

**An analysis of the association between board
composition and firm valuation in Finland**

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Abstract <p>The purpose of this study was to analyze the association between firms' valuation and board composition. However, existing research explored the phenomenon of different boards' structure and its impact on company performance in non- Finnish settings. This has created a need for a study that examines the association between firms' valuation and board composition. The main objective of the investigation was to analyze the relationship between board size and firm valuation.</p> <p>In order to reach the objectives, the previous literature was reviewed and the conceptual framework identified whether the board size had either a positive or negative influence on their respective firms' performance. The firms' valuation was considered on the basis of their stock prices which were determined with discounted cash flow method. The sample companies used in this study currently trading in Nasdaq Stock Exchange.</p> <p>The study applied quantitative research methods. Financial data was collected for a period of 5 years, 2014-2018. The key source of information was the companies' financial statements and the Nasdaq OMX Helsinki web page. The analysis of the data included the Discounted Cash Flow model to estimate the fair value of a stock.</p> <p>According to the findings, the majority of 20 listed firms were undervalued by the stock market, and study showed the average size of a firm's board was 20 members. The limitations of the study were that the findings were based on the perspective of the small sample set and also ignored other dimensions such as gender diversification, reputational capital, and education.</p>		
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Abbreviations

CAPM	Capital Asset Pricing Model
CCF	Capital Cash Flow
DCF	Discounted Cash Flow
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, and depreciation amortization
EBIAT	Earnings before interest after taxes
ECF	Equity Cash Flow
EVA	Economic Value Added
FCF	Free Cash Flow
GDP	Gross Domestic Product
IPO	Initial Public Offering
IP	Intellectual Property
NASDAQ	National Association of Securities Dealers Automated Quotations
WACC	Weighted average cost of capital
WACCBT	Weighted average cost of capital before tax
R_f	Risk-free rate
R_m	Market rate of return
β	Beta
$R_m - R_f$	Market risk premium

1. Introduction

A firm's Board size holds significant value in the world of corporate sector. This study focused on the association of Finnish companies' board size and valuation. This chapter briefly introduces the background, motivation, and relevance of this study and the author discussed the research question and thesis structure.

1.1. Background

The board of members is made up of individuals who are elected according to the legal requirements to protect and preserve the interests of shareholders. The main function of the board is to control managerial behavior and ensure that senior management acts in the best interest of the shareholders. (Lahlou 2018.) In order to determine the firm performance, mostly it is required for investors to analyze the board composition. According to the available literature, there are two opposing views are held regarding the impact of board size on firm performance. Some authors propose that a larger board is a source of knowledge and expertise and help to enhance the firm's performance (Dalton et al. 1999). However, many other authors argue that a larger board hardly makes any contribution in a firm's performance. According to Jensen (1993), a larger board is less likely to work effectively and face the communication gap and coordination problems. According to the same author, it becomes more difficult for a CEO to handle the larger board and to organize meetings and achieve a consensus.

The consideration of firm board composition and valuation method is very important for investors/analysts while valuing a firm. Every publicly listed company's stock trading at a certain price and there are many key factors impact the stock price. A firm's performance mostly measures by its market share in the respective industry (Santoz and Brito 2012, 99). Therefore, it is important for an investor to check if the current market price of a stock truly reflects the current value of a company and how the firm's board size impacts the firm's performance. Usually, stock markets make corrections and for investors it is important to determine these market corrections.

In order to understand the market corrections, investors' need to adopt a reliable valuation method that help them to estimate the fair value of a firm's stock.

1.2. Research Motivation, Aim and Objective

Having recently studied published articles on valuation and board composition the author of the research realized the importance of this study in the Finnish context. Additionally, it could be beneficial for the author's future career path to receiving both theoretical and practical knowledge of valuation and its measurement methods, since the author has personal interest in stock investment.

The main purpose of this study was to analyze the association between boards' size and firm valuation. In order to achieve the study objective, the author examined the previous literature to answer the research question.

The study was conducted in order to make the contribution in the existing literature by assessing the effects of board size on the firms' performance and the research aimed to determine the valuation of sample companies with DCF method. The study was focused to analyze the association between firm valuation and board size. Through this study, the author hoped to find the solution for the research question.

1.3. Research Approach and Question

The quantitative approach was used to conduct the research since the data used in this study was numerical and the primary source of research data was companies' annual financial statements. Microsoft Excel was used to make the calculations of the available data and determine the valuation of different stocks with the DCF model to answer the following question:

- What is the association between the board size and the firm valuation derived through discounted cash flow method?

The author used the secondary source to collect the data from the aforementioned websites NASDAQ, FIN Treasury, Investing, Trading economics, Yahoo! Finance, World Bank and the relevant companies' online website for exploring the financials

of the particular company. In addition, every source had its limitations and to eliminate these limitations, the author used a combination of the above sources and addressed these challenges. For instance, while the research needed 5-year data from 2014 to 2018, NASDAQ provided the five-year data but with limited information, Yahoo! Finance had only four year updated data, and Investing.com provided the last four year data with ratio analysis. Finally, the company's websites were used to check the financial reports and board members information.

1.4. Structure of the thesis

The author divided the thesis into six chapters. It begins with an Introduction chapter that briefly describes the phenomenon of board size and its impact on firm performance. In addition, the research question is formulated in chapter one. The second and third chapter is a combination of theoretical and empirical literature review and it consists of a presentation of the basic concepts about valuation, different valuation methods with special emphasis on the DCF valuation model. The chapters also discuss briefly about different boards size and composition. The fourth chapter describes the methodology part that consists of data collection, analysis of data, research approach and context. This chapter also provides information on the data collection sources, valuation process and other details that impact on stock valuation. The fifth chapter contains a summary of this study in order to have an overall overview and synopsise the main idea of the study. In the final chapter, the author discusses key findings, practical limitations, implications, and recommendations.

2. Literature Review

This chapter highlights and reviews the existing studies that investigate various aspects of valuation methods and board size. This section examines literature focused on the board's size, board's independence and valuation methods to analyze the association between the firms' board composition and valuation.

2.1. The valuation Process

Every asset has its value and it can be valued but the valuation process of every asset is not the same. A firm valuation process requires different kinds of historical data, company information, and assumptions. Therefore, it is mandatory for an analyst to adopt different formats and techniques to estimate the fair value of a firm. (Damodaran 2002, 1-3.) In order to estimate the firm value, it is mandatory for investors to choose the valuation method to conduct the valuation process. However, it is necessary to consider the other aspects of an asset that impact the valuation. It is not possible to determine the firm's fair value only on the basis of historical data. An investor with a preconception always tries to estimate the value of a stock with more fairness. Valuation is more than a number and an investor evaluates several other factors (Board size, Capital structure, Goodwill, Synergy, IP, Life stage of company).

2.1.1. Information, Noise and Valuation

Every valuation method is a combination of a set of information and a valuation model. However, the main problem is that there is plenty of information available on different sources. This large unnecessary information less likely helps analysts/investors in valuation process and most likely distract them from using the relevant information. It is mandatory for analysts/investors to know the importance of the information in order to use the valuation method in a better way. (Damodaran 2015.) For instance, the financial reports (Annual report, 10K, 10Q) of a company cover a great deal of information and most of the data is not required to be used in the valuation process. Therefore, it is important for an analyst to remain focused while looking for company information.

2.1.2. Price vs Value Enhancement

It is important to understand the difference between price enhancement and value enhancement of a firm. Therefore, it is mandatory for investors to identify that if a company's policies and strategies fail to make an impact on current cash flow, growth or discount rate then it is less likely to contribute in firm valuation (Damodaran 2014).

Value –Neutral actions that do not make any impact on firm value are as follows:

- Stock splits and stock dividends
- Accounting decisions, i.e. inventory related decisions, and pooling instead of purchase
- Decisions on new securities that might impact on the perceptions but not on firm valuation

Value – Enhancement Actions

- Reinvestment in projects
- Appreciation in operating margins
- Acquisitions
- Building competitive advantage, i.e. brand name, cost advantage, patents, and legal protection

2.1.3. Bias and sources of Bias

The bias plays a big role in the valuation process. Bias is an important factor that allows analysts/investors to assume the valuation of a company even before choosing the valuation model. Usually, investors collect information and check the stock prices before investing in the company's stock because investors make an investment in a company for profit reasons. Any prior information about the company, most likely, sets a value of its stock in investors minds at an early stage of the valuation process. (Damodaran 2016, 2-5). For instance, a company's current

operating margin most likely set a perception in investors mind. The main sources of biases are the analysts/investors' perceptions about the stock, in-group favoritism, experts views, management discussions in their annual reports (Damodaran 2016, 2-5).

2.1.4. Bias Mitigation from Valuation

Bias cannot be regulated or legislated out of existence. Investors/Analysts are humans and bring their biases to the table. However, they can reduce the impact of bias on valuation with the below approaches. (Damodaran 2016).

- Self-awareness
- Valuation needs to remain separate from the structure of reward and punishment
- Avoid to reveal the beforehand intentions
- Bias revealing

There are some certain truths about business valuation (Damodaran 2006-2012)

- Valuation is biased
- There can be no precise result in a valuation
- The valuation model complexity is an inverse relationship with the quality of the results.

2.1.5. Valuation –Mixture of Narrative and Numbers

It is easy to remember a story rather than numbers but in the financial world, fantasy can create a problem for the investors and misguide them. Numbers allow investors to remain disciplined but without a story, valuation is all about excel sheet and formulas. In order to assume a firm's future cashflows and growth, It is important for an investor to combine the numbers and stories. (Damodaran 2017).

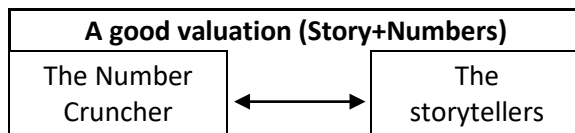


Figure 1. Valuation process (Adapted from Damodaran 2017)

According to (Damodaran 2017) an investor/analyst needs to apply five steps (as in Figure 2 below) to defend the story and each set of numbers needs to be backed with the story. Most of the qualitative stories need to be connected to the value inputs. It is most important for the storyteller to remain open for feedback and listen to others and remain ready to modify the story.

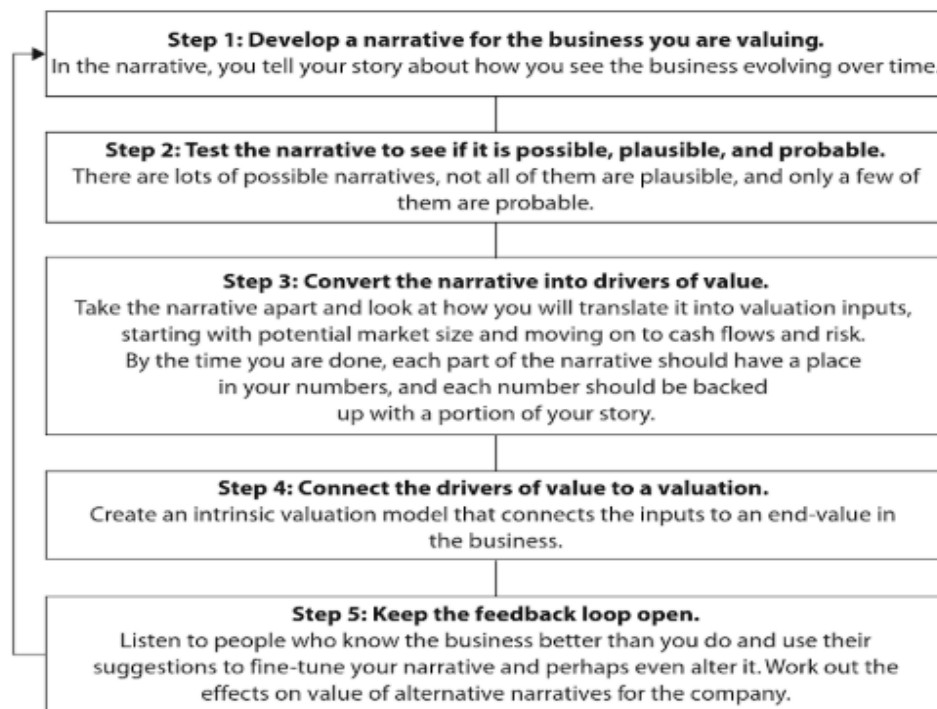


Figure 2. (The story- to- number process; Adapted from Damodaran 2017)

2.2. Valuation Methods and Choices

There are several models for the valuation of an asset/firm, but the main problem is to choose the most reliable method in order to assume the fair valuation of an asset/firm. There are four well-known methods (figure 3) used by investors/analysts for valuation (Damodaran 2002).

An analyst can use any of the below-mentioned approaches to assume the value of a firm/asset. In order to estimate the fair valuation, it is necessary for investors to choose the most appropriate method. However, the importance of other factors such as time horizon, the reason for doing valuation, analyst/investor’s beliefs about the market most likely play an important part in valuation (Damodaran 2002).

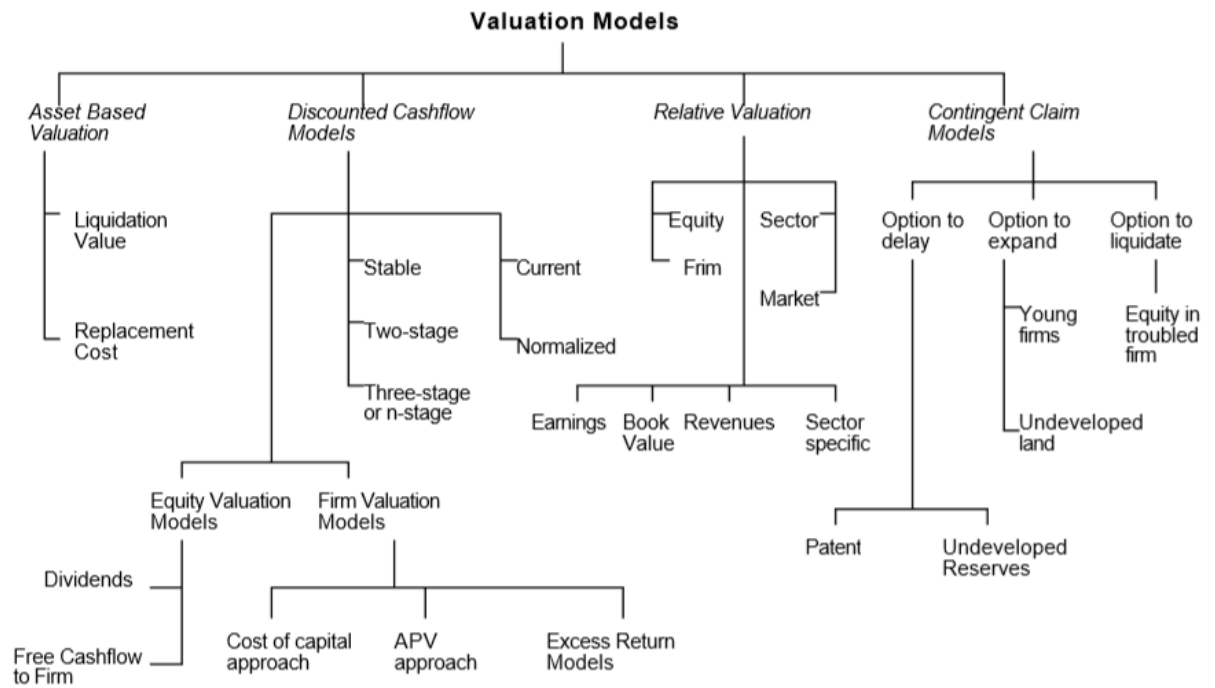


Figure 3. Valuation Models (Adapted from Damodaran 2002)

There are many methods available in order to conduct a valuation, which as classified in six different ways. (See Table 1).

Table 1. The main valuation methods (Adapted from Fernandez 2007)

MAIN VALUATION METHODS					
Balance Sheet	Income Statement	Mixed(Goodwill)	Cash Flow Discounting	Value Creation	Options
Book Value	Multiples	Classic	Equity Cash Flow	EVA	Black and Scholes
Adjusted book value	Per	Union of	Free Cash Flow	Economic Profit	Investment option
Liquidation Value	Sales	European Accounting Experts	Capital Cash Flow	Cash Value added	Expand the Project
Substantial Value	P/EBITDA	Abbreviated Income	Debt Tax Shield	CFROI	Delay the investment
	Other Multiples	Others			Alternative uses

Apart from the methods above, below are commonly used methods.

- Relative Valuation Model
- The Comparable Valuation Model
- Dividend Discount Valuation Model

2.2.1. Balance Sheet-Based Methods

To determine the firm valuation investors most likely use the balance sheet based methods. These methods only consider the company's assets mentioned on the balance sheet and this valuation approach most likely ignores the important factors such as the industry's current situation, contracts, management problems, human resources, etc. (Fernandez, P. 2002, 24).

Some of these methods as follow:

- Book Value
- Adjusted Book Value
- Liquidation Value
- Substantial Value

2.2.2. Income Statement –Based Method

Income statement based methods are different from the balance sheet-based methods. These methods seek to determine a firm's value through the earning size of a firm, sales or other relative indicators. (Fernandez, P. 2002, 27.) An income statement allows the investors/analysts to estimate the profitability of a firm in absolute terms (Damodaran 2012, 72). The income statement of firm measures both the operating and equity income of the firm in the form of the EBIT and net income (Damodaran 2006, 84). In relative valuation, the valuation of an asset is compared to the values assessed by the market for similar comparable assets (Damodaran 2010, 5). For example, if a buyer is determining the price of a real estate in a particular area, then the buyer would look at what similar real estate in the nearby area is sold for. The first step is to find similar firms for the target group. (Damodaran 2010.)

2.2.3. Discounted Cash Flow Valuation Process (DCF)

Discounted cash flow method is the foundation on which all other approaches built. It is important to understand this approach to use the other valuation approaches appropriately such as relative valuation and option pricing model. This valuation approach is technically correct to value a firm. (David 2012.)

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

Where

CF= cash flow

i= discount rate

n=time periods from one to infinity

Below is the generic valuation model of DCF (Damodaran 2011)

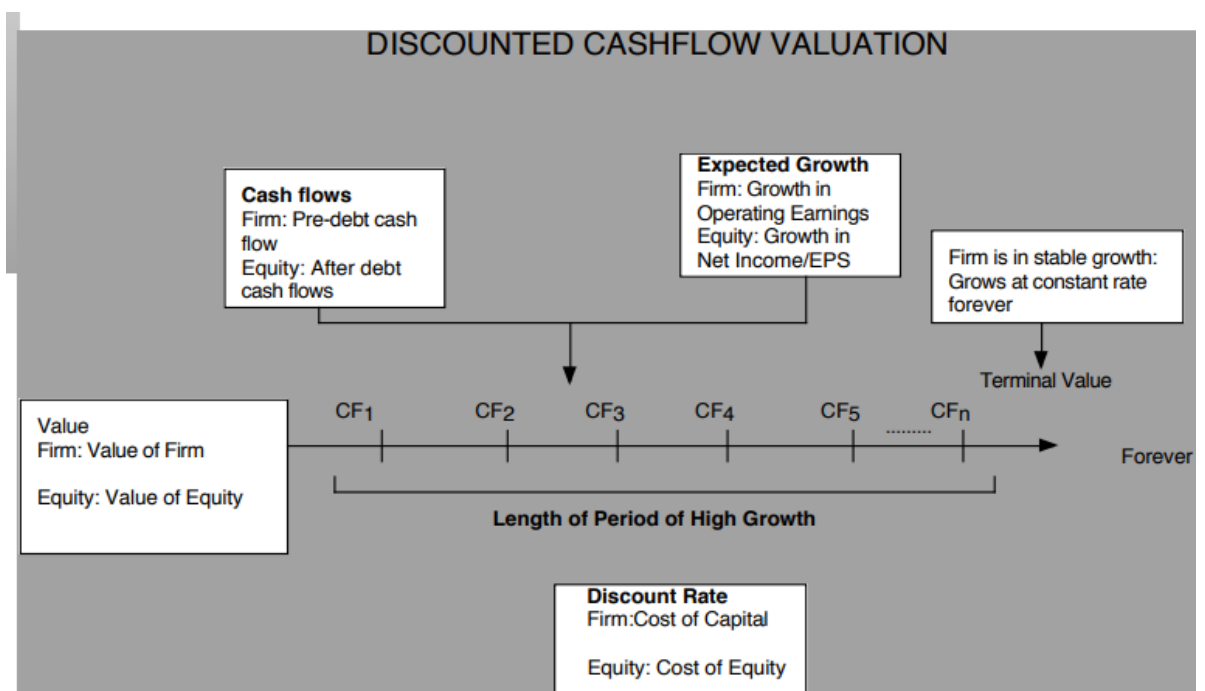


Figure 4. Generic valuation model of DCF (Adapted from Damodaran 2011)

2.2.4. Advantage and Disadvantages of the DCF Method

The DCF valuation method allows investors/analysts to understand the business and business-related activities of the firm. It also helps analysts/investors to take a close look of the company's cash flows, risk, and earnings. According to (Damodaran 2006-2012), appropriate use of DCF model can produce beneficial results for analysts.

Besides, there is number of disadvantages of this model. DCF valuation model requires a lot of information and historical data to estimate the discount rate, growth, and cashflows. Another big disadvantage of this model is that the analyst can manipulate the input which reflects the bias of the analyst. (Damodaran 2012.)

2.2.5. Relative Valuation Model

This valuation model allows an investor/analyst to compare an asset with similar or comparable assets to estimate the relative value of an asset which derived from comparable assets, a common variables such as revenue, book value, earnings, and cash flows. (Damodarn 2012.) One of the illustrations of the relative valuation model is to value a firm and it uses an industry-average price earning ratio. It assumes that the other firms in the sector are comparable to the firm being valued and that the market, on average, prices these firms correctly (Damodarn 2012). Some additional value drivers that could be applied by an analyst in the relative valuation model i.e. PS (Price to Sales) and PB (Price to Book).

Analysts often choose the most common approach to estimate the PE ratio for a firm and there are some limitations of this approach.

Limitations of this approach:

- Bias makes this approach weak.
- Same group of firms often have very different business mix and risk growth profiles.
- It is difficult to predict the PE growth of growing firms.

2.2.6. Dividend Discount Models (DDM)

One of the simplest models for equity valuation is the dividend discount model. The value of a stock is the present value of the expected dividend on it. A formula that analysts/investors use to value the equity of a firm by computing the present value of all expected future dividends (Fernandez 2002). The DDM valuation model remains very useful for specific companies and the model is outmoded as per analysts and not suitable for every company to estimate the value. While investing in the stock market, an investor always expects the returns in two types of cashflows.

- Dividends during stock holding period
- Expected price at the end of holding period

An analyst/investor use several version of the dividend discount model (DDM) to assume future growth by assuming different dividend discount model.

2.2.7. The Gordon Growth Model

The Gordon Growth model use by analysts/investors mostly for 'steady state' firm valuation which produce growing dividends with a sustained rate forever. This model relate the value of a stock to returns on an investment in terms of its expected dividends in the following period time. (Damaodaran 2012).

The Model

$$\text{Value of Stock} = \frac{\text{DPS}_1}{k_e - g}$$

Where,

DPS1 = Expected Dividends (next period – one year)

ke= Required rate of return (equity investors)

g = Growth rate (dividends forever)

The model has a difficult assumption to meet that the growth rate in dividends has to be constant over time which seems unrealistic in case of the cyclical firm.

The model is simple to make the valuation of stock but there are some limitations of this model and it remains sensitive to assume the growth rate of the firm because it can produce the absurd results. For example, a stock with an expected dividend \$2.30 per share for the next period with a cost of equity of 17% and expected growth rate 4% forever. The value of a stock is:

Value=	\$ 2.3	=\$ 17.69
	(0.17) – (0.4)	

Figure 5. DDM Valuation

2.3. Key Components and inputs for Valuation

Every valuation method requires the inputs to assume the fair value of a stock. For DCF method an analyst required four important inputs expected growth rate, expected cash flow, Terminal value, and WACC. (Damodaran 2010.)

a). Expected Growth

The investor may use a different way to estimate the expected growth of the firm. Historical per share earnings growth is a good step to initiate. To estimate, future growth is to look at other analysts' predictions. Investors can check the investment strategies of the firm in new projects to predict the future rate of return. (Damodaran 2006-2012.) There are some disadvantages to using these methods, to estimate the expected growth. While considering the historical growth it is important to consider the appropriate base year to estimate fair growth expectation for the future year and it is important for the analysts/investors to deal with negative historical growth i.e. startup companies mostly have negative earnings in the early stage. It is important to check the bias while using the firm's management and other analyst growth estimation.

b) Cash Flows

It is one of the important components to predict the company's value. According to Damodaran, to make the forecast of cash flows it is essential for analysts to examine the historical data and check the growth rate to predict the future while considering the following aspects.

- The time period of Growth
- Terminal value calculation
- Cash flow in that particular period

While making the forecast of cash flows which require plenty of assumptions and predictions about the company and how the company will run the business in the future. Undoubtedly, it is impossible to make any future predictions. There are some important factors that help an analyst to make predictions about the future of the company.

- Historical data
- Other analysts assumptions
- Company's management plans

2.3.1. Capital Asset Pricing Model(CAPM)

The CAPM is a model that formally links the notion of risk and return; it uses the beta, the risk-free rate, and the market return to help investors define the required rate of return on investment. The Capital asset pricing model (CAPM) originally developed by William F.Sharpe and John Lintner about five decades ago. CAPM predicts that a share's expected return depends on three following things: Risk-free rate, the expected return on the overall market and the share's beta. (Gitman 2011, 147.) The CAPM model does not have any rational or orderly way to make assumptions and it makes unrealistic conclusions and predictions (Fernandez 2017). It is an attracted model because of its simple logic and intuitively pleasing predictions about measuring risk and return relationships. The model's empirical problems may reflect true failings (Fama & French 2003).

2.3.2. Risk

Risk is a part of the investment, and understanding of what it is and how it is measured is essential to develop an investment philosophy. In finance, risk definition is both different and broader. Risk as an investor sees it, refers to the likelihood that an investor will make a return on an investment that is different from the return an investor to make it can be profit or loss. Risk is a mix of danger and opportunity. Risk is always remaining subject to investment. For instance, an investor buying any default-free bond for a fixed time period with a sure return of 6 percent expected growth will receive the actual return 6 percent after the specific period. But an investor who bought stock in a company and expected to have 20 percent on the same stock but the actual return on this investment will not certainly be the same as investors expect. It might even be lower or higher. (Damodaran 2012.)

2.3.3. Risk Free Rate and Risk Premium

An asset is risk free for an investor if the investor already knows the certain expected return on it– the actual return is always equal to the expected return of an investor i.e. government securities (Damodarn 2012, C7). In order to make an investment risk free, investors most likely to consider the following two conditions (Damodaran 2009).

- a) No risk of default can be associated with its cash flow.
- b) The investment that has no reinvestment risk.

According to (Fernandez and his team 2018), the average risk-free rate for Finland in the financial world was 1.7 percent.

RF	Number of Answers	Average	St. Dev.	Median	MAX	min	St.Dev. / Average
USA	1348	2.8%	0.8%	2.8%	7.0%	-0.3%	30.0%
Spain	675	2.1%	1.1%	1.8%	6.2%	-0.1%	52.3%
Germany	528	1.4%	1.0%	1.2%	5.2%	-0.7%	67.6%
Argentina	73	9.3%	4.9%	10.4%	25.9%	2.0%	52.8%
Australia	74	3.1%	0.5%	3.0%	5.0%	2.4%	14.7%
Austria	56	2.0%	1.1%	1.8%	6.2%	0.7%	54.1%
Belgium	53	1.6%	0.4%	1.7%	2.4%	0.8%	26.6%
Bolivia	6	3.0%	1.1%	3.0%	4.2%	1.8%	37.0%
Brazil	100	7.3%	2.3%	7.2%	10.7%	2.0%	31.9%
Bulgaria	8	2.8%	1.2%	2.9%	5.0%	1.3%	44.9%
Canada	77	2.9%	0.5%	2.9%	4.2%	1.8%	17.7%
Chile	72	4.1%	0.7%	4.3%	5.0%	1.8%	15.9%
China	95	3.8%	0.4%	3.8%	4.7%	2.3%	11.7%
Colombia	72	6.7%	1.4%	6.7%	10.2%	3.9%	20.6%
Czech Republic	63	2.6%	0.6%	2.8%	3.3%	0.8%	21.4%
Denmark	53	1.6%	0.5%	1.7%	2.7%	0.5%	30.4%
Ecuador	7	3.6%	1.4%	3.8%	6.0%	2.1%	38.8%
Egypt	9	10.0%	3.5%	10.0%	14.2%	5.8%	34.7%
Estonia	7	2.1%	0.9%	1.8%	4.0%	1.3%	43.5%
Finland	53	1.7%	0.6%	1.8%	2.7%	0.6%	33.4%
France	83	1.6%	0.7%	1.6%	3.2%	0.3%	41.7%
Greece	42	4.8%	1.6%	5.0%	6.4%	0.4%	33.2%
Hong Kong	21	2.2%	0.6%	2.0%	3.7%	1.7%	25.9%
Hungary	42	3.6%	0.9%	3.8%	4.9%	1.3%	25.7%
India	64	6.8%	0.7%	6.7%	8.2%	4.8%	9.6%
Indonesia	39	6.8%	0.9%	7.2%	7.8%	4.0%	13.7%

Figure 6. Risk free rate (Adapted from Fernandez 2018)

The market risk premium illustrates the return of the market portfolio after excluding the risk-free rate. According to (Berk et al. 2011), most of the researcher usually make the assumption of MRP (Market Risk Premium) within a range of 3 to 5 percent according to last 5 decades historical data. For this thesis, the author assumed the market risk premium 5.9%.

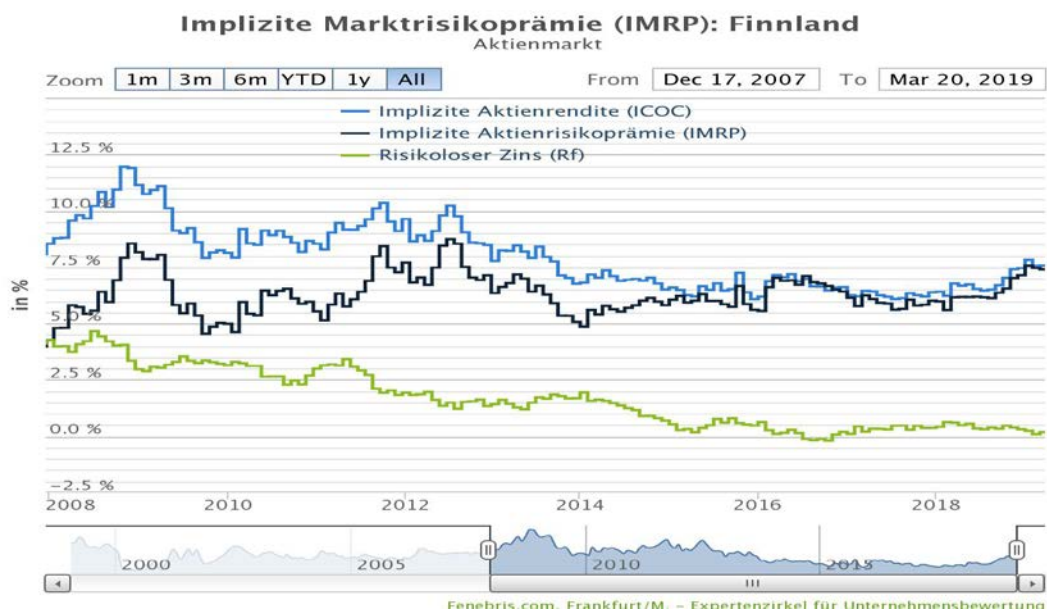


Figure 7. Market risk premium (Source: <http://www.xn--marktrisikoprämie-7nb.de/fi.html>)

2.3.4. Nature of Business and Beta

According to the CAPM model, there is a direct linear relationship between the risk of an asset relative to the market and the return that can be expected from the assets. The Product sensitivity of business sets the value of a firm's beta. It is often observed that companies in the business of discretionary products have higher betas than the firms involve in less discretionary products. (Damodaran 2014.)

Cyclical companies that produce the luxury product have higher beta than non-cyclical/ defensive firms that produce the essential products like utilities that a person needs to have even in the bad economic situations have lower beta. A product that is discretionary in one market close to being a non-discretionary in other markets. For example, Internet service seems non-discretionary in developed nations like Europe. However, in countries like Africa people still cannot afford these services and it seems discretionary products for them. (Damodaran 2014.)

3. Corporate Governance

According to economists, the standard definition of corporate governance is "defense of stakeholders interests" (Tirole 2001). Corporate governance is an essential part of finance research and an integral part of the valuation, stakeholders of a company impact directly or indirectly the company's decision making and the company's stock value. Corporate boards of directors perform critical roles and consider an essential governance mechanism (Lipton and Lorsch 1992; Jensen 1993). The essence of corporate governance is to ensure that the assets of the company are in the hand of responsible persons and they use the assets efficiently and effectively in the interest of the company (Mamun 2011). According to (Calder 2008), the modern corporation has a legal personality and it exists within a legal framework.

