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Bakkafrost Group

Strategic Analysis and Valuation

Farzan Saeed Khan

Supervisor: Dr Yuanhao Li

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NORWEGIAN SCHOOL OF ECONOMICS

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Abstract

This thesis has evaluated Bakkafrost holistically and estimated share price of the company. The thesis has used WACC-based DCF approach to calculate the intrinsic value and complemented it with multiples-based valuation using P/E multiple and EV/EBIT multiple. The estimated share price as of 18th May is NOK 850, and is a weighted average of fundamental and multiples-based valuation, with 70% weight to the fundamental valuation. The market price of the share as of 17th May was NOK 685; the estimated share price offers an upside of over 24% and hence, the author issues a "BUY" recommendation.

The financial valuation has been grounded in industry and economic realities using strategic analysis. The analysis finds that salmon farming industry is well-suited to the emerging consumer trends of health, wellness, and sustainability. Furthermore, salmon farming remains politically and socially accepted in the countries Bakkafrost operates in. Moreover, Bakkafrost has demonstrated success over the years and is currently focusing on enhancing capacity and improving efficiency, which will lead to higher cash inflows in the future.

Nonetheless, the salmon farming industry is not without its challenges. The growth in the industry is constrained due to limited number of farming licenses; however, the limited availability of licenses also creates a high barrier to entry, thereby protecting the industry from new entrants and high rivalry. Limited growth, coupled with increasing demand, is set to push prices up. Global warming and extreme weather events pose a threat to salmon farming because salmon growth requires very particular environmental conditions. But perhaps, the single largest challenge is salmon lice, which continues to reappear in significant levels in different countries and imposes various costs on salmon farmers.

All in all, as per the author, salmon farming's competitive landscape has moderate rivalry and is well positioned to capitalize on the macro-trends in the world. The author issues a "BUY" recommendation for Bakkafrost.

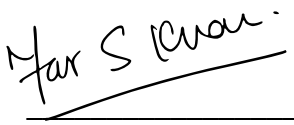
Preface

This thesis has been written as part of my MSc in Business Administration and Economics at Norwegian School of Economics. No funding has been taken for this research. The thesis holistically analyses Bakkafrost, a salmon farming company headquartered in the Faroe Islands.

This thesis would not have been possible without the support and guidance of my supervisor, Dr. Yuanhao Li. He has been very accessible, understanding, and helpful. His expertise in salmon farming has helped me considerably. I am extremely grateful to him for all his help.

I would also like to thank the Norwegian people and NHH Norges Handelshøyskole for providing me the opportunity to study in Norway. I am forever indebted to you all.

And finally, as I complete my higher education, I would like to express my gratitude to Lahore University of Management Sciences (LUMS). It was the rigorous undergraduate program at LUMS that shaped me and equipped me to handle the challenges of NHH.



Farzan Saeed Khan
Oslo, 28 May 2021

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1. Introduction

This paper is an attempt to holistically analyse Bakkafrost and conduct its valuation. To do so, literature from finance, economics and strategy have been utilized. The thesis can be used not only by those who are interested in Bakkafrost but also by those interested in learning about the salmon farming industry in Norway, Scotland, and the Faroe Islands.

1.1 Motivation

The author has chosen to conduct financial valuation and strategic analysis of Bakkafrost because it requires application of financial models and theories along with a holistic understanding of macro and micro level factors that affect salmon farming industry. Hence, to conduct financial valuation and strategic analysis, the author would have to step outside the world of finance and apply theories from different disciplines. This would inherently be a challenging task. Nonetheless, the challenge – and the steep learning curve that it brings – is the reason why the author has chosen to conduct strategic analysis and valuation of Bakkafrost.

1.2 Research Question

The primary objective of this thesis is to evaluate Bakkafrost holistically and consequently, provide a recommendation to equity investors on whether they should SELL, BUY or HOLD equity in the said company.[1] Therefore, the research question is:

"Is Bakkafrost a good investment for equity investors as of 18th May 2021?"

To answer the above research question, this thesis has essentially been divided into 2 halves. In the first half, i.e., in chapters 2-5, qualitative analysis has been carried out, and in the second half, i.e., in chapters 6-11, quantitative analysis has been carried out.

Apart from investment recommendation, this thesis serves a secondary purpose: the strategic analysis (i.e., the qualitative part of this thesis) can serve as a 'handbook' for anyone trying to understand the salmon farming industry and Bakkafrost's position within it. In a sense, it could

[1]It must be noted that this is an academic exercise and not investment advice. The author does not take any liability for any losses incurred because of acting on the conclusion of this thesis.

be considered a complimentary handbook to the one issued by Mowi Group, the difference being that this one has been made with Bakkafrost at the core. Strategic analysis has been complemented by an analysis of capital structure and financial ratios, to better understand the nexus between capital structure and company strategies in the salmon industry – this area has not been explored in earlier publications.

1.3 Resources Used & Citations

The author has used literature from different disciplines for this thesis.

Within the field of finance, literature by Aswath Damodaran and Koller et al. (2015) have been used extensively. Whenever Koller et al. has been mentioned, it refers to the 6th edition of "Valuation: Measuring and Managing the Value of Companies (Wiley Finance)". The year 2015 has often been emitted when Koller et al. is referenced in favour of brevity.

Michael Porter's 5 Forces Framework and SWOT Framework forms the cornerstone of strategic analysis. Moreover, PEST analysis has been carried out to better analyse the industry characteristics, and VRIO framework by Barney has been used to evaluate the resources that Bakkafrost has.

Furthermore, work of Tuan and Thapa (2020) and Stangeland and Vu (2019), have been used to help structure this thesis. It must be noted, however, that the said papers are themselves based on the work of Koller et al. (2015). Work of Malin, Mathias, & Saad (2016) has formed the basis of calculation of operating tax and to estimate the premium that Bakkafrost earns per kg of salmon. Nonetheless, the valuation chapters are primarily based on the work of Koller et al. (2015), and the work of Malin et al. is itself based on the work of Koller et al. (2015).

The thesis has been cited using APA format. All reasonable efforts have been made to reference everything properly, and only items of common knowledge have been left unreferenced; however, once something has been referenced, it has not always been referenced subsequently. APA citation requires page number to be provided only when a direct quote is taken, nonetheless, the author has provided page numbers in a lot of instances even when no direct quote has been taken – this is done simply because it is the recommended approach. In direct quotes, page numbers have been omitted only when it was not possible to include page number, e.g., in newspaper articles, and in such cases all efforts have been made to provide an

alternative, e.g., section name or paragraph number, so that the reader can easily pinpoint source of the direct quote.

Furthermore, the URL's mentioned in the references need to be copy and pasted in the browser for them to work.

1.4 Limitations

The primary limitation of this thesis stems from the fact that valuation requires several assumptions. Given the amount of inputs and the assumptions involved, it is very likely that the estimated share price will not be perfect. Moreover, due to the Covid-19, we are all engulfed by an unprecedented level of uncertainty. This uncertainty is hard to quantify. Furthermore, because of the Covid-19 related lockdowns, the author been unable to access Bloomberg Terminal (except once very early on in the thesis) and hence, the author's access to analyst reports and market data has been almost non-existent.

1.5 Structure

This paper has been divided into different chapters and structured in a manner that allows the research question to be answered from both strategy and finance perspectives.

In chapter 2, the industry and production process have been introduced, followed by company introduction in chapter 3. Chapters 2 and 3 help provide the context for chapter 4, where strategic analysis has been conducted. In chapter 5, historic financial analysis has been conducted to see the financial structure of the industry and to evaluate Bakkafrost's financial health. Chapter 5 also has detailed note on capital structure and on how a company's strategy is impacted by its capital structure; based on this, Bakkafrost and its competitors' capital structure and strategic behaviour have been analysed towards the end of chapter 5. It must be mentioned here that capital structure analysis does not directly contribute to valuation, nonetheless, it is important to do a capital structure analysis since it impacts the company's strategy. Moreover, without a capital structure analysis of salmon farming companies, the thesis would be rather incomplete for those who want to use it as a handbook. Interestingly, the widely used resources issued by Mowi and EY on salmon farming do not have discussion on capital structure of salmon farming companies, and hence, chapter 5 fills this gap. Together,

chapters 2 to 5 holistically analyse salmon farming industry and Bakkafrost in a primarily qualitative manner.

Chapters 6 to 11 are related to fundamental valuation of Bakkafrost. In chapter 6, review of valuation techniques has been done. In chapter 7, historic financial statements have been reorganized based on whether items are operational or non-operational. In chapter 8, financial statements have been forecasted. Following forecasting of financial statements, in chapter 9, method of calculation of cost of capital is introduced, followed by calculation of Bakkafrost's WACC. In chapter 10, fundamental value is calculated using DCF valuation. Finally, in chapter 11, multiples-based valuation has been conducted to compliment the fundamental valuation.

Chapter 12 concludes the thesis.

2. Company & Industry Overview

2.1 Bakkafrost

Bakkafrost Group is the seventh-largest salmon farming group (by volume) in the world (Berge, 2020), and farms Atlantic Salmon (Bakkafrost, n.d.-b). Bakkafrost traces its roots to 1968, and in 2010, was listed on the Oslo Stock Exchange. The company has its salmon farming farms primarily in the Faroe Islands but has recently expanded its farming operations to Scotland by means of an acquisition. The company *claims* to be "… the most vertically integrated salmon farming company in the world" (Bakkafrost, 2021, p. 22), and controls almost the entire value chain, from production of feed for salmon to processing and packaging of fresh & value-added salmon.

The company is listed on the Oslo Stock Exchange, and as of 26th February 2021, had market capitalization of NOK 36,43 billion (by May 17th, the market capitalization had surpassed NOK 40 billion). The company's stock price has grown considerably over the years, from NOK 320 per share in March 2016 to NOK 616 per share in February 2021 – a CAGR of 14%. In comparison, the Oslo Stock Exchange's Benchmark Index has grown by a CAGR of 11,36% over the same period.

The primary source of external revenue to the company are its fish farming and value-added products segments, while most of the revenue in the fish oil & feed segment is internally generated and not reported in the group financial statements in accordance with IFRS 10. The group's presentation and operational currency is DKK.

2.2 Industry Overview

Salmon aquaculture is a fast-moving industry (Bell & Johnson, 2016). Since salmon is a commodity, its prices have seen significant fluctuations over the years, primarily due to the economics of supply & demand (Bakkafrost, 2010). The production of salmon takes almost 3 years; hence, the producers are unable to adjust to short term fluctuations in demand, which causes prices to fluctuate[2]. Similarly, the production of salmon is not evenly distributed

[2] Details of production are explained later in the thesis.

throughout the year, the harvest is usually highest in the fall and hence, prices tend to go down in fall, as per the author's discussion with an industry expert. Apart from seasonal fluctuations in prices, fluctuations over the years have also been significant. Figure 1 below illustrates fluctuations in Atlantic salmon prices over the years (Fish Pool, n.d.). The price fluctuation is evident; however, it can also be seen that on average, the prices have risen over the years with a very significant increase being in 2016.

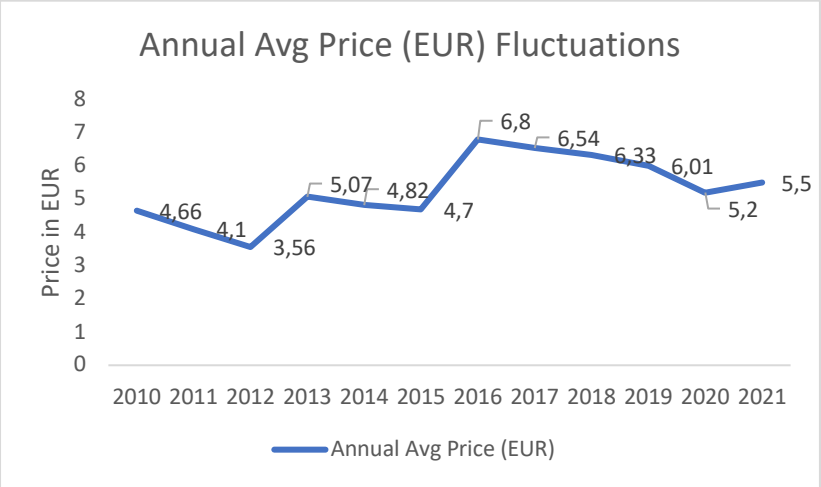

Figure 1: Plot of historical fluctuation in salmon price in Euros; Data Source: Fish Pool

2.2.1 Salmonoids

Salmon belongs to the family of Salmonids. Other species belonging to the same family include trout, chars, freshwater whitefishes, and graylings. Within the family of salmonids, Atlantic salmon is harvested more than all the other salmonoid species combined (Mowi ASA, 2020). The wild Atlantic salmon's population has stagnated over the years due to overfishing and currently, almost all "… commercially available Atlantic salmon" is farmed (Bell & Johnson, 2016, p. 3). In fact, in several countries, including the US, fishing for wild-Atlantic salmon is prohibited and only available Atlantic salmon for consumption is farmed salmon (NOAA, n.d.). Farming of salmon is governed and regulated by licenses, and the length and amount of these licenses vary by jurisdictions[3].

Salmon is highly prized for its high protein and omega-3 content, it also has low levels of saturated fats and can lower the risks of cardiovascular disease, dementia, and Alzheimer's

[3] PESTEL analysis covers this in detail, later in the thesis.

(WebMD, 2019). According to SINTEF, production of salmon has significantly lower carbon footprint than other sources of animal meat and protein (Winther et al., 2020).

Within the global seafood harvest (both farmed and wild), salmonoids are only 4,4% (Mowi ASA, 2020, p. 14). Despite being a relatively small part of the global seafood supply, the harvesting of Atlantic salmon is more industrialized than any other seafood (Mowi ASA, 2020, p. 15). Due to high and intensive industrialization, salmon farmers are able to control different aspects of salmon farming (e.g., they administer feed with the help of cameras, are able to control harvest timings, smolt size, etc.), which consequently, means that the risks involved in the farming are reduced since the value chain is highly controlled, as per the author's discussion with an industry expert. The farming of seafood is seen by experts as a major solution to worldwide shortages of protein-intensive foods (Bell & Johnson, 2016).

The quality of salmon, based on the author's discussion with an industry expert, are determined by farming practices and the quality of feed and not by the country it is farmed in. It is worth mentioning here that salmon produced by Bakkafrost tends to be priced higher than average salmon (Bakkafrost, 2020).

