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Master Thesis

Financial valuation of Norway Royal Salmon

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Introduction

This thesis will take the reader through a valuation of Norway Royal Salmon (NRS). NRS is a mid-size market cap company listed on the Oslo Stock Exchange. As of 14th July 2017, the market cap was 5 697 million NOK, with a share price of 131 NOK.

The main valuation technique used is DCF. This method is very thorough, which is the reason we have focused our efforts primarily on this valuation tool. In addition, we use a Monte Carlo simulation to account for uncertainty in our estimates. The uncertain variables are linked to the primary key value drivers of NRS.

Furthermore, NRS has applied for 10 development licenses. These licenses may or may not be granted. It is therefore sensible to use a real option valuation on this part of NRS. We use a decision tree analysis to conduct this part of our valuation. The real option value is then added to the DCF-result to find a target price. Additionally, we look at multiples to see what the price should be if NRS was valued according to industry multiples.

The salmon industry is one of Norway's largest industries, with an export value of 50 billion NOK in 2016. The salmon industry is Norway's second largest export industry, beaten only by the petroleum industry.

To farm salmon in Norway, you need a salmon license. The Norwegian government grants these licenses. There is a maximum allowed biomass (MAB) on each license, as well as environmental requirements. Growing salmon depends on several factors, such as a certain temperature and current flows.

Licenses typically have a certain space between them in order to mitigate environmental issues. This means if an outbreak occurs, it will have a much lower chance of affecting the surrounding area, or other cages.

The main industry risks comes down to spot prices for the salmon, operating costs and sustainability issues. The revenue of farmers is a product of price and volume. Price is therefore one of the most important factors. Historically, the price has been volatile and have had a significant impact on their profitability.

Operating costs are a risk factor as they have to be paid up to three years before the point of harvest. As prices can be volatile, operating costs are less so. This can leave farmers in a situation where their costs have increased steadily over the past three years, whilst the spot prices drops at the point of sale. Farmers therefore have to be careful, and focus on cost efficiency. Most farmers state in their reports that this is a major focus for the industry. Looking at the numbers, it does not seem that any farmers have been able to decrease their costs.

Sustainability issues is the third risk factor, and primarily includes topics related to fish diseases, escapes and pollution. This risk factor has received a lot of attention in the media and is prioritized among both regulators and farmers.

The salmon farming industry has considerable growth opportunities, but are unable to realize the full potential. The industry faces high demand, which is likely to continue in the future. However, sustainability issues hold the growth opportunities back.

Political facilitation is focused on farmers solving the industry sustainability issues to allow for further growth. For example, Norwegian regulators have issued development licenses that are granted to farmers that have innovative solutions to solve the sustainability issues the industry is facing.

The value of NRS is affected by the aforementioned factors, but the key value drivers for NRS are price, volume and operating costs. Operating costs primarily consists for feed costs, and is a risk beyond their control. Other important value drivers are working capital and investment in PPE, which are both required to be high due the nature of the production cycle of salmon.

The master thesis is intended to be written in a way that resembles a real equity research report. The report is split into three parts. Part one deals with the salmon industry as a whole, and look at tangible and intangible assets for NRS. The intension is to find external and internal implications for the valuation, and identify the key value drivers. Part two contains the valuation itself. The valuation consists of an enterprise DCF, a decision tree analysis, Monte Carlo simulation as well as a look at multiples valuation. Part three contains the theoretical framework for the valuation. This part explains the concepts used in the valuation, as well as showing our calculations for the discount rate.

Part one and two can be considered as the main parts of the thesis, with part three being supplementary for those who wish to delve deeper into the theoretical concepts.

Acknowledgement

We want to thank our thesis advisor, Janis Berzins. He has helped steer us in the right direction when we were uncertain, whilst allowing us to take the thesis in the direction we wanted.

We also want to thank BI Norwegian Business School for a great learning environment throughout our studies.

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Initiating coverage

Share price: NOK 131

Recommendation: Buy

Target price: 170

Norway Royal Salmon

Attractive investment case

We see a 30% upside from current share price to our target price. Until 2021, we see revenues growing by 22%, whilst operational costs growing by 28.5%. By our estimates, we see group EBIT peaking in 2018, before coming down due to lower prices and costs outpacing revenue growth.

Key facts	
Number of shares (millions)	43.57
Market cap NOK (millions)	5708
Share price NOK	131
Ticker	NRS
Stock exchange	Oslo Børs

Our target price of 170 reflects a value per share of 167 NOK for the current operations, and an additional 3 NOK per share for the development license project.

NRS faces three main risks. Price risk, cost risk, and disease and escape risk. Prices are likely to continue to remain strong due to restricted supply growth for the foreseeable future. Costs have climbed at worrying levels for the past years. We believe this will continue, but at a slower pace in the coming years. As for disease and escapes, NRS is not immune, but this risk generally is not as bad as the media makes it out to be. For instance only a total of 24 salmon (!) have escaped so far in 2017 according to the Directorate of Fisheries.

We caution investors not to underestimate the effect of costs rising at a rapid rate the same way oil and gas did recently. A drop in prices will leave a lot of farmers vulnerable, including NRS.

Millions of NOK	2016	2017E	2018E	2019E	2020E	2021E
Operational revenue	4 224	4 632	4 876	4 966	5 068	5 172
Total operating expenses	-3 584	-3 908	-4 119	-4 272	-4 447	-4 606
Operational EBIT	**641**	**725**	**757**	**695**	**621**	**566**
Income from associated compan	72	80	83	76	68	62
Group EBIT	**712**	**804**	**840**	**771**	**689**	**629**

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PART I: IMPLICATIONS FOR THE VALUATION

Understanding the production cycle and its financial considerations

Key takeaways

It takes three years for a generation of salmon to be produced

The production cycle for farmed Atlantic salmon lasts for approximately 3 years and consists of three stages. The first stage, and the first 12 months, is the production from egg to finished smolt. Eggs are fertilized and grown in a controlled freshwater environment up to 100 grams. After this, the salmon is being transported into seawater cages where it grows for 14-24 months until it reaches its harvestable size. In the last stage, the salmon is slaughtered and gutted at a processing plant. To maintain premium quality, it is imperative for this process to be efficient. Thus, slaughtering, cleaning and packaging is done on one site.

Salmon farming needs high working capital

Building biomass is a capital intensive process. When reaching a steady production state, there will always be three stages in the production cycle. Hence, there will be three different generations of salmon at all times in three different phases. At the point of harvest there has incurred costs to produce the fish for up to 36 months. During this process, some costs have incurred to grow smolt at the beginning of the process, further costs is then related to grow the fish in seawater, and lastly there are costs connected to the harvest of the salmon. Once one generation is moved to the next stage, a new generation is set out. This is a rolling and never-ending process, and requires a substantial amount of working capital to be tied up, both in a steady state and when increasing production (Marine Harvest, 2017).

Since the production cycle lasts for approximately 3 years, the cash cost at the point of harvest is small relative to the revenue from that batch. This creates a high net cash flow at the point of the harvest. When the production is going forward the positive cash flow is reinvested in working capital to grow new salmon. This shows that high working capital investments are required to cater for growth.

- NRS require high working capital
- 3 years to grow a salmon generation, meaning growth cannot be immediate

Challenges for industry growth

The license regime

The key prerequisite for a company to operate in the salmon farming industry, and the biggest barrier to entry, is the salmon farming license. The salmon industry is heavily regulated, and a license is required to produce salmon. To be awarded a license, companies must meet ethical and environmental requirements by the government, in addition to being the highest bidder. New fish farming licenses are awarded by the Norwegian Ministry of Trade, Industry and Fisheries. Since 1982, the issuance of new licenses has been awarded only in limited years, due to severe industry sea lice challenges. This has led to a weak increment of new establishers in the industry.

Figure 1 - Number of wholesalers (all industries vs. aquaculture)
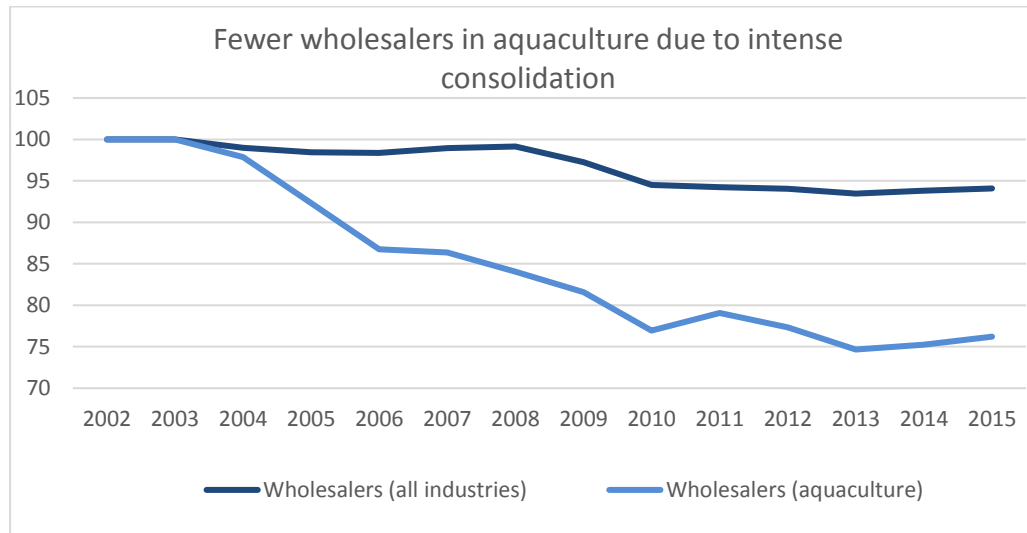
In addition to being a barrier to entry and a key driver for industry consolidation, the license regime also brings volume constraints to the production, limiting the growth possibilities of existing companies. These volume constraints are regulated as maximum allowed biomass (MAB), and is defined as the maximum volume of fish a company can hold at sea. The current MAB is 780 tons (900 tons in the counties of Troms and Finmark) (Directorate of Fisheries, 2016).

- NRS will not be awarded new licenses in the estimation period due to the license regime

Industry sustainability issues

Sustainability challenges for any industry will vary over time. The salmon farming industry is currently facing several challenges, limiting growth potential and the effectiveness of the production cycle. The most discussed sustainability challenge is the environmental impact of salmon farming. During a production cycle, the batch will to some extent suffer from sea lice and diseases affecting the salmon's physiology and mortality. Sea lice and diseases not only affect the farmed salmon, but also the natural habitat of wild fish through infection from escaped farmed salmon. In addition, emission and effects from particulate matter from the farming facilities creates toxic gases and substances which have a significant negative impact on the ocean bottom and surrounding ecosystems, killing benthic animals.

The sustainability challenges has led to increased government regulations and legislations, inflicting both direct and indirect costs for the salmon farmers in the form of monitoring, management practices, maintenance etc. The environmental challenges mitigates growth potential as the government does not allow for an expansion that also entail increased environmental impact. Therefore, the industry must be able to grow while also reducing their environmental footprint.

During the last two decades, there has been a stabilization of mortality which have been achieved principally through good husbandry, management practices and vaccination. The sea lice level has also gone down since 2014, but is still at a higher level than desired.

Figure 2 - Average number of sea lice per salmon

The salmon farming industry have significantly increased their efforts to reduce the sustainability issues, and have implemented several measures to resolve the

problems, such as the "cleaner fish" whom eats the sea lice (Norwegian Seafood Federation, 2017). Sea lice and diseases are assumed to continue to be the leading cause of mortality among farmed salmon, although the mortality rate is expected to be reduced in the future as the effort to resolve the problem continues.

> - As mortality rate decreases, NRS will have lower mortality costs per kg GWE

Coastline limitations

The aquaculture industry is a very area effective food producer. According to estimations conducted by Nofima, only 0.5% of the Norwegian sea areas within the aquaculture baseline is used by the aquaculture industry (Andreassen & Robertsen, 2014).

Figure 3 - Geographical representation of farming area

The total area used in salmon farming is only equal to a small island the size of Andøya.

Cannot place a salmon farm just anywhere in the coastline

Despite the fact that the salmon farming industry physically occupies a very small portion of the sea area, there are significant challenges linked to space requirements between plants. The risk of spreading contaminants between the facilities is high if they are not spaced far apart in case of a lice breakout. Additionally, they may have a negative environmental impact of surrounding ecosystems should the plants be placed too close together. The battle for access to sea areas is also in competition with fishing, offshore energy production, tourism and other leisure activities. The industry also experiences reluctance from municipalities to establish new production sites because they claim not to be economically compensated enough for the use of the area (Norsk Industri,

2017). Lastly, several natural factors also limits potential areas of salmon farming, such as seawater temperature, water flows, oxygen level etc. This means that it is difficult to utilize more of the remaining coastline for aquaculture food production.

To achieve desired industry growth, the industry must exploit the existing sea areas better while in addition being given access to new areas. Better utilization of the ocean area in the near future is not realistic as substantial technological innovations must find place to resolve the current limitations. The government is not likely to grant new areas before the environmental issues are solved.

Technology needs to improve in order to see growth

- Further support for no new licenses

Access to feed
Atlantic salmon feeds should provide essential nutrients (proteins, fat, carbohydrates etc.) to ensure a healthy and muscular fish. Historically, the two key ingredients have been fish meal and fish oil. Because of heavy availability constraints of these two ingredients, they have been reduced and replaced by a variety of vegetal raw materials.

Figure 4 - Salmon feed raw material development

Development mix of raw materials in salmon feed in Norway

Year	Fish meal	Fish oil	Vegetal raw materials
1990	65%	24%	11%
2000	34%	31%	35%
2010	25%	17%	59%
2012	20%	12%	68%
2014	17%	9%	74%
2016	12%	9%	79%

■ Vegetal raw materials ■ Fish oil ■ Fish meal
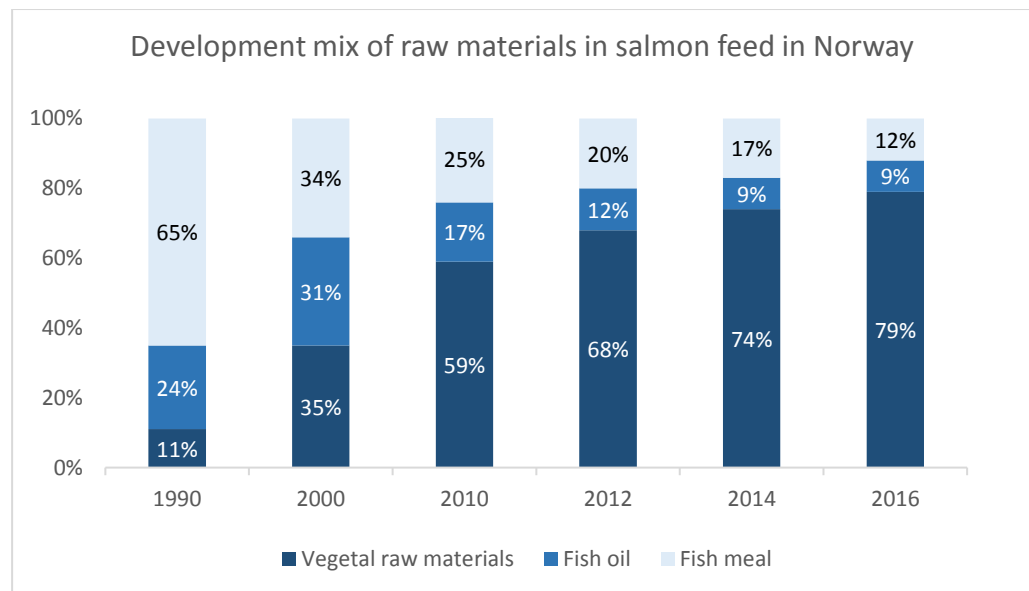
Access to feed another bottleneck for growth

Access to enough feed raw material is one of the biggest challenges for growth in the salmon farming industry. The majority of fish resources around the world is either close to being maximally utilized, or is already fully utilized. An

expansion of the salmon farming industry is therefore partly dependent on an increase in the use of alternative sources of fat and protein.

