKIA	2,260	11,616	16,392	4,564	0,156	1,411
NOKIAN RENKAAT	2,809	17,645	2,908	4,180	0,228	0,165
OUTOKUMPU	2,013	16,251	1,507	3,074	0,085	0,093
STORA ENSO	0,937	-47,065	0,748	1,324	0,018	-0,016
TIETO	1,287	-44,943	0,791	2,940	0,001	-0,018
UPM	2,590	108,984	3,171	4,692	0,048	0,029
WÄRTSILÄ	0,694	8,749	0,616	1,750	0,101	0,070
YIT	1,401	12,608	0,776	3,510	0,091	0,062

Table 6 summarises all information of 17 companies in the year 2007, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are four undervalued and thirteen overvalued firms in year 2007 of Tobin's Q. Undervalued firms are Huhtamaki, Kone, Stora Enso, and Wärtsilä. Wärtsilä can be considered as the most undervalued firm with the lowest result.

For Price to earnings ratio, all values have an average of 8,8. Alas, Huhtamaki, Stora Enso, and Tieto have a negative value, which implies that their value cannot be considered. Three firms have a relatively high value than average. This implicates that their stock is overvalued. These firms are Cargotec, Kesko, Nokia, Outokumpu and UPM. There are two firms that are low and can be considered as undervalued. These firms are Kone and Wärtsilä.

Price to sales ratio resulted seven firms to be overvalued. Ten firms are undervalued. Within year 2007, overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat, Outokumpu and UPM. Undervalued firms are Cargotec, Huhtamaki, Kesko,

Konecranes, Kone, Neste, Stora Enso, Wärtsilä and YIT. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted no undervalued firm. Seventeen firms indicated that they are overvalued. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet and YIT

For year 2007, the highest Operating profit margin ratio resulted for three firms. These firms are Elisa, Fortum, and Nokian Renkaat. Fortum has the highest Operating profit margin.

The highest Net profit margin ratio resulted for three firms. These firms are Fortum Nokia, and Nokian Renkaat. If a firm has a negative result, it indicates of loss of profit. In 2007 Huhtamaki, Stora Enso and Tieto had a negative result.

Overall, regarding Market value versus equity value, Kone And YIT were undervalued during all years of the pre-crisis phase.

4.2 During crisis

The results for years 2008-2010 will be discussed individually. Each year has their own subchapter.

Year 2008

In Table 7, 17 companies in the year 2008 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 7 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are

too large or too low to fit in charts (see Figure 5), for clarity purposes, their values are fully presented within these tables.

Table 7 All values of 2008 part 1

2008	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	1368,8	863,5	621,0	21,64	13,65
ELISA	2354,2	874,5	-442,3	14,90	5,53
FORTUM	22944,2	8411,0	-5558,5	25,01	9,17
HUHTAMÄKI	616,0	702,0	91,9	6,26	7,13
KESKO	2539,2	2025,5	490,8	23,64	18,86
KONECRANES	1247,5	401,0	253,6	21,12	6,79
KONE	2684,2	1085,0	593,5	10,60	4,28
METSO	3490,3	1453,0	515,4	24,61	10,25
NESTE	4584,9	2179,0	-22,4	17,25	8,20
NOKIA	63889,2	16510,0	2796,6	17,25	4,46
NOKIAN RENKAAT	2876,8	784,3	-10,2	22,62	6,17
OUTOKUMPU	7911,4	2800,0	-743,3	43,53	15,41
STORA ENSO	5865,3	5650,0	-1056,1	7,34	7,07
TIETO	902,2	483,1	239,8	12,38	6,63
UPM	5837,8	6120,0	-2335,6	11,35	11,90
WÄRTSILÄ	1808,2	1199,0	688,6	18,04	11,96
YIT	1569,6	807,0	678,6	12,30	6,32

Ten firms have positive values in all categories for year 2008. Equity value is negative for seven firms. Overall, there are no firms that can be considered undervalued and seventeen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. The negative Equity values of Elisa, Fortum, Neste, Nokian Renkaat, Outokumpu, Stora Enso and UPM indicate that negative value is generated due the structure of their earnings and spending in the year.

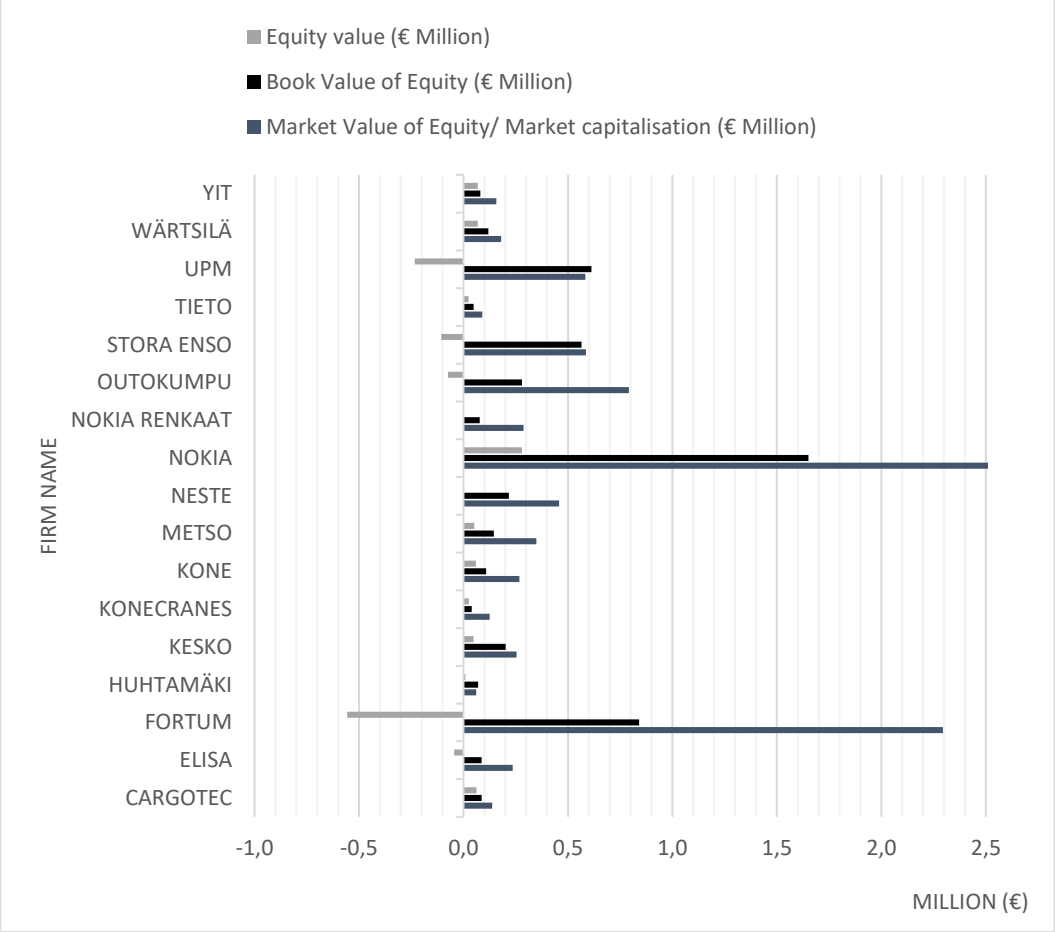

Figure 5 Year 2008 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted two firms to be undervalued. Undervalued firms are Huhtamaki and UPM. (See Table 7.) Buying the stocks of these undervalued firms should be considered, because their share prices may increase in the future. Equally, there are two firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued companies are Huhtamaki and UPM.

Table 8 All values of 2008 part 2

2008	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,641	11,331	0,403	1,585	0,051	0,036
ELISA	1,576	13,301	1,585	2,692	0,178	0,119
FORTUM	1,501	14,376	4,078	2,728	0,349	0,284
HUHTAMÄKI	0,571	-5,590	0,273	0,877	-0,033	-0,049
KESKO	0,779	10,554	0,264	1,254	0,030	0,025
KONECRANES	1,130	7,490	0,593	3,111	0,118	0,079
KONE	1,080	6,422	0,583	2,474	0,121	0,091
METSO	0,849	8,949	132,970	48,353	0,100	0,061
NESTE	1,196	45,395	0,305	2,104	0,012	0,007
NOKIA	1,727	16,428	12,599	3,870	0,098	0,767
NOKIAN RENKAAT	2,330	20,563	2,662	3,668	0,229	0,129
OUTOKUMPU	1,799	-41,859	1,445	2,826	-0,012	-0,035
STORA ENSO	0,809	-8,638	0,532	1,038	-0,066	-0,062
TIETO	0,892	14,913	0,484	1,868	0,060	0,032
UPM	0,792	-32,432	6,075	0,954	0,025	-0,187
WÄRTSILÄ	0,521	4,648	0,392	1,508	0,114	0,084
YIT	0,812	11,713	0,398	1,945	0,066	0,034

Table 8 summarises all information of 17 companies in the year 2008, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are nine undervalued and eight overvalued firms in year 2008 of Tobin's Q. Undervalued firms are Cargotec, Huhtamaki, Kesko, Metso, Stora Enso, Tieto, UPM, Wärtsilä and YIT. Overvalued firms are Elisa, Fortum, Konecranes, Kone, Neste, Nokia, Nokian Renkaat, and Outokumpu.

For Price to earnings ratio, Huhtamaki, Outokumpu, Stora Enso and UPM have a negative value, which implies that their value cannot be considered. Three firms have a high value. This implicates that their stock is overvalued. These firms are Neste and, Nokian Renkaat. Neste has a ratio of 45,3 and Nokian Renkaat a ratio of 20,5. There are two firms that are significantly low and can be considered as undervalued. These firms are Kone and Wärtsilä.

Price to sales ratio resulted seven firms to be overvalued. Ten firms are undervalued. Within year 2008, overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat,

Outokumpu, and UPM. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone, Neste, Stora Enso, Tieto, UPM, Wärtsilä and YIT. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted in two undervalued firms. Fifteen firms indicated that they are overvalued. Undervalued firms are Huhtamaki and UPM. Overvalued firms are Cargotec, Elisa, Fortum, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, Wärtsilä and YIT.

For year 2008, the highest Operating profit margin ratio resulted for three firms. These firms are Elisa, Fortum, and Nokian Renkaat. Fortum has the highest Operating profit margin. If a firm has negative operating profit, it results in a negative ratio result. There are three firms that resulted in negative operating profit margin. These firms are Huhtamaki, Outokumpu and Stora Enso. Out of these, Stora Enso had the lowest result with -0,07.

The highest Net profit margin ratio resulted for two firms. These firms are Fortum and Nokia. If a firm has a negative result, it indicates of loss of profit. In 2008 four firms had a negative result. These firms are Huhtamaki, Outokumpu, Stora Enso and UPM. One firm resulted in significantly low result. This firm is Neste with a Net profit margin ratio of 0,01.

Year 2009

In Table 9, 17 companies in the year 2009 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 9 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 6), for clarity purposes, their values are fully presented within these tables.

Table 9 All values of 2009 part 1

2009	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	1764,4	881,0	158,9	12,43	6,20
ELISA	1940,4	899,4	-412,8	12,39	5,74
FORTUM	14790,7	8491,0	-5035,0	16,20	9,30
HUHTAMÄKI	-140,7	736,0	-2836,5	7,33	-38,32
KESKO	2092,6	2068,5	258,2	19,80	19,58
KONECRANES	991,0	407,0	167,2	16,86	6,92
KONE	2804,2	1440,0	709,0	11,01	5,65
METSO	2081,2	1792,0	-899,2	14,61	12,58
NESTE	2858,6	2222,0	-495,3	10,93	8,49
NOKIA	10475,4	14749,0	2875,6	9,67	13,61
NOKIAN RENKAAT	1582,8	757,7	-38,9	13,30	6,37
OUTOKUMPU	4873,1	2550,0	-786,9	26,98	14,12
STORA ENSO	3470,5	5183,0	-1009,4	4,43	6,61
TIETO	803,8	518,0	163,3	11,26	7,26
UPM	3728,6	6602,0	-1551,0	7,28	12,89
WÄRTSILÄ	1194,9	1512,0	878,5	11,92	15,08
YIT	1087,3	764,0	915,9	8,95	6,29

Ten firms have positive values in all categories for year 2008. Market value of Equity is negative for one firm additionally, Equity value is negative for eight firms. Overall, there are no firms that can be considered undervalued. All seventeen firms are overvalued regarding the comparison of Market value of Equity versus Equity value. The negative Equity values of Elisa, Fortum, Huhtamaki, Metso, Neste, Outokumpu, Stora Enso and UPM indicate that negative value is generated due the structure of their earnings and spending in the year.

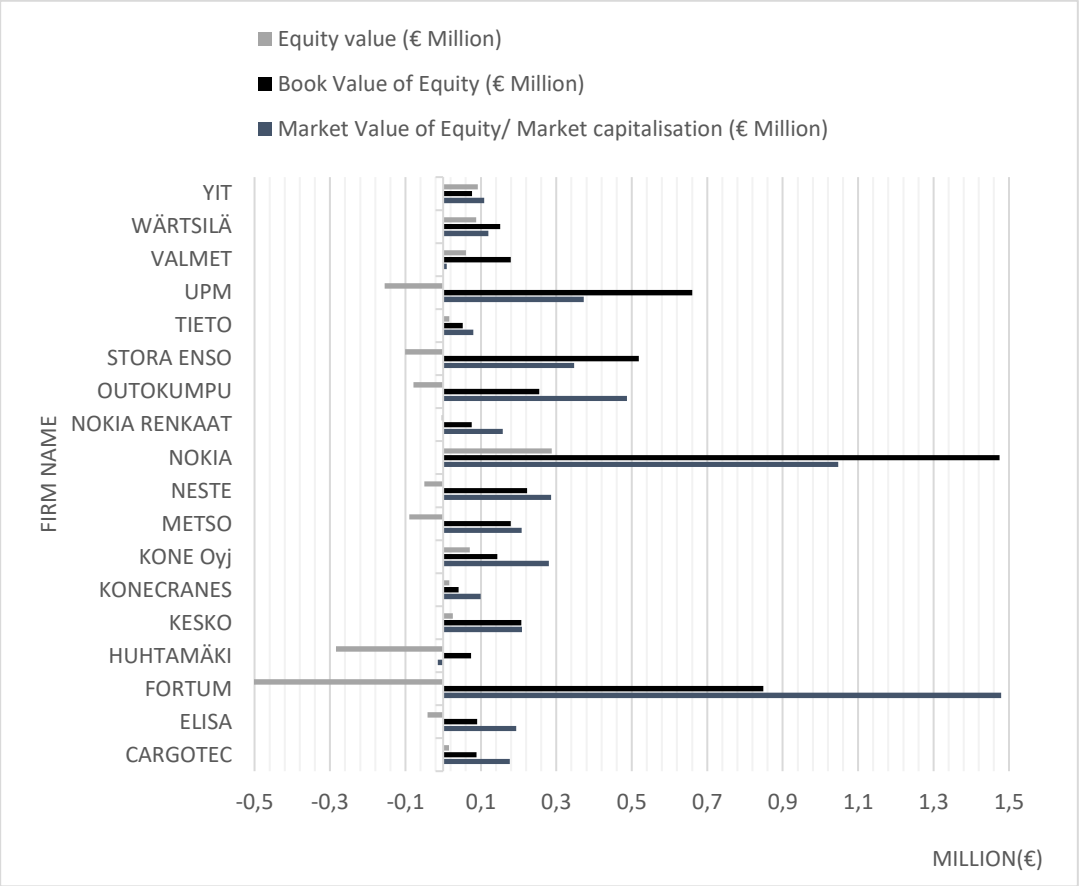

Figure 6 Year 2009 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted five firms to be undervalued. Undervalued firms are Nokia, Stora Enso, UPM, Wärtsilä and YIT. (See Table 9.) Buying the stocks of these undervalued firms should be considered, because their share prices may increase in the future. Correspondingly, there are six firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued firms are Huhtamaki, Nokia, Stora Enso, UPM, Wärtsilä and YIT.

Table 10 All values of 2009 part 2

2009	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,888	248,513	0,684	2,003	0,000	0,003
ELISA	1,369	10,963	1,357	2,157	0,187	0,124
FORTUM	1,091	10,948	2,721	1,742	0,328	0,249
HUHTAMÄKI	0,126	11,632	-0,077	-0,191	0,006	-0,007
KESKO	0,664	15,593	0,248	1,012	0,028	0,016
KONECRANES	0,997	15,609	0,593	2,435	0,059	0,038
KONE	0,995	6,018	0,591	1,947	0,119	0,098
METSO	0,850	13,782	201,343	189,946	0,059	0,030
NESTE	0,859	12,705	0,297	1,287	0,035	0,023
NOKIA	0,439	40,290	2,556	0,710	0,029	0,063
NOKIAN RENKAAT	1,562	27,149	2,005	2,089	0,129	0,074
OUTOKUMPU	1,346	-14,503	1,845	1,911	-0,167	-0,127
STORA ENSO	0,638	-3,952	0,388	0,670	-0,068	-0,098
TIETO	0,838	14,625	0,471	1,552	0,044	0,032
UPM	0,602	22,063	0,483	0,565	0,017	0,022
WÄRTSILÄ	0,399	3,017	0,227	0,790	0,113	0,075
YIT	0,644	15,990	0,312	1,423	0,048	0,020

Table 10 summarises all information of 17 companies in the year 2009, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are thirteen undervalued and four overvalued firms in year 2009 of Tobin's Q. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Stora Enso, Tieto, UPM, Wärtsilä and YIT. Huhtamaki can be considered as the most undervalued firm with the lowest result 0,1.

For Price to earnings ratio, Stora Enso and Outokumpu have a negative value, which implies that their value cannot be considered in comparison. Four firms have a value higher than average. This implicates that their stock is overvalued. These firms are Cargotec, Nokia, Nokian Renkaat, and UPM. There are five firms that are significantly low and can be considered as undervalued. These firms are Fortum, Huhtamaki, Kone Neste, and Wärtsilä.

Price to sales ratio resulted six firms to be overvalued. Twelve firms are undervalued. Within year 2009, overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat,

and Outokumpu. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone, Neste, Stora Enso, UPM, Wärtsilä and YIT. Undervalued firms in Price to sales ratio can be considered as a good investment.

Overall, Price to book value ratio resulted in five undervalued firms. Twelve firms indicated that they are overvalued. Undervalued firms are Huhtamaki, Nokia, Stora Enso, UPM and Wärtsilä. Overvalued firms are Cargotec, Elisa, Fortum, Kesko, Kone, Metso, Neste, Nokian Renkaat, Outokumpu, Tieto, UPM and YIT.

For year 2009, the highest Operating profit margin ratio resulted for two firms. These firms are Elisa and Fortum. Fortum has the highest Operating profit margin. If a firm has negative operating profit, it results in a negative ratio result. There are two firms that resulted in negative operating profit margin. These firms are Outokumpu and Stora Enso. Outokumpu had the lowest result with -0,17.

The highest Net profit margin ratio resulted for one firm. This firm is Fortum. If a firm has a negative result, it indicates of loss of profit. In 2009 three firms had a negative result. These firms are Huhtamaki, Outokumpu, and Stora Enso. One firm resulted in significantly low result. This firm is Cargotec with a Net profit margin ratio of 0,002.

Year 2010

In Table 11, 17 companies in the year 2010 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 11 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 7), for clarity purposes, their values are fully presented within these tables.

Table 11 All values of 2010 part 1

2010	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	1699,7	1069,1	5791,0	26,37	16,58
ELISA	2413,3	832,2	-277,2	15,39	5,31
FORTUM	17777,1	8742,0	-3977,0	19,17	9,43
HUHTAMÄKI	1001,3	848,6	390,7	8,90	7,55
KESKO	3137,8	2209,4	1491,3	29,97	21,10
KONECRANES	1433,8	456,0	1164,8	24,57	7,81
KONE	4417,5	1699,8	1846,5	17,26	6,64
METSO	4492,1	2071,0	-71919,0	29,77	13,73
NESTE	3077,4	2426,0	886,1	11,86	9,35
NOKIA	22518,8	16231,0	10916,5	8,38	6,04
NOKIAN RENKAAT	2770,0	937,2	1377,9	21,55	7,29
OUTOKUMPU	5713,4	2375,0	2541,6	31,59	13,13
STORA ENSO	4858,8	6255,0	6662,0	6,13	7,89
TIETO	580,3	556,9	624,9	14,94	14,33
UPM	5556,6	7109,0	5096,5	10,70	13,69
WÄRTSILÄ	2103,5	1664,0	4964,4	20,72	16,39
YIT	2072,4	883,0	6501,1	16,58	7,06

Fourteen firms have positive values in all categories for year 2010. Equity value is negative for three firms. Overall, there are five firms that can be considered undervalued and twelve overvalued within this year regarding the comparison of Market value of Equity versus Equity value. The negative Equity values of Elisa, Fortum and Metso indicate that negative value is generated due the structure of their earnings and spending in the year.

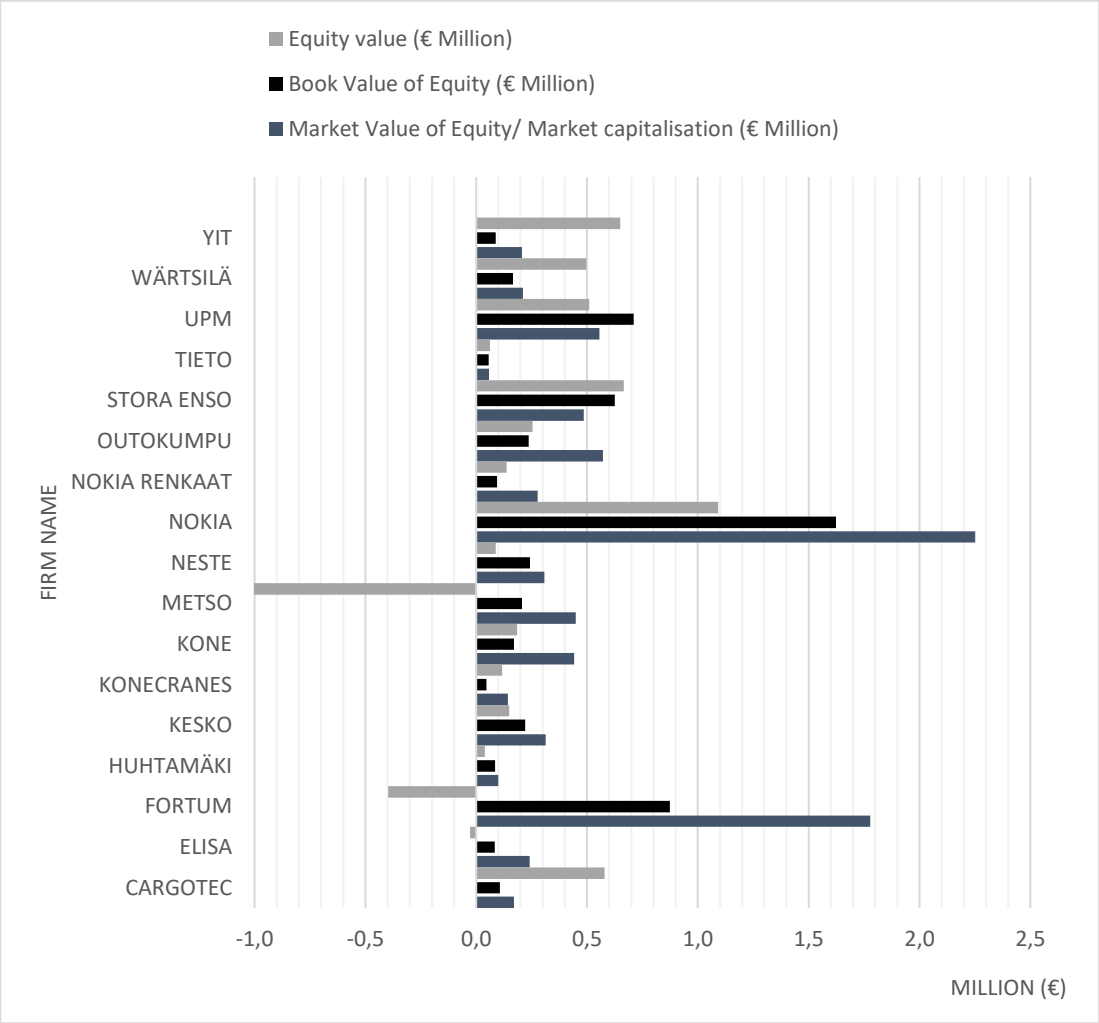

Figure 7 Year 2010 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted two firms to be undervalued. Undervalued firms are Stora Enso and UPM. (See Table 11.) Buying the stocks of these undervalued firms should be considered, because their share prices may increase in the future. Correspondingly, there are two firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued companies are Stora Enso and UPM.

Table 12 All values of 2010 part 2

2010	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,765	21,791	0,660	1,590	0,051	0,030
ELISA	1,634	16,035	1,649	2,900	0,183	0,103
FORTUM	1,145	13,129	2,824	2,034	0,271	0,215
HUHTAMÄKI	0,193	8,729	0,513	1,180	0,069	0,059
KESKO	0,865	14,547	0,358	1,420	0,035	0,025
KONECRANES	1,291	18,335	0,927	3,144	0,073	0,051
KONE	1,383	8,257	0,886	2,599	0,140	0,107
METSO	1,078	17,411	127,790	74,731	0,080	0,046
NESTE	0,789	13,322	0,259	1,269	0,027	0,019
NOKIA	0,711	16,768	5,305	1,387	0,049	0,316
NOKIAN RENKAAT	2,178	16,323	2,618	2,956	0,210	0,160
OUTOKUMPU	1,446	-46,450	1,351	2,406	-0,020	-0,029
STORA ENSO	0,671	6,316	0,472	0,777	0,100	0,075
TIETO	0,594	21,645	0,339	1,042	0,042	0,016
UPM	0,690	9,905	0,623	0,782	0,085	0,063
WÄRTSILÄ	0,582	5,298	0,462	1,264	0,090	0,087
YIT	0,918	14,803	0,547	2,347	0,058	0,037

Table 12 summarises all information of 17 companies in the year 2010, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are ten undervalued and seven overvalued firms in year 2010 of Tobin's Q. Undervalued firms are Cargotec, Huhtamaki, Kesko, Neste, Nokia, Stora Enso, Tieto, UPM, Wärtsilä and YIT.

For Price to earnings ratio, Stora Enso has a negative value, which implies that their value cannot be considered. Three firms have a value higher than average. This implicates that their stock is overvalued. These firms are Cargotec, Konecranes and Tieto. There are no firms that are significantly low in comparison to their previous values and cannot be considered as undervalued.

Price to sales ratio resulted six firms to be overvalued. Twelve firms are undervalued. Within year 2010, overvalued firms are Elisa, Fortum, Metso, Nokia, Nokian Renkaat,

and Outokumpu. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Kone, Neste, Stora Enso, UPM, Wärtsilä and YIT.

Overall, Price to book value ratio resulted in two undervalued firms. Sixteen firms indicated that they are overvalued. Undervalued firms are Konecranes and Wärtsilä. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet and YIT.

For year 2010, the highest Operating profit margin ratio resulted for three firms. These firms are Elisa, Fortum, and Nokian Renkaat. Fortum has the highest Operating profit margin. If a firm has negative operating profit, it results in a negative ratio result. There is one firm that resulted in negative operating profit margin. This firm is Outokumpu.

The highest Net profit margin ratio resulted for three firms. These firms are Fortum, Nokia and Nokian Renkaat. If a firm has a negative result, it indicates of loss of profit. In 2010 one firm had a negative result. This firm is Outokumpu. One firm resulted in significantly low result. This firm is Tieto with a Net profit margin ratio of 0,02.

4.3 Post crisis

The results for years 2015-2018 will be discussed individually. Each year has their own subchapter.

Year 2015

In Table 13, 18 companies in the year 2015 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 13 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are

too large or too low to fit in charts (see Figure 8), for clarity purposes, their values are fully presented within these tables.

Table 13 All values of 2015 part 1

2015	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	2056,5	1341,0	1866,4	31,80	31,80
ELISA	4612,6	925,3	29,9	28,79	28,79
FORTUM	14640,2	13863,0	491,5	16,47	16,47
HUHTAMÄKI	3074,5	1035,7	1063,0	29,09	29,09
KESKO	3810,9	525,7	3442,3	33,44	33,44
KONECRANES	1587,6	456,0	425,3	27,32	27,32
KONE	20289,9	2748,4	4774,5	38,54	38,54
METSO	3711,7	1063,0	2045,0	24,51	24,51
NESTE	6078,8	3104,0	2407,0	23,66	23,66
NOKIA	25515,5	10524,0	9282,1	6,51	6,51
NOKIAN RENKAAT	3811,4	1241,6	1330,7	28,50	28,50
OUTOKUMPU	1687,0	2328,0	3209,7	4,51	4,51
STORA ENSO	6707,4	5513,0	3719,8	8,74	8,74
TIETO	1663,7	482,6	648,3	22,61	22,61
UPM	8721,0	7944,0	4363,1	16,38	16,38
VALMET	1563,3	861,0	1756,8	10,22	10,22
WÄRTSILÄ	2678,2	2655,0	3022,8	13,36	13,36
YIT	717,5	523,0	2013,9	5,65	5,65

All firms have positive values in all categories for year 2015. Overall, there are four companies that can be considered undervalued and fourteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued companies are Outokumpu, Valmet, Wartsila and YIT. The difference between Market value of equity and Equity value is highest with Kone. The firm can be considered the most overvalued firm.

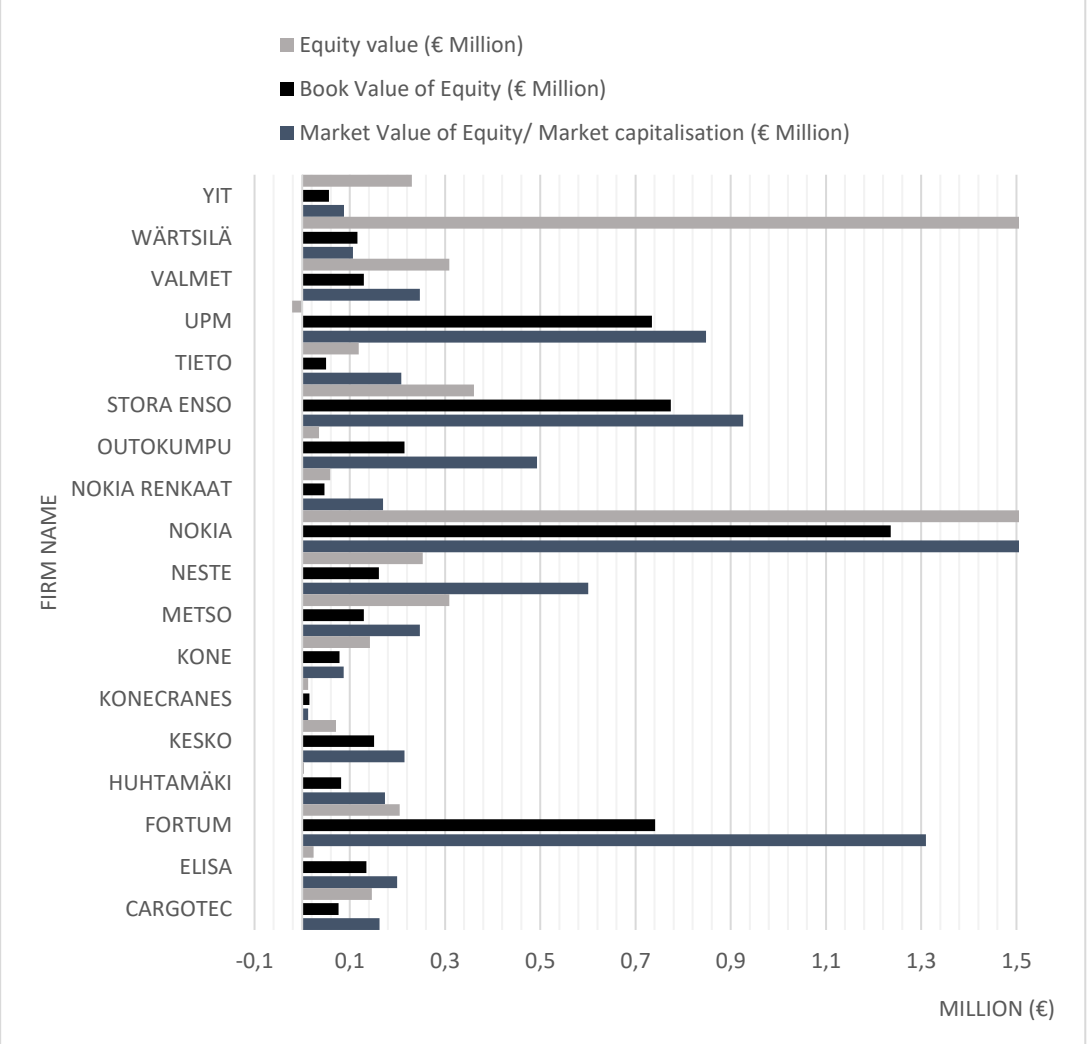

Figure 8 Year 2015 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted no firm to be undervalued. (See Table 13.) Correspondingly, there is one firm that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued firm is Outokumpu.

Table 14 All values of 2015 part 2

2015	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,793	14,391	0,551	1,534	0,057	0,038
ELISA	2,495	18,943	2,939	4,985	0,199	0,155
FORTUM	0,907	3,535	4,232	1,056	-0,043	1,197
HUHTAMÄKI	1,449	20,483	1,128	2,969	0,079	0,055
KESKO	1,754	32,461	0,884	7,249	-0,112	0,027
KONECRANES	1,261	51,544	0,747	3,482	0,030	0,014
KONE	2,735	19,269	2,346	7,382	0,000	0,122
METSO	1,165	70,031	0,386	1,102	0,186	0,018
NESTE	1,173	10,855	0,546	1,958	0,063	0,050
NOKIA	1,318	10,339	21,691	2,425	0,144	2,098
NOKIAN RENKAAT	2,297	15,835	2,802	3,070	0,218	0,177
OUTOKUMPU	0,593	19,616	0,264	0,725	0,036	0,013
STORA ENSO	0,882	8,566	0,668	1,217	0,105	0,078
TIETO	1,696	18,384	-4,460	3,447	0,364	-0,243
UPM	0,830	9,521	0,860	1,098	0,113	0,090
VALMET	0,668	20,042	0,534	1,816	0,041	0,027
WÄRTSILÄ	0,609	5,938	0,533	1,009	0,117	0,090
YIT	0,696	15,266	0,414	1,372	0,047	0,027

Table 14 summarises all information of 18 companies in the year 2015, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are eight undervalued and ten overvalued firms in year 2015 of Tobin's Q. Undervalued firms are Cargotec, Fortum, Outokumpu, Stora Enso, UPM, Valmet, Wärtsilä and YIT.

Price to earnings ratio estimation resulted in three firms have a value higher than their average. This implicates that their stock for the year is overvalued. These firms are Kesko (32,4), Konecranes (51,5), and Metso (70,0). There is one firm that are significantly low and can be considered as undervalued. This firm is Fortum with Price to earnings ratio of 3,5.

Price to sales ratio resulted six firms to be overvalued. Twelve firms are undervalued. Within year 2015, overvalued firms are Elisa, Fortum, Huhtamaki, Kone, Nokia, and Nokian Renkaat. Undervalued firms are Cargotec, Kesko, Konecranes, Metso, Neste,

Outokumpu, Stora Enso, UPM, Valmet, Wärtsilä and YIT. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted in one undervalued firm. Seventeen firms indicated that they are overvalued. Undervalued firm is Outokumpu. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokia, Nokian Renkaat, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT.

For year 2015, the highest Operating profit margin ratio resulted for four firms. These firms are Elisa, Metso, Nokian Renkaat and Tieto. Tieto has the highest Operating profit margin 0,36. If a firm has negative operating profit, it results in a negative ratio result. There are two firms that resulted in negative operating profit margin. These firms are Fortum and Kesko. There is one firm that has significantly low result of operating profit margin ratio. This firm is Kone with a result of 0,0014.

The highest Net profit margin ratio resulted for four firms. These firms are Elisa, Fortum, Nokia and Nokian Renkaat. If a firm has a negative result, it indicates of loss of profit. In 2015 one firm had a negative result. This firm is Tieto with a result of -0,24. Three firms resulted in significantly low results. These firms are Konecranes, Metso and Outokumpu. Two firms have a Net profit margin ratio of 0,01. These firms are Konecranes and Outokumpu.

Year 2016

In Table 15, 18 companies in the year 2016 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 15 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 9), for clarity purposes, their values are fully presented within these tables.

Table 15 All values of 2016 part 1

2016	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	2290,3	1397,0	2009,1	35,46	21,63
ELISA	4149,3	550,3	-129,6	32,38	4,29
FORTUM	12337,0	13542,0	-1520,0	13,71	15,05
HUHTAMÄKI	732,7	1181,6	951,9	35,84	57,80
KESKO	4513,2	2125,7	2379,8	39,26	18,49
KONECRANES	1502,4	539,0	574,9	25,57	9,17
KONE	21549,7	2978,5	4465,1	41,96	5,80
METSO	3427,2	1439,0	2380,7	22,94	9,63
NESTE	8470,1	3755,0	3744,5	32,87	14,57
NOKIA	36104,7	20975,0	14583,1	5,06	2,94
NOKIAN RENKAAT	4337,2	1458,5	1250,5	32,04	10,77
OUTOKUMPU	1932,1	2458,0	3661,4	4,70	5,97
STORA ENSO	5503,5	5868,0	2430,9	7,98	8,51
TIETO	1826,9	487,6	689,5	24,88	6,64
UPM	9490,6	8238,0	4932,2	17,79	15,45
VALMET	1717,1	-289,0	1965,2	11,52	-1,94
WÄRTSILÄ	2576,4	2321,0	2897,7	12,92	11,64
YIT	736,3	564,0	1885,4	6,22	4,77

All firms, except Elisa and Fortum, have positive values in all categories for year 2016. Elisa and Fortum have negative Equity value. Overall, there are five companies that can be considered undervalued and thirteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued companies are Huhtamaki, Outokumpu, Valmet, Wartsila and YIT. The negative Equity value of Elisa and Fortum implies that negative value is generated due the structure of their earnings and spending in the year.

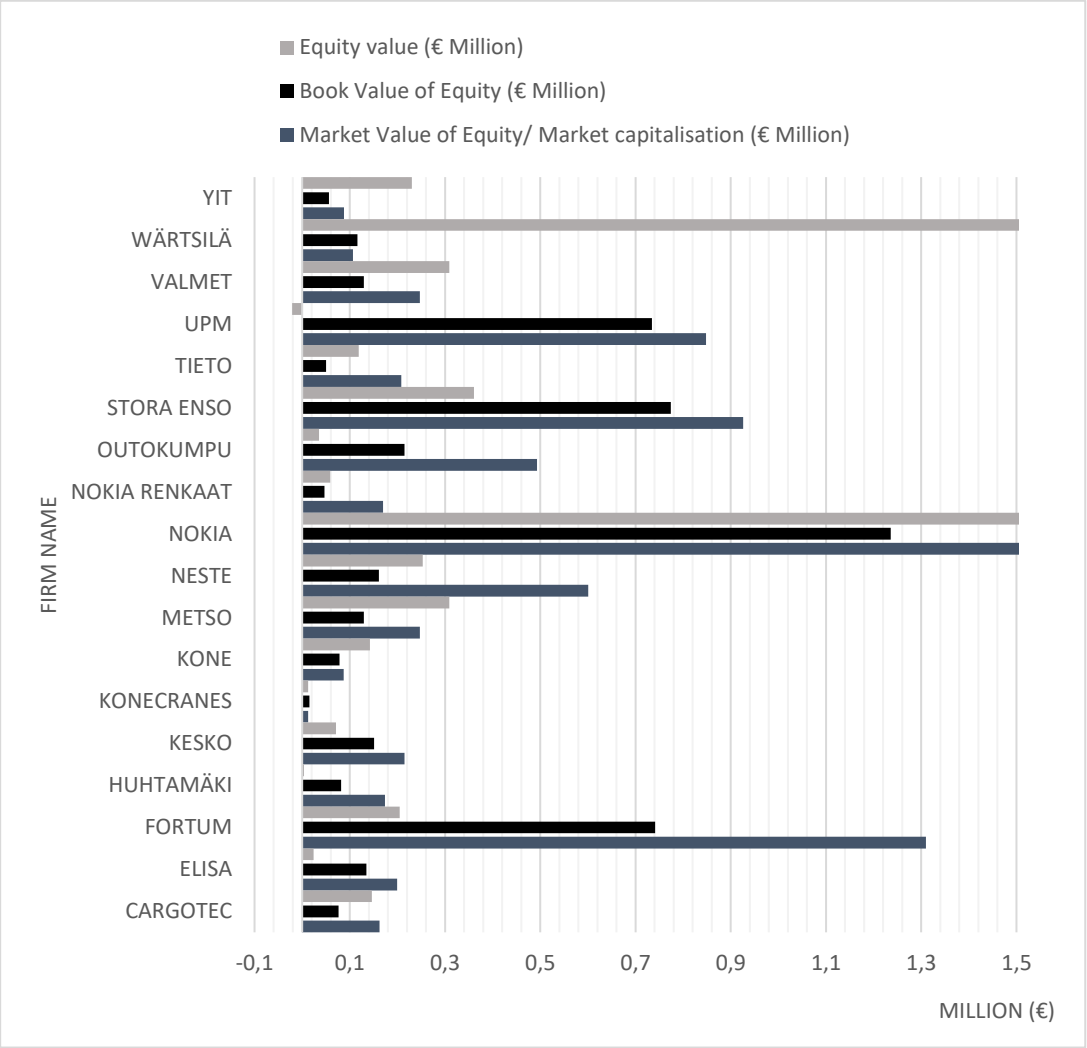

Figure 9 Year 2016 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted four firms to be undervalued. Undervalued firms are Fortum, Huhtamaki, Outokumpu and Stora Enso. (See Table 15.) Buying the stocks of these undervalued firms should be considered, because their share prices may increase in the future. Correspondingly, there are four firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued firms are Fortum, Huhtamaki, Outokumpu and Stora Enso.

Table 16 All values of 2016 part 2

2016	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,867	18,279	0,652	1,639	0,056	0,036
ELISA	2,518	20,113	2,537	7,540	0,207	0,126
FORTUM	0,794	24,478	3,397	0,911	0,174	0,139
HUHTAMÄKI	0,484	19,909	0,256	0,620	0,093	0,013
KESKO	1,141	39,659	0,443	2,123	0,014	0,011
KONECRANES	1,194	39,957	0,709	2,787	0,040	0,018
KONE	2,739	21,086	2,453	7,235	0,147	0,116
METSO	1,059	26,363	0,000	0,000	0,088	0,050
NESTE	1,336	8,982	0,725	2,256	0,099	0,081
NOKIA	0,894	38,948	15,272	1,721	-0,047	0,392
NOKIAN RENKAAT	2,310	17,225	3,118	2,974	0,223	0,181
OUTOKUMPU	0,564	13,417	0,340	0,786	0,018	0,025
STORA ENSO	0,752	13,522	0,561	0,938	0,080	0,042
TIETO	1,862	17,042	1,224	3,747	0,094	0,072
UPM	0,872	10,785	0,967	1,152	0,116	0,090
VALMET	1,476	20,940	0,587	-5,941	0,050	0,028
WÄRTSILÄ	0,594	7,217	0,537	1,110	0,111	0,074
YIT	0,628	-103,705	0,439	1,306	0,011	-0,004

Table 16 summarises all information of 18 companies in the year 2016, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are nine undervalued and nine overvalued firms in year 2016 of Tobin's Q. Undervalued firms are Cargotec, Fortum, Huhtamaki, Nokia, Outokumpu, Stora Enso, UPM, Wärtsilä and YIT.

Price to earnings ratio estimation resulted in three firms have a value higher than their average. This implicates that their stock for the year is overvalued. These firms are Kesko (39,6), Konecranes (39,9), and Nokia (38,9). There are no firm that are significantly low and can be considered as undervalued. YIT had negative value for year 2016, and their result is not valid.

Price to sales ratio resulted six firms to be overvalued. Twelve firms are undervalued. Within year 2015, overvalued firms are Elisa, Fortum, Kone, Nokia, Nokian Renkaat, and Tieto. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Metso,

Neste, Outokumpu, Stora Enso, UPM, Valmet, Wärtsilä and YIT. Undervalued firms can be considered as a good investment.

Overall, Price to book value ratio resulted in six undervalued firm. Twelve firms indicated that they are overvalued. Undervalued firms are Fortum, Huhtamaki, Metso, Outokumpu, Stora Enso and Valmet. Overvalued firms are Cargotec, Elisa, Kesko, Kone, Neste, Nokia, Nokian Renkaat, Tieto, UPM, Wärtsilä and YIT.

For year 2016, the highest Operating profit margin ratio resulted for two firms. These firms are Elisa, and Nokian Renkaat. Nokian Renkaat has the highest Operating profit margin. If a firm has negative operating profit, it results in a negative ratio result. There is one firm that resulted in negative operating profit margin. This firm is Nokia. There are two firms that have significantly low result of operating profit margin ratio. These firms are Kesko and YIT with a result of 0,01.

The highest Net profit margin ratio resulted for two firms. These firms are Nokia and Nokian Renkaat. Four firms resulted in significantly low results. These firms are Huhtamaki, Kesko, Konecranes, and YIT.

Year 2017

In Table 17, 18 companies in the year 2017 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 17 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 10), for clarity purposes, their values are fully presented within these tables.

Table 17 All values of 2017 part 1

2017	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Market price per share (€)	Book value per share (€)
CARGOTEC	3251,8	1427,0	1878,7	50,10	21,99
ELISA	3846,0	498,4	-69,5	33,87	4,39
FORTUM	13711,3	13287,0	-998,9	15,23	14,76
HUHTAMÄKI	1473,4	1207,6	1066,4	34,77	28,50
KESKO	4630,6	2231,5	1947,7	44,62	21,50
KONECRANES	2885,4	1278,5	1252,1	36,93	16,36
KONE	22774,2	3049,0	3730,6	43,91	5,88
METSO	4419,7	1350,0	2125,6	29,46	9,00
NESTE	9906,7	4338,0	3484,7	38,48	16,85
NOKIA	46861,7	16218,0	24166,6	4,96	1,72
NOKIAN RENKAAT	5108,5	1468,4	1261,0	37,15	10,68
OUTOKUMPU	3593,1	2722,0	4163,8	8,25	6,25
STORA ENSO	9013,0	6055,0	4843,9	11,60	7,79
TIETO	1972,7	475,6	700,0	26,72	6,44
UPM	12842,7	8663,0	8048,0	24,00	16,19
VALMET	2424,6	-226,0	2256,2	16,04	-1,49
WÄRTSILÄ	3500,3	2395,0	3170,2	17,82	12,19
YIT	897,8	565,0	1665,6	6,98	4,39

All firms, except Elisa and Fortum, have positive values in all categories for year 2017. Elisa and Fortum have negative Equity value. Overall, there are two companies that can be considered undervalued and sixteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued companies are Outokumpu and YIT. The negative Equity value of Elisa and Fortum implies that the negative values are generated due the structure of their earnings and spending in the year.

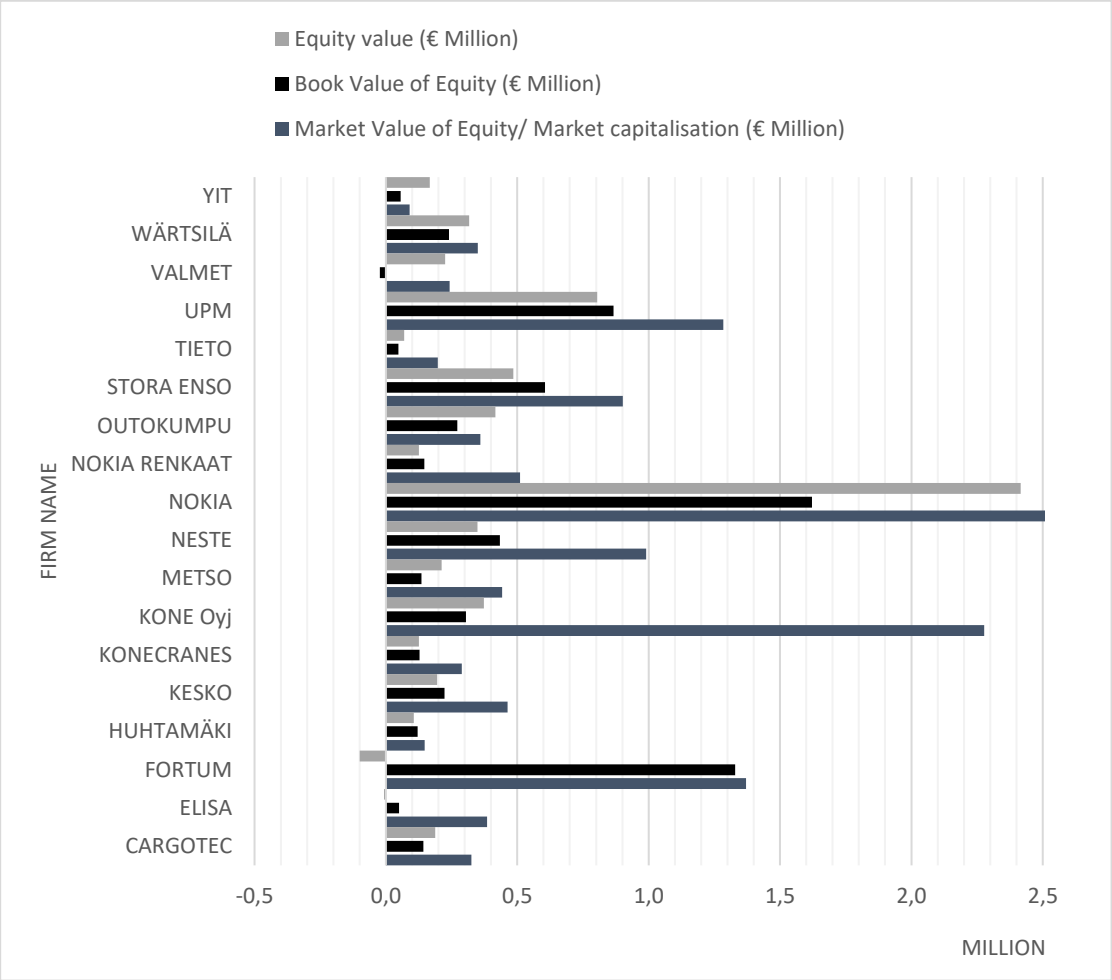

Figure 10 Year 2017 Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted no firm to be undervalued. (See Table 17.) Correspondingly, there are no firms that are considered undervalued in this year comparison of Market value of equity versus Book value of Equity.

Table 18 All values of 2017 part 2

2017	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	1,155	23,858	0,991	2,279	0,069	0,042
ELISA	2,434	16,052	2,152	7,717	0,211	0,134
FORTUM	0,855	15,546	3,033	1,032	0,256	0,195
HUHTAMÄKI	0,731	18,793	0,493	1,220	0,088	0,026
KESKO	1,155	17,227	0,441	2,075	0,031	0,026
KONECRANES	1,023	12,824	0,920	2,257	0,101	0,072
KONE	2,974	23,358	2,547	7,469	0,136	0,109
METSO	1,427	43,331	6,231	9,163	0,081	0,038
NESTE	1,425	10,839	0,750	2,284	0,089	0,069
NOKIA	1,234	19,065	20,245	2,889	0,007	1,062
NOKIAN RENKAAT	2,793	23,074	3,249	3,479	0,232	0,141
OUTOKUMPU	0,815	9,166	0,565	1,320	0,070	0,062
STORA ENSO	1,022	14,679	0,897	1,489	0,090	0,061
TIETO	1,925	18,300	1,278	4,148	0,090	0,070
UPM	1,078	13,186	1,283	1,482	0,126	0,097
VALMET	1,111	19,092	0,768	-10,729	0,056	0,040
WÄRTSILÄ	0,735	9,139	0,711	1,461	0,112	0,078
YIT	0,678	15,863	0,450	1,589	0,043	0,028

Table 18 summarises all information of 18 companies in the year 2017, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are five undervalued and thirteen overvalued firms in year 2017 of Tobin's Q. Undervalued firms are Fortum, Huhtamaki, Outokumpu, Wärtsilä and YIT.

For Price to earnings ratio, Three firms have a value higher than average. This implicates that their stock is overvalued. These firms are Cargotec, Kone and Metso. There are no firm that is significantly low and can be considered as undervalued.

Price to sales ratio resulted eight firms to be overvalued. Ten firms are undervalued. Within year 2017, overvalued firms are Elisa, Fortum, Kone, Metso, Nokia, Nokian Renkaat, Tieto and UPM. Undervalued firms are Cargotec, Huhtamaki, Kesko, Konecranes, Neste, Outokumpu, Stora Enso, Valmet, Wärtsilä and YIT.

Overall, Price to book value ratio resulted in one undervalued firm. Seventeen firms indicated that they are overvalued. Undervalued firm is Valmet. Overvalued firms are

Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Wärtsilä and YIT.

For year 2017, the highest Operating profit margin ratio resulted for three firms. These firms are Elisa, Fortum and Nokian Renkaat. Nokian Renkaat has the highest Operating profit margin. There is one firm that has significantly low result of operating profit margin ratio. This firm is Nokia with a result of 0,006.

The highest Net profit margin ratio resulted for two firms. These firms are Fortum and Nokia. No firm had significantly low results in comparison to prior years.

Year 2018

In Table 19, 18 companies in the year 2018 have been valued are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Outokumpu, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT. The value calculated by the FCFF model is Equity Value and the DCF future forecasted Equity value. The values taken from the stock market is Market Price per share. Market value of equity, Book value of Equity, and Book value per share are calculated by the author. Data is based on the stock market and data from each firms' financial statements.

Table 19 is used for several purposes. Table summarizes all information calculated, and it supports readers to understand the results clearer. Also, some firm values are too large or too low to fit in charts (see Figure 11), for clarity purposes, their values are fully presented within these tables.

Table 19 All values of 2018 part 1

2018	Market Value of Equity/ Market capitalisation (€ Million)	Book Value of Equity (€ Million)	Equity value (€ Million)	Equity value DCF Forecast (€)	Market price per share (€)	Book value per share (€)
CARGOTEC	2727,5	1427,6	4414,7	-84170,6	41,67	21,81
ELISA	5820,0	1134,7	-41,2	5340,1	36,47	7,11
FORTUM	17649,4	12077,0	-2251,7	46628,9	19,54	13,37
HUHTAMÄKI	3296,9	1273,7	1328,2	77455,1	31,28	12,08
KESKO	5429,1	2063,4	2276,8	14963,2	48,86	18,57
KONECRANES	2597,4	1284,2	1393,2	-43810,5	34,09	16,85
KONE	22629,7	3220,0	4170,5	-1085221,5	43,64	6,21
METSO	4184,8	1931,0	2047,9	-41514,6	27,96	12,90
NESTE	16914,0	4630,0	5378,1	-118054,4	65,79	18,01
NOKIA	15948,3	15371,0	11913,6	-482486,9	4,76	4,59
NOKIAN RENKAAT	4717,5	1486,1	1242,4	11988,2	34,20	10,77
OUTOKUMPU	77,2	2750,0	2785,2	-338934,3	0,19	6,77
STORA ENSO	11432,2	6732,0	5888,0	-256695,2	14,81	8,72
TIETO	2047,4	482,0	679,1	-33207,6	27,59	6,49
UPM	15614,5	9797,0	8554,7	-188527,4	29,22	18,34
VALMET	2667,5	949,0	1201,9	25342,8	17,72	6,31
WÄRTSILÄ	10224,3	2432,0	3288,6	-66247,4	17,22	4,10
YIT	1199,8	1049,0	2028,8	43747,1	5,82	5,08

Five firms have positive values in all categories for year 2018. Elisa and Fortum have negative Equity values. Overall, there are three firms that can be considered undervalued and Fourteen overvalued within this year regarding the comparison of Market value of Equity versus Equity value. Undervalued companies are Cargotec, Outokumpu and YIT. The negative Equity value of Elisa and Fortum implies that negative value is generated due the structure of their earnings and spending in the year. Consequently, the DCF resulted in six firms to be undervalued and twelve firms overvalued. Undervalued firms are Fortum, Huhtamaki, Kesko, Nokia, Valmet and YIT. The negative values of DCF indicate that the firm may run out of cash in the five-year period of forecast or that negative value is generated due the structure of their earnings and expenditure.

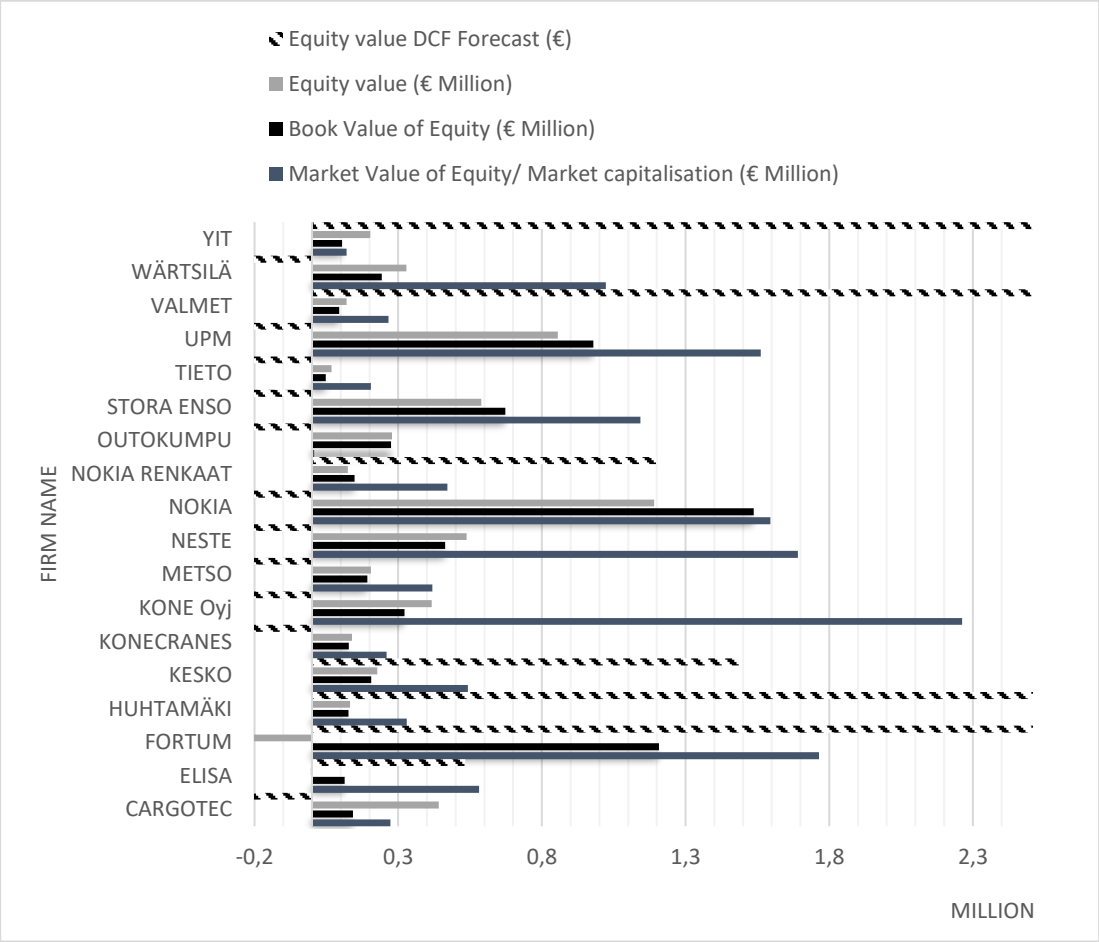

Figure 11 Year 2018 Equity value DCF Forecast, Equity value, Book value of Equity and Market value of Equity in comparison

Overall, Market price per share in comparison to Book value per share resulted one firm to be undervalued. Undervalued firm is Outokumpu. (See Table 19.) Buying the stocks of this undervalued firms should be considered, because their share price may increase in the future. Correspondingly, there is one firm that is considered undervalued in this year comparison of Market value of equity versus Book value of Equity. Undervalued firm is Outokumpu.

Table 20 All values of 2018 part 2

2018	Tobin's Q	Price to earnings ratio	Price to sales ratio	Price to book value ratio	Operating profit margin	Net profit margin
CARGOTEC	0,993	25,255	0,826	1,911	0,058	0,033
ELISA	2,612	18,418	3,178	5,129	0,220	0,173
FORTUM	1,060	20,570	3,367	1,461	0,217	0,164
HUHTAMÄKI	1,262	20,853	1,062	2,588	0,072	0,051
KESKO	1,357	30,347	0,523	2,631	0,030	0,017
KONECRANES	0,946	26,423	0,823	2,023	0,053	0,031
KONE	2,955	26,774	2,495	7,028	0,115	0,093
METSO	1,459	18,274	32,723	21,388	0,101	0,072
NESTE	2,195	21,713	1,134	3,653	0,069	0,052
NOKIA	0,500	47,607	7,068	1,038	-0,026	0,148
NOKIAN RENKAAT	2,317	15,981	2,957	3,174	0,233	0,185
OUTOKUMPU	0,231	0,594	0,011	0,028	0,041	0,019
STORA ENSO	1,150	11,571	1,090	1,698	0,133	0,094
TIETO	1,964	16,618	1,280	4,248	0,097	0,077
UPM	1,177	10,437	1,490	1,594	0,181	0,143
VALMET	0,960	17,549	0,802	2,811	0,063	0,046
WÄRTSILÄ	1,823	26,488	1,976	4,204	0,105	0,075
YIT	0,599	30,607	0,325	1,144	0,026	0,011

Table 20 summarises all information of 18 companies in the year 2018, for the values calculated for Tobin's Q, Price to earnings ratio, Price to sales ratio, Price to book value ratio, Operating profit margin and Net profit margin are calculated based on data from the stock market and data from company's financial statements.

Overall, there are six undervalued and twelve overvalued firms in year 2018 of Tobin's Q. Undervalued firms are Cargotec, Konecranes, Nokia, Outokumpu, Valmet, and YIT. Most undervalued firm is Outokumpu (0,23). Overvalued firms are Elisa, Fortum, Huhtamaki, Kesko, Kone, Metso, Neste, Nokian Renkaat, Stora Enso, Tieto, UPM, and Wärtsilä. Most overvalued firm is Kone (2,9).

For Price to earnings ratio five firms have a value higher than their average. This implicates that their stock is overvalued. These firms are Kone, Neste, Nokia, Wärtsilä, and YIT. There is one firm that has significantly low result and can be considered as undervalued. This firm is Outokumpu (0,5).

Price to sales ratio resulted twelve firms to be overvalued. six firms are undervalued. Within year 2018, overvalued firms are Elisa, Fortum, Huhtamaki, Kone, Metso, Neste, Nokia, Nokian Renkaat, Stora Enso, Tieto, UPM and Wärtsilä. Undervalued

firms are Cargotec, Kesko, Konecranes, Outokumpu, Stora Enso, Valmet, and YIT. Metso can be considered the most overvalued with result of 32,7.

Overall, Price to book value ratio resulted in one undervalued firm. Seventeen firms indicated that they are overvalued. Undervalued firm is Outokumpu. Overvalued firms are Cargotec, Elisa, Fortum, Huhtamaki, Kesko, Konecranes, Kone, Metso, Neste, Nokia, Nokian Renkaat, Stora Enso, Tieto, UPM, Valmet, Wärtsilä and YIT.

For year 2018, the highest Operating profit margin ratio resulted for four firms. These firms are Elisa, Fortum, Nokian Renkaat and UPM. Nokian Renkaat has the highest Operating profit margin. If a firm has negative operating profit, it results in a negative ratio result. There is one firm that resulted in negative operating profit margin. This firm is Nokia, with a -0,03 operating profit margin.

The highest Net profit margin ratio resulted for four firms. These firms are Elisa, Fortum, Nokia and Nokian Renkaat. One firm resulted in significantly low results. This firm is YIT.

5 Discussion

Chapter 5 exhibits the most key insights of this thesis. It offers the reader a clear impression of the research. It includes two subchapters which are 5.1. Findings, and 5.2. Limitations and recommendations. Findings conclude the core results of this research and answers to the research questions. Subchapter Limitations and recommendations demonstrate the existing limitations in the research, and also it offers recommendations for future research.

5.1 Findings

The primary goal of this study was to examine the potential of the Finnish stock market, in the context of the financial crisis in 2008 and the financial performance of these companies from the phases before the crisis, during the crisis and after the crisis. The theoretical and empirical analysis assisted the author in achieving the main

goals of the work. To summarise the key findings of the study, the research questions are answered in this chapter.

1. *What are the values of the top 25 Finnish firms as calculated by various valuation techniques?*

2. *Which of the firms listed in the OMXH25 are undervalued or overvalued?*

3. *What are the implications of under/overvaluation of firms on investors?*

To answer these questions, the research was conducted. The following measures discussed implicated the value of the firm or whether the firm is overvalued or undervalued.

Overall, in the ten-year sample, 174 comparisons of the Market value of Equity versus Equity value were conducted. Twenty-eight comparisons resulted in a firm in an undervalued state. During the recession, according to the comparison of the Market value of Equity versus Book value of Equity, the inclination of firms probably in financial trouble increased and was at the highest level for the whole sample in 2009. Six firms indicated for possible financial trouble. These firms are Huhtamaki, Nokia, Stora Enso, UPM, Wärtsilä and YIT. The second-highest rate was in the year 2016, when four firms had a higher Book value of Equity than the market value of Equity. These firms are Fortum, Huhtamaki, Outokumpu and Stora Enso.

During the recession, the number of undervalued firms in share price comparison between the Market value and Book value per share increased and was at the highest level for the whole sample in 2009. Five firms were undervalued, these firms are Nokia, Stora Enso, UPM, Wärtsilä and YIT. The second-highest rate was in the year 2016, when four firms had higher Book value per share than the Market price per share. These firms are Fortum, Huhtamaki, Outokumpu and Stora Enso. For the year 2018, the share price of Outokumpu was measured undervalued and indicated that they should be invested in. To respond the third research question, Outokumpu share price indicates that their stock price may increase in the future. Other 17 firms show that their stock price may stay relatively the same or drop in the future.

For the Market value of Equity versus Equity value DCF Forecast, Six firms are measured undervalued and twelve firms overvalued. Undervalued firms are Fortum, Huhtamaki, Kesko, Nokia, Valmet and YIT. Unpredictably, the firm Outokumpu is not undervalued, although all other measures indicated the firm of being undervalued. Among these, 11 firms had negative real value. The negative values of DCF indicate that the firm may run out of cash in the five-year period of forecast or that negative value is generated due to the structure of their earnings and expenditure. When comparing DCF values with other methods Outokumpu, Nokia, Valmet and YIT can be interpreted as undervalued.

No firm was undervalued for the whole sample considering Tobin's Q. Wärtsilä was closest by nine years. Two firms were overvalued for the whole sample. Elisa and Nokian Renkaat. Moreover, most undervalued, or overvalued companies determined by Tobin's Q are also found undervalued or overvalued when applying price-to-earnings ratio and Price to sales ratio. The Operating profit margin and the Net profit margin both corresponded to this. If the firm was showing the undervalued result, the result in operating profit margin and the net profit margin ratio was substantially low, or at a negative level. The result of the Price to Earnings ratio shows that the price at which the firm's stocks are being traded does directly affect the firm's financial health indicated by price-to-earnings ratio.

To conclude, investors may purchase stocks that are undervalued because these stock prices could increase in the future. On the other hand, for overvalued stocks, investors may want to sell or bet against the stock market. Overvalued stock prices may drop in the future. This could aid the investors to diminish future losses if they sell overvalued stocks, or they can generate future profits if they decide to bet against the stock market. The results may aid the firm's management in the decision-making process, or with choosing the right stocks, or with defining future acquisition strategies.

Temporarily the recession increased the number of firms, that showed financial distress. However, as one immerses through the results, firms have overcome the recession. Nearly for all firms' market value has increased from the pre-crisis level, which indicates that each of the firms can be invested.

5.2 Limitations and recommendations

Although the research is implemented with care, there are some limitations. From NASDAQ OMX Helsinki 25 firms that suit the criteria of the study, 18 firms were used in the sample in this research. Outlier firms had apparent inclinations that made their data to be dysfunctional for valuation. Resulting, these firms were excluded from this research, and the goal of valuing all 25 companies did not deliver. Also, a firm Metso split into Metso and Valmet in 2013, which affected the results.

Most of the limitations were related to the valuation models, especially the DCF model. There were years at the beginning of the sample, that did not have market data available, which caused an issue with the determination of the market risk premium. Three firms did not have annual market data available, and the market risk premium was not calculated. Though going through an excessive amount of research, there is no other alternative approach to calculate it. Therefore, the author applied the historical market risk premium approach to determine the market risk premium. (Koller Goedhart & Wessels 2005, 299-312.) Also, the risk-free rate has been a debatable topic. Damodaran has discussed (2008) the issues around it. Different rate selection can affect the final value. The author followed Damodaran's suggestions by choosing the 10-year Finnish government bank yield as the risk-free rate.

The estimation of future cash flows and the growth of the firm can be done in two ways- in historical performance, or by trusting financial analysts. As Damodaran has stated (2016, 2), there are three significant issues found from valuation, that the analyst should pay attention to when performing the process. Those are the human bias, uncertainty, and complexity and the development of valuation models. With the estimation of growth, the author assumed, of that the firms are stable, and by that, their growth is steady of 2%, and did not yield the values from the historical performance. Here, the author's predictions may not have been the best option. Overall, the DCF valuation resulted in both positive and negative values. As it was previously discussed, the negative value can indicate that the firm may bankrupt during the estimated five years or that the DCF model did not reflect the firm's value accurately. One of the issues that yielded negative values was the firm's structure of their expenditure and earnings, and that may not have been best for the forecasting.

Therefore, the analyst may have made incorrect predictions of the sufficiency of the DCF model.

The author found out that if the WACC applied to the DCF is less or negative in comparison to the growth rate, the terminal value of the firm may result as negative. The author faced concerns with constructing the DCF model. There is not profound research about how the construction of the model should be implemented. Most of the research literature consists of valuation theories and formulas, but not about how to construct a DCF model. It might be useful for future research if there were research as well about the way a DCF model should be constructed.

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Appendices

Appendix 1. DCF of Cargotec

CARGOTEC	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
net earnings/ net income	136,6	166,1	138,4	120,8	7,1	78,0	142,9	125,3	136,3	108,0
Depreciation	37,9	40,5	59,8	60,1	60,0	60,5	76,5	84,8	72,0	77,2
Accounts receivable	453,8	444,2	528,8	714,0	506,1	546,3	778,4	778,9	751,3	822,5
Inventory	453,8	528,9	657,4	881,9	609,3	678,8	655,4	647,0	607,0	688,8
Accounts payable	628,9	665,2	882,0	1144,4	564,8	642,8	872,1	936,2	880,3	813,5
Cash flow from operations	1711,0	1844,9	2266,4	2921,2	1747,3	2006,4	2525,3	2572,2	2446,9	4528,0
Cash flow from investing activities										
PP&E	-0,9	-47,4	-160,0	-31,5	22,1	-3,4	-57,5	-62,9	-70,6	-71,5
Cash flow from financing activities										
Borrowing (repayment)	197,1	25,9	29,5	34,4	51,1	119,3	436,5	62,1	260,8	87,6
Total cash flow	1907,2	1823,4	2135,9	2924,1	1820,5	2122,3	2904,3	2571,4	2637,1	4544,1
Beginning cash	0,0	1907,2	3730,6	5866,5	8790,6	10611,1	12733,4	15637,7	18209,1	20846,2
Ending cash	1907,2	3730,6	5866,5	8790,6	10611,1	12733,4	15637,7	18209,1	20846,2	25390,3
Notes:										
Cash paid for interest	11,0	11,5	12,0	25,5	25,3	27,0	22,0	21,9	20,1	18,6
Cash paid for taxes	18,4	43,3	43,6	30,6	38,6	29,4	47,4	77,5	49,4	61,0
Cost of debt	0,0	0,0	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0
	0,3	0,4	0,6	1,2	0,5	0,5	0,6	0,5	0,5	0,5
Book Value of Debt	247,0	246,0	487,0	580,0	622,0	532,0	773,9	949,0	855,0	930,0
MV of debt	240,1	237,6	464,4	553,6	609,7	523,3	752,0	926,4	834,6	907,8
Cash flow from operations	1711,0	1844,9	2266,4	2921,2	1747,3	2006,4	2525,3	2572,2	2446,9	4528,0
Plus: Interest expense × (1 − Tax ra	8,0	8,4	8,8	18,9	18,7	20,0	17,6	17,5	16,1	14,9
Less: Investment in fixed capital	-8,6	-72,1	188,3	113,7	34,5	6,4	71,1	77,1	71,1	148,7
Free cash flow to the firm	1710,4	1781,2	2463,5	3053,8	1800,5	2032,8	2614,0	2666,8	2534,1	4691,6
Free cash flow !	1805,9	1784,6	1914,8	3382,5	1724,1	1575,7	2457,7	2623,4	2525,2	5403,7
WACC	0,003	-0,824	-0,870	1,600	1,343	-0,678	-0,002	-0,092	-0,066	-0,119
MV of debt	240,126	237,633	464,381	553,595	609,727	523,314	752,000	926,388	834,637	907,771
Tax rate	0,270	0,270	0,270	0,260	0,260	0,260	0,200	0,200	0,200	0,200
Cost of debt	0,030	0,037	0,050	0,050	0,021	0,018	0,030	0,025	0,025	0,025
After tax cost of debt	0,022	0,027	0,037	0,037	0,016	0,013	0,024	0,020	0,020	0,020
Equity Value= FCFF-Debt	1465,499	9890,331	18555,193	621,045	158,894	5791,019	1866,383	2009,118	1878,692	4414,699

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	110,16	112,363	114,61	116,9026733	119,2407267	Tax Rate	0,25
Depreciation	78,744	80,3189	81,9253	83,56376275	85,23503801	Discount Rate	WACC
Accounts receivable	838,95	855,729	872,844	890,3004516	908,1064606	Growth Rate	0,02
Inventory	702,576	716,628	730,96	745,5792718	760,4908572	Cost of Debt	0,2
Accounts payable	829,77	846,365	863,293	880,5585622	898,1697334		
Cash flow from operations	4618,56	4710,93	4805,15	4901,25282	4999,277877		
Cash flow from investing activities	-72,93	-74,389	-75,876	-77,39389944	-78,94177743		
Cash flow from financing activities							
	89,352	89,352	91,139	91,13904	92,9618208		
Total cash flow	4634,982	4725,89	4820,41	4914,997961	5013,29792		
Cash paid for interest	18,972	19,3514	19,7385	20,13323818	20,53590294		
Plus: Interest expense × (1 − Tax rate)	14,229	14,5136	14,8039	15,09992863	20,53590294		
Less: Investment in fixed capital	77,2854	78,8311	80,4077	82,01588476	164,1768154		
Free Cash flow to firm	4710,0744	4804,28	4900,36	4998,368634	5183,990595		
WACC	-12 %	-12 %	-12 %	-12 %	-12 %		
PV of cash flow	5343,450721	6183,24	7155,01	8279,506427	8586,978391		
Sum of present values of FCF	35548,1842						
FCF (t+1)	8758,717959						
Terminal Value	-63224,68453						
PV terminal value	-118811,0618						
Enterprise value	-83262,87765						
Equity value	-84170,64838						

Appendix 2. DCF of Elisa

ELISA	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	177,8	161,4	220,3	177	177	150,5	243,5	206,3	239,6	316
Depreciation	213,2	209,1	197,4	227,6	216,4	216,7	220,4	223,8	229,7	236,2
Accounts receivable	10,6	4,8	7,3	12,4	19,4	22,5	73,7	74,8	83,7	93,8
Inventory	20,3	38,4	28,5	21,7	31,2	22,5	54,8	55	68,3	65,4
Accounts payable	279,9	287,5	303,2	255,5	263,3	280,6	255,5	307,7	349,8	309,3
Cash flow from operations	701,8	701,2	756,7	694,2	707,3	692,8	847,9	867,6	971,1	1020,7
Cash flow from investing activities										
PP&E	-148,5	5,1	23,8	0,6	0,9	1,9	1,1	3,8	4	1,6
Cash flow from financing activities										
Borrowing (repayment)	-102,4	-122,4	44,2	30	36,1	80,2	10,7	130,8	11,1	59,5
Total cash flow	450,9	583,9	824,7	724,8	744,3	774,9	859,7	1002,2	986,2	1081,8
Beginning cash	0	450,9	1034,8	1859,5	2584,3	3328,6	4103,5	4963,2	5965,4	6951,6
Ending cash	450,9	1034,8	1859,5	2584,3	3328,6	4103,5	4963,2	5965,4	6951,6	8033,4
Notes:										
Cash paid for interest	30,6	25,8	26,9	49,6	39,6	77,6	23,8	22	19,3	19,2
Cash paid for taxes	5,1	0,3	82,2	59,5	57,2	53,4	52	65,1	63,6	68,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,8912621	0,92054	1,28095	2,3619	0,8145	1,33464	0,6932	0,53659	0,47073	0,46829
Book Value of Debt	505	718	755	844,6	749	808,1	991	1168	1117,4	1148,7
MV of debt	491,18252	693,302	720,329	806,743	734,409	795,536	962,829	1140,05	1090,62	1121,15
Cash flow from operations	701,8	701,2	756,7	694,2	707,3	692,8	847,9	867,6	971,1	1020,7
Plus: Interest expense × (1 − Tax rate	22,338	18,834	19,637	36,704	29,304	57,424	19,04	17,6	15,44	15,36
Less: Investment in fixed capital (AKA CapEX)	366,8	227,8	174,2	227,9	217,4	215,9	223,1	224	227,3	234,6
Free cash flow to the firm	1090,938	947,834	950,537	958,804	954,004	966,124	1090,04	1109,2	1213,84	1270,66
Free cash flow !	564,5	654,4	815,7	688,6	677,2	699,8	792,1	829,7	1001	1360
WACC	0,4903966	1,22965	0,70132	1,63067	1,96595	0,86376	0,09799	0,09777	0,18874	0,17654
MV of debt	491,18252	693,302	720,329	806,743	734,409	795,536	962,829	1140,05	1090,62	1121,15
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	240,796	-268,199	-161,622	-442,271	-412,757	-277,162	29,930	-129,641	-69,498	-41,153

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	322,32	328,7664	335,3417	342,0486	348,8895	Tax Rate	0,25
Depreciation	240,924	245,7425	250,6573	255,6705	260,7839	Discount Rate	WACC
Accounts receivable	95,676	97,58952	99,54131	101,5321	103,5628	Growth Rate	0,02
Inventory	66,708	68,04216	69,403	70,79106	72,20688	Cost of Debt	0,2
Accounts payable	315,486	321,7957	328,2316	334,7963	341,4922		
Cash flow from operations	1041,114	1061,936	1083,175	1104,839	1126,935		
Cash flow from investing activities	1,632	1,66464	1,697933	1,731891	1,766529		
Cash flow from financing activities							
	60,69	60,69	61,9038	61,9038	63,14188		
Total cash flow	1103,436	1124,291	1146,777	1168,474	1191,844		
Cash paid for interest	19,584	19,9757	20,3752	20,7827	21,1984		
Plus: Interest expense × (1 − Tax rate	14,688	14,9818	15,2814	15,587	21,1984		
Less: Investment in fixed capital	240,957	245,776	250,691	255,705	259,017		
Unlevered Cash flow	1296,76	1322,69	1349,15	1376,13	1407,15		
WACC	18 %	18 %	18 %	18 %	18 %		
PV of cash flow	1102,18	955,536	828,402	718,183	734,372		
Sum of present values of FCF	4338,67						
FCF (t+1)	749,059						
Terminal Value	4785,14						
PV terminal value	2122,58						
Enterprise value	6461,25						
Equity value	5340,1						

Appendix 3. DCF of Fortum

FORTUM	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	1410	1120	1608	1596	1351	1354	4142	504	882	858
Depreciation	407	429	451	515	510	563	346	373	464	536
Accounts receivable	620	680	736	742	918	1149	773	985	1010	683
Inventory	256	329	285	444	447	387	231	233	216	233
Accounts payable	866	844	869	962	1000	1265	879	841	1112	1058
Cash flow from operations	3559	3402	3949	4259	4226	4718	6371	2936	3684	3368
Cash flow from investing activities										
PP&E	30	83	14	37	48	7	28	10	8	38
proceeds from sales of fixed assets										
Cash flow from financing activities										
Borrowing (repayment)	706	803	417	3479	2711	912	956	934	543	586
Total cash flow	4295	4288	4380	7775	6985	5637	7355	3880	4235	3992
Beginning cash	0	4295	8583	12963	20738	27723	33360	40715	44595	48830
Ending cash	4295	8583	12963	20738	27723	33360	40715	44595	48830	52822
Notes:										
Cash paid for interest	261	193	271	352	291	234	263	214	187	171
Cash paid for taxes	298	374	383	332	239	355	65	216	83	94
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	7,601942	6,8862102	12,904762	16,7619	5,9853085	4,02457002	7,6601942	5,2195122	4,56098	4,1707317
Book Value of Debt	5240	4502	4893	7500	6859	7382	6007	5107	4885	6093
MV of debt	5094,981	4348,2555	4672,9048	7159,619	6723,9089	7259,06143	5839,699	4987,6585	4770,41	5948,561
Cash flow from operations	3559	3402	3949	4259	4226	4718	6371	2936	3684	3368
Plus: Interest expense × (1 − Tax rate	190,53	140,89	197,83	260,48	215,34	173,16	210,4	171,2	149,6	136,8
Less: Investment in fixed capital	460	360	474	526	469	584	328	371	494	498
Free cash flow to the firm	4209,53	3902,89	4620,83	5045,48	4910,34	5475,16	6909,4	3478,2	4327,6	4002,8
Free cash flow !	3541	3346	3986	4037	3711	5303	6217	2625	4052	4914
WACC	-0,410845	0,6648206	1,7884935	2,151191	1,9074526	0,66818578	0,0913181	0,0030447	0,14745	0,0827671
MV of debt	5094,981	4348,2555	4672,9048	7159,619	6723,9089	7259,06143	5839,699	4987,6585	4770,41	5948,561
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	2050,044	-2003,925	-3015,799	-5558,485	-5035,028	-3976,957	491,544	-1520,017	-998,927	-2251,736

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	875,16	892,663	910,516	928,727	947,301	Tax Rate	0,25
Depreciation	546,72	557,654	568,807	580,184	591,787	Discount Rate	WACC
Accounts receivable	696,66	710,593	724,805	739,301	754,087	Growth Rate	0,02
Inventory	237,66	242,413	247,261	252,207	257,251	Cost of Debt	0,2
Accounts payable	1079,16	1100,74	1122,76	1145,21	1168,12		
Cash flow from operations	3435,36	3504,07	3574,15	3645,63	3718,54		
Cash flow from investing activities	38,76	39,5352	40,3259	41,1324	41,9551		
Cash flow from financing activities							
	597,72	597,72	609,674	609,674	621,868		
Total cash flow	4071,84	4141,32	4224,15	4296,44	4382,37		
Cash paid for interest	174,42	177,908	181,467	185,096	188,798		
Plus: Interest expense × (1 − Tax rate	130,815	133,431	136,1	138,822	188,798		
Less: Investment in fixed capital	547,495	558,445	569,614	581,006	549,832		
Unlevered Cash flow	4113,67	4195,94	4279,86	4365,46	4457,17		
WACC	8 %	8 %	8 %	8 %	8 %		
PV of cash flow	3799,22	3578,98	3371,51	3176,07	3242,79		
Sum of present values of FCF	17168,6						
FCF (t+1)	3307,65						
Terminal Value	52697,2						
PV terminal value	35408,9						
Enterprise value	52577,5						
Equity value	46628,9						

Appendix 4. DCF of Huhtamaki

HUHTAMÄKI	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	9,4	96,6	-22,8	-110,2	-12,1	114,7	150,1	36,8	78,4	158,1
Depreciation&amort	132,5	101,5	203,2	245,9	88,6	81,2	104,5	113,9	122	142,3
Accounts receivable	4,3	400,7	394,8	377,9	305,5	305,1	438,7	476,1	507,3	538,6
Inventory	311,3	341,8	348,5	296,7	236,1	265,2	385,7	401,9	444,8	497,7
Accounts payable	401,4	411,5	371,8	374,4	335,8	363,8	492,8	533,9	539,1	559,1
Cash flow from operations	858,9	1352,1	1295,5	1184,7	953,9	1130	1571,8	1562,6	1691,6	1895,8
Cash flow from investing activities										
PP&E	10,4	6,5	14,3	7,1	5,9	7,4	0,4	1,9	13,6	2,8
Proceeds from selling tangible assets										
Cash flow from financing activities										
Borrowing (repayment)	3427,5	3039,1	3429,4	3036,4	1148,5	1484	1104,1	2122	3027	2796,2
Total cash flow	4296,8	4397,7	4739,2	4228,2	2108,3	2621,4	2676,3	3686,5	4732,2	4694,8
Beginning cash	0	4296,8	8694,5	13433,7	17661,9	19770,2	22391,6	25067,9	28754,4	33486,6
Ending cash	4296,8	8694,5	13433,7	17661,9	19770,2	22391,6	25067,9	28754,4	33486,6	38181,4
Notes:										
Cash paid for interest	43,6	38	42,7	43,2	21	12,8	25,7	20,4	21,9	14,8
Cash paid for taxes	15,5	16,3	18,6	5	12,5	6,6	29,1	50,8	42,9	37,8
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	1,269902913	1,35583	2,03333	2,05714	0,4319295	0,22015	0,748544	0,49756	0,5341463	0,360976
Book Value of Debt	419	355,7	419	499	362	345	569	657	669,5	649,9
MV of debt	408,0660194	344,365	401,081	477,295	354,98629	339,286	553,1757	641,473	653,70488	634,4098
Cash flow from operations	858,9	1352,1	1295,5	1184,7	953,9	1130	1571,8	1562,6	1691,6	1895,8
Plus: Interest expense × (1 − Tax rate)	31,828	27,74	31,171	31,968	15,54	9,472	20,56	16,32	17,52	11,84
Less: Investment in fixed capital	128,6	109,3	196	244,7	90,1	74,2	106	125,6	111,2	139,5
Free cash flow to the firm	1019,328	1489,14	1522,67	1461,37	1059,54	1213,67	1698,36	1704,52	1820,32	2047,14
Free cash flow !	486,8	1396,6	1265,2	1236,3	953,9	994,9	1508	1557,4	1704	2498,6
WACC	1,292474157	0,7864	1,06997	1,56765	-1,426965	0,66263	0,050836	0,06974	0,0582349	0,043083
MV of debt	408,0660194	344,365	401,081	477,295	354,98629	339,286	553,1757	641,473	653,70488	634,4098
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	36,575	489,234	334,518	91,851	-2836,547	390,686	1063,023	951,918	1066,443	1328,176

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	161,262	164,487	167,777	171,133	174,555	Tax Rate	0,25
Depreciation	145,146	148,049	151,01	154,03	157,111	Discount Rate	WACC
Accounts receivable	549,372	560,359	571,567	582,998	594,658	Growth Rate	0,02
Inventory	507,654	517,807	528,163	538,726	549,501	Cost of Debt	0,2
Accounts payable	570,282	581,688	593,321	605,188	617,292		
Cash flow from operations	1933,716	1972,39	2011,84	2052,07	2093,12		
Cash flow from investing activities	2,856	2,91312	2,97138	3,03081	3,09143		
Cash flow from financing activities							
	2852,124	2852,12	2909,17	2909,17	2967,35		
Total cash flow	4788,696	4827,43	4923,98	4964,27	5063,56		
Cash paid for interest	15,096	15,3979	15,7059	16,02	16,3404		
Plus: Interest expense × (1 − Tax rate	11,322	11,5484	11,7794	12,015	16,3404		
Less: Investment in fixed capital	145,20312	148,107	151,069	154,091	154,019		
Unlevered Cash flow	2090,24112	2132,05	2174,69	2218,18	2263,48		
WACC	4 %	4 %	4 %	4 %	4 %		
PV of cash flow	2003,906342	1959,56	1916,2	1873,79	1912,05		
Sum of present values of FCF	9665,506146						
FCF (t+1)	1950,29455						
Terminal Value	84489,63672						
PV terminal value	68424,02323						
Enterprise value	78089,52938						
Equity value	77455,11962						

Appendix 5 DCF of Kesko

KESKO	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	189,2	379,4	307,4	240,6	134,2	215,7	117,4	113,8	268,8	178,9
Depreciation	136,6	141,5	118,7	118,1	116,9	116,3	1276	137,6	139,2	143,5
Accounts receivable	686,9	760,8	823,8	770,5	593,6	619,6	581,7	831,2	836	820,3
Inventory	785,9	788,8	922,3	871	665,5	756,9	735	978,9	938,6	913
Accounts payable	734,3	789,2	837,8	755,6	703,5	838,3	795,1	1069,2	1023,7	982,7
Cash flow from operations	2532,9	2859,7	3010	2755,8	2213,7	2546,8	3505,2	3130,7	3206,3	3038,4
Cash flow from investing activities										
PP&E	119,8	194	97,1	158,4	198,3	121,1	470,4	44	96,7	18,7
Cash flow from financing activities										
Borrowing (repayment)	11,3	14,6	14,5	5,6	0,2	0,4	2,8	3,6	5,4	4,3
Total cash flow	2664	3068,3	3121,6	2919,8	2412,2	2668,3	3978,4	3178,3	3308,4	3061,4
Beginning cash	0	2664	5732,3	8853,9	11773,7	14185,9	16854,2	20832,6	24010,9	27319,3
Ending cash	2664	5732,3	8853,9	11773,7	14185,9	16854,2	20832,6	24010,9	27319,3	30380,7
Notes:										
Cash paid for interest	31,1	35,6	31,1	30	37,5	19,5	17,6	17	15,5	14,1
Cash paid for taxes	59,5	103,6	92,9	99	44,5	132,3	38,9	84,1	46,6	50,5
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,90583	1,2702	1,48095238	1,42857	0,7713	0,33538	0,512621	0,41463	0,378049	0,343902
Book Value of Debt	754	609,8	625	490,5	456	476	439,1	514,7	533,9	411,2
MV of debt	732,945	589,313	596,719048	468,571	447,392	468,149	426,8233	502,561	521,2561	401,5146
Cash flow from operations	2532,9	2859,7	3010	2755,8	2213,7	2546,8	3505,2	3130,7	3206,3	3038,4
Plus: Interest expense × (1 − Tax rate)	22,703	25,988	22,703	22,2	27,75	14,43	14,08	13,6	12,4	11,28
Less: Investment in fixed capital	210,8	44,6	180	158	39,7	465,6	849,6	190,3	61,2	124,8
Free cash flow to the firm	2766,4	2930,29	3212,703	2936	2281,15	3026,83	4368,88	3334,6	3279,9	3174,48
Free cash flow !	2332,8	2978,5	3032,9	2739,4	2221,5	2256,7	3651,9	3078,4	3315,4	3947,1
WACC	0,91716	0,94791	-0,7232162	2,06033	2,23318	0,54475	0,129172	0,15689	0,328439	0,185271
MV of debt	732,945	589,313	596,719048	468,571	447,392	468,149	426,8233	502,561	521,2561	401,5146
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	710,026	915,012	11010,545	490,802	258,151	1491,281	3442,278	2379,825	1947,731	2276,759

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	182,478	186,128	189,85	193,647	197,52	Tax Rate	0,25
Depreciation	146,37	149,297	152,283	155,329	158,436	Discount Rate	WACC
Accounts receivable	836,706	853,44	870,509	887,919	905,677	Growth Rate	0,02
Inventory	931,26	949,885	968,883	988,261	1008,03	Cost of Debt	0,2
Accounts payable	1002,354	1022,4	1042,85	1063,71	1084,98		
Cash flow from operations	3099,168	3161,15	3224,37	3288,86	3354,64		
Cash flow from investing activities	19,074	19,4555	19,8446	20,2415	20,6463		
Cash flow from financing activities							
	4,386	4,386	4,47372	4,47372	4,56319		
Total cash flow	3122,628	3184,99	3248,69	3313,58	3379,85		
Cash paid for interest	14,382	14,6696	14,963	15,2623	15,5675		
Plus: Interest expense × (1 − Tax rate	10,7865	11,0022	11,2223	11,4467	15,5675		
Less: Investment in fixed capital	146,75148	149,687	152,68	155,734	137,789		
Unlevered Cash flow	3256,70598	3321,84	3388,28	3456,04	3508		
WACC	19 %	19 %	19 %	19 %	19 %		
PV of cash flow	2747,647113	2364,52	2034,82	1751,09	1777,41		
Sum of present values of FCF	10675,49578						
FCF (t+1)	1812,962684						
Terminal Value	10969,64699						
PV terminal value	4689,263814						
Enterprise value	15364,7596						
Equity value	14963,24496						

Appendix 6 DCF of Konecranes

KONECRANES	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	24,1	68,581	129,153	166,554	63,491	78,2	30,8	37,6	225	98,3
Depreciation	15,5	22,4	24,6	26,5	32,5	31,1	54	53,7	117	119,9
Accounts receivable	223	324,2	328	398,3	265,4	315,7	377,3	379,3	538,2	548
Inventory	156	226,5	251,2	333	248,2	269,8	365,2	281,8	545	635
Accounts payable	83,6	113,5	120,3	135,2	83,7	117,1	139,1	99,1	201,2	211,2
Cash flow from operations	502,2	755,181	853,253	1059,55	693,291	811,9	966,4	851,5	1626,4	1612,4
Cash flow from investing activities										
PP&E	0,6	1,15	32,2	0,99	0,94	1,58	2,6	1,5	3,7	2,2
Cash flow from financing activities										
Borrowing (repayment)	30	1792,4	1858	52,9	511	403	768	4,6	1050	14,5
Total cash flow	532,8	2548,731	2743,453	1113,44	1205,23	1216,48	1737	857,6	2680,1	1629,1
Beginning cash	0	532,8	3081,531	5824,98	6938,43	8143,659	9360,14	11097,1	11954,739	14634,84
Ending cash	532,8	3081,531	5824,984	6938,43	8143,66	9360,139	11097,1	11954,7	14634,839	16263,94
Notes:										
Cash paid for interest	10,6	11,4	10,7	8,33	4,5	5,7	15,6	19,3	43,4	38,4
Cash paid for taxes	9,9	22,06	40,7	70,5	59,6	31,2	26,3	29,6	38,2	82,5
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,30874	0,40675	0,509524	0,39667	0,09256	0,098034	0,45437	0,47073	1,0585366	0,936585
Book Value of Debt	178,383	173,268	77,595	114,438	65,476	83,086	284	323,7	758,7	776,4
MV of debt	173,496	167,4926	74,40952	109,385	64,2218	81,75504	276,183	316,276	741,25366	758,4
Cash flow from operations	502,2	755,181	853,253	1059,55	693,291	811,9	966,4	851,5	1626,4	1612,4
Plus: Interest expense × (1 − Tax ra	7,738	8,322	7,811	6,1642	3,33	4,218	12,48	15,44	34,72	30,72
Less: Investment in fixed capital	16,05	53,45	-6,61	26,45	33,14	32,12	52,9	55,9	115,5	117,7
Free cash flow to the firm	525,988	816,953	854,454	1092,17	729,761	848,238	1031,78	922,84	1776,62	1760,82
Free cash flow !	441,05	738,231	881,063	1159,2	630,551	822,68	922,1	851,5	1698,1	1738,8
WACC	0,75095	-0,77053	-1,752322	2,00844	2,15364	-0,31955	0,4708	0,03558	-0,108747	-0,18164
MV of debt	173,496	167,4926	74,40952	109,385	64,2218	81,75504	276,183	316,276	741,25366	758,4
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	126,905	3392,726	-1210,165	253,649	167,181	1164,834	425,329	574,860	1252,142	1393,243

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	100,266	102,271	104,317	106,403	108,531	Tax Rate	0,25
Depreciation	122,298	124,744	127,239	129,784	132,379	Discount Rate	WACC
Accounts receivable	558,96	570,139	581,542	593,173	605,036	Growth Rate	0,02
Inventory	647,7	660,654	673,867	687,344	701,091	Cost of Debt	0,2
Accounts payable	215,424	219,732	224,127	228,61	233,182		
Cash flow from operations	1644,648	1677,54	1711,09	1745,31	1780,22		
Cash flow from investing activities	2,244	2,28888	2,33466	2,38135	2,42898		
Cash flow from financing activities							
	14,79	14,79	15,0858	15,0858	15,3875		
Total cash flow	1661,682	1694,62	1728,51	1762,78	1798,04		
Cash paid for interest	39,168	39,9514	40,7504	41,5654	42,3967		
Plus: Interest expense × (1 − Tax rate	29,376	29,9635	30,5628	31,174	42,3967		
Less: Investment in fixed capital	122,34288	124,79	127,286	129,831	129,95		
Unlevered Cash flow	1796,36688	1832,29	1868,94	1906,32	1952,57		
WACC	-18 %	-18 %	-18 %	-18 %	-18 %		
PV of cash flow	2195,080135	2735,94	3410,06	4250,27	4353,39		
Sum of present values of FCF	16944,73198						
FCF (t+1)	4440,45482						
Terminal Value	-22021,75095						
PV terminal value	-59996,86364						
Enterprise value	-43052,13166						
Equity value	-43810,53166						

Appendix 7 DCF of Kone

KONE	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	124	234	180	418	466	535	1053	1022	975	845,2
Depreciation	59	61,3	70,2	64,8	64,2	65,5	100	106,5	114,3	118,9
Accounts receivable	524,3	622	706,3	789,4	837	917,7	1480,2	1573,7	1608,7	1988,3
Inventory	584,9	668,8	773,2	885,5	784,6	765,9	1326,7	1373,5	1244,6	624,1
Accounts payable	214,2	231,5	274,6	282,2	252,5	284,2	728,9	743,3	705,1	786,7
Cash flow from operations	1506,4	1817,6	2004,3	2439,9	2404,3	2568,3	4688,8	4819	4647,7	4363,2
Cash flow from investing activities										
Purchases of PP&E	37,1	44,1	71,4	62,4	48,4	113,6	66,5	82,2	34,6	27
Cash flow from financing activities										
Borrowing (repayment)	16,8	9,5	59,1	54,8	145,1	1,1	1,4	4,2	46,7	22,5
Total cash flow	1560,3	1871,2	2134,8	2557,1	2597,8	2683	4756,7	4905,4	4729	4412,7
Beginning cash	0	1560,3	3431,5	5566,3	8123,4	10721,2	13404,2	18160,9	23066,3	27795,3
Ending cash	1560,3	3431,5	5566,3	8123,4	10721,2	13404,2	18160,9	23066,3	27795,3	32208
Notes:										
Cash paid for interest	8,5	15,6	18,8	6,4	19,3	2,1	2,1	3	3,3	3,3
Cash paid for taxes	137,4	100,3	119,9	109,2	151,2	169,5	317,8	317,2	303	210,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,2475728	0,5566056	0,8952381	0,304762	0,3969638	0,0361179	0,06116505	0,07317073	0,0804878	0,0804878
Book Value of Debt	157	148	237	184	34	69	236	228	234	222,1
MV of debt	152,67476	143,27599	226,609524	175,5429	33,697649	67,849386	229,187379	222,512195	228,37317	216,76341
Cash flow from operations	1506,4	1817,6	2004,3	2439,9	2404,3	2568,3	4688,8	4819	4647,7	4363,2
Plus: Interest expense × (1 − Tax rate)	6,205	11,388	13,724	4,736	14,282	1,554	1,68	2,4	2,64	2,64
Less: Investment in fixed capital	66	88,6	61,2	50,8	129,4	18,4	115,7	58,9	106,7	91,9
Free cash flow to the firm	1578,605	1917,588	2079,224	2495,436	2547,982	2588,254	4806,18	4880,3	4757,04	4457,74
Free cash flow !	1468,3	1767,3	2034,9	2335,1	2208	2169	4612	4740,9	3573,6	6541,1
WACC	0,0032675	-0,322603	-0,5219342	2,244936	2,430836	0,3520053	-0,0394686	0,04110451	0,2015698	0,0160734
MV of debt	152,67476	143,27599	226,609524	175,5429	33,697649	67,849386	229,187379	222,512195	228,37317	216,76341
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	1420,789	2687,541	4122,633	593,482	708,973	1846,532	4774,480	4465,106	3730,648	4170,459

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	862,104	879,346	896,933	914,872	933,169	Tax Rate	0,25
Depreciation	121,278	123,704	126,178	128,701	131,275	Discount Rate	WACC
Accounts receivable	2028,066	2068,63	2110	2152,2	2195,24	Growth Rate	0,02
Inventory	636,582	649,314	662,3	675,546	689,057	Cost of Debt	0,2
Accounts payable	802,434	818,483	834,852	851,549	868,58		
Cash flow from operations	4450,464	4539,47	4630,26	4722,87	4817,33		
Cash flow from investing activities	27,54	28,0908	28,6526	29,2257	29,8102		
Cash flow from financing activities							
	22,95	22,95	23,409	23,409	23,8772		
Total cash flow	4500,954	4590,51	4682,32	4775,5	4871,01		
Cash paid for interest	3,366	3,43332	3,50199	3,57203	3,64347		
Plus: Interest expense × (1 − Tax rate)	2,5245	2,57499	2,62649	2,67902	3,64347		
Less: Investment in fixed capital	121,8288	124,265	126,751	129,286	101,465		
Unlevered Cash flow	4574,8173	4666,31	4759,64	4854,83	4922,43		
WACC	2 %	2 %	2 %	2 %	2 %		
PV of cash flow	4502,447691	4519,85	4537,31	4554,85	4618,27		
Sum of present values of FCF	22732,73073						
FCF (t+1)	4710,638156						
Terminal Value	-1199671,227						
PV terminal value	-1107737,477						
Enterprise value	-1085004,746						
Equity value	-1085221,509						

Appendix 8 DCF of Metso

METSO	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	237	410	384	390	151	258	53	130	102	229
Depreciation	102	105	148	138	143	178	69	61	59	58
Accounts receivable	918	1218	1274	1146	938	1242	632	605	631	585
Inventory	888	1112	1410	1606	1172	1305	715	709	750	950
Accounts payable	925	1238	1307	1189	1065	1377	469	470	547	431
Cash flow from operations	3070	4083	4523	4469	3469	4360	1938	1975	2089	2253
Cash flow from investing activities										
PP&E	39	277	14	10	8	7	17	21	5	5
Cash flow from financing activities										
Borrowing (repayment)	2	90	37	163	200	46	39	4	5	0
Total cash flow	3111	4450	4574	4642	3677	4413	1994	2000	2099	2258
Beginning cash	0	3111	7561	12135	16777	20454	24867	26861	28861	30960
Ending cash	3111	7561	12135	16777	20454	24867	26861	28861	30960	33218
Notes:										
Cash paid for interest	55	45	45	64	68	73	24	29	24	20
Cash paid for taxes	50	68	114	154	138	98	72	21	64	87
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	1,601942	1,605593	2,1428571	3,04762	1,39863	1,2555283	0,699029	0,707317	0,58537	0,487805
Book Value of Debt	753	830	722	1190	2775	2225	27	0	270	598
MV of debt	732,6699	801,9913	689,7619	1136,38	2719,32	2187,9877	26,91262	0,707317	264	583,9024
Cash flow from operations	3070	4083	4523	4469	3469	4360	1938	1975	2089	2253
Plus: Interest expense × (1 − Tax rate)	40,15	32,85	32,85	47,36	50,32	54,02	19,2	23,2	19,2	16
Less: Investment in fixed capital	340	-158	144	136	142	188	73	45	59	53
Free cash flow to the firm	3450,15	3957,85	4699,85	4652,36	3661,32	4602,02	2030,2	2043,2	2167,2	2322
Free cash flow !	2443	4519	4969	4369	2987	5278	1954	1929	2451	2324
WACC	-0,09757	-1,593446	-1,4759561	1,81666	1,01154	-1,065997	-0,02012	-0,142008	-0,09308	-0,11773
MV of debt	732,6699	801,9913	689,7619	1136,38	2719,32	2187,9877	26,91262	0,707317	264	583,9024
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	3090,497	-7471,263	-10564,308	515,351	-899,166	-71919,033	2044,983	2380,668	2125,620	2047,936

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	233,58	238,252	243,017	247,877	252,835	Tax Rate	0,25
Depreciation	59,16	60,3432	61,5501	62,7811	64,0367	Discount Rate	WACC
Accounts receivable	596,7	608,634	620,807	633,223	645,887	Growth Rate	0,02
Inventory	969	988,38	1008,15	1028,31	1048,88	Cost of Debt	0,2
Accounts payable	439,62	448,412	457,381	466,528	475,859		
Cash flow from operations	2298,06	2344,02	2390,9	2438,72	2487,49		
Cash flow from investing activities	5,1	5,202	5,30604	5,41216	5,5204		
Cash flow from financing activities							
	0	0	0	0	0		
Total cash flow	2303,16	2349,22	2396,21	2444,13	2493,01		
Cash paid for interest	20,4	20,808	21,2242	21,6486	22,0816		
Plus: Interest expense × (1 − Tax rate	15,3	15,606	15,9181	16,2365	22,0816		
Less: Investment in fixed capital	59,262	60,4472	61,6562	62,8893	58,5163		
Unlevered Cash flow	2372,622	2420,07	2468,48	2517,85	2568,09		
WACC	-12 %	-12 %	-12 %	-12 %	-12 %		
PV of cash flow	2689,214773	3109,01	3594,34	4155,44	4238,36		
Sum of present values of FCF	17786,3753						
FCF (t+1)	4323,13186						
Terminal Value	-31389,1735						
PV terminal value	-58717,09449						
Enterprise value	-40930,71918						
Equity value	-41514,62162						

Appendix 9 DCF of Neste

NESTE	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	670	636	580	101	225	231	560	943	914	779
Depreciation	153	153	195	223	234	259	358	366	371	614
Accounts receivable	837	808	955	786	757	866	870	1034	1097	1231
Inventory	601	697	968	637	1148	1079	1090	1516	1563	1482
Accounts payable	1093	1027	1211	916	980	1547	1307	1565	1679	1749
Cash flow from operations	3354	3321	3909	2663	3344	3982	4185	5424	5624	5855
Cash flow from investing activities										
PP&E	635	521	321	487	807	924	491	381	447	347
Cash flow from financing activities										
Borrowing (repayment)	215	776	441	1117	607	893	390	387	692	64
Total cash flow	4204	4618	4671	4267	4758	5799	5066	6192	6763	6266
Beginning cash	0	4204	8822	13493	17760	22518	28317	33383	39575	46338
Ending cash	4204	8822	13493	17760	22518	28317	33383	39575	46338	52604
Notes:										
Cash paid for interest	1	11	29	50	40	29	74	73	93	47
Cash paid for taxes	139	131	177	85	43	33	27	137	169	151
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,029126	0,3924783	1,380952	2,380952	0,822723	0,498771	2,1553398	1,780488	2,2682927	1,146341
Book Value of Debt	875	783	807	1059	2035	2181	1887	1471	1195	1140
MV of debt	849,5437	755,45516	769,9524	1010,952	1993,967	2143,988	1834,1942	1436,902	1168,122	1113,341
Cash flow from operations	3354	3321	3909	2663	3344	3982	4185	5424	5624	5855
Plus: Interest expense × (1 − Tax rate)	0,73	8,03	21,17	37	29,6	21,46	59,2	58,4	74,4	37,6
Less: Investment in fixed capital	39	-47	361	543	351	-174	248	432	271	267
Free cash flow to the firm	3393,73	3282,03	4291,17	3243	3724,6	3829,46	4492,2	5914,4	5969,4	6159,6
Free cash flow !	3659	3461	3876	2819	2482	4662	4299	5228	5439	7700
WACC	0,002714	-0,557513	0,326053	2,280395	1,485267	0,263814	0,0591802	0,141468	0,2829718	-0,05112
MV of debt	849,5437	755,45516	769,9524	1010,952	1993,967	2143,988	1834,1942	1436,902	1168,122	1113,341
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	2535,001	6661,785	2466,096	-22,352	-495,295	886,095	2407,010	3744,494	3484,669	5378,098

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	794,58	810,4716	826,681	843,2147	860,0789	Tax Rate	0,25
Depreciation	626,28	638,8056	651,5817	664,6133	677,9056	Discount Rate	WACC
Accounts receivable	1255,62	1280,732	1306,347	1332,474	1359,123	Growth Rate	0,02
Inventory	1511,64	1541,873	1572,71	1604,164	1636,248	Cost of Debt	0,2
Accounts payable	1783,98	1819,66	1856,053	1893,174	1931,037		
Cash flow from operations	5972,1	6091,542	6213,373	6337,64	6464,393		
Cash flow from investing activities	353,94	361,0188	368,2392	375,604	383,116		
Cash flow from financing activities							
	65,28	65,28	66,5856	66,5856	67,91731		
Total cash flow	6391,32	6517,841	6648,198	6779,83	6915,426		
Cash paid for interest	47,94	48,8988	49,87678	50,87431	51,8918		
Plus: Interest expense × (1 − Tax rate)	35,955	36,6741	37,40758	38,15573	51,8918		
Less: Investment in fixed capital	633,3588	646,026	658,9465	672,1254	294,7896		
Unlevered Cash flow	6641,4138	6774,242	6909,727	7047,921	6811,074		
WACC	-5 %	-5 %	-5 %	-5 %	-5 %		
PV of cash flow	6999,210311	7523,808	8087,725	8693,909	8401,748		
Sum of present values of FCF	39706,40023						
FCF (t+1)	8569,782763						
Terminal Value	-120498,2632						
PV terminal value	-156647,4403						
Enterprise value	-116941,0401						
Equity value	-118054,3815						

Appendix 10 DCF of Nokia

NOKIA	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	3616	4306	7205	3889	260	1343	2468	927	2458	335
Depreciation	712	712	1206	1617	1784	1771	286	1594	1591	1455
Accounts receivable	5346	5888	11200	9444	7981	7570	3913	6972	6880	4856
Inventory	1668	1554	2876	2533	1865	2523	1014	2506	2646	3168
Accounts payable	3494	3732	7074	5225	4950	6101	1910	3781	3996	4773
Cash flow from operations	14836	16192	29561	22708	16840	19308	9591	15780	17571	14587
Cash flow from investing activities										
Purchases of PP&E	167	29	72	54	100	21	0	505	668	760
Proceeds from sale of fixed assets+aq										
Cash flow from financing activities										
Borrowing (repayment)	0	7	16	34	209	6	24	2599	2044	31
Total cash flow	15003	16228	29649	22796	17149	19335	9615	18884	20283	15378
Beginning cash	0	15003	31231	60880	83676	100825	120160	129775	148659	168942
Ending cash	15003	31231	60880	83676	100825	120160	129775	148659	168942	184320
Notes:										
Cash paid for interest	26	18	59	155	256	235	99	309	409	159
Cash paid for taxes	1254	1163	1457	1780	915	905	290	503	555	364
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,75728155	0,64223722	2,8095238	7,380952	5,2654261	4,04176904	2,8834951	7,53658537	9,9756098	3,8780488
Book Value of Debt	398	316	1274	4452	5203	5279	2074	4027	3766	3822
MV of debt	387,165049	305,367406	1216,1429	4247,381	5101,2498	5192,24816	2016,4757	3936,31707	3684,122	3732,6585
Cash flow from operations	14836	16192	29561	22708	16840	19308	9591	15780	17571	14587
Plus: Interest expense × (1 − Tax rate)	18,98	13,14	43,07	114,7	189,44	173,9	79,2	247,2	327,2	127,2
Less: Investment in fixed capital	574	755	1188	1663	1705	1750	791	1757	1683	695
Free cash flow to the firm	15428,98	16960,14	30792,07	24485,7	18734,44	21231,9	10461,2	17784,2	19581,2	15409,2
Free cash flow !	14080	8817	32841	23732	16837	25668	5648	15634	19248	21808
WACC	-0,57164173	-0,0779193	-0,448324	2,476119	1,3486113	0,31803725	-0,074112	-0,0396994	-0,296924	-0,0151506
MV of debt	387,165049	305,367406	1216,1429	4247,381	5101,2498	5192,24816	2016,4757	3936,31707	3684,122	3732,6585
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	35631,703	18087,969	54599,347	2796,595	2875,566	10916,477	9282,087	14583,091	24166,647	11913,591

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	341,7	348,534	355,5047	362,6148	369,8671	Tax Rate	0,25
Depreciation	1484,1	1513,782	1544,058	1574,939	1606,438	Discount Rate	WACC
Accounts receivable	4953,12	5052,182	5153,226	5256,291	5361,416	Growth Rate	0,02
Inventory	3231,36	3295,987	3361,907	3429,145	3497,728	Cost of Debt	0,2
Accounts payable	4868,46	4965,829	5065,146	5166,449	5269,778		
Cash flow from operations	14878,74	15176,31	15479,84	15789,44	16105,23		
Cash flow from investing activities	775,2	790,704	806,5181	822,6484	839,1014		
Cash flow from financing activities							
	31,62	31,62	32,2524	32,2524	32,89745		
Total cash flow	15685,56	15998,64	16318,61	16644,34	16977,23		
Cash paid for interest	162,18	165,4236	168,7321	172,1067	175,5488		
Plus: Interest expense × (1 − Tax rate)	121,635	124,0677	126,5491	129,08	175,5488		
Less: Investment in fixed capital	1499,604	1529,596	1560,188	1591,392	767,3362		
Unlevered Cash flow	16499,98	16829,98	17166,58	17509,91	17048,11		
WACC	-2 %	-2 %	-2 %	-2 %	-2 %		
PV of cash flow	16753,81	17351,77	17971,08	18612,49	18121,62		
Sum of present values of FCF	88810,77						
FCF (t+1)	18484,05						
Terminal Value	-525853,6						
PV terminal value	-567565						
Enterprise value	-478754,2						
Equity value	-482486,9						

Appendix 11 DCF of Nokian Renkaat

NOKIA RENKAAT	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	82,2	107,3	168,9	139,9	58,3	169,7	240,7	251,8	221,4	295,2
Depreciation	35,6	40,8	47,1	56,2	62	69,4	100,4	100,5	98,4	93,4
Accounts receivable	224,9	252,3	289,4	378,1	319,6	328,5	441,1	452,6	489,6	481,8
Inventory	146,1	159,8	193,2	290,9	200	210,6	271,3	304,3	340,1	369,2
Accounts payable	132,1	136,1	132,2	176,7	98	165,2	242,4	219,4	231,5	430,5
Cash flow from operations	620,9	696,3	830,8	1041,8	737,9	943,4	1295,9	1328,6	1381	1670,1
Cash flow from investing activities										
PP&E	93,1	89,2	29,2	35,3	97,1	54,4	100	101,5	134,9	226,5
aq of property										
Cash flow from financing activities										
Borrowing (repayment)	42,6	42,9	45,2	26,1	117	29,2	25,1	33,8	67,1	123,5
Total cash flow	756,6	828,4	905,2	1103,2	952	1027	1421	1463,9	1583	2020,1
Beginning cash	0	756,6	1585	2490,2	3593,4	4545,4	5572,4	6993,4	8457,3	10040,3
Ending cash	756,6	1585	2490,2	3593,4	4545,4	5572,4	6993,4	8457,3	10040,3	12060,4
Notes:										
Cash paid for interest	4,3	16	23,5	99	44,9	42,9	49,8	27,8	36,5	12,4
Cash paid for taxes	56,7	44,3	14,7	87	4,2	3,3	40	69,4	128,9	63
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,125243	0,570878	1,1190476	4,714286	0,923506	0,7378378	1,4504854	0,6780488	0,8902439	0,302439
Book Value of Debt	165,3	165,9	265,4	432,3	326,2	217,6	219,6	225,8	135,2	132,3
MV of debt	160,6107	160,5516	253,88095	416,4286	320,4142	214,59533	214,65437	220,97073	132,79268	129,37561
Cash flow from operations	620,9	696,3	830,8	1041,8	737,9	943,4	1295,9	1328,6	1381	1670,1
Plus: Interest expense × (1 − Tax rate)	3,139	11,68	17,155	73,26	33,226	31,746	39,84	22,24	29,2	9,92
Less: Investment in fixed capital	31,7	-19,2	53,2	118	19,3	115	101,9	133,9	190	-133,1
Free cash flow to the firm	655,739	688,78	901,155	1233,06	790,426	1090,146	1437,64	1484,74	1600,2	1546,92
Free cash flow !	607,1	756,5	789,2	1026,3	715,1	768,7	1338,9	1281,9	1127,3	2439,7
WACC	-0,12779	-0,33627	-0,4738164	2,035438	1,807493	-0,315455	-0,069714	0,0090467	0,14812	0,1276962
MV of debt	160,6107	160,5516	253,88095	416,4286	320,4142	214,59533	214,65437	220,97073	132,79268	129,37561
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	591,200	877,194	1458,744	-10,207	-38,873	1377,916	1330,720	1250,458	1260,964	1242,377

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	301,104	307,1261	313,2686	319,534	325,9247	Tax Rate	0,25
Depreciation	95,268	97,17336	99,11683	101,0992	103,1211	Discount Rate	WACC
Accounts receivable	491,436	501,2647	511,29	521,5158	531,9461	Growth Rate	0,02
Inventory	376,584	384,1157	391,798	399,634	407,6266	Cost of Debt	0,2
Accounts payable	439,11	447,8922	456,85	465,987	475,3068		
Cash flow from operations	1703,502	1737,572	1772,323	1807,77	1843,925		
Cash flow from investing activities	231,03	235,6506	240,3636	245,1709	250,0743		
Cash flow from financing activities							
	125,97	125,97	128,4894	128,4894	131,0592		
Total cash flow	2060,502	2099,193	2141,176	2181,43	2225,059		
Cash paid for interest	12,648	12,90096	13,15898	13,42216	13,6906		
Plus: Interest expense × (1 − Tax rate)	9,486	9,67572	9,869234	10,06662	13,6906		
Less: Investment in fixed capital	99,8886	101,8864	103,9241	106,0026	-146,953		
Unlevered Cash flow	1812,8766	1849,134	1886,117	1923,839	1710,663		
WACC	13 %	13 %	13 %	13 %	13 %		
PV of cash flow	1607,593068	1454,066	1315,201	1189,598	1057,781		
Sum of present values of FCF	6624,240159						
FCF (t+1)	1078,937054						
Terminal Value	10018,33878						
PV terminal value	5493,322823						
Enterprise value	12117,56298						
Equity value	11988,18737						

Appendix 12 DCF of Outokumpu

OUTOKUMPU	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	363	963	641	-189	-336	-123	86	144	392	130
Depreciation	232	229	204	206	214	235	302	226	216	204
Accounts receivable	849	1328	985	726	522	793	686	687	659	640
Inventory	1186	1710	1630	1204	1027	1448	1251	1232	1380	1555
Accounts payable	771	841	635	404	450	561	1089	1459	1441	1471
Cash flow from operations	3401	5071	4095	2351	1877	2914	3414	3748	4088	4000
Cash flow from investing activities										
PP&E	194	174	160	313	212	159	120	116	144	151
Cash flow from financing activities										
Borrowing (repayment)	590	200	232	112	346	513	612		541	240
Total cash flow	4185	5445	4487	2776	2435	3586	4146	3864	4773	4391
Beginning cash	0	4185	9630	14117	16893	19328	22914	27060	30924	35697
Ending cash	4185	9630	14117	16893	19328	22914	27060	30924	35697	40088
Notes:										
Cash paid for interest	93	89	83	76	57	42	111	94	78	54
Cash paid for taxes	58	87	239	30	36	2	11	9	8	5
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	2,70874	3,17550627	3,952381	3,61905	1,17238	0,722359	3,2330097	2,292683	1,902439	1,3170732
Book Value of Debt	2151	1946	1482	1697	1655	2434	1796	1445	1203	1309
MV of debt	2091,06	1879,74253	1415,381	1619,81	1622,132	2392,86	1746,9223	1412,049	1175,561	1278,3902
Cash flow from operations	3401	5071	4095	2351	1877	2914	3414	3748	4088	4000
Plus: Interest expense × (1 − Tax rate)	67,89	64,97	60,59	56,24	42,18	31,08	88,8	75,2	62,4	43,2
Less: Investment in fixed capital	212	215	357	105	161	196	298	254	223	53
Free cash flow to the firm	3680,89	5350,97	4512,59	2512,24	2080,18	3141,08	3800,8	4077,2	4373,4	4096,2
Free cash flow !	3396	5554	4006	2433	1969	2335	3028	3914	4245	4707
WACC	0,50597	-1,04653181	-1,607835	1,86606	1,490613	-0,36344	-0,23319	-0,19637	-0,18092	0,0080296
MV of debt	2091,03	1879,74253	1415,381	1619,81	1622,132	2392,86	1746,9223	1412,049	1175,561	1278,3902
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	353,136	-116875,705	-8839,414	-743,260	-786,924	2541,581	3209,715	3661,418	4163,849	2785,181

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	132,6	135,252	137,957	140,7162	143,5305	Tax Rate	0,25
Depreciation	208,08	212,2416	216,4864	220,8162	225,2325	Discount Rate	WACC
Accounts receivable	652,8	665,856	679,1731	692,7566	706,6117	Growth Rate	0,02
Inventory	1586,1	1617,822	1650,178	1683,182	1716,846	Cost of Debt	0,2
Accounts payable	1500,42	1530,428	1561,037	1592,258	1624,103		
Cash flow from operations	4080	4161,6	4244,832	4329,729	4416,323		
Cash flow from investing activities	154,02	157,1004	160,2424	163,4473	166,7162		
Cash flow from financing activities							
	244,8	244,8	249,696	249,696	254,6899		
Total cash flow	4478,82	4563,5	4654,77	4742,872	4837,729		
Cash paid for interest	55,08	56,1816	57,30523	58,45134	59,62036		
Plus: Interest expense × (1 − Tax rate)	41,31	42,1362	42,97892	43,8385	59,62036		
Less: Investment in fixed capital	211,1604	215,3836	219,6913	224,0851	58,51628		
Unlevered Cash flow	4332,47	4419,12	4507,502	4597,652	4534,46		
WACC	1 %	1 %	1 %	1 %	1 %		
PV of cash flow	4297,96	4348,998	4400,643	4452,901	4391,698		
Sum of present values of FCF	21892,2						
FCF (t+1)	4479,532						
Terminal Value	-374217						
PV terminal value	-359548						
Enterprise value	-337656						
Equity value	-338934						

Appendix 13 DCF of Stora Enso

STORA ENSO	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	-126,3	589,2	-212,4	-679	-878,2	769,3	783	407	614	988
Depreciation	1427	1257,7	1881,3	1468,5	1152,9	282,7	763	398	515	479
Accounts receivable	2157	2156	2063	1583	1362,6	1621,8	1324	1273	1319	1487
Inventory	2150	2019	1992,6	1693,6	1281	1474	1373	1346	1321	1567
Accounts payable	1975	1992,5	1971,3	1602,1	1473	1697,1	1765	1774	1888	1960
Cash flow from operations	7582,7	8014,4	7695,8	5668,2	4391,3	5844,9	6008	5198	5657	6481
Cash flow from investing activities										
PP&E	14,5	30	83,5	52	60,5	28,6	27	220	45	9
proceeds from fixed assets										
Cash flow from financing activities										
Borrowing (repayment)	674,9	869,5	1145,4	4	359,9	318,5	1181	46	76	39
Total cash flow	8272,1	8913,9	8924,7	5724,2	4811,7	6192	7216	5464	5778	6529
Beginning cash	0	8272,1	17186	26110,7	31834,9	36646,6	42838,6	50054,6	55518,6	61296,6
Ending cash	8272,1	17186	26110,7	31834,9	36646,6	42838,6	50054,6	55518,6	61296,6	67825,6
Notes:										
Cash paid for interest	166,2	247,5	261,9	191,2	113,5	113	191	144	143	116
Cash paid for taxes	209	215,4	111,6	25,5	3	62	78	92	97	152
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	4,840777	8,830762	12,471429	9,104762	2,334476	1,9434889	5,563107	3,512195	3,4878049	2,8292683
Book Value of Debt	6083,9	4928,5	4350,1	4032,9	3923,3	3893,4	4196	3770	3012	3343
MV of debt	5911,54	4761,483	4155,4238	3849,962	3844,94	3828,3808	4079,35	3681,561	2942,0244	3264,2927
Cash flow from operations	7582,7	8014,4	7695,8	5668,2	4391,3	5844,9	6008	5198	5657	6481
Plus: Interest expense × (1 − Tax rate)	121,326	180,675	191,187	141,488	83,99	83,62	152,8	115,2	114,4	92,8
Less: Investment in fixed capital	1442,5	1311,2	1849,8	1477	1121	281,1	956	223	479	470
Free cash flow to the firm	9146,526	9506,275	9736,787	7286,688	5596,29	6209,62	7116,8	5536,2	6250,4	7043,8
Free cash flow !	7419,7	8048,7	8277,5	5596,6	4132,9	5975,4	5830	5188	5699	8370
WACC	-0,03922	0,040453	-0,1736821	1,608108	0,97363	-0,408063	-0,08749	-0,09427	-0,19722	-0,2303769
MV of debt	5911,54	4761,483	4155,4238	3849,962	3844,94	3828,3808	4079,35	3681,561	2942,0244	3264,2927
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	3608,353	4375,184	7627,918	-1056,102	-1009,408	6661,963	3719,766	2430,854	4843,921	5887,979

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	1007,76	1027,92	1048,47	1069,44	1090,83	Tax Rate	0,25
Depreciation	488,58	498,352	508,319	518,485	528,855	Discount Rate	WACC
Accounts receivable	1516,74	1547,07	1578,02	1609,58	1641,77	Growth Rate	0,02
Inventory	1598,34	1630,31	1662,91	1696,17	1730,09	Cost of Debt	0,2
Accounts payable	1999,2	2039,18	2079,97	2121,57	2164		
Cash flow from operations	6610,62	6742,83	6877,69	7015,24	7155,55		
Cash flow from investing activities	9,18	9,3636	9,55087	9,74189	9,93673		
Cash flow from financing activities							
	39,78	39,78	40,5756	40,5756	41,3871		
Total cash flow	6659,58	6791,98	6927,82	7065,56	7206,87		
Cash paid for interest	118,32	120,686	123,1	125,562	128,073		
Plus: Interest expense × (1 − Tax rate)	88,74	90,5148	92,3251	94,1716	128,073		
Less: Investment in fixed capital	488,764	498,539	508,51	518,68	518,918		
Unlevered Cash flow	7188,12	7331,89	7478,52	7628,09	7802,54		
WACC	-23 %	-23 %	-23 %	-23 %	-23 %		
PV of cash flow	9339,8	12378,3	16405,2	21742,2	22239,4		
Sum of present values of FCF	82104,9						
FCF (t+1)	22684,2						
Terminal Value	-90600						
PV terminal value	-335536						
Enterprise value	-253431						
Equity value	-256695						

Appendix 14 DCF of Tieto

TIETO	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	138	247	-31,2	60,5	54,96	26,81	90,5	107,2	107,8	123,2
Depreciation	61,8	59,4	117	66,1	55,1	49,5	56,6	53,9	54,7	57,9
Accounts receivable	484,6	503	560,2	498,5	441,3	465,2	353,9	390,3	420,7	382,9
Inventory										
Accounts payable	413,2	410,6	461,7	447,5	370,1	411,1	334,6	344,6	362,5	340,1
Cash flow from operations	1097,6	1220	1107,7	1072,6	921,46	952,61	835,6	896	945,7	904,1
Cash flow from investing activities										
PP&E	1,8	1,6	8	3	2,9	0,5	0,6	0,1	0,4	0,6
Cash flow from financing activities										
Borrowing (repayment)	6,8	9,3	12,7	606,6	302,5	248	230,2	629,7	0,3	1,6
Total cash flow	1106,2	1230,9	1128,4	1682,2	1226,86	1201,11	1066,4	1525,8	946,4	906,3
Beginning cash	0	1106,2	2337,1	3465,5	5147,7	6374,56	7575,67	8642,07	10167,9	11114,3
Ending cash	1106,2	2337,1	3465,5	5147,7	6374,56	7575,67	8642,07	10167,9	11114,3	12020,6
Notes:										
Cash paid for interest	3,3	9,1	8,1	12,6	10,6	11,8	3,8	4,2	3,5	3,9
Cash paid for taxes	18,9	24,8	9,9	14	14,4	18,1	20,4	37,6	16,9	21,4
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,0961165	0,32469	0,3857143	0,6	0,21802	0,20295	0,11068	0,10244	0,08537	0,09512
Book Value of Debt	251,3	230,6	247,4	216,7	198	156,3	178	172,4	237,1	304,1
MV of debt	244,0767	222,697	236,00476	206,981	194,146	153,815	172,926	168,298	231,402	296,778
Cash flow from operations	1097,6	1220	1107,7	1072,6	921,46	952,61	835,6	896	945,7	904,1
Plus: Interest expense × (1 − Tax rate)	2,409	6,643	5,913	9,324	7,844	8,732	3,04	3,36	2,8	3,12
Less: Investment in fixed capital	61,6	65,8	112	66	52,7	49,6	56,1	54,2	54,9	57,3
Free cash flow to the firm	1161,609	1292,44	1225,613	1147,92	982,004	1010,94	894,74	953,56	1003,4	964,52
Free cash flow !	1082	1105,3	1188,6	1207,3	858,96	1140,31	789,7	847,4	1005,7	1627,7
WACC	-0,187503	0,63291	-0,0529527	1,56904	1,74743	0,29815	0,08953	0,11163	0,07731	-0,0116
MV of debt	244,0767	222,697	236,00476	206,981	194,146	153,815	172,926	168,298	231,402	296,778
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	1185,602	568,800	1058,137	239,850	163,281	624,943	648,290	689,504	699,991	679,067

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	125,664	128,177	130,741	133,356	136,023	Tax Rate	0,25
Depreciation	59,058	60,2392	61,4439	62,6728	63,9263	Discount Rate	WACC
Accounts receivable	390,558	398,369	406,337	414,463	422,753	Growth Rate	0,02
Inventory	0	0	0	0	0	Cost of Debt	0,2
Accounts payable	346,902	353,84	360,917	368,135	375,498		
Cash flow from operations	922,182	940,626	959,438	978,627	998,199		
Cash flow from investing activities	0,612	0,62424	0,63672	0,64946	0,66245		
Cash flow from financing activities							
	1,632	1,632	1,66464	1,66464	1,69793		
Total cash flow	924,426	942,882	961,74	980,941	1000,56		
Cash paid for interest	3,978	4,05756	4,13871	4,22149	4,30592		
Plus: Interest expense × (1 − Tax rate)	2,9835	3,04317	3,10403	3,16611	4,30592		
Less: Investment in fixed capital	59,07024	60,2516	61,4567	62,6858	63,2638		
Unlevered Cash flow	984,23574	1003,92	1024	1044,48	1065,77		
WACC	-1 %	-1 %	-1 %	-1 %	-1 %		
PV of cash flow	995,7921731	1027,63	1060,49	1094,4	1116,71		
Sum of present values of FCF	5295,037594						
FCF (t+1)	1139,047002						
Terminal Value	-36039,78524						
PV terminal value	-38205,86882						
Enterprise value	-32910,83122						
Equity value	-33207,60927						

Appendix 15 DCF of UPM

UPM	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	261	367	292	-180	169	561	916	880	974	1496
Depreciation	1130	890	831	806	779	765	524	545	450	422
Accounts receivable	165	1567	1717	1686	1446	1661	1876	1726	1783	1833
Inventory	1256	1255	1342	1354	1112	1299	1367	1346	1311	1642
Accounts payable	1364	1399	1443	1258	1206	1417	1619	1594	1765	1881
Cash flow from operations	4176	5478	5625	4924	4712	5703	6302	6091	6283	7274
Cash flow from investing activities										
Purchases of PP&E	47	108	71	33	46	55	26	93	305	32
proceeds of tangible assets										
Cash flow from financing activities										
Borrowing (repayment)	262	398	66	153	6	23	519	540	964	331
Total cash flow	4485	5984	5762	5110	4764	5781	6847	6724	7552	7637
Beginning cash	0	4485	10469	16231	21341	26105	31886	38733	45457	53009
Ending cash	4485	10469	16231	21341	26105	31886	38733	45457	53009	60646
Notes:										
Cash paid for interest	156	187	191	202	163	92	22	40	32	15
Cash paid for taxes	93	159	164	76	31	77	140	145	216	252
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	4,54369	6,672131	9,0952381	9,619048	3,3525955	1,58231	0,640777	0,97561	0,78049	0,365854
Book Value of Debt	5302	4345	4315	5071	4464	3979	3066	2645	1241	856
MV of debt	5152,12	4196,643	4118,619	4839,143	4375,5367	3912,147	2977,34	2581,46	1211,51	835,4878
Cash flow from operations	4176	5478	5625	4924	4712	5703	6302	6091	6283	7274
Plus: Interest expense × (1 − Tax rate)	113,88	136,51	139,43	149,48	120,62	68,08	17,6	32	25,6	12
Less: Investment in fixed capital	1191	853	793	819	788	736	591	757	177	390
Free cash flow to the firm	5480,88	6467,51	6557,43	5892,48	5620,62	6507,08	6910,6	6880	6485,6	7676
Free cash flow !	2677	5408	5891	4961	4464	5383	6389	5616	6721	9378
WACC	0,10863	-0,205418	0,0037744	1,353623	0,9898965	-0,27768	-0,05856	-0,08433	-0,29957	-0,182554
MV of debt	5152,12	4196,643	4118,619	4839,143	4375,5367	3912,147	2977,34	2581,46	1211,51	835,4878
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	-208,299	3942,865	2414,154	-2335,564	-1550,958	5096,460	4363,117	4932,199	8047,956	8554,729

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	1525,92	1556,44	1587,57	1619,32	1651,7	Tax Rate	0,25
Depreciation	430,44	439,049	447,83	456,786	465,922	Discount Rate	WACC
Accounts receivable	1869,66	1907,05	1945,19	1984,1	2023,78	Growth Rate	0,02
Inventory	1674,84	1708,34	1742,5	1777,35	1812,9	Cost of Debt	0,2
Accounts payable	1918,62	1956,99	1996,13	2036,05	2076,78		
Cash flow from operations	7419,48	7567,87	7719,23	7873,61	8031,08		
Cash flow from investing activities	32,64	33,2928	33,9587	34,6378	35,3306		
Cash flow from financing activities							
	337,62	337,62	344,372	344,372	351,26		
Total cash flow	7789,74	7938,78	8097,56	8252,62	8417,67		
Cash paid for interest	15,3	15,606	15,9181	16,2365	16,5612		
Plus: Interest expense × (1 − Tax rate)	11,475	11,7045	11,9386	12,1774	16,5612		
Less: Investment in fixed capital	431,0928	439,715	448,509	457,479	430,592		
Unlevered Cash flow	7862,0478	8019,29	8179,67	8343,27	8478,24		
WACC	-18 %	-18 %	-18 %	-18 %	-18 %		
PV of cash flow	9617,813604	12001	14974,7	18685,2	18987,5		
Sum of present values of FCF	74266,27333						
FCF (t+1)	19367,2698						
Terminal Value	-95615,56397						
PV terminal value	-261958,1843						
Enterprise value	-187691,911						
Equity value	-188527,3988						

Appendix 16 DCF of Valmet

VALMET	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	237	410	384	390	151	258	78	82	127	152
Depreciation	102	105	148	138	143	178	92	87	81	76
Accounts receivable	918	1218	1274	1146	938	1242	575	646	662	555
Inventory	888	1112	1410	1606	1172	1305	508	471	442	419
Accounts payable	925	1238	1307	1189	1065	1377	767	754	817	286
Cash flow from operations	3070	4083	4523	4469	3469	4360	2020	2040	2129	1488
Cash flow from investing activities										
Purchases of PP&E	39	277	14	10	8	7	41	58	64	73
Cash flow from financing activities										
Borrowing (repayment)	2	90	37	163	200	46	0	62	90	18
Total cash flow	3111	4450	4574	4642	3677	4413	2061	2160	2283	1579
Beginning cash	0	3111	7561	12135	16777	20454	24867	26928	29088	31371
Ending cash	3111	7561	12135	16777	20454	24867	26928	29088	31371	32950
Notes:										
Cash paid for interest	55	45	45	64	68	73	7	14	12	5
Cash paid for taxes	50	68	114	154	138	98	25	40	58	48
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	1,6019417	1,605593	2,14285714	3,047619	1,39863	1,2555283	0,203883	0,341463	0,2926829	0,1219512
Book Value of Debt	753	830	722	1190	2775	2225	371	267	219	201
MV of debt	732,6699	801,9913	689,761905	1136,381	2719,32	2187,9877	360,3981	260,8293	213,95122	196,21951
Cash flow from operations	3070	4083	4523	4469	3469	4360	2020	2040	2129	1488
Plus: Interest expense × (1 − Tax rate)	40,15	32,85	32,85	47,36	50,32	54,02	5,6	11,2	9,6	4
Less: Investment in fixed capital	340	-158	144	136	142	212	109	93	90	3
Free cash flow to the firm	3450,15	3957,85	4699,85	4652,36	3661,32	4626,02	2134,6	2144,2	2228,6	1495
Free cash flow !	2443	4519	4969	4369	2987	4806	1908	1926	2735	1983
WACC	-0,097568	-1,59345	-1,4759561	0,4161652	0,10123	-0,143686	0,008222	-0,036756	-0,097794	0,0693145
MV of debt	732,6699	801,9913	689,761905	1136,381	2719,32	2187,9877	360,3981	260,8293	213,95122	196,21951
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	3090,497	-7471,263	-10564,308	2148,801	605,443	3214,259	1756,794	1965,190	2256,215	1201,872

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	155,04	158,141	161,304	164,53	167,82	Tax Rate	0,25
Depreciation	77,52	79,0704	80,6518	82,2648	83,9101	Discount Rate	WACC
Accounts receivable	566,1	577,422	588,97	600,75	612,765	Growth Rate	0,02
Inventory	427,38	435,928	444,646	453,539	462,61	Cost of Debt	0,2
Accounts payable	291,72	297,554	303,505	309,576	315,767		
Cash flow from operations	1517,76	1548,12	1579,08	1610,66	1642,87		
Cash flow from investing activities	74,46	75,9492	77,4682	79,0175	80,5979		
Cash flow from financing activities							
	18,36	18,36	18,7272	18,7272	19,1017		
Total cash flow	1610,58	1642,42	1675,27	1708,4	1742,57		
Cash paid for interest	5,1	5,202	5,30604	5,41216	5,5204		
Plus: Interest expense × (1 − Tax rate)	3,825	3,9015	3,97953	4,05912	5,5204		
Less: Investment in fixed capital	79,0092	80,5894	82,2012	83,8452	3,31224		
Unlevered Cash flow	1600,5942	1632,61	1665,26	1698,56	1651,7		
WACC	7 %	7 %	7 %	7 %	7 %		
PV of cash flow	1496,841346	1427,81	1361,96	1299,15	1263,31		
Sum of present values of FCF	6849,077744						
FCF (t+1)	1288,578117						
Terminal Value	26129,78614						
PV terminal value	18689,96616						
Enterprise value	25539,0439						
Equity value	25342,82439						

Appendix 17 DCF of Wärtsilä

WÄRTSILÄ	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	168	353	265	389	396	397	451	357	383	386
Depreciation	71,6	72	78	99	165	116	124	138	134	130
Accounts receivable	670,2	772	874	891	1028	860	1394	1220	1307	1222
Inventory	638,6	838	1081	1656	1577	1244	1200	1042	1051	1165
Accounts payable	238,1	271	348	444	299	366	510	502	539	596
Cash flow from operations	1786,5	2306	2646	3479	3465	2983	3679	3259	3414	3499
Cash flow from investing activities										
Purchases of PP&E	28	93,9	147	147	157	83	37	55	64	99
Cash flow from financing activities										
Borrowing (repayment)	44,7	6,9	5	0	3	78	112	91	101	84
Total cash flow	1859,2	2406,8	2798	3626	3625	3144	3828	3405	3579	3682
Beginning cash	0	1859,2	4266	7064	10690	14315	17459	21287	24692	28271
Ending cash	1859,2	4266	7064	10690	14315	17459	21287	24692	28271	31953
Notes:										
Cash paid for interest	47,6	24	42	45	72	72	29	13	6	14
Cash paid for taxes	50,5	56	127	104	158	173	108	127	119	104
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	1,3864078	0,8563163	2	2,14286	1,4809	1,238329	0,8446602	0,3170732	0,14634146	0,341463
Book Value of Debt	403	271	283	664	664	628	724	628	619	822
MV of debt	392,64854	262,18708	271,52381	634,524	651,824	618,4373	703,75728	613	604,04878	802,2927
Cash flow from operations	1786,5	2306	2646	3479	3465	2983	3679	3259	3414	3499
Plus: Interest expense × (1 − Tax rate)	34,748	17,52	30,66	33,3	53,28	53,28	23,2	10,4	4,8	11,2
Less: Investment in fixed capital	137,5	125,1	78	109	91	70	142	147	169	31
Free cash flow to the firm	1958,748	2448,62	2754,66	3621,3	3609,28	3106,28	3844,2	3416,4	3587,8	3541,2
Free cash flow !	1785,3	2316,9	3108	3398	3307	2307	3685	3135	3521	4251
WACC	-0,942393	-1,114431	-1,2818256	1,73703	1,35846	-0,44361	0,0315748	-0,026863	-0,0494103	-0,13436
MV of debt	392,64854	262,18708	271,52381	634,524	651,824	618,4373	703,75728	613	604,04878	802,2927
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	33609,115	-21660,401	-10045,867	688,554	878,528	4964,447	3022,778	2897,707	3170,240	3288,552

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	393,72	401,594	409,626	417,819	426,175	Tax Rate	0,25
Depreciation	132,6	135,252	137,957	140,716	143,531	Discount Rate	WACC
Accounts receivable	1246,44	1271,37	1296,8	1322,73	1349,19	Growth Rate	0,02
Inventory	1188,3	1212,07	1236,31	1261,03	1286,25	Cost of Debt	0,2
Accounts payable	607,92	620,078	632,48	645,13	658,032		
Cash flow from operations	3568,98	3640,36	3713,17	3787,43	3863,18		
Cash flow from investing activities	100,98	103	105,06	107,161	109,304		
Cash flow from financing activities							
	85,68	85,68	87,3936	87,3936	89,1415		
Total cash flow	3755,64	3829,04	3905,62	3981,98	4061,62		
Cash paid for interest	14,28	14,5656	14,8569	15,1541	15,4571		
Plus: Interest expense × (1 − Tax rate)	10,71	10,9242	11,1427	11,3655	15,4571		
Less: Investment in fixed capital	134,6196	137,312	140,058	142,859	34,2265		
Unlevered Cash flow	3714,3096	3788,6	3864,37	3941,66	3912,86		
WACC	-13 %	-13 %	-13 %	-13 %	-13 %		
PV of cash flow	4290,822945	5055,96	5957,53	7019,86	6968,58		
Sum of present values of FCF	29292,75071						
FCF (t+1)	7107,95579						
Terminal Value	-46048,02565						
PV terminal value	-94737,84068						
Enterprise value	-65445,08997						
Equity value	-66247,38265						

Appendix 18 DCF of YIT

YIT	2005	2006	2007	2008	2009	2010	2015	2016	2017	2018
Net profit	156	175	228	134	68	140	47	-7,1	56,6	39,2
Depreciation	23,9	24,1	27,2	31,8	33,6	35,9	12,1	16,5	14,2	53,3
Accounts receivable	545	688	727	778	640	889	187,6	235,4	213,5	495,5
Inventory	685	1006	1265	1509	1477	1484	1528	1746	1592	1880
Accounts payable	685	779	920	1126	1118	1200	700,3	395,2	392,7	575,1
Cash flow from operations	2094,9	2672,1	3167,2	3578,8	3336,6	3748,9	2475	2386	2269	3043,1
Cash flow from investing activities										
Purchases of PP&E	23	33	28,6	33,5	20,7	19,8	6,6	13,9	12,2	10,4
Cash flow from financing activities										
Borrowing (repayment)	36,4	37,3	74,2	97,4	110,6	50,4	203,9	131,4	112,9	195,6
Total cash flow	2154,3	2742,4	3270	3709,7	3467,9	3819,1	2685,5	2531,3	2394,1	3249,1
Beginning cash	0	2154,3	4896,7	8166,7	11876,4	15344,3	19163,4	21848,9	24380,2	26774,3
Ending cash	2154,3	4896,7	8166,7	11876,4	15344,3	19163,4	21848,9	24380,2	26774,3	30023,4
Notes:										
Cash paid for interest	20,7	24,8	27,3	45,4	35,3	27,5	25,9	33	32,3	49,6
Cash paid for taxes	37	54,1	66,1	65,3	38,6	50,4	10,9	9,1	9,4	23,1
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
	0,602913	0,8848602	1,3	2,161905	0,726053	0,472973	0,7543689	0,804878	0,787805	1,2097561
Book Value of Debt	334	531	574	846	701	788	651	699	590	891,7
MV of debt	324,8748	512,93886	547,9667	807,8762	687,3078	774,92015	632,7932	682,7561	576,3976	871,16098
Cash flow from operations	2094,9	2672,1	3167,2	3578,8	3336,6	3748,9	2475	2386	2269	3043,1
Plus: Interest expense × (1 − Tax rate)	15,111	18,104	19,929	33,596	26,122	20,35	20,72	26,4	25,84	39,68
Less: Investment in fixed capital	33,9	19,7	32,1	19	32,7	22,7	19,4	14,8	12,4	42,9
Free cash flow to the firm	2143,911	2709,904	3219,229	3631,396	3395,422	3791,95	2515,12	2427,2	2307,24	3125,68
Free cash flow !	2168,9	2755,5	3149,3	3705,6	3013,5	5007,2	2943	2258,1	2094,4	2244,1
WACC	-0,1838	-0,394667	-0,939331	1,442993	1,117931	-0,478846	-0,049719	-0,054885	0,02911	0,0778211
MV of debt	324,8748	512,93886	547,9667	807,8762	687,3078	774,92015	632,7932	682,7561	576,3976	871,16098
Tax rate	0,27	0,27	0,27	0,26	0,26	0,26	0,2	0,2	0,2	0,2
Cost of debt	0,03	0,037	0,05	0,05	0,021	0,0175	0,03	0,025	0,025	0,025
After tax cost of debt	0,0219	0,02701	0,0365	0,037	0,01554	0,01295	0,024	0,02	0,02	0,02
Equity Value= FCFF-Debt	2301,830	3963,775	52513,934	678,577	915,871	6501,148	2013,919	1885,398	1665,578	2028,838

Forecast	2019	2020	2021	2022	2023	Assumptions	
net earnings/ net income	39,984	40,7837	41,5994	42,4313	43,28	Tax Rate	0,25
Depreciation	54,366	55,4533	56,5624	57,6936	58,8475	Discount Rate	WACC
Accounts receivable	505,41	515,518	525,829	536,345	547,072	Growth Rate	0,02
Inventory	1917,6	1955,95	1995,07	2034,97	2075,67	Cost of Debt	0,2
Accounts payable	586,602	598,334	610,301	622,507	634,957		
Cash flow from operations	3103,96	3166,04	3229,36	3293,95	3359,83		
Cash flow from investing activities	10,608	10,8202	11,0366	11,2573	11,4824		
Cash flow from financing activities							
	199,512	199,512	203,502	203,502	207,572		
Total cash flow	3314,08	3376,37	3443,9	3508,71	3578,88		
Cash paid for interest	50,592	51,6038	52,6359	53,6886	54,7624		
Plus: Interest expense × (1 − Tax rate)	37,944	38,7029	39,4769	40,2665	54,7624		
Less: Investment in fixed capital	54,5782	55,6697	56,7831	57,9188	47,3651		
Unlevered Cash flow	3196,48	3260,41	3325,62	3392,13	3461,96		
WACC	8 %	8 %	8 %	8 %	8 %		
PV of cash flow	2965,69	2806,59	2656,03	2513,54	2565,28		
Sum of present values of FCF	13507,1						
FCF (t+1)	2616,59						
Terminal Value	45253,1						
PV terminal value	31111,1						
Enterprise value	44618,2						
Equity value	43747,1						