3.1. Corporate Governance in Finland

The structure of Finnish listed companies' ownership is not similar. Some companies' ownership structure is decentralized, while in other companies shareholders have significant holdings. In Finnish listed companies dominant shareholders play an active ownership role through board representation. (Lekvall 2014.) The board makes the decisions as a collective and the main responsibilities of the board to manage the company's operational activities accurately and make the supervision of financial matters. According to the Finnish corporate governance code, company's operational activities and development stage set the composition of the board. According to the code, a major portion of the directors need to be independent in the company. (Lekvall 2014.) An independent director means the person does not have any employment relations with the company's operational as well as financial activities.

3.2. Board Size

The size of firm boards' has received significant attention from academic researchers over the past decades. From a theoretical standpoint, two different observations are held regarding the impact of board size on firm performance. According to the previous literature, some authors argue that firms' performance can be improved by larger boards. To improve the firm performance, larger boards may provide the expertise and better decision making (Lahlou 2018).

However, there are many authors suggest that larger boards are less likely to create any positive contribution to firm performance. Larger boards most likely create problems, which usually overshadow the potential benefits of having a larger board (Lahlou 2018). According to (Yermack, 1996), studied a negative relationship between firm value and board size. According to (Garg, 2007), smaller boards are more efficient than the larger boards. The same author suggested six as the ideal board size for a firm.

Most of the existing studies on the board of directors are based on agency theory which is concerned with the monitoring role of directors. According to the perspective of agency theorists, the main purpose of the board of directors is to solve the agency problem. According to (Kalsie, Shrivastva 2016), board size

positively affects firm performance. Larger boards meant companies had more knowledge base and resources in comparison to smaller boards. Recourse theory suggested that the large size of the board brought diversity in the board with wide variety of expertise. However, the stewardship theory had opposing views and suggested that a smaller board is more effective and supports the negative association between board size and firm performance. (Kalsie and Shrivastva 2016.) The role of the board directors is to monitor the company's operational activities and make strategic decisions according to the company's requirement to sustain the firm's business. There is no doubt that board size is one of the key factors while determining the valuation of the company. Large boards have their advantages because of the supply of better advice to the company management (Pfeffer, 1972; Zahra and Pearce, 1989; Lynall et al., 2003). According to (Lipton and Lorsch 1992; Jensen 1993), larger boards are counterproductive because large board makes the decision-making process weaker.

3.3. Board Independence

The corporate board plays significant role in monitoring and management key decision making. From a theoretical standpoint, two different observations are held regarding the impact of independent board members on firm performance. According to the previous literature, some authors argue that firms' performance can be improved with optimal board independence. To eliminate the bad practices and to protect the shareholders' interest most likely every country has a certain code for boards' composition. (Lahlou 2018.) For instance, NASDAQ listed companies' needs to have a certain percentage of independent directors in the board composition (Lahlou 2018). According to (Fema and Jensen 1983), outside directors affect the firm's performance positively than inside directors. Outside directors challenge the CEO and better able to perform their responsibilities (Weisbach 1988).

However, there are many researchers failed to find any positive relationship between firm performance and board independence. According to (Ferris and Yan 2007), there is no association between fund performance and board independence. According to (Bhagat and Black 2002), their study unable to find any positive

association between firm performance and board independence in a large sample investigation and found firms with more independent directors were less likely to outperform other firms.

3.4. Board Composition

Board composition in terms of the ratio of independent to inside directors and the number of directors influence the effectiveness of the board. Board of directors needs immense knowledge about the firm's operating environment to add value and perform their duties and to contribute towards the company's objectives efficiently and effectively.

In Finland, an organization's board can have either one or two-tier structure and generally the composition of the listed company's board have non-executive directors. According to the code, managing director and chairman of the company play a different role in the board and listed companies normally have 5 to 10 directors. (Calkoen 2011.)

According to the previous studies, there is difference between inside and outside directors' incentives. Non-executive directors often play the same role in many boards and paid less than executive directors (Mura 2007). In order to protect the shareholders' interest and to improve board effectiveness, policymakers throughout the world have introduced a range of code to improve the governance practices (Lahlou 2018).

In Finland, according to the corporate governance code, executive and non-executive directors have the same importance and both are liable for the outcome of a decision and the supply of right information on the right time to non-executive director is mandatory. According to the previous literature, there are three main stages of every company such as emerging, maturing, and decline and exit. In order to sustain and grow, every stage demands a different kind of strategies and decision making ability from the board. According to (Lynall 2003 et.al), firms' financial and non-financial requirements changed according to the life stage and to meet the demands, a firm needs an appropriate board. In mature firms most likely have larger

board composition with the different levels of diversity and expertise in business and non-business activities (Balogh 2016).

Based on the previous literature review, this study conjectures that board size and firm performance are interdependent.

H₁ There is a positive relationship between larger board size and firm performance.

4. Methodology

This chapter presents a step-by-step account of how the data was collected and explained the research methodology applied in the investigation in order to achieve the objective of the study. The first section of this chapter explained the difference between the research method and research methodology. The other sections showed the research strategy, data collection and analysis methods applied in the study. Whereas, the final section of this chapter presents the reliability and validity of this study.

4.1. Research Approach

The characteristics of research (Krishnaswami, et al. 2010) is a systematic and critical investigation into a phenomenon and adopt a scientific method, objective, and logical, based upon observable experience or empirical evidence and remain focused on the development of theories and principles. The objective of a researcher to build up the knowledge wealth through his/her research findings. There are two main domains of research qualitative and quantitative methods. Whereas, research methodology is a combination of science and philosophy behind every research. (Adams, Khan and Raeside 2014, 5).

The qualitative approach is based on subjective assessment of behavior, attitude and this approach seeks for in-depth solution of the given research problems and it includes an array of interpretive techniques (Cooper and Schindler 2013).

The quantitative research approach outcome is presented through numerical terms or monetary (Krishnaswami, O et al. 2010). For example, if an analyst/investor wants to make the valuation of stock then it is essential for the investor/analyst to check

the previous year financials because the future profit of the company is directly correlated with the profit of the previous years.

The author used the quantitative method in this thesis to find the solutions to research questions. The material used in this thesis was accounting information; companies' financials to estimate the companies' valuations. Therefore, the material used for the research is correct and unchanged.

Table 2. Comparison of Qualitative and Quantitative methods

S.No.	Issue	Qualitative methods	Quantitative methods
1	Overall aim	Explanation and understanding	Generalization and conformation
2	Sample size	Small	Large
3	Data amount	Large size data (raw)	Relatively small data (numerical)
4	Connection with respondents	One-to-one relationship (close)	Almost no direct relationship
5	Data collection techniques	Interview, costly and time consuming	Large scale survey, less costly and less time consuming
6	Flexibility and Standardization	Flexible	Relatively less flexible than qualitative analysis
7	Point of view	Participants	Researcher

Note: Above list of issues in not exhaustive and the order does not represent any priority.

In quantitative method researchers generally impose a framework of their own, but in qualitative method, researchers see things from the eyes of participants. Additionally, there is a mixed method – the mixture of qualitative and quantitative methods.

4.2. Data Collection and Analysis

It is based on facts and relevant past and present materials such as the opinion of a certain group, marks obtained by certain students, a certain raw material for certain output, the types of news and newspaper readers, etc (Krishnaswami, O et al. 2010). The data play an essential role in research and allow the researcher to eliminate the guesswork and imagination from the study. There are two main data sources to collect the data.

- a) Primary Source
- b) Secondary Source

According to (Krishnaswami, O et al. 2010), data collected through primary sources, always collected through origin without any previous records. For example, interviewing of consumers on the brand loyalty program, brand preference to know the consumer behavior. Primary data provide first-hand information to the researcher.

Secondary data sources consist of readily available compendia and statistical statements i.e. companies financial reports, census reports, publications of international organizations, etc. Secondary data are readymade and readily available data and researchers have no original control over the collection and classification of data. (Krishnaswami, O et al. 2010.) Secondary data is not collected by the researcher directly from respondents/subjects (Greener, S. 2008).

This thesis research data are mainly gathered from secondary data sources such as company's annual reports, financial reports, and brochures. The data not collected through any surveys, interviews or questionnaires. It is collected from publicly available free sources and it is purely free from the bias of the author because it is publicly available data for general use and not for any particular motive of research.

The data used in this study mostly gathered from the following listed (Table 3) websites, a combination of different sources used by the author to eliminate the weakness of a particular source. For instance, this study seeks 5-year data from 2014 to 2018, but every website has its limitation and the combination of different websites eliminates the weakness of each resource i.e. Yahoo Finance! and Morningstar allows the author to list down the 5-year on one place to compute the valuation of stocks. The author gathered data of 20 Finnish publicly listed companies on the OMX25. The details of the companies as listed in Appendix 1. The companies are from different sectors as listed below:

- Consumer Cyclical
- Industrials
- Communication Services

- Utilities
- Consumer Defensive
- Basic Materials
- Energy
- Technology
- Health Care

The study collected 5 years data of 20 Finnish firms from annual reports, balance sheets, income statement and cash flows from 2014 to 2018. There are multiple sources were used to collect the data but the main source of financial data was NASDAQ (<http://www.nasdaqomxnordic.com/>).

The current market data obtained was all as of April 30th, 2019, or May generally where available.

Table 3: Sources of historical data used in the study

Variable	Source
Revenue	Nasdaqomxnordic, Yahoo Finance, Income Statement
EBITDA	Nasdaqomxnordic, Yahoo Finance, Income Statement
Net income	Nasdaqomxnordic, Yahoo Finance, Income Statement
D&A	Nasdaqomxnordic, Yahoo Finance, Cash Flow
CapEx	Nasdaqomxnordic, Yahoo Finance, Cash Flow
Net Debt	Nasdaqomxnordic, Yahoo Finance, Balance Sheet
Beta	Yahoo Finance, Reuter, FT
Share Price	Nasdaqomxnordic
No of share outstanding	Nasdaqomxnordic
Risk free rate	Marktrisikoprämie.de
Market risk premium	Marktrisikoprämie.de
Marginal tax rates	KPMG
General Company Information	Nasdaqomxnordic, Reuter

<http://www.nasdaqomxnordic.com/>

www.marktrisikoprämie.de

<https://finance.yahoo.com/>

<https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html>

In order to make the data analysis the author combed through the financial reports and compiled data from the selected companies. To identify the board size of each company author noted the number of board members and the independent directors. Once the data of board members were identified, the author sought to investigate the firms' performance with the help of firm valuation such as equity value, current beta and current debt.

4.3. DCF Calculation Process

In order to calculate the valuation with DCF model following formulas applied for the years from 2014 to 2018 only.

- *Revenue growth rate (%) = (Revenue of this year /Revenue of the previous year– 1)×100*
- *EBIT Margin (%) = (EBIT of this year /Revenue of this year– 1)×100*
- *D&A (%) = (D&A of this year /Revenue of this year– 1)×100*
- *Accounts Receivable Growth (%) = (Accounts Receivable of this year/ Accounts Receivable of previous year–1)×100*
- *Inventories Growth (%) = (Inventories of this year/Inventories of previous year- 1) X 100*
- *Accounts Payable Growth (%) = (Accounts Payable of this year Accounts Payable of previous year– 1)×100*
- *Accrued Expenses Growth (%) = (Accrued Expenses of this year Accrued Expenses of previous year– 1)×100*
- *Capital Expenditures Growth (%) = (Gross PP&E of this year Gross PP&E of previous year– 1)×100*

There is another set of calculations applied for the year 2019 and 2020

- *Revenue growth rate (%) = Average/Median of all previous revenue growth rates. There are some companies with negative growth rate of previous years. So, there are some adjustment made if the ultimate average/median reflect negative values.*

- EBIT Margin (%) = Average/Median of all previous EBIT margins. Adjustment made when there are negative numbers in previous years.
- Depreciation and Amortization (D&A) (%) = Average/Median of all previous D&A rates. The additional terms & condition remain the same as above.
- Accounts Receivable Growth (%) = Average/Median of all previous accounts receivable growth rates. The additional terms & conditions remain the same as above.
- Inventories Growth (%) = Average/Median of all previous inventories growth rates. The additional terms & conditions remain the same as above.
- Accounts Payable Growth (%) = Average/Median of all previous accounts payable growth rates. The additional terms & conditions remain the same as above.
- Accrued Expenses Growth (%) = Average/Median of all previous accrued expenses growth rates. The additional terms & conditions remain the same as above.
- Capital Expenditures Growth (%) = Average/Median of all previous capital expenditures growth rates. The additional terms & conditions remain the same as above.

4.4. Reliability and Validity

According to Bryman & Bell 2007, there are three prominent factors involve to check the reliable measure.

- Stability
- Internal reliability
- Inter-observer consistency

There are different ways to establish validity: face validity, concurrent validity, predictive validity, construct validity and convergent validity (Bryman et al. 2007).

Face validity: Every new measure that develops by a researcher should establish its face validity and that can be established by asking from experts and professional and it is an essential intuitive process. (Bryman et al. 2007, 165.)

Concurrent validity: According to (Paul J. Frick et al. 2009), test with this kind of validity illustrates substantial correlations with other measures to which it is theoretically related. This is a parameter also used in behavioral sciences.

Predictive validity: With the help of this validity researchers able to predict some later criterion measure, rather than a contemporary in as in it execute in concurrent validity (Bryman et al. 2007, 165).

Convergent validity: This validity of measures of a similar concept builds through other methods (Bryman et al. 2015, 171). For example, with the help of a questionnaire one can measure the time amount of an employee on daily activities and may examine its validity by tracking the number of employees and using a structured observation schedule to notice the amount of time spent on similar activities with the frequency details.

The author used only internationally accepted frameworks of valuation and also research satisfied the internal as well as external validity aspects. The methods described by the author in this study is universal and other researchers can also use the same models and techniques the author used in this study.

5. Results

This chapter presents the results of the study. It shows the relationship between firm valuation and board size of 20 Finnish companies. This study investigated the impact of boards' size on firm performance using a unique data set of 20 Finnish listed firms. This result supports the agency theory preposition that optimal board size improves monitoring to enhance the performance of the firm. Below Tables 4 and 5 present the different variable of independent members in the firms' board. It was found that most of the firms had more than 40% independent board members in their board composition and that different firms' board compositions resembled each other. However, they seemed to have different working styles, strategies to achieve their vision and mission.

Table No. 4 Summary Output

Variable (in Numbers)	Mean	Median	Min	Max
Board Size	20.5	19.5	16	30
Independent Board Members	5.95	6	0	9

Table 5. Values of twenty companies

Stock symbol	Enterprise value (Euro) in million	Equity value (Euro) in million	Equity value per share (Euro)	Share price on 3rd May 2019 (Euro)	Total debt (Euro) (million)	Board size
HUH1V	3066.75	2266.35	21.81	34.87	893.4	18
KCR	2983.76	2457.96	31.11	36.54	756.3	30
KESKOB	6868.88	6535.71	66.02	47.08	440.6	16
KNEBV	23294.23	23736.43	46.09	48.99	193.8	24
METSO	4307.1	4040.1	26.93	32.61	598	19
NESTE	25185.64	25282.64	32.88	29.35	1039	17
NRE1V	6133.62	6448.82	46.73	29.53	132.3	22
ORNBV	5861.62	5960.42	42.27	29.74	149.9	16
OTE1V	140.2	172.6	0.95	4.51	201	18
OUT1V	5128.58	3972.58	8.88	3.63	1224	18
STERV	10107.52	9540.52	12.08	11.47	567	22
UPM	13642.2	13845.2	25.98	25.5	685	21
VALMT	5595.13	5770.13	38.47	23.84	201	23
WRT1V	15652.38	15318.38	25.88	13.89	821	26
YIT	1007.93	1139.23	5.58	5.36	132.3	19
METSÄ BOARD OYJ B	2314.02	1983.62	5.57	5.03	440.1	16
NOKIA	32871.96	35310.96	6.32	4.57	3822	26
AMEAS	14628.54	13826.34	119.19	40.07	1042.2	18
CGCBV	5014.38	4299.38	66.14	36.96	971.3	21
FORTUM	39864.38	34357.36	38.69	18.55	6092	20

Table 6. Firms beta and stock price

Stock Code	Beta	Equity value per share (Euro)	Share price (Euro)
HUH1V	1.097	21.81	34.87
KCR	1.29	31.11	36.54
KESKOB	0.48	66.02	47.08
KNEBV	0.79	46.09	48.99
METSO	1.37	26.93	32.61
NESTE	0.89	32.88	29.35
NRE1V	1.13	46.73	29.53
ORNBV	0.9	42.27	29.74
OTE1V	1.71	0.95	4.51
OUT1V	2.21	8.88	3.63
STERV	1.86	12.08	11.47
UPM	1.58	25.98	25.5
VALMT	0.61	38.47	23.84
WRT1V	0.93	25.88	13.89
YIT	0.53	5.58	5.36
METSÄ BOARD OYJ B	1.91	5.57	5.03
NOKIA	1.14	6.32	4.57
AMEAS	0.52	119.19	40.07
CGCBV	1.38	66.14	36.96
FORTUM	0.75	38.69	18.55

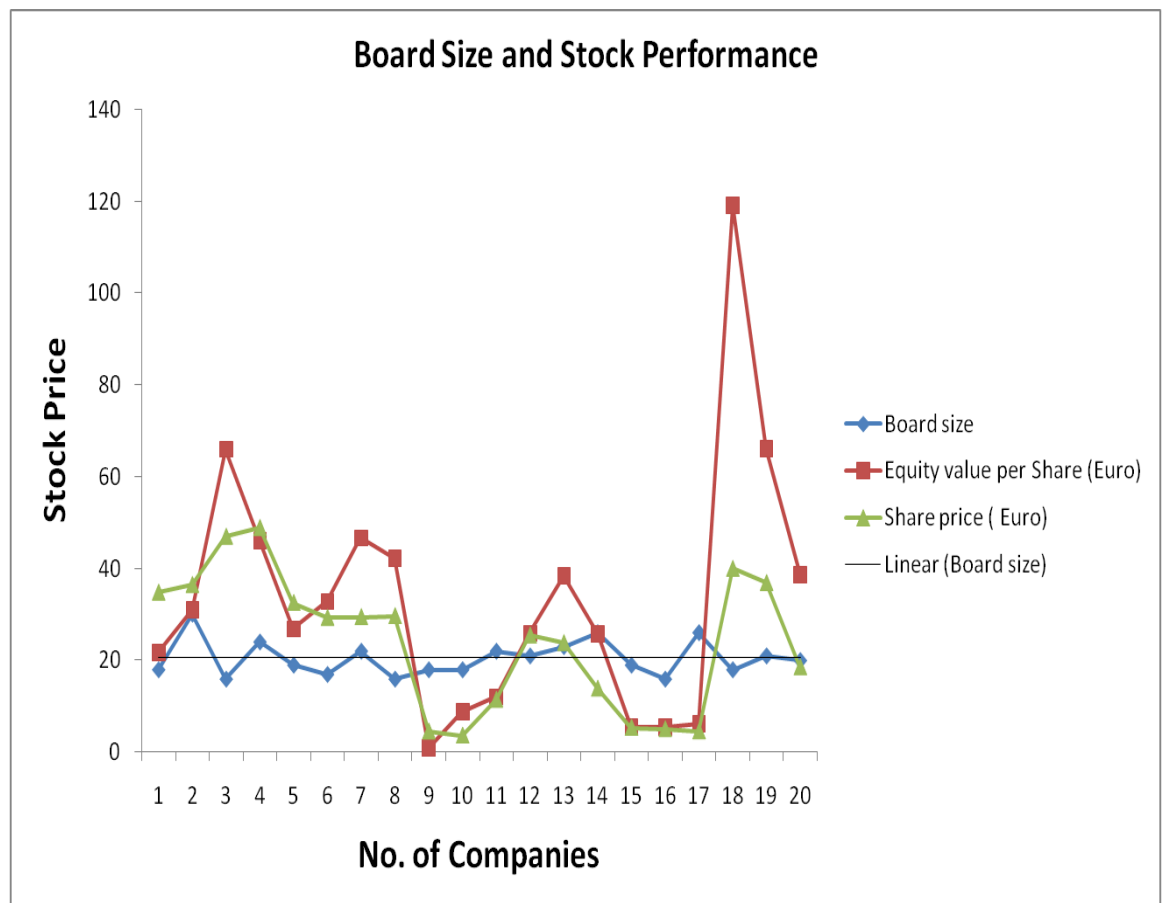


Figure 8. Board size and Stock Performance

The results of this study suggested that firm's with smaller board size positively associate with firm stock. The study showed that firms' stocks with the smaller board were traded below their equity value per share.

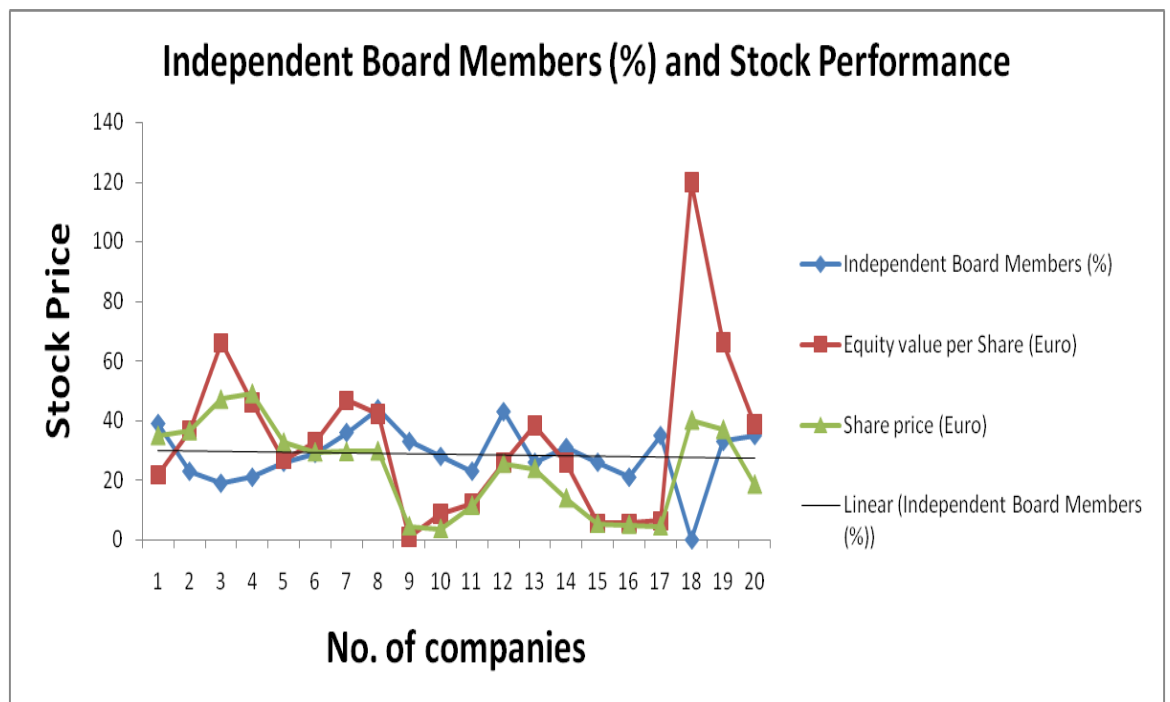


Figure 9. Independent Board Members (%) and Stock Performance

According to the above analysis, the author was not found any relationship between board members independence and stock performance.

It is important to consider that the result was based on the author's predictions and personal judgments that author made during the analysis. There were some assumptions made in the valuation process in order to forecast the future and it is near to impossible to predict the future. It is very important for investors to use the different valuation models as well as check the future perspective of the companies while making any investment decision.

According to Warren Buffet: "investors must realize that it is impossible to predict what will happen in the market or the world and that the only way to survive bad times is to invest in companies that are strong enough to weather catastrophic events" (Buffet, 2018).

6. Discussion

This chapter presents the key findings of the study. The discussion further highlights the practical implications and limitations of the study. The section further mentioned the recommendations for the future researcher.

6.1. Summary and Key Findings

This study aimed at estimating the theoretical valuation of 20 Finnish companies and determine these companies' association with board size.

- What is the association between the board size and the firm valuation derived through discounted cash flow method?

To find the solution of the above question, the author used the DCF valuation model to predict the value and the stock price of firms. The findings are summarized below:

- For per share equity value, there was a total 16 undervalued and four overvalued firms from different sectors.
- The majority of the firms had board compositions with more than 40% of independent board members.
- The average beta of both the overvalued firms was more than the average beta of the undervalued firms.
- The average board size of 20 Finnish firms was more than 20 members with no firm having less than 16 members on the board.
- The study suggested that smaller boards associated positively with firm valuation.

6.2. Practical Implications

The findings of this research may impact the perspective of investors and it may change their investment strategies about sample companies. In the near future, these findings could help sample companies internal management in decision making and may also help to analyze and predict the competitor firms' strategies with different viewpoint. Managers of these companies may also come with the solution if companies found the current stock price unrealistic.

6.3. Limitations and Recommendations

Few limitations affect this study's results. Firstly, the size of the studied sample (20 companies) is too small, which may potentially enhance the chance to make the impact on final results either positively or negatively.

Secondly, the author only used the quantitative method to conduct this study, while the combination of different research methods undoubtedly would be more beneficial. Because this research depends solely on historical numbers and the author had no idea about companies' futuristic narratives.

Thirdly, this study also ignores the board composition's many aspects other than Board size and percentage of independent board members. Other factors such as age, education, the background of board members, gender diversity etc. not recognized by the author.

Fourthly, the valuation of the companies assume with the help of current beta and DCF method. The author used the historical data of companies to assume the firm valuation and there were many assumptions and judgments were made to predict the future cash flow and stock price.

The author limited the analysis to board size as a result of data availability. As more data become available, researchers may consider including other board attributes such as board diversity and reputational capital of board members. Methodologically, more insights may be obtained in future studies by conducting in-depth interviews with boards, managers, and shareholders.

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Appendices

Appendix 1. List of 20 Finnish Companies

S.No.	Company Name	Stock Code	Sector
1	HUHTAMÄKI	HUH1V	Consumer Cyclical
2	KONECRANES OYJ	KCR	Industrials
3	KESKO OYJ B	KESKOB	Consumer Defensive
4	KONE OYJ	KNEBV	Industrials
5	METSO OYJ	METSO	Industrials
6	NESTE OYJ	NESTE	Energy
7	NOKIAN RENKAAT OYJ	NRE1V	Consumer Defensive
8	ORION OYJ B	ORNBV	Healthcare
9	OUTOTEC OYJ	OTE1V	Industrials
10	OUTOKUMPU OYJ	OUT1V	Basic Materials
11	STORA ENSO OYJ R	STERV	Basic Materials
12	UPM-KYMMENE OYJ	UPM	Basic Materials
13	VALMET OYJ	VALMT	Industrials
14	WÄRTSILÄ OYJ ABP	WRT1V	Industrials
15	YIT OYJ	YIT	Industrials
16	Mesta Board	METSÄ BOARD OYJ B	Basic Materials
17	NOKIA	NOKIA	Technology
18	Amer Sports Oyj	AMEAS	Consumer Cyclical
19	Cargotec Oyj	CGCBV	Industrials
20	Fortum Oyj	FORTUM	Utilities

Appendix 2. DCF Valuation of HUH1V

Valuation Date	3-May-19								
Share price	34.87								
Diluted share outstanding	104								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		2235.7	2726.4	2865	2988.7	3103.6	3249.488649	3402.234978	
Revenue (%)	Growth rate		21.95%	5.08%	4.32%	3.84%	4.70%	4.70%	
EBITDA									
EBITDA	Margin %								
EBIT									
EBIT	Margin %	169.3	230.8	262.3	270.6	222.6	241.4439261	261.8830612	
		7.57%	8.47%	9.16%	9.05%	7.17%	8.47%	8.47%	
Depreciation & Amortization									
D&A as % of Revenue		7.4	6.8	8.6	8.4	9.1	9.126681918	9.153442069	
		0.33%	0.25%	0.30%	0.28%	0.29%	0.29%	0.29%	
Balance Sheet and Other Data									
Cash		350.8	103.2	105.9	116	95	95	95	
Accounts receivable		304.5	375.2	417.8	418.8	461.3	510.8943321	565.8205474	
Inventory		312.7	385.7	401.9	444.8	497.7	508.1517	518.8228857	
Prepaid Expense			31.2	24.8	44.2	39.5	45.69755	52.8674956	
Account Payable		253.6	301.9	304.6	352.1	361.3	394.191155	430.0765755	
Accrued Expenses			145.8	176.1	137.6	135.1	136.451	137.81551	
Accrued Expenses(Raw data)			1.46	1.76	1.38	1.35			
Debt						893.4			
Accrued Expense (Reverse data)			1.35	1.38	1.76	1.46			
Gross PP&E(increase annual be calculated)			853.8	1035.8	1055	1122.1	1168.21831	1216.232083	
Account Receivable Growth (%)			23.22%	11.35%	0.24%	10.15%	10.75%	10.75%	
Inventories Growth (%)			23.35%	4.20%	10.67%	11.89%	2.10%	2.10%	
Prepaid Expenses Growth(%)				-20.51%	78.23%	-10.63%	15.69%	15.69%	
Account Payable Growth (%)		19.05%		0.89%	15.59%	2.61%	9.10%	9.10%	
Accrued Expenses Groth (%)				20.78%	-21.86%	-1.82%	1.00%	1.00%	
Capital Expenditure Growth (%)				21.32%	1.85%	6.36%	4.11%	4.11%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							3,249.49	3,402.23	
EBITDA									
EBIT							241.44	261.88	
Tax Rate							20%	20%	
EBIAT							193.16	209.51	
Depreciation & Amortization							9.13	9.15	
Accounts receivable							(49.59)	(54.93)	
Inventories							(10.45)	(10.67)	
Prepaid expenses							(6.20)	(7.17)	
Accounts Payable							32.89	35.89	
Accrued expenses							1.35	1.36	
Capital expenditures							(46.12)	(48.01)	
unlevered free cash flows							124.1620857	135.1287023	
Discount rate (WACC)							6.23%	6.23%	
Present value of free cash flows							116.4272601	126.7106981	
Sum of present values of FCFs		243.1379583							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate	2.60%								
WACC	6.23%								
Free cash flow(t+1)	138.6420485								
Terminal value	3819.740464								
Present value of terminal value	2823.616583								
WACC									
Share Price	34.87								
Diluted Share Outstanding	104								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	8.18%	1.71	5.9	1.097					
Total Debt	893.4								
Total Equity	3626.48								
Total Capital	4519.88								
Debt Weighting	24.64%								
Equity Weighting	75%								
WACC=	6.23%								
Enterprise Value to Equity Value									
Enterprise Value	3066.754541								
Less: Net debt	798.4								
Equity Value	2268.354541								
Diluted Shares Outstanding	104								
Equity Value per Share	21.81	Overvalued							

Appendix 3. DCF Valuation of KCR

Valuation Date	3-May-19								
Share price	36.54								
Diluted share outstanding	79								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		2011.4	2126.2	2118.4	3136.4	3156.1	3256.078559	3359.224226	
Revenue (%)	Growth rate		5.71%	-0.37%	48.06%	0.63%	3.17%	3.17%	
EBIDTA									
EBIDTA	Margin %								
EBIT		114.7	102.6	121.8	111.3	179.9	190.1544311	200.9933722	
EBIT	Margin %	5.70%	4.83%	5.75%	3.55%	5.70%	5.70%	5.70%	
Depreciation & Amortization		43.1	48.8	51.1	110.8	106.1	108.659342	111.2804203	
D&A as % of Revenue		2.14%	2.30%	2.41%	3.53%	3.36%	2.41%	2.41%	
Balance Sheet and Other Data									
Cash		97.94	80.8	167.4	233.1	230.5	230.5	230.5	
Accounts receivable		364.89	377.3	379.3	538.2	548	562.3080317	576.9896397	
Inventory		324.3	358.9	272.1	524.4	618.3	706.6405771	807.6029519	
Prepaid Expense									
Account Payable		138.93	139.6	100.6	202.1	211.2	216.4641375	221.859483	
Accrued Expenses							0	0	
Accrued Expenses(Raw data)		0.00	0.00	0.00	0.00	0.00			
Debt						756.3			
Accrued Expense (Reverse data)		0.00	0.00	0.00	0.00	0.00			
Gross PP&E(increase annual be calculated)			142.5	128.1	270.4	236.7	239.067	241.45767	
Account Receivable Growth (%)			3.40%	0.53%	41.89%	1.82%	2.61%	2.61%	
Inventories Growth (%)			10.67%	-24.19%	92.72%	17.91%	14.29%	14.29%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			0.48%	-27.94%	100.89%	4.50%	2.49%	2.49%	
Accrued Expenses Groth (%)									
Capital Expenditure Growth (%)				-10.11%	111.09%	-12.46%	1.00%	1.00%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							3256.078559	3359.224226	
EBITDA									
EBIT							190.1544311	200.9933722	
Tax Rate							20%	20%	
EBIAT							152.1235449	160.7946978	
Depreciation & Amortization							108.659342	111.2804203	
Accounts receivable							-14.3080317	-14.681608	
Inventories							-88.3405771	-100.962375	
Prepaid expenses							0	0	
Accounts Payable							5.264137483	5.395345548	
Accrued expenses							0	0	
Capital expenditures							-2.367	-2.39067	
unlevered free cash flows							161.0314155	159.4358108	
Discount rate (WACC)							6.95%	6.95%	
Present value of free cash flows							149.8356793	148.3510094	
Sum of present values of FCFs		298.1866887							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		6.95%							
Free cash flow(t+1)		163.5811419							
Terminal value		3758.311587							
Present value of terminal value		2685.577808							
WACC									
Share Price	36.54								
Diluted Share Outstanding	79								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	9.33%	1.71	5.9	1.2915					
Total Debt	756.3								
Total Equity	2886.66								
Total Capital	3642.96								
Debt Weighting	26.20%								
Equity Weighting	74%								
WACC=	6.95%								
Enterprise Value to Equity Value									
Enterprise Value	2983.764497								
Less: Net debt	525.8								
Equity Value	2457.964497								
Diluted Shares Outstanding	79								
Equity Value per Share	31.11	Overvalued							

Appendix 4. DCF Valuation of KESKOB

Valuation Date	3-May-19								
Share price	47.08								
Diluted share outstanding	99								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		9070.6	8678.9	10180.5	10675.8	10382.8	10492.89186	10604.15106	
Revenue (%)	Growth rate		-4.32%	17.30%	4.87%	-2.74%	1.06%	1.06%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %								
EBIT		-14	231.6	232.7	271.3	305.9	313.6737191	321.6449887	
EBIT		-0.15%	2.67%	2.29%	2.54%	2.95%	2.54%	2.54%	
Depreciation & Amortization									
D&A as % of Revenue		195.1	136.8	161.6	153.7	146.9	149.2154916	151.5674808	
D&A as % of Revenue		2.15%	1.58%	1.59%	1.44%	1.41%	1.58%	1.58%	
Balance Sheet and Other Data									
Cash		107	141.2	141.3	132.7	107.5	107.5	107.5	
Accounts receivable		584.2	581.7	831.2	836	820.3	933.99358	1063.44509	
Inventory		776.4	735	978.9	938.6	913	1045.6589	1197.593138	
Prepaid Expense									
Account Payable		794.6	795.1	1069.2	1023.7	982.7	1047.26339	1116.068595	
Accrued Expenses							0	0	
Accrued Expenses(Raw data)		0.00	0.00	0.00	0.00	0.00			
Debt						440.6			
Accrued Expense (Reverse data)		0.00	0.00	0.00	0.00	0.00			
Gross PP&E(increase annual be calculated)			1211	1049.3	1243.1	1162.4	1232.02776	1305.826223	
Account Receivable Growth (%)			-0.43%	42.89%	0.58%	-1.88%	13.86%	13.86%	
Inventories Growth (%)			-5.33%	33.18%	-4.12%	-2.73%	14.53%	14.53%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			0.06%	34.47%	-4.26%	-4.01%	6.57%	6.57%	
Accrued Expenses Groth (%)									
Capital Expenditure Growth (%)				-13.35%	18.47%	-6.49%	5.99%	5.99%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							10492.89186	10604.15106	
EBITDA									
EBIT							313.6737191	321.6449887	
Tax Rate							20%	20%	
EBIAT							250.9389753	257.3159909	
Depreciation & Amortization							149.2154916	151.5674808	
Accounts receivable							-113.69358	-129.45151	
Inventories							-132.6589	-151.934238	
Prepaid expenses							0	0	
Accounts Payable							64.56339	68.80520472	
Accrued expenses							0	0	
Capital expenditures							-69.62776	-73.7984628	
unlevered free cash flows							148.7376168	122.5044653	
Discount rate (WACC)							4.15%	4.15%	
Present value of free cash flows							142.5623288	117.4183251	
Sum of present values of FCFs		259.9806539							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		4.15%							
Free cash flow(t+1)		125.6895814							
Terminal value		8099.600305							
Present value of terminal value		6608.907784							
WACC									
Share Price	47.08								
Diluted Share Outstanding	99								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	4.56%	1.71	5.9	0.4828	4.55852				
Total Debt	440.6								
Total Equity	4660.92								
Total Capital	5101.52								
Debt Weighting	9.45%								
Equity Weighting	91%								
WACC=	4.15%								
Enterprise Value to Equity Value									
Enterprise Value	6868.888438								
Less: Net debt	333.1								
Equity Value	6535.788438								
Diluted Shares Outstanding	99								
Equity Value per Share	66.02	Undervalued							

Appendix 5. DCF Valuation of KNEBV

Valuation Date	3-May-19								
Share price	48.99								
Diluted share outstanding	515								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		7334.5	8647.3	8784.3	8942.4	9070.7	9224.1813	9380.259588	
Revenue (%)	Growth rate		17.90%	1.58%	1.80%	1.43%	1.69%	1.69%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %	1035.6	1241.5	1293.3	1205.5	1042.4	1189.582417	1357.546362	
		14.12%	14.36%	14.72%	13.48%	11.49%	14.12%	14.12%	
Depreciation & Amortization									
Depreciation & Amortization		84.3	100	106.4	114.4	118.9	120.3401785	121.7978012	
D&A as % of Revenue		1.15%	1.16%	1.21%	1.28%	1.31%	1.21%	1.21%	
Balance Sheet and Other Data									
Cash									
Cash		336.1	552.7	589.2	496.5	636	636	636	
Accounts receivable									
Accounts receivable		1368.3	1480.2	1573.7	1608.7	1988.3	2132.399508	2286.942445	
Inventory									
Inventory		1202.1	1326.7	1373.5	626.8	624.1	633.7635337	643.576697	
Prepaid Expense									
Prepaid Expense			84.4	124.5	122.1	137.9	155.7445536	175.8982305	
Account Payable									
Account Payable		597.1	728.9	743.3	705.1	786.7	839.9926557	896.8954642	
Accrued Expenses									
Accrued Expenses			1538.4	1569.7	1451.1	1431.3	1445.613	1460.06913	
Accrued Expenses(Raw data)		0.00	0.15	0.16	0.15	0.14			
Debt									
Debt						193.8			
Accrued Expense (Reverse data)			0.14	0.15	0.16	0.15			
Gross PP&E(increase annual be calculated)			341.7	365.8	371	397.4	425.4285045	455.4338512	
Account Receivable Growth (%)									
Account Receivable Growth (%)			8.18%	6.32%	2.22%	23.60%	7.25%	7.25%	
Inventories Growth (%)									
Inventories Growth (%)			10.37%	3.53%	-54.36%	-0.43%	1.55%	1.55%	
Prepaid Expenses Growth(%)									
Prepaid Expenses Growth(%)				47.51%	-1.93%	12.94%	12.94%	12.94%	
Account Payable Growth (%)									
Account Payable Growth (%)			22.07%	1.98%	-5.14%	11.57%	6.77%	6.77%	
Accrued Expenses Growth (%)									
Accrued Expenses Growth (%)				2.03%	-7.56%	-1.36%	1.00%	1.00%	
Capital Expenditure Growth (%)									
Capital Expenditure Growth (%)				7.05%	1.42%	7.12%	7.05%	7.05%	
Free Cash Flow Buildup									
Period									
Period							1	2	
Total Revenues									
Total Revenues							9,224.18	9,380.26	
EBITDA									
EBITDA									
EBIT									
EBIT							1,189.58	1,357.55	
Tax Rate									
Tax Rate							20%	20%	
EBIAT									
EBIAT							951.67	1,086.04	
Depreciation & Amortization									
Depreciation & Amortization							120.34	121.80	
Accounts receivable									
Accounts receivable							(144.10)	(154.54)	
Inventories									
Inventories							(9.66)	(9.81)	
Prepaid expenses									
Prepaid expenses							(17.84)	(20.15)	
Accounts Payable									
Accounts Payable							53.29	56.90	
Accrued expenses									
Accrued expenses							14.31	14.46	
Capital expenditures									
Capital expenditures							(28.03)	(30.01)	
unlevered free cash flows									
unlevered free cash flows							939.98	1,064.68	
Discount rate (WACC)									
Discount rate (WACC)							6.35%	6.35%	
Present value of free cash flows									
Present value of free cash flows							880.2947	997.0800881	
Sum of present values of FCFs									
Sum of present values of FCFs		1877.374788							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC									
WACC		6.35%							
Free cash flow(t+1)									
Free cash flow(t+1)		1092.360352							
Terminal value									
Terminal value		29135.79783							
Present value of terminal value									
Present value of terminal value		21416.85552							
WACC									
Share Price									
Share Price		48.99							
Diluted Share Outstanding									
Diluted Share Outstanding		515							
Cost of Debt									
Cost of Debt		0.32%							
Tax rate									
Tax rate		20%							
After - tax cost of debt									
After - tax cost of debt		0.26%	RF	RM-RF	Beta				
Cost of Equity									
Cost of Equity		6.40%	1.71	5.9	0.7943				
Total Debt									
Total Debt		193.8							
Total Equity									
Total Equity		25229.85							
Total Capital									
Total Capital		25423.65							
Debt Weighting									
Debt Weighting		0.77%							
Equity Weighting									
Equity Weighting		99%							
WACC=									
WACC=		6.35%							
Enterprise Value to Equity Value									
Enterprise Value									
Enterprise Value		23294.23031							
Less: Net debt									
Less: Net debt		-442.2							
Equity Value									
Equity Value		23736.43031							
Diluted Shares Outstanding									
Diluted Shares Outstanding		515							
Equity Value per Share									
Equity Value per Share		46.09	Overvalued						

Appendix 6. DCF Valuation of MESTO

Valuation Date	3-May-19								
Share price	32.61								
Dilluted share outstanding	150								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		3658	2977	2586	2706	3173	3265.6516	3361.008627	
Revenue (%)	Growth rate		-18.62%	-13.13%	4.64%	17.26%	2.92%	2.92%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %	359	333.1	219	221	371	407.4103335	447.3940158	
D&A as % of Revenue		0	0	0	0	0	0	0	
D&A as % of Revenue		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Balance Sheet and Other Data									
Cash		279	590	698	672	331	331	331	
Accounts receivable		643	483	464	497	585	594.2965905	603.7409189	
Inventory		842	715	709	750	950	973.4822512	997.5449404	
Prepaid Expense			43	48	53	54	58.3092	62.96227416	
Account Payable		330	248	275	342	431	506.9653299	596.3198277	
Accrued Expenses			123	118	163	164	165.006135	166.0184425	
Accrued Expenses(Raw data)			1.23	1.18	1.63	1.64			
Debt						598			
Accrued Expense (Reverse data)			1.64	1.63	1.18	1.23			
Gross PP&E(increase annual be calculated)			853.8	1035.8	1055	1122.1	1193.467687	1269.374495	
Account Receivable Growth (%)			-24.88%	-3.93%	7.11%	17.71%	1.59%	1.59%	
Inventories Growth (%)			-15.08%	-0.84%	5.78%	26.67%	2.47%	2.47%	
Prepaid Expenses Growth(%)				11.63%	10.42%	1.89%	7.98%	7.98%	
Account Payable Growth (%)			-24.85%	10.89%	24.36%	26.02%	17.63%	17.63%	
Accrued Expenses Groth (%)				-4.07%	38.14%	0.61%	0.61%	0.61%	
Capital Expenditure Growth (%)				21.32%	1.85%	6.36%	6.36%	6.36%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							3,265.65	3,361.01	
EBITDA									
EBIT							407.41	447.39	
Tax Rate							20%	20%	
EBIAT							325.93	357.92	
Depreciation & Amortization							0.00	0.00	
Accounts receivable							(9.30)	(9.44)	
Inventories							(23.48)	(24.06)	
Prepaid expenses							(4.31)	(4.65)	
Accounts Payable							75.97	89.35	
Accrued expenses							1.01	1.01	
Capital expenditures							(71.37)	(75.91)	
unlevered free cash flows							294.4440028	334.2151189	
Discount rate (WACC)							8.66%	8.66%	
Present value of free cash flows							268.9353614	305.2609764	
Sum of present values of FCFs		574.1963378							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		8.66%							
Free cash flow(t+1)		342.904712							
Terminal value		5655.390443							
Present value of terminal value		3732.911044							
WACC									
Share Price	32.61								
Diluted Share Outstanding	150								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%		RF	RM-RF	Beta				
Cost of Equity	9.83%		1.71	5.9	1.377	9.8343			
Total Debt	598								
Total Equity	4891.5								
Total Capital	5489.5								
Debt Weighting	12.23%								
Equity Weighting	88%								
WACC=	8.66%								
Enterprise Value to Equity Value									
Enterprise Value	4307.107381								
Less: Net debt	267								
Equity Value	4040.107381								
Dilluted Shares Outstanding	150								
Equity Value per Share	26.93	Overvalued							

Appendix 7. DCF Valuation of NESTE

Valuation Date	3-May-19							
Share price	29.35							
Dilluted share outstanding	769							
Select Operating Data								
Currency: Euro								
Revenue		2014	2015	2016	2017	2018	2019	2020
Revenue		15012	11131	11688	13217	14919	16252.86286	17705.98238
Revenue (%)	Growth rate		-25.85%	5.00%	13.08%	12.88%	8.94%	8.94%
EBIDTA								
EBIDTA	Margin %							
EBIT								
EBIT	Margin %							
EBIT		94	587	1102	1167	1142	1229.416315	1323.524059
EBIT		0.63%	5.27%	9.43%	8.83%	7.65%	7.65%	7.65%
Depreciation & Amortization								
D&A as % of Revenue		330	358	366	371	498	513.5944559	529.6772391
		2.20%	3.22%	3.13%	2.81%	3.34%	3.13%	3.13%
Balance Sheet and Other Data								
Cash		246	596	788	783	1136	1136	1136
Accounts receivable		771	771	874	994	972	1036.92607	1106.188966
Inventory		1055	1090	1416	1563	1482	1583.508786	1691.970361
Prepaid Expense			1090	1416	1563	1482	1635.851695	1805.675282
Account Payable		1388	787	1030	1163	1033	1041.959381	1050.996469
Accrued Expenses			123	112	104	113	113.8588	114.7241269
Accrued Expenses(Raw data)			1.23	1.12	1.04	1.13		
Debt						1039		
Accrued Expense (Reverse data)			1.13	1.04	1.12	1.23		
Gross PP&E(increase annual be calculated)			3745	3747	3856	3737	3738.995728	3740.992521
Account Receivable Growth (%)			0.00%	13.36%	13.73%	-2.21%	6.68%	6.68%
Inventories Growth (%)			3.32%	29.91%	10.38%	-5.18%	6.85%	6.85%
Prepaid Expenses Growth(%)				29.91%	10.38%	-5.18%	10.38%	10.38%
Account Payable Growth (%)			-43.30%	30.88%	12.91%	-11.18%	0.87%	0.87%
Accrued Expenses Groth (%)				-8.94%	-7.14%	8.65%	0.76%	0.76%
Capital Expenditure Growth (%)				0.05%	2.91%	-3.09%	0.05%	0.05%
Free Cash Flow Buildup								
Period							1	2
Total Revenues							16,252.86	17,705.98
EBITDA								
EBIT							1,229.42	1,323.52
Tax Rate							20%	20%
EBIAT							983.53	1,058.82
Depreciation & Amortization							513.59	529.68
Accounts receivable							(64.93)	(69.26)
Inventories							(101.51)	(108.46)
Prepaid expenses							(153.85)	(169.82)
Accounts Payable							8.96	9.04
Accrued expenses							0.86	0.87
Capital expenditures							(2.00)	(2.00)
unlevered free cash flows							1184.663411	1248.854049
Discount rate (WACC)							6.65%	6.65%
Present value of free cash flows							1105.855569	1165.776028
Sum of present values of FCFs		2271.631597						
Terminal Value								
Growth in perpetuity method:								
Long term growth rate		2.60%						
WACC		6.65%						
Free cash flow(t+1)		1281.324255						
Terminal value		31619.36436						
Present value of terminal value		22914.01462						
WACC								
Share Price		29.35						
Diluted Share Outstanding		769						
Cost of Debt		0.32%						
Tax rate		20%						
After - tax cost of debt		0.26%	RF	RM-RF	Beta			
Cost of Equity		6.96%	1.71	5.9	0.89			
Total Debt		1039						
Total Equity		22570.15						
Total Capital		23609.15						
Debt Weighting		4.60%						
Equity Weighting		95%						
WACC=		6.65%						
Enterprise Value to Equity Value								
Enterprise Value		25185.64621						
Less: Net debt		-97						
Equity Value		25282.64621						
Dilluted Shares Outstanding		769						
Equity Value per Share		32.88	Undervalued					

Appendix 8. DCF Valuation of NRE1V

Valuation Date	3-May-19							
Share price	29.53							
Diluted share outstanding	138							
Select Operating Data								
Currency: Euro								
Revenue		2014	2015	2016	2017	2018	2019	2020
		1389.1	1360.2	1391.1	1572.4	1595.6	1625.494972	1655.950053
Revenue (%)	Growth rate		-2.08%	2.27%	13.03%	1.48%	1.87%	1.87%
EBIDTA								
EBIDTA	Margin %							
EBIT								
EBIT	Margin %	307.8	294.6	313.4	365.5	374	458.2582129	561.498903
		22.16%	21.66%	22.53%	23.24%	23.44%	22.53%	22.53%
Depreciation & Amortization								
D&A as % of Revenue		0	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Balance Sheet and Other Data								
Cash		439.9	429.3	513.2	343.4	447.5	447.5	447.5
Accounts receivable		351	356.9	374.3	432.9	409.5	426.699	444.620358
Inventory		288.3	271.3	304.3	340.1	369.2	406.7125897	448.0366485
Prepaid Expense			0	0	4.8	2.3	2.3	2.3
Account Payable		63.9	55.7	78	72.8	111	129.5199282	151.129836
Accrued Expenses			71.7	92.6	124.6	292.9	394.1181425	530.3144769
Accrued Expenses(Raw data)			0.72	0.93	1.25	2.93		
Debt						132.3		
Accrued Expense (Reverse data)			2.93	1.25	0.93	0.72		
Gross PP&E(increase annual be calculated)			3745	3747	3856	3737	3849.11	3964.5833
Account Receivable Growth (%)			1.68%	4.88%	15.66%	-5.41%	4.20%	4.20%
Inventories Growth (%)			-5.90%	12.16%	11.76%	8.56%	10.16%	10.16%
Prepaid Expenses Growth(%)				0.00%	0.00%	-52.08%	0.00%	0.00%
Account Payable Growth (%)			-12.83%	40.04%	-6.67%	52.47%	16.68%	16.68%
Accrued Expenses Groth (%)				29.15%	34.56%	135.07%	34.56%	34.56%
Capital Expenditure Growth (%)				0.05%	2.91%	-3.09%	3.00%	3.00%
Free Cash Flow Buildup								
Period							1	2
Total Revenues							1,625.49	1,655.95
EBITDA								
EBIT							458.26	561.50
Tax Rate							20%	20%
EBIAT							366.61	449.20
Depreciation & Amortization							0.00	0.00
Accounts receivable							(17.20)	(17.92)
Inventories							(37.51)	(41.32)
Prepaid expenses							0.00	0.00
Accounts Payable							18.52	21.61
Accrued expenses							101.22	136.20
Capital expenditures							(112.11)	(115.47)
unlevered free cash flows							319.5230514	432.2866478
Discount rate (WACC)							8.12%	8.12%
Present value of free cash flows							293.5899061	397.2013781
Sum of present values of FCFs		690.7912842						
Terminal Value								
Growth in perpetuity method:								
Long term growth rate		2.60%						
WACC		8.12%						
Free cash flow(t+1)		443.5261006						
Terminal value		8040.421197						
Present value of terminal value		5442.830858						
WACC								
Share Price		29.53						
Diluted Share Outstanding		138						
Cost of Debt		0.32%						
Tax rate		20%						
After - tax cost of debt		0.26%	RF	RM-RF	Beta			
Cost of Equity		8.38%	1.71	5.9	1.1305			
Total Debt		132.3						
Total Equity		4075.14						
Total Capital		4207.44						
Debt Weighting		3.25%						
Equity Weighting		97%						
WACC=		8.12%						
Enterprise Value to Equity Value								
Enterprise Value		6133.622142						
Less: Net debt		-315.2						
Equity Value		6448.822142						
Diluted Shares Outstanding		138						
Equity Value per Share		46.73	Undervalued					

Appendix 9. DCF Valuation of ORNBV

Valuation Date	3-May-19								
Share price	29.74								
Dilluted share outstanding	141								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		1015.3	1015.6	1073.5	1084.7	977.4	982.6430872	987.9143	
Revenue (%)	Growth rate		0.03%	5.70%	1.04%	-9.89%	0.54%	0.54%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %	271.6	269.3	292.8	285.2	253.1	320.2128692	405.1216184	
EBIT	Margin %	26.75%	26.52%	27.28%	26.29%	25.90%	26.52%	26.52%	
Depreciation & Amortization									
D&A as % of Revenue		0	0	0	0	0	0	0	
D&A as % of Revenue		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Balance Sheet and Other Data									
Cash		185.5	245.2	200.9	164	248.7	248.7	248.7	
Accounts receivable		174	205.7	227.5	225.4	222.1	232.8439556	244.1076438	
Inventory		178.7	205.7	227.5	225.4	222.1	232.8439556	244.1076438	
Prepaid Expense			0	0	0	0	0	0	
Account Payable		66.6	99.1	106.1	83.2	74.9	79.75352	84.9215481	
Accrued Expenses			0	0	0	0	0	0	
Accrued Expenses(Raw data)			0.00	0.00	0.00	0.00	0.00	0.00	
Debt						149.9			
Accrued Expense (Reverse data)			0.00	0.00	0.00	0.00			
Gross PP&E(increase annual be calculated)			252.3	258.2	261.9	260.6	264.3343919	268.1222976	
Account Receivable Growth (%)			18.22%	10.60%	-0.92%	-1.46%	4.84%	4.84%	
Inventories Growth (%)			15.11%	10.60%	-0.92%	-1.46%	4.84%	4.84%	
Prepaid Expenses Growth(%)				0.00%	0.00%	0.00%	0.00%	0.00%	
Account Payable Growth (%)			48.80%	7.06%	-21.58%	-9.98%	6.48%	6.48%	
Accrued Expenses Groth (%)				0.00%	0.00%	0.00%	0.00%	0.00%	
Capital Expenditure Growth (%)				2.34%	1.43%	-0.50%	1.43%	1.43%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							982.64	987.91	
EBITDA									
EBIT							320.21	405.12	
Tax Rate							20%	20%	
EBIAT							256.17	324.10	
Depreciation & Amortization							0.00	0.00	
Accounts receivable							(10.74)	(11.26)	
Inventories							(10.74)	(11.26)	
Prepaid expenses							0.00	0.00	
Accounts Payable							4.85	5.17	
Accrued expenses							0.00	0.00	
Capital expenditures							(3.73)	(3.79)	
unlevered free cash flows							235.8015122	302.9500409	
Discount rate (WACC)							6.78%	6.78%	
Present value of free cash flows							219.8183994	282.4154624	
Sum of present values of FCFs		502.2338619							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate	2.60%								
WACC	6.78%								
Free cash flow(t+1)	310.826742								
Terminal value	7439.238919								
Present value of terminal value		5359.390511							
WACC									
Share Price	29.74								
Diluted Share Outstanding	141								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	7.02%	1.71	5.9	0.9					
Total Debt	149.9								
Total Equity	4193.34								
Total Capital	4343.24								
Debt Weighting	3.57%								
Equity Weighting	96%								
WACC=	6.78%								
Enterprise Value to Equity Value									
Enterprise Value	5861.624373								
Less: Net debt	-98.8								
Equity Value	5960.424373								
Dilluted Shares Outstanding	141								
Equity Value per Share	42.27	Undervalued							

Appendix 10. DCF Valuation of OTE1V

Valuation Date	3-May-19							
Share price	4.51							
Diluted share outstanding	182							
Select Operating Data								
Currency: Euro								
Revenue		2014	2015	2016	2017	2018	2019	2020
		1042.6	1201.2	1057.9	1139.2	1276.5	1402.473661	1540.879255
Revenue (%)	Growth rate		15.21%	-11.93%	7.69%	12.05%	9.87%	9.87%
EBIDTA								
EBIDTA	Margin %							
EBIT								
EBIT	Margin %	56.4	52.1	-21.5	18.4	-50.1	18.4	18.4
		5.41%	4.34%	-2.03%	1.62%	-3.92%	0.00%	0.00%
Depreciation & Amortization								
D&A as % of Revenue		0	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Balance Sheet and Other Data								
Cash		281.9	300.7	233	230.2	233.4	233.4	233.4
Accounts receivable		376.6	346.2	332.3	348.9	210.6	212.706	214.83306
Inventory		170.1	202.3	210	185.8	208.9	212.17973	215.5109518
Prepaid Expense			15.3	21.8	4.9	4.3	4.3	4.3
Account Payable		237.8	248.3	237.9	207.3	241.1	243.31812	245.5566467
Accrued Expenses			55.9	49.1	36	38.7	39.087	39.47787
Accrued Expenses(Raw data)			0.56	0.49	0.36	0.39		
Debt						201		
Accrued Expense (Reverse data)			0.39	0.36	0.49	0.56		
Gross PP&E(increase annual be calculated)			82.1	64	52.4	49	49.49	49.9849
Account Receivable Growth (%)			-8.07%	-4.02%	5.00%	-39.64%	1.00%	1.00%
Inventories Growth (%)			18.93%	3.81%	-11.52%	12.43%	1.57%	1.57%
Prepaid Expenses Growth(%)				42.48%	-77.52%	-12.24%	0.00%	0.00%
Account Payable Growth (%)		4.42%		-4.19%	-12.86%	16.30%	0.92%	0.92%
Accrued Expenses Groth (%)				-12.16%	-26.68%	7.50%	1.00%	1.00%
Capital Expenditure Growth (%)				-22.05%	-18.13%	-6.49%	1.00%	1.00%
Free Cash Flow Buildup								
Period							1	2
Total Revenues							1,402.47	1,540.88
EBITDA								
EBIT							18.40	18.40
Tax Rate							20%	20%
EBIAT							14.72	14.72
Depreciation & Amortization							0.00	0.00
Accounts receivable							(2.11)	(2.13)
Inventories							(3.28)	(3.33)
Prepaid expenses							0.00	0.00
Accounts Payable							2.22	2.24
Accrued expenses							0.39	0.39
Capital expenditures							(0.49)	(0.49)
unlevered free cash flows							11.44939	11.39621494
Discount rate (WACC)							8.97%	8.97%
Present value of free cash flows							10.42210677	10.37370278
Sum of present values of FCFs		20.79580956						
Terminal Value								
Growth in perpetuity method:								
Long term growth rate		2.60%						
WACC		8.97%						
Free cash flow(t+1)		11.69251653						
Terminal value		183.4873205						
Present value of terminal value		119.4053537						
WACC								
Share Price		4.51						
Diluted Share Outstanding		182						
Cost of Debt		0.32%						
Tax rate		20%						
After - tax cost of debt		0.26%	RF	RM-RF	Beta			
Cost of Equity		11.80%	1.71	5.9	1.71			
Total Debt		201						
Total Equity		820.82						
Total Capital		1021.82						
Debt Weighting		24.49%						
Equity Weighting		76%						
WACC=		8.97%						
Enterprise Value to Equity Value								
Enterprise Value		140.2011633						
Less: Net debt		-32.4						
Equity Value		172.6011633						
Diluted Shares Outstanding		182						
Equity Value per Share		0.95	Overvalued					

Appendix 11. DCF Valuation of OUT1V

Valuation Date	3-May-19								
Share price	3.63								
Dilluted share outstanding	447								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		6844	6384	5690	6363	6872	6915.91743	6960.115526	
Revenue (%)	Growth rate		-6.72%	-10.87%	11.83%	8.00%	0.64%	0.64%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %								
EBIT		-201	-209	69	417	244	246.9588752	249.9536314	
EBIT		-2.94%	-3.27%	1.21%	6.55%	3.55%	1.21%	1.21%	
Depreciation & Amortization									
D&A as % of Revenue		0	0	0	0	0	0	0	
D&A as % of Revenue		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Balance Sheet and Other Data									
Cash		191	186	203	112	68	68	68	
Accounts receivable		536	443	471	493	482	496.0744	510.5597725	
Inventory		1526	1250	1231	1379	1555	1675.668	1805.699837	
Prepaid Expense			3	7	7	11	17.28571429	27.16326531	
Account Payable		1031	830	1111	1162	1200	1247.164097	1296.181904	
Accrued Expenses			151	139	133	114	115.14	116.2914	
Accrued Expenses(Raw data)			1.51	1.39	1.33	1.14			
Debt						1224			
Accrued Expense (Reverse data)			1.14	1.33	1.39	1.51			
Gross PP&E(increase annual be calculated)			2856	2753	2478	2426	2450.26	2474.7626	
Account Receivable Growth (%)			-17.35%	6.32%	4.67%	-2.23%	2.92%	2.92%	
Inventories Growth (%)			-18.09%	-1.52%	12.02%	12.76%	7.76%	7.76%	
Prepaid Expenses Growth(%)				133.33%	0.00%	57.14%	57.14%	57.14%	
Account Payable Growth (%)			-19.50%	33.86%	4.59%	3.27%	3.93%	3.93%	
Accrued Expenses Groth (%)				-7.95%	-4.32%	-14.29%	1.00%	1.00%	
Capital Expenditure Growth (%)				-3.61%	-9.99%	-2.10%	1.00%	1.00%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							6,915.92	6,960.12	
EBITDA									
EBIT							246.96	249.95	
Tax Rate							20%	20%	
EBIAT							197.57	199.96	
Depreciation & Amortization							0.00	0.00	
Accounts receivable							(14.07)	(14.49)	
Inventories							(120.67)	(130.03)	
Prepaid expenses							(6.29)	(9.88)	
Accounts Payable							47.16	49.02	
Accrued expenses							1.14	1.15	
Capital expenditures							(24.26)	(24.50)	
unlevered free cash flows							80.58308268	71.23475159	
Discount rate (WACC)							3.82%	3.82%	
Present value of free cash flows							77.50775258	68.51618625	
Sum of present values of FCFs		146.0239388							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		3.82%							
Free cash flow(t+1)		73.08685513							
Terminal value		6008.71725							
Present value of terminal value		4982.565893							
WACC									
Share Price	3.63								
Diluted Share Outstanding	447								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	14.75%	1.71	5.9	2.21					
Total Debt	1224								
Total Equity	1622.61								
Total Capital	2846.61								
Debt Weighting	75.43%								
Equity Weighting	25%								
WACC=	3.82%								
Enterprise Value to Equity Value									
Enterprise Value	5128.589832								
Less: Net debt	1156								
Equity Value	3972.589832								
Dilluted Shares Outstanding	447								
Equity Value per Share	8.887225574	Undervalued							

Appendix 12. DCF Valuation of STERV

Valuation Date	3-May-19								
Share price	11.47								
Diluted share outstanding	790								
Select Operating Data									
Currency: Euro									
Revenue		2014	2015	2016	2017	2018	2019	2020	
		10213	10040	9802	10045	10486	10527.16627	10568.49416	
Revenue (%)	Growth rate		-1.69%	-2.37%	2.48%	4.39%	0.39%	0.39%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %		524	861	946	893	1294	1409.036536	1534.299813
			5.13%	8.58%	9.65%	8.89%	12.34%	8.89%	8.89%
Depreciation & Amortization									
D&A as % of Revenue			538	522	504	493	479	503.6292593	529.5249078
			5.27%	5.20%	5.14%	4.91%	4.57%	5.14%	5.14%
Balance Sheet and Other Data									
Cash			0	0	0	0	0	0	0
Accounts receivable			1202	987	871	965	1136	1297.9936	1483.087487
Inventory			1297	1265	1244	1224	1485	1801.602	2185.703546
Prepaid Expense				127	121	119	96	96.96	97.9296
Account Payable			1097	1203	1239	1337	1382	1459.91266	1542.217781
Accrued Expenses				463	456	529	568	609.8752363	654.8376828
Accrued Expenses(Raw data)				4.63	4.56	5.29	5.68		
Debt								567	
Accrued Expense (Reverse data)				5.68	5.29	4.56	4.63		
Gross PP&E(increase annual be calculated)				6238	6100	5758	5234	5286.34	5339.2034
Account Receivable Growth (%)				-17.89%	-11.75%	10.79%	17.72%	14.26%	14.26%
Inventories Growth (%)				-2.47%	-1.66%	-1.61%	21.32%	21.32%	21.32%
Prepaid Expenses Growth(%)					-4.72%	-1.65%	-19.33%	1.00%	1.00%
Account Payable Growth (%)				9.66%	2.99%	7.91%	3.37%	5.64%	5.64%
Accrued Expenses Growth (%)					-1.51%	16.01%	7.37%	7.37%	7.37%
Capital Expenditure Growth (%)					-2.21%	-5.61%	-9.10%	1.00%	1.00%
Free Cash Flow Buildup									
Period								1	2
Total Revenues								10,527.17	10,568.49
EBITDA									
EBIT								1,409.04	1,534.30
Tax Rate								20%	20%
EBIAT								1,127.23	1,227.44
Depreciation & Amortization								503.63	529.52
Accounts receivable								(161.99)	(185.09)
Inventories								(316.60)	(384.10)
Prepaid expenses								(0.96)	(0.97)
Accounts Payable								77.91	82.31
Accrued expenses								41.88	44.96
Capital expenditures								(52.34)	(52.86)
unlevered free cash flows								1218.750784	1261.203893
Discount rate (WACC)								11.91%	11.91%
Present value of free cash flows								1073.64226	1111.040761
Sum of present values of FCFs								2184.68302	
Terminal Value									
Growth in perpetuity method:									
Long term growth rate								2.60%	
WACC								11.91%	
Free cash flow(t+1)								1293.995194	
Terminal value								13904.45867	
Present value of terminal value								7922.837813	
WACC									
Share Price								11.47	
Diluted Share Outstanding								790	
Cost of Debt								0.32%	
Tax rate								20%	
After - tax cost of debt								0.26%	
Cost of Equity								12.68%	
					RF	RM-RF	Beta		
					1.71	5.9	1.86		
Total Debt								567	
Total Equity								9061.3	
Total Capital								9628.3	
Debt Weighting								6.26%	
Equity Weighting								94%	
WACC=								11.91%	
Enterprise Value to Equity Value									
Enterprise Value								10107.52083	
Less: Net debt								567	
Equity Value								9540.520833	
Diluted Shares Outstanding								790	
Equity Value per Share								12.08	Undervalued

Appendix 13. DCF Valuation of UPM

Valuation Date	3-May-19								
Share price	25.5								
Dilluted share outstanding	533								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		9868	10138	9812	10010	10483	10732.18374	10987.29064	
Revenue (%)	Growth rate		2.74%	-3.22%	2.02%	4.73%	2.38%	2.38%	
EBIDTA									
EBIDTA	Margin %								
EBIT		734	749	1018	1129	1351	1491.166938	1645.876268	
EBIT	Margin %	7.44%	7.39%	10.38%	11.28%	12.89%	10.38%	10.38%	
Depreciation & Amortization		521	524	545	450	422	443.8117972	466.7509747	
D&A as % of Revenue		5.28%	5.17%	5.55%	4.50%	4.03%	5.17%	5.17%	
Balance Sheet and Other Data									
Cash		700	626	992	716	888	888	888	
Accounts receivable		1412	1436	1360	1447	1476	1537.992	1602.587664	
Inventory		1316	1342	1324	1292	1609	1786.9554	1984.592667	
Prepaid Expense			134	134	123	135	136.35	137.7135	
Account Payable		854	917	994	1167	1310	1458.816	1624.537498	
Accrued Expenses			430	451	419	425	431.0859189	437.2589869	
Accrued Expenses(Raw data)			4.30	4.51	4.19	4.25			
Debt						685			
Accrued Expense (Reverse data)			4.25	4.19	4.51	4.30			
Gross PP&E(Increase annual be calculated)			6633	6391	5881	6131	6391.5675	6663.209119	
Account Receivable Growth (%)			1.70%	-5.29%	6.40%	2.00%	4.20%	4.20%	
Inventories Growth (%)			1.98%	-1.34%	-2.42%	24.54%	11.06%	11.06%	
Prepaid Expenses Growth(%)				0.00%	0.00%	9.76%	1.00%	1.00%	
Account Payable Growth (%)			7.38%	8.40%	17.40%	12.25%	11.36%	11.36%	
Accrued Expenses Groth (%)				4.88%	-7.10%	1.43%	1.43%	1.43%	
Capital Expenditure Growth (%)				-3.65%	-7.98%	4.25%	4.25%	4.25%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							10,732.18	10,987.29	
EBITDA									
EBIT							1,491.17	1,645.88	
Tax Rate							20%	20%	
EBIAT							1,192.93	1,316.70	
Depreciation & Amortization							443.81	466.75	
Accounts receivable							(61.99)	(64.60)	
Inventories							(177.96)	(197.64)	
Prepaid expenses							(1.35)	(1.36)	
Accounts Payable							148.82	165.72	
Accrued expenses							6.09	6.17	
Capital expenditures							(260.57)	(271.64)	
unlevered free cash flows							1289.782367	1420.108505	
Discount rate (WACC)							10.49%	10.49%	
Present value of free cash flows							1154.4984	1271.154761	
Sum of present values of FCFs		2425.653161							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		10.49%							
Free cash flow(t+1)		1457.031326							
Terminal value		18469.38798							
Present value of terminal value		11216.54954							
WACC									
Share Price	25.5								
Diluted Share Outstanding	533								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%								
Cost of Equity	11.03%								
		RF	RM-RF	Beta					
		1.71	5.9	1.58					
Total Debt	685								
Total Equity	13591.5								
Total Capital	14276.5								
Debt Weighting	5.04%								
Equity Weighting	95%								
WACC=	10.49%								
Enterprise Value to Equity Value									
Enterprise Value	13642.2027								
Less: Net debt	-203								
Equity Value	13845.2027								
Diluted Shares Outstanding	533								
Equity Value per Share	25.98	Undervalued							

Appendix 14. DCF Valuation of VALMT

Valuation Date	3-May-19								
Share price	23.84								
Dilluted share outstanding	150								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		2473	2929	2926	3158	3325	3544.733793	3778.988771	
Revenue (%)	Growth rate		18.44%	-0.10%	7.93%	5.29%	6.61%	6.61%	
EBIDTA									
EBIDTA	Margin %								
EBIT		67	144	165	197	210	221.8421053	234.3519984	
EBIT	Margin %	2.71%	4.92%	5.64%	6.24%	6.32%	5.64%	5.64%	
Depreciation & Amortization		0	0	0	0	0	0	0	
D&A as % of Revenue		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Balance Sheet and Other Data									
Cash		192	165	240	296	376	376	376	
Accounts receivable		525	692	758	756	724	757.5708664	792.698367	
Inventory		474	508	471	442	419	423.19	427.4219	
Prepaid Expense			0	0	0	0			
Account Payable		226	250	226	287	286	300.6875829	316.1294493	
Accrued Expenses			0	0	0	0			
Accrued Expenses(Raw data)			0.00	0.00	0.00	0.00			
Debt						201			
Accrued Expense (Reverse data)			0.00	0.00	0.00	0.00			
Gross PP&E(increase annual be calculated)			385	374	354	347	350.47	353.9747	
Account Receivable Growth (%)			31.81%	9.54%	-0.26%	-4.23%	4.64%	4.64%	
Inventories Growth (%)			7.17%	-7.28%	-6.16%	-5.20%	1.00%	1.00%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			10.62%	-9.60%	26.99%	-0.35%	5.14%	5.14%	
Accrued Expenses Groth (%)									
Capital Expenditure Growth (%)				-2.86%	-5.35%	-1.98%	1.00%	1.00%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							3,544.73	3,778.99	
EBITDA									
EBIT							221.84	234.35	
Tax Rate							20%	20%	
EBIAT							177.47	187.48	
Depreciation & Amortization							0.00	0.00	
Accounts receivable							(33.57)	(35.13)	
Inventories							(4.19)	(4.23)	
Prepaid expenses							0.00	0.00	
Accounts Payable							14.69	15.44	
Accrued expenses							0.00	0.00	
Capital expenditures							(3.47)	(3.50)	
unlevered free cash flows							150.9304006	160.0593646	
Discount rate (WACC)							5.02%	5.02%	
Present value of free cash flows							143.3461771	152.0164124	
Sum of present values of FCFs	295.3625896								
Terminal Value									
Growth in perpetuity method:									
Long term growth rate	2.60%								
WACC	5.02%								
Free cash flow(t+1)	164.2209081								
Terminal value	6772.050094								
Present value of terminal value	5299.771067								
WACC									
Share Price	23.84								
Diluted Share Outstanding	150								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	5.31%	1.71	5.9	0.61					
Total Debt	201								
Total Equity	3576								
Total Capital	3777								
Debt Weighting	5.62%								
Equity Weighting	94%								
WACC=	5.02%								
Enterprise Value to Equity Value									
Enterprise Value	5595.133657								
Less: Net debt	-175								
Equity Value	5770.133657								
Dilluted Shares Outstanding	150								
Equity Value per Share	38.47	Undervalued							

Appendix 15. DCF Valuation of WRT1V

Valuation Date		3-May-19							
Share price		13.89							
Dilluted share outstanding		592							
Select Operating Data									
Currency: Euro			2014	2015	2016	2017	2018	2019	2020
Revenue			2162	2356	2315	2405	2402	2447.193016	2493.236327
Revenue (%)	Growth rate			8.97%	-1.74%	3.89%	-0.12%	1.88%	1.88%
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %		498	556	511	510	503	614.0293737	749.566743
EBIT	Margin %		23.03%	23.60%	22.07%	21.21%	20.94%	22.07%	22.07%
Depreciation & Amortization									
D&A as % of Revenue			113	124	121	121	126	132.5857451	139.5157128
			5.23%	5.26%	5.23%	5.03%	5.25%	5.23%	5.23%
Balance Sheet and Other Data									
Cash			571	334	472	379	487	487	487
Accounts receivable			1186	1394	1220	1307	1222	1239.3524	1256.951204
Inventory			1120	1156	1000	1016	1121	1147.984071	1175.617688
Prepaid Expense				0	0	0	0	0	0
Account Payable			436	510	502	539	596	649.4780581	707.7546106
Accrued Expenses				0	0	0	0	0	0
Accrued Expenses(Raw data)				0.00	0.00	0.00	0.00		
Debt							821		
Accrued Expense (Reverse data)				0.00	0.00	0.00	0.00		
Gross PP&E(Increase annual be calculated)				418	394	349	324	327.24	330.5124
Account Receivable Growth (%)				17.54%	-12.48%	7.13%	-6.50%	1.42%	1.42%
Inventories Growth (%)				3.21%	-13.49%	1.60%	10.33%	2.41%	2.41%
Prepaid Expenses Growth(%)									
Account Payable Growth (%)				16.97%	-1.57%	7.37%	10.58%	8.97%	8.97%
Accrued Expenses Groth (%)					0.00%	0.00%	0.00%	1.00%	1.00%
Capital Expenditure Growth (%)					-5.74%	-11.42%	-7.16%	1.00%	1.00%
Free Cash Flow Buildup									
Period								1	2
Total Revenues								2,447.19	2,493.24
EBITDA									
EBIT								614.03	749.57
Tax Rate								20%	20%
EBIAT								491.22	599.65
Depreciation & Amortization								132.59	139.52
Accounts receivable								(17.35)	(17.60)
Inventories								(26.98)	(27.63)
Prepaid expenses								0.00	0.00
Accounts Payable								53.48	58.28
Accrued expenses								0.00	0.00
Capital expenditures								(3.24)	(3.27)
unlevered free cash flows								629.7108307	748.9408391
Discount rate (WACC)								6.50%	6.50%
Present value of free cash flows								588.7545188	700.2298227
Sum of present values of FCFs								1288.984341	
Terminal Value									
Growth in perpetuity method:									
Long term growth rate				2.60%					
WACC				6.50%					
Free cash flow(t+1)				768.4133009					
Terminal value				19682.78222					
Present value of terminal value				14363.39663					
WACC									
Share Price			13.89						
Diluted Share Outstanding			592						
Cost of Debt			0.32%						
Tax rate			20%						
After - tax cost of debt			0.26%		RF	RM-RF	Beta		
Cost of Equity			7.20%		1.71	5.9	0.93		
Total Debt			821						
Total Equity			8222.88						
Total Capital			9043.88						
Debt Weighting			9.98%						
Equity Weighting			90%						
WACC=			6.50%						
Enterprise Value to Equity Value									
Enterprise Value			15652.38097						
Less: Net debt			334						
Equity Value			15318.38097						
Dilluted Shares Outstanding			592						
Equity Value per Share			25.88	Undervalued					

Appendix 16. DCF Valuation of YIT

Valuation Date	3-May-19								
Share price	5.36								
Diluted share outstanding	204								
Select Operating Data									
Currency: Euro									
Revenue		2014	2015	2016	2017	2018	2019	2020	
		1476.4	1382.6	1446.4	1634.6	2905.3	3161.345679	3439.956804	
Revenue (%)	Growth rate		-6.35%	4.61%	13.01%	77.74%	8.81%	8.81%	
EBIDTA									
EBIDTA	Margin %								
EBIT		80.1	80.8	18.9	62	56.9	59.05820384	61.29826786	
EBIT	Margin %	5.43%	5.84%	1.31%	3.79%	1.96%	3.79%	3.79%	
Depreciation & Amortization		12.6	12.1	16.5	14.2	53.3	53.76646174	54.23700578	
D&A as % of Revenue		0.85%	0.88%	1.14%	0.87%	1.83%	0.88%	0.88%	
Balance Sheet and Other Data									
Cash		199.4	122.2	66.4	89.7	263.6	263.6	263.6	
Accounts receivable		118.1	104.6	113	113.4	209.5	252.2799	303.7954556	
Inventory		1615.6	1462.4	1701.2	1558.7	1825.6	1898.193902	1973.674458	
Prepaid Expense			487.7	0	0	0	0	0	
Account Payable		109.6	123.1	164.4	155.7	255.6	314.2186364	386.2807178	
Accrued Expenses									
Accrued Expenses(Raw data)									
Debt						132.3			
Accrued Expense (Reverse data)									
Gross PP&E(increase annual be calculated)			47.2	53.2	54.8	200.3	225.7618644	254.4604065	
Account Receivable Growth (%)			-11.43%	8.03%	0.35%	84.74%	20.42%	20.42%	
Inventories Growth (%)			-9.48%	16.33%	-8.38%	17.12%	3.98%	3.98%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			12.32%	33.55%	-5.29%	64.16%	22.93%	22.93%	
Accrued Expenses Groth (%)									
Capital Expenditure Growth (%)				12.71%	3.01%	265.51%	12.71%	12.71%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							3,161.35	3,439.96	
EBITDA									
EBIT							59.06	61.30	
Tax Rate							20%	20%	
EBIAT							47.25	49.04	
Depreciation & Amortization							53.77	54.24	
Accounts receivable							(42.78)	(51.52)	
Inventories							(72.59)	(75.48)	
Prepaid expenses							0.00	0.00	
Accounts Payable							58.62	72.06	
Accrued expenses							0.00	0.00	
Capital expenditures							(25.46)	(28.70)	
unlevered free cash flows							18.79599446	19.6430479	
Discount rate (WACC)							4.28%	4.28%	
Present value of free cash flows							17.99101368	18.80179015	
Sum of present values of FCFs		36.79280383							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		4.28%							
Free cash flow(t+1)		20.15376715							
Terminal value		1197.68622							
Present value of terminal value		971.1385498							
WACC									
Share Price		5.36							
Diluted Share Outstanding		204							
Cost of Debt		0.32%							
Tax rate		20%							
After - tax cost of debt		0.26%	RF	RM-RF	Beta				
Cost of Equity		4.84%	1.71	5.9	0.53				
Total Debt		132.3							
Total Equity		1093.44							
Total Capital		1225.74							
Debt Weighting		12.10%							
Equity Weighting		88%							
WACC=		4.28%							
Enterprise Value to Equity Value									
Enterprise Value		1007.931354							
Less: Net debt		-131.3							
Equity Value		1139.231354							
Diluted Shares Outstanding		204							
Equity Value per Share		5.58	Undervalued						

Appendix 17. DCF Valuation of METSÄ BOARD OYJ B

Valuation Date	3-May-19								
Share price	5.03								
Dilluted share outstanding	356								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		2008.4	2007.5	1720.3	1848.6	1944.1	1993.881206	2044.937125	
Revenue (%)	Growth rate		-0.04%	-14.31%	7.46%	5.17%	2.56%	2.56%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %	61	110.1	87.5	133.5	116.9	123.3113026	130.0742289	
		3.04%	5.48%	5.09%	7.22%	6.01%	5.48%	5.48%	
Depreciation & Amortization									
D&A as % of Revenue		99.8	103.4	95.8	95.4	91.8	96.52832877	101.5001989	
		4.97%	5.15%	5.57%	5.16%	4.72%	5.15%	5.15%	
Balance Sheet and Other Data									
Cash		250.4	321.8	220.6	215.1	109.7	109.7	109.7	
Accounts receivable		252.8	221.6	217.6	217.8	248.1	250.581	253.08681	
Inventory		328.6	287.3	321	311.7	355.9	371.6177946	388.0297423	
Prepaid Expense		0	0	18.5	0	17.5	17.5	17.5	
Account Payable		237.3	292.7	251.8	298.7	310.2	345.0601369	383.8378403	
Accrued Expenses		0	52.3	49.6	0	66.7	67.367	68.04067	
Accrued Expenses(Raw data)		0.00	0.01	0.00	0.00	0.67			
Debt						440.1			
Accrued Expense (Reverse data)			0.67	0.00	0.00	0.01			
Gross PP&E(increase annual be calculated)			812.3	829.8	788.6	753.2	760.732	768.33932	
Account Receivable Growth (%)			-12.34%	-1.81%	0.09%	13.91%	1.00%	1.00%	
Inventories Growth (%)			-12.57%	11.73%	-2.90%	14.18%	4.42%	4.42%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			23.35%	-13.97%	18.63%	3.85%	11.24%	11.24%	
Accrued Expenses Groth (%)				-5.16%	-100.00%		1.00%	1.00%	
Capital Expenditure Growth (%)				2.15%	-4.97%	-4.49%	1.00%	1.00%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							1993.881206	2044.937125	
EBITDA									
EBIT							123.3113026	130.0742289	
Tax Rate							20%	20%	
EBIAT							98.64904209	104.0593831	
Depreciation & Amortization							96.52832877	101.5001989	
Accounts receivable							(2.48)	(2.51)	
Inventories							(15.72)	(16.41)	
Prepaid expenses							0.00	0.00	
Accounts Payable							34.86	38.78	
Accrued expenses							0.67	0.67	
Capital expenditures							(7.53)	(7.61)	
unlevered free cash flows							204.97	218.49	
Discount rate (WACC)							9.85%	9.85%	
Present value of free cash flows							184.78	196.96	
Sum of present values of FCFs		381.7402004							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate	2.60%								
WACC	9.85%								
Free cash flow(t+1)	224.1665105								
Terminal value	3091.083904								
Present value of terminal value		1932.28083							
WACC									
Share Price	5.03								
Diluted Share Outstanding	356								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	12.98%	1.71	5.9	1.91					
Total Debt	440.1								
Total Equity	1790.68								
Total Capital	2230.78								
Debt Weighting	24.58%								
Equity Weighting	75%								
WACC=	9.85%								
Enterprise Value to Equity Value									
Enterprise Value	2314.021031								
Less: Net debt	330.4								
Equity Value	1983.621031								
Dilluted Shares Outstanding	356								
Equity Value per Share	5.57	Undervalued							

Appendix 18. DCF Valuation of NOKIA

Valuation Date	3-May-19								
Share price	4.57								
Dilluted share outstanding	5588								
Select Operating Data									
Currency: Euro		2014	2015	2016	2017	2018	2019	2020	
Revenue		12732	12499	23614	23147	22563	23014.26	23474.5452	
Revenue (%)	Growth rate		-1.83%	88.93%	-1.98%	-2.52%	2.00%	2.00%	
EBIDTA									
EBIDTA	Margin %								
EBIT		1518	1796	262	1351	1224	1295.4401	1371.04988	
EBIT	Margin %	11.92%	14.37%	1.11%	5.84%	5.42%	5.84%	5.84%	
Depreciation & Amortization									
D&A as % of Revenue									
Balance Sheet and Other Data									
Cash		2527	6995	7497	7369	6261	109.7	109.7	
Accounts receivable		3430	3913	6972	6880	4856	5165.863028	5495.498521	
Inventory		1275	1014	2506	2646	3168	3568.981416	4020.716019	
Prepaid Expense			331	646	628	443	443	443	
Account Payable		2313	1910	3781	3996	4773	5372.745845	6047.852068	
Accured Expenses		0	1538	3234	3153	3785	4543.680622	5454.434238	
Accured Expenses(Raw data)		0.00	0.15	0.32	31.53	37.85			
Debt						3822			
Accured Expense (Reverse data)			37.85	31.53	0.32	0.15			
Gross PP&E(increase annual be calculated)			695	1981	1853	1790	1807.9	1825.979	
Account Receivable Growth (%)			14.08%	78.18%	-1.32%	-29.42%	6.38%	6.38%	
Inventories Growth (%)			-20.47%	147.14%	5.59%	19.73%	12.66%	12.66%	
Prepaid Expenses Growth(%)									
Account Payable Growth (%)			-17.42%	97.96%	5.69%	19.44%	12.57%	12.57%	
Accrued Expenses Groth (%)				110.27%	-2.50%	20.04%	20.04%	20.04%	
Capital Expenditure Growth (%)				185.04%	-6.46%	-3.40%	1.00%	1.00%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							23014.26	23474.5452	
EBITDA									
EBIT							1295.4401	1371.04988	
Tax Rate							20%	20%	
EBIAT							1036.35208	1096.839904	
Depreciation & Amortization							0	0	
Accounts receivable							(309.86)	(329.64)	
Inventories							(400.98)	(451.73)	
Prepaid expenses							0.00	0.00	
Accounts Payable							599.75	675.11	
Accrued expenses							758.68	910.75	
Capital expenditures							(17.90)	(18.08)	
unlevered free cash flows							1,666.03	1,883.25	
Discount rate (WACC)							7.21%	7.21%	
Present value of free cash flows							1,545.88	1,747.44	
Sum of present values of FCFs		3293.319335							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate	2.60%								
WACC	7.21%								
Free cash flow(t+1)	1932.215163								
Terminal value	41897.68895								
Present value of terminal value	29578.64099								
WACC									
Share Price	4.57								
Diluted Share Outstanding	5588								
Cost of Debt	0.32%								
Tax rate	20%								
After - tax cost of debt	0.26%	RF	RM-RF	Beta					
Cost of Equity	8.44%	1.71	5.9	1.14					
Total Debt	3822								
Total Equity	25537.16								
Total Capital	29359.16								
Debt Weighting	14.97%								
Equity Weighting	85%								
WACC=	7.21%								
Enterprise Value to Equity Value									
Enterprise Value	32871.96033								
Less: Net debt	-2439								
Equity Value	35310.96033								
Dilluted Shares Outstanding	5588								
Equity Value per Share	6.32	Undervalued							

Appendix 19. DCF Valuation of AMEAS

Valuation Date	3-May-19								
Share price	40.07								
Dilluted share outstanding	116								
Select Operating Data									
Currency: Euro									
Revenue		2014	2015	2016	2017	2018	2019	2020	
		2228.7	2534.4	2622.1	2685.2	2678.2	2756.763031	2837.630651	
Revenue (%)	Growth rate		13.72%	3.46%	2.41%	-0.26%	2.93%	2.93%	
EBIDTA									
EBIDTA	Margin %								
EBIT									
EBIT	Margin %	167.9	212	219.3	212.8	208.9	225.4551616	243.3223069	
		7.53%	8.36%	8.36%	7.92%	7.80%	7.92%	7.92%	
Depreciation & Amortization									
D&A as % of Revenue		0	31.6	39.7	62	52.4	53.1933641	53.99874015	
		0.00%	1.25%	1.51%	2.31%	1.96%	1.51%	1.51%	
Balance Sheet and Other Data									
Cash		221.2	318.4	303.6	353.7	240	240	240	
Accounts receivable		543.2	563.9	607.3	595.5	602.7	618.91263	635.5613797	
Inventory		413.2	482	513.6	477.9	546.9	604.308595	667.7434229	
Prepaid Expense		0	0	0	40.9	39.8	40.198	40.59998	
Account Payable		237.8	275.7	256.3	315	361.7	403.87422	450.9659541	
Accrued Expenses		0	0	0	282.9	284.3	285.7069282	287.120819	
Accrued Expenses(Raw data)		0.00	0.00	0.00	2.83	2.84			
Debt						1042.2			
Accrued Expense (Reverse data)		2.84	2.83	0.00	0.00	0.00			
Gross PP&E(increase annual be calculated)			196.4	205.4	204.2	239.9	260.17155	282.156046	
Account Receivable Growth (%)			3.81%	7.70%	-1.94%	1.21%	2.69%	2.69%	
Inventories Growth (%)			16.65%	6.56%	-6.95%	14.44%	10.50%	10.50%	
Prepaid Expenses Growth(%)						-2.69%	1.00%	1.00%	
Account Payable Growth (%)			15.94%	-7.04%	22.90%	14.83%	11.66%	11.66%	
Accrued Expenses Groth (%)						0.49%	0.49%	0.49%	
Capital Expenditure Growth (%)				4.58%	-0.58%	17.48%	8.45%	8.45%	
Free Cash Flow Buildup									
Period							1	2	
Total Revenues							2756.763031	2837.630651	
EBITDA									
EBIT							225.4551616	243.3223069	
Tax Rate							20%	20%	
EBIAT							180.3641293	194.6578455	
Depreciation & Amortization							53.1933641	53.99874015	
Accounts receivable							(16.21)	(16.65)	
Inventories							(57.41)	(63.43)	
Prepaid expenses							(0.40)	(0.40)	
Accounts Payable							42.17	47.09	
Accrued expenses							1.41	1.41	
Capital expenditures							(20.27)	(21.98)	
unlevered free cash flows							182.85	194.69	
Discount rate (WACC)							3.76%	3.76%	
Present value of free cash flows							175.97	187.36	
Sum of present values of FCFs		363.3291203							
Terminal Value									
Growth in perpetuity method:									
Long term growth rate		2.60%							
WACC		3.76%							
Free cash flow(t+1)		199.7541529							
Terminal value		17159.85117							
Present value of terminal value		14265.21584							
WACC									
Share Price		40.07							
Diluted Share Outstanding		116							
Cost of Debt		0.32%							
Tax rate		20%							
After - tax cost of debt		0.26%							
Cost of Equity		4.78%							
			RF	RM-RF	Beta				
			1.71	5.9	0.52				
Total Debt		1042.2							
Total Equity		4648.12							
Total Capital		5690.32							
Debt Weighting		22.42%							
Equity Weighting		78%							
WACC=		3.76%							
Enterprise Value to Equity Value									
Enterprise Value		14628.54496							
Less: Net debt		802.2							
Equity Value		13826.34496							
Dilluted Shares Outstanding		116							
Equity Value per Share		119.19	Undervalued						

Appendix 20. DCF Valuation of CGCBV

Valuation Date		3-May-19							
Share price		36.96							
Dilluted share outstanding		65							
Select Operating Data									
Currency: Euro			2014	2015	2016	2017	2018	2019	2020
Revenue			3357.8	3729.3	3513.7	3280.1	3303.5	3336.535	3369.90035
Revenue (%)	Growth rate			11.06%	-5.78%	-6.65%	0.71%	1.00%	1.00%
EBIDTA									
EBIDTA	Margin %								
EBIT			139.31	225.5	249	262.7	241.6	257.35232	274.1316913
EBIT	Margin %		4.15%	6.05%	7.09%	8.01%	7.31%	6.52%	6.52%
Depreciation & Amortization			0	0	0	0	0	0	0
D&A as % of Revenue			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Balance Sheet and Other Data									
Cash			205.4	175.8	273.2	309.1	256.3	256.3	256.3
Accounts receivable			712.9	631.4	654	588.9	626.3	632.563	638.88863
Inventory			657.9	604	623.3	581.1	556	573.792	592.153344
Prepaid Expense									
Account Payable			416.6	388.8	438.5	415.7	424.2	427.33908	430.5013892
Accrued Expenses			1060.3	863.4	1002.5	861.2	924.5	933.745	943.08245
Accrued Expenses(Raw data)			0.11	0.09	0.10	0.09	0.09	0.09	0.09
Debt							971.3		
Accrued Expense (Reverse data)			0.09	0.10	0.09	0.11	0.00		
Gross PP&E(increase annual be calculated)				305.7	308.6	310.8	308.7	311.787	314.90487
Account Receivable Growth (%)				-11.43%	3.58%	-9.95%	6.35%	1.00%	1.00%
Inventories Growth (%)				-8.19%	3.20%	-6.77%	-4.32%	3.20%	3.20%
Prepaid Expenses Growth(%)									
Account Payable Growth (%)				-6.67%	12.78%	-5.20%	2.04%	0.74%	0.74%
Accrued Expenses Growth (%)				-18.57%	16.11%	-14.09%	7.35%	1.00%	1.00%
Capital Expenditure Growth (%)					0.95%	0.71%	-0.68%	1.00%	1.00%
Free Cash Flow Buildup									
Period								1	2
Total Revenues								3,336.54	3,369.90
EBITDA									
EBIT								257.35	274.13
Tax Rate								20%	20%
EBIAT								205.88	219.31
Depreciation & Amortization								0.00	0.00
Accounts receivable								(6.26)	(6.33)
Inventories								(17.79)	(18.36)
Prepaid expenses									
Accounts Payable								3.14	3.16
Accrued expenses								9.25	9.34
Capital expenditures								(3.09)	(3.12)
unlevered free cash flows								191.12	204.00
Discount rate (WACC)								5.97%	5.97%
Present value of free cash flows								179.71	191.82
Sum of present values of FCFs								371.5234297	
Terminal Value									
Growth in perpetuity method:									
Long term growth rate			2.60%						
WACC			5.97%						
Free cash flow(t+1)			209.3042752						
Terminal value			6205.282681						
Present value of terminal value			4642.857942						
WACC									
Share Price			36.96						
Diluted Share Outstanding			65						
Cost of Debt			0.32%						
Tax rate			20%						
After - tax cost of debt			0.26%						
Cost of Equity			9.85%						
				RF	RM-RF	Beta			
				1.71	5.9	1.3802			
Total Debt			971.3						
Total Equity			2402.4						
Total Capital			3373.7						
Debt Weighting			40.43%						
Equity Weighting			60%						
WACC=			5.97%						
Enterprise Value to Equity Value									
Enterprise Value			5014.381372						
Less: Net debt			715						
Equity Value			4299.381372						
Dilluted Shares Outstanding			65						
Equity Value per Share			66.14	Undervalued					

Appendix 21. DCF Valuation of FORTUM

Valuation Date		3-May-19							
Share price		18.55							
Dilluted share outstanding		888							
Select Operating Data									
Currency: Euro			2014	2015	2016	2017	2018	2019	2020
Revenue			4751	3459	3632	4520	5242	5791.752046	5791.752046
Revenue (%)	Growth rate			-27.19%	5.00%	24.45%	15.97%	10.49%	0.00%
EBIDTA									
EBIDTA	Margin %								
EBIT			1342	807	642	809	961	1137.177222	1345.652482
EBIT	Margin %		28.25%	23.33%	17.68%	17.90%	18.33%	18.33%	18.33%
Depreciation & Amortization			526	346	373	464	536	591.0230088	651.6943974
D&A as % of Revenue			11.07%	10.00%	10.27%	10.27%	10.23%	10.27%	10.27%
Balance Sheet and Other Data									
Cash			2766	8202	5154	3896	585	585	585
Accounts receivable			549	395	562	743	800	959.5120292	1150.829168
Inventory			256	231	233	216	233	234.165	235.335825
Prepaid Expense				29	31	0	0		
Account Payable			298	249	323	318	334	339.8173764	345.7360758
Accrued Expenses				315	323	384	281	288.1365079	295.4542605
Accrued Expenses(Raw data)				3.15	3.23	3.84	2.81		
Debt							6092		
Accrued Expense (Reverse data)				2.81	3.84	3.23	3.15		
Gross PP&E(increase annual be calculated)				7955	9106	9883	9981	10832.66231	11756.99557
Account Receivable Growth (%)				-28.05%	42.28%	32.21%	7.67%	19.94%	19.94%
Inventories Growth (%)				-9.77%	0.87%	-7.30%	7.87%	0.50%	0.50%
Prepaid Expenses Growth(%)					6.90%	-100.00%	0.00%	1.00%	1.00%
Account Payable Growth (%)				-16.44%	29.72%	-1.55%	5.03%	1.74%	1.74%
Accrued Expenses Groth (%)					2.54%	18.89%	-26.82%	2.54%	2.54%
Capital Expenditure Growth (%)					14.47%	8.53%	0.99%	8.53%	8.53%
Free Cash Flow Buildup									
Period								1	2
Total Revenues								5,791.75	5,791.75
EBITDA									
EBIT								1,137.18	1,345.65
Tax Rate								20%	20%
EBIAT								909.74	1,076.52
Depreciation & Amortization								591.02	651.69
Accounts receivable								(159.51)	(191.32)
Inventories								(1.16)	(1.17)
Prepaid expenses								0.00	0.00
Accounts Payable								5.82	5.92
Accrued expenses								7.14	7.32
Capital expenditures								(851.66)	(924.33)
unlevered free cash flows								501.38	624.63
Discount rate (WACC)								3.96%	3.96%
Present value of free cash flows								481.52	599.89
Sum of present values of FCFs								1081.4123	
Terminal Value									
Growth in perpetuity method:									
Long term growth rate				2.60%					
WACC				3.96%					
Free cash flow(t+1)				640.8720389					
Terminal value				47096.45099					
Present value of terminal value				38782.95066					
WACC									
Share Price			18.55						
Diluted Share Outstanding			888						
Cost of Debt			0.32%						
Tax rate			20%						
After - tax cost of debt			0.26%	RF	RM-RF	Beta			
Cost of Equity			6.14%	1.71	5.9	0.75			
Total Debt			6092						
Total Equity			16472.4						
Total Capital			22564.4						
Debt Weighting			36.98%						
Equity Weighting			63%						
WACC=			3.96%						
Enterprise Value to Equity Value									
Enterprise Value			39864.36296						
Less: Net debt			5507						
Equity Value			34357.36296						
Dilluted Shares Outstanding			888						
Equity Value per Share			38.69	Undervalued					