Salmonid feed is crucial for the production of salmon, and makes up a substantial part of the total costs. Salmon farmers are therefore completely dependent of the availability of feed. Today, the market for feed producers is dominated by a handful of players, indicating that the bargaining power of the suppliers are high. The producers have historically operated on cost-plus contracts, leaving the exposure of raw material prices with the salmon farming companies. As approximately 45% of the cost structure for salmon farmers is salmonid feed, an increase in the prices of the raw materials will have a substantial impact on the total production costs for Atlantic salmon (Marine Harvest, 2017).

Fish meal and fish oil have both an increasing trend in price the last decade. However, since fish meal and fish oil is a scarce resource, the producers constantly try to develop sustainable alternatives to the traditional raw materials in salmonid feed. Skretting is now the first producer in the world who can produce salmonid feed excluding fish meal, without compromising neither growth nor fish welfare (Skretting, 2016). Other producers will probably follow, mitigating the risk of increased production costs for salmons.

NRS is therefore not likely to experience any abnormal variations in their costs for salmon feed in the valuation period. The access to feed is also assumed to remain good.

- Feed cost likely to remain high, but the growth rate will decline in the future
- Market forces pull in each direction, indicating uncertainty regarding NRS feed cost

Industry growth

Political facilitation

The Norwegian salmon farming industry is currently in a situation where it faces a global market hungry for more salmon, while at the same time being limited by challenges related to sustainability. Salmon lice is a continuous challenge and the escape problem remains unresolved. The economic situation in the industry

supports that it now has a unique opportunity to capitalize on the potential market growth. However, political regulation is restricting industry growth until the environmental challenges are resolved. The Norwegian government are therefore responsible for balancing growth and sustainability issues through political facilitation.

The Norwegian government have high ambitions for value creation in the Norwegian aquaculture, as evidenced by "Havstrategi" presented in February 2017 (Ministry of Trade, Industry and Fisheries, Ministry of Petroleum and Energy, 2017). Additionally, industry organizations work together with the Norwegian regulators to find solutions to solve sustainability issues. This shows that the government facilitates for industry growth, but not at the expense of the environment.

Figure 5 - One of the examples for solving sustainability issues (published by Norsk Industri)
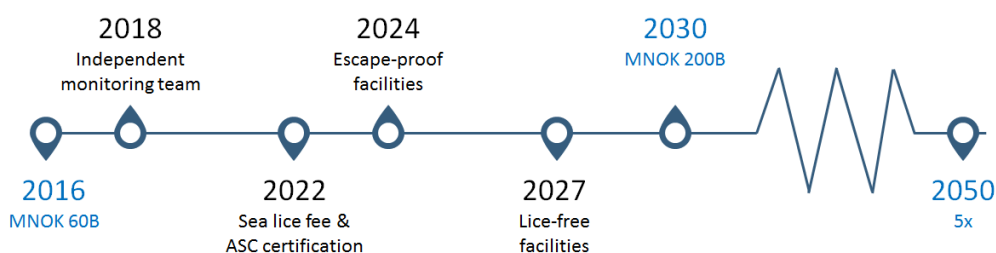
Regulators wish to facilitate healthy growth

New measures are constantly being implemented by regulators and industry organizations and players to secure healthy industry growth. Green licenses and development licenses are both concrete measures already implemented by Norwegian regulators contributing to a sustainable and competitive aquaculture industry. However, not all measures turns out successful. In the summer of 2016, the Norwegian government tried to allow salmon companies to operate with a flexible biomass (Directorate of Fisheries, 2017). No large companies applied for this program as the application process was too expensive and farmers generally were pessimistic about the actual impact of growth.

Through realization of new technological solutions and practices the industry will reduce the environmental footprint and support future sustainable growth. A predictable policy for industry growth and increased investment in R&D is therefore crucial for ensuring that Norway continues to be a world leader in the

salmon farming industry. Continuous political facilitation for industry growth will reduce the possibilities of bad investment decisions.

> • Regulators forcing salmon farmers to reduce environmental footprint
>   ➢ Short term: Higher costs
>   ➢ Long term: Decreasing mortality rate → Increased capacity utilization
> • NRS will benefit from technological advances, R&D and other innovative solutions with the rest of the industry.

Green licenses

Last production licenses granted over 2 years ago

In 2013, the Ministry of Trade, Industry and Fisheries created a regulation allowing for the issuance of 45 new green licenses, imposing strict environmental requirements (Ministry of Trade, Industry and Fisheries, 2013). All the green licenses, with one exception, have been assigned. The regulation have therefore played out its role and no more permits can be granted after this scheme, unless the ministry grants a new regulation. This is however not part of the government's sea strategy, and is not deemed likely to happen in the near future. The license lasts in perpetuity, but may be withdrawn in case of material breach of conditions set out in the license or the environmental legislation.

Development licenses

R&D efforts shared between salmon farmers

In 2015, the Norwegian government also announced an additional category of licenses to fuel investment into the technological shift in the industry. The aim of the development licenses is to facilitate the development of technology that can help solve one or more of the sustainability challenges, by for example constructing prototypes and test facilities, industrial design, equipment installation and full scale sample production. The technology being developed in the projects must be shared so that it benefits the entire industry (Directorate of Fisheries, 2017). If the project is successful, the development license is converted to a perpetual license. If the project fails, the company loses the license at the end of the trial period.

> • NRS was granted 10 green licenses in 2014
> • Together with Aker ASA, NRS have applied for 15 development licenses which are pending approval.

Supply

Overall supply

In 2016, the total volume of farmed Atlantic salmon was 1,944 million tons. This was approximately 850 thousand tons more than in 2004. Whilst the volume of Atlantic salmon was only 79% higher in 2016 compared to 2004, the value of that volume was almost 4 times higher in 2016 than in 2004 (Kontali Analyse, 2017).

From 2005 to 2016, the global supply has seen a CAGR of 5%. Kontali Analyse expects a CAGR of 3% in the salmon industry going forward (Kontali Analyse, 2017). Growth prospects has slowed significantly due to salmon farmers reaching a point where biological boundaries are being pushed. Marine Harvest claims that the industry is likely to be subject to means to reduce the biological footprint rather than growth (Marine Harvest, 2017).

In order to produce salmon, certain conditions has to be met. These include a certain seawater temperature, a particular current in order to exchange the water as well as other biological parameters (Marine Harvest, 2017). This means that there are only a few coastlines worldwide that are fit for production of salmon.

Figure 6 - Coastal areas suitable for salmon production

In 2016, Norway and Chile combined accounted for approximately three quarters of the total volume of farmed Atlantic salmon. Norway alone accounts for approximately 55% of the total supply of Atlantic salmon. Other producing countries include Faroe Islands, Australia, New Zealand, North America as well

Norway is world leader in Atlantic salmon

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as some countries in the EU. However, only Norway, Chile and the Faroes produce more salmon than their local market demand, meaning that they are the primary exporters (Marine Harvest, 2017).

Due to salmon primarily being marketed as a fresh product, producing areas export primarily to nearby markets, as well as sharing Asia (Marine Harvest, 2017). This means Norway primarily exports to EU and Russia.

> - Global industry growth of 3% in the future

Norwegian supply

In 2016, the total volume of Norwegian farmed Atlantic salmon was 840 thousand tons, which was a decrease of 67 thousand tons from the previous year. Based on sales so far in 2017, it seems likely that there will be a further decrease in salmon exports out of Norway in 2017 compared to 2016[1] (Statistics Norway, 2017).

Figure 7 - Norwegian export volumes - Tons and growth
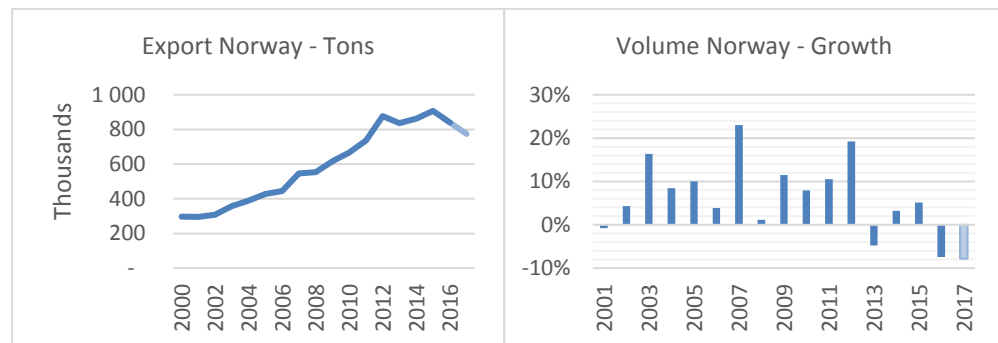
In the future we expect this trend to reverse due to political facilitation. The Norwegian supply growth is assumed to equal the global supply growth of 3% after 2017. It seems likely that growth for salmon farmers will come from consolidation and technological advances.

> - Norway and NRS will follow global supply growth of 3% in the long-term

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[1] Decrease in 2017 are our own estimates based on current sales this year compared to previous years.

Demand

The development of demand for Norwegian salmon

For the past five years, salmon farmers has continuously posted record profits, which has been reflected in their stock prices. The Oslo Børs Seafood Index has been one of the strongest indexes in the world because of this. Throughout this time, there has been no talk in their quarterly or annual reports about excess supply.

Figure 8 - Seafood index vs Benchmark index

Seafood index (OBSFX) vs. Oslo Børs Benchmark Index (OSEBX)
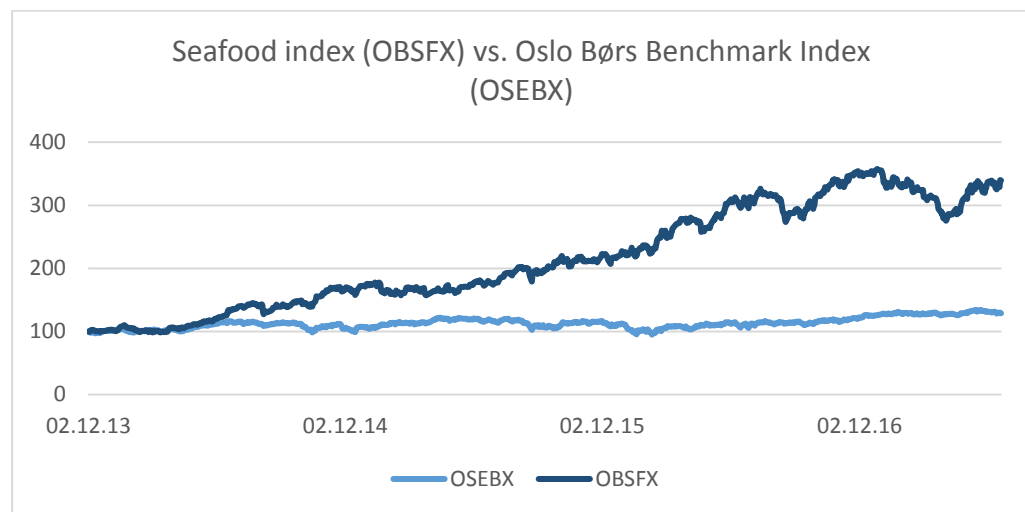
Demand proved to be strong…

The largest demand scare in the past five years was in 2014, when Russia, one of Norway's largest salmon markets, banned the import of Norwegian salmon (Skonnord, 2014). This however, turned out to only impact the prices short term. Salmon farmers write in their annual reports of having no trouble finding alternative markets for their salmon, and prices continued to climb, which is supported by data from Statistics Norway (Statistics Norway, 2017). South-Korea is one example where the demand for Atlantic salmon have experienced a substantial increase. In 2016, the value of the export of Norwegian seafood to South Korea increased by 73%, making the country the fourth largest growth market for salmon (Tuv, 2017). In conclusion, the current high salmon prices seem to do nothing to deter demand. Russia has since allowed for Norwegian salmon import, further strengthening demand.

Future prospects

Future prospects in salmon demand are likely to remain positive. United Nations population data estimates the world population to be 9.7 billion people by 2050 (United Nations, 2015). Assuming that the global per capita food consumption stays constant, this implies an increase in demand for protein source for human consumption by 35%. In addition, the middle class is growing in large emerging markets, which further supports the increase in demand for the consumption of high quality proteins.

Salmonid production accounts for only a small portion of global protein supply, whereas the dominating protein source from animals are pork, poultry and beef.

Figure 9 - Animal protein production
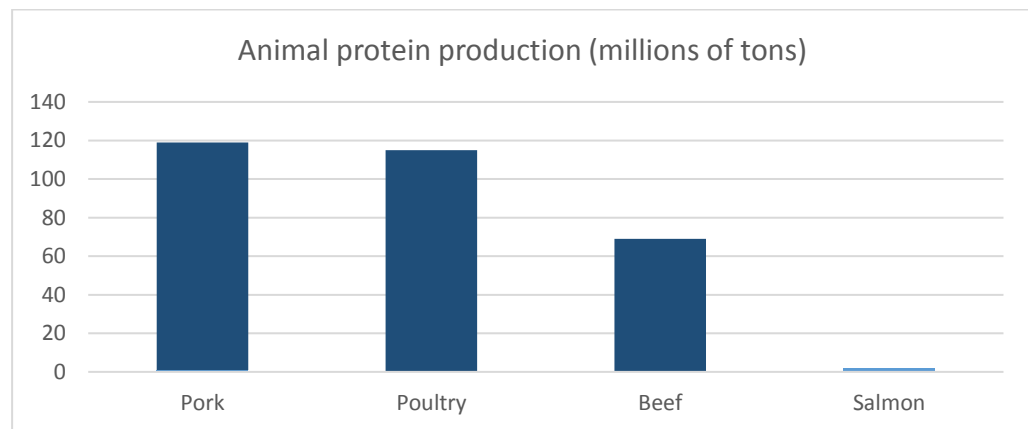
Although this is the case, it is not because of lack of demand for salmonid products. Salmonid are considered an exclusive product with health benefits, great taste and high-quality protein. Moreover, Norwegian salmon is in particular recognized as a quality product and are highly sought after worldwide. This recognition is likely to remain constant in the future, especially with a continuous focus on healthy foods.

- Supply and demand analysis give evidence for demand being persistently higher than supply
  - All salmon produced is sold and will remain so in the future

Price

Prices highly volatile, but strong over past few years

The salmon price has historically been highly volatile, with a yearly standard deviation of 28.2% since year 2000. The lowest the price has been was 17.46 NOK, and the highest weekly average price was 75.25 NOK. Since 2012, the salmon industry has seen the prices rise dramatically from an average price of 27.7 NOK to 60.04 NOK in 2016. So far in 2017, the average salmon price is at 66.38 NOK (Statistics Norway, 2017). Forward prices is listed at 61.90 NOK and 57.75 NOK for 2019 (Fishpool, 2017).

Figure 10 - Salmon prices
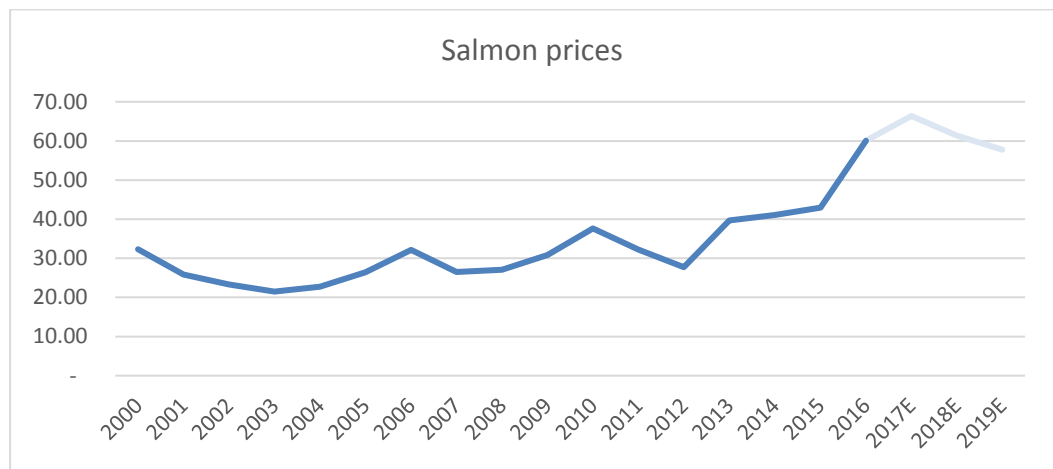
Price driven by supply growth

Price seems to be primarily driven by the supply growth in the industry. Plotting the changes in average prices against the changes in volume displays a clear negative correlation with increased volume and price changes.

Figure 11 - Price growth regressed on supply growth
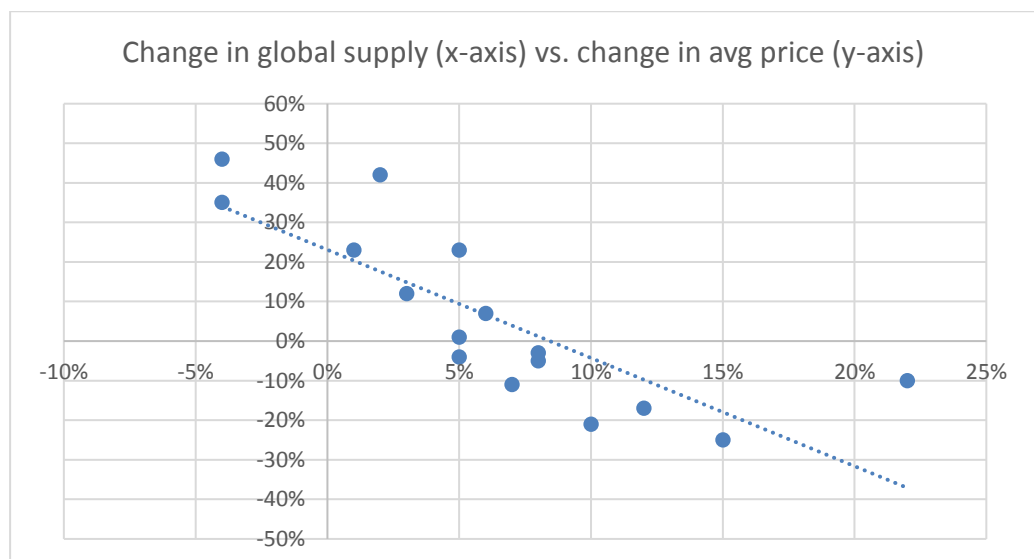
Further supply growth is expected to remain at low levels, with Kontali Analyse expecting a growth in total supply of 3% per year until 2020. We agree with this belief for the overall sector, as growth prospects seems to come down to consolidation rather than expansion. This would indicate prices to remain high, at least until there is some solution to growing the supply side.

Despite this, the forward prices indicate that the price will decrease somewhat YoY for 2018 and 2019. This is due to a very low liquidity for these contracts. Customers therefore require some discount in order to enter longer contracts.

- Forward prices is a sensible estimate of future prices, and are therefore used in our model to estimate future cash flow for the years they are available

Tangible assets

Financial resources

NRS has seen their profits rise in an astronomical fashion due to the high salmon prices leading to great margins. This has allowed NRS to strengthen their balance sheet considerably, taking their accounting equity ratio from 36.2% in 2012 to 55.1% in 2016. NRS had a net result of just over 1 billion NOK for 2016, and an operational CF of 630 million NOK. With total liabilities of 1.67 billion NOK, it can be said that NRS is in a very favorable financial position.

NRS is listed on the Oslo Stock Exchange, and in the past five year period, NRS's share price has increased by an incredible 1,500%, and the company is now one of the 50 largest companies on the Oslo Stock Exchange.

Whilst most salmon companies are not going to have any problems raising capital in the current market conditions, the above factors speak for NRS having an even easier time than much of their compatriots. Additionally, NRS is able to strengthen their financial position year over year due to their dividend policy.

Access to smolt

NRS has currently stable access to smolt through the associated companies Ranfjord Fiskeprodukter AS and Skardalen Settefisk AS, of which NRS own 37.75% and 30% respectively. The smolts are purchased at market prices. The

group also purchase smolts from Nordland Akva AS, which is owned by an important shareholder of NRS.

NRS plans to become almost self-sufficient with smolts in the years to come, and have purchased land in Karlsøy (Troms) where construction of a new hatchery will start in 1-2 years. According to the application, the hatchery will have a production capacity of 10 million smolts in a recirculating aquaculture system (RAS), which is approximately equivalent to the number of smolt NRS put at sea in 2016.

A new hatchery entails increased control over the value chain. Moreover, NRS can increase the size of the smolts in order to shorten the time at sea. This will reduce the production cycle time from smolt to edible fish, hence increasing production capacity. There will also be considerable mitigations of the price risk, since only a small share of the total smolts will be purchased through associated companies at the market price. They will therefore be less affected by market price fluctuations in the years to come.

Intangible assets

Licenses

The most valuable and important intangible asset is the licenses. NRS have acquired several small-to-medium sized firms the last two decades, increasing their portfolio of licenses. The group now own five subsidiaries that own a total of 35 licenses, of which ten are green licenses awarded in 2014. Due to the strict licenses regime of the Norwegian government, new standard licenses are considered attainable only through acquisitions. As the industry becomes more consolidated, the number of possible targets to acquire becomes lower.

Future growth in the Norwegian fish farming industry must be based on sustainable criteria, and both the green licenses and the development licenses are measures from the Norwegian government to steer the industry in a more sustainable direction. NRS wishes to be a leader in this effort, and has recently submitted an application together with Aker ASA for 15 development licenses to develop an offshore aquaculture farming concept that facilitates sustainable growth in areas that the aquaculture technology thus far has not been able to

NRS to become self-sufficient of smolt…

… leading to better capacity utilization and better cost control

NRS has 35 production licenses

No new production licenses for NRS, but applied for 15 development licenses

exploit. A joint operation to develop the farms will be established if the Directorate of Fisheries grant the development license.

> - 35 licenses included in future DCF estimates
> - Decision tree valuation on development license project

Intellectual property, research and development, and technology

When salmon farming first was established in Norway in the 1970's, the industry faced considerably worse conditions regarding sea lice and diseases than today. The challenges threatened the industry, contributing to industry players becoming gradually more transparent in regards to sharing information, findings from research and development programs and technological advances. Today, all industry players work close together with the Norwegian regulators to collectively resolve the industry sustainability issues.

Economies of scale main competitive advantage in industry

The high level of transparency makes the salmon farming industry unique in the sense that competitors have little or no competitive advantage regarding intellectual property or technological advances. Competitive advantages seems only to come from economies of scale. There are of course some industry players in the driver seat, such as Marine Harvest, Salmar and Lerøy, spending more on new technology and R&D. However, their competitive advantage lies, to a bigger extent, in controlling a larger part of the value chain rather than advances in sustainability issues, since smaller companies can copy their technology as long as they have the capital required.

For the purpose of the valuation, it is assumed not to be any significant differences between NRS and other competitors in regards to intellectual property. Neither are they assumed to possess significant better or weaker competences and technology in relation to the production process.

> - Economies of scale only competitive advantage for NRS

NRS outlook

NRS targets a yearly production of 45 000 tons gutted weight equivalent (GWE) once they are operating at 100 percent capacity. The main growth NRS has seen has been from the ten green licenses they received in December 2014. They

guide for a volume of 34 000 tons for 2017. This is an increase of 7200 tons from 2016. They give no indication of when NRS will reach peak capacity, but we can assume a full capacity will be reached by 2019. This assumption is made because it takes approximately three years for a smolt to become a fully grown salmon ready for harvest. In 2016, 10.1 million smolt were released, with NRS expecting a further increase in 2017. The smolt generation released in 2016 will yield a harvestable volume of 45.450 tons if we assume no mortality and an average salmon size of 4.5kg. Some mortality is to be expected, so realized production capacity should be somewhat lower than this. This means that a production capacity of approximately 45 thousand tons make sense for 2019.

Figure 12 - Harvest quantity NRS in tons GWE
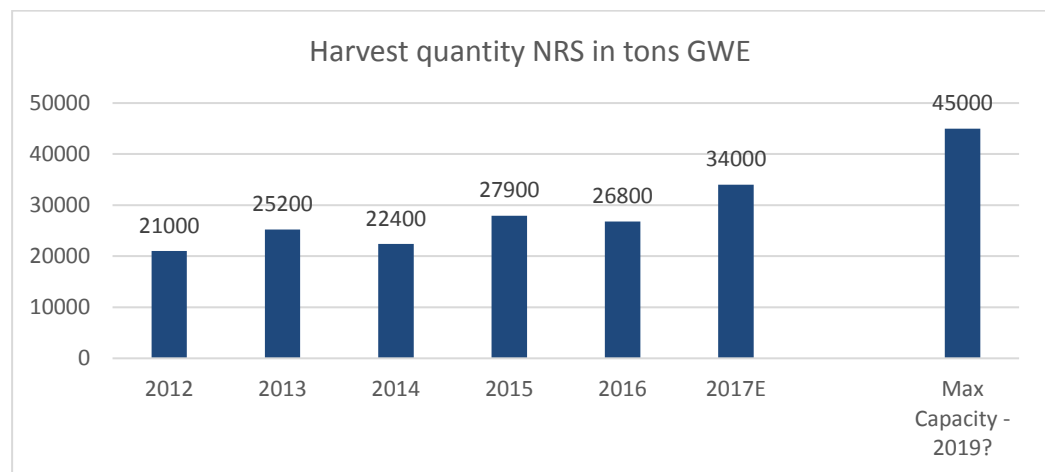
Furthermore, NRS has indicated an increasing willingness to hedge part of their salmon sales with forward contracts. For the three remaining quarters of 2017, they have hedged 25% of their expected sales.

NRS also claims that besides the growth to reach production capacity, their focus will be on reduction of production costs. This cost reduction will come through efficient operations through bigger sites, increased smolt quality and size, focus on fish health and optimizing feed consumption. According to our findings, we believe NRS will be unable to reduce costs, but they will be able to slow the growth rate.

- NRS will be close to full capacity of 45 000 tons GWE by 2019

PART II: VALUATION OF NORWAY ROYAL SALMON

Key value drivers

Three key value
drivers:

There are three factors of particular importance to NRS' value. The first is the salmon price. We use forward prices in our estimate for future prices, as this gives a sensible estimate of future spot price. There is however more uncertainty in this factor than reflected in our DCF model, and we therefore simulate different price levels in our Monte Carlo model.

1. Price

2. Capacity
utilization
(harvest volume)

The second factor that has a huge impact on the value of NRS is their capacity utilization. With all 35 licenses, they claim to have a max capacity of 45 000 tons, but we find it unlikely that they will be able to see 100 percent capacity utilization. For instance, in 2015 they guided a volume of 27 500 tons for 2016, but only managed a volume of 26 819 tons. Historically, the guided volume has been higher than realized volume. The past three years has seen improvements YoY due to higher PPE investments and a larger workforce. In the future, we expect a capacity utilization between 90-96% because of these measures.

Figure 13 - Actual volume as percent of guided volume
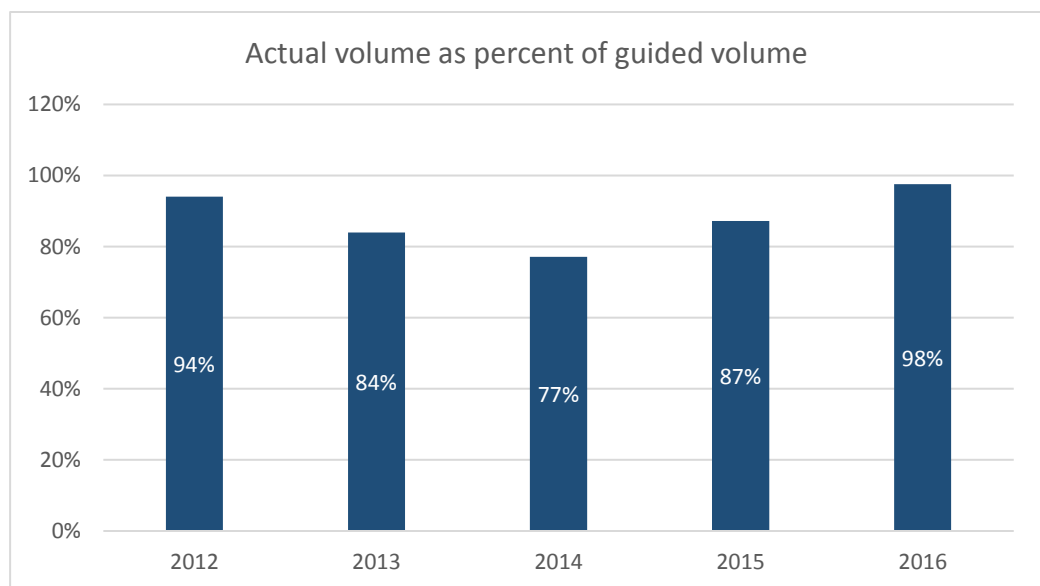
3. Cost of materials
(mainly feed)

The third key value driver is the cost of materials. This is primarily driven by feed cost, which accounts for approximately 60% of these costs. The remaining 40% is explained by smolt, primary processing, maintenance, and mortality costs.

Expect to see declining growth in feed prices

Feed costs have risen significantly over the past five years, with a CAGR of 7%. In 2016, feed prices increased by 13.9%. We expect feed costs to continue to see high price increases in our estimation period. This is because feed suppliers have a high bargaining power. Feed farmers can see the current margins of salmon farmers, and get away with charging higher prices as long as the salmon price is at current levels. Salmon farmers cannot conduct their business without purchasing feed, and so they are forced to accept prices that they are quoted. However, we expect feed prices to see declining growth over the estimation period due to advances in feed technology and reduced margins for salmon farmers.

NRS to see minor growth in smolt cost

The smolt costs have increased by approximately 4% per year over the past five years for NRS. This has been lower than the industry average over the same period (Marine Harvest, 2017). We expect smolt costs to continue to climb. However, due to NRS trying to reach self-sufficiency of smolt, we expect the growth of smolt costs to remain low.

Other costs of materials to grow at historical rates

Other cost of materials costs, such as primary processing, maintenance are expected to continue to grow at historical levels in our DCF. Mortality costs will remain at current levels for the estimation period, but drop in the terminal value calculation due to our expectations of R&D efforts in the showing positive results.

Other value drivers

Working capital

Biological assets 66% of next year revenue

The working capital of NRS mainly consists of biological assets, accounts receivables and accounts payables. Biological assets are the salmon that are not yet ready for harvest. We have linked our estimates of future biological assets to revenues the following year. Historically, fish at sea the previous year has accounted for 66% of the next year's farming revenues.

Figure 14 - Biological assets as a percent of next year farming revenue
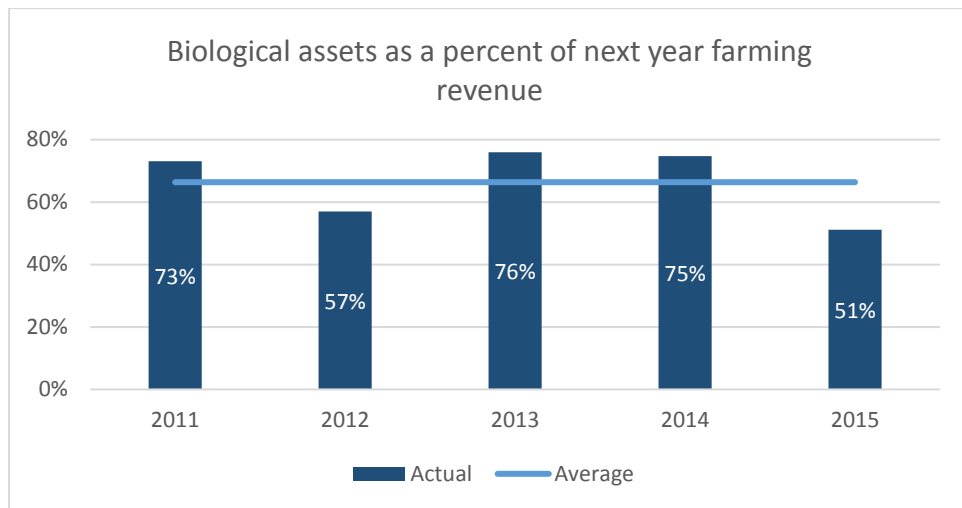
Accounts payables linked to operating costs and accounts receivables is linked to overall revenues the same year. We use the historical average of these levels to estimate the working capital in the future.

Sales division

External sales to grow at industry average

NRS' sales division sells all fish that farming produces (internal), as well as salmon from associates, partners and other customers (external). Sales from external farmers account for a large portion of the overall revenue. We expect the volume sold from external farmers to grow with the industry average of 3%. Despite an expected drop in Norwegian exports for 2017, we do not expect this to impact NRS because of the current customer base.

Figure 15 - Total volume sold by Sales division split on own farming and external farmers
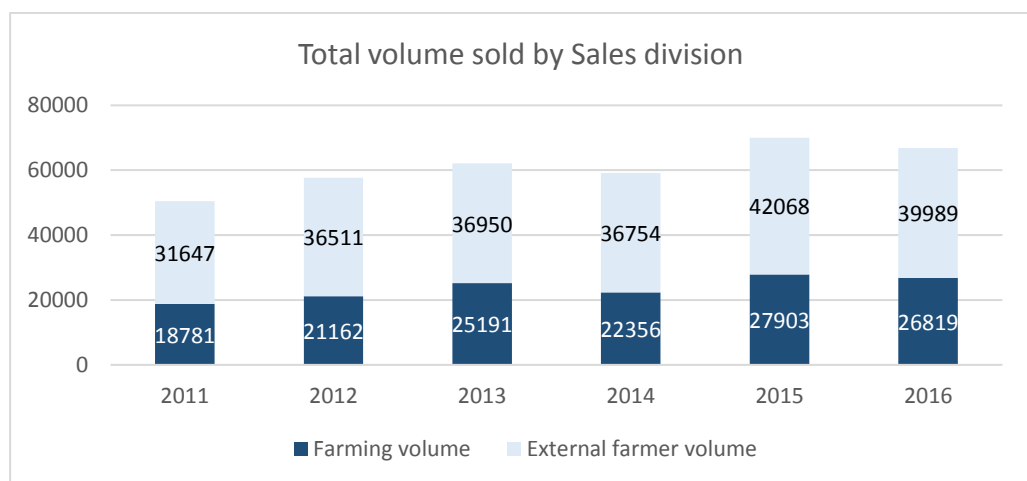
EBIT/kg external
sales at 0.096

The margin of the sales division has been volatile over the past five years, but has added value overall. In our DCF, future estimates are based on the average margin.

Figure 16 - Margin on external sales - Sales division (NOK EBIT per kg GWE)
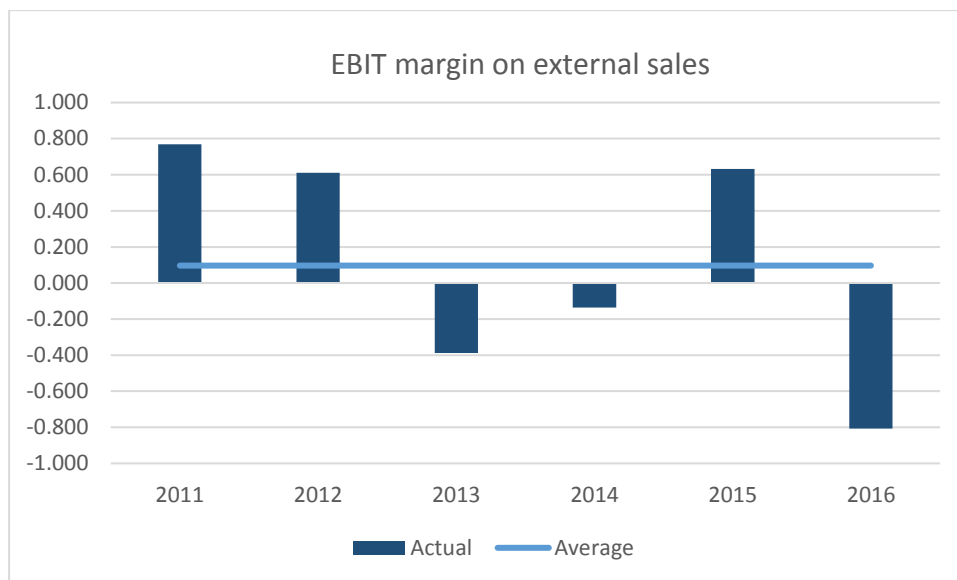
Personnel expenses
NRS has grown salary expenses significantly since 2014 due to the 10 additional licenses they were granted. We believe NRS now has the headcount they need for their current capacity, and expect no new hires. We therefore expect a growth in personnel expenses equal to the industry average of 3.9% (Statistics Norway, 2015).

Other operating expenses
Other operating expenses includes insurance, fees, fuel and rental of office premises among other things. These costs has historically represented approximately 3% of overall revenue in the same year. We use this historical average to estimate future periods.

Income from associated companies
There are eight different companies where NRS has an ownership between 30 and 50%. These companies are accounted for under income from associated companies. The companies included in this post are all part of the salmon industry, and as such we expect the future income from these companies to reflect NRS' situation. Income from associates has historically been 11% of NRS' operational EBIT. We will use this estimate for the future periods.

Tax

NRS expects a tax rate of 25% going forward, which we will use for our estimations.

Depreciation

NRS has had a depreciation rate of close to 15% of PPE over the past five years, which we will use in future estimates as well.

Investments

We calculate investments as the increase in PPE accounting for depreciation. We expect PPE to see large investments until NRS reaches a capacity close to 45 000 tons of salmon, after which the investment rate will decline somewhat.

The DCF model

Revenue

We expect a total revenue growth of 22% over the next five-year period. This growth is driven by a higher volume from farming due to the new licenses, a CAGR in external sales volume of 3% and a moderate decrease in spot prices of salmon.

Figure 17 - Revenue in millions of NOK

Operational costs

Costs still a concern going forward
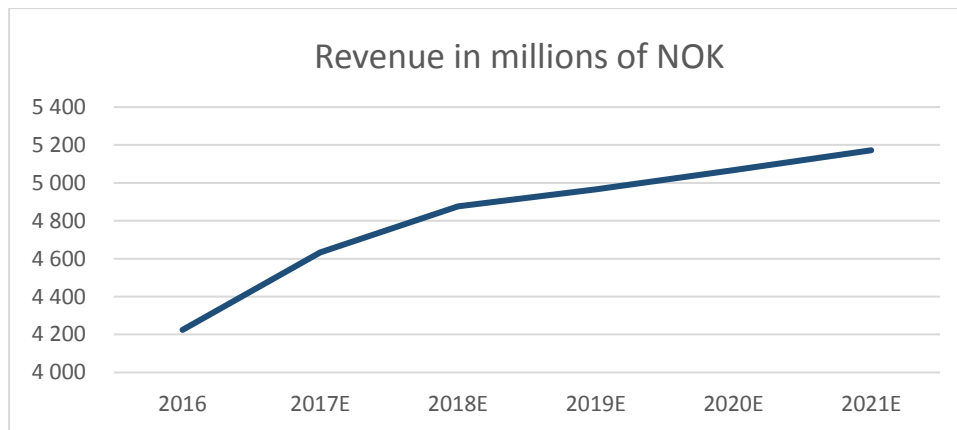
Our estimates indicate costs outpacing revenue growth in the future, with a 28.5% increase in overall operating costs. This is a worrying trend as the costs of salmon farmers are not very flexible. Before you sell a salmon, you will already have three years of costs tied to it. This means that a price-crash would potentially have a larger negative impact in the future compared to a few years ago.

Figure 18 - Total operating costs in millions of NOK

Operational profits
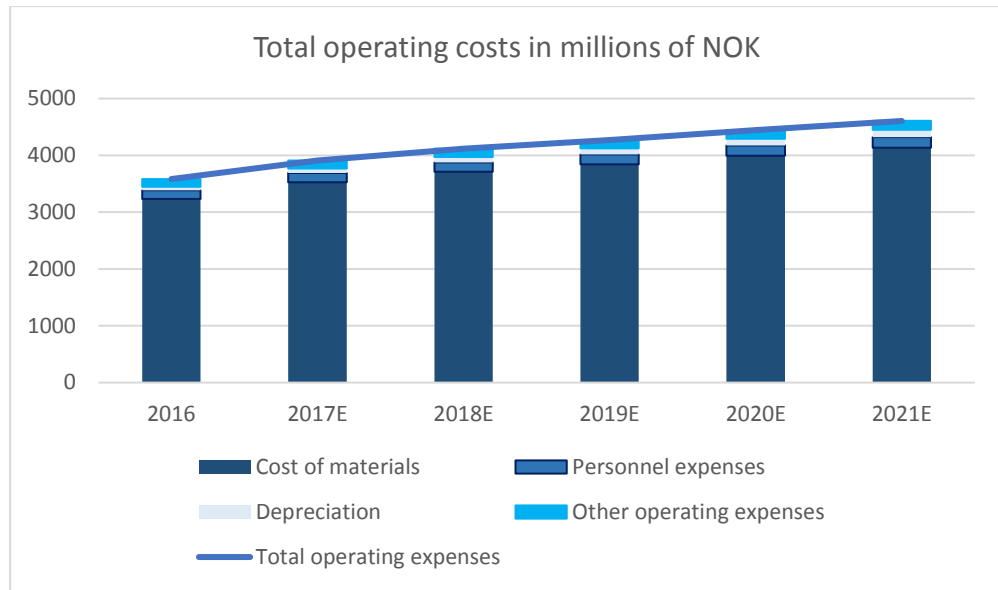
Operational profit peaks in 2018

Despite troubling costs developments, NRS will still see fantastic operational performance in our estimation period. Still, we expect operational performance to decrease after 2018. This is explained by expectations of somewhat lower prices, costs outpacing revenues and increased investments leading to increased depreciations.

Figure 19 - Group EBIT and NOPAT in millions of NOK
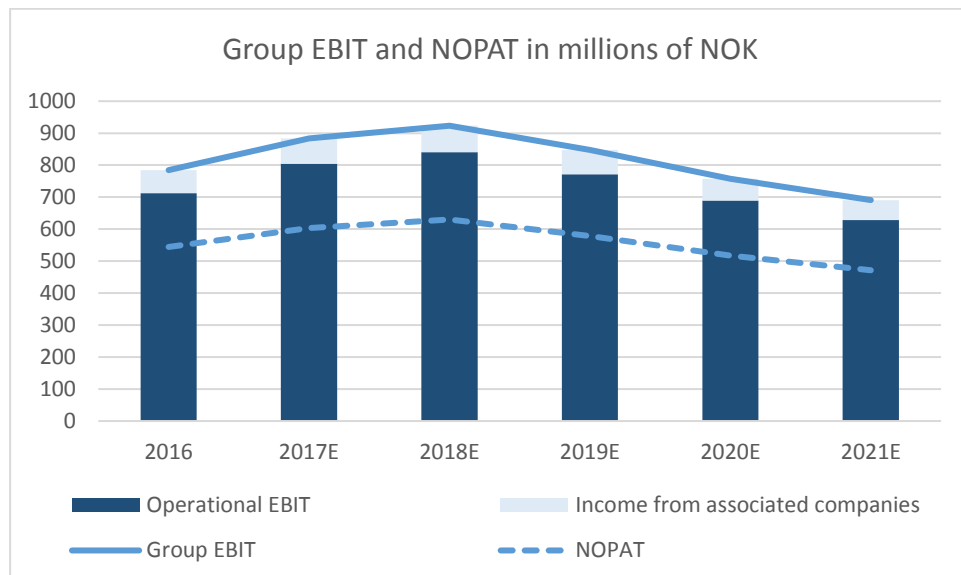
Working capital

Intense working capital buildup until 2019

Towards 2019, NRS will need to add significant investments to their working capital. This is due to NRS increasing their harvested volume towards 2019. Beyond 2019, working capital will normalize, as we expect NRS to grow at the industry rate of 3%. This means that harvested volume will be more predictable, and key balance sheet items will remain at stabile levels.

Figure 20 - Incremental working capital investments in millions of NOK (negative values indicate additional working capital requirements)
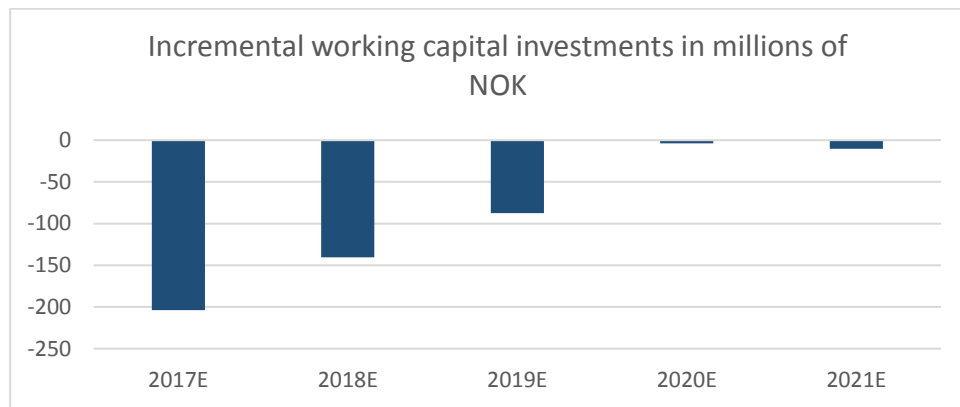
Capital expenditure

CapEx primarily include boats and floating assets as well as machinery and equipment. In our estimations, we expect NRS to replace assets as they are depreciated in order to keep their market position. On top of this, the increased capacity NRS has acquired through the 10 green licenses will require new investments. We expect the majority of the new investments to be done by 2020, after which the new investments will equal 5.5% of PPE the previous year. These 5.5% account for an inflation of 2.5% and the expected industry growth of 3%.

Figure 21 - CapEx in millions of NOK
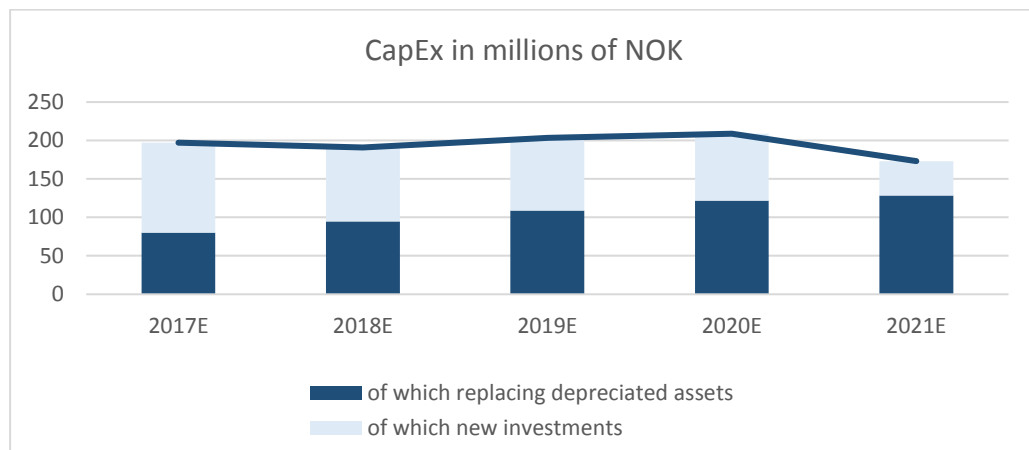
DCF results

Figure 22 - Free Cash Flow in millions of NOK
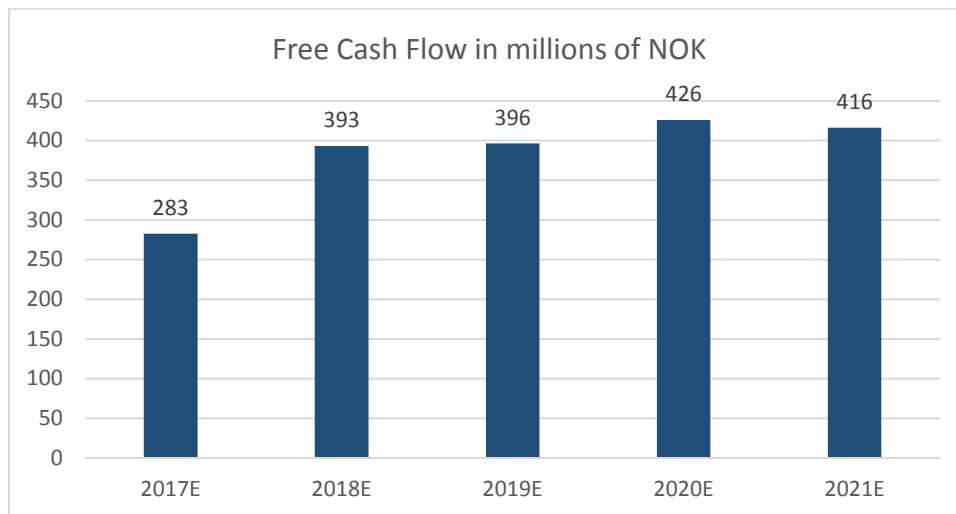
Our model indicates a FCF for NRS as seen in the graph above[2]. Basing the terminal value on the FCF for 2021, we get a terminal value of 8 576 million NOK. The discounted FCF has a NPV of 1 631 million NOK, and the discounted terminal value is 5 837 million NOK, meaning approximately 20% of the value is accounted for over the next five years, whilst 80% of the value lies in operations beyond those five years. The total enterprise value is then equal to 7 467 million NOK

DCF results in share price of 167

As of 31.12.16, NRS had an interest bearing debt of 256.15 million NOK, and financial assets of 84.19 million NOK. Subtracting these from the enterprise value leaves us with the value of NRS' equity. This equals 7 295 million NOK. With 43 572 million shares outstanding, this leaves us with an equity per share of 167 NOK[3].

Sensitivity analysis

High cyclicality simulated by Monte Carlo

The salmon farming industry has in its past proven to be very cyclical, and is assumed to continue to be cyclical in the future. It is therefore a great deal of uncertainty in the value estimate from the DCF. To evaluate this uncertainty, we have conducted a sensitivity analysis using a Monte Carlo simulation. The

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[2] See appendix 1 for details
[3] See appendix 2 for details

simulation models changes in the key value drivers and the contribution from NRS market and sales division. Other variables such as personnel expenses and other COGS is kept constant as there is lower uncertainty to these posts. Including these variables in the simulation would compromise the quality of the results.

Salmon prices

NRS enters into contracts for future delivery of salmon. 25% of their expected sales in 2017 is hedged with fixed contracts, leaving little uncertainty this year. The same level of the harvested volume is assumed to continue to be hedged the other years in the estimation period. These contracts are not set which leads to uncertainty in the forward prices from 2018-2021. The standard deviation increases each year[4].

The standard deviation for the hedged volume is set to be lower than the unhedged volume. This is to simulate that 75% of the total volume will be sold at spot prices. The uncertainty for the unhedged volume is set to be twice as high as the uncertainty of the hedged volume.

Capacity utilization

In the DCF we expect NRS not being able to utilize their full capacity, because they have struggled to do so in the past. The capacity utilization may vary year to year, but is not deemed likely to drop below 85% due to high investments in PPE. Capacity utilizations in the lower interval can be explained by either lice outbreaks or salmon escapes. We have therefore set the capacity utilization to lie within the interval of 85-100%. For each year, a most likely outcome has been set.

Due to NRS having licenses and cages spread out over 35 licenses, they have diversified their escape and outbreak risks. The licenses and cages are spread out in such a way that an outbreak would likely be contained within that license rather than spread between them. This explains why capacity utilization should

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[4] For detailed distribution information, see appendix 4.

not drop below 85%. A capacity utilization of 85% would equal outbreaks/escapes for five of the total 35 licenses.

Feed cost

Feed costs uncertain, but less so than spot prices

The feed cost has historically increased at a high rate, and several factors such as scarce resources and high bargaining power of suppliers indicate continuous increased prices. The feed price has however been less volatile than the salmon prices, and is therefore set to a lower degree of uncertainty compared to changes in salmon prices.

Market & Sales division

Both volume and margin uncertain for Sales division

There is uncertainty in both the external volume sold by the Market & Sales division and the EBIT margin per kg salmon they contribute with. The external volume has historically had a standard deviation of 8.3%. This is considered too high going forward, as there is two years with an extreme growth due to gaining new important customers. NRS is likely to have steadier customer base in the future. Removing the extreme values from the volume growth yields a standard deviation of 2.6%. The volume fluctuation in the simulation is therefore set to the interval of 2-4%, with the most likely outcome of the industry growth of 3%. The EBIT margin per kg salmon has been volatile, and is likely to remain so. The interval is therefore set between the highest and lowest EBIT contribution.

Simulation results

Figure 23 - Monte Carlo simulation result (output on target price)
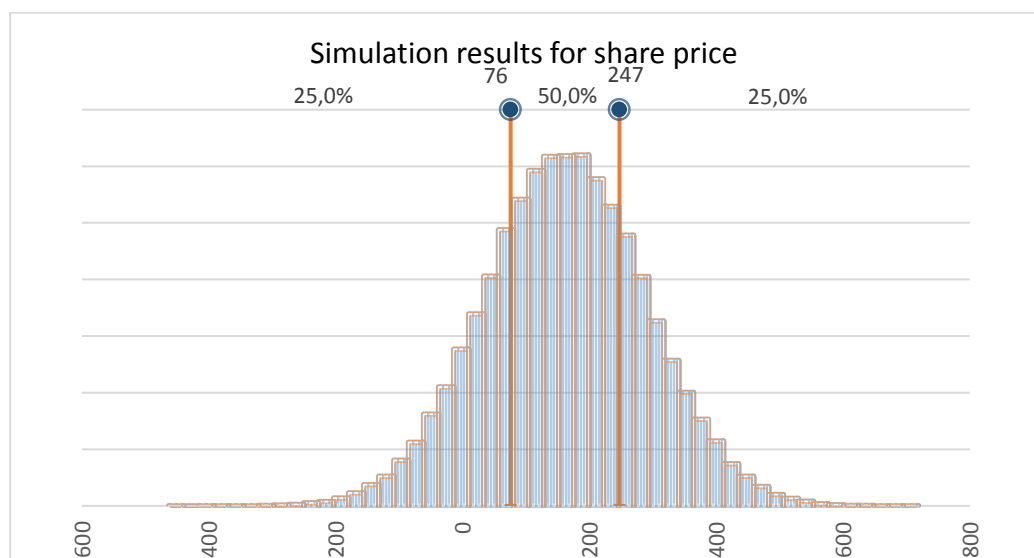
The simulation was ran with 100 000 iterations, where 50% of the outcomes were in the interval [76, 247]. The mean of the overall sample was 161. Not surprisingly, the simulation reveals that NRS value is highly sensitive to fluctuations in prices.

There are some flaws with the simulation. For instance, the model does not take into account the correlation between salmon prices and cost-base, meaning that in some scenarios, the salmon price may be 20 NOK per kg/salmon while the costs of materials being 40 NOK per kg/salmon for perpetuity. This results in negative value estimates, which in reality could not be the case as investors will have an option to exercise the stock at 0. NRS would in those scenarios be bankrupt, and these results must be ignored from the simulation. Similarly, the most positive upsides should be ignored.

The simulation reveals a big interval for the share price, but we find it realistic that the share price can vary by a lot as there lies great uncertainty regarding NRS future operations. We find the minimum to be within the bounds of reason, as the liquidation value of all 35 licenses without any PPE and biological assets would be close to 61 NOK per share. This is assuming that the market value of one license is worth NOK 76 million[5]. We believe the maximum value to be representative only if everything goes in NRS' direction.

Multiples

We have created an industry average of both trailing P/E and EV/EBIT using accounting data from Marine Harvest, Lerøy Seafood, Salmar, Bakkafrost and Grieg Seafood. These companies all primarily sell farmed salmon, and as such are good peers for Norway Royal Salmon. The industry average EV/EBIT is 11.87, whilst the industry average P/E is 12.60.

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[5] The average bid for 15 assigned licenses in 2014 was MNOK 60 million (Riisnæs, 2014).
With a rate of return of 8% (WACC), this is equivalent to NOK 76 million in 2017.

Table 1 - Industry average EV/EBIT and P/E

	EV/EBIT	Weight			P/E	Weight
Bakkafrost	18.03	10 %		Bakkafrost	15.22	11 %
Marine Harvest	12.32	46 %		Marine Harvest	14.35	46 %
Grieg seafood	8.35	6 %		Grieg seafood	7.24	6 %
Lerøy Seafood	7.42	19 %		Lerøy Seafood	10.04	19 %
Salmar	12.98	19 %		Salmar	11.02	19 %
Industry average		**11.87**		**Industry average**		**12.60**

The industry average P/E and EV/EBIT are both trailing 12-month measures as of 31.12.2016. They have been weighted by their market cap/enterprise value compared to the total market cap/enterprise value.

Table 2 - Value NRS multiples

Multiples	Value NRS (thousands of NOK)	Per share
P/E	8 713 067	200
EV/EBIT	7 604 852	175
Actual market cap 02.01.17	8 823 369	202.5

P/E gives an equity value per share for NRS of 200, whilst EV/EBIT gives us an EV per share of 175. As of 02.01.17, the actual share price was 202.50 NOK. This indicates that NRS was overvalued somewhat at this point.

Decision tree analysis – Development license project

As mentioned in part 1, NRS has applied for fifteen development licenses along with Aker ASA. If their project is successful, the development licenses are granted to NRS in perpetuity as a production license. This could potentially be very valuable for NRS, but the outcome is highly uncertain. In their 2016 annual report, NRS claims that they passed the first hurdle in the application process claiming that they received "positive signals that the project meets the criteria for development licenses". On 7th June 2017, the Ministry of Fisheries partly rejected the application for the licenses (Directorate of Fisheries, 2017), but that they will continue processing the application. According to ilaks and NTB, the partial rejection was for 8.705 tons of biomass, meaning that they will continue processing the application with the remaining 2.995 tons of biomass (iLaks, 2017). NRS has said that they will appeal the partial rejection.

Based on the status of the application, we assign there to be a 50-50 probability of the application being approved or denied. Furthermore, there is uncertainty as to whether the project will be successful, and how many development licenses they would be awarded in the case of an approved application.

Due to NTB's claim, we deem it the most likely that they will receive a third of the licenses they have applied for. This also corresponds well to previously granted development licenses. For instance, Nordlaks Oppdrett AS applied for 39 licenses, and was awarded 10 and one of the concepts of Marine Harvest applied for 14 licenses and was awarded 4. We have included only three outcomes of approval for simplicity reasons. The scenarios for approval is NRS being granted either 5, 10 or 15 licenses.

The third part of the decision tree analysis is whether the project is successful or not. If NRS is granted a higher amount of licenses (10 or 15), we believe that to be a signal from the Ministry of Fisheries that they believe there is a higher probability of success than if they granted fewer licenses (5). Even if they grant only 5 licenses, it would still be a signal that the probability of success is higher than the probability of failure. We have therefore used the probabilities you see in the decision tree on the next page.

We have calculated the value of one license as the equity value in our DCF (7 295 million NOK) divided by the total number of licenses (35) as of 2017. We believe this is a good proxy for the value of a converted development license. Our reasoning is that the way that NRS operates a license, each license is worth 208 million NOK. A converted development license would largely be operated in the same way as the current licenses.

The investments are highly uncertain, as it is not publicly known information. We have therefore used PPE per license as of 2020 discounted to 2017. We used the PPE for 2020, as this is the point that we expect them to be fully invested for their current capacity goal of 45 000.

We have adjusted the PPE per license by an "investment factor" of 3. The reasoning behind the investment factor is that these projects will require higher investments than current licenses. The current licenses use current technology, which in all likelihood is cheaper than developing new technology. We have no

real indication of how much more investment is required for the project, and therefore estimate them to the best of our ability.

According to our model, the real option adds a value per share of 3.02 NOK. This assumes that NRS owns 50% of the joint venture with Aker ASA. With a 100% ownership this equals a project equity value of 6.04 NOK per share.

Figure 24 - Decision tree analysis of development license project NRS and Aker ASA

DECISION TREE ANALYSIS, Thousands of NOK

Stage I Application

Stage II Number of licenses granted

Stage III Success or failure

Probability   Scenario NPV

| | S | 80 % | 45 953 |
| 15 | F | 20 % | -4 145 |

Probability

15	5 %		
10	20 %	S	70 %	107 223
		F	30 %	-16 579
5	75 %	S	60 %	172 323
		F	40 %	-41 448

Project starts

Probability

| Approved | 50 % |
| Not approved | 50 % |

Development license

Project NPV	263 327
# of shares	43 572
Per share[1]	3,02

1) Assuming 50% owner-ship of joint venture

Value per NRS license	**208 440**
PPE per license	18 421
Investment adjustment factor	3
Investment per license	**55 264**
Gain per license if success (NPV)	*153 176*
Loss per license if fail (NPV)	*-55 264*

Target price

The different valuation techniques yield different results. According to our DCF, the price should be 167 NOK. Monte Carlo simulates a mean of 161 NOK. With the DTA, these would give target prices of 170 and 164 respectively. We decide to use a target price of 170 as the Monte Carlo simulations include too many extreme values that we believe are unrepresentative. We do however gain confidence in our estimates, as the Monte Carlo value is fairly close to the DCF value.

We have also looked at multiples, but due to the simplicity of the valuation tool, we decide to not weight this technique. We feel multiples do not accurately represent the risks of the company.

Additional factors

The majority of NRS revenues is in Euros, GBP and USD as they export most 88% of their harvest quantity. This means that they are exposed to large currency fluctuations. This is not accounted for in our model, but it will have an impact of NRS in the future. NRS currently employs both forward contracts and borrows in foreign currencies to reduce its exposure to foreign exchange risk.

We have modelled the price such that it can change dramatically in a short period of time. This is an attempt to model extreme external shocks. For instance, a sudden supply drop should result in a spike in prices. A perfect model would be able to link total global volume to the future spot price. We have used a standard deviation for the future spot price, and therefore have a somewhat imperfect model.

The Q1 results have been published. These numbers have not been directly included in the model, but we have checked the numbers and outlook provided. These numbers and outlook do not change our estimates for 2017.

PART III: THEORETICAL FOUNDATION FOR THE VALUATION

Frameworks for valuation

There exists a variety of frameworks for valuation. It is common to categorize the different valuation techniques into three main categories; fundamental valuation multiples, and real-option valuation (Koller, Goedhart, & Wessels, 2010).

Fundamental valuation uses discounted cash flow (DCF) to find the value estimate. When conducting a fundamental valuation, it is imperative to thoroughly examine information about the firm and reach conclusions about the underlying value that the information implies. It is an attempt to measure the intrinsic value of the company, meaning the actual value of the company based on an underlying perception of its true value (Penman, 2013). This includes seeking information of all aspects of the business, in terms of both tangible and intangible factors, as well as overall economic and industrial conditions and other macroeconomic factors. The intrinsic value may differ from the market value. Therefore, given reliability and validity in the estimation, the analyst can indicate whether the company is undervalued or overvalued.

The use of multiples for valuing a company is also a commonly used valuation technique. However, because DFC models tend to be more used among analysts, multiples are in some cases used as a supplement to DFC, rather than a replacement. The value of the company is based on one or more multiples of comparable companies. Among the most commonly used multiples is the EV/EBITA. Valuing a company based on this approach is done by multiplying the company's EBITA with a representative EV/EBITA from comparable companies in the industry. An advantage by using multiples for valuing a company is that the method is less time consuming. However, the method is criticized for not being profound. The technique can therefore be more suited for companies with a short operational history (Koller, Goedhart, & Wessels, 2010).

The third, and the last category for valuation techniques, is the real-option valuation (ROV) to deal with managerial flexibility. Managerial flexibility must not be confused with uncertainty, as every company to some extent face an uncertain future. Instead, flexibility refers to choices between alternative plans that managers may make in response to events (Koller, Goedhart, & Wessels,

2010). Valuing flexibility does not always require sophisticated option-pricing models, such as the Black and Scholes model that relies on replicating portfolios. Another effective approach falling under the same category as ROV, is the decision tree analysis (DTA). ROV is theoretically superior to DTA, but it is not the right approach in every case. ROV depends on knowing the value of the underlying asset, and is therefore more commonly used in scenarios where the assets have an observable market price. Although they have some technical differences, they share the same foundation of forecasting future free cash flows contingent on the future states of the world, and then discounting these to today's value (Koller, Goedhart, & Wessels, 2010).

Choice of valuation model for NRS

There are many considerations to account for when determining the valuation technique that fits best to valuing a company. The different techniques come with both strengths and weaknesses, and can in many cases be considered supplements rather than different alternative techniques. It is not necessarily given that one valuation technique will be sufficient to give a realistic value of the company. Consequently, several analysts tend to use supplementary techniques to find their value estimate (Kaldestad & Møller , 2011).

In short, the valuation of NRS is done using all three valuation techniques. This is justified by the fact that all the valuation techniques fail, to some extent, to capture the full essence of either the industry or the company. The activities of Norway Royal Salmon can easily be traced back in time as they were listed 2011. Hence, the company has a relatively long accounting history, which is an important prerequisite for choosing fundamental valuation.

NRS have however gone through an extensive expansion through acquisitions since going public, increasing their operational EBIT with a CAGR of 68% the last 5 years. This intense expansion makes it difficult to predict future estimates based on historical data. Multiples can therefore be a useful application for valuing NRS. Yet, multiples alone will not capture relevant external and internal information, and the likelihood of omitting key variables is deemed high. Multiples are therefore uses as a supplementary valuation technique, while fundamental valuation will be the dominating method. Having access to forward

prices and a future target for volume increase by NRS speaks in favor for the DCF.

Both fundamental valuation and multiples does not deal well with managerial flexibility, and the current situation where NRS have applied for a development licenses will not be captured by any of these models. DTA valuation will therefore be used to value the development license as a separate project. DTA is used instead of a the ROV model merely because it is a more effective alternative for valuing flexibility related to technological risk than commodity risk, where ROV is preferred (Koller, Goedhart, & Wessels, 2010).

In conclusion, we believe that fundamental valuation using discounted cash flow is the most suitable application for valuation method, first and foremost because the method is thorough. The thorough investigation required by fundamental valuation underpins the reliability of the estimation, as it decreases the chances of omitting relevant information that otherwise should have been included. Multiples are used as a *supplement* to the fundamental valuation, because of the weakness in the DCF related to historical data. Lastly, DTA is used to value the development license as an isolated project. The value from the project will be added to the estimated value from the DCF.

The application of the valuation techniques

Fundamental valuation
The two most common techniques used within fundamental valuation is the enterprise discounted cash flow (DCF) model, and the equity cash flow (ECF) model. The enterprise DCF model discounts free cash flow (FCF). The free cash flow consists of cash available to all NRS investors, including equity holders, debt holders, and any other non-equity holders. The FCF is discounted at the weighted average cost of capital, meaning the blended cost for all investor capital. To determine the value of the equity holders, debt holders and other non-equity investors' claim on the cash flow is subtracted from the enterprise value (Koller, Goedhart, & Wessels, 2010).

Contrary to the enterprise DCF model, the ECF model only value the claim of the equity holders of NRS against operating cash flows, discounted at the levered

cost of equity. If both methods are applied correctly, they will yield the same estimate. However, the equity method can be challenging to implement correctly because capital structure is embedded within the cash flow (Koller, Goedhart, & Wessels, 2010). This makes it challenging to match equity cash flow with the correct cost of equity. Consequently, we have decided to use the enterprise DCF model for our valuation of Norway Royal Salmon.

Part one - External and internal implications

An external industry oriented analysis is conducted to gain a deep insight of the industry and its impact on the daily operations of NRS. Industry specific conditions have different implications for the valuation, and are crucial to investigate in order to understand the future prospects for the industry and NRS. More specifically, the external analysis covers information about the impact of the production cycle of salmon, industry sustainability issues and future growth prospects, as well as demand, supply and price developments and outlooks.

In addition to the external analysis, an internal company analysis is conducted to gain an even deeper insight about NRS's underlying economic circumstances and prospects, as well as their financial and operational advantages. This includes a resource analysis of NRS's tangible and intangible assets. We initiate with reorganizing the financial statements to become more investor oriented[6]. The purpose is to emphasize normalized value creation and its sources. Then, historical accounting numbers is analyzed in combination with a ratio analysis, which forms the basis for their financial performance and future estimates. Other tangible and intangible assets and their impact on value creation is also taken into account, such as access to smolt and intellectual property and technological advances.

The external and internal analysis is key to understanding NRS's position in the industry, their future prospects, strategic advantage, and more importantly, the underlying value drivers for the DCF model.

Part two - Valuation

Projecting FCF based on external and internal implications, as well as the key value drivers, is the next step to build the enterprise DCF model. After 5 years it

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[6] See appendix 3 for details

often becomes impractical to estimate a future FCF as the degree of uncertainty in the estimation increases with time. A terminal value is therefore calculated using the perpetuity growth model[7]. Additionally, the weighted average cost of capital is computed based on a weight between cost of equity and the borrowing cost.

Based on the projections of our DCF model, the enterprise value is calculated. In order to find the value of the equity, all non-equity claim is subtracted from the enterprise value. This entails finding, and subtracting non-equity claims such as debt, operating leases, unfunded retirement liabilities, preferred stock and minority interest.
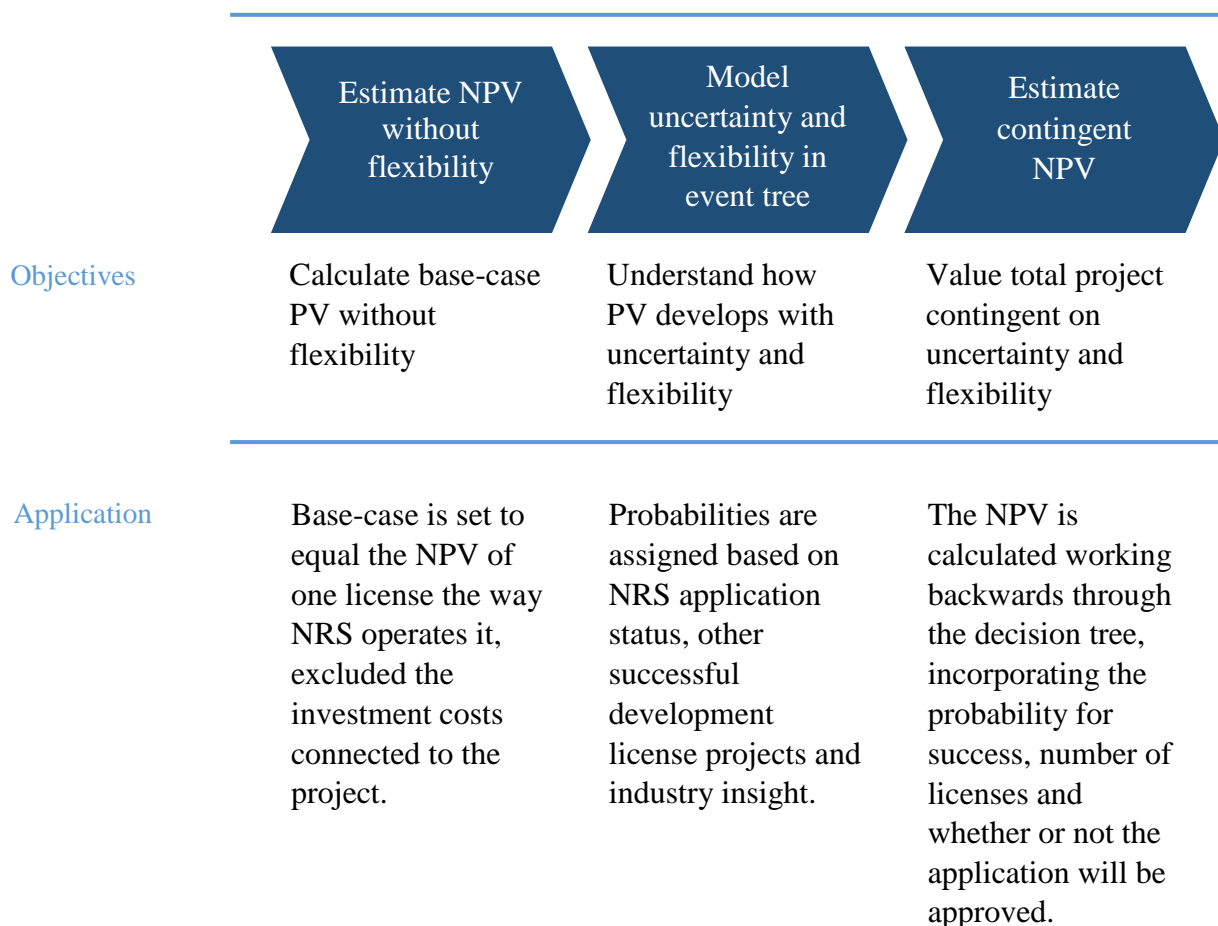
There is naturally considerable uncertainty connected to value estimate. It is therefore of interest to analyze this uncertainty. A sensitivity analysis is therefore conducted through a Monte Carlo simulation to study how the value estimate is effected when the key drivers for value changes.

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[7] $Terminal\ value = \frac{Final\ project\ year\ CF*(1+Growth)}{WACC-Growth}$

Decision tree analysis

Three steps are followed to determine the added value from the potential project NRS have together with Aker ASA regarding development licenses. The process is described in the following framework (Koller, Goedhart, & Wessels, 2010).

Figure 25 – Decision tree analysis framework

Estimate NPV without flexibility	Model uncertainty and flexibility in event tree	Estimate contingent NPV
Objectives		
Calculate base-case PV without flexibility	Understand how PV develops with uncertainty and flexibility	Value total project contingent on uncertainty and flexibility
Application		
Base-case is set to equal the NPV of one license the way NRS operates it, excluded the investment costs connected to the project.	Probabilities are assigned based on NRS application status, other successful development license projects and industry insight.	The NPV is calculated working backwards through the decision tree, incorporating the probability for success, number of licenses and whether or not the application will be approved.

Theoretical terms and concepts

Cost of capital

One of the most influential factors in valuing a company is the discount rate. The discount rate is equal to the investors cost of capital. The cost of capital is equal to the opportunity cost of investing in a project with the same risk. Fundamental analysis uses the cost of capital to discount future cash flows into present value. We will adjust the discount rate for risk, inflation and time horizon in order to reach a sensible discount rate. We will base our estimate on the capital asset pricing model, and then adjust the result if necessary.

Risk

Risk is a function of the consequences and the probability of a particular outcome occurring. A company with high risk is a company where the future cash flows are highly uncertain. It is therefore of particular importance to identify the type of risk and the risk tolerance of the investors. The total risk of a firm can be split into two parts; systematic risk and unsystematic risk.

Systematic risk

Systematic risk is the inherent risk in the market. The inherent risks in the market are factors that an investor is unable to completely protect himself from if they are invested in the market. It therefore cannot be controlled or eliminated through diversification. The only way to safely steer clear of systematic risk is to only be invested in risk free investments. Examples of systematic risk include currency risk, interest rate risk and weather (Bøhren & Michalsen, 2010).

Unsystematic risk

Unsystematic risk, or company specific risk, is the uncertainty surrounding the particular business in question. This type of risk can be eliminated through diversification. Elimination of unsystematic risk is one of the assumptions of the capital asset pricing model, and may therefore need to be adjusted for in order to make the valuation realistic. Examples of unsystematic risk include competence within a firm and access to capital.

Risk-free investments

The risk-free rate is the rate of return an investor can expect to achieve without accepting any degree of risk (Kane, Bodie, & Marcus, 2014). A truly risk-free investment is theoretical, as you will always assume a degree of risk no matter where you place your capital. However, we are able to approximate the risk-free rate by using governmental bonds in countries where the government has superb credit worthiness. These bonds generally do not have any risk of bankruptcy or failed payments.

The maturity of the bond used as risk-free rate depends on the horizon of the investment. In our case, we assume that the firm will operate for an infinite amount of time in the future. This indicates that the governmental bonds with a longer maturity will be more relevant than a short term bond. As we are valuing a Norwegian salmon company, we also find it sensible to use the Norwegian

government bonds as our risk-free rate. The Norwegian government has a very high credit worthiness, and therefore meet our conditions.

As of 02.01.2017 (the first trading day for 2017 in Norway), the 10-year government bond had an interest rate of 1.66%. We will use this as our risk free rate.

Assume the investor is risk averse

A risk averse investor weighs the risk of an investment against the expected returns. They want the highest possible return at the lowest possible risk. This means that a risk averse investor will not carry more risk than necessary. Most people are risk averse, and our discount rate is based on a risk averse investor. A risk averse investor will require a higher rate of return for a risky project (Economic Times, 2016).

Market risk premium

The market risk premium is the additional returns an investor can expect from investing in the market instead of using a risk-free investment vehicle (Bøhren & Michalsen, 2010). It illustrates how much extra returns you can achieve by taking on more risk. The market risk premium will be found by looking at historical returns against historical risk-free returns. One can either take an average of a sample period, or one can estimate different market risk premiums for each year. We will use an average for ease of calculations. Since we are valuing a Norwegian salmon company, we find it sensible to use a Norwegian equity index to measure historical returns.

In the period 1996 to 2017, the average return of Oslo Børs Benchmark index was 9.12%. With a risk free rate of 1.66%, we get a market risk premium of 7.46%.

Beta

The beta-value is a way to quantify systematic risk (Kaldestad & Møller , 2011). It compares the volatility of the instrument we are valuing with the market-index that we have chosen. If the beta equals 1, the instrument will see the same developments in returns as the market index. If the beta is above 1, the volatility of returns will be higher than the market, whereas the volatility will be lower than the market if beta is below 1. If the beta-value equals 0, you will see no volatility, and the investment is considered to be risk-free (Bøhren & Michalsen,

2010). Norway Royal Salmon has a beta of 0.85 according to Reuters (Reuters, 2017). We will use this estimate when calculating cost of capital.

Capital asset pricing model

The capital asset pricing model will be used to find our unadjusted cost of capital. It is, as mentioned, a way to quantify the impact risk should have on returns. The capital asset pricing model assumes that you carry no unsystematic risk (Kane, Bodie, & Marcus, 2014), which we find problematic. The reason is that especially in the salmon industry, the largest owners have most of their net worth in one investment. The owners thereby carry unsystematic risk, even though it is by choice. In order to make the valuation more relevant to such persons, we believe an adjustment of the discount rate based on unsystematic risk is a sensible correction.

Weighted average cost of capital (WACC)

We will apply the WACC, as we are discounting the cash flows of the entire business, rather than the cash flow to equity. This means that we will look at the cost of different types of capital. The borrowing cost as well as the cost of equity has to be used in order to reach a discount rate that we can apply to our valuation.

The WACC for NRS comes out to 7.48% with our inputs. NRS claims in their annual report that they base their fair value calculations on a WACC of 8%. NRS claim their "Capital costs are adjusted to reflect conditions at individual cash flow generating units, such as particular risks and interest rate differentials". This indicates that NRS adjusts their discount rate for unsystematic risk. We believe our rate of 7.48% should be adjusted somewhat, as we do not think the estimate truly represents the risk in the industry. The beta of 0.85 is in our belief artificially low due to Oslo Børs being very dependent on seafood in general.