2.2.2 Industry Trends

The harvest of Atlantic salmon has experienced a global CAGR of 6% during the period 2000-2019, as per Kontali Analyse (Mowi ASA, 2020). However, the CAGR for the years 2021-25 is expected to be 4% (Mowi, 2021a). The decrease in growth stems from the fact that the industry has already reached high efficiency levels and is therefore, facing diminishing marginal returns. For the growth to increase, progress in technology & pharmaceutical products is needed (Mowi ASA, 2020). However, perhaps the single largest limitation to growth of salmon farming is limited availability of farming licenses (and how those licenses are to be used), since the industry is highly regulated[4]. Between 2009 and 2018, the market price per kg of salmon has risen, from an average of 3,58 Euros, to 6,01 Euros (Fish Pool, n.d.). In 2010, the global salmon harvest was 1455 M tons, by 2019 it had risen to 2599 M tons, as reported by Statista (GAA, 2019).

[4] The regulations are discussed in detail in the PESTEL section.

2.2.3 Major Players

The largest players in Salmon farming industry are Norway and Chile. Mowi, a Norwegian company headquartered in Bergen, is the single largest salmon producer globally (producing more than twice than the second largest salmon farming company). The industry has undergone consolidation in the last 2 decades and all major salmon farming companies today are vertically integrated (Bell & Johnson, 2016), as this allows not only for cost synergies but also helps ensure product quality and safety (Bakkafrost, 2019). In Norway, 90 companies control the entirety of salmon farming, whereas in Chile, 13 companies hold 90% of the licenses (Mowi ASA, 2020, p. 49), this shows how consolidated the industry is.

2.2.4 Production Process & Value Chain

Salmon farming is a capital-intensive process, and it takes about 3 years for one growing cycle to complete (Bell & Johnson, 2016). A 3-year long period of production implies that the supply is inelastic in the short-term and requires high working capital.

Of this, the time spent in freshwater tanks lasts between 10-16 months whereas the seawater cages take about 12-24 months (Mowi ASA, 2020). To avoid flooding the market (and hence, driving the price down) at any given time, the salmon farming companies harvest fish all around the year. However, the 3-year production cycle referred to above, can fluctuate based on the sea water temperatures, as Salmon is a cold-blooded animal[5]. The optimal temperatures for salmon farming are between 8 and 14 °C (CORDIS, 2020). This means that salmon cannot be farmed everywhere and is the reason why salmon farming is restricted to certain geographies. Moreover, the time that salmon needs to spend in the sea cages can be reduced by having larger size smolt, which could ultimately lead to greater harvest from the same license.

The first step in salmon farming is the production of eggs. Eggs are produced using broodstock (in simple words, eggs are produced by breeding mature salmons). Most of the major companies have their own broodstock program, which resultantly means that they produce

[5] As a cold-blooded animal, Salmon cannot regulate its body temperature. Rather, its body temperature is dependent on the temperature of its environment. If this external temperature is within the optimal range for Salmon growth, the fish will grow quicker. If the temperature is too warm, it can lead to diseases and if it is too cold, it can lead to high mortality amongst the fishes.

their own eggs. However, a lot of these companies are not self-sufficient in egg production and source them from external providers as well.

During the production stage, eggs are placed in freshwater tanks, and at this stage, fertilization of eggs takes place and "… the fish are grown to 100 grams in controlled freshwater…" (EY, 2020, p. 36). Artificial lighting and plastic covers for tanks are used to create optimal environment for hatching and growth of salmon at this stage (Bell & Johnson, 2016, p. 4). The salmon at this stage are called "smolt". Once the salmon has spent about eight to fifteen months in these tanks, they are moved to the sea where they spend a further 12 to 24 months (Bell & Johnson, 2016; Mowi ASA, 2020). Transferring fish from freshwater tanks to the sea is done using dedicated tankers (Bakkafrost, 2020) and utmost care is taken to ensure that no fish escapes the seawater cages, as any fish that escape seawater cages can lead to inbreeding with wild fish and can also spread diseases. In sea water cages, fish grow to weights of about 4 to 5 kgs (EY, 2020, p. 36). For Bakkafrost, the weights are 4-5 kgs in Scotland and 5-6 kgs in the Faroe Islands (Bakkafrost, 2020). Once the fish are ready, the tankers bring fishes back from sea to land where they are processed further (Bell & Johnson, 2016). After harvesting of a site, it is fallowed for 2 to 4 months in the Faroe Islands and over 2 months in Scotland (Bakkafrost, 2020). The tankers are also cleaned after every trip, to avoid contamination and transfer of disease. Given the inter-linked processes, salmon farming can be considered a value-chain based process (as opposed to value networks or value shops), keeping in view the explanation of each of these by Stabell & Fjellstad (1998).

The process is summarized in Figure 2 below:

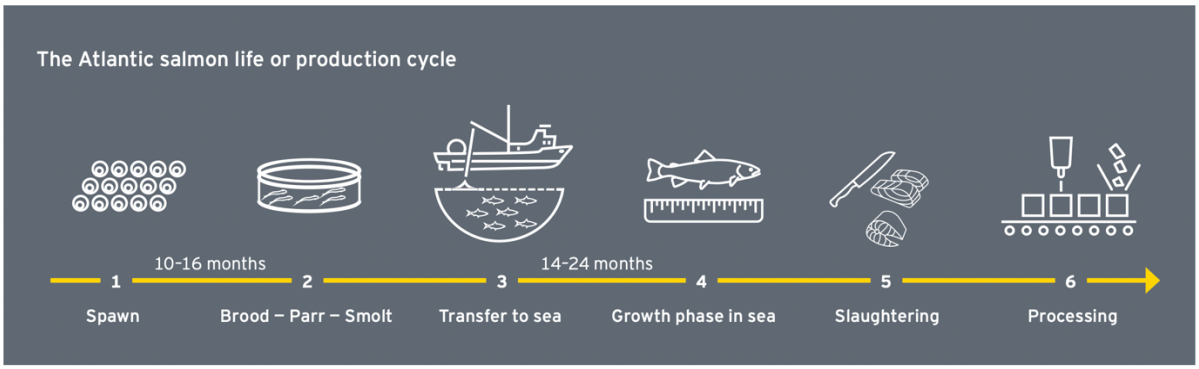

Figure 2: Visual summary of salmon farming process; Taken from: (EY, 2021, p. 45)

Even though the annual report of Bakkafrost does not mention this, but the Faroese Government's legislation requires that the provision of feed to salmon be monitored via

sensors and cameras, leading to higher feed conversion ratios as compared to the global averages and reduction in feed waste (Faroese Seafood, n.d.-a).

It is important to mention here that salmon is sold as fresh fish and as fillets (e.g., the salmon fillets available in the supermarkets). Fresh fish is sold as head-on-gutted (HOG), which means that their visceral parts have been removed. Fillets is the processed salmon and is also called "value-added product (VAP)". Both fresh fish and salmon fillets (VAP) have different qualities, which are explained in chapter 3, sub-section 3.1.2.

2.2.5 Global Consumption & Demand of Fish

As per the UN, the population has grown at a rate of 1,6% between 1961-2007, whereas the fish consumption for the same period has increased by 3,1% (FAO, 2020b). Moreover, for the same period, fish consumption outpaced consumption from all other animal sources of protein, which grew by a CAGR of 2.1% (FAO, 2020b). In 2019, the production of Atlantic salmon increased by 7% (FAO, 2020a). In 2017, fish provided 7% of the global protein consumption (Mowi ASA, 2020). Mowi estimates that for the foreseeable future, the demand of salmon will grow by twice the salmon supply growth (Mowi, 2021a). Furthermore, it is widely accepted that salmon farming is well-in-line with other global macro trends, e.g., rising middle class, increasing population and water scarcity (amongst others) – the details have been covered in the PESTEL analysis.

2.3 Chapter Summary

This chapter has briefly introduced Bakkafrost and the salmon farming industry, followed by a description of how salmon is farmed. Bakkafrost is one of the largest salmon farming groups with operations in the Faroe Islands and Scotland. The salmon farming industry is dominated by a few players. The production of salmon is approximately a 3-year long process, is capital intensive, and requires specific environmental conditions. The prices of salmon tend to fluctuate, however, a general trend of increase in salmon prices is visible.

The following chapter explores Bakkafrost in detail and covers the operational challenges and risks that the company faces.

3. Company Details

Bakkafrost traces its roots back to 1968, when it was established as a family-owned company (Bakkafrost, 2019). It was listed on Oslo Stock Exchange in 2010 after a series of M&As (Bakkafrost, 2019). Since then, it has acquired several companies and consolidated its value chain vertically. The two major acquisitions were of P/F Havsbrun in 2011 and of Scottish Salmon Company (SSC) in 2019; Havsbrun produces fishmeal, fish oil and fish feed (FOF) whereas SSC is an integrated salmon farmer in Scotland (Bakkafrost, 2021).

Today, Bakkafrost's farming operations are based in the Faroe Islands and Scotland, and include smolt production, fish farming, processing of harvested fish, and packaging of fresh fish and value-added products. It also produces FOF products, but most of them are sold internally. The company has recently established its own Biogas plant in Faroe Islands in a bid to be more circular and has also taken over the native Faroese broodstock program (Bakkafrost, 2020).

3.1 Markets & Segments

3.1.1 Markets

Bakkafrost sells its fish in all major salmon markets, except Japan. Even though the company has farming operations only in the Faroe Islands and Scotland, it does have sales offices in England and the US (Bakkafrost, 2020). Within the US, Bakkafrost has also established a processing facility. Bakkafrost's distribution network includes ship, plane, and land transport – based on where the product is being sent (Bakkafrost, 2020).

Bakkafrost aims to balance between different product segments and geographical markets to diversify market risk (Bakkafrost, 2020). The current markets for Bakkafrost include Eastern Europe (including Russia), Asia (primarily China), Europe, and North America. In 2019, the company sold salmon products to 37 countries, with Western Europe being the dominant market (Bakkafrost, 2020). For the year ended 2020, 67% of the company's sales were in Western Europe and 18% in North America (Bakkafrost, 2021). However, Eastern Europe – primarily Russia – is also one of the major markets for the company, with 8% and 5% of sales being in Eastern Europe in 2019 and 2020, respectively.

3.1.2 Segments

The different segments within the company are discussed below.

Fresh Fish

Selling fresh fish in the open/spot market is Bakkafrost's major source of revenue. Fresh fish is sold as head-on-gutted (also called gutted whole fish). The company's sale of fresh fish has fluctuated in different years due to various biological and market forces. However, overall, the segment has grown in both volume and revenues. The fresh fish from the Faroe Islands are sold on the spot market whereas fresh fish from its Scotland's operations are sold both in the spot market and through long-term contracts (Bakkafrost, 2021). It is worth mentioning here that the Scottish subsidiary of Bakkafrost only sells fresh fish.

Fresh fish has three different quality standards: superior, ordinary and production, based on the author's discussions with an industry expert. However, Bakkafrost does not disclose details about its quality standards; nonetheless, it does disclose that it sells its superior salmon to HoReCa segment (Bakkafrost, 2021, p. 4).

Value Added Products (VAP)

VAP segment involves processing of fish which are then sold as fillets. Unlike fresh fish, value-added products are not sold in the spot market, rather VAP are sold only via long-term contracts (Bakkafrost, 2021). These contracts usually are 6-12 months in the future and their prices are set using forward prices (Bakkafrost, 2021). Given that there is a time lag between spot prices and forward prices, the VAP segment does relatively poorly when spot prices are rising (Bakkafrost, 2017, p. 6).

Bakkafrost's long-term goal is to have between 40% to 50% of its sales via the VAP segment as this allows for minimizing the risk of salmon price fluctuations which is inherent in the spot market.

VAP salmon has three different quality standards: premium, standard, and processing, as per the author's discussion with an industry expert, and Bakkafrost *claims* that its salmon is of premium standard.

Fish Oil & Feed (FOF)

Fishmeal, Oil and Feed segment is primarily meant to supply "food" for the salmon that Bakkafrost harvests. In 2019, 79% of produced feed and 100% of produced oil was used internally (Bakkafrost, 2020). In comparison to 2019, in 2018, Bakkafrost utilized 90% of the produced feed and 95% of the produced oil internally (Bakkafrost, 2019).

FOF operations are conducted at Havsbrun facility in Faroe Islands and the company's production of FOF fluctuates due to raw material availability which is regulated by pelagic fishery quotas in the North Atlantic (Bakkafrost, 2019, p. 34)[6]. Starting from 2022, the company expects almost all FOF sales to be internal.

3.2 Bakkafrost's Value Chain

In chapter 2, production process and value chain of salmon was explained. In this section, Bakkafrost's operations and value chain will be touched upon briefly.

Bakkafrost operates one of the most integrated value chains in the industry. It is pertinent to mention here that Bakkafrost not only owns the factories and facilities necessary to carry out its operations but has recently also established a Biogas plant to be more circular in its operations. The Biogas plant will produce electricity for the national grid of the Faroe Islands and will also produce fertilizers that will be distributed to the farmers of the Faroe Islands (Bakkafrost, 2021). In addition to this, Bakkafrost has taken over the responsibility of Faroese Broodstock Program[7] from the Government (Bakkafrost, 2020); this would allow Bakkafrost to move from external sourcing of salmon eggs to internal production (Bakkafrost, 2020, p. 23). The company is also making investments to significantly increase capacity and quality of its hatcheries both in Scotland and the Faroe Islands.

[6] Pelagic fish are fish that are used to make salmon feed.
[7] "Broodstock, or broodfish, are a group of mature individuals used in aquaculture for breeding purposes" (Wikipedia, 2021, para. 1)

The value chain of Bakkafrost Group is illustrated below in Figure 3, the first row shows its value chain in the Faroe Islands, whereas the second row illustrates the Group's value chain in Scotland (i.e., Scottish Salmon Company).

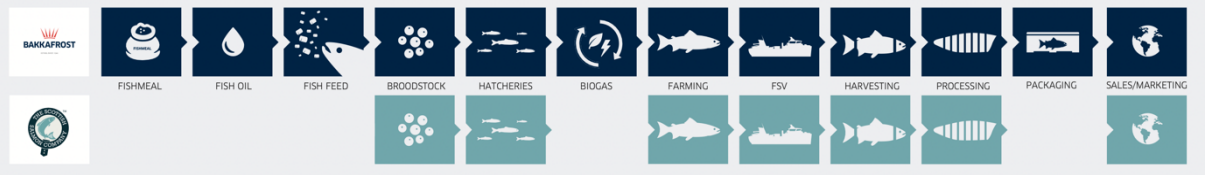

Figure 3: Visual summary of Bakkafrost Group's operations & value chain; Source: (Bakkafrost, 2021, p. 24)

3.3 Future Investments & Capacity Enhancements

Bakkafrost has conducted various acquisitions, both before and after its listing on Oslo Børs. In 2016, Bakkafrost announced a five-year investment plan for the five years ending 2020. The total planned investment was DKK 2,2 billion, including maintenance CAPEX (Bakkafrost, 2017, p. 15). These investments were primarily meant to help Bakkafrost become self-sufficient in smolt production and increase smolt weight to 500 grams. Another major aspect of this investment was to develop a new VAP/harvest factory in Glyvrar (in the Faroe Islands).

In 2018, another investment plan was announced, with the primary aim to increase farming capacity to 100 000 tons annual head on gutted (HOG) in the Faroe Islands. As of now, Bakkafrost aims to achieve smolt production size in the Faroe Islands to 400 grams in 2021 and 500 grams by 2022 (Bakkafrost, 2021, p. 8). The company has also applied for licenses for offshore farming in the Faroe Islands and expects to receive the licenses in 2021 (Bakkafrost, 2021, p. 5). By 2025, the company hopes to achieve its target of 100 000 tons annual HOG in the Faroe Islands, and for capacity increase beyond this, Bakkafrost is looking at offshore farming.

In Scotland, the aim is to invest DKK 350 to 400 M annually for the years 2020 to 2024 (Bakkafrost, 2021, p. 12). A significant portion of this investment is meant to develop three hatcheries in Scotland, one of which is already under construction (at Applecross). These three hatcheries will replace all the current hatcheries that Bakkafrost currently operates in Scotland. The current capacity of hatcheries in Scotland is 8 M smolts with average size of 90 grams (Bakkafrost, 2021, p. 26). The new Applecross hatchery alone will have capacity of 11 M

smolts with average weight of 250 grams and will be operational by 2023 (Bakkafrost, 2021, p. 26). These investments signify that Bakkafrost plans to significantly enhance capacity in Scotland.

All in all, Bakkafrost has made significant capital outlays in the past and significant investments are planned for the foreseeable future. Consequently, the positive benefits of these investments will flow to the company in the future.

3.4 Operational Challenges in Salmon Farming

The major operational challenges in Atlantic salmon farming for Bakkafrost are listed and explained below. It is worth noting here that these are challenges and risks are not limited only to Bakkafrost and other salmon farmers face similar challenges.

- **Fish Health & Parasite**

Salmon is a living being and as such is not immune to diseases. There are numerous diseases that Atlantic salmon can catch or develop. The immediate impact of such diseases is not limited to the loss of fish (Bakkafrost, 2016). Rather, the impact goes further, including increased cost of treatment, decrease in quality and "… subsequent periodic reduced production capacity" (Bakkafrost, 2016, p. 40). Closely tied to fish health is the issue of mortality. The Faroese Islands have had lower mortality than global averages and Bakkafrost aims to have mortality rate of no more than 6% (Bakkafrost, 2021).

However, the primary challenge under the umbrella of fish health, is salmon lice. In fact, salmon lice is considered to be "… the biggest threat to Norwegian fish health…" (EY, 2021, p. 51). Whereas the report by EY focuses only on Norway, sea lice is a problem prevalent in all countries where salmon is farmed. In 2020, Scotland was reported to have "horrendous" levels of sea lice (Hutchison, 2020, para. 1). Similarly, Chile had the highest levels of sea lice in 2020 since 2012 (Mutter, 2020). Presence of lice could lead to more diseases, early harvesting, and punitive actions by the concerned regulatory authorities. Salmon lice lead to direct and indirect costs on the farmers. A paper by Berle and Rim (2018) define direct costs as the costs involved in treating and/or preventing lice and "… the indirect costs as the revenue lost due to reduction in biomass growth" (p. 1). The indirect costs of salmon lice, as per Berle and Rim (2018), varies by geography but is 16,09% and 4,51% of the expected revenues in South Norway and North Norway, respectively, whereas the direct costs are 18,86% and

7,52% of total revenues in South Norway and North Norway, respectively (Berle & Rim, 2018). The variation in costs is due to differences in farm densities, temperature, and farm sizes (Berle & Rim, 2018). Given the magnitude of costs, it can be seen that salmon lice pose a major threat to salmon farming.

The regulatory authorities, particularly in the EU, Norway and the Faroe Islands closely monitor sea lice levels. Sea lice levels beyond certain levels could result in the regulators reducing the allowed biomass in any given area (for instance, Norway has developed a traffic-light system which determines whether production can be increased or can stay constant or must be decreased based on sea lice levels)[8]. Therefore, sea lice are the single largest health challenge to all salmon farmers.

- **Environment & Climate**

Given that salmon is strongly dependent on its environment, the need for stable and favourable environmental conditions cannot be stressed upon enough. The environmental challenges impact all major KPIs including "… mortality, growth, yield per smolt … feed conversion ratio, cost of … treatment and required fallowing time between generations for sites …" (Bakkafrost, 2021, p. 67). Hence, stable, and conducive environment is necessary for salmon growth and health and hence, climate change poses a challenge.

- **Escapes**

Escape of fish from their cages can lead to several problems and challenges.

The loss of fish will cause immediate financial loss. However, for Bakkafrost this is expected to be limited since its farming sites are geographically diversified and hence, loss from any single site will cause limited direct financial loss. Greater than the direct financial losses, the major problem of fish escapes stems from the fact that it can lead to spreading of diseases and inbreeding with wild salmon, which will have negative impact on wild salmon (which could ultimately lead to public opposition to salmon farming). Moreover, because of the escapes, the company might be reprimanded by the government and the public (Bakkafrost, 2020, p. 64).

Thus, fish escapes is a significant problem because it can result not only in financial losses and financial penalties but can also fuel anti-salmon farming sentiment in society.

[8] Details covered (and sources given) in PESTEL analysis.

- **Fish Feed**

Bakkafrost is self-sufficient in feed production (Bakkafrost, 2021). Fish feed costs are perhaps the single largest cost in salmon farming. Fish feed are also responsible for 95% of carbon footprint and emissions in salmon farming (EY, 2021, p. 52). The major challenges in FOF (Fish Oil & Feed) segment stem from the fact that fish feed requires pelagic fish as raw material and the supply of raw material can experience "… shortfalls … due to limited catch volumes …" (Bakkafrost, 2021, p. 68), which would translate to lower feed production and can force Bakkafrost to source the feed externally and can even adversely impact fish harvest. Even though all salmon farmers are exposed to similar risks, the risk of FOF raw materials being unavailable is mitigated for farmers who purchase feed externally because the "… risk is normally mitigated contractually through replacement obligations from third party" (Bakkafrost, 2021, p. 68).

3.5 Governance & Shareholding

A study by Matsunaga and Park (2001) finds that CEOs are penalized in their bonuses if they miss quarterly expectations or if performance for any quarter is less than the performance for the same quarter in the previous year (Matsunaga & Park, 2001). This *could* create agency problems where CEOs want to focus on short-term profitability rather than long-term profitability and sustainability.

Bakkafrost was initially established as a family business and even today, the family that established Bakkafrost has significant shareholdings in the company. The CEO, Johan Regin Jacobsen, belongs to the founding family and has been at the helm since 1989. He currently holds 7,80% of the outstanding shares (Bakkafrost, n.d.-c). His mother, Oddvør Marita Jacobsen holds 7,77% of the outstanding shares (Bakkafrost, n.d.-c). The single largest shareholder is "Folketrygfondet" with stake of 9,09%, and all other major shareholders have an ownership stake that is significantly less than the CEO's stake of 7,80% (Bakkafrost, n.d.-c). A strong internal shareholding *could* help Bakkafrost reduce agency problems and follow policies which are in the long-term interests of the company, rather than focusing on quarterly earnings.

3.6 Chapter Summary

This chapter has summarized Bakkafrost and its operations. The company operates 3 segments: Fresh Fish, Value Added Products, and Fish Oil & Feed. The largest market for Bakkafrost is the EU, followed by North America and Eastern Europe (including Russia). Japan, despite being a major importer of salmon globally, is not a major market of Bakkafrost. The company has consolidated its operations vertically over the years and the primary operational challenge identified is sea lice. Moreover, Bakkafrost has made significant investments in recent years and the returns are expected in the near future. Furthermore, Bakkafrost has a strong internal shareholding which *could* help the company have a long term view rather than focusing on quarterly benchmarks.

In the following chapter, strategic analysis of Bakkafrost and the salmon farming industry has been conducted, and the information introduced in chapters 2 and 3 help understand the strategic analysis better.

4. Strategic Analysis

The strategic analysis below is meant to explore the industry structure, macro-level factors impacting the industry, and Bakkafrost's position in the industry. Strategic analysis helps provide a comprehensive understanding of the industry and the company. It is important to understand the strategic environment within and without the company to better understand the business environment a company operates in, since no company operates in isolation and is influenced by both internal and external factors. Moreover, the understanding derived by the strategic analysis will form an integral part of the financial forecasting. Schill (2016) recommends "grounding business forecasts in the reality of the industry and the macroenvironment" (p. 5). He particularly recommends using Porter's 5 Forces to look at the micro-economic and industry-level forces (p. 5). Foley and Khavkin (2019) state that "… a great forecast reflects the firm's industry context" (p. 3) and accounts for the competitive forces that any firm faces (Foley & Khavkin, 2019).

Strategic analysis has been divided into different sections. Firstly, the forces shaping salmon farming industry are analysed using Porter's 5 Forces Framework – this analysis helps the reader understand the structure and profitability of the industry. Afterwards, macro-environment factors relevant to the salmon farming industry are analysed using PESTEL framework, this helps the reader understand whether salmon farming is well suited to the greater macro trends or not. Thereafter, Bakkafrost's key internal resources are analysed to see whether it enjoys competitive advantage, both in the short and long run, this helps understand whether Bakkafrost has the resources required to develop a competitive advantage. Lastly, the Strategic Analysis is synthesized using SWOT framework – SWOT analysis essentially brings the entire strategic analysis under one single umbrella. A brief introduction of each of these frameworks has been provided at the start of each section.

4.1 Industry Analysis

The common method to conduct strategic analysis is to first analyse the macro-environment, followed by industry analysis and finally conduct an internal resource analysis. However, due to less known nature of the salmon farming industry, the author believes that it is better to conduct industry analysis before macro analysis, as it would allow the reader to form comprehensive understanding of the industry. To do so, Porter's 5 Forces framework has been

used. It is essential to conduct an industry-level analysis because it allows one to understand the competitive pressures that an organization faces.

4.1.1 Porter's 5 Forces

In 1979, Michael Porter published what could perhaps be termed his most influential paper titled "How Competitive Forces Shape Strategy". Porter argued that there are 5 forces that form the structure of an industry and "… determine the profitability of an industry …" (Porter, 2008, p. 3). The structure of the industry will impact the attractiveness of the industry from profitability point of view. Porter argued that competitive forces in an industry are not only shaped by the incumbents, but players external to the industry – including substitutes, suppliers, and potential entrants – directly shape the profit potential of any given industry (1979). Porter argues these forces determine who will capture what amount of the value generated by the industry, and further argues that these forces explain why industries have different average returns in the long run (Porter, 2007). The forces shaping any industry are shown in the Figure 4 below (recreated by the author).

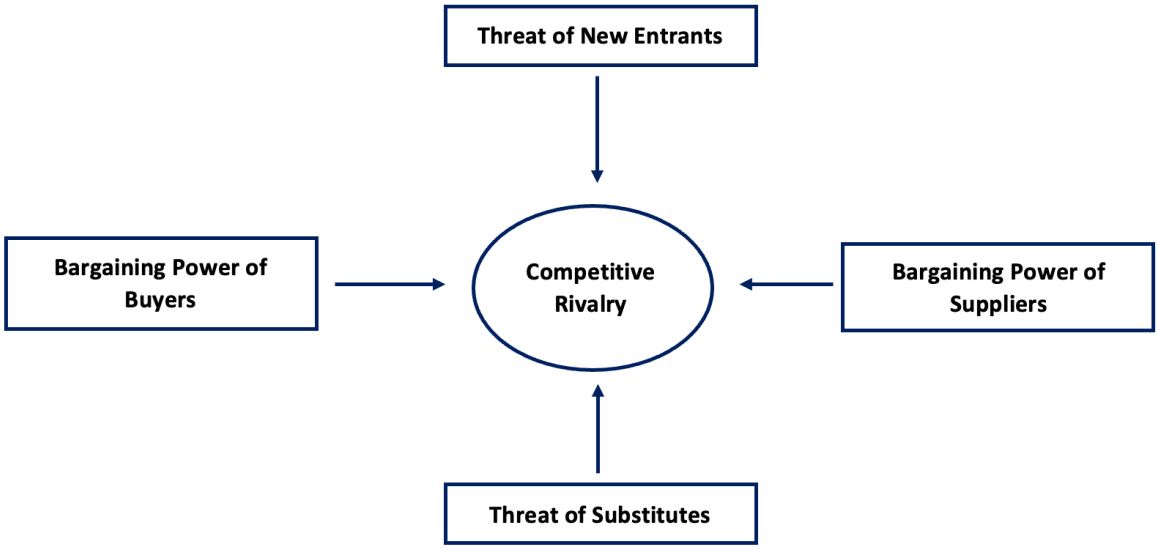

Figure 4: Illustration of Porter's 5-Forces; Source: (Porter, 2008, p. 4)

The 5 Forces Analysis below is conducted while keeping the major salmon farming companies listed on the Oslo Stock Exchange as players since these players are relevant for Bakkafrost. These players are: Bakkafrost, SalMar, Mowi, Lerøy, Greig, and Norway Royal Salmon.

5 Forces: Supplier Power

Porter (2007) argues that if suppliers have sufficient power, they can influence the industry players and capture more value than they would have been able to if they did not have significant bargaining power vis-à-vis the industry players. Porter further explains the industry characteristics which could lead to suppliers attaining relatively more power than the industry players, however, the discussion below will be restricted to the relevant dimensions for the salmon farming industry.

The suppliers of the salmon farming industry can be subdivided into different categories. However, for the purposes of this analysis, the subdivision will be into two categories, in what the EY calls "technical solutions suppliers" and "biotechnology suppliers" (EY, 2020, p. 26).

The technical solutions providers supply the solutions, services, and equipment necessary for operations of salmon farming companies, e.g., cages, vessels, software, sensors, etc (EY, 2020). EY's (2020) report states that even though the segment has witnessed increased M&A activity since 2016, it remains fragmented (EY, 2020). The solutions providers are also unlikely to integrate forward due to the differences in nature of business activities (EY, 2020). Therefore, technical solution providers have lower bargaining power relative to the industry players. However, what strengthens the hand of solutions providers is that with regards to some of the systems, the salmon farmers might have to incur switching costs because of retraining of employees (Marketline, 2020).

Another group of major suppliers is the providers of biotechnology (EY, 2020). This segment includes the feed providers and providers of pharmaceutical products (EY, 2020). The feed subsegment is concentrated (EY, 2020). The feed represents almost 50% of the total production costs (EY, 2020, p. 42). Mowi states that fish feed is "… approximately 40%..." of their "… cost in box per kg in 2020" (Mowi, 2021, p. 267)[9]. The fact that most of the feed contracts are cost plus (Mowi ASA, 2020), only strengthens the position of feed suppliers. However, in recent years, all major fish farming companies have integrated backwards in a bid to reduce the power of feed suppliers and achieve synergies. In the 5 years ending 2019,

[9] It is worth mentioning here that as per the author's discussion with an industry expert, feed accounts for 30% of the production costs. Keeping the industry expert's opinion in view along with the report by EY (50% of production.costs) and Mowi's report (40% of production costs), the author believes that the feed costs lie between 30% to 50% of total production costs and could vary depending on different factors, including the content of the feed.

the leading 4 companies generated 80% to 90% of the revenues in this subsegment (EY, 2020, p. 42). What is interesting to note, however, is that in 2018, 2 of the 4 leading companies were subsidiaries of SalMar ASA and Mowi ASA (EY, 2020, p. 42). Apart from feed providers, the other subsegment within the biotechnology providers is of suppliers of pharmaceutical products. However, the products offered by these companies are only marginally differentiated which reduces their bargaining position (Marketline, 2020). It is unlikely that aquaculture drug providers will integrate forwards, given the significant differences in salmon farming and pharmaceutical production.

Overall, the author would classify supplier power as moderate, however, it is likely to weaken in the future as more and more salmon farmers become self-sufficient in fish feed.

5 Forces: Buyer Power

Like the suppliers, buyers can influence the industry players and force them to act in a manner which is in favour of the buyers. They can do so by demanding lower prices, higher quality or even playing "… competitors off against each other …" (2007, p. 5). Porter further explains several industry characteristics which could lead to high buyer power; however, the discussion below will be restricted to the relevant dimensions for the salmon farming industry.

Buyers of fresh and value-added salmon consist of wholesalers, retailers, food processors, supermarkets, and hypermarkets (Marketline, 2020). This means there are many buyers of various sizes and hence, it is unlikely that any single buyer can influence the market.

However, since salmon is considered a homogenous product, the buyers face low-switching costs which increases the bargaining power of the buyers (Marketline, 2020).

Moreover, salmon is a perishable item. Therefore, with regards to the fresh salmon, salmon farming companies are primarily price-takers because they need to clear their inventory of fresh salmon on a regular (if not daily) basis due to its perishable nature. Within the value-added category, however, the salmon is sold via long-term contracts (Bakkafrost, 2020). Whereas this does provide certainty of revenues to the incumbents, it also means that certain large buyers can carry significant power and hence, force the incumbents to drive their prices down. This is particularly true for Bakkafrost which sold 55% of its VAP to one single customer in 2019 (Bakkafrost, 2020).

Most of the above factors lead to high buyer power. However, what brings down the power of buyers is that they are very unlikely to be able to vertically integrate backwards and produce salmon themselves. This makes them "… dependent on players" (Marketline, 2020, p. 18). Furthermore, the demand of salmon is expected to increase by 8% between 2021-2025, and supply is expected to grow only by 5% during the same period; this would further weaken the power of buyers.

Overall, the power of buyers is assessed to be moderate.

5 Forces: Threat of New Entrants

Porter argues that with new entrants, comes additional capacity in the industry (2007). If the industry is sufficiently attractive, new players will enter and try to gain market share, as a result of which, long-term profitability of the industry will suffer. Therefore, threat of new entrants limits the profit potential of any industry (2007). Porter argues that this threat can be assessed on two dimensions: barriers to entry and on the potential reaction from the incumbents towards the new entrant (2007). Porter further identifies the major barriers to entry; however, the discussion below will be restricted to the relevant barriers for the salmon farming industry.

Salmon farming industry has grown considerably over the years and the high P/E ratios of almost all salmon farming companies listed on the Oslo Stock Exchange indicate that the industry is expected to grow. The industry has outperformed Oslo Benchmark Index. All in all, the industry could be deemed attractive for new players. The fact that the final product is essentially homogenous coupled with the availability of multiple suppliers and buyers available to any new entrant only makes the industry easier to enter (Marketline, 2020).

However, there are multiple factors that could discourage new entrants. Firstly, the salmon farming industry has high CAPEX & OPEX requirements. The production cycle is roughly 3-year long, which means that a high amount of investment will be tied in working capital. Moreover, salmon farming requires expensive specialized equipment, including ships, cages, and trained employees. All of this translates to high fixed costs and the need for economies of scale to be able to sustain operations. However, it must be noted that high CAPEX & OPEX requirements themselves do not promise that new entrants would not enter the market, since in efficient markets, capital can be raised for a business with positive NPV. Moreover, all leading salmon companies in Norway are heavily vertically integrated and as such, not only

enjoy cost synergies that come with integration but also quality control. Any new entrant (based on green field investment) will have to develop the entire value chain, which could be a challenging endeavour. Without developing a new value chain, the new entrant will be at a disadvantage as compared to the incumbents. Moreover, a new entrant might not have the same level of efficiencies as the incumbents because it might have to go through the learning curve.

Apart from the barriers to entry identified above, the single most important factor limiting entry of new players is the licensing regime in each jurisdiction. The licenses which allow for farming of salmon are limited, expensive and governed by stringent environmental and health laws[10]. Furthermore, the fact that salmon requires very specific temperatures to be able to grow limits the areas where salmon production can take place. In recent years, however, there has been a growing interest in in-land farming, though its potential remains to be demonstrated. An equity research report by Handelsbanken's Capital Market's division recommends BUY on all salmon farming companies within its coverage[11] citing "… low supply growth and strong demand" (Lye, 2017, p. 2); the low supply growth is inevitably a cause of limited licenses, and Handelsbanken's recommendation shows how limited licenses work in favour of incumbents.

Overall, the barriers to entry in the salmon farming industry are high, which consequently mean that threat of new entrants is low.

5 Forces: Threat of Substitutes

By definition, a substitute is a product that can replace another product by virtue of providing similar function. Porter argues that "substitutes are easy to overlook because they may look very different from the industry's product" (2007, p. 6), but can limit profitability of an industry "by placing a ceiling on prices it can charge" (1979, subsection: "substitute products"). Porter argues that, once substitutes have been identified, it is important to understand their "… price-performance …" position vis-à-vis the industry's products (1979, subsection: "substitute products").

[10] Licenses and regulations are discussed in detail in the PESTEL section.
[11] The companies are: Bakkafrost, MHG (now called: Mowi), SalMar, Greig Seafood, Lerøy Seafood and Norway Royal Salmon – these are the same companies the author eventually uses for comparable valuation in chapter 11.

Farmed Atlantic salmon primarily serves the function of providing animal meat and protein. Therefore, other sources of animal meat and protein can be considered substitutes to farmed salmon. The three major dimensions on which salmon can be compared to its substitutes are price, quality (health benefits), and environmental impact.

With regards to price, salmon is relatively more expensive than other meat proteins (Mowi ASA, 2020). In terms of quality, salmon is well-known for its health benefits and its superiority to other animal meat needs no explanation. Moreover, the salmon from the Faroe Islands is raised without use of any antibiotics which only adds to their attractiveness from a health/quality point of view.

On the environmental front, salmon outperforms other meat proteins as well. The single most common method to understand the environmental impact of any product is by quantifying its CO_2e emissions. Farmed salmon has CO_2e emissions of 7.9 kg per kg of edible product (Mowi ASA, 2020, p. 32). In comparison, beef and pork stand at 39 kg and 12.2 kg of CO_2e emissions per kg of edible product, respectively (Mowi ASA, 2020). However, poultry has CO_2e emissions per kg of edible product of 6.2 kg, almost 20% less than salmon (Mowi ASA, 2020). Figure 5 below shows CO_2e emissions of different meats.

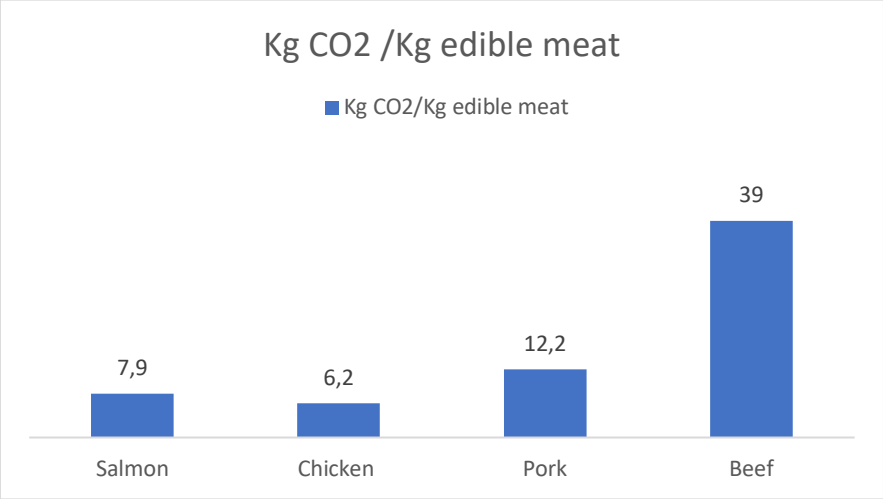

Figure 5: Representation of CO_2 produced per kg of edible meat by different meats; Data Source: (Mowi ASA, 2020, p. 32).

In terms of water usage, salmon significantly outperforms all other major sources of animal proteins, as shown in Figure 6 below. Hence, from an environmental and sustainability point of view, salmon outperforms all other meat proteins by a significant margin.

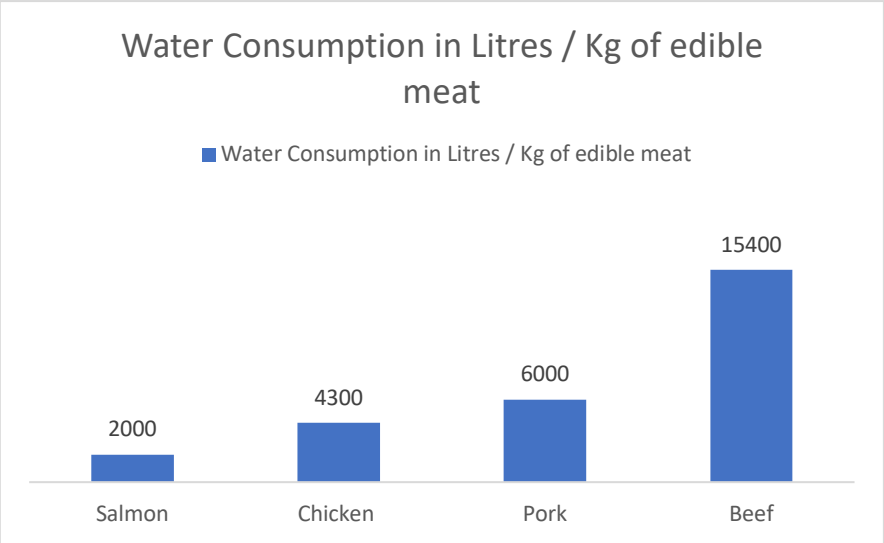

Figure 6: Representation of water consumption per kg of edible meat by different meats; Data Source: (Mowi ASA, 2020, p. 22).

Overall, the threat from substitutes is regarded as moderate. The threat would have been regarded as low had it not been for the fact that salmon is relatively pricier than other meat proteins.

5 Forces: Rivalry

Rivalry in an industry determines its profitability potential to a great extent. However, what is crucial with concept of rivalry is the basis on which it is done. The rivalry in an industry could be on multiple dimensions but is broadly in the form of price and performance. Porter (2008) states: “rivalry is especially destructive to profitability if it gravitates solely to price because price competition transfers profits directly from an industry to its customers” (2008, p. 9). Porter further provides the industry characteristics which determine the intensity of rivalry; however, the discussion below will be restricted to the relevant characteristics for the salmon farming industry.

The players in the salmon farming industry are large groups, most of which are vertically integrated. They are unable to scale their output immediately due to long production cycles and at any given time, it is possible that they might have to fight for the market in case the demand falls. Given the specialized equipment, the players might find it difficult to exit the

market in case of dwindling returns. Furthermore, salmon is regarded as a homogenous product and the buyers can switch from one player to another without any cost. All these factors contribute towards high rivalry.

Nonetheless, the supply growth in the market is decelerating, with 4% supply growth expected in the coming years (Mowi, 2021a). The demand has increased over the years and the decelerating growth in supply is because of limited licenses, not because the demand is falling; in fact, between 2021-2025, demand is expected to rise by twice the supply (Mowi, 2021a) – this would ease competitive pressures. Moreover, the Chilean industry has historically used antibiotics and therefore, the US buyers have recently turned towards Norway for salmon, this has further eased the competitive pressures in the Norwegian market (Marketline, 2020). It would not be wrong to presume that the Faroese and Scottish farmers must have benefitted from the Chilean use of antibiotics as well.

Overall, the degree of rivalry amongst the incumbents is classified as moderate.

4.1.2 Summary of the Industry Analysis

The salmon farming industry is dominated by a few large players, is highly integrated and is pushing the boundaries of efficiency. The socio-economic indicators point towards a growing demand for salmonoids. The industry requires specialized equipment, licenses, and has high CAPEX and OPEX requirements.

Based on the forces identified in the 5 Forces Analysis, the threat of new entrants is regarded as low, because of high barriers to entry. Supplier and buyer powers are regarded as moderate because both these groups are unlikely to vertically integrate (forward and backwards, respectively) and hence, are dependent on players. Moreover, with rising populations and salmon supply constraints posed by limitations of licenses, it is likely that buyer power will further erode in the future. As more and more salmon farmers develop in-house fish feed production capacities, supplier power will also weaken. The threat of substitutes is also regarded as moderate because salmon is more expensive than other meat products (even though salmon outperforms them on quality-environmental impact matrix). All in all, the industry is considered attractive for incumbents and has moderate rivalry.

4.2 Macro Environment's Analysis

No industry is immune to the macro-level opportunities, threats, and trends. The macro-level factors always have significant impact on any given industry and business, and in extreme cases, could lead to complete closures of industries; for instance, the Paris Climate Agreement has put certain business models in jeopardy, e.g., coal-fired power plants are being shut down in many countries. Hence, it is essential to keep an eye on macro environment.

4.2.1 PESTEL Analysis

The most common tool for analysis of macro-level factors for any industry is the PESTEL framework. PESTEL "… framework categorises environmental influences into six main types: political, economic, social, technological, environmental and legal" (Johnson et al., 2009, p. 25). PESTEL allows analysis of the company's macro environment (Johnson et al., 2009, p. 26).

The following analysis has been conducted while keeping salmon companies in Scotland, Norway, and the Faroe Islands as players.

Below, each of the PESTEL factors is discussed in detail.

PESTEL: Political

Salmon companies based in Norway, the Faroe Islands and Scotland are governed by strict governmental regulations and export most of their output. The largest importer of salmon globally is the EU, which imported more than 43% of the global salmon imports in 2019 (FAO, 2020c). Apart from the EU, the major salmon markets are Japan, Russia, China, and the US. Since most of global salmon production is exported, the major political challenge that the industry faces are global trade barriers and supply chain disruptions due to political, security and diplomatic reasons. Apart from diplomatic issues which can cause disruptions on the "demand side", social and political opposition to salmon farming in countries of production could lead to disruptions on the "supply side". Both demand and supply side political challenges are discussed below.

- **Political: Social & Political Acceptance**

Earlier this year, Canada announced that it would phase-out salmon farming in the Discovery Islands of British Columbia (Forrest, 2021; Larsen, 2020; Connelly, n.d.). The fish farming

operations in the Discovery Islands are to be disbanded by end-of-June 2022, and in the meantime, addition of new fish in these farms is not permitted (Forrest, 2021; Larsen, 2020; Connelly, n.d.). The decision has been made keeping in view the threats that mixing of farmed salmon with wild fish pose, which, according to the critics, leads "… to the collapse of wild Fraser River salmon stocks…" (Larsen, 2020, para. 7), and the decision has been strongly influenced by the First Nations who remain opposed to the fish farming in their waters because it impacts wild salmon (Larsen, 2020).

The fact that the First Nations were able to convince the Canadian Government to phase-out the fish farms raises concerns that similar social action against fish farming could be witnessed in the Faroe Islands, Norway, and Scotland. However, the author believes that actions similar to the one in British Columbia are unlikely to happen in the 3-countries of interest, and the reasons are explained below.

Jennifer Bailey from NTNU Trondheim and Sigrid Eggereide from Sentio Research Trondheim have recently studied the social acceptance of salmon farming in Norway and find that "… there does not seem to be enough explicit and concentrated opposition to threaten the industry's social acceptance…" (Bailey & Eggereide, 2020, p. 14). Moreover, the Norwegian Government intends to increase Norway's salmon and trout production to 5 million by 2050, which is roughly a 5 times higher volume than the 2017's output of 1,2M (PwC, 2017, p.24). Such a huge increase in salmon production over the next 3 decades signifies that the Norwegian Government does not expect fish farms to be shut down in Norway. Moreover, in Norway aquaculture is often "… presented… in the national… interests…" (Bailey & Eggereide, 2020, p. 3). Hence, the author is of the view that it is unlikely that salmon farming industry would be rolled down in Norway, or that social acceptance of salmon farming in Norway would face similar challenges as those faced by the industry in Canada. Nonetheless, farmed salmon has had an adverse impact on the livelihoods of Sami people in Norway (Pedersen, 2012). Sami people have traditionally engaged in catching wild salmon for income; however, the money Sami farmers receive for their wild catch has not caught up with inflation. Pedersen (2012) states that the Sami farmer in 2011 was paid, in real terms, $1/7^{th}$ of the money that the farmer received in 1970. Moreover, as per the "Norwegian Scientific Council for Salmon Management", fish escapes and salmon lice from fish farms continue to be the "…two out of six of the most serious threats to the existence of wild salmon" (as cited in Pedersen, 2012, p. 55). Hence, the possibilities of Sami communities protesting and resisting salmon farming industry cannot be ignored. However, the author does not view the risks to be

significant enough to threaten the entire Norwegian salmon farming industry, given the importance of salmon farming to Norway's economy and the Norwegian Government's long-term plans to increase salmon output by almost 500% in next 30 years.

Academic papers on the social acceptance of fish farming in the Faroe Islands are hard to find. However, the author hypothesizes that this is perhaps because of the overwhelming acceptance of fish farming in the Faroe Islands. Roughly 15% of the labour force in the Faroe Islands is employed in the fishing industry and between 90% to 95% of the country's exports are related to aquaculture (Economy of the Faroe Islands, n.d.), with around 50% of the exports value being of "… farmed fish" (Faroese Seafood, n.d.-b, subsection: "A key player on the international market"). An official website of the Faroe Islands calls the Faroe Islands a "… proud fisheries nation…" (Faroese Seafood, n.d.-b, para. 2). For a country with such a strong tradition and dependence on aquaculture, it is unlikely to imagine that salmon farming in the Faroe Islands would be rolled back like in Canada.

Unlike Norway and the Faroe Islands, the economy of Scotland is not heavily dependent on aquaculture. Nonetheless, salmon is the UK's largest food export (Edwards, 2021) and is "… said to be worth more than £1bn…" annually to the UK's economy (Adams, 2019, para. 3). Moreover, in the last decade, salmon companies in the Scotland have been given £20m in grants (Edwards, 2021), which shows the Government's willingness to develop this sector. Nonetheless, there have been voices against public funding to salmon farming industry and critics have argued that the salmon farming practices being used in Scotland are not environmentally friendly (Edwards, 2021). However, the pressure seems to be to force the salmon companies in Scotland to be more sustainable and environmentally friendly, rather than shut down the operations in entirety. Moreover, Scotland does not have indigenous peoples like Norway and Canada. Keeping the above in view, it is deduced by the author that salmon farming in Scotland would not have the same social challenges as it did in Canada. Nonetheless, the political and social acceptance of salmon farming in Scotland does seem to be less than its acceptance in Norway and the Faroe Islands.

- **Political: Diplomatic Upheavals & Trade Barriers**

The EU is the major export partner of salmon farming companies in the Faroe Islands, Norway and Scotland. Apart from the EU, other major salmon buying countries include the US, Japan, Russia and China. It is noteworthy here that Norway/Faroe Islands/Scotland have reasonably good relationship with all the major salmon importers, except for Russia & China.

Hence, the challenge with regards to the diplomatic relations is in the Russian and the Chinese markets. In 2010, a critic of the Chinese Government, Liu Xiaobo, was awarded Nobel Peace Prize by the Oslo-based Centre for Nobel Peace Prize. This strained relations between Beijing and Oslo, and it took 6 years for relations to improve (Reuters, 2016). In 2010, Norway's market share of imported salmon in China was 92%, by first half of 2011 it had fallen to 29% (Milne, 2013), because of the strained relations. At the same time, the market share of the salmon exporters from the Faroe Islands and the UK increased significantly (Milne, 2013). This shows the impact deterioration of foreign relations has on salmon exports.

With regards to the Russian market, the EU has had thorny relationship with Russia in recent years. In 2014, the Russian Military annexed Crimea. As a result, the EU introduced sanctions against the Russian government. In retaliation, Russia imposed sanctions on the EU and its closest allies, including Norway. Consequently, the export of salmon from Norway and the UK to Russia stalled and fish farmers from the Faroe Islands filled in the gap (Moore, 2018). However, Russia has intermittently banned imports of salmon from the Faroe Islands on two occasions, once in 2018 (Witzøe, 2018) and then again in 2020 (McDonagh, 2020a) citing product safety reasons.

To sum up, all producers in the Faroe Islands, Scotland and Norway face negligible political and diplomatic risks in their EU markets. However, the producers from these countries face different level of risks in Russian and Chinese markets. In case the EU's (or NATO's) relations with China/Russia deteriorates, producers from non-EU/non-NATO countries, for example Bakkafrost (from the Faroe Islands) will benefit, as has been seen in the last decade.

- **Political: Brexit**

A major threat to stable political conditions in the salmon markets is Brexit. The UK has exited the EU in December 2020, and because of that, Scottish salmon farmers suffered losses of 11M pounds in the first 2 months of 2021, largely due to confusion regarding paperwork (Scottish Salmon, 2021a). However, as everyone gets accustomed to the new rules, the challenges will reduce. In fact, in the first quarter of 2021, salmon exports to the EU from Scotland increased by 74% (in tonnes) as compared to the same quarter in 2020 (Scottish Salmon, 2021b), which could be an indication that the initial paperwork related problems caused by Brexit have now been overcome. Given the general friendliness between the UK and the EU, the author does not expect further adverse diplomatic fallout of Brexit, at least not to the extent which could lead to trade sanctions and barriers.

PESTEL: Economic

Several economic challenges and opportunities directly relevant to salmon farming companies are discussed below.

- **Economic: COVID-19**

2020 was an unprecedented year, and the global economy contracted by 3,3% in terms of real GDP (IMF, n.d.). IMF and World Bank both have expressed optimism about economic recovery and as of late January 2021, IMF expected the GDP growth in 2022 to be 4.1% globally (Amaro, 2021). For the Euro zone, the IMF does not expect the economy to reach 2019 levels until at least the end of 2022 (Amaro, 2021). However, it must be kept in mind that despite the increasing availability of Covid-19 vaccinations, any prediction about how the pandemic situation will develop remains rooted in assumptions regarding efficacy of vaccines against the new variants of the virus.

A major economic impact of the corona pandemic has been frequent lockdowns, curfews and ban on in-door gatherings. The current state of measures against the virus differs from jurisdiction to jurisdiction, however, much of the Europe remains locked down as of this writing (BBC News, 2021b). As a result of the lockdowns, salmon farming companies have suffered as demand in the HoReCa segment has dwindled (Bakkafrost, 2020). However, demand in the retail segment has remained strong throughout the corona crises (Bakkafrost, 2020).

The Covid-19 pandemic has also disrupted the supply chains. As a result of disruptions, the cost of freight increased as much as three times (Bakkafrost, 2020). In the long-run, however, Covid-19 will inevitably be defeated.

- **Economic: Low Interest Rates**

Most of the major economies in the world are experiencing low interest/discount rates since several years now. In fact, since the recession of 2008, the global interest rates have been at historic lows (Chen & Estevez, 2020). Interest/discount rates, as set by the central banks, are the primarily tools of the central banks to set the monetary policy in any jurisdiction (Gerdes, 2017). Other than the interest rates, central banks influence monetary policy via open market operations, reserve ratio requirements and interest on bank reserves (Gerdes, 2017). To avoid confusion between interest rates set by the central bank for borrowings and the interest rate that the central bank pays to commercial banks on its reserves, the author will use the term "policy rate" to refer to interest rates set by the central bank for borrowings as this "policy" rate has ripple effect throughout the economy.

By setting low policy rate, the central bank makes borrowing more attractive (FocusEconomics, n.d.). In the Euro Zone and the US, the policy rates have been at historic lows in recent years. De Nederlandsche Bank expects the policy rates in the Euro Zone to remain low for foreseeable future (De Nederlandsche Bank, n.d.).

As a result of low policy rates, the investments have become cheaper, and this allows salmon farming companies to take on more debt at low rates and incur CAPEX. Moreover, low interest rates not only allow for investments in the salmon industry but also tends to stimulate the economy, which in turn, would mean that the economy and people's incomes would grow – this is particularly important for salmon industry because salmon is relatively more expensive than other types of meat.

- **Economic: Reducing Poverty, Rising Incomes & Economic Growth**

Earlier in 2021, China's President Xi Jinping announced that China has successfully pulled almost 100 million people out of extreme poverty (BBC News, 2021). Whereas economic experts do question China's definition of extreme poverty, it is nonetheless true that China has been able to achieve an unprecedented economic feat. Furthermore, even though China's success is unparalleled, other countries have been able to achieve different levels of success in increasing incomes of their citizens and pulling them out of poverty. In 1990, 25% of the world's population lived in extreme poverty, by 2018 the number had been brought down to 11% (Woetzel et al., 2020). As of 2018, nearly half of those living in extreme poverty lived in just five countries of the sub-Saharan African (World Bank, n.d.).

Moreover, a high economic growth can be seen in the emerging economies. As per a report by Bain & Company, India has enjoyed a steady 7,5% annual GDP growth for the 13 years prior to the Covid-19 pandemic and had there been no Covid-19 pandemic (and GDP growth had continued at 7,5% annual rate), by 2030 1 in every 2 households in India would have belonged to high and upper-middle class, as compared to 1 in every 4 in 2018 (Ojha & Sridharan, 2019). Bain & Company also expected the consumption in the Indian market to quadruple between 2018-2030, from $1.5 trillion to $5.7-6 trillion, making India the 3rd largest consumer market in the world (Bain & Company, 2019). Whereas it is true that the crises and recession brought by the corona pandemic did force a decline in GDP growth, the numbers nonetheless show the potential of the emerging economies. Similar trends can be seen in other emerging economies as well.

However, increase in GDP, rise in incomes and reduction in poverty does not mean that the growth in income is distributed evenly. Income inequality remains high in emerging economies. In fact, OECD finds that income inequality in the most unequal OECD countries is still lower than income inequality in emerging markets (Balestra et al., 2018). There are multiple ways to measure income inequality. The three most popular measures are Kuznet's ratio, Gini coefficient, and Lorenz curve. The most common measure is the Gini coefficient, it measures the wealth distribution on a scale of 0-100%, with 100% being the highest level of income inequality (Investopedia, 2020). The Gini coefficient in Norway in 2019 was 29.22% (Statista, 2021a), while it was 46.5% in China (CEIC, 2020), 35.9% in India (Statista, 2021b), and 48% in the US (US Census Bureau, 2020) for the same period – hence, income inequality varies significantly amongst countries.

Whereas a high-income inequality, as measured by the Gini coefficient, does mean that not everyone is benefitting equally from growing prosperity. The fact, however, remains that emerging markets have a faster rate of GDP (and population) growth as opposed to the developed markets. Altogether, rising incomes, reducing poverty and economic growth provide an opportunity for growth for salmon farming companies. Since salmon is relatively more expensive than other meat proteins, higher incomes (both in developed and developing economies) could mean that people might be more willing to choose salmon rather than relatively cheaper meat proteins.

PESTEL: Social

The salmon farming industry is well positioned to benefit from societal changes. Increasing and aging population that is conscious about sustainability and health offer growth opportunities. Relevant and specific social trends are discussed below.

- **Social: Demographic & Health Trends**

The United Nations expects the world's population to grow by 2 billion in the next 30 years (UN DESA, 2019). However, most of the growth is expected in the emerging markets, including South Asia & Africa, whereas Europe and North America are expected to grow by 2% between 2019-2050 (UN DESA, 2019). The increase in population translates into increase in demand for food. Given that wild catch is dwindling and that other sources of meat are excessively unsustainable due to their high CO_2e emissions and water usage, the farmed fishing industry is well positioned to fill in the increased demand for food. Moreover, the emerging economies not only have the fastest growth in population, but these economies also have a rising middle-class (Mowi, 2020). This combination means that people in the emerging countries could be the next growth market for salmon farmers.

Moreover, the world's population, particularly in the developed countries, is ageing. World Health Organization predicts that the percentage of people over the age of 60 will increase from 12% of the global population in 2015 to 22% by 2050 (WHO, 2018). Moreover, the fact that salmon is recommended to counter risks of cardiovascular diseases, Alzheimer's, arthritis, and dementia (WebMD, 2019), could lead to increase in salmon demand. However, warns Chand and Tung (2014), this could also mean that the labour markets would get less efficient with time[12] (which could mean lower consumer spending power) and labour shortages could occur (Chand & Tung, 2014). Moreover, an ageing population could also result in "poverty among the elderly" as they tend to not work full-time (Chand & Tung, 2014, p. 411). However, despite the challenges that an aging population poses, business executives continue to see an aging population as an opportunity rather than as a problem (Chand & Tung, 2014). The fact that salmon is healthy and helps against certain diseases also fits well with an ageing population.

[12] With age, the efficiency declines.

- **Social: Sustainability Conscious Consumers**

There is a growing trend amongst consumers to choose products which have been produced in an environmentally friendly and sustainable way. A research by PwC (2019) found that 35% people globally prioritize products based on whether they are environmentally friendly or not (PwC, 2019). This trend of sustainability is not limited to consumer markets, rather financial institutions are following the trend as well by funding sustainable projects and companies (Fleming, 2020). Salmon farming is perhaps the most sustainable source of animal protein[13], and hence, could be particularly attractive to sustainability conscious consumers and investors.

Moreover, given the fact that respective governments of the Faroe Islands, Norway and Scotland have paid special attention to ensure that the salmon production in these jurisdictions is eco-friendly and sustainable, it could be presumed that salmon companies in these countries can position themselves to be attractive to sustainability conscious consumers more than producers from Chile.

PESTEL: Technological

As mentioned previously, Atlantic salmon requires specific temperatures and environment to be able to grow and combat disease. To stimulate growth, salmon farming companies are researching and developing new technologies and methodologies. Countries leading salmon aquaculture have also started issuing "development licenses". However, given the unprecedented levels of innovation in every industry, it is extremely difficult to exactly pinpoint future developments. In fact, EY notes that "within 2040, we may very well witness technological disruptions [in salmon farming] that are unimaginable today" (EY, 2021, p. 20).

The major technological trends in salmon farming are discussed below.

- **Technological: Land-based Farming**

As mentioned previously, Atlantic salmon requires certain environment and temperature to be able to grow and thrive. However, recently, there has been a growing interest in land-based salmon farming. The primary advantage of land-based farming is that it allows salmon to be farmed closer to the consumers (EY, 2020). The planned capacity of land-based farming has increased significantly over the years, with a total expected production from land-based farms

[13] Explained in detail in the environment section of PESTEL.

of 622 700 tons by 2022 (EY, 2020)[14]. As per the plans, only two companies, Atlantic Sapphire and Purse Salmon, alone will control almost 50% of the land-based farms (EY, 2020), which could provide them considerable bargaining power and economies of scale. The financing for land-based farms have also increased as compared to previous years. Whereas in 2015, DNB was unwilling to provide credit facilities to land-based farming companies, they have now changed course and started providing (albeit limited) funding to land-based farming companies (EY, 2020). What is interesting, however, is that equity investors have provided funding to several land-based farming companies, e.g., Atlantic Sapphire was valued at NOK 7.6 bn as of September 2019, even though the company had not sold even a single salmon by then (EY, 2020)! Nevertheless, the growing interest in land-based farming remains a concern as it could not only lead to increased supply of salmon but due to its proximity to consumer markets, could lower costs (in terms of transportation and tolls). Environmentally, land-based farming is expected to have a carbon footprint nearly 28% higher than traditional salmon farming, however, with deployment of land-based farming and the learning curve that will accompany it, the environmental footprint might reduce (EY, 2020). Moreover, by virtue of its proximity to consumer markets, land-based farming could save on carbon emissions.

Nonetheless, despite the increased interest in land-based farming, EY predicts that "it is highly unlikely that all these planned [in-land farming] projects will be realized…" (EY, 2021, p. 26).

- **Technological: Fish Feed**

Fish-feed is the single largest cost in salmon farming and has the largest carbon footprint in the entire value chain. Currently, the fish feed itself is made up of fish, i.e., the fish humans do not prefer to eat are used as feed for fish (Brady, 2021). Several companies are currently experimenting with plant-based and insect-based fish feed (Helmstetter, 2019). Once such company is the Netherlands based Protix. Protix has received approval from the EU to use their insect-based fish feed as an alternative to fish-based fish-feed (Brady, 2021). The CEO of Protix expects the industry to grow fast. However, it must be kept in mind that plant and insect-based elements can only be used to provide the required protein in the fish feed (Brady,

[14] To put this into perspective, Bakkafrost's salmon farming operations in the Faroe Islands are expected to have 100,000 tons HOG by 2025 – and Bakkafrost is the largest salmon farmer in the Faroe Islands!

2021). The fish oils that go into fish feed cannot be completely replaced by other sources (Brady, 2021).

Nonetheless, plant and insect-based fish feeds are considered environmentally more sustainable and are expected to become competitive in terms of price once their production is scaled up. Moreover, since plant and insect-based feed need not be located in coastal areas (since their primary raw material is not pelagic fish), they can be located closer to land-based sites, saving on transportation costs and carbon emissions (EY, 2021).

- **Technological: Genetically Modified Salmon**

In 2015, genetically modified salmon was approved for human consumption by the US and the same was approved in Canada in 2016 (Cutt et al., 2018). In fact, genetically modified salmon was the first modified animal approved for consumption in the US (Cutt et al., 2018). AquaBounty, the company that led the development of genetically modified salmon claimed that their salmon tastes the same as traditional salmon, has same nutritional value but requires 25% less feed to grow and grows faster than traditional salmon (Cutt et al., 2018). Understandably, the salmon is patented and is currently not available for consumption (AquaBounty, n.d.). However, in the long run, the impact of genetically modified salmon remains to be seen. All in all, genetically modified salmon does NOT seem to pose any substantial threat to established salmon farming companies in the foreseeable future because even at full capacity, the impact of genetically modified salmon on global salmon harvest would be marginal. Nonetheless, as per the author's discussions with an industry expert, it is found that genetically modified salmon's primary attractiveness (or desirable trait) is in its potential to be immune to lice, which would consequently reduce the indirect and direct costs of salmon lice.

PESTEL: Environmental

Given that salmon farming is significantly dependent on the environment, there are significant environmental challenges (and opportunities) facing the salmon farming industry. The major challenges are discussed below.

- **Environmental: Climate Change**

Essentially, "… climate change presents a new, unprecedentedly disruptive, potentially cascading and profoundly uncertain type of change in organizational environments" (Winn et al, 2011, p. 169). It is impacting every country and the UN has declared "Climate Action" as

one of its 17 Sustainable Development Goals. 2019 was the warmest year of the previous decade, whereas the years 2010-19 marked the warmest decade on record (UN, n.d.). In fact, the impact of climate change is so pervasive that many of the UN SDGs are linked to combating climate change.

Given that salmon is a cold-blooded animal and is dependent on the temperature of the environment to be able to grow and thrive, any changes in temperatures would have an adverse impact on salmon farming industry. Whereas the optimal temperatures for salmon growth is between 8 to 14 Celsius, "very cold temperatures could lead to massive mortality rates, and very warm temperatures could breed disease" (Bell & Johnson, 2016, p. 5). Such changes in temperature due to climate change are not unheard of, with Texas winter storms of early 2021 being a case in point.

Moreover, with climate change comes extreme weather events, e.g., hurricanes. These extreme weather events can lead to increased mortality in fish. One such instance happened in February 2020 in the Faroe Islands where a storm led to loss of 1,2 M salmons from farms of Bakkafrost, thereby reducing Bakkafrost's 2020's harvest from expected 57 000 tons gutted weight[15] (tgw) to 51 000 – 52 000 tgw (Bakkafrost, 2020, pp. 8-9). Given the increasing occurrences of extreme weather events across the globe, it would be naïve to presume that such events would not reoccur in the future at an increasing rate. Extreme weather events could also cause supply chain disruptions and such disruptions would have material adverse impact on salmon farming due to the perishable nature of food products, both as raw materials and as final product (i.e., salmon).

There is a growing realization that the climate change needs to be minimized. In line with the Paris Climate Agreement, the Governments across the world are taking several initiatives, including taxing carbon emissions, providing incentives for Carbon Capture & Storage (CCS), reforestation, etc. Currently, only 5% of the oceans are used for food production even though seafood is amongst the most climate friendly ways of meeting global food requirements (Global Salmon Initiative, n.d.). Hence, there is an opportunity for salmon farmers to provide food that has a relatively low carbon footprint vis-à-vis other sources of food (particularly meat). This becomes increasingly important when taken within the context that currently more

[15] Same as HOG.

than 1/4th "… of the world's GHG emissions come from agriculture, forestry, and land-use change" (Ahmed et al., 2020, p. 2). Moreover, as mentioned in the 5 Forces analysis, salmon farming has 7,9 kg of CO_2e emissions/kg of edible meat, as opposed to 39 kg and 12,2 kg of CO_2e / kg of edible meat for beef and pork, respectively (Mowi ASA, 2020). By replacing other sources of agriculture with salmon, the GHG emissions can be reduced. This is also in line with the broader consumer trends of sustainability.

- **Environmental: Water Scarcity**

Only 3% of the world's water is suitable for human consumption (WWF, n.d.). Of this 3%, 2/3rd is inaccessible due to being frozen in the form of glaciers (WWF, n.d.). Today, 1,1 billion people do not have access to water, whereas a total of 2,7 billion people face water scarcity at least one month every year (WWF, n.d.). The problem of water scarcity is a result of a number of factors, including pollution, climate change, and increasing population. 70% of the freshwater is consumed (and wasted) in agricultural activities (WWF, n.d.).

Salmon has lowest water consumption per kg of edible meat when compared to chicken, pork, and beef (Mowi ASA, 2020). Salmon consumes only 2 000 litres of water/kg of edible meat as opposed to 4 300 and 15 400 litres/kg of edible meat for chicken and beef, respectively (Mowi ASA, 2020). Hence, salmon is well positioned to meet the world's growing need for protein in a sustainable and environmentally friendly way.

PESTEL: Legal

Salmon farming is regulated in the Faroe Islands, Scotland, and Norway by their respective governments. The licenses that allow for salmon farming are limited and form the primary barrier to entry. A brief note on legal conditions surrounding salmon farming in each of these countries is presented below.

- **Legal: Norway**

The salmon farming industry in Norway is governed primarily by "The Aquaculture Act (2005)" and "The Food Safety Act 2003" (FAO, 2007).

The Aquaculture Act has jurisdiction over both oceans based and land-based aquaculture and covers all aquatic life, "… from broodstock and hatchery production, to table fish production …" (FAO, 2007, para. 1). The Norwegian Ministry of Fisheries and Coastal Affairs enforces the Aquaculture Act (FAO, 2007). The Act has established a licensing system and no aquaculture activity is permitted without licenses (FAO, 2007). The said licenses are limited

and are issued/renewed based on several factors, primarily related to environment and sustainability and the concerned ministry reserves the right to revoke and amend licenses as it sees fit (FAO, 2007). Since 1982, the issuance of new licenses has been done "… only in certain years" (Mowi ASA, 2020, p. 81). The licenses can be transferred from one party to another and leasing of licenses in certain situations can be permitted, pending approval from the Ministry of Fisheries and Coastal Affairs. Moreover, the licenses can be pledged as mortgage. However, the Act does not allow any single entity to "… control more than 25 percent of the total licensed biomass" (FAO, 2007, subsection: "Transfer of licences/changes in ownership"). Production is limited by "Maximum Allowed Bio-Mass", which is the maximum weight of fish any given company can hold in sea at any given time (Mowi ASA, 2020). A single license allows for MAB of 780 tons (FAO, 2007). Moreover, each site has its own MAB and the aggregate of fish at a given site cannot exceed the MAB for that particular site (Mowi ASA, 2020). Furthermore, the Norwegian coast has been divided into 13 regions and whether MAB in any of these regions is asked to decrease, asked to hold constant or allowed to increase is based on the presence of sea lice in the region, this is also known as traffic light system (Mowi ASA, 2020).

The Food Safety Act (2003) regulates, as the name goes, the safety of the food (including Animal health) and covers production and processing of the fish, amongst other items of food (FAO, 2007). Furthermore, the Norwegian Government has recently also started issuing "development licenses" with the aim of stimulating growth in the Norwegian salmon farming industry.

Moreover, given the fact that salmon farming in Norway is dependent on the natural resources (fjords, favourable water temperatures, etc.), the Norwegian Ministry of Finance of established a commission in 2018 to evaluate how the use of Norwegian sea and coastal area can be taxed so that it better serves "... the common interests" (Government Drops 'Salmon Tax' Plan, 2020, para: 3). The committee recommended a 40% tax rate, arguing that this is the same rate paid by the power industry (McDonagh, 2020b). However, amidst strong political opposition, the recommendations were not implemented. Alternatively, the Government recommended and adopted a production tax of NOK 0.40 per kg of salmon produced, starting January 2021 (Holland, 2020; Poulsen, 2020).

Furthermore, Norway, while not being a member of the EU, does belong to the European Economic Area, but fisheries and its management are not included in the EEA agreement. As

such, the Norwegian salmon exports to the EU are taxed at 2% for fresh salmon and 13% for smoked salmon (Regjeringen, 2018). However, the veterinary policies of Norway are fully aligned with that of the EU and hence, all seafood products from Norway can enter the EU without border control (Regjeringen, 2018).

- **Legal: Faroe Islands**

The Faroe Islands are located West of Norway, about halfway between Norway and Iceland. It is a territory within the Kingdom of Denmark but enjoys significant autonomy. The island has its own Parliament and elects its own Prime Minister. However, the Faroe Islands do have representation in the Danish Parliament. It is not a part of the European Union (even though Denmark is a part of the EU). Faroe Islands are not a part of the EU Free Trade Agreement (FTA); however, the Faroese Government has entered several FTAs, including with Norway (The Government of the Faroe Islands, n.d.).

Like Norway, salmon farming in the Faroe Islands is strictly regulated and is subject to license approval by the Faroese Government. The three most pertinent legislative documents regulating salmon farming in the Faroe Islands are the Aquaculture Act (2009), the Environment Act (1988) and the Food Safety Act (2010) (Mowi ASA, 2020). As a result of stringent regulatory requirements regarding fish health, today no farmed salmon in the Faroe Islands is treated with antibiotics (Faroese Seafood, n.d.-c). Unlike Norway, the production is not governed by maximum allowed biomass (MAB) and each site in the Faroe Islands has production between 1200 tons and 5800 tons per year "… depending on site characteristics and the geographic location of the individual farm". (Mowi ASA, 2020, p. 89). The Aquaculture Act of the Faroe Islands allow any single company to hold a maximum of 50% of total sea licenses (Mowi ASA, 2020, p. 89).

Like Norway, the licenses in the Faroe Islands can be transferred and pledged and the Government reserves the right to revoke or amend any license as it sees fit (Mowi ASA, 2020, p. 90). Each license in the Faroe Islands is issued for 12 years and is presumed to be renewable indefinitely (Bakkafrost, 2020). Like the recently introduced production tax on salmon production in Norway, the companies in the Faroe Islands have to pay a harvesting fee based on the volume it harvests in any given year (Mowi ASA, 2020)[16]. The revenue tax in the Faroe Islands is applied as a percentage of price of salmon rather than a fixed price and is generally

[16] Details of revenue tax rate is provided in the forecasting chapter.

higher than the revenue tax in Norway, which is fixed at NOK 0,40 per kg harvested. Furthermore, like Norway, the Faroese Government has started issuing development licenses to stimulate development in the salmon farming industry.

Moreover, like Norway and the UK, the Faroe Islands veterinary laws are in tandem with that of the EU, and the Islands are part of the EU's internal veterinarian zone, which means that farmed salmon from the Faroe Islands are exported to the EU without any further border checks (Faroese Seafood, n.d.-a).

The salmon farming industry in the Faroe Islands has consolidated recently in line with the global trends. From 69 salmon farming companies at one point in time, the industry now has a total of 3 players (Holland, 2018), Bakkafrost being the largest. The legislation governing salmon farming consists of an "… all in, all out…" system (Faroese Seafood, n.d.-a, subsection: 'The "all in - all out" strategy'). This means that at any given farming location, only one generation of fish can be farmed and after harvesting, the area must remain fallow for 2-3 months (Holland, 2018).

- **Legal: Scotland**

Salmon farming in Scotland, just like the Faroe Islands and Norway, is regulated. However, in Scotland, the regulation is not in terms of formal licenses (Mowi ASA, 2020). Rather, permissions from relevant Government organizations are necessary to establish a farming site (Mowi ASA, 2020). MAB in Scotland varies from site to site and renewal of the permission for farming from the concerned organizations is presumed indefinitely.

As opposed to the Faroe Islands and Norway, Scotland belonged to the EU until December 2020. With the UK's accession from the EU, salmon farming industry in Scotland is said to have suffered losses, primarily due to paperwork, as was mentioned in the "Brexit" sub-section of political analysis. Moving forward, the extent of damage on the salmon farming industry in Scotland due to the UK exiting the Single Market remains to be seen. However, the author does not expect the damage to be significant, particularly because the UK and the EU have cordial relations.

4.2.2 Summary of Macro Analysis

The PESTEL analysis has revealed that the macro-environmental forces around the salmon farming industries in Norway, Scotland and the Faroe Islands are well-suited for the incumbents[17]. The reason these countries have been selected for analysis is because they are directly related to the author's company of interest, i.e., the Bakkafrost Group.

Politically, all the 3 countries in question have stable internal political environment and salmon farming have relatively high social acceptance in all 3 countries (particularly in the Faroe Islands and Norway). The relationship of these countries with the EU, the single largest salmon importer in the world, is also cordial. However, their relationship with Russia and China varies and, in the past, each country has had various levels of successes in the Russian and Chinese markets. The threat of deterioration in diplomatic relationship with China and Russia remains. Any deterioration in relations of China & Russia with the EU (and Norway) could play in Bakkafrost's favour since the company is primarily based in the Faroe Islands and hence, is not grouped together with EU/NATO countries when trade sanctions are imposed. Another major salmon market is Japan and given Japan's strong alliance with the EU and NATO countries, threat of diplomatic breakdowns between the EU/Norway and Japan seems negligible. It is important to mention here that despite being a major salmon importer, Japan is not a major market of Bakkafrost. Economically, the combination of rising middle class along with economic recovery as a result Covid-19 vaccination are promising for the long-term growth of the industry. Social changes, such as aging population and consumer demand for more healthier and sustainable products provides an opportunity for the industry, whereas technological progress in the field of fish feed, land-based farming, and improved methods to combat sea lice offer opportunities for increased production and cost savings. Technological progress is essential as the industry seems to be pushing its biological and efficiency limits. Genetically modified fish is also worth keeping an eye on, however, threat from this area seems negligible for the foreseeable future. Within the dimension of environment and sustainability, salmon farming is well-suited to provide protein to a growing population in the most sustainable manner as opposed to other sources of animal meat, and strict regulatory

[17] This is not meant to say that other salmon producing countries, including Chile, the UK, Canada, and others are not well-suited for salmon production.

requirements and licensing requirements keep the barriers to entry high for the industry, protecting the profit potential and competitive structure of the industry.

4.3 Internal Resource Analysis

Until now, factors external to Bakkafrost have been analysed. In this section, factors internal to Bakkafrost and how those factors could or could not lead to competitive advantage will be analysed.

Traditionally, the overarching view in strategy was that some firms outperformed others due to imperfections in product markets. However, in the 1980's an alternative view started gaining traction when Wernerfelt (1984), as per Crook et al. (2008), argued that "… firms can be viewed as collection of resources and [Wenerfelt] suggested that resources enable effective product market strategies" (Crook et al, 2008, p. 1143). In 1986, Barney introduced the concept of "strategic factor markets" and argued that if the markets for strategic resources become perfect, all profits will be competed away (Barney, 1986). He concluded that the reason why some firms outperform others is because they are either lucky or have superior information with regards to the factors available in strategic factor markets (or both) (Barney, 1986). If they have superior information, Barney (1986) argued, they could acquire the strategic factors and generate economic profits. However, since superior information about external environment is difficult to achieve, Barney argued that the company's internal skills, capabilities and competencies can provide superior information/expectations to companies. In 1989, in what could be termed a critique of Barney's 1986 paper, Derickx and Cool (1989) argued that the factors that could be bought and sold in strategic factor markets are, by themselves, not sufficient to create competitive advantage primarily because others can buy them too. Moreover, Derickx and Cool (1989) argued that "… it is not clear that *all* resources are actually bought and sold" (p. 1505). Therefore, Derickx and Cool (1989) conclude that when all factors are unavailable in the factor markets, they ought to be developed internally. They further argue that these assets can neither be developed in an instant nor can their stocks be adjusted at whim. Given this, how easily can (or cannot) these non-tradeable assets be imitated by competitors is what determines a company's competitive position, argue Derickx and Cool (1989).

Below, the internal factors of Bakkafrost will be discussed and analysed in the backdrop of above arguments by Barney (1986), and Derickx and Cool (1989).

4.3.1 VRIO Framework

VRIO framework allows for evaluation of the resources a company has and helps answer the question of whether those resources can offer sustainable competitive advantage to the company or not. The framework aims to answer the following questions (Barney, 1995): (1) are the resources valuable? (2) are the resources rare? (3) are the resources imitable? (4) are the resources organized?

Whereas all the questions are self-explanatory, it is important to note here that value of resources can change with the change in environment (Barney, 1995). Similarly, a resource which is valuable but not rare, is a source of "… competitive parity" and not a source of competitive advantage (Barney, 1995, p. 52). In a similar vein, a resource that is imitable will provide competitive advantage in the short-term whereas an inimitable resource will provide sustainable competitive advantage (Barney, 1995). Finally, it is important for the company to be organized in a manner that allows for exploitation of resources, this includes corporate governance, reporting mechanisms, etc (Barney, 1995).

Major resources of Bakkafrost are discussed below, followed by answer to the question of whether the company is organized enough to exploit these resources.

Resource 1: Integrated Value Chain

Bakkafrost's distinguishing factor as compared to other players in the industry is its vertically integrated value chain. Bakkafrost controls the entire value chain from broodstock and hatcheries to fish harvesting, processing, and selling.

The integrated value chain allows Bakkafrost to not only keep track of every step of salmon production & processing, but also allows for quality control and cost synergies. The significance of integrated value chain is particularly important in the FOF segment since feed costs are not only the single largest expense in salmon farming but also because feed producers are few and concentrated, which allows them to have significant power vis-à-vis non-integrated salmon farming companies. By having its own FOF production, the company is not only able to control costs but is also able to ensure a constant and sufficient supply of high-quality fish feed. Since it controls its fish feed, the company ensures that the salmon's diet is "…as close as possible to the natural diet of the wild salmon…" and uses only "… sustainably certified…" raw materials in feed production (Bakkafrost, 2021, p. 25). It is due to its control over the entire value chain, but particularly due to control over its feed production, that

Bakkafrost is able to enter into long-term contracts without being dependent on external providers. Moreover, as mentioned previously, feed is the primary factor that determines salmon quality. By making its own feed, Bakkafrost has control over fish quality.

The company has recently taken over Faroese broodstock program and has the right to genome sequence of the broodstock. This broodstock program is meant to help develop roe which will be more resistant to diseases (Bakkafrost, 2021), thereby reducing fish mortality. Moreover, the group also has its own broodstock program in Scotland. The Scottish broodstock program allows for farming for Scottish Island salmon, which is stronger, leaner and "… noticeably firmer salmon than other Atlantic salmon" (Bakkafrost, 2021, p. 26).

The in-house processing and packaging facilities allow Bakkafrost to serve both the fresh fish segment and the VAP segment. The long-term aim of Bakkafrost is to utilize its in-housing processing facilities to increase its VAP sales, which would allow Bakkafrost to minimize the price risk that accompanies the fresh fish segment. The processing facilities also allow Bakkafrost to divert its salmon from fresh salmon market to VAP market if the situation requires, as it was able to do so in 2020 when Covid-19 pandemic reduced demand in the fresh fish segment (Bakkafrost, 2021).

The value of having an integrated chain is indisputable. However, other salmon producers have also started integrating vertically (some are already well integrated). In the long-run, it is likely that having a vertically integrated value-chain will become a necessity rather than a competitive advantage. But for the time being, it continues to provide Bakkafrost with a competitive edge. Building a vertically integrated value chain and developing knowledge (for example genome rights for broodstock program) cannot be done at a whim and requires a long period of time, just as Derickx and Cool (1989) argued. It also allows for synergies, cost savings and quality control.

Resource 2: Faroese Roots

Bakkafrost's fish farming operations are spread in 2 countries (Faroe Islands and Scotland), with its HQ based in the Faroe Islands. This allows Bakkafrost a competitive advantage that most of its competitors do not enjoy: the Faroe Islands is considered a neutral territory and as such, is not grouped together with either the EU or the NATO countries – and hence, Bakkafrost is able to avoid the fallout of breakdown of international diplomatic relations. For instance, when in 2010, Norwegian salmon exports to China dwindled due to diplomatic

upheaval between the two countries, farmers from the Faroe Islands filled in (explained in detail in PESTEL analysis above). Similar event transpired in Russia after salmon exports from the EU to Russia dwindled in face of Russian aggression in Crimea. Moreover, the Faroe Islands enjoy extremely good relations with the EU and the Faroese salmon can be imported to the EU without border checkpoints. Therefore, Bakkafrost enjoys the advantages that its competitors based out of Norway, or the UK (or Scotland) are unable to, i.e., protection from diplomatic upheavals, while enjoying the upside of good relations with the EU.

Given the fact that there are only 3 salmon companies in the Faroe Islands (coupled with a limited number of licenses), it is safe to say that Bakkafrost enjoys a rare and an inimitable resource in the shape of its Faroese roots and licenses. Whereas it is true that salmon producers in the UK and Norway also enjoy favourable environment for salmon growth, they lack the political (diplomatic) neutrality that Bakkafrost enjoys due to its Faroese roots. This is, naturally, a rare resource since the number of licenses available for farming in the Faroe Islands are restricted.

Furthermore, Bakkafrost has recently established its own Biogas plant in the Faroe Islands. The plant does not only "recycle" the biological waste and turn it into fertilizer which is then given to farmers for free but also produces electricity, which is added to the Faroese national electricity grid (Bakkafrost, 2021). Biogas plant will save 11 000 tons of CO_2e emissions (Bakkafrost, 2021). Biogas plant shows Bakkafrost's close collaboration with the Government and the local community in which it operates, hence, adding to Bakkafrost's social and political acceptance.

Resource 3: Strong Internal Shareholding

The CEO of Bakkafrost and his mother own significant share in the company. The CEO roughly owns a little more than 7,8% of the outstanding shares whereas his mother owns another 7,7% (Bakkafrost, n.d.-c). This *could* allow alignment between company insiders and outsiders and prevent agency problems. The fact that the CEO and his family have significant shareholding in the company could also add trust in the company from investor's point of view, since the family has its fortunes tied to the fortunes of Bakkafrost. Moreover, as mentioned previously, due to strong internal shareholdings, it is *probable* that the CEO would focus on long-term growth rather than quarterly earnings.

However, this is not a rare resource since other salmon farming companies do also have relatively consolidated shareholdings, e.g., 53,2% shared are owned by the Chairperson in Greig Seafood (GSG, 2021, p. 202), and President & CEO of SalMar owns 93,02% shares of a holding company that in turn holds 52,46% of SalMar ASA (SalMar, 2021, p. 59). However, Mowi's internal shareholding is limited, with the insiders holding only 0,30% of outstanding shares (Mowi, 2021b, p. 223). Nonetheless, it seems that strong internal shareholding is not unique to Bakkafrost amongst major salmon producers. However, internal shareholding could prevent agency problems and avoid excessive focus on quarterly results, thereby, leading to decisions which are in long-term interests of the company.

Are the resources organized?

In terms of being organized, it is undisputed that Bakkafrost is well organized and well positioned to be able to take advantage of the resources mentioned previously. It is the business acumen of Bakkafrost's management which has allowed the company to conduct multiple acquisitions successfully since its listing on Oslo Børs in 2007. In 2015, the company was awarded the title of "company of the year" by the Faroese House of Industry (faroeislands.fo, 2015), and the same year the company was awarded "Stockman Prize 2015" by "The Norwegian Society of Financial Analysts" (Bakkafrost, 2015), and in 2021 the company's CEO has been awarded *Edie* "Business Leader of the Year" award[18] (Market Screener, 2021); these awards serve to show that Bakkafrost is a well-organized company. Moreover, the company has long history of collaboration with the Government and the locals, which allows it to have legitimacy in the local community.

All in all, Bakkafrost is well-organized to exploit the resources it possesses.

4.3.2 Summary of Internal Resource Analysis

The internal resource analysis has revealed that Bakkafrost possesses resources which allow it to have competitive advantage vis-à-vis its competitors. Firstly, the resource of integrated value chain allows Bakkafrost to control quality of salmon and achieve cost synergies; this resource is not entirely rare to Bakkafrost since salmon farming, generally, is dominated by vertically integrated companies. Nonetheless, an integrated value chain could further increase

[18] The contestants included Nestle, Vodafone, and PepsiCo (amongst others).

the barriers to entry in the industry since developing integrated value chains for new players is very challenging. Secondly, the Faroese roots allows the company to avoid diplomatic challenges which salmon farmers in the EU and Norway face – Faroese licenses and roots are rare and sustainable resources. Thirdly, strong internal shareholding *could* allow the company to focus on long-term value creation rather than short-term earnings benchmarks; however, this resource is not specific to Bakkafrost alone and several competitors do also have strong internal shareholding.

All in all, Bakkafrost does have several resources which differentiates it from the competitors, however, only the Faroese roots seem to be the resource that can be considered rare in the long-term.

4.4 Fusion of Internal & External Analysis

Until now, this chapter has analysed the salmon farming's industry structure, which was followed by macro-level analysis. The analysis of the industry and macro-environment focused on factors external to the company and were followed by internal resource analysis of Bakkafrost. This section aims to analyse the learnings from internal and external analysis together with the help of SWOT analysis. Very limited new information is introduced in this section.

4.4.1 SWOT Analysis

SWOT framework helps synthesize the learnings from external environment and internal resource analysis (Johnson et al., 2009). Strengths & Weaknesses are internal to the company whereas Opportunities & Threats are from the external environment (Johnson et al., 2009). Hence, SWOT framework is an excellent way to fuse internal and external analysis.

Strengths

The major strengths Bakkafrost enjoys are its vertically integrated value chain and the Faroese roots. The vertically integrated value chain allows for control over quality and costs, whereas the Faroese roots allow it to avoid the diplomatic upheavals which are common between the EU and China/Russia. Furthermore, Bakkafrost's primary operations are in the Faroe Islands and in the Islands, antibiotics are not used. This provides Bakkafrost and other salmon farming companies from Norway and the Faroe Islands a unique selling point. In fact, due to use of

antibiotics in Chile, North American salmon importers have by and large shifted to salmon farmers in Norway and surrounding countries.

Moreover, due to its control over the value chain (and broodstock program), Bakkafrost is well on its way to increase the size of smolt in the Faroe Islands to 500g by 2025 in the Faroe Islands. In Scotland, the company is replacing 11 old hatcheries with 3 RAS-based hatcheries, like those in the Faroe Islands, this would allow for 500g smolts in Scotland (Bakkafrost, 2021, p. 9). This would help reduce mortality and increase total harvests, since the higher the weight of smolt at the time of transfer to sea, the more resilient it is to diseases (thereby, reducing biological risk) and the less time it needs to spend in the sea (Bakkafrost, 2021, p. 4).

Lastly, strong internal shareholding *could* allow Bakkafrost to reduce agency problems and enable the company's management to focus on long-term metrics rather than quarterly reporting.

Weaknesses

A significant weakness of Bakkafrost seems to be in its limited geographical diversification. The company, until recently, had operations only in the Faroe Islands, which meant that the company was "over-dependent" on one single country for its operations. With the acquisition of SSC in Scotland, the risk has arguably been diversified. Nonetheless, the company is still not as geographically diversified as other major salmon farmers, e.g., Mowi & Grieg Seafood. Geographic diversification would not only allow risks to be diversified but could also perhaps help reduce transportation costs. If processing plants/factories are established in relatively cheaper countries, perhaps costs of producing value-added products could be reduced as well.

Moreover, apart from relatively low geographic diversification, Bakkafrost also has low diversification in its VAP segment, with 52% and 52% of VAP sales going to one single customer in 2020 and 2019, respectively (Bakkafrost, 2021, p. 100).

All in all, however, Bakkafrost does not seem to have any major weaknesses.

Opportunities

The global population is increasing, disposable incomes are rising and with the vaccination campaign in full swing, the global economy is set to grow by more than 4% in 2022. Moreover, there is rising health consciousness amongst consumers and an increasing care for the environment. All of these provide opportunities to not only Bakkafrost but also to salmon

farming companies all over the world as the demand for healthy and environmentally friendly protein is set to increase. Salmon, being one of the most eco-friendly and healthiest meat products, is well suited to capitalize on these macro-trends. Rising incomes could allow consumers to buy salmon, which is relatively more expensive (and healthier) than other sources of animal protein.

There is also rising interest of investors and farmers alike in land-based salmon farming. Bakkafrost's current portfolio does not have land-based farming, however, the company has applied for off-shore farming licenses in the Faroe Islands (Bakkafrost, 2021). Hence, even though the company does not have in-land farming in its portfolio, it is expanding its production by moving into off-shore farming. Nonetheless, land-based farming could be an area of opportunity.

Threats

The primary threat to all salmon farmers is salmon lice. The direct and indirect costs salmon lice impose on salmon farmers are significant and were mentioned in detail earlier. Bakkafrost is making significant investments to produce smolt of higher weight as the company sees it as a way of not only increasing capacity but also reducing risk of diseases. Nonetheless, Scotland has recently suffered high lice levels, which is a source of concern. In 2019, Mowi's operations in Scotland suffered a hit in earnings because of rising lice and mortality (BBC News, 2020). Mowi also had to use antibiotic in its operations in Scotland (BBC News, 2002). Given that Bakkafrost also has operations in Scotland since 4th quarter of 2019, it is probable that Bakkafrost could also suffer from the aforementioned problems. If Bakkafrost also has to use antibiotics to combat sea lice, this could impact brand equity, since its entire salmon production in the Faroe Islands' is antibiotics free.

Another threat that Bakkafrost and all other industry players face is that of climate change. Salmon is a cold-blooded animal and requires a certain range of temperatures to be able to grow and avoid diseases. With rising global temperatures and extreme weather events, salmon farming is facing unprecedented challenges, e.g., Bakkafrost's lost 1,2 M salmons in the Faroe Islands in early 2020 because of a "severe storm" (Bakkafrost, 2020, p. 6).

Moreover, there is rising opposition to salmon farming in various countries. The opposition in Norway and the Faroe Islands is not deemed significant, primarily because salmon farming is a major economic activity in these countries. Scotland, however, is not economically

dependent on salmon farming and hence, threats remain that salmon farming licenses might be withdrawn sometime in the future due to political and social opposition; for now, however, this threat is not significant in Scotland either.

4.4.2 Summary: Internal & External Analysis Synthesized

This section has brought together the different elements of the strategic analysis with the help of the SWOT framework. The framework allows to look at the opportunities and threats in the external environment from the perspective of the company, i.e., it allows for analysis of external environment while keeping the company's strengths and weakness in view and helps point out the threats and opportunities in the environment (Johnson et al., 2009). Through the SWOT analysis, it has been observed that the integrated value chain and the Faroese roots remain Bakkafrost's major strengths. However, as the Faroese roots bring significant diplomatic and political advantages (e.g., wide political acceptance of salmon farming) to the company, the concentration of operations in the Faroe Islands and Scotland also exposes company to the threats posed by little geographical diversification (as compared to other major salmon farmers). The opportunities lie in the fact that demand for salmon is expected to increase globally amidst rising incomes, aging & growing populations, and greater consumer concerns about sustainability & health. Salmon lice remain the biggest threat to the industry and the company and continues to impose direct and indirect costs.

4.5 Summary of Strategic Analysis

To summarize, salmon farming industry is well-suited to the rising consumer trends. The industry is consolidated, vertically integrated, and protected by high barriers to entry. There seems to be a consensus that increase in demand will outstrip the increase in supply in the foreseeable future (Mowi, 2021a). There also seems to be no major political or social threats to salmon farming in Norway, the Faroe Islands and Scotland. Salmon lice remains the single biggest challenge to salmon production. Limited availability of licenses, coupled with stringent regulations, also place a limit on the supply growth of salmon.

Based on strategic analysis alone, the author concludes that salmon farming is certainly an attractive investment. Bakkafrost's position within the industry is strong and it enjoys all the resources necessary for successful salmon operations, i.e., favourable climate, good relations with all the salmon importing nations/economic blocks, and social acceptance of salmon

farming in the countries it farms salmon in. Therefore, Bakkafrost, as per strategic analysis, seems to be an attractive investment.

The following chapter analyses Bakkafrost's financial health, as well as explores the industry's and Bakkafrost's capital structure.

5. Financial Health & Capital Structure

This chapter has been divided into two sections. In the first section, the financial health of Bakkafrost has been evaluated, with the primary goal of examining whether the company faces any liquidity and solvency challenges. In the second section, capital structure theories have been introduced and the capital structure of Bakkafrost has been analysed, with the aim to see why the company has the capital structure that it has and how the capital structure could influence the company's strategy.

5.1 Financial Health

Ratio analysis is a common tool to learn about a company's financial health. It allows to see historic trends and to get insights into the company's operational and financial activities (Young, 2013). It is also important to conduct ratio analysis to be able to understand the trends in any industry. There are 4 major categories of financial ratios: liquidity, profitability, solvency, and efficiency.

The ratio analysis below has been conducted primarily with the aim of understanding the industry's financial architecture and to understand Bakkafrost's financial performance over the years, particularly its liquidity position, since liquidity is one of the most important elements in any financial analysis. All the averages have been calculated *excluding* Bakkafrost because the sample is small and including Bakkafrost will bias the result in its favour. It is worth mentioning here that the financial trends in sub-section 5.1.1 below give only a "snapshot" at a particular point in time, which is followed by Bakkafrost's analysis over time in sub-section 5.1.2.

5.1.1 Industry's Financial Trends

It can be seen in Table 1 below[19] that there is significant variation in financial ratios within the major salmon farming companies listed on the Oslo Stock Exchange. All the salmon farming companies have lower volatility as compared to the market since all salmon farming companies listed on the Oslo Stock Exchange have beta less than 1. It is observable that the

[19] To ensure consistency and comparability, all ratios in sub-section 5.1.1 have been taken from WSJ and all Beta's from Yahoo Finance, with the implicit assumption that the publishers have ensured consistency in computing respective ratios.

salmon farming industry has different levels of leverage. However, despite variations in leverage, almost all salmon companies enjoy a healthy interest coverage ratio, with an average of 9,13.

Company	Beta	Total Debt to Total Equity	Total Debt to Total Assets	Cash Ratio	Interest Coverage (times)	Return on Invested Capital
Grieg Seafood	0,43	95,30%	39,11%	0,37%	1,74	-0,05%
Lerøy Seafoods Group	0,55	45,03%	25,02%	0,69%	8,06	3,53%
Mowi	0,67	75,98%	35,90%	0,15%	7,66	2,66%
Norway Royal Salmon	-0,11	51,93%	27,61%	0,04%	9,30	2,01%
SalMar	0,22	61,36%	27,50%	0,05%	18,89	14,91%
Average (excluding Bakkafrost)	**0,352**	**65,92%**	**31,03%**	**0,26%**	**9,13**	**4,61%**
Bakkafrost	0,38	29,97%	19,81%	0,61%	9,03	4,42%

Table 1: Summary of key financial ratios of Bakkafrost & competitors; Data Source: Yahoo Finance & Wall Street Journal, Dated 17th May 2021

In comparison to peers, Bakkafrost is significantly less leveraged, with Bakkafrost's leverage, as measured by Total Debt/Total Equity of 0,29, against the industry average of 0,65. Bakkafrost's cash ratio is roughly 2,3x higher than the industry average and the company also enjoys an interest coverage ratio that is on par with the industry. However, the industry's interest coverage ratio is significantly influenced by SalMar's high interest coverage ratio; when SalMar's interest coverage ratio is excluded from the analysis, the industry's interest coverage ratio falls to a mere 6,6, against Bakkafrost's 9,03. A high interest coverage ratio ensures that, despite high leverage, a corporation will not face liquidity crisis. The industry has an average Return on Invested Capital (ROIC) of 4,61%, against Bakkafrost's 4,42%. SalMar and Grieg Seafood are outliers in ROIC, and when adjusted for them, the industry's ROIC falls to a mere 2,73%, which is significantly less than the ROIC of Bakkafrost.

All in all, it does seem that, as per the data available on 17th May 2021, Bakkafrost outperforms most of its peers in terms of solvency, liquidity and return on invested capital. However, the limitation remains that this analysis is restricted to a certain point in time, i.e., 17th May – and as of this date, not all peer companies had issued their latest quarterly reports and by restricting to only one point in time, it is not possible to see the trend over the years.

5.1.2 Bakkafrost's Financial Trends

For the following analysis, the author has calculated the ