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Valuation of Norway Royal Salmon ASA

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Preface

This thesis is the final part of my studies towards a bachelor's degree at Handelshøyskolen BI in Oslo.

To value Norway Royal Salmon has been both challenging and rewarding. I have realized that valuation is an art rather than a science and that a value-estimate partly is based on subjective value-perceptions. Although much of the knowledge I have dedicated me during my years at BI came to use, I soon realized that I was facing challenges where this was not sufficient and that I had to acquire new knowledge or take my own assumptions.
I believe this thesis is a good stepping stone for me towards further studies in finance.

I would like to thank my supervisor Tor Tangenes who has provided good advices and guidance during the entire process.
Finally, I would like to thank the people who have proofread and provided valuable, constructive, feedback. Thank you.

Andreas Lachonius

Summary

In this bachelor thesis, I have performed a valuation of Norwegian Royal Salmon ASA (NRS).

The problem statement in the thesis is defined as:

> *‹‹What is the fundamental value of a share in NRS, traded at the Oslo Stock Exchange as of 23.05.2017››?*

With a sub-problem statement:

> *‹‹Should the fictive investor buy, remain neutral, or sell the NRS stock when his objective is financial profit››?*

The valuation is built of many different analyzes. The first step was to analyze the financial statement of the firm and to compare historical key figures of NRS and an industry benchmark. This was done to gain a better understanding of the firm's current financial position. The second analysis I performed was a profound strategic analysis, which consisted of both internal and external aspects of the firm. A good strategic analysis of macro-economic factors, and potential competitive advantages is essential in order to understand the firm's ability, and possibilities, to grow in the future.

Based on the financial statement analysis and the strategic analysis, I started to forecast the next ten years for the company. I chose a period of 10 years to avoid undervaluing the firm, which is a common result in a valuation of cyclical companies if the forecast period is shorter.

The main valuation approach in this thesis is the discounted cash flow (DCF) analysis. The forecasted variables serve as inputs in the DCF model. Due to the high uncertainty tied to the value estimate derived from the model, I have also used relative valuation as a control method. Once the valuation was performed, I conducted different simulations and sensitivity analyzes to see what happens with the share price when selected variables in the DCF model are changed.
As an answer to the problem statement, I have concluded that the NRS stock is currently undervalued in the market in relation to its fundamental value, which results in a buy recommendation to the fictive investor.

1. Introduction

1.1 Purpose

The purpose of this thesis is to perform a valuation of the Norway Royal Salmon ASA stock. Thus, the ultimate objective is to estimate its fundamental value and to find out whether a share of the firm, traded at the Oslo Stock Exchange, is overpriced, underpriced, or correctly priced in relation to the estimated value. The fundamental value will be derived to the output from the discounted cash flow model used in this thesis.

1.2 Problem Statement

A problem statement could be defined as ‹‹an issue that is addressed with a specific objective and in a manner, that it lets itself be illuminated by social science methods›› (Johannessen, Christoffersen & Tufte, 2011, p. 63). To formulate a problem statement is basically about answering two questions: *What and who should be investigated?*
Applying this definition and the two questions to the field of valuation, I have come up with the following answers to define a good and precise problem statement:

Why do I value a firm?
I perform the valuation to be able to provide a recommendation whether an investor should buy, sell, or remain neutral to a stock when his objective is financial profit.

What and who should be valued?
When searching for an appropriate firm to value, I based the research on the following preferences and ideas:

- I wanted to value a listed company to make it easier to provide a financial recommendation.
- I wanted a company that is engaged in one industry only, rather than multiple industries, to be able to do a more accurate valuation and to limit the scope of this thesis.
- The more factors that make the fundamental value of a firm uncertain, the greater chance that a valuation could achieve financial profit.

It should be mentioned that this statement is based on the idea that there is a greater possibility that the market is pricing a specific stock wrong when it is greater uncertainty tied to its fundamental value (see market efficiency). Based on financial literature, I considered some well-known drivers of uncertainty:

- The value of a young firm is more uncertain than the value of a mature firm, assuming that a young firm's fundamental value is based on expected cash flows from future investments in comparison to a mature firm whose fundamental value is based on cash flows from investments already made.
- The value of a firm operating in an immature industry is more uncertain than the value of a firm operating in a mature industry since immature industries tend to lack stability in the market and tend to have low barriers to entry.

What about market efficiency?

If we assume that the financial markets are efficient, valuing a company would be unnecessary. In that case, we could just have looked at the current stock prices to find the best estimated value of a company. Thus, I assume that the market is mispricing individual stocks but that it will converge towards a correct price when new information makes the mispricing evident. However, it is important to mention that there are a lot of disagreement about market efficiency among financial theorists.

For whom is the valuation done?

The valuation will be done to provide a financial recommendation to a fictive investor. The investor is not assumed to be a marginal investor, i.e. he does not trade at the margin, which means that he does not set prices of the stock. Furthermore, the investor is assumed to be well diversified in accordance with standard modern portfolio theory. Finally, the investor has a long-time horizon on his investments.

After carefully considerations, I decided to perform the valuation on Norway Royal Salmon ASA (henceforth called NRS). NRS is listed on Oslo Børs (Oslo Stock Exchange) and operates in an industry I find very interesting.

Finally, the problem statement can be defined as:

‹‹What is the fundamental value of a share in NRS, traded at the Oslo Stock Exchange as of 23.05.2017››?

With a sub-problem statement:

‹‹Should the fictive investor buy, remain neutral, or sell the NRS stock when his objective is financial profit››?

1.3 Demarcation

In this thesis, historical accounting data from the last five years is used. This applies for both NRS and its competitors in the industry, which means that the financial year that ended in 2016 is the last year considered. Since the quarterly report for Q1 2017 is released close to the thesis' due date, I find it both practical and convenient to restrict the information to the Q4 2016, and annual 2016 reports. All other information is updated as of 23.05.2017. The valuation is based on publicly available information such as quarterly and annual reports, news articles, financial data from the Bloomberg Terminal, information from governmental and other independent sources etc. This means that I have not contacted the firm to get internal information. Furthermore, I have chosen to ignore how possible exchange rate movements between currencies in the future may affect future sales revenue.

Finally, I have not considered the market psychology in the financial markets. If the NRS stock is undervalued based on my analysis, it would implicate a buy recommendation, even though market psychology could indicate that it will be undervalued in a perspicuous future.

1.4 Thesis Structure

Chapter one deals with the purpose, problem statement, and demarcation of the thesis. In chapter two, an introductory to the company, industry, and product is presented. Chapter three, four, and five are theoretical chapters where financial and strategic theories are presented in addition to methodologies, analysis tools, and financial methodologies used. Chapter five also presents different valuation approaches and a detailed presentation of each component of the discounted cash flow model. Chapter six to chapter ten are analytical chapters where I start with a historical financial statement analysis of NRS and its competitors before moving on to a strategic analysis of both internal and external factors that affects NRS. Chapter eight is the forecasting chapter where all inputs for the valuation are

estimated and explained. In chapter nine, the valuation is performed and a summary of the results from the intrinsic valuation and the relative valuation is presented. Chapter ten deals with uncertainty considerations and several simulations are performed. Chapter eleven to chapter thirteen are the closing chapters where I discuss the results, presents criticism of the thesis, and finally presents a conclusion related to the problem statement.

2. Description of the Firm, Industry & Product

NRS is a public company, listed on the Oslo Stock Exchange. NRS is engaged in farming of Atlantic salmon (aquaculture) and sales & marketing of its products. The company is headquartered in Trondheim.

2.1 NRS History

NRS was founded in 1992 by 34 fish farming companies as a sales and marketing company for farmed Atlantic salmon. In 1996, NRS took control of Reinhartsen Seafood AS with 90.1% of the shares and changed the name to NRS Sales AS. The company Salmon Invest AS was established at the same time. In 2003, the three companies NRS, NRS Sales and Salmon Invest was merged. Four years later, the company continued to grow and acquired Feøy Fiskeoppdrett AS and Åmøy Fiskeoppdrett AS together with 82.5% of the shares in Nor Seafood AS. In the following three years, NRS acquired several fish farming companies, including Altafjord Laks AS, AS Brilliant Fiskeoppdrett, AS Tri along with smaller stakes in multiple companies. On the 29th of March, 2011, NRS became listed on the Oslo Stock Exchange and the IPO valued the company at 832 million NOK. In 2016, NRS acquired 50% of the shares in the Icelandic fish farming company Arctic Fish ehf (NRS, 2017c).

2.2 NRS Performance

2016 was a record year for NRS who posted operating revenues of 4.22 billion NOK (3.2 billion in 2015) and a net profit of 1 billion NOK, which was a significant improvement from the net profit in 2015 of 237.5 million NOK. The increase in revenues and net profit is due to higher prices of farmed salmon. The farming business is divided in two geographical segments; Region North and Region South. As of today, NRS owns 35 licenses to produce farmed Atlantic salmon, divided between 29 licenses in the north region (Troms and Western

Finnmark), and 6 licenses in the south region, located in the area near Haugesund. The harvested volume (also called HOG[1]) was 26 819 tonnes in 2016, which was down 3.9% from 27 903 tonnes in 2015. For 2017, NRS are expecting to harvest 34 000 tonnes HOG (up 27% from 2016). The firm's total capacity is 45 000 tonnes HOG on a yearly basis (NRS, 2017a).

2.3 The Product Salmon

Salmon is the common name for species of fish in the Salmonidae-family (Atlantic- and Pacific Salmon) and several trout species (e.g. brown- and seawater trout). Approximately 70% of the world's salmon production is farmed and the Atlantic salmon is by quantity the largest species of salmonids. Consumption of salmon is considered to be healthy because of its high content of protein and Omega- 3 fatty acids, as well of its richness of D- and B12 vitamins and high content of minerals. The total supply of farmed salmon, globally, exceeds 2.2 million tonnes HOG, in comparison with 1 million tonnes HOG of wild salmon (Marine Harvest, 2017).

2.4 Salmon Production

Salmon farming companies are subject to a large number of regulations. In Norway, a company needs to get awarded licenses by the Norwegian Ministry of Trade, Industry and Fisheries, which are administrated by the Directorate of Fisheries, to be able to farm salmon. Furthermore, there are production limitations known as ‹‹maximum allowed biomass›› (MAB), which defines the maximum volume of salmon a producer can hold at sea at all times (Marine Harvest, 2017). One license is set at a MAB of 780 tons, except in Troms and Finnmark (North Region) where the MAB is of 945 tons per license (Directorate of Fisheries, 2017). The sum of all license-MAB that a firm holds is the firm's total allowed biomass for production.

The farming production cycle of Atlantic salmon is about three years. During the first 12 months of production, the process takes place in freshwater environment

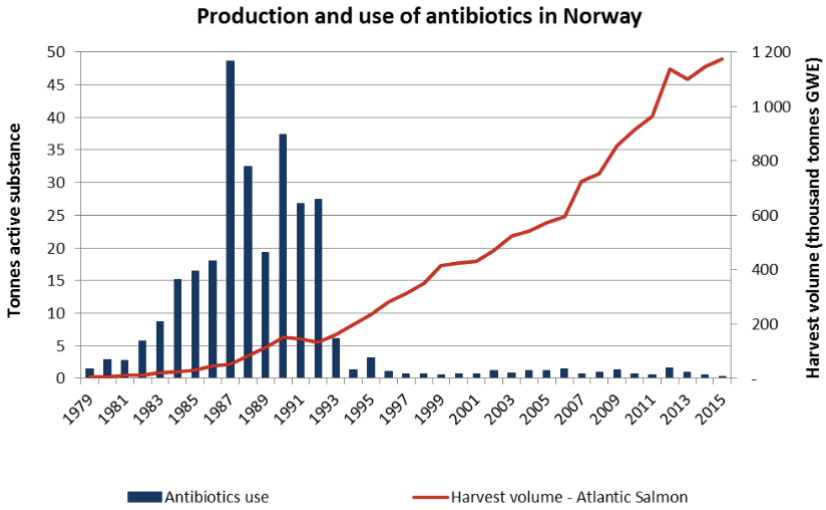
[1] Harvested volume = fish harvested in a specific period in a standardized term, i.e. HOG (Head-on-Gutted) or GWE (Gutted Weight Equivalent), which is the same weight measure.

where the eggs are fertilized and the fish grows into 100 grams. After about 14 months, the fish is transferred to sea where it spends 14-24 months growing out to approximately 4-5 kg. Smolt is generally released into seawater twice a year in Norway[2]. When the salmon reaches harvestable size, it is slaughtered, processed, and sold gutted on ice in a box (HOG) (NRS, 2016a). The harvested volume is spread throughout the year but the quantity is largest in the fourth quarter due to better growth. During the summer months, the supply to the market is different than during the rest of the year because the harvesting pattern shifts generation (Marine Harvest, 2017).

2.4 Operational Risk

The salmon farming industry is a subject to several risk factors, mainly tied to the health of the fish. One way to overcome this is to vaccinate the fish during the freshwater stage of the production cycle. Besides improving the health of the fish, vaccines also reduced the use of antibiotics in Norway once it was introduced to the market as shown in the graph below (Marine Harvest, 2017). Overuse of antibiotics can result in a development of antibiotic resistance, which can be dangerous to humans (WHO, 2015).

Figure 1: Antibiotics Use in Norway (Marine Harvest, 2017)



Today, sea lice are the biggest health issue for the salmon farming industry. Sea lice infect the salmon skin and causes severe lesions, which increases the mortality of the farmed salmon. In 2016, almost 53 million salmons died in the sea cages, the majority because of sea lice infections. This number represented

[2] Smolt = juvenile fish

over 16% of the salmons that were put in the sea cages during the year (Norwegian Veterinary Institute, 2016). The fish farming companies in Norway spends approx. 10 billion NOK on a yearly basis, trying to overcome the sea lice-issue. The methods included are different medicines, fresh water treatment, wrasses, and mechanical removal of the lice (Directorate of Fisheries, 2017). Another severe risk factor is the Pancreas Disease (PD) that is caused by a virus, which exists in Europe. The highly contagious virus causes muscle and pancreas lesions, which elevates the mortality (Institute of Marine Research, 2017).

2.5 Salmon Industry and Markets

Norway is the largest producer of farmed Atlantic salmon in the world, producing more than 1 million tonnes HOG annually which represents about 54% of the global harvest. Historically, the industry has consisted of many small firms. However, the industry is changing and during the last decade, the salmon farming industry has experienced increased consolidation. As of today, there are 151 companies owning licenses for salmon farming in Norway (Directorate of Fisheries, 2017). Despite this, the top ten salmon farming companies in Norway contribute with 70% of the total harvest of approx. 1.2 million tonnes HOG (Marine Harvest, 2017). Other major producing countries of farmed Atlantic salmon are Chile, Canada, Scotland and Faroe Islands. Norway and Chile, the two largest producers of farmed salmon, have a countercyclical production, resulting in an even supply to the global market throughout the year. Since salmon farming requires a water temperature of 0 to 20 degrees Celsius, the existence of a current below a certain level, and several biological parameters, there are limited coast lines in the world that are suitable for the industry. The main market for Norwegian salmon farming companies has historically been EU, Russia and Asia. Since 2014, however, Russia is boycotting Norwegian salmon as a response to the sanctions Norway put on the Russian oil industry in 2014 (Breivik, E24, 2016). In general, each producing region has focused on supplying the nearby markets. This is since salmon is a fresh product, which means that time and cost of transportation makes it suitable to focus on the nearest markets. The exception is the Asian market that is shared by all producers since the transportation cost is similar from all countries (Marine Harvest, 2017). Europe, Russia and North America are the largest markets for Atlantic salmon but in recent year, there has been a significant growth in demand in emerging markets. It was particularly the

strong development in South-East Asia that contributed to the growth in the Asian market, which now has a market share of Norwegian Salmon at 15% (Kontali Analyse, 2016). The harvested volume in 2016 was down 7% on a global scale compared to the volume in 2015. In Norway, the harvested volume was down 5% from 2015. The spot prices of farmed Atlantic salmon reached record high levels in 2016. The price of 66.13 NOK/kg HOG on a 12 month-average was up 50% from 42.09 NOK/kg HOG in 2015. Because of the high spot prices, the prices on forward contracts (typically with duration of 3-12 months) also reached record high levels (Fish Pool, 2017a). The all-time high salmon prices were driven by a strong demand and the decline in global supply. For supplementary data to chapter 2, please refer to appendix 1.

3. Theoretical Foundation

3.1 The Value Concept

It is important to distinguish between the concepts of ‹‹price›› and ‹‹value››. The buyer of a fortune object pays a certain price for it. Thus, the price is an observable size that emerges from the actual price paid in a transaction. The value, on the other hand, depends on the buyer's personal preferences, which basically makes the value a subjective size. Consequently, the value concept must be understood as a subjective value perception (Dyrnes, 2011a, p. 80). Valuation is essentially about estimating the likely price of a fortune object that would be paid in a particular market, at a certain time, and under certain conditions.

Some people argues that the market value does not always reflects the fundamental value of a firm. This is based on the idea that it is possible to perform analyzes of whether the market value reflects the fundamental value of the firm or not. When analyzing a firm, an analyst must interpret and evaluate the available information, which leads to uncertain estimates of the future economic development. This is the reason why different brokerage firms operate with different recommendations for the same stock; their analysts have different value perceptions, despite having access to the same information (Dyrnes, 2011a, p. 81). Consequently, it seems inexpediently to assume that a fortune object has a single true value. Instead, we should think of a valuation as an estimate of a hypothetical price based on certain assumptions of the market.

Before performing a valuation of a stock, it is important to define the bases of value. Herein lies the question of *‹‹the value for whom››?* To answer this, we need to determine whether it is the subjective value for a single person, the equilibrium price in a market, or the hypothetical price agreed between a few parties (Dyrnes, 2011a, p. 92).

The International Valuation Standards Council (IVSC) operates with three different bases of value: *open market value, closed transaction value,* and *value in use* (IVSC, 2017).

The open market value is an estimate of the likely price that would be paid in a hypothetical transaction in a free and open market. However, it is important to understand, and to describe the market where the valued object normally is traded. As quoted by IVSC:

> *‹‹In order to undertake valuations based on the estimated price that would be paid for an asset, it is of fundamental importance to understand the extent of the market in which that asset would trade››* (rendered in Dyrnes, 2011a, p. 93).

The closed transaction value is an estimate of the price in a transaction between two, or more, predefined parties. The closed transaction value is the natural base of value when market value seems unreasonable.

The value in use is an estimate of the result of owning and using the object, rather than what the object could have been sold for in a hypothetical transaction. According to IAS 36 Impairment of Assets[3], the value in use is the discounted present value of the future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its useful life (International Financial Reporting Standards, 2014).

Another important aspect to consider when estimating a value is the ‹‹level of value››, which is a hypothesis saying that the price of a stock may vary depending on which level of value the stock trades at. Dyrnes operates with five levels of value: market for strategic control, liquid market for financial control, market for liquid minority stakes, illiquid market for financial control, and market for illiquid minority stakes (2011a, p. 95).

[3] IAS 36 = International Accounting Standards 36, dealing with impairment of assets.

The last aspect to consider when determining which value that should be estimated is premise of value. This is under which hypothetical circumstances the value will be estimated. A few examples are:

- *Is the firm a going concern or will it liquidate?*
- *If the firm will be sold, is the sale well organized or forced?*
- *Are there any limitations regarding revenues of the object that should be considered in the valuation?*

3.2 Reasons for Competitiveness

How we perceive the competitiveness of a firm depends on whether we identify ourselves with the competitive positioning school developed by Michael Porter, or with the resource based view (RBV), which has been developed over a long time by several theorists, such as Penrose, Rumelt, Wernefelt, and Barney. However, the two theories are not clean competitors which means that one theory does not automatically exclude the other. When performing a valuation with a discounted cash flow model, the strategic analyzes of the firm are highly relevant. The reason is that both internal and external aspects of the firm are important to consider when estimating future cash flows.

3.2.1 Porter's Strategic Positioning

The competitive positioning school argues that certain positions in a market offers possibilities to develop, and to protect competitiveness for a company. Thus, the company needs to carefully analyze the market to find a position that they can take. The theory also suggests that the possibilities for a firm to find an attractive position in the market depends on the degree of existence of entry barriers, product differentiation, and concentration in the industry (Gjønnes & Tangenes, 2014, p. 184-185). There are several major sources of entry barriers according to Porter: *economies of scale, capital requirements, cost disadvantages independent of size, access to distribution channels,* and *government policy.*

Economies of scale often deter entry by forcing the aspirant to either entry on a large scale or to accept a cost disadvantage. Capital requirements create a barrier to entry if the new player needs to invest large financial resources in order to compete, particularly if the capital is required for unrecoverable expenditures tied to advertising or research and development (Porter, 1979, p. 138). Consolidated companies may have a cost advantage that is unavailable to the competitors, no

matter what their size and economies of scale. Such advantages can be the favorable locations, access to superior raw materials sources, or proprietary technology. This entry barrier is known as cost disadvantages independent of size. Access to distribution channels is a prerequisite for a new player to successfully enter a market. Without securing the distribution of their products, the new player will not last for long. Finally, the government can limit or restrict entry to industries by implementing license requirements and limits on access to raw materials (Porter, 1979, p. 139-140). Porter also developed the model ‹‹The five competitive forces››, which is widely used when analyzing a company's competitive landscape based on the theory of the positioning school. The five forces were identified as *Threats of new entrants, bargaining power of buyers, bargaining power of suppliers, threat of substitute products or services,* and *rivalry among existing competitors* (Porter, 1979; Harvard Business Review, 2008, p. 27). The theory by Michael Porter is considered to have an ‹‹outside-in›› approach when explaining competitiveness.

3.2.2 The Resource Based View

On the other side, the RBV has an ‹‹inside-out›› approach when explaining competitiveness and argues that the competitiveness of a firm depends on the unique resources the firm possesses. To develop a competitive advantage, a firm needs to possess, or develop resources that are valuable, rare, costly to imitate, and that lacks substitutes. This is usually referred to as the VRIN framework. In the RBV theory, firm resources include all assets, capabilities, organizational processes, firm attributes, and knowledge that are controlled by the firm (Barney, 1991, p. 101). According to Barney, a firm can either have a competitive advantage or a sustained competitive advantage. The prior is when a firm implements a value creating strategy that has not been implemented by any current or potential competitors. Sustained competitive advantage is when a firm implements a value creating strategy that has not been implemented by any current or potential competitors and in addition, these other firms are unable to duplicate the benefits created by the strategy. However, that a competitive advantage is sustained does not imply that it will last forever. It rather means that it will not be competed away by duplication efforts of other firms. One of the most important arguments of Barney is that immobile resources create barriers to entry. If firm resources are mobile, any resource that allows a firm to implement

strategies currently protected by entry barriers can be acquired by firms that are seeking entry to a market or industry, which would remove some entry barriers. Instead, these barriers become sources of sustained competitive advantage when the firm resources are not perfectly mobile (p. 105). Consequently, a firm's strategy must according to the RBV, be based on resources that provides competitive advantages. When those are established, the firm may move on to decide a market position (Gjønnes & Tangenes, 2014, p. 184-185).

3.2.3 Industrial Clusters

Another cause of competitiveness is the existence of industrial clusters. A region must have strong industrial clusters to appear as an attractive localization to firms (Reve, 2009, p. 17). An industrial cluster consists of companies operating in the same industry and is characterized by shared competence between the companies, specialized actors in every part of the value chain, and dispersion of knowledge. These factors lead to increased competitiveness and innovation among the companies within the cluster. Eventually, the cluster will grow into a global knowledge hub, which is a type of ‹‹super-cluster››, consisting of a higher knowledge content and a larger critical mass than usually exists in an industrial cluster. The Silicon Valley, the biotechnology environment in Boston, and the aquaculture industry in Norway are typical examples of such global knowledge hubs (Reve, 2009, p. 20).

3.3 Portfolio Theory and Relevant Risk

The modern portfolio theory (MPT) was introduced by Harry Markowitz in 1952, and is now serving as a conceptual framework for portfolio management methods used by practitioners (Vollmer, 2014, p. 9). According to MPT, the greatest challenge for an investor is to find the perfect combination of risky assets considering the expected return and variance of return. A very simple, but still suitable explanation of the MPT is ‹‹Do not put all your eggs in one basket››. A basic assumption for the perfect combination of risky assets is that the portfolio with the highest return is not automatically the portfolio with the lowest risk. The underlying idea assumes that the expected return of a portfolio increases when an investor takes additional risk, or that a risk-averse investor is able to reduce the risk in exchange for lower expected return (Vollmer, 2014, p. 10). The MPT builds on the idea that when an investor adds another security to the risky

portfolio, the overall portfolio risk will be reduced. This concept holds as long as the investor is spreading the investments on securities in different industries, a process designated as diversification. When a risky portfolio consists of shares in companies in different industries, the firm-specific influences on the stocks differs, i.e. they are uncorrelated. The hope for such a portfolio is that when one stock lose value, another one should increase in value. The two effects are offsetting, which stabilizes portfolio return (Bodie, Kane, & Marcus, 2017, p. 148). The risk of a portfolio can be divided in two sources: *market risk or systematic risk* and *firm-specific risk or unsystematic risk.* The prior is the risk attributed to marketwide risk sources, such as business cycles, inflation, interest rates and exchange rates. The latter is the risk attributed to a specific firm, such as management style and philosophy, the firm's success in R&D, and uncertainty in earnings. The unsystematic risk can be eliminated by diversification. When all risk in a portfolio is firm-specific, diversification can reduce the risk to low levels, resulting in a low portfolio volatility. However, we cannot avoid all risk. Since all securities are affected by common macroeconomic factors, it is not possible to eliminate exposure to general economic risk, no matter how many stocks we add to the portfolio. This risk that remains even after extensive diversification is the systematic risk. The systematic risk is usually designated as beta in financial models. International diversification may reduce the portfolio further, but the same concepts applies here: there are some global economic and political factors that affect all countries, which will limit the extent of risk reduction (Bodie et al., 2017, p. 149).

3.4 Limitations of the Capital Asset Pricing Model

The capital asset pricing model, usually referred to as the CAPM, is a centerpiece of modern financial economics. The CAPM was developed by Treynor, Sharpe, Lintner, and Mossin in the early 1960s and derives from Markowitz modern portfolio theory. The model predicts the relation between the risk and equilibrium expected returns on risky assets. CAPM investors are expected to hold perfectly diversified portfolios, meaning that the unsystematic risk is already eliminated. Thus, the expected return of a stock is linearly correlated to its beta risk (Bodie et al., 2017, p. 193). The expected return of a stock is derived from adding the risk-free rate to the risk premium of the stock (see section 5.2 for a more detailed definition of the model).

When using the CAPM, we need to lay down some assumptions that underlie the model. Without going too deeply into details of these, we can define two major assumptions:

- *The markets for securities are perfectly competitive and equally profitable to all investors.*
- *Investors are alike in every way except for initial wealth and risk aversion; thus, all investors choose investment portfolios in the same manner.* (Bodie et al., 2017, p. 194).

It is obvious that these assumptions ignore many real-world problems. Although most empirical tests of the model in the 1970s concluded that CAPM is valid, criticism exists towards the model. Roll's criticism mentions that even if the proxy of the market portfolio is perfect[4], it does not reflect the correct weighting of all investments of all people. Consequently, the most crucial mistake is to use a false index as a proxy of the market portfolio since it misleads to a validation of the CAPM (Vollmer, 2014, p. 21).

Market efficiency is a basic assumption for any asset pricing model. In an efficient market, prices of securities fully reflect all available information about the securities. There are, however, empirical evidences that stock prices are not efficient in relation to all available information (Bodie et al., 2017, p. 233). Another important result from the studies of CAPM is that the unsystematic risk does not seems to affect the pricing of the stock. This implies that undiversified investors carry risk without being compensated for it. The results also imply that it is more than the systematic risk that seems to decide expected return and cost of equity for uncertain projects. In addition, factors like the size of a company and multiples like Price/Earnings and Price/Book, are indicated to affect the cost of equity. Since those factors are excluded in the CAPM, the model basically says that they are irrelevant. Furthermore, recent studies of companies listed on the Oslo Stock Exchange suggests that for companies of the same size, there is no connection between higher beta and higher achieved return (Bøhren & Michalsen, 2012, p. 136).

Roll also argues that the CAPM cannot be tested since the real market portfolio cannot be observed. Besides stocks and bonds, an investors efficient set of

[4] All securities in the market weighted by their capitalization.

investments also includes human capital, real estates, foreign investments, and art. Since CAPM uses a stock index as a proxy of the market portfolio, it basically neglects these investments. As a consequent, the measured market yield does not represent an investor's actual return on a maximum diversified portfolio (Vollmer, 2014, p. 22; Bøhren & Michalsen, 2012, p. 136).

The final important weakness of the CAPM is that the model is single-periodic while most real-life investments are multi-periodical. Hence, it is not obvious that the cost of equity estimated by CAPM can be used to discount all future, multi-periodical, expected cash flows.

4. Research Methodology

In this chapter, I will present the methodological approach used in this thesis. Methodology is about following a particular path towards an objective. This path is often referred to as the research process and consists of four phases; preparation, data collection, data analysis, and reporting (Johannessen et al., 2011, p. 36). Since this thesis is considered to be a report of the research process, the main focus in this chapter will be on the first three phases of the process.

4.1 Preparation

The starting point for all research is the desire to answer one, or several problem statements, and to successfully do so, you need to explore relevant theory. Thus, exploring financial literature and information about NRS was the first thing I did. I also had a look on previous works in the valuation field, both theoretical and practical, to get a sense of how the structure of my thesis should be. Search engines like Oria, Google Scholar, and Idunn.no has been valuable sources of information in terms of scholarly articles. In addition, financial literature provided me a deeper understanding of the valuation practice and which valuation models that are best suited for my work.

4.1.1 Purpose

The purpose of this thesis is to estimate the fundamental value of the publicly traded NRS stock. The thesis will also provide a basis for an investment advice given to a fictive investor. This process is referred to as providing a support for decisions based on action-oriented research. Keeping the definition from section 3.1 in mind, that the value concept must be understood as a subjective value

perception, we can conclude that results previous analyzes done should not be the foundation of this thesis since each individual analyst takes their own assumptions. Consequently, the purpose of this thesis can be considered to be of exploratory nature. An exploratory investigation aims to explore conditions that are less known, or unknown since the knowledge we possess of the phenomenon is inadequate (Johannessen et al., 2011, p. 61-62).

4.1.2 Approach

A common practice is to distinguish between inductive research design and deductive research design. In the inductive research approach, empirical findings provide the foundation for new theories. The deductive approach, on the other hand, compares established theories with your empirical findings (Nyeng, 2004, p. 37-39). In some cases, a researcher must use a combination of these approaches since the exclusion of one of them may lead to inaccurate research.
This thesis can be considered to have a deductive research design. The reason is that I use several established models to find out the fundamental value of NRS, and to see if it is under/over-priced. In other words; I move from theory to empirical findings. Furthermore, the empirical findings from my research are not supposed to create new theoretical aspects. In addition, the deductive approach is usually tied to quantitative research while the inductive approach is usually tied qualitative research (Ulleberg, 2002).

4.2 Data Collection

4.2.1 Research Strategy

This thesis is a case study, which implies that the researcher collects a lot of information from one or several units during a specific period of time (weeks, months, or years). Ultimately, the case should be studied in an appropriate setting, which in this case is economics. A case study can also be either a single-case study or a multi-case study. Furthermore, the case study can have one or several analysis units, which basically means that the researcher collects information from one or several individuals, programs, institutions, or concepts (Johannessen et al., 2011, p. 92).
This study should be considered as a single-case study with several analysis units. The reason is that I am only studying *one* case (NRS), using data collected from

several units such as quarterly reports, theoretical literature, analyzes from different institutions, and market news from the media.

4.2.2 Data Foundation

The data used in a case study can be of either qualitative or quantitative nature. According to Saunders, Lewis, & Thornhill (2016), qualitative data presents attributes tied to a phenomenon and are therefore best suited for case studies with an inductive design. They also argue that quantitative data can be measured in numbers unlike qualitative data, which is better suited for deductive studies (p. 566). A typical example of qualitative data is in-depth interviews, while standardized questionnaires are good examples of quantitative data. In other words, qualitative research has a broad and open approach when it comes to the object while quantitative research is focusing on analyzing already noted theory and variables (Nyeng, 2004, p. 187). Since this thesis is a valuation of a firm, it is natural to define it as a quantitative research, considering much of the information is collected form financial statements and forecasts. However, some of the information is collected from theoretical textbooks and other sources to gain a better understanding of the relevant theory. Thus, there are also some elements of qualitative data in the thesis.

We also distinguish between primary data and secondary data. Primary data is collected by the researcher, specifically for the research project being undertaken while secondary data originally were collected for some other purpose. Secondary data can be further analyzed to provide additional or different knowledge or conclusions. Furthermore, secondary data includes both raw data that usually must be further analyzed, and published summaries. Many secondary data sets were originally primary data sets but when researches combined them, they became secondary data (Saunders et al., 2016, p. 316-318).

This study is solely based on secondary data since all necessary information already is published. Some of the data I have used, for example financial data from quarterly reports and accounting information, can be classified as raw data which I had to analyze and process further. There are also some elements of compiled data (summarized data), for example reports and analyzes collected from the central bank and other institutions.

4.3 Data Analysis

4.3.1 Analysis Tools

The valuation process is based on several financial and strategic analyzes for which different tools are best suited. As for the financial analyzes, the discounted cash flow model (DCF), built in excel, is the most important tool. By using this model, I will arrive at the fundamental value of the firm. Furthermore, I will also perform a relative valuation of NRS where different multiples estimates are used as tools. When collecting financial raw data, the Bloomberg terminal is a tool that simplifies the procedure. Since the DCF model includes several variables (inputs), it is interesting to see how a change in any of these inputs affects the result (output). It will also illustrate which input that is the most decisive. Such an analysis is called a sensitivity analysis, which is used later in this study. A valuation is usually associated with uncertainty. As an analyst, you must take several assumptions about the future of the company, industry, and economy, which heavily affects the valuation. However, you never know whether your assumptions will be materialized or not, which makes the valuation uncertain. To test these uncertainty considerations, the Monte Carlo simulation is an appropriate tool. In chapter 10, you will find a further description of this tool. When valuing a firm using the DCF model, the strategic analyzes of the firm and industry are highly relevant. The reason is that both internal and external aspects affect the assumptions you take, which serves as the foundation for the estimated future cash flows. Consequently, established tools and frameworks like the VRIO, PESTEL, and Porter's five forces will be used and presented in chapter 7.

4.3.2 Methodological Qualities and Limitations

A basic question in all research is how reliable the data is, which in research terms is known as reliability. The reliability of the research is tied to the accuracy of the data, what data that is used, how the data is collected, and how it is processed. A common way to test the reliability is that several researchers studies the same phenomenon, and if they get the same result, it implies a high degree of reliability (Johannessen et al., 2011, p. 44). Another basic question is how relevant the data is to the phenomenon, commonly known as the validity of the data. The validity of the data is essentially about whether it represents the general phenomenon or not, and if it measures what it intends to do (Johannessen et al., 2011, p. 73).

To achieve a high reliability of this study, I have focused on using data, information, and theories that are generally accepted by theorists and authors. By comparing the information from several sources, I tried to determine if they got the same results, which would suggest a high degree of reliability. However, since all the data is categorized as secondary data, it is hard to know how reliable the primary sources are. It is important to understand where the original data is coming from and how it was collected to be able understand what motives and intentions that may have affected the interpretation of the data. In some textbooks, for example, the authors do not refer to their sources, which could be a sign of questionable reliability. Since a valuation of a firm usually is affected by many assumptions made by the analyst, it is characterized by subjectivity. This implies that if several people are valuing the same company, the result will most likely differ between each individual analyst. This can also be used to question the reliability of the research. Consequently, I have tried to limit the personal assumptions in this research to occasions where they are necessary and otherwise tried to use established market reports.

As for the validity of this thesis, I have tried to only use data, information, and theories that contributes to answering the problem statement. By constantly asking myself *‹‹Will this information contribute to bring the thesis forward?››*, my objective was to only use data that represents the general phenomenon. Once again, since some of the inputs in the DCF model are estimated future values, questions can be raised whether these represents the reality or not. This can also be used to question the validity of the research.

To assure a high methodological quality of this thesis, I have used several different valuation models and strategic models in addition to the statistical Monte Carlo Simulation and scenario analyzes. This should contribute to increasing the validity and reliability of the research, although there is a possibility that real numbers are outside the range used in the Monte Carlo simulation for example.

5. Financial Methodology

5.1 Valuation Methods

There are several possible methods to use when valuing a company and you can basically choose which tools you find best suited for the specific situation. The main method used in this valuation is the discounted cash flow analysis (DCF). In addition, I have performed a control valuation through a relative valuation. These

tools are widely different, both in what assumptions they are based on and what information they provide. Some may argue that the methods are competitors but I believe that they work as supplements and enable me to provide a more accurate recommendation to the investor. A lot of emphasis is put on valuation theory by Aswath Damodaran of NYU, Koller, Goedhart, & Wessels of McKinsey & Company, and Kaldestad & Møller. Below follow some widely known valuation tools and comments why I did, or did not, choose to use them.

5.1.1 Earnings-based Valuation

There are several earnings-based valuation tools to choose from but the DCF remains a favorite of practitioners and academics because it relies solely on the flow of cash in and out of the company, rather than on accounting-based earnings (Koller, Goedhart, & Wessels, 2015, p. 137). A common characteristic for earnings-based valuation tools is that they are usually more time consuming than other valuation techniques. However, I find it appropriate to use the DCF in this case study to be able to answer the problem statement as accurate as possible.

5.1.1.1 Discounted Cash Flow Model

As previously mentioned, the DCF is the main method used in this case study. The procedure of using the DCF starts by estimating future cash flows for a specific forecast period. The second step is to estimate the terminal value, considering the creation of value after the forecast period. Step three is about estimating a required rate of return and in step four, you finally discount the estimated future cash flows back to present value, based on the rate of return that reflects the asset's riskiness (Kaldestad & Møller, 2011, p. 29). These steps will be further explained and examined in chapter 5.2, DCF Inputs.

In DCF valuation, we believe that every asset has an intrinsic value, which we try to estimate by looking at an asset's fundamentals. This intrinsic value reflects the asset's cash flow potential and its risk. Damodaran (2010), defines the intrinsic value as *‹‹the value that would be attached to an asset by an all-knowing analyst with access to all information available right now and a perfect valuation model››* (p. 23). However, such an analyst does not exist and the problem lies in the fact that none of us gets to see the true intrinsic value of an asset. Consequently, we do not know whether our DCF valuation is close to the mark or not. A strength with the method is that is not heavily affected by the market's mood or momentum

since it is based on fundamentals of the asset. However, the method requires the analyst to take several assumptions regarding the future. These assumptions can be hard to estimate, but also easy to manipulate. Thus, if we want a high value of the firm we are valuing, it can relatively easy be achieved by the DCF model.

5.1.1.2 Dividend Discount Model

The dividend discount model (DDM) suggests that the value of equity is equal to the present value of future dividends. Dividends received by investors are the strictest measure of cash flow to equity. According to Kaldestad and Møller (2011), the model is best suited for firms in the financial industry (p. 37). Another limitation of focusing on dividends is that many companies have shifted from dividends to stock buybacks as their mechanism for returning cash to stockholders. Thus, focusing only on dividends will undervalue the firm's equity. Although this can be adjusted by relatively easy calculations, the problem remains that stock buybacks can spike in some years and be followed by years of inaction unlike dividends that are usually smoothed out over time. The model also requires a very long forecast period (Damodaran, 2010, p. 25). I have thus chosen not to use the DDM in this case.

5.1.1.3 Residual Income Model

The residual income (RI), also known as *‹‹super-profit››* is mainly based on results estimates. The model essentially says that the value of a firm is based on the capital invested +/- the present value of the return created by the invested capital. According to Dyrnes, the model is linking the strategy field with the valuation field in a better way than the DCF does (2011b, p. 41). The main difference between the RI and DCF models is that DCF is based on cash flow estimates while RI is based on result-estimates and the balance sheet (Gjønnes & Tangenes, 2014, p. 433). Another advantage with the model is that the terminal value is a smaller part of the total value than what it is in the DCF model. Thus, estimation-faults in the terminal value will have a smaller effect on the total value in the RI model. Furthermore, the model is not necessarily saying that growth is positive since growth can spoil values if it does not increase the residual income. A disadvantage with the model is that it is good in the theory, but relatively hard to use in practice. The reason is that the use of RI requires a certain understanding of how choices of accounting principles and time limits affects the financial

statements. The model is also little known and used in practice (Dyrnes, 2011b, p. 55). I therefore decided to use other valuation tools than the RI model.

5.1.2 Relative Valuation

In relative valuation, the objective is to find and asset's value based on how similar assets are currently priced in the market. Relative valuation consists of two components. Firstly, to value assets on a relative basis, prices must be standardized. This is achieved by converting prices into multiples of earnings, book values, or sales. Secondly, we need to find similar firms, which is difficult since no two firms are identical. Although firms are operating in the same business, they can still differ on risk, growth potential, and cash flows. (Damodaran, 2012, p. 453). The use of relative valuation is widespread and some of the commonly used multiples are: Price/Earnings (P/E), Price/Book Value (P/B), Price/Sales (P/S), and Enterprise Value/EBITDA (EV/EBITDA). There are several reasons why relative valuation is popular among analysts. A valuation based on multiples can be completed far more quickly and with fewer explicit assumptions than a DCF valuation. A relative valuation is also easier to understand and present to clients and customers. For example, it is easier to use multiples in sales pitches than using the complex DCF. Finally, a relative valuation is more likely to reflect the current mood of the market, since it is an attempt to measure relative value rather than intrinsic value (Damodaran, 2012, p. 454).

The strengths of relative valuation are also its weaknesses. Since a relative valuation can be put together easily by pulling together multiples and a group of comparable firms, it can also result in inconsistent estimates of value. The reason is that important variables such as risk, growth, and cash flow potentials are ignored. Furthermore, since multiples reflect the current market mood, it also implies that using those multiples can result in a value too high when the market is overvaluing comparable firms, or too low when it is undervaluing comparable firms. Finally, a biased analyst who is allowed to choose multiples and comparable firms to base the valuation on can essentially ensure that almost any value can be justified (Damodaran, 2010, p. 92-93). Due to its widespread in practice and its simplicity, I will use the relative valuation through the P/E, P/B, and EV/EBITDA multiples. Althouth P/E multiples are widely used, they have two major flaws: they are systematically affected by capital structure and are

including many non-operating items. EV/EBITDA are not affected by capital structure and are hence considered a better multiple than the price-based ones. These will be further explained in chapter 9, valuation.

5.1.3 Contingent Claim Valuation

This valuation method uses option pricing models to measure the value of assets that share option characteristics. These options can either be traded financial assets like warrants or non-traded real options like projects, patents, and oil reserves (Damodaran, 2012, p. 11). To have the option, but not duty, to implement a measure is considered to have a value (Kaldestad & Møller, 2011, p. 32). A contingent claim (option) pays off only under certain contingencies, for example if the underlying asset exceeds a pre-specified value for the option. Thus, an option-based valuation may be a valuable supplement to other models and can provide insight in what the underlying value drivers are. However, a valuation through real options can be difficult to undertake since it is hard to estimate the inputs in the model. Real options are well suited in industries characterized by high flexibility. In the salmon farming industry, a firm can decide the volume to grow but it is also tied to forward contracts, which can make the flexibility questionable. In this case, it is also possible to discuss real options in terms of development projects, licenses, patents, or mergers and acquisitions. These real options can provide some value to NRS, but I do not have the sufficient information about this and I have thus chosen not to use option-based valuation.

5.1.4 Other Valuation Methods

Besides the earnings based valuation, relative valuation, and contingency claim valuation, there are other existing valuation methods like the cost-based approach and the substance-based approach. However, since those are not widely used in practice, and since I will not use them in this valuation I find it little appropriate and unnecessary to examine and present these in detail here.

5.2 Discounted Cash Flow Model – Inputs

A firm is more than just its equity investors. It also has other claim holders, such as bondholders and banks. Consequently, when valuing a firm, we must consider cash flows to all of these claim holders. This is commonly known as the free cash flow to firm (FCFF). Using the DCF model, the firm value can be estimated by this formula:

$$\sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} + \frac{Terminal\ Value_n}{(1+WACC)^n}$$

In the following sections, the components are further explained. For supplementary material to chapter 5.2, see appendix 3.

5.2.1 FCFF

The FCFF is the cash flow left over after operating expenses, taxes, and reinvestment needs but before any debt payments. Thus, it measures the cash flow generated by the assets before any financing costs are considered, which is a measure of operating cash flow. An alternative approach is to use the free cash flow to equity (FCFE) in the DCF model, but since I am interested in valuing the firm rather than the equity, the FCFF is preferable. The approach to estimating FCFF is described as:

EBIT (1-tax rate) – (capital expenditures – depreciation) – change in noncash working capital = FCFF.

The difference between capital expenditures and depreciation and the increase in noncash working capital represent the reinvestments made by the firm to generate future growth (Damodaran, 2001, p. 751). These elements will be explained in detail in chapter 8, forecasting.

5.2.2 Cost of Capital (WACC)

Since a firm can raise its capital from both equity and debt, the cost of capital is defined as the weighted average cost of capital (WACC). The weights on the debt and equity should reflect their market value proportions as these proportions measure how the firm is financed (Damodaran, 2001, p. 218). The cost of debt and equity are also rates of return required by debt holders and equity holders (Koller et al., 2015, p. 148). The WACC formula is defined as:

$$WACC = \frac{E}{(D+E)}\ k_e + \frac{D}{(D+E)}\ k_d(1-t)$$

Where E = Equity (market value) D = Debt (market value)

k_e= Cost of equity k_d= Cost of debt t = Tax

5.2.3 Cost of Equity

As noted above, the cost of equity is the rate of return required by equity holders and hence, the cost a firm must pay to raise equity. The cost of equity is perhaps the most difficult component of WACC to estimate. Academics and practitioners have proposed numerous models to estimate the cost of equity during the years, but none have been universally accepted (Koller et al., 2015, p. 286). However, the most commonly used model is the CAPM, which also is used in my model. I thus assume that CAPM is valid even though some empirical tests clearly are questioning this for several reasons (see chapter 3.4). In addition, it is worth mentioning that the model is heavily affected by assumptions. The CAPM is defined as:

$$E\ (R_i) = \ R_f + \ \beta_i\ [E(R_m) - R_f]$$

Where $E\ (R_i)$= Expected return on asset *i* R_f= Risk-free rate

β_i= Beta of investment *i* $E(R_m)$= Expected return on market portfolio

5.2.3.1 Risk-free Rate

A risk-free asset is one for which an investor knows the expected returns with certainty. For an investment to be risk-free over a time horizon, two conditions must be met: there is no default risk and there is no uncertainty about reinvestment rates. Such assets are risk-free, and the interest rate earned on them are called the *risk-free rate* (Damodaran, 2001, p. 188). The most common practice is to use the current yield on long-term government bonds to estimate the risk-free rate. Furthermore, the most theoretically sound approach is to use a bond with the same duration as the estimated cash flow, for example; a 10-year bond for a 10-year estimation of cash flows (Koller et al., 2015, p. 289). According to Damodaran, only a zero-coupon government bond fulfills the conditions to be used as a risk-free rate since it has no default risk and there are no cash flows prior to the end of its maturity date. A government bond with coupons is not considered risk-free since the coupons have to be reinvested at the rates prevailing at that time (p.188). However, not all government bonds are risk-free, and there are examples in the history when governments have failed to pay their obligations. Norwegian government bonds are, however, considered to be approximate risk-free, and hence, using a 10-year zero-coupon Norwegian government bond as the risk-free rate will yield a close approximation of the true value. As of May 2017,

the 10-year Norwegian government bond's monthly average is 1.61% (Norges Bank, 2017a). Thus, in my model, R_f= 1.61%.

5.2.3.2 Market Risk Premium

The market risk premium is the extra return that is demanded by investors for shifting their money from a riskless investment to an average risk investment. In the CAPM, market risk premium is defined as $[E(R_m) - R_f]$. There are three ways to estimate the market risk premium; Historical premiums, Implied premiums, and questionnaires. Using historical premiums, is the most common approach and in the CAPM, the premium is estimated by looking at the difference between average returns on stocks and average returns on risk-free securities over an extended period of history (Damodaran, 2001, p. 190). However, the approach is best suited for the U.S. market which is large, diversified, and has a long history of returns on stocks and riskless securities. For markets with short and volatile histories, it is difficult to estimate a reliable historical premium. This is obviously true for emerging markets, but also for European equity markets. Although many Western European economies are mature, their equity markets do not share the same characteristics. Until two decades ago, many markets were dominated by a few companies, many businesses were private, and only a few stocks were commonly traded. Consequently, when estimating historical risk premiums for these markets, the standard deviation is usually very high, for example, 28% for the Norwegian market. (Damodaran, 2012, p. 164). The implied premium is estimated by looking at the relation between current share prices and aggregate fundamental performance (earnings, expected dividends, growth expectations, and required return on equity) (Koller et al., 2015, p. 286). I find this approach quite demanding considering my competence and I thus did not choose to use it.

The last approach is to use questionnaires where practitioners answer what they think is the appropriate risk premium. If the participants are representative for the market, this could be a useful approach. In addition, the estimate will be based on future expected returns. A disadvantage with the approach is that the result might be affected by the prevailing market mood at the time it is conducted (Kaldestad & Møller, 2011, p. 117).

In December 2016, PWC performed a survey with members of Norges Finansanalytikeres Forening with the objective to estimate the risk premium in the

Norwegian market. The conclusion of the survey was an average market risk premium of 5% (PWC, 2017). However, only 143 of the union's total 1166 members answered the survey, which makes it questionable if they can be considered as representative for the market. It is, also, difficult to know how historical numbers affected the answers and there is always general uncertainty tied to such estimates. Therefore, I did not use this estimate. According to Dimson, Marsh, & Staunton, Norway has had a real return on equities of 6.7% between 2000 and 2016, and 5.9% between 1900 and 2005 (2017, p.10). Professor Damodaran at NYU is annually presenting estimates of each country's risk premium based on a historically mature market premium and an additional country risk premium. For Norway, the estimate is 5.69% in 2017. Although this may not be a perfect estimate, I choose to use it in my model in the absence of better alternatives. The estimate is also supported by Koller et al., who states that although many in the finance profession disagree about how to measure the market risk premium, a range around 5% is appropriate (2015, p. 292). To summarize, in my model, $[E(R_m) - R_f]$ = 5.69%.

5.2.3.3 Equity Beta

In the CAPM, the beta of an investment is the risk that the investment adds to the portfolio. The beta is also defined as a measure of the systematic risk of the stock. Once again, there are several approaches to use when estimating this component; Historical market betas (regression betas), Fundamental betas, or Accounting betas.

In my model, I have used a fundamental beta, more precisely bottom-up betas (industry betas). The fundamental beta of a firm is determined by three variables; the type of business the firm is in, its degree of operating leverage, and its degree of financial leverage. Furthermore, we differ between unlevered betas (asset betas) and levered betas (equity betas). The unlevered beta is determined by the firm's products and operative leverage while the levered beta, which is used in the CAPM, is determined both by the riskiness of the business it operates in and by the amount of financial leverage the firm has taken on. Consequently, if other things remain equal, we expect an increase in financial leverage to increase the beta of the equity in the firm and vice versa (Damodaran, 2012, p. 193). Bottom-up betas tend to be far more precise than simple regression betas because they are calculated by using an average of a large number of regression betas. When using

an average of several betas, the standard error of the estimate will be lower than what it would be in a simple regression.

The formula for estimating the levered beta is written as:

$$\beta_L = \beta_U(1 + (1 - t)\left(\frac{D}{E}\right))$$

Where β_L= Levered equity beta for the firm $\left(\frac{D}{E}\right)$= Debt/Equity ratio in the firm

β_U= Unlevered average industry beta t = Corporate tax rate (marginal)

The bottom-up beta can be estimated in four steps, which will be explained in detail in appendix 3. In this chapter, it is sufficient to mention that I started by collecting betas for firms in the same industry (consumer goods) from the Bloomberg terminal and estimated an average industry beta. Then I unlevered the average industry beta by using the average D/E ratio for the industry. The unlevered industry beta was then put into the formula above together with a corporate tax rate of 24% and the D/E ratio of NRS. This resulted in a levered beta of 0.56. Thus, in my model, β_i= 0.56.

5.2.3.4 Blume's Adjusted Beta

It is argued that the beta will regress towards the grand mean of all betas over time, in other words, the historical beta will move towards 1. Therefore, it is common practice to adjust estimated regression betas in order to shift those towards 1. The formula for doing this is written as (Blume, 1975, p. 194):

$$\beta_{Adj} = \beta_{raw}\ x\ 0.67 + 1\ x\ 0.33$$

When using bottom-up betas, we have to start by collecting regression betas for several firms in the same industry as the firm we are valuing. Those betas can either be estimated individually, or obtained from estimation services like Bloomberg or Morningstar etc. In my model, I obtained the betas from the Bloomberg terminal, which means that they have already been adjusted in accordance with Blume's model and are thus ready to use.

5.2.3.5 Estimated Cost of Equity

Considering the sections above, it is now possible to estimate the cost of equity (required rate of return) by using the CAPM formula:

$$k_e = 1.61\% + 0.56 \text{x} 5.69\% = 4.71\%$$

5.2.4 Cost of Debt

The cost of debt measures the current cost to the firm of borrowing funds to finance projects. In general, the cost of debt is determined by the current level of interest rates, the default risk of the company, and the tax advantage associated with debt (Damodaran, 2001, p. 212). The simplest scenario for estimating the cost of debt is when a firm has long-term bonds outstanding. In such cases, the market price of the bond together with its coupons and maturity can be used to calculate the cost of debt. However, many smaller firms, like NRS, does not have rated bonds, which leaves us with two alternatives to estimate the cost of debt. The first one is to evaluate recent borrowing history, where we simply look at the interest rate paid on interest-bearing debt previous years and then calculate an average. The second alternative is to estimate a synthetic rating, where we use the interest coverage ratio and the size of the firm, and compares these to similar firms with rated debt to get a synthetic rating of our firm. Since this approach is quite time consuming, and the it does not necessarily reflect what the firm is actually paying for its debt, I have chosen not to use it. Instead, I have estimated the average interest rate paid by NRS in the period 2012-2016, and used this as cost of debt. This is not a perfect estimate, and there are several objections against the approach, but for practical reasons, I find it adequate to use in my model.

Table 1: Cost of debt

(NOK 1000)

Year	2012	2013	2014	2015	2016
Total interest paid	36 781	29 699	21 499	23 976	16 270
Long-term interest-bearing debt	328 292	323 084	518 788	653 361	303 781
Short-term interest-bearing debt	247 637	184 530	182 089	46 519	47 635
Total interest bearing debt	575 929	507 614	700 877	699 880	351 416
Interest rate paid %	6,39%	5,85%	3,07%	3,43%	4,63%
Average interest rate paid %	4,67%				

$$k_d = 4.67\%$$

5.2.5 Market Value of Equity and Debt

Before estimating the cost of capital, the market value of equity and debt must be calculated. As for the value of equity, it is calculated multiplying outstanding shares with the current price of the stock. There are several arguments against using market value and it may seem inconsistent since I want to find the

fundamental value of the NRS stock. On the one hand, my desire to find the fundamental value basically says that the market value of NRS is not necessarily correct, but on the other hand, I still use the market value of the equity in my model.

The reason why it after all is not inconsistent is that WACC must be based on market value. The reason is that the cost of capital measures the cost of issuing securities to finance projects, and these securities are issued at market value, not book value (Damodaran, 2001, p. 216).

To estimate the market value of debt is more complicated. An alternative is to price the debt as if it was a bond by using the following formula:

$$MV\ Debt = Cx\frac{1-(1-i)^{-n}}{i} + \frac{P}{(1+i)^n}$$

Where C = interest expense n = average maturity of debt

i = pre-tax cost of debt P = book value of debt

However, Bøhren & Michalsen (2012) argues that it is reasonable to assume that market value of debt is the same as the book value (p. 208). Furthermore, if an observable market value of debt is not available, the debt should be valued at book value (Koller et al., 2015, p. 310). This approach is generally considered to be more conservative than using the formula above and I felt that it would provide me a more accurate estimate, which made me use this approach.

The book value of debt is found in the annual report of NRS and consists of notes payable, the current portion of long term-debt, and long-term debt:

$$D\ =\ 351\ 416\ 000$$

The market value of equity is estimated by multiplying total shares outstanding (43 572 191) with the current stock price 166.50 NOK (May 23rd):

$$E = 43\ 572\ 191x164\ NOK = 7\ 254\ 769\ 802$$

Consequently, the value of the total capital is calculated as:

$$V = D + E =\ 351\ 416\ 000 + 7\ 254\ 769\ 802 = 7\ 606\ 185\ 802$$

5.2.6 Estimated WACC

Based on the calculations above, I am now able to estimate WACC:

$$WACC = 4.71\%x\left(\frac{7\ 145\ 839\ 324}{7\ 497\ 255\ 324}\right) +\ 4.67\%x\left(\frac{351\ 416\ 000}{7\ 497\ 255\ 324}\right)x(1-0.24)$$

$$= 4.66\%$$

5.2.7 Terminal Value

The last part to estimate in the DCF model is the terminal value. Publicly traded firms have infinite lives, but we cannot estimate cash flows forever. Instead, we stop our estimation of cash flows sometime in the future and then computes a terminal value that should reflect all cash flows beyond that point (Damodaran, 2001, p. 761). The terminal value can be found in several ways and the simplest formula is defined as the *‹‹stable growth approach››*:

$$Terminal\ value = \frac{FCFF_{n+1}}{WACC - g_n}$$

This approach assumes that the cash flows will grow at a constant rate forever beyond the terminal year. However, no firm can grow forever at a higher rate than the growth rate of the economy where it operates, which implies that the stable-growth rate cannot be greater than the rate for the overall economy. This approach assumes that the firm is a going concern, which I believe is best suited for NRS as a public firm. Another approach is the *‹‹liquidation approach››:*

$$Terminal\ value = \frac{EBIT_{n+1}(1-t)(1-\frac{g_n}{ROIC_n})}{WACC_n - g_n}$$

The approach assumes that the firm has a finite life and that it will be liquidated at the end of that life and sell the assets it has accumulated to the highest bidders. Since I am assuming that NRS has an infinite life, it would lead to consistency errors if I used the liquidation approach.

5.3 Consistency Conditions

When valuing a firm, you are free to take assumptions to get your estimates. This freedom is easy to misuse and it is important to be consistent when taking those assumptions and making estimates. A simple example is to use risk-free rate consistently in the model, and not use different estimates. When performing a valuation based on the DCF model and the FCFF, it is also important to discount the cash flow with WACC, and not with the cost of equity, for example. This is because the FCFF is the cash flow to both the equity and debt holders, and hence, we must use the cost of capital as a discount rate (Koller et al. 2015, p 148). Another example is the use of multiples, which are easy to misuse. A multiple has a numerator that can be either an equity value (market price, value of equity), or a firm value (enterprise value, which is the sum of debt and equity). The denominator can also be an equity value (earnings per share, book value of equity,

net income), or a firm value (book value of capital, EBITDA, operating income) (Damodaran, 2012, p. 457). An easy rule to remember here is that if the numerator is an equity value, the denominator must be an equity value as well, and vice versa. Thus, a Price/EBITDA multiple is not consistent, and cannot be used.
We can also consider elements of *‹‹causal consistency››*, i.e., cause and effect. For example, if I am assuming that NRS will have a high growth rate in the future, I am basically also assuming that NRS will reinvest capital and that they will have a return on capital that justifies the growth estimate. This must be taken into consideration when I am estimating those future elements.

6. Financial Statement Analysis

The main idea with performing a financial statement analysis is to gain insight into the past, which will help us estimating the firm's future cash flow. A financial statement analysis is based on the company's balance sheet and profit & loss statement which shows historical results, what kind of assets the firm has invested in, the firm's liabilities, and the relation between activities and investments in working capital and fixed assets (Kaldestad & Møller, 2011, p. 49). When valuing a firm, it is important to have a balanced relation with the financial statement analysis. In other words, an analyst should not rely too much on numbers from previous years since that may make valuation misleading. On the other hand, historical numbers may prevent the analyst from making unrealistic assumptions of the future, i.e., it is important to find a good balance.

6.1 Analysis Period and Benchmark

In the analysis, I have used financial data from the past five years. This should be sufficient to be able to analyze the historical performance of NRS and the industry. Furthermore, I have used seven of NRS' competitors as a benchmark (Appendix 2) to get an insight in how NRS have performed in comparison to the industry during the period.

6.2 About the Financial Statement

The financial statement of NRS is prepared in accordance with International Financial Reporting Standards (IFRS), and in accordance with the Norwegian Accounting Act. PWC has been auditing the financial statement and are commenting it in the annual report of NRS: *‹‹In our opinion, the financial*

statements of the group are prepared in accordance with the law and regulations and present fairly, in all material respects, the financial position of the group Norway Royal Salmon ASA as at 31 December 2016, and its financial performance and its cash flows for the year then ended in accordance with International Financial Reporting Standards as adopted by EU›› (NRS Annual Report 2016, p. 138).

IFRS 13 *Fair Value Measurement* defines fair value on the basis of an "exit price" notion and uses "fair value hierarchy", which results in market-based, rather than entity-specific, measurement (Deloitte, 2017a).

Considering this definition from Deloitte, in addition to the fact that NRS' financial statements are prepared in accordance with IFRS and that they are fairly reflecting the financial position of the firm, I find no reason to adjust the financial statements before analyzing the key figures; they already reflect market value. In situations where the financial statements are not reflecting a market-based measurement, however, some adjustments may be required.

6.3 Traditional Financial Statement Analysis

The traditional analysis is characterized by the large number of key figures that are calculated in order to find the underlying conditions for the firm's financial statement. The analysis is usually divided into four parts: *profitability, liquidity, solvency, and financing.* The solvency and financing parts are closely related and may thus be merged into one part (Eklund & Knutsen, 2012, p.101).

In the following chapters, a summarized table from the analysis of the historical performance of NRS and its competitors is presented, followed by some short comments of the key figures and their development.

6.4 Results from the Analysis

To be able to calculate the historical key figures for NRS and its competitors, I had to collect historical data. As for NRS, all key figures are based on previous annual reports, which means that the key figures are calculated by myself. As for the industry benchmark, I used the Bloomberg Terminal to collect historical data and key figures from NRS' competitors. The only part left for me was to calculate the annual average for each key figure. The reason why I chose to use pre-calculated figures for the industry benchmark was simply my time limitation; it would have been too time consuming to use historical annual reports for all the

benchmark firms. In my opinion, these estimates are sufficient, considering the purpose and scope of this analysis.

Table 2: Historical Key Figures

Financial Statement Analysis					
Year	2012	2013	2014	2015	2016
Key Figure					
Return on Assets					
NRS	1,79%	16,23%	10,94%	8,40%	30,01%
Industry Benchmark	2,93%	11,28%	7,77%	6,69%	15,31%
Return on Equity					
NRS	5,81%	48,80%	28,84%	22,26%	63,18%
Industry Benchmark	7,00%	24,75%	15,71%	12,74%	31,28%
Return on Invested Capital					
NRS	1,28%	13,83%	9,06%	9,76%	21,82%
Industry Benchmark	3,62%	12,64%	10,23%	8,95%	18,83%
Current Ratio					
NRS	1,54	1,94	1,94	2,34	2,19
Industry Benchmark	2,16	3,31	3,18	3,17	3,43
Quick Ratio					
NRS	0,52	0,75	0,62	0,98	0,83
Industry Benchmark	0,70	0,84	0,91	0,80	0,87
Equity Ratio					
NRS	33,79	39,71	36,51	38,80	54,24
Industry Benchmark	43,41	45,83	45,46	47,55	47,90
Debt/Equity Ratio					
NRS	1,88	1,14	1,13	1,12	0,84
Industry Benchmark	1,43	1,18	1,11	1,11	0,97
Interest Coverage Ratio					
NRS	0,83	8,05	8,65	9,38	40,40
Industry Benchmark	3,98	10,40	10,82	11,37	21,76

6.5 Key Figures

In accordance with traditional financial statement analysis, I have analyzed key figures tied to profitability, liquidity, and solvency and financing. There are many key figures available to use and I have chosen eight of the most commonly used. This should help to get an overall understanding of NRS' financial statements and its development over time. The formulas for each key figure can be found in appendix 2.

6.5.1 Profitability Analysis

Measuring a firm's profitability is one of the key financial analyzes. The profitability is important for a firm's future survival and to ensure a satisfactory return to shareholders. Sound profitability is a signal of economic strength, which helps the firm to maintain positive relationships with customers and suppliers. The historical profitability may serve as an important tool for defining the future expectations for the firm (Petersen & Plenborg, 2012, p. 93).

6.5.1.1 Return on Assets (ROA)

The return on assets of a firm is a measurement of its operating efficiency in generating profits from its assets, prior to the effects of financing. By using its assets, the firm is creating a result, which can be distributed on the equity and debt that have financed the firm (Eklund & Knutsen, 2012, p.108).

6.5.1.2 Return on Equity (ROE)

The return on equity measures the profitability of the firm and takes both operating and financial leverage into account. ROE measures the owners accounting return on their investment in a firm (Petersen & Plenborg, 2012, p. 117).

6.5.1.3 Return on Invested Capital (ROIC)

The return on invested capital measures the overall profitability for the operations and provides a better estimate of the true return on capital employed in the business than what ROE does. ROIC is an important measure, specifically in a valuation context where a higher rate of return will lead to a higher value. Furthermore, it will be more attractive to provide loans to a company with a high ROIC. In other words, the company will be able to obtain cheaper financing (Petersen & Plenborg, 2012, p. 94).

6.5.2 Liquidity Analysis

Liquidity is a crucial subject for any company because without liquidity, a company cannot pay its bills or carry out profitable investments. In some cases, lack of liquidity leads to bankruptcy. Consequently, it is important to analyze the short- and long-term liquidity risk in the company (Petersen & Plenborg, 2012, p. 150). Short-term liquidity risk arises primarily from the need to finance current

operations, for example, when a firm must make payments to its suppliers before it gets paid for the goods it provides, there is a cash short-fall that has to be met through short-term borrowing. Long-term liquidity risk measures the long-term solvency attempt to examine the firm's capacity to meet interest and debt payments in the long term (Damodaran, 2001, p. 101-103).

6.5.2.1 Current Ratio

The current ratio is the ratio of current assets to its current liabilities. A current ratio below 1 would indicate that the company has more obligations to pay in the next year than assets it can expect to turn into cash. Thus, it would be an indication high of liquidity risk. Traditional analysis suggests that the firm should maintain a current ratio of 2 or higher. However, a firm should also avoid having a very high current ratio since that would imply that the firm is having troubles reducing its inventory (Damodaran, 2001, p. 102).

6.5.2.2 Quick Ratio

The quick ratio is a variant of the current ratio but it only includes the most liquid current assets. Due to this fact, it is considered to be a relatively more conservative indicator of the short-term liquidity risk than the current ratio. Some argues that the quick ratio should be greater than 1, but it is difficult to apply that rule of thumb across different industries (Petersen & Plenborg, 2012, p. 155).

6.5.3 Solvency and Financial Leverage

The solvency can be defined as a firm's ability to handle losses and are usually tied to the ratio between its equity and total capital. It is also considered as a measurement of long-term liquidity risk. Generally, a high financial leverage and a low solvency ratio indicate a high long-term liquidity risk. When estimating the financial leverage- and solvency ratios, it is important that all financial obligations are recognized in the balance sheet. The same idea applies for equity; all values should be included. Finally, it is important to determine whether the ratios should be based on book value or market value. When market values are available, it is recommended to use them since they are closer to realizable value (Petersen & Plenborg, 2012, p.158).

6.5.3.1 Equity Ratio

A common solvency ratio is the equity ratio, which explains how much of a firm's assets that are financed with equity. In addition, it gives information about how much the firm can lose before the debt will be incurred losses. The greater the ratio is, the more solvent is the firm (Eklund & Knutsen, 2012, p. 168).

6.5.3.2 Debt to Equity Ratio

The D/E ratio is a measurement of the financial leverage of the firm. The ratio measures debt as a proportion of the equity in the firm. In general, a lower D/E ratio implies a better solvency. The ratio is important to see whether the firm can pay back the principal on outstanding debt or not (Petersen & Plenborg, 2012, p. 158).

6.5.3.3 Interest Coverage Ratio

The interest coverage ratio is a measurement of a firm's ability to meet its interest payments from pre-debt and pre-tax earnings. The higher the ratio, the more secure is the firm's capacity to make interest payments from earnings, which implies a lower risk. The ratio is generally recommended to be at least 3. If it is lower than 1, the firm will lose money (Petersen & Plenborg, 2012, p. 161).

6.6 Summary of Key Figures

When looking at the table in chapter 6.4, NRS appears more attractive than its competitors from a profitability aspect. NRS has experienced an extreme improvement of its ROA during the last five years and grew from 1.79% to 30%. At the same time, the industry benchmark grew from 2.93% to 15.31%. This implies that NRS are better than its competitors in generating profits from its assets. The ROE in NRS has also experienced a significant improvement during the last five years. The top notes were in 2013, and most of all, 2016. As we can see in the table, the industry benchmark has experienced the same development and fluctuations as NRS. However, NRS has managed to achieve twice as high ROE as the industry average in last the four years. Last year, NRS had a ROE of 63.18%, which is very good considering the industry average of 31.28%. In general, financial analysts consider a ROE in the 15%-20% range as an attractive level of investment quality. Thus, the whole industry, and especially NRS, should appear attractive to investors since investors usually are putting a lot of emphasis

in the ROE. The development of NRS' ROIC follows the development of the ROA and ROE; a clear improvement in the last five years with two top notes in 2013 and 2016. Once again, NRS has achieved a higher ROIC than the industry average in the most of the years during the five-year period. The difference, however, is not as significant as it is for the ROA and ROE. This should, however, imply a higher value for NRS, in addition to a good ability to obtain cheap financing.

The liquidity analysis shows that NRS has experienced a solid growth in the key figures between 2012 and 2016. The current ratio has grown from 1.54 in 2012 to 2.19 in 2016. According to traditional analysis, NRS has achieved a satisfying current ratio only in 2015 and 2016 since it was 2 or higher in those years. The quick ratio in NRS has also experienced a decent development since 2012. However, it has not reached 1 or higher in any year, which generally is said to be the minimum satisfying level of the ratio. This could be a warning sign of a little too weak liquidity in NRS. Furthermore, NRS has been outperformed by the industry average in every year since 2012, both when it comes to the current ratio and the quick ratio. Although the quick ratio is below 1 for the industry benchmark, it is still higher than NRS', which is somewhat alarming.

NRS' equity ratio and D/E ratio are relatively close to the industry benchmark. The ratios have been relatively stable during the last five years and as we can see in the table, NRS' ratios have generally been a little bit lower than the industry average. The most drastic change occurred 2016 when NRS' equity ratio grew from 38.80% to 54.24%, which brought the D/E ratio down to 0.84 from 1.12. In contrast to this, the industry benchmark experienced only a marginal change in the equity- and D/E ratios. Since debt are considered to increase the risk of a firm, NRS' development must be considered satisfying.
Finally, when we look at the interest coverage ratio, NRS' has had a lower ratio than the industry average historically. However, both NRS and the benchmark has had ratios significantly higher than the recommended level of 3. Between 2015-2016, NRS had an extreme improvement in the ratio (from 9.38 to 40.40). The benchmark also experienced a significant improvement, although not as great as NRS. Consequently, 2016 was the first year that NRS outperformed the industry

in this key figure. The large improvement in the key figure 2016 is essentially a result of the record year that the fish farming industry had.

As a final note, I should mention that the benchmark is largely affected by the key figures of P/F Bakkafrost. Bakkafrost has been outperforming the industry (including NRS) in almost every key figure, in every year during the period. On the other hand, the Scottish Salmon Co. has contributed to bringing many of the average key figures down since their key figures tend to be significantly lower than the rest of the industry. Consequently, there is room for revising the historical analysis. However, excluding the two companies from the benchmark did not affect the overall tendencies and the relation between NRS' and the benchmark namely. Thus, have chosen to include them. In appendix 2, historical key figures are further presented.

7. Strategic Analyzes

In this chapter, internal and external strategic analyzes are presented to help gaining a better understanding of NRS' strategic position in the market and how the development of the overall economy and market outlook affects NRS. In addition, these analyzes should help estimating NRS' future cash flows more accurately.

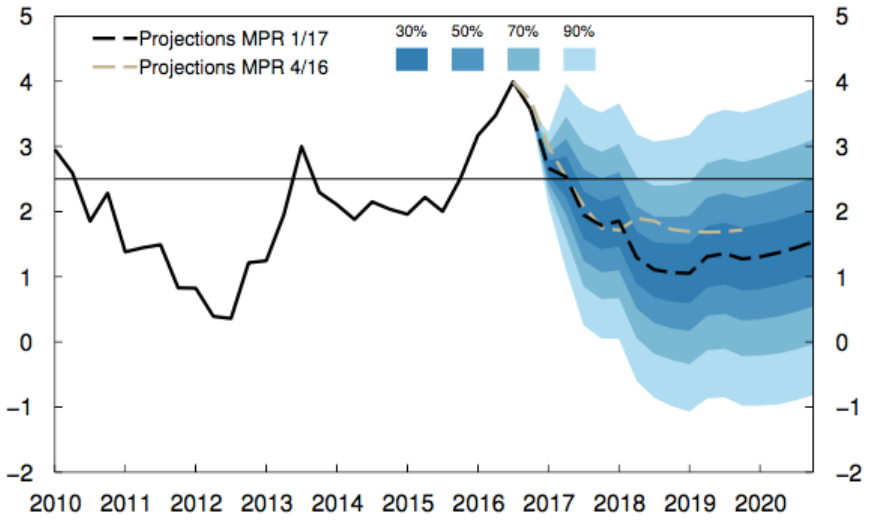
7.1 Macroeconomic Analyzes

When considering the market outlook for NRS, a lot of macroeconomic conditions are affecting. These will be analyzed in this section.

7.1.1 Inflation

The inflation is affecting the future price levels, and it can be challenging to forecast it over a long time-horizon. In Norway, the government has set an inflation target for the monetary policy and the main operational target is to sustain a low and stable inflation over time, with an annual consumer price inflation (CPI) of approximately 2.5%.

Figure 2: CPI Development (Norges Bank, 2017b)



As we can see in the chart, the inflation has fallen since the peak in 2016 and is projected to slow down even more in the coming years, before rising slightly in 2020 again. In 2016, annual CPI reached the highest recorded level in many years, significantly above the target of 2.5% (2017b). In 2020, Norges Bank predicts the CPI to be 1.5%, before slowly increasing. The increase in the consumer price inflation in recent years is largely reflected by the substantial depreciation of the Norwegian Krone in the period that lasted until the beginning of 2016. Although different analyzes suggest different rates of the inflation in the coming years, consensus seems to be a declining CPI in the nearest future.

7.1.2 Purchasing Power

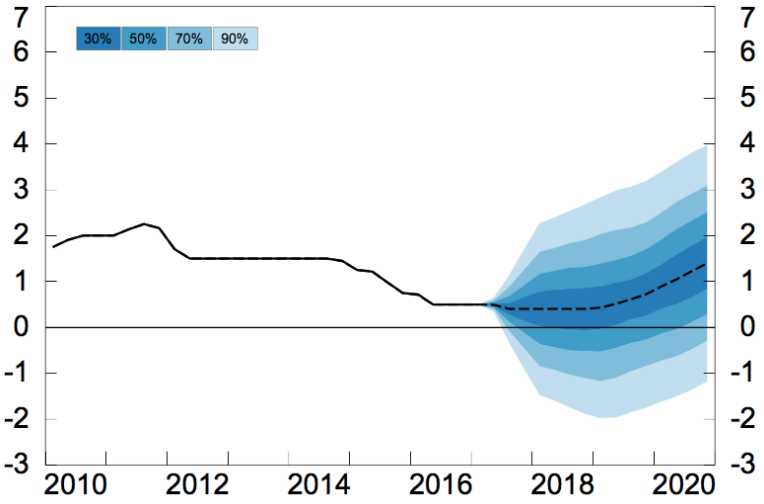
The Norwegian private consumption rose weakly in 2016 and registered a 1.4% increase compared to the previous year. A moderate growth in wages of 1.7% and a high inflation contributed to a fall in real wages of 1.1%, which was the weakest development in Norway in 35 years. Consequently, the households purchasing power decreased, which can explain the weak development in the consumption. The growth in wages is estimated to continue to be moderate in the coming years and according to Norges Bank, the wage growth is projected at 2.5% in 2017. However, lower inflation will contribute to a marginal strengthening the households purchasing power in the nearest future (2017c).

7.1.3 Interest Rates

Since March 2016, the key policy rate in Norway has been 0.5%. The forecast for the rate is close to 0.5% even for the coming years, although the forecast also

implies a slightly higher probability of a decrease than an increase of the rate in the coming period (Norges Bank, 2017c).

Figure 3: Key policy rate in recent years & projections (Norges Bank, 2017)



As shown in the chart above, the key policy rate is expected to remain at low level the coming two years before increasing in 2019. If the key policy rate is consistent with these projections, the projections for the CPI above will also turn out to be accurate.

7.1.4 The Global Economy

Over the past few years, global economic growth has gradually been slowing down, which primarily reflects a weaker growth in emerging economies, especially among commodity producers. The global trade growth in 2016 recorded its weakest performance since the global financial crisis in 2008 (World Bank, 2017, .p 12). The growth was stronger in advanced economies than in emerging economies where the overall picture was more mixed. Important drivers of the growth in advanced economies was an improved purchasing power in the households the last two years combined with improved financial conditions. Those improved conditions are a result of expansionary monetary policies. Furthermore, there are signs of an increase in investments in many advanced economies, and particularly the US where investments have been decreasing for several years. As a consequent, the growth in overall import in advanced economies has been revised up from previous estimates. In addition, the import growth in China is also expected to be slightly higher (OECD, 2017). Higher

import growth among Norway's trading partners implies an increased activity in the Norwegian economy.
Although there are many positive signals for the global economic development, there are also a significant uncertainty tied to the future. On the one hand, the growth may be higher than forecasted in many countries. On the other hand, there is an increased risk for greater protectionism and political unrest on the global arena, which may lead to a lower growth than projected.
The global interest rates remained at a very low level last year. However, the interest rates among Norway's trading partners are now expected to rise faster than what previous consensus said (Norges Bank, 2017c).

In 2016, the global gross domestic product (GDP) growth was just under 3%, which was the weakest growth pace since 2009. In the coming years, the growth pace is expected to pick up modestly and to be in the range of 3.3%-3.5% a year between 2017 and 2020. This would leave the global GDP growth below the historical average of approx. 4% in the two decades before the financial crisis (OECD, 2017). The background is a five-year period where the global economy has been in a low-growth phase and where the pace has been disappointing. The expected modest increase in global growth in the nearest future is mainly due to the effects of fiscal initiatives in the US and China combined with an easier stance in the Eurozone. These will serve as catalysts of private economic activity, which will increase global demand.

7.1.5 The Norwegian Economy

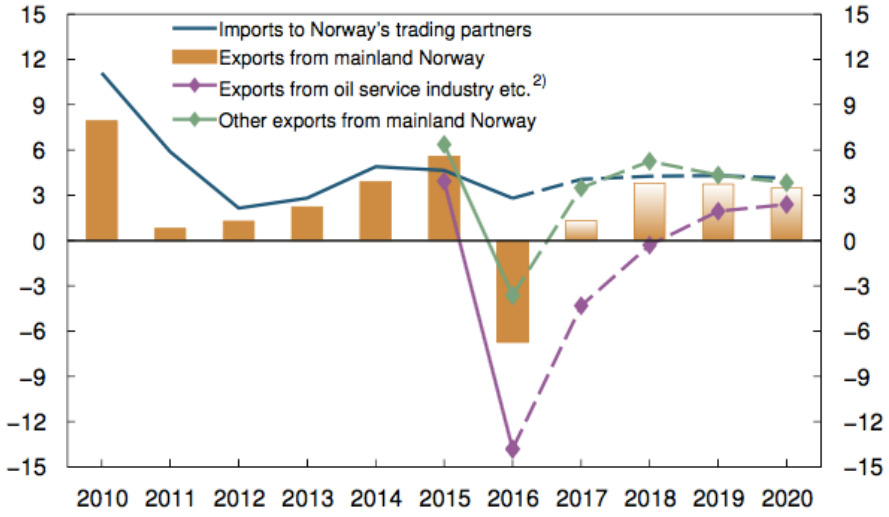
In 2016, the growth in the mainland GDP was the lowest since the global financial crisis in 2009 and registered a 0.7% growth from 2015. Last year is believed to have marked the bottom of the Norwegian GDP growth and the pace is now expected to pick up. However, the growth pace is projected to be slow and resulting in a growth of 1.3% in 2017 and increasing to approx. 2% in 2019-2020 (Norges Bank, 2017c). Both the oil investments and the traditional export decreased last year but are also expected to have reached the bottom point. The sharp decline in oil prices in the summer of 2014 marked the start of a period of depreciation of the krone, which lasted until the start of 2016. The krone then appreciated through 2016 as a result of rising oil prices. Norges Bank estimates

the krone exchange rate to remain broadly unchanged in 2017, and then starting to appreciate gradually (2017c).

The growth in mainland business investment has been weak in recent years and in 2013-2015, the investments as a share of mainland GDP was lower than the average between 1995 and 2016. By the end 2016, the mainland business investment increased and are projected to continue increasing in coming years. In 2018, the business investments are expected to be 10% of mainland GDP, which is marginal higher than the historical average (Norges Bank, 2017c).

The weaker krone has also led to an improved cost competitiveness among Norwegian firms' in recent years. Furthermore, the wage growth in Norway has declined and was lower than among its trading partners in 2016, which was the first time since 1995. These aspects combined with improved competitiveness and solid import growth among trading partners contributed to an increase in mainland exports in 2014 and 2015. However, the decline in the petroleum industry led to a sharp decline in exports from Norwegian oil service companies in 2016, which in turn contributed to a lower export of financial and commercial services (SSB, 2017). As shown in the graph below, Norges Bank predicts the mainland export to increase modestly in 2017 and then at a quicker pace in 2018-2020.

Figure 4: Annual %-change in mainland exports (Norges Bank, 2017c)



7.1.6 Market Outlook

The global supply of Atlantic salmon has increased by 417% since 1995, which corresponds to a compounded annual growth rate (CAGR) of 9% in harvested

volumes. However, the growth has slowed down in recent years and if we look at the period 2004-2015, the CAGR was 6%. Despite this, the salmon farming industry experienced salmon prices at the highest level in the last 20 years in the fourth quarter of 2016 (NRS, 2017).

The harvested volume decreased in 2016 by 7% globally compared to 2015. In Norway, the decrease in harvested volume was 5%. A large contributor to the large global decrease was an algae incident in Chile that made the farming companies lose a significant amount of salmons. For 2017, the global harvest is expected to increase by 2% while remaining at the 2016 level in Norway. Furthermore, in a market report, Kontali Analyse estimates the global CAGR to be 3% between 2016 and 2021 (2016).

The reason for this modest CAGR is that the industry has reached a production level where biological boundaries are being pushed (Marine Harvest, 2017). Thus, it is expected that future growth can no longer be driven by the industry decisions alone. Instead, the industry must focus on reducing its biological footprints, which requires progress in technology, development of improved pharmaceutical products, and improved industry regulations. Consequently, it is difficult to estimate the growth in supply beyond 2021.

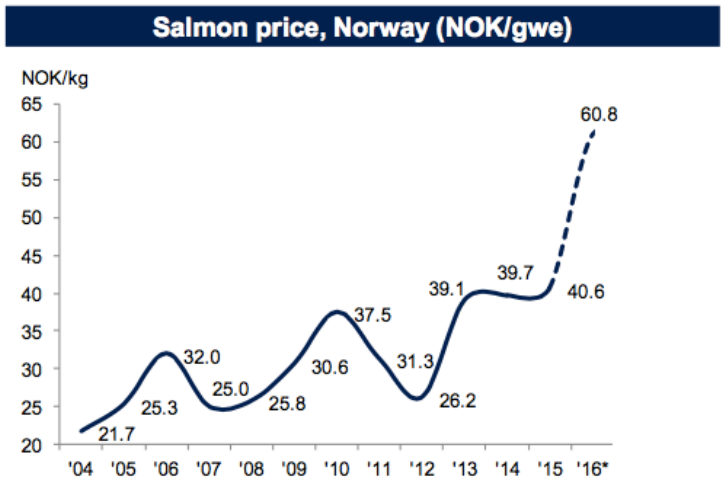
The consumption of salmon in the world declined by 4% in 2016 as a result of lower supply volumes (NRS, 2017a). According to the United Nations, the world population is expected to grow to approx. 9.7 billion by 2050. If the consumption per capita stays constant, this implies a 40% increase in demand for protein (Marine Harvest, 2017). However, the UN estimates the increase in actual demand to be near the double. Since salmon is an important and rich source of protein, this would imply a strong demand for the product in the long-term.

In Norway, the salmon farming companies can apply for development licenses to increase their total capacity. The development licenses are special licenses awarded to projects that contributes with significant technologies and investments. The period for applying for these licenses started in November 2015 and lasts until November 2017. As of May 2nd, Norwegian companies have 42 applications under review while three applications have been approved and eleven has been denied (Directorate of Fisheries, 2017). Consequently, successful applications will increase the farming capacity, which in turn may increase the supply.

So far in 2017, the average spot price of salmon has been 67.41 NOK/KG according to the Fish Pool Index. In 2016, the average spot price was 63.13

NOK/KG. Historically, the salmon price has been cyclical and volatile on a year-to-year basis. However, since 2013, we have had four consecutive years with high and stable prices, which makes it rather difficult to estimate prices for the future.

Figure 5: Annual spot prices (ABGSC, 2016)



A useful tool when looking at future salmon prices is the forward price curve from Fish Pool. The forward prices reflect the expectations of the members of Fish Pool for the coming months. The prices are derived from contracts already made and the interest to buy and sell at Fish Pool. As of May 23rd, Fish Pool estimates forward prices for Q2-17 of 63.70 NOK/KG before decreasing towards the end of the year. In 2018 the forward prices are estimated to be 61.25 NOK/KG in Q1+Q2 and 57.75 NOK/KG in Q3+Q4 as shown in the graph below (2017).

Figure 6: Forward prices (Raw data from Fish Pool, 2017)

In summary, the modest expected growth in supply in 2017 combined with a solid demand, and the current forward prices results in a positive outlook for the salmon

prices in the coming period. Although the forward prices are a little lower in 2018 and 2019, they are still high if we compare them with historical prices.

7.2 Supplementary Analyzes

Besides the macroeconomic factors presented above, analyzes more focused on NRS and its competitive should be performed to get a complete picture of the firm's strategic position.

7.2.1 Company Outlook and Development

As mentioned earlier, there are a lot of uncertainty tied to the growth in supply and future salmon prices. NRS is currently exporting 90% of the harvested volume to the international market and expects this proportion to remain in the future (NRS, 2017b). In the next five years, NRS's objectives are to grow into Norway's most profitable salmon company, to go from being a mid-size to a large salmon company, to become a preferred employer, and to achieve sustainable growth (NRS, 2017b).

7.2.2 Cost Control

NRS have established several cost-reducing programs to lower the production costs in the future. This will be achieved by implementing new and bigger sites with an efficient operational structure, by increasing the smolt quality and size, and by educating and increasing the production knowledge of the staff (NRS, 2017b).

7.2.3 PESTEL

In the PESTEL analysis, the macro environment that affect NRS are presented. This is interesting since those conditions directly affects NRS' operations, which in turn affects NRS' strategy (Johnson, Scholes, & Whittington, 2009, p. 25).

7.2.3.1 Political Factors

The domestic policy conditions should be considered stable in the long term. The Norwegian parliament election in 2017, however, may possibly affect the salmon farming industry in the short term. The government is putting a lot emphasis on sustainable and environmental-friendly development of the industry. Thus, the industry is limited by the required licenses that the companies must hold to engage in the industry, which also affects the growth possibilities. The industry is

also affected by export fees of salmon. All registered exporters are obligated to pay NOK 15 000 annually in addition to an export fee 0.3% of the export value of the fish (Lovdata, 2017). Furthermore, exporting companies are affected by toll fees. Since 90% of NRS' sales were made to the international market, this is a relevant factor to the firm. However, most of the sales (78%) were made to the European market. The rest were divided on 21% to Asia and 1% to the US. Thus, there are different toll fees that must be taken into account. The geopolitical uncertainty is high, especially tied to Brexit and different trade agreements with the US and Russia. These uncertainties may not cause any issues to NRS in short term, but can possibly do so in the long term.

7.2.3.2 Economic Factors

The economic factors are obviously having significant effects on the companies in the salmon farming industry. The macroeconomic factors and its development was presented in detail in chapter 7.1 and will not be repeated here. Chapter 7.1.1-7.1.6 are all relevant in this section of the PESTEL analysis.

7.2.3.3 Social Factors

As mentioned before, the global population is expected to grow to 9.6 billion in 2050. Higher living standards will contribute to an increased demand in high-quality food products. In addition, it is fair to expect that consumers are becoming more aware of the danger with consuming food that is heavily processed with antibiotics. As presented in chapter 7.1.6, the industry is dependent on improved technological solution to be able to grow further in the future. In addition, possible development licenses are only awarded to projects that contributes with significant technological solutions. Thus, for NRS to grow and to stay competitive, the company must attract highly educated engineers in the future.

7.2.3.4 Technological Factors

Technological development and new innovations are essential in the aquaculture industry. These components contribute to higher product qualities, and to a sustainable development of the environment and economic factors. As noted in chapter 7.1.6, the industry is dependent of new technological solutions in order to grow and meet the future demand. Therefore, many of the applications for development licenses consists of projects based offshore instead of the traditional

localization in protected fjords (Thonhaugen, NRK, 2016). An example is NRS and Aker who have applied for 15 licenses with a total capacity of 11 700 tonnes by the cost in the Troms/Finnmark area. The project consists of semi-submersible cages that offers new technological solutions offshore (Dagens Næringsliv, 2017). The existing cages for salmon farming are also dependent on the development of new technologies. One of the major problems the farming companies is facing is the escape of fish. The escape of salmons causes both economic losses for the companies and issues to the environment. The reason is that the farmed salmon may be infected by diverse diseases, which is dangerous to the wild fishes in the surrounding areas (Directorate of Fisheries, 2017). Improved technology is therefore important to prevent this problem to grow in the future. NRS' ability to develop and offer new technology is essential for the firm to stay competitive in the future and to gain competitive advantages.

7.2.3.5 Environmental Factors

The water temperature is important for the industry because a large increase in temperature leads to a greater risk for diseases among the fish in addition to increased algae's in the water, which tend to increase the mortality of the salmon (Marine Harvest, 2017). If the sea temperature rises too much, many current localizations may be useless. However, the most important issue the industry is facing is the sea lice. The sea lice have become more common in Norwegian farming locations in recent years. Sea lice are dangerous to the fish as it eats its skin and blood which increases the risk for infections of the fish. Only in 2016, the sea lice problem is estimated to have a total cost of somewhere in the range of 5-10 billion NOK to the Norwegian companies (Berge, ILaks, 2017a). The sea lice are expected to continue to be the largest and most important problem to the industry in the coming years.

7.2.3.6 Legal Factors

The industry is mainly regulated by the Aquaculture Act in Norway. However, the firms that are engaged in salmon farming in other countries have local regulations and laws to follow as well. As for NRS, the only relevant law is the Aquaculture Act, which serves to promote the aquaculture's profitability and competitiveness within the frames of sustainable development in addition to contribute to value creation by the coast (Lovdata, 2017). In addition, the Directorate of Fisheries has

established a regulation framework called NYTEK. The NYTEK framework are handling the regulations to follow when establishing new, or developing new technologies for fish farms (Directorate of Fisheries, 2017). Furthermore, the production limitations in Norway are regulated by the maximum allowed biomass (MAB), which is the defined as the maximum volume of fish a company can hold at sea at all times (Marine Harvest, 2017). As mentioned in chapter 7.2.3.1, a company must be awarded licenses by the Directorate of Fisheries to farm salmon. One license is currently consisting of 780 tons, except in Troms/Finnmark where one license consists of 945 tons.

7.2.4 The Five Forces Framework

Porter's five forces framework constitute an industry's structure and is a helpful tool to discover potential possibilities and threats that may affect NRS in the future. Porter's essential message is that where the five forces are high, industries are not attractive to compete in since there will be too much competition and pressure (Johnson et al., 2009, p. 30).

7.2.4.1 The Threat of New Entrants

The industry is protected by relatively high barriers to entry since it requires companies to be awarded licenses by the Directorate of Fisheries in order to enter the salmon farming industry. Another barrier to entry is the capital requirements since a company needs a lot of capital to enter the business. This is particularly tied to large one-time investments that must be done prior starting the production. Those investments are especially related to the production sight: cages, technology, transportation systems to and from the sea, slaughtering, and processing. Furthermore, the environment can be considered as a barrier to entry since it is limited how much each firm can produce without affecting the environment negatively. As mentioned in chapter 7.1.6, the future growth in the industry is dependent on new technology rather than industry decisions, which means that it is difficult for new companies to be awarded licenses without providing superior technology and environmental-friendly solutions. However, it is reasonable to believe that the existing salmon companies may have an advantage in this matter due to their experience and scale. Thus, the threats from new entrants are considered low due to the entrance barriers.

7.2.4.2 The Threat of Substitutes

There are several other sources of protein that may substitute the salmon, both animal proteins and vegetal proteins. Although 70% of the earth's surface is covered by water, only 6.5% of the protein sources for human consumption is produced in this element (Marine Harvest, 2017). Other important sources of protein are vegetables, chicken, pork, lamb, and beef. However, the salmon has some advantages compared to these other sources. The edible yield, that is how much of the meat from each unit that can be used, is significantly higher for salmon (68%) compared to the other sources of protein (range of 41%-52%), which implies that other protein sources have a higher level of waste. In addition, the feed conversion ratio is measures how many kilograms of feed that is needed to increase the animal's bodyweight by one kg. For the salmon, the ratio is 1.1 while other sources are in the range of 2.2-10. The World Bank is projecting that the fish consumption will increase in the future and in 2030, per capita fish consumption is estimated to double from today's consumption (2013). However, as the global demand for protein is expected to increase by 40% (7.1.6) by 2050, the demand for other protein sources will grow as well and continue to be a substitution threat. The price of each protein source will determine how big the threats of substitutes will be in the future. Thus, the threat of substitutes is high.

7.2.4.3 The Power of Buyers

The buyers of salmon are essentially individuals. The customers can easily switch between suppliers and protein sources, which implies low switching costs. Since much of the salmon is supplied in the spot market, buyers are free to choose which supplier they will buy from. Thus, the forward sales of salmon can be considered to lower the power of the buyers since they are obligated to fulfill such contracts. A lot of individual customers and low switching costs are typical examples of high bargaining power of the customers. Furthermore, the high degree of substitutes also increase the buyers bargaining power. Consequently, it is reasonable to consider the bargaining power of buyers to be high.

7.2.4.4. The Power of Suppliers

The salmon farming industry is dependent on some components from suppliers to be able to deliver the fish. It is mainly the producers of smolt and medicines that are important here. Several suppliers of these products exist, which means that it

is difficult for the suppliers to increase prices. This is generally a sign of weak bargaining power of the suppliers. However, NRS and many of its competitors monitors the suppliers and carries out yearly audits to ensure the suppliers' quality. Many of the fish farming companies have set strict standards of the quality of the smolt and medicine that the suppliers must meet. Thus, the salmon producers have incurred switching costs, which increases the bargaining power of the suppliers. In summary, the suppliers have some bargaining power, but it should be considered low in total.

7.2.4.5 Competitive Rivalry

Several producers of farmed salmon exist, both Norwegian and International. Many are of the same size as NRS (mid-size), although some are significant larger. Less rivalrous industries tend to have a few dominant organizations. Consequently, this is a sign of high competitive rivalry in the industry. The industry is also characterized by low differentiation. The suppliers offer the same products which means that there is little to stop customers from switching between competitors. Usually in such cases, the only way to compete is on price. The salmon industry, however, is highly dependent on the spot- and forward prices, which means it is hard for the companies to differentiate. In addition, extra capacity in the production can only be added if significant investments are made. This means that it is important to fully use the capacity of each firm since new investments may lead to overcapacity, which is unwanted by the producers. This is also a contributor to high competition in the industry. Thus, the competitive rivalry among existing firms is considered high.

7.2.5 Strategic Capabilities

The internal strategic capabilities of NRS are defined as the resources and competencies needed to survive and prosper. The main objective with an internal analysis is to identify strengths and weaknesses of NRS (Johnson et al., 2009, p. 59). A useful tool to perform such an analysis is the VRIO-framework, originally developed by Barney (1991). By using this framework, I will be able to evaluate whether NRS possesses any resources that may contribute to a continuous competitive advantage or not. Table 3 shows the outcome of the VRIO-analysis of NRS.

Table 3: NRS VRIO-analysis

Resource/ Capability	Valuable	Rare	Inimitable	Organized to Capture value	Competitive Advantage?
Physical	Yes	No	No	Yes	Parity
Financial	Yes	No	No	Yes	Parity
Technology	Yes	Yes	Yes	Yes	Sustained
Opinion	Yes	No	No	Yes	Parity
Competencies	Yes	Partly	Partly	Yes	Temporary

If an organization seeks to build a competitive advantage, it must have resources that are valuable to its customers. A resource is valuable when it enables a firm to exploit opportunities or defend against threats. Competitive advantage may also be achieved when a firm possesses a unique or rare capability or resource. When determining whether a resource is rare or not, there are three important points to bear in mind: *ease of transferability, sustainability, and core rigidities.* Furthermore, a resource is inimitable if other organizations that does not possess it cannot buy it or substitute it at a reasonable price. Imitation can occur by duplicating or substituting resources. Finally, a firm must organize all resources to capture value in order to sustain a competitive advantage (Johnson et al., 2009, p. 68-69).

7.2.5.1 Physical Resources

NRS' physical resources consist of buildings, production sights & capacities, machines, inventory and ships. Since NRS is a mid-size salmon company, their physical resources do not differ significantly from other firms in the industry. The physical resources are valuable to NRS and its customers, but they are not rare, nor inimitable. It is reasonable to assume that all firms in the salmon farming industry possess the same physical resources. Consequently, NRS' physical resources cannot contribute to a competitive advantage.

7.2.5.2 Financial Resources

The financial resources include capital supplied by shareholders and creditors. From chapter 6 we know that NRS has a ROIC that is higher than the industry benchmark which implies that NRS should be an attractive firm to provide loans to. It also means that NRS can obtain cheaper financing. We also know that NRS

has a somewhat satisfying liquidity situation, although the liquidity ratios suggest that it is below the industry average. In addition, NRS has a marginally higher equity ratio (54.24%) than its competitors (47.90%) and a higher ROE than its competitors. It is thus reasonable to assume that NRS is in a favorable position when it comes to obtain capital. The question is, however, if this is sufficient to sustain a competitive advantage. The most natural answer is no. As we can see in appendix 2, P/F Bakkafrost for example, has even stronger numbers in many of the key figures. Thus, NRS' financial resources are not rare, nor are they inimitable. Other competitors in the industry may obtain the same capital structure and achieve similar figures as NRS if they implement changes in their strategies, although there is a question of how much time and money such changes require. In summary, it is reasonable to define NRS' financial resources to be in competitive parity.

7.2.5.3 Technology

As mentioned before, NRS has together with Aker ASA developed an offshore farm to facilitate sustainable growth in areas where aquaculture technology has not been able to exploit (NRS, 2017b, p. 7). The new offshore farm has some completely new technological solutions. In addition, it is the first project in the salmon farming industry that Aker is a part of. Aker is present in many different industries and should therefore be able to contribute with expertise, and unique and valuable inputs regarding the technology in the project. In addition, NRS has a strong focus on biological production and is therefore participating in developing new technology in order to handle sea-lice and problems with ice in the cages during the winter (NRS, 2017b, p. 46). This implies that NRS has a solid position in the technology-area. Consequently, NRS' technological resources are valuable to the firm and its customers and they are rare. They must also be considered as inimitable since other competitors most likely cannot buy, or substitute the resources at a reasonable price; technology development is usually costly. As with any other resource, the technology is organized for NRS to capture value. Consequently, the technological resources that NRS possesses offer a sustained competitive advantage. However, a *‹‹reasonable price››* may be defined differently by different companies, which means that a resource is inimitable to some competitors while it is imitable to others. Thus, the statement that NRS

possesses a sustained competitive advantage with their technology should not be thought of as a common perception.

7.2.5.4 Opinion

To build strong relationships with customers are important to establish a good opinion, which is one of the most important intangible assets a company can have. Therefore, NRS are striving for a culture of transparency in all areas concerning customer care, relationship building, sponsorships, gifts, entertainment, travel etc. In addition, the company aims to achieve environmental sustainable production (NRS, 2017b, p. 49). Salmon farming is dependent on good cooperation with local populations and authorities. Thus, NRS strives to maintain an open dialogue with them so that the company is perceived as serious and solutions-oriented. To be successful in this matter, NRS has established some guidelines for their corporate social responsibility: Safe, Engaged, Innovative, and Credible (NRS, 2017b, p. 48). A good opinion among a NRS' stakeholders is highly valuable. However, it is doubtful if it is rare or inimitable. It is reasonable to believe that competitors can establish similar frameworks for their CSR relatively easy. Thus, the opinion of NRS is not contributing to a sustained competitive advantage, but rather a competitive parity.

7.2.5.5 Competencies

In the annual report, NRS states that its vision is to develop into the most profitable salmon company in Norway by becoming a preferred employer. To successfully achieve this, the company is working hard to make sure it is able to recruit qualified and talented personnel at all levels in the organization by offering competitive employment terms. Since much of the firm's success is determined by the technology, NRS are trying to attract highly educated people with technological and engineering backgrounds (NRS, 2017b, p. 49). In addition, NRS has a strong focus on research and development and are participating in several internal- and external projects to strengthening the firm's competencies (2017, p. 46). Although every single employee is unique, it is a little doubtful whether the competencies are rare and inimitable or not. On the one hand, no two people are the same; they have different personal abilities and characteristics and will therefore contribute in different ways. On the other hand, engineers, for example, should possess similar knowledge after graduating and may thus, not be

a rare resource. Consequently, I have defined NRS' competencies as partly rare and inimitable, which results in a temporary competitive advantage.

8. Forecasting

So far, I have focused on accounting data (chapter 6) and the measurement of historical profitability and growth. Based on the historical data, combined with the strategic analysis in chapter 7, this chapter is providing a forward-looking view. In this chapter, the objective is to forecast the different components of the future FCFF, which lays the foundation for the DCF valuation.

8.1 Forecasting Model

There are three commonly used models when forecasting the future: naïve models, top-down analysis, and bottom-up analysis. Naïve models are somewhat simplified and are based on the idea that the next year's cash flow will be equal to the present year's cash flow or an average of recent year's cash flows. Thus, those models do not consider significant industry changes, cyclical changes, or firm-specific changes. Top-down analyzes are based on aspects that affects industry revenues, market shares, and profits. The disadvantage with these analyzes is that it does not always consider the relation between cost of reinvestments and growth properly. The bottom-up approach is based on estimation of numbers tied to volume produced, price per unit, and production costs etc. The weakness of the approach is that it relatively easy can be manipulated by allowing the user to take simplified assumptions regarding price, production, and costs (Kaldestad & Møller, 2011, p. 48-49).

I decided to use a mix of the top-down and bottom-up approaches in an attempt to take advantage of their relative strengths and to minimize their weaknesses. This mix should provide the most robust approach and I will thus include the overall development of the industry as well as development in NRS' production volumes, costs, and prices.

8.2 Forecast Period

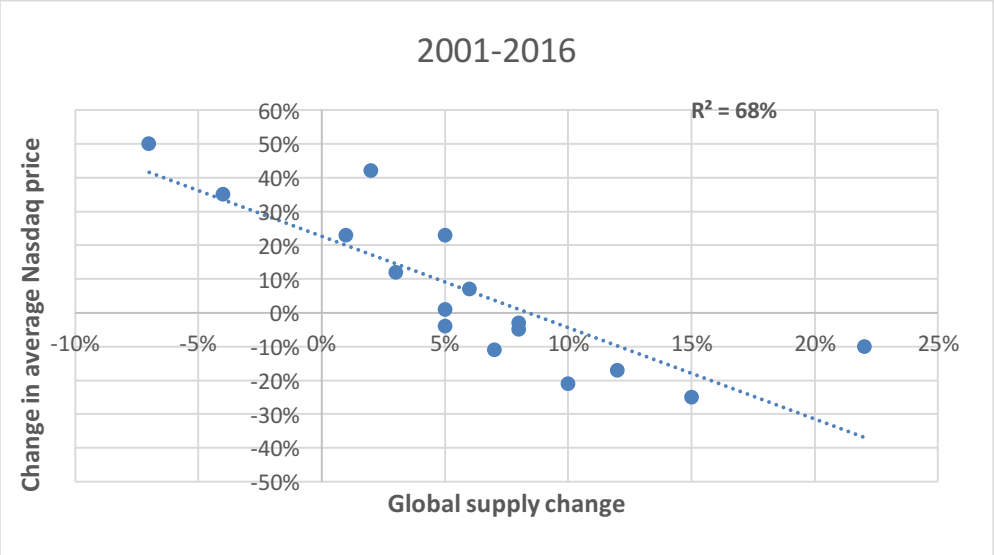
From chapter 7.1.6, Market Outlook, we know that salmon prices have been cyclical in the history. Koller et al. (2015) recommends using a forecast period of 10-15 years for cyclical companies. Using a shorter period, for example five

years, typically results in a significant undervaluation of the company. However, forecasting 10 years in the future is difficult and it is recommended to simplify the model by using a detailed five-year to seven-year forecast and a simplified forecast for the remaining period (p. 244-245). Since the salmon farming industry is very affected by salmon prices and harvested volumes, it is a lot of uncertainty tied to forecasted figures 10 years from now. Prices and volumes are in turn affected by several external variables, which makes it difficult to forecast the future. Despite this, I have decided to use a forecast period of 10 years, mainly because I want to avoid a significant undervaluation of NRS.

8.3 Revenues

NRS' revenues are determined by the salmon price and the sold volume in each year. By using historical numbers of the growth in global supply and the change in average Nasdaq price from Norway, I am able to run a regression to find the correlation between the data. As we can see in figure 7, the relation had an explanatory power of 68%, which means that the change in global supply explains 68% of the annual price development in the period. This can be considered as a reasonable result since the demand for salmon most certainly is an important factor for the development of the salmon price in addition to the supply.

Figure 7: Linear correlation between global supply change and change in average Nasdaq price from Norway (Raw data from Fish Pool, 2017)



In the annual report, NRS states that the short-term strategy is to achieve organic growth and to achieve full utilization of all licenses in the long term. In 2017, NRS expects the harvested volume to be 34 000 tonnes, which is an increase by

27% from the harvested volume in 2016 of 26 800 tonnes (2017a). As of today, the firm has a capacity of 45 000 tonnes to harvest, which implies an additional potential growth of 32% in harvested volumes from the expected 2017 level. In addition, NRS has applied for development licenses, that if approved, will contribute with additionally 11 700 tonnes to the total capacity. According to Berge at Ilaks.no, the Directorate of Fisheries has indicated the licenses will be approved and that NRS and Aker should prepare to build their offshore farms (2017b).

I base the supply-forecast on that NRS will be awarded the development licenses and hence, increase the total harvest capacity to 56 700 tonnes. Although the firm aims to utilize the full capacity, I find this doubtful, mainly due to the increased sea lice problem that will continue to be a problem for the salmon farmers. Instead, I believe that NRS will be able to reach approx. 54 000 tonnes by the end of the forecast period (2027). Given the underlying expectation that NRS will harvest 34 000 tonnes in 2017, this would imply a growth in harvested volume of 58%, or a CAGR of 4.73% until 2027. The growth may differ from year to year but over the whole period, I assume that the total growth will be in line with my forecast. In the forecast, the assumption is that NRS will be awarded the development licenses by the end of 2017 or in the beginning of 2018. It is then reasonable to believe that the constructing and testing of the offshore farms will require at least a year, which means that NRS will be able to put fish in the new farms earliest in 2019. As a result, NRS will be able to utilize the increased harvest capacity from 2020 and forward. In my estimates, NRS should reach the current capacity of 45 000 tonnes in 2021, which corresponds to a CAGR of 10.92% in the period 2018-2021. Consequently, NRS should expect 2020 and 2021 to result in extra strong growth when the new capacity is available in addition. In the last six years of the period, I have forecasted a CAGR of 3%, which is in line with the recommendation from Koller et al.; to use a simplified forecast in the last five years in the model. Although the harvested volume is an important figure for the future, the operating income is determined by the volume sold. The volume sold usually differs a lot from the harvested volume since it also includes contract sales and other products than fresh HOG salmon (NRS, 2017b). In the last 10 years, the development in volume sold has correlated with the harvested volume, but the change in volume sold has been more modest (approx.

half the % growth) compared to the growth in the harvest. Thus, in my forecast model I assume that this trend will remain, and I have modeled a yearly growth in volume sold that corresponds to half the growth in volume harvested.

The price development is even more difficult and uncertain to estimate. Besides supply and demand, disease outbreaks, quality, and flexibility of market channels also affects the salmon price. So far in 2017, the average spot price of salmon is 67.41 NOK/kg, and it has been relatively stable at this level during the beginning of the year. However, the forward price for Q3+Q4 is currently 60.26 NOK/kg, which could imply an expected drop in prices in the second half of 2017. According to the forward curve at Fish Pool, the forward price for 2018 is 61.25 NOK/kg and 57.75 NOK/kg for 2019 (2017). A drop in prices in 2019 would also reflect the historical cyclical development in the industry presented in figure 5 in chapter 7.1.6. In the absence of better alternatives, I will base the forecasted price on Fish Pool's forward estimates for 2018 and 2019.
To estimate the prices from 2020 to 2027 is almost a guessing game, but I will try to connect it to some fundamental drivers. As we know from the regression above, the change in global supply explains 68% of the change in the Norwegian Nasdaq prices of Atlantic salmon. We also know that the expected global supply growth is low in the long-term (7.1.6, Market Outlook), which should provide good price prospects. In addition, the long-term global demand for protein is projected to increase by 40-80% (7.1.6). Taking these aspects into account, I have forecasted the price to experience a CAGR of 4% between 2020 and 2027, with a typical cyclical drop in 2023-2024. This is again, in accordance with the recommendations from Koller et al. The growth in prices is also in line with the historical change in prices (see appendix 3 for supplementary data).
Consequently, in my model, NRS will achieve a 15% growth in revenues in the best years and a 3% decline in the worst years, which corresponds to a CAGR in revenues of 6.9% during the 10-year period (see appendix 3 for complete model).

8.4 Expenses

The operating expenses should be forecasted based on revenues in order to reflect the activity in the firm. The operating expenses usually include costs of goods sold, and selling, general, and administrative costs (Koller et al., 2015, p. 238). On NRS' income statement, these are defined as cost of goods sold, salaries, and

other operating costs. To forecast the operating expenses in the period, I looked at the historical relation between the costs and revenues. In the last five years, the operating expenses was in average 91% of the revenues each year, although last year, NRS managed to lower the operating expenses to 83% of revenues. It is difficult to know if the historical relation will remain in the future, especially since NRS states that they will focus on reducing the production costs. However, the company does not state how much they aim to reduce the production costs and there is a possibility that the increased medication costs tied to the sea lice problem may offset the effect from the reduction in other production costs. In my forecast, I assume that NRS will be able to keep the operating expenses at a level close to 83% of revenues yearly until 2020. After 2020, I expect the expenses to increase slightly again due to the increased activity level created by the higher capacity limitations, and to increase to approx. 85% of the revenues.
Finally, inflation must be considered. From the strategic analysis in chapter 7, we know that the inflation and growth in real wages are expected to be low until 2020. I have therefore forecasted a modest growth in salaries for NRS until 2020 and then a somewhat higher growth in salaries between 2020 and 2027, which is in line with Norges Bank's projections for the real wage growth (2017c).
It is, however, important to remember that there is a lot of uncertainty tied to these estimates, and whether the relationship between revenues and expenses will stay at a constant level in the future.

8.5 Depreciation and Reinvestment Needs

When forecasting depreciation, you have several options. Two preferred approaches are to forecast depreciation as a percentage of property, plant, and equipment (PP&E), or if you have access to a company's equipment purchases and depreciation schedules, you can generate deprecation forecasts based on this information. The latter approach is obviously not possible for me to use since I do not have access to such information. Furthermore, it is important to avoid tying depreciation to sales since it will incorrectly grow as revenues grow, although capital expenditures have not been made. If we look at the historical depreciation as a percentage of PP&E, the average depreciation in the last five years was 17.13% of the PP&E. I assume that depreciation remains constant as a percentage of PP&E and predict 17.13% in line with the average rate in most recent years. PP&E should be forecasted as a percentage of revenues (Petersen & Plenborg,

2012, p. 203). In the same 5-year period, the relation between PP&E and revenues was 10.10%. Based on these historical numbers, I expect NRS to maintain this relation between PP&E and revenues until 2020. In 2020, the relation should increase as a result of the expected new awarded licenses that requires more PP&E. Consequently, I expect the relation to be 12% from 2020 until 2027. Depreciation is directly tied to a particular asset and should hence, increase only after an expenditure (Koller et al., 2015, p. 239).

This brings us to the reinvestment needs. The reinvestment of capital is essential for a firm to grow, and since I have forecasted a future growth in revenues, I must also forecast a proper reinvestment rate that defends the growth rate.

The FCFF can be written as:

$$FCFF = EBIT(1-t)(1-Reinvestment\ Rate)$$

where

$$Reinvestment\ Rate = \frac{Capital\ Expenditure - Depreciation + \Delta Noncash\ WC}{EBIT(1-tax\ rate)}$$

By using this formula, I will avoid consistency errors and avoid forecasting a growth in depreciation without any reinvestments being made. The reinvestment rate is often measured using a firm's past history on reinvestment. However, firms seldom have smooth capital expenditure streams, they may be volatile from year to year. It is therefore necessary to look at capital expenditures over time and normalize them by taking an average or by looking at industry norms (Damodaran 2001, p. 757). I this case, I have chosen to use NRS' average capital expenditures in the last five years. When applying NRS' historical numbers to the formula above, the reinvestment rate is estimated to be 57.43%, which is the rate that will be used in my DCF model (appendix 3).

8.6 Working Capital

In its traditional form, working capital is the difference between the current assets and current liabilities of a firm. This definition, however, is too broad when the purpose is to find the effect of working capital on cash flows. The reason is that cash is often held for other reasons than to cover day-to-day operations, and cash in large amounts usually earns a market interest and has no opportunity cost. Therefore, it is common to use the *noncash working capital* instead where you simply exclude the cash from the working capital (Damodaran, 2001, p. 390). The

noncash working capital is the difference between noncash current assets and non-interest bearing current liabilities. Changes in working capital are unstable and may differ significantly from each year. To ensure that the projections are not a result of an unusual base year, I started by obtaining historical ratios of the noncash working capital and revenues (appendix 3). The average ratio from the period could then be used to forecast the working capital as a percentage of future revenues. In average, the noncash current assets were 48% of revenues, and the current liabilities were 26% of revenues between 2012 and 2016. In my forecast model, these ratios are included in the reinvestment rate shown in the formula above, and are thus used to estimate future change in noncash working capital.

8.7 Taxes

The Norwegian corporate standard tax rate is reduced from 25% to 24% as from the fiscal year ending in 2017 (Deloitte, 2017b). In the DCF model, the tax rate used is 24% and the underlying assumption is that the tax rate will remain at this level during the 10-year period. Another assumption is that the tax is paid instantaneous, which is not always true in reality but the tax must regardless be paid at some point in the future. I have thus chosen not to consider deferred tax.

8.8 Terminal Value

From chapter 5 we know that we cannot estimate cash flows forever and that we instead estimate a terminal value after the final year in the forecasting period. In order to do this, there are a few components that need to be forecasted.
The growth rate in the stable period (beyond 2027) will be determined mainly by the development in prices and demand. The reason for this is the capacity limits that exist in the industry, which persists firms from supplying unlimited volumes. From the strategic analysis, we know that the long-term demand is expected to increase, which should affect future prices and growth positively. It is, however, not reasonable to expect a very high growth in prices since it is limited how much people are willing to pay for the products. I have thus used a growth rate of 1% to reflect these limited growth possibilities. For simplicity reasons, I assume that the WACC will remain the same in the stable period as the rate I use in the DCF model. This will certainly not be the reality, but it is impossible to estimate future capital structures and other components of WACC accurately so far in the future.

$$Terminal\ value = \frac{1\ 242\ 531\ 000}{0{,}0466 - 0{,}01} = 10\ 980\ 724\ 000$$

9. Valuation

Based on chapter 5-8, I am now able to perform the valuation of the NRS stock. As previously mentioned, the main model is the DCF model, from which the fundamental value of the stock is derived. I will then perform a relative valuation using multiples to control the estimated value derived from the DCF model. The numbers in the valuation models, both DCF and multiples, are last updated on May 23rd 2017.

9.1 Discounted Cash Flow Valuation

Below is a summary of the DCF model and its outputs. The complete model can be found in appendix 3.

Table 4: FCFF summary

Summary
May 23rd 2017

Year	0	1	2	3	4	5	6	7	8	9	10
(NOK 1000)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenues	4 869 301	4 855 146	4 852 372	5 554 995	6 359 359	6 936 788	6 725 910	6 521 442	7 113 589	7 759 503	8 228 953
EBIT	818 976	816 595	816 129	913 923	960 232	1 047 421	1 015 579	984 706	1 074 117	1 171 647	1 242 531
EBIT (1-t)	622 422	620 612	620 258	694 581	729 776	796 040	771 840	748 376	816 329	890 452	944 324
Reinvestment	-357 486	-356 446	-356 243	-398 930	-419 144	-457 202	-443 304	-429 827	-468 855	-511 427	-542 369
FCFF	264 936	264 166	264 015	295 651	310 632	338 837	328 537	318 549	347 473	379 024	401 955

Table 5: Output DCF: Value per share

Output	Value NOK
PV Terminal value	6 963 070 744
PV FCFF	2 774 297 686
Value of operating assets	9 737 368 430
Cash	69 257 000
Net Debt outstanding	-646 813 000
Minority interests	-16 706 000
Value of equity	9 143 106 430
Shares outstanding	43 572 191
Value per share NOK	209,84

By using the DCF model, I am arriving at an estimated value per share of 209.84 NOK. This implies that the stock is undervalued in the market since it is currently trading at 166.50 NOK per share (May 23rd). The estimate reflects a future where NRS will experience a solid growth in volumes sold and where the firm is awarded new licenses which will increase the total harvest, and sales capacities. In 2027, NRS will harvest 54 000 tonnes. This is in accordance with what I estimate as a possible capacity, given the strong expected future demand, and that NRS will be able to utilize most of its future capacity. Based on my assumptions, the future will also be characterized by high salmon prices where approx. 60

NOK/KG seems to be the new bottom level. As we can see, NRS will experience a top-year in 2027 where the company should reach 8 billion NOK in revenues for the first time, before entering the stable growth period.

9.2 Relative Valuation

Another popular approach for valuing a firm is to value a firm based on how similar firms are priced in the market. To use relative valuation, the first step is to define the comparable firms and to collect their multiples. A comparable firm is one with cash flows, growth potential, and risk similar to the firm being valued. Usually, comparable firms are defined to be other firms in the firm's industry (Damodaran, 2010, p. 105). In my model, I have used 8 food-producing firms listed on Oslo Stock Exchange, where 7 of them are salmon-farming companies. As I have mentioned before, I will use three multiples in my relative valuation: P/E, P/B, and EV/EBITDA. The multiples used are the median of the comparable firms. This is in accordance with Damodaran's recommendations: The median is more representative of the typical firm in the group and all comparisons should be made to medians. In addition, by using the median, your model will not be affected by potential extreme deviations of individual firm's multiples (2010, p. 98). Complete calculations of the multiples can be found in appendix 4.

9.2.1 Price/Earnings

The P/E multiple is the most commonly used multiple in practice. An intuitive way of think of the value of a stock is as a multiple of the earnings the stock generates. It is therefore common to look at the price paid as a multiple of the earnings per share (EPS) generated by the firm (Damodaran, 2010, p. 93).
P/E is calculated by using the following formula:

$$\frac{\mathrm{P}}{\mathrm{E}} = \frac{Market\ value\ per\ share}{EPS}$$

There are several different EPS-values available to use. I have used the EPS over the last four quarters, which results in a trailing twelve months (TTM) P/E. Although the P/E multiple is the most widely used multiple, it is also the most widely misused one. The reason is that its relationship to a firm's financial fundamentals, such as capital structure, is often ignored, which leads to significant errors in applications (Damodaran, 2012, p. 468).

Table 6: Price/Earnings: Value per share

P/E (TTM)	
Multiple	10,27
Net profit	1 004 713 000
Value of equity	10 318 402 510
Shares outstanding	43 572 191
Value per share NOK	236,81

As of May 23rd, NRS' P/E ratio is 7.32 while the median for the comparable firms is 10.27. This could imply that NRS is undervalued, or that the comparable firms are overvalued, or that investors do not perceive NRS as doing as well as the industry presently. Furthermore, by using the industry median, I am arriving at a value per share of NRS of 236.81 NOK. As we can see, this estimate is well above the value per share derived from the DCF as well as the current market value per share. More specifically, it is 26.97 NOK above the DCF estimate and 70.31 NOK above current market value. By using the P/E estimate, NRS once again appears to be undervalued in the market.

9.2.2 Price/Book

The P/B ratio is another widely used multiple in the relative valuation. Stocks selling for below book value of equity is generally considered undervalued, while stocks selling for more than book value is considered overvalued. An advantage with the P/B ratio is that it provides a relatively stable, intuitive measure of value that can be compared to market value. (Damodaran, 2012, p. 512).
The formula for estimating P/B is written as:

$$\frac{P}{B} = \frac{Market\ price\ per\ share}{Book\ value\ per\ share}$$

Table 7: Price/Book: Value per share

P/B TTM	
Multiple	2,43
Book value of equity	2 047 017 000
Value of equity	4 974 251 310
Shares outstanding	43 572 191
Value per share NOK	114,16

As of May 23rd, NRS' P/B ratio is 3.54 while the median for comparable firms is 2.43. Once again, this could imply that NRS is overvalued or that the comparable firms are undervalued. When I use the industry-median estimate the value of the

NRS stock, I am arriving at a value of 114.16 NOK per share. In contrast to the value derived from the DCF and P/E ratio, the P/B ratio implies that the NRS stock is overvalued by 52.34 NOK. A reason for this is according to Kaldestad & Møller (2011) that the book value of equity does not include intangible assets (p. 161). On the balance sheet, NRS has intangible assets in the shape of licenses worth 649 million NOK (total non-current assets are 1614 million NOK). Licenses are an essential part of the salmon farming companies' assets, which could make the use of the P/B multiple questionable in this industry.

9.2.3 Enterprise Value/EBITDA

The EV/EBITDA multiple has become increasingly more popular among practitioners in the last two decades. One reason is that the multiple is not affected by different depreciation methods across different companies, which may affect net income but not EBITDA. Another reason is that the multiple can be compared more easily across companies with different financial leverage since it is not affected by capital structures by nature (Damodaran, 2012, p. 500).
The formula for estimating the EV/EBITDA multiple is written as:

$$\frac{EV}{EBITDA} = \frac{(Market\ value\ equity + net\ interest\ bearing\ debt)}{EBITDA}$$

As of May 23rd, NRS' EV/EBITDA ratio is 6.07 while the median of comparable firms is 7.82, which could imply that NRS is undervalued in relation to its comparable firms. The industry median results in a value per share of 220.05 NOK, which is 53.55 NOK above the current share price of 166.50 NOK. It is also higher (10.21 NOK) than the estimated value per share in the DCF model.

Table 8: EV/EBITDA: Value per share

EV/EBITDA TTM	
Multiple	7,82
EBITDA	1 249 753 000
Debt	716 070 000
Minority interests	16 706 000
Non-operating assets	547 898 000
Value of equity	9 588 190 460
Shares outstanding	43 572 191
Value per share NOK	220,05

In other words, the EV/EBITDA multiple supports the main result from the DCF model: that the NRS is currently undervalued in the market.

10. Uncertainty Considerations

10.1 Sensitivity Analysis

The estimated value of the NRS stock from the DCF model is based on several assumptions. These assumptions may be good based on the available information at the time the analysis is carried out, but it does not necessarily mean that it is what NRS' future will be like. Since I aim to provide a buy/hold/sell recommendation to a fictive investor, it is of great interest to see how much the parameters in the DCF model can change before my recommendation changes as well, and how the changes in parameters affect the valuation of NRS. In the following chapter, I will present the results from several simulations.

10.1.1 Simulation: Growth Rate Stable Period and WACC

Since a large portion of the estimated firm value in the DCF model is derived from the terminal value, it is interesting to see how changes in the growth rate and WACC in the stable period affects the value per share. In my DCF model I used a growth rate in the stable period of 1% in combination with a WACC of 4.66% (same as the first ten years). These inputs resulted in a value per share of 209,84 NOK. In the table below, the effect by changing the growth rate and WACC by 0.5% is presented. As we can see, the highest outcome is 4078,34 NOK per share and the lowest outcome is 87,59 NOK per share. A value of 4078 NOK per share is obviously not realistic at all, but it shows the importance of doing proper research and analyzes before forecasting the inputs in the model. Without using sound inputs, you risk getting unrealistic outputs from the model. The green area in the table below represents a value per share that is higher than the current value per share of 166.50 NOK (May 23rd).

Table 9: Sensitivity analysis: Growth rate & WACC

Growth rate stable period	WACC								
	3,66%	4,16%	4,66%	5,16%	5,66%	6,16%	6,66%	7,16%	7,66%
-2%	166,96	151,22	137,89	126,47	116,59	107,95	100,35	93,61	87,59
-1,5%	177,99	160,02	145,02	132,32	121,44	112,01	103,77	96,52	90,08
-1%	191,38	170,53	153,41	139,12	127,02	116,64	107,65	99,79	92,86
-0,5%	207,99	183,29	163,43	147,12	133,50	121,96	112,06	103,49	95,98
1%	295,29	245,81	209,86	182,66	161,30	144,11	129,98	118,17	108,16
1,5%	351,54	282,32	235,19	200,98	175,02	154,66	138,27	124,80	113,53
2%	441,14	335,73	269,99	225,09	192,49	167,75	148,34	132,71	119,86
2,5%	608,37	421,32	320,91	258,28	215,49	184,41	160,83	142,32	127,41
3%	1028,97	580,69	402,49	306,82	247,13	206,35	176,73	154,23	136,58
3,5%	4078,34	981,53	551,41	384,61	293,43	236,54	197,66	169,41	147,95
4%	N/A	3887,64	936,51	529,46	367,32	280,70	226,46	189,38	162,44

By looking at the table, we see that at the highest WACC rate (7.66%), a change in future growth rate will have a total effect of 74.85 NOK per share. Furthermore, by keeping the growth rate constant at negative 2 %, a change in WACC will have a total effect of 79.39 NOK per share. This implies that the parameter WACC has a slightly more decisive on the share price than the future growth rate.

10.1.2 Simulation: Reinvestment Rate and WACC

As we know, NRS must reinvest capital in order to grow in the future. Thus, in this simulation, I am looking at how changes in the reinvestment rate and WACC will affect the share price. In my DCF model, I used an estimated reinvestment rate of 57.43%. The table below shows the effect on the share price by changing the reinvestment rate by 10% in either direction, and changing WACC by 0.5% in either direction. Not surprisingly, we would get the highest share price of 513 NOK with the combination of the lowest WACC and the lowest reinvestment rate. The lowest outcome of 22.33 NOK is the result of the highest possible WACC combined with the highest possible reinvestment rate.

Table 10: Sensitivity analysis: Reinvestment rate & WACC

Reinvestment rate	WACC								
	3,66%	4,16%	4,66%	5,16%	5,66%	6,16%	6,66%	7,16%	7,66%
27,43%	513,00	428,65	367,37	320,99	284,58	255,28	231,20	211,06	193,99
37,43%	440,43	367,70	314,87	274,88	243,49	218,22	197,46	180,10	165,38
47,43%	367,86	306,76	262,36	228,77	202,39	181,16	163,72	149,14	136,77
57,43%	295,29	245,81	209,86	182,66	161,30	144,11	129,98	118,17	108,16
67,43%	222,72	184,86	157,36	136,55	120,20	107,05	96,25	87,21	79,55
77,43%	150,15	123,92	104,86	90,43	79,11	70,00	62,51	56,25	50,94
87,43%	77,58	62,97	52,36	44,32	38,02	32,94	28,77	25,28	22,33

By repeating the test from simulation 1, to hold one parameter constant and see how a change in the other one affects the share price, we can conclude that the reinvestment rate has a greater effect on the share price than what WACC has. By keeping WACC at a constant high level and changing the reinvestment rate, the

total effect on share price is 171.66 NOK. Conversely, if we keep the reinvestment rate constant at 87.43% and changes WACC, the total effect on the share price is 55.25 NOK.

10.1.3 Simulation: CAGR in Revenues and WACC

In the third simulation, I am looking at how changes in the CAGR in revenues and WACC affects the share price. CAGR is a useful measure of growth over multiple time periods when the growth has fluctuated widely from year to year during the period. As we know from before, NRS' CAGR is determined by the change in volumes sold in combination with changes in salmon prices. Based on my assumptions regarding the growth in supply and salmon prices, the CAGR in revenues is 6.90% between 2017 and 2027 in my DCF model. In the simulation, the best outcome is when the CAGR is highest (9.40%) and when WACC is lowest (3.66%). This results in a share price of 420.45 NOK. Conversely, the worst outcome appears when the CAGR is 2.90% and WACC is 7.66%, which results in a share price of 89.10 NOK.

Table 11: Sensitivity analysis: CAGR & WACC

CAGR in revenues	WACC								
2017-2027	3,66%	4,16%	4,66%	5,16%	5,66%	6,16%	6,66%	7,16%	7,66%
2,90%	237,24	198,17	150,10	148,23	131,32	117,68	106,47	97,08	89,10
3,40%	248,13	207,14	157,70	154,77	137,03	122,74	110,98	101,15	92,79
3,90%	259,48	216,49	165,65	161,57	142,97	128,00	115,68	105,38	96,63
4,40%	271,32	226,23	173,96	168,65	149,16	133,47	120,47	109,78	100,62
4,90%	283,65	236,38	182,66	176,03	155,61	139,17	125,65	114,35	104,76
5,40%	296,50	246,95	191,76	183,70	162,31	145,09	130,94	119,10	109,07
5,90%	309,89	257,96	201,27	191,69	169,28	151,25	136,43	124,04	113,54
6,40%	323,84	269,43	206,21	200,01	176,54	157,66	142,15	129,18	118,19
6,90%	338,36	281,37	209,84	208,66	184,09	164,32	148,08	134,52	123,02
7,40%	353,49	293,79	250,49	217,66	191,94	171,25	154,26	140,07	128,04
7,90%	363,23	306,73	261,39	227,03	200,10	178,45	160,80	145,83	133,25
8,40%	385,63	320,19	272,73	236,77	208,59	185,94	167,35	151,82	138,66
8,90%	402,69	334,20	284,53	247,56	217,42	193,72	174,28	158,04	144,29
9,40%	420,45	348,77	296,80	257,43	226,59	201,81	181,48	164,50	150,13

By holding WACC constant at 7.66%, the total effect on the share price by changing the CAGR is 61.03 NOK. If we instead hold the CAGR constant 2.90% and changes WACC, the total effect on the share price is 148.14 NOK. This implies that WACC has a greater effect on the share price than what the CAGR in revenues has.

10.2 Scenario Analysis

In this part, I will focus on a scenario that represents another future than what the DCF valuation is based on. The underlying assumption in the DCF model is that NRS will be awarded new development licenses in the near future, which would increase the harvesting-capacity to 56 700 tonnes from today's capacity of 45 000 tonnes. In the alternative scenario, NRS will not be awarded those licenses, which means that the growth potential for the firm decreases considerably. The CAGR in revenues will in such a scenario be 3.17% in the coming 10 years, compared to 6.90% in the base case.

Table 12: Scenario Analysis

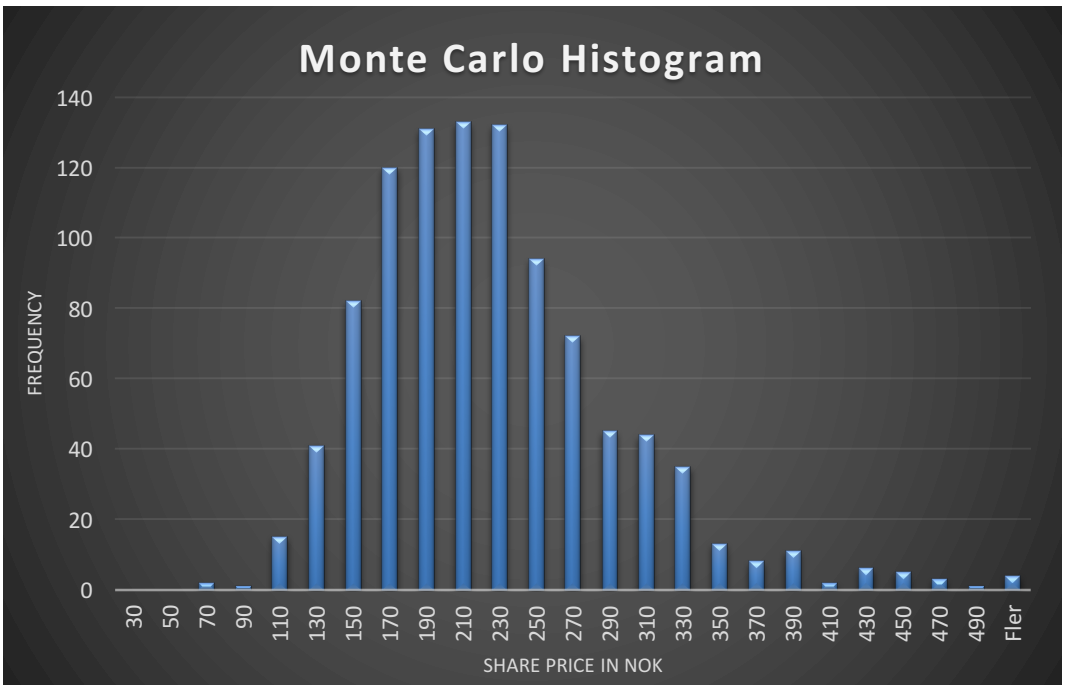
Variables	Base Case	Alternative Scenario
Awarded new licenses	Yes	No
Harvesting capacity	56 700	45 000
Capacity utilization 2027	95%	100%
Cost of capital 2017-2027	4,66%	4,66%
CAGR in revenues 2017-2027	6,90%	3,17%
Reinvestment rate	57,43%	57,43%
Cost of capital stable period	4,66%	4,66%
Growth in stable period	1%	1%
Value per share NOK	209,84	178,07

As we can see, the share price in the alternative scenario is lower than the price in the base case, but still higher than the current market value per share (166.50 NOK). The alternative scenario should also be considered fully realistic. Although NRS has received positive signals from the Directorate of Fisheries regarding their development licenses, there is a possibility that they will only be awarded a part of the total 15 licenses applied for. However, NRS has stated that they need all 15 licenses to realize the project (Vartdal, Dagens Næringsliv, 2017). In appendix 5, a best case and worst case scenario based on more unrealistic inputs have been simulated as well. The advantage with a scenario analysis is that it, unlike the simple sensitivity analyzes, is possible to model by changing several variables at the same time.

10.3 Monte Carlo Simulation

In a Monte Carlo simulation, the distribution of simulating the future many times is presented. A Monte Carlo simulation is stochastic and is using a random number generator, preferably in a software program. My simulation is done in Excel where I used the *rand()* formula. In finance, the Monte Carlo simulation can be used to model the components of the cash flow that are affected by uncertainty. The advantage with the Monte Carlo simulation is that in every unique simulation, several uncertain variables are randomly changed at the same time (Winston, 2016, p. 683-691). I made 1000 simulations where I gave the variables a value equal to the values used in the base case, and a discretionary standard deviation based on the different outcomes in the sensitivity analysis. In appendix 5, the conditions for the variables in the simulation is presented and the result of the simulation is illustrated in the figure below.

Figure 8: Output Monte Carlo simulation



The average value from the simulation was 214.80 NOK per share and the standard deviation was 75.70. As we can see, there is a great possibility that the result is a higher value than the current market value of the stock. However, it is also possible scenarios where the stock has a value less than the current market value. The Monte Carlo simulation is an algorithm that does not consider economic- and financial theories. As illustrated in the histogram, the distribution

has a tail on the right side which means that the distribution is a little bit skewed. One should therefore review the output a bit critical and question the realism in some of the most extreme outcomes.

11. Discussion of the Analysis Results

Based on the intrinsic valuation, the relative valuation, and the Monte Carlo simulation, NRS clearly appears to be undervalued in the market. In the DCF model, which is the main approach in this valuation, the fundamental value of the NRS stock is 209.84 NOK. This is 43.34 NOK above the current market price of the stock and the stock should thus increase in value. In a compilation of ten brokerage houses' recommendations of the stock, it appears that seven of them believes the stock will rise, one believe that it will drop, and two remains neutral (The Wall Street Journal, 2017). Although this does not necessarily imply that my value-estimate is correct, it supports my expectations regarding the future of the firm.

Despite that my estimate shows that the stock is undervalued today, it is possible that future market conditions may change this result in a different direction. As I have mentioned before, the underlying assumption in the DCF model is that NRS will have a bright future where they will experience a solid growth in revenues during the next ten years. In order to do so, the company is dependent on several uncertain parameters. The future salmon price is such an uncertain parameter. It is perhaps the most difficult component to estimate in the future, especially 10 years from today. The DCF model is built on the expectation that a price around 60 NOK/kg is the new price floor. However, if this appears to be incorrect, and if the price decreases below this level in the future, it will affect the revenues, and the cash flow, negatively compared to my estimates. Consequently, the value derived from DCF model would be lower than my estimate in such a scenario. An example of the difficulties of estimating the future price is that in the beginning of 2017, consensus among analysts and industry experts was that the spot price in 2017 should drop compared to 2016. So far this year, the average spot price is instead higher than last year's record levels.

In the relative valuation, NRS is valued in relation to a sample of its competitors by using three common multiples. The result explains that NRS is undervalued in two of three cases, both when comparing NRS' multiple with the industry-median

and when using the industry-median multiple to estimate the NRS share price. How reliable the relative valuation is, is widely discussed among theorists and practitioners. It is a little off-topic considering the problem statement and the purpose of this thesis, and may instead be a subject for further investigation and analysis.

The sensitivity analysis showed that the reinvestment rate and WACC were the most important variables in relation to the share price. This should come as no surprise. A higher reinvestment rate will reduce the free cash flow to firm, which in turn decreases the firm value. Vice versa applies in a scenario with a low reinvestment rate: the firm value will increase. However, the lowest possible reinvestment rate is not necessarily desirable. In order to grow in the future, and to provide a decent return on capital, NRS must reinvest. Without reinvestments, the daily operations will stagnate and NRS will fall behind its competitors. Furthermore, the analysis showed that even if the growth rate in the stable period should be negative, there are still scenarios where stock appears to be undervalued. The sensitivity analysis is useful since it explains the vulnerability of the DCF model. More specific, it shows how the model's output is affected when we change some selected variables. However, the tables in the sensitivity analysis are only two-dimensional, which means that you can change only one variable at a time. To better simulate the share price of NRS, I performed a Monte Carlo simulation. The advantage with the Monte Carlo simulation is that it allows me to simultaneously change several variables at a time, which will result in a lot of randomly simulated values of the share. The outcome from this simulation was pretty clear: in approx. 80% of the 1000 simulations, the result was a share price higher than the current market value (166.50 NOK). This means that there are scenarios where certain combinations of the reinvestment rate, WACC, CAGR, etc., will result in a share value lower than the current value. Although these scenarios are obviously less likely to occur, I still find it important to highlight this.

The strategic analysis showed that the salmon-farming industry is protected by relatively high barriers to entry since a company must possess licenses to be allowed to farm salmon. While this is positive from a competition-point of view, it also affects the growth possibilities of NRS negatively. To be awarded new

licenses, and thus increase the harvesting capacity, is difficult. It is also reasonable to believe that it will become even more difficult in the future because the industry has reached a production level where the biological boundaries are being pushed and where future growth is dependent on new technology. We can therefore expect that new licenses will be harder to obtain in the future since it will require a new license to provide pioneering technology, which can be both expensive and difficult to develop.

Finally, an alternative scenario is developed where NRS will not be awarded the development licenses that they have applied for, which reduces the growth potential considerably. When putting the alternative variables into the DCF model, the result was still a value per share (178.07) higher than the current market value per share, which supports my assumptions, forecasts, and estimates in the base case. The financial statement analysis was discussed in chapter 6 and I will thus not repeat it here.

12. Criticism of the Analysis

A lot of weaknesses and criticism has already been highlighted ongoing in the text but I will briefly summarize a part of them here.

Since a valuation to a large extent is based on the available information at the time it is carried out, it is not necessarily valid the day after. The reason is that the information stream is continuous and numbers must be updated to get a fair value. Furthermore, the valuation is based on a number of assumptions which represents my perception of the future of the firm and the industry. Consequently, my value-estimates should be understood as subjective value perceptions, not as unambiguously true estimates of the value of the stock. Additionally, the DCF model is built on different economic principles that does not necessarily hold in reality. The most obvious example is the required rate of return that is based on the CAPM. As we know from chapter 3, a lot of criticism of the CAPM exists and questions whether it is valid or not. Despite this, it is widely used and I have chosen to use it in this thesis as well.

To forecast the future is difficult, and one can question the forecasted variables that are used as inputs in the DCF model. For example, in some analyzes, I had to base my estimates on historical data. It is highly uncertain whether historical data is valid as a foundation for estimating the future: we cannot know if the future will look like the history. A concrete example is my estimations of the future salmon

price where I assume that it will experience the same cyclical drop in the future as it has experienced in the history. This can be a possible weakness in the analysis. The low interest rates on government bonds results in a WACC that is relatively low. It is reasonable to assume that the interest rates will rise during the 10-year period that my valuation is built on. However, I have kept the WACC constant during this period as well as in the stable growth period, which obviously is a bit unrealistic. WACC is also affected by the capital structure, which means that by keeping WACC constant, I am implicitly suggests that NRS capital structure will remain constant during the whole period. This will most likely not be the reality, but to estimate future capital structures is close to impossible and such estimates would only be guesswork from me. I therefore decided to leave WACC constant, although it probably should change from year to year.

Since this is an external valuation, it affects the depth in the analyzes. If I would have access to internal information from NRS, my analyzes and estimates would probably be different. For example, when estimating future depreciation, access to internal depreciation schedules would probably result in a more precise estimate. Finally, the use of multiples in relative valuation has a lot of advantages, but also significant weaknesses. In my valuation, NRS appeared to be undervalued in two of three cases compared to its competitors. However, it is important to remember that the industry in overall may be overvalued. If that is the case, it should not matter if NRS is undervalued in relation to its competitors: the fundamental value may still be lower than the current market value, which would imply that NRS is overvalued instead.

13. Conclusion

The purpose of this thesis has been to estimate the fundamental value of the NRS stock, and based on this estimate, provide a buy/hold/sell recommendation to a fictive investor. The value derived from the DCF model implies that the NRS stock is undervalued by 26%. As we can see in the table below, this result is supported by the by the relative valuation where NRS is undervalued when using both the P/E (42%) and EV/EBITDA (32%) ratios. In addition, the results from the Monte Carlo simulation clearly indicates that the share value is higher (29%) than 166.50 NOK. The fact that the fundamental value from the DCF is supported by three out of four other estimates must be consider a strength. However, I would once again like to emphasize the uncertainty tied to this kind of estimates before

providing any recommendation to the investor. Table 13 summarizes the recommendations for each value-estimate in the thesis.

Table 13: Recommendations

	DCF	P/E	P/B	EV/EBITDA	MC-Simulation
Value per share NOK	209,84	236,81	114,16	220,05	214,80
Current market value NOK (May 23rd)	166,50	166,50	166,50	166,50	166,50
%-Change	26%	42%	-31%	32%	29%
Recommendation	Buy	Buy	Sell	Buy	Buy

The problem statement in the beginning of the thesis was defined as:

> *‹‹What is the fundamental value of a share in NRS, traded at the Oslo Stock Exchange as of 23.05.2017››?*

With a sub-problem statement:

> *‹‹Should the fictive investor buy, remain neutral, or sell the NRS stock when his objective is financial profit››?*

The fundamental value is estimated to be 209.84 NOK as of May 23rd. Based on this estimate, and considering the supportive value estimates, NRS appears to be undervalued and I would therefore recommend the fictive investor to buy the NRS stock in order to achieve financial profit.

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