Due to us believing that NRS has a better handle on the risks of the business than ourselves, we decide to use the 8.0% WACC in our estimates. Our estimated WACC is close enough to NRS' WACC that we feel confident in their estimate as well.

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Appendices

Appendix 1 – DCF model

Thousands of NOK	2016	2017	2018	2019	2020	2021
Operational revenue	**4 224 340**	**4 632 343**	**4 875 512**	**4 966 330**	**5 068 023**	**5 171 987**
Cost of materials	-3 230 927	-3 527 098	-3 710 061	-3 839 566	-3 992 159	-4 133 918
Personnel expenses	-155 468	-161 515	-167 798	-174 324	-181 105	-188 149
Depreciation	-61 063	-80 159	-94 588	-108 776	-121 829	-128 530
Other operating expenses	-136 269	-138 970	-146 265	-148 990	-152 041	-155 160
Total operating expenses	**-3 583 727**	**-3 907 742**	**-4 118 712**	**-4 271 656**	**-4 447 134**	**-4 605 756**
Operational EBIT	**640 613**	**724 601**	**756 800**	**694 674**	**620 889**	**566 231**
Income from associated companies	71 865	79 706	83 248	76 414	68 298	62 285
Group EBIT	**712 478**	**804 307**	**840 048**	**771 089**	**689 187**	**628 516**
Tax	-167 707	-201 077	-210 012	-192 772	-172 297	-157 129
NOPAT	**544 771**	**603 231**	**630 036**	**578 316**	**516 890**	**471 387**
Depreciation		80 159	94 588	108 776	121 829	128 530
+/- ΔNWC		-203 694	-140 551	-87 471	-3 925	-10 405
Cash flow		479 696	584 073	599 621	634 794	589 511
CapEx		-197 058	-190 779	-203 363	-208 850	-173 200
= FCF		**282 638**	**393 294**	**396 258**	**425 944**	**416 311**

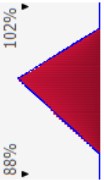Appendix 2 – DCF outputs
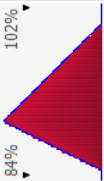
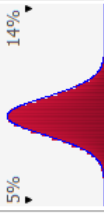| DCF output	
NPV estimation period	1 630 656
Discounted terminal value	5 836 691
Enterprise Value	7 467 347
Interest bearing debt	256 146
Financial assets	84 185
Value of equity	7 295 386
Number of outstanding shares	43 572 191
Target price	**167**

Appendix 3 – Reformulated financial statements
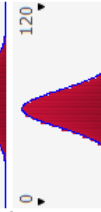
Income statement	2011	2012	2013	2014	2015	2016
Operating revenues	**1 734 022**	**1 744 266**	**2 603 712**	**2 599 799**	**3 210 548**	**4 224 340**
Cost of materials	1 549 263	1 540 290	2 137 934	2 175 278	2 707 071	3 230 927
Personnel expenses	60 595	71 764	85 627	104 557	113 268	155 468
Depreciation	26 043	30 449	33 728	41 412	53 697	61 063
Other operating expenses	50 865	71 428	90 422	120 488	134 618	136 269
Total operating expenses	**1 686 766**	**1 713 931**	**2 347 711**	**2 441 735**	**3 008 654**	**3 583 727**
Operational EBIT	**47 256**	**30 335**	**256 001**	**158 064**	**201 894**	**640 613**
Income from associates	-70 627	49 428	28 834	27 136	22 754	71 865
Normalized operating result	**-23 371**	**79 763**	**284 835**	**185 200**	**224 648**	**712 478**
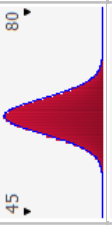
Balance sheet	31.12.2011	31.12.2012	31.12 2013	31.12 2014	31.12.2015	31.12.2016
NCOA	780 050	797 319	849 326	1 091 094	1 196 825	1 613 886
NCFA	3 385	3 335	1 395	1 895	395	395
OA	683 787	874 803	1 200 793	1 506 412	1 540 188	2 097 107
FA	71	69	98	61	132 836	1 994
Total assets	1 467 293	1 675 526	2 051 612	2 599 462	2 870 244	3 713 382
E	495 434	566 784	814 632	949 125	1 113 788	2 013 983
M	37 229	40 984	54 355	64 781	72 730	33 034
IBD	537938	575929	507614	700877	699880	351 416
OL	388 212	482 787	664 689	865 946	971 366	1 303 567
NCOL	8 480	9 040	10 320	18 733	12 480	11 383
E+D	1 467 293	1 675 524	2 051 610	2 599 462	2 870 244	3 713 383
Simplified TA Format						
OA	1 463 837	1 672 122	2 050 119	2 597 506	2 737 013	3 710 993
FA	3 456	3 404	1 493	1 956	133 231	2 389
IBD	537938	575929	507614	700877	699880	351416
OL	396 692	491 827	675 009	884 679	983 846	1 314 950
E	495 434	566 784	814 632	949 125	1 113 788	2 013 983
NOA	**1 067 145**	**1 180 295**	**1 375 110**	**1 712 827**	**1 753 167**	**2 396 043**
NIBD	534 482	572 525	506 121	698 921	566 649	349 027
E+M	532 663	607 768	868 987	1 013 906	1 186 518	2 047 017
	1 067 145	1 180 293	1 375 108	1 712 827	1 753 167	2 396 044
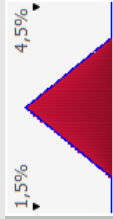
Appendix 4 – Monte Carlo simulation inputs

Name	Cell	Graph	Min	Mean	Max	5 %	95 %
Category: Capacity utilization							
Capacity utilization / 2017E	C10		85 %	92 %	100 %	87 %	97 %
Capacity utilization / 2018E	D10		85 %	92 %	100 %	87 %	98 %
Capacity utilization / 2019E	E10		85 %	93 %	100 %	88 %	98 %
Capacity utilization / 2020E	F10		85 %	93 %	100 %	88 %	98 %
Capacity utilization / 2021E	G10		90 %	95 %	100 %	92 %	99 %

Name	Cell	Graph	Min	Mean	Max		5 %	95 %
Category: Cost of materials farming (feed)								
Cost of materials farming (feed) / 2017E	C11		0.4 %	10.0 %	20.3 %	6.4 %	13.6 %	
Cost of materials farming (feed) / 2018E	D11		5.3 %	9.0 %	13.0 %	7.6 %	10.4 %	
Cost of materials farming (feed) / 2019E	E11		4.7 %	8.0 %	11.2 %	6.8 %	9.2 %	
Cost of materials farming (feed) / 2020E	F11		3.7 %	6.0 %	8.4 %	5.1 %	6.9 %	
Cost of materials farming (feed) / 2021E	G11		3.7 %	5.5 %	7.4 %	4.8 %	6.2 %	

Name	Cell	Graph	Min	Mean	Max	5 %	95 %
Category: Expected spot price							
Expected spot price / 2017E	C5		42.85	64.53	85.93	56.34	72.72
Expected spot price / 2018E	D5		33.22	61.90	88.78	52.08	71.72
Expected spot price / 2019E	E5		27.76	57.75	87.88	46.29	69.20
Expected spot price / 2020E	F5		19.34	57.75	98.03	43.44	72.06
Expected spot price / 2021E	G5		1.73	57.75	105.21	39.85	75.65

Name	Cell	Graph	Min	Max	Mean	5 %	95 %
Category: Hedged Price							
Hedged Price / 2018E	D6		49.12	75.06	61.90	56.99	66.81
Hedged Price / 2019E	E6		40.47	73.71	57.75	52.02	63.48
Hedged Price / 2020E	F6		39.16	76.39	57.75	50.59	64.91
Hedged Price / 2021E	G6		33.87	81.48	57.75	48.80	66.70

Name	Cell	Graph	Min	Mean	Max	5 %	95 %
Category: Margin per KG/sales Market & Sales							
Margin per KG/sales Market & Sales / 2017E	C16	-1,5 ▸ / ◂ 1,5	-1.00	0.03	1.00	-0.67	0.70
Margin per KG/sales Market & Sales / 2018E	D16	-1,5 ▸ / ◂ 1,5	-1.00	0.03	1.00	-0.67	0.70
Margin per KG/sales Market & Sales / 2019E	E16	-1,5 ▸ / ◂ 1,5	-1.00	0.03	1.00	-0.67	0.70
Margin per KG/sales Market & Sales / 2020E	F16	-1,5 ▸ / ◂ 1,5	-1.00	0.03	1.00	-0.67	0.70
Margin per KG/sales Market & Sales / 2021E	G16	-1,5 ▸ / ◂ 1,5	-1.00	0.03	1.00	-0.67	0.70
Category: Volume Market and Sales							
Volume Market and Sales / Parameters	H15	1,5% ▸ / ◂ 4,5%	2.0 %	3.0 %	4.0 %	2.3 %	3.7 %

Preliminary

Study programme: MSc in Business

Title: Valuation of Norway Royal Salmon

Supervisor: Janis Berzins

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1.0 Introduction

This chapter has the purpose of explaining the underlying motivation for choosing *valuation* as the topic for our master thesis, as well as describing our main objective with the thesis. Then, we will present our goal with the master thesis, in addition to the refinements that has been made. Lastly, the remaining structure for the master thesis will be presented with the intention that the reader should easily be able to follow the process for the valuation.

1.1 Background

1.1.1 Determining the topic for our master thesis
We caught an early interest in finance and accounting from our bachelor's degree at BI in Bergen. Hence, taking an MSc in Business with specialization within finance was an obvious choice for us. Through our master studies, we have been introduced for a variety of courses related to valuation. Among them are "applied valuation" and "financial reporting and analysis". This has strengthened our interest within the field. Knowing that we are highly motivated get further insight in what determines a company value, it became natural for us to choose *valuation* as the topic for our master thesis. By doing a valuation, we will be able to apply knowledge acquired from several courses from our time at BI. The topic requires that we combine knowledge from both quantitative and qualitative disciplines.

1.1.2 Determining the choice of industry
As we are both Norwegian, we find the Norwegian economy to be more interesting than other alternatives, as we will be affected by the Norwegian economy no matter our profession. We therefore wanted to look at an industry that has some impact on the Norwegian economy. The two largest sectors in Norway, both in tax revenues and market cap, is the oil sector and the salmon farming industry. We believe both industries are interesting, and understanding the dynamics of either market is something we believe to be very attractive and relevant knowledge. However, we also see that almost any investment bank in the world is able to value companies like Statoil and Seadrill, whereas rather few international analysts tend to add any new information or knowledge in the salmon industry. The salmon industry is, on a global basis, a small industry. Many of the companies listed on the Oslo Stock Exchange are controlled by a family, rather than by institutional

investors. While relatively large-cap on the Oslo Stock Exchange, on a global basis the companies can still be considered small.

Due to the lack of exposure of the salmon industry internationally, we believe there are going to be more opportunities in buying/shorting salmon stocks rather than oil stocks. We both expect to be lifelong investors in the Oslo Stock Exchange, and therefore find it an attractive prospect to get a deeper understanding of the sector.

Another reason we are attracted to the salmon industry is because it is a highly cyclical industry. Currently, everything seems to be going the way of the salmon farmer. We want to investigate whether the current pricing makes sense. We also hope to find some negative triggers that we will be able to pay attention to in order to hopefully make money shorting stocks in the case of a down-cycle. Generally, we believe that the more cyclicality in an industry, the more opportunities for good investments. (But shipping, another strong Norwegian industry, is *too* cyclical for our liking.)

1.1.3 Determining the choice of company

We have decided to do our valuation on Norway Royal Salmon (NRS). NRS is a company that has seen its share price increase significantly over the past year (+145% for NRS, +46% for the Oslo Børs Seafood index), and has a somewhat limited trading volume. We want to find an opportunity to make some money, so we believe picking a company that relatively few eyes are watching is going to be the smartest move. NRS is a company that has the highest percentage of their sales in the spot market of all Norwegian salmon companies. This means that a price decrease will quickly be felt for NRS, which likely means that NRS will be the first short opportunity in the salmon industry. However, if the prices continue to increase, NRS is likely also going to be the company that has the sharpest increase in share price. We find this exciting, and therefore decided to pick NRS.

1.2 Main objective and goals

The main objective for this master thesis is to find the value of Norway Royal Salmon. We will evaluate whether the share price of NRS is priced in accordance with the company's underlying economic circumstances and their expected future prospects for the time of the valuation, which is set to June 1st 2017.

Our goal is to give a reasoned buy, sell or hold strategy for the stock. The estimated value will be compared to the market price of NRS, reflected through the company's share price. This will give a basis for arguing whether the share price is overpriced or underpriced, and thus give a reasoned recommendation for an investment strategy.

2.0 Industry and company presentation

2.1 The Norwegian salmon industry

The salmon industry has seen extremely positive developments in profitability since 2012. The total export-volume in 2012 was 37 531 tons higher in 2012 than in 2016, which is a volume loss of approximately 4.3%. At the same time, the average price of salmon was 32.34 NOK higher in 2016 compared to 2012, equaling a price increase of 117%. The value of the salmon exports coming out of Norway increased by 107% from 2012 to 2016, despite the volume dropping. This clearly indicates that the market is ready for growth. The "perfect storm" we are currently seeing in the salmon industry is in other words purely driven by a lack of growth on the supply side.
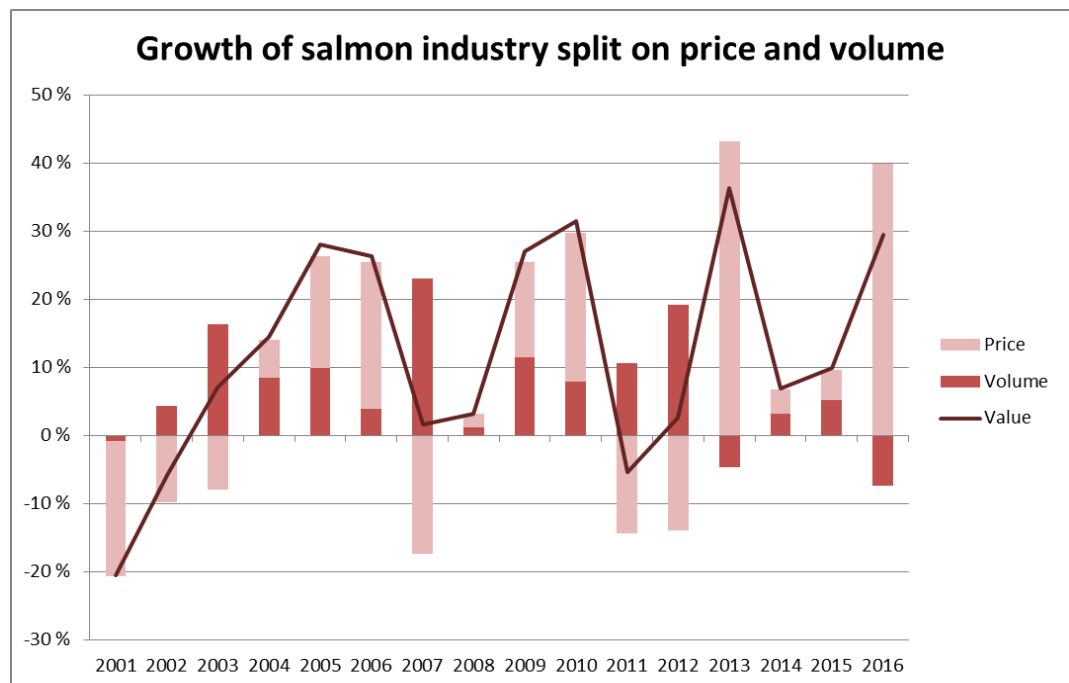
Source: Statistics Norway, table: 03024

However, even if the market is ready to see some growth in the supply side, it is not as simple to grow as salmon consumers wish it was. The salmon industry is

heavily regulated, and in order to produce salmon, you need to acquire a license from the government. Companies have to meet ethical and environmental requirements by the government, in addition to being the highest bidder for a particular license. In addition, there has to actually be licenses available for auction.

Norway has split the farming areas into four areas; region north, mid, west and south. Not every part of the ocean is optimal for harvesting salmon, and so the industry has a bottleneck in terms of supply by physically available space in addition to the aforementioned auctions.

An alternative to allow for growth is to allow a higher biomass in the different licenses. The current maximum allowed biomass (MTB) is 780 tons (900 tons in the counties of Troms and Finmark). This has been left unchanged for a number of years due to a number of different issues. In the summer of 2016, the Norwegian government tried to allow salmon companies to operate with a flexible biomass. This would have enabled salmon farmers to adjust their standing biomass throughout the year. The program allowed you to have any standing biomass, so long as the average biomass in the license equaled the current MTB of 780. No large companies applied for this program however, as the application process was too expensive. In addition, farmers generally were unoptimistic about the actual impact of growth.

So while a particular company may be able to grow through M&A activities, the sector as a whole has a bottleneck through available farming licenses. This is what has driven prices to the extremes we are seeing currently, and salmon companies earning super profits.

2.2 Presentation of Norway Royal Salmon

This subchapter will be written at a later stage in the process.

3.0 The theoretical framework

This chapter will present the valuation method used to determine the value of Norway Royal Salmon. The chapter starts with a brief introduction on the different frameworks for valuation, followed by a reasoned choice of valuation technique. Lastly, the chosen method will be described in more detail.

3.1 Frameworks for valuation

There exists a variety of frameworks for valuation. It is common to categorize the different valuation techniques into three main categories; fundamental valuation, multiples (comparables), and real options (Koller, Goedhard, & Wessels, 2010). Fundamental valuation is about thoroughly examining information about firms and reaching conclusions about the underlying value that the information implies. It is an attempt to measure the intrinsic value of the company, meaning the actual value of the company based on an underlying perception of its true value (Penman, 2013). This includes seeking information of all aspects of the business, in terms of both tangible and intangible factors, as well as overall economy and industry conditions and other macroeconomic factors. The intrinsic value may differ from the market value. Given reliability and validity in the estimation, the analyst can give an indication on whether the company is undervalued or overvalued.

The use of multiples for valuing a company is also a commonly used valuation technique. Because DFC models tend to be more used among analysts, multiples are in some cases used as a supplement to DFC, rather than a replacement. According to Teller, one way to place the DCF model in the proper context is to create a set of comparables (Koller, Goedhard, & Wessels, 2010). The value of the company is based on different multiples of comparable companies. Among the most commonly used comparables is the enterprise value (EV)-to-earnings before interest, taxes, and amortization (EBITA) multiple. Valuing a company based on this approach is done by multiplying the company's EBITA with a representative EV/EBITA from comparable companies in the industry (Koller, Goedhard, & Wessels, 2010). An advantage by using comparables for valuing a company is that the method is less time consuming. However, the method is criticized for not being profound. The technique can therefore be suited for companies with a short operational history (Koller, Goedhard, & Wessels, 2010).

The third, and the last category for valuation techniques, is the real option valuation, using a replicating portfolio. In the article "the pricing of options and corporate liabilities" from 1973, Fischer Black and Myron Scholes derived a theoretical valuation formula for options. Their model relies on replicating portfolios. The intuition is that a replicating portfolio that perfectly resembles the

security you attempt to value, must have the same price as the security (Black & Scholes, 1973). Contrary to traditional discounted cash flow techniques, which do not deal well with managerial flexibility or future response to uncertainty, real option based pricing techniques handles this flexibility quite well. This has led to analysts trying to replicate portfolios for companies and their projects. However, an attempt to value a company using real options tend to be difficult as it is challenging to create a perfectly replication portfolio, unlike the case for financial options, e.g., valuing derivatives (Koller, Goedhard, & Wessels, 2010). Therefore, this method is not commonly used among analysts.

3.2 Choice of valuation model

There are several considerations that has to be made when determining which valuation technique that is best fit in determining the company's value. For instance, Kaldestad and Møller (2011) claims that access to information, time available, and the requirements in regard to reliability are factors of great importance for the final decision. In addition, they state that both the industry the company operates, as well as the stage in the life cycle of both the industry and the company, are important factors to consider whilst deciding upon the valuation technique (Kaldestad & Møller, 2011). The different techniques come with both strengths and weaknesses, and should be considered supplements rather than different alternative techniques. It is not necessarily given that one valuation technique will be sufficient to get a realistic value. Consequently, several analysts tend to use supplementary techniques to value a company.

The activities of Norway Royal Salmon can be traced far back in time as they were listed spring 2007. Hence, the company has a relatively long accounting history, which is an important prerequisite for choosing fundamental valuation. The Norwegian salmon industry consists of a number of companies similar to Norway Royal Salmon in regards to structure, operation and financing, which is useful in both fundamental valuation and valuation based on multiples. Similar companies also have detailed annual reports, and mainly uses the same accounting policies.

Fundamental valuation is typically considered to be the most suitable method for companies in a mature phase of their life cycle. Whether Norway Royal Salmon, and the Norwegian salmon industry, can be said to be in a mature phase will depend on

the market studied in which they operate in. For instance, markets such as Scandinavia and the European Union can be claimed to be in a mature stage with long operational history, whilst markets such as China and parts of East-Europe can be doubted of being in a mature stage. Such markets can better be categorized as growth markets, which may suggest the use of an option based approach for these markets due to the uncertain future prospects.

It is, however, the company's phase in the life cycle that is decisive. Norway Royal Salmon is deemed to be in a mature phase in the life cycle and is expected to have organic growth within their primary product segment (salmon). This is further emphasized by the licensing required to farm salmon, which makes it difficult to increase production volume and thus mitigates large growth opportunities through increased production. However, the company is still expected to grow through acquisitions and focus on new products. This speaks in favor for either fundamental analysis or comparable valuation techniques.

Time available is also a factor that must be taken into consideration when determining the valuation technique. Using more than one valuation technique will be time consuming if every method is to be done thoroughly. This may reduce the preciseness of the methods as the risk of omitting important factors increases. We will therefore use one valuation technique when valuing Norway Royal Salmon.

In conclusion, we believe that fundamental valuation using discounted cash flow techniques is the most suitable application for valuation method, first and foremost because the method is thorough. The thorough investigation required by fundamental valuation underpins the reliability of the estimation, as it decreases the chances of omitting relevant information that otherwise should have been included. The method is also precise as it combines insight from historical accounting data with strategic analysis regarding the company's future prospects.

3.3 Fundamental valuation

The two most common techniques used within fundamental valuation is the enterprise discounted cash flow (DCF) model, and the equity cash flow model. The enterprise DCF model discounts free cash flow (FCF). The free cash flow consists of cash available to all investors, including equity holders, debt holders, and any other

nonequity holders. The FCF is discounted at the weighted average cost of capital, meaning the blended cost for all investor capital. To determine the value of the equity holders, debt holders and other nonequity investors' claim on the cash flow is subtracted from the enterprise value (Koller, Goedhard, & Wessels, 2010).

Contrary to the enterprise DCF model, the equity cash flow model value only the equity holders' claims against operating cash flows, discounted at the levered cost of equity. If both methods are applied correctly, they will yield the same estimate. However, the equity method tends to be difficult to implement correctly because capital structure is embedded within the cash flow (Koller, Goedhard, & Wessels, 2010). This makes it challenging to match equity cash flow with the correct cost of equity. Consequently, we have decided to use the enterprise DCF model for our valuation of Norway Royal Salmon.

The fundamental valuation is a thorough process, including many steps to reach the final estimate. To make it easier for the reader to follow the entire process throughout this thesis, we will in the following go deeper into the steps of a fundamental valuation, based on Palepu Healy and Bernard's framework for fundamental valuation (Palepu & Healy, 2013).

Step 1 Accounting analysis and strategic analysis

The valuation process is typically initiated with analysis of historical accounting numbers. The goal is to achieve insight about the company's underlying economic circumstances and prospects. Because the financial statements mix operating performance, nonoperating performance, and capital structure, a reorganization of the statements into new statements is done to separate the three. This creates a clearer distinction between operations and financing (Penman, 2013). The reorganized financial statements will form the basis for our valuation, and will be used to find the free cash flow.

Once the financial statements are reorganized, a thorough analysis of the historical performance. According to Koller (2010), a good analysis focuses on the key drivers of value, described as return on invested capital (ROIC), revenue growth, and FCF (Koller, Goedhard, & Wessels, 2010). Understanding how these drivers behaved in the past will help us make more reliable estimates of future cash flow.

In parallel to the accounting analysis, a strategic analysis is done to gainer an even deeper insight to the industry, and the company's underlying economic circumstances and prospects. The strategic analysis will be twofold; an external industry oriented analysis and an internal resource oriented analysis. This will reveal the company's strategic advantage, which are often related to the company's operations, but can also relate to its financing.

Step 2: Analyzing risk and profitability

Based on the reorganized financial statements, risk analysis and profitability analysis is done to find the synthetic rating and the company's strategic advantage, respectively. The synthetic rating gives important inputs for determining the company's cost of capital, whilst the strategic advantage is found through quantifying the company's operational and financial advantage.

Step 3: Projecting future estimates

Projecting FCF, which is driven by ROIC and revenue growth, is the next step to build the enterprise DCF model. Expected future income statements, balance sheets and free cash flows are included. When it becomes impractical to estimate a future FCF (often between 5-10 years ahead), a continuing value is calculated. Then, the weighted average cost of capital is calculated, based on a weight between cost of equity and the borrowing cost.

Step 4: Finding the value estimate

Based on the projections made in step 3, the enterprise value is calculated. In order to find the value of the equity, all nonequity claim has to be subtracted from the enterprise value. This entails finding, and subtracting nonequity claims such as debt, operating leases, unfunded retirement liabilities, preferred stock and minority interest, to name a few. A comprehensive list of nonequity claims is impractical at this point, but will be covered in more details later in the thesis.

Step 5: Analysis of uncertainty to the value estimate

There is naturally considerable uncertainty connected to the estimated share price found in step four. It is therefore of interest to analyze this uncertainty. Simulations

and sensitivity analysis will therefore be used to study how the value estimate is effected when the key drivers for value changes.

4.0 Theoretical terms and concepts

4.1 Cost of capital

One of the most influential factors in valuing a company is the discount rate. The discount rate is equal to the investors cost of capital. The cost of capital is equal to the opportunity cost of investing in a project with the same risk. Fundamental analysis uses the cost of capital to discount future cash flows into present value. We will adjust the discount rate for risk, inflation and time horizon in order to reach a sensible discount rate. We will base our estimate on the capital asset pricing model, and then adjust the result if necessary.

4.2 Risk

Risk is a function of the consequences and the probability of a particular outcome occurring. A company with high risk is a company where the future cash flows are highly uncertain. It is therefore of particular importance to identify the type of risk and the risk tolerance of the investors. The total risk of a firm can be split into two parts; systematic risk and unsystematic risk.

4.2.1 Systematic risk

systematic risk is the inherent risk in the market. The inherent risks in the market are factors that an investor is unable to completely protect himself from if they are invested in the market. It therefore cannot be controlled or eliminated through diversification. The only way to safely steer clear of systematic risk is to only be invested in risk free investments. Examples of systematic risk include currency risk, interest rate risk and weather. (Bøhren & Michalsen, 2010)

4.2.2 Unsystematic risk

Unsystematic risk, or company specific risk, is the uncertainty surrounding the particular business in question. This type of risk can be eliminated through diversification. Elimination of unsystematic risk is one of the assumptions of the capital asset pricing model, and may therefore need to be adjusted for in order to

make the valuation realistic. Examples of unsystematic risk include competence within a firm and access to capital.

4.3 Risk-free investments

The risk-free rate is the rate of return an investor can expect to achieve without accepting any degree of risk (Bodie, Kane, Marcus, & Jain, 2014). A truly risk-free investment is theoretical, as you will always assume a degree of risk no matter where you place your capital. However, we are able to approximate the risk-free rate by using governmental bonds in countries where the government has superb credit worthiness. These bonds generally do not have any risk of bankruptcy or failed payments.

The maturity of the bond used as risk-free rate depends on the horizon of the investment. In our case, we assume that the firm will operate for an infinite amount of time in the future. This indicates that the governmental bonds with a longer maturity will be more relevant than a short term bond. As we are valuing a Norwegian salmon company, we also find it sensible to use the Norwegian government bonds as our risk-free rate. The Norwegian government has a very high credit worthiness, and therefore meet our conditions.

4.4 Attitude towards risk

The returns an investor can expect are highly correlated with the amount of risk in their portfolio. An investor who enters a lot of very risky investments is likely to have a higher expected return than the investor who shies away from risk. The attitude towards risk is primarily split into three categories.

4.4.1 Risk neutral

A risk neutral investor is an investor who only cares about the expected returns (Bøhren & Michalsen, 2010). A risk neutral investor will be indifferent between to projects yielding 10%, even if one of the projects is objectively riskier.

4.4.2 Risk averse

A risk averse investor weighs the risk of an investment against the expected returns. They want the highest possible return at the lowest possible risk. This means that a risk averse investor will not carry more risk than necessary. Most people are risk averse, and our discount rate is based on a risk averse investor. A risk averse

investor will require a higher rate of return for a risky project (Economic Times, 2016).

4.4.3 Risk seeking

A risk seeking investor is an investor who values risk. If they are presented with two projects with the same expected return, they will prefer the investment with the highest risk. A risk seeking investor will accept a lower expected return for an investment with a higher degree of risk (Bodie, Kane, Marcus, & Jain, 2014).

4.5 Market risk premium

The market risk premium is the additional returns an investor can expect from investing in the market instead of using a risk-free investment vehicle (Bøhren & Michalsen, 2010). It illustrates how much extra returns you can achieve by taking on more risk. The market risk premium will be found by looking at historical returns against historical risk-free returns. One can either take an average of a sample period, or one can estimate different market risk premiums for each year. We will use an average for ease of calculations. Since we are valuing a Norwegian salmon company, we find it sensible to use a Norwegian equity index to measure historical returns.

4.6 Beta

The beta-value is a way to quantify systematic risk (Kaldestad & Møller, 2011). It compares the volatility of the instrument we are valuing with the market-index that we have chosen. If the beta equals 1, the instrument will see the same developments in returns as the market index. If the beta is above 1, the volatility of returns will be higher than the market, whereas the volatility will be lower than the market if beta is below 1. If the beta-value equals 0, you will see no volatility, and the investment is considered to be risk-free (Bøhren & Michalsen, 2010). As our firm is a listed entity, we can find the beta through a regression of historical prices. It is also possible to construct a beta through looking at similar companies. If the beta of a firm is much higher than the industry standard, it means that the market perceives that company to have more risk.

4.7 Adjusting the beta

Empirical studies by Marshal Blume found that beta-values seem to converge towards the market average (=1) (Blume, 1975). As we are valuing a company with an infinite operating horizon, we may find it sensible to make such an adjustment to the beta-value.

4.8 Capital asset pricing model

The capital asset pricing model will be used to find our unadjusted cost of capital. It is, as mentioned, a way to quantify the impact risk should have on returns. The capital asset pricing model assumes that you carry no unsystematic risk (Bodie, Kane, Marcus, & Jain, 2014), which we find problematic. The reason is that especially in the salmon industry, the largest owners have most of their net worth in one investment. The owners thereby carry unsystematic risk, even though it is by choice. In order to make the valuation more relevant to such persons, we believe an adjustment of the discount rate based on unsystematic risk is a sensible correction.

4.9 Weighted average cost of capital (WACC)

We will apply the WACC, as we are discounting the cash flows of the entire business, rather than the cash flow to equity. This means that we will look at the cost of different types of capital. The borrowing cost as well as the cost of equity has to be used in order to reach a discount rate that we can apply to our valuation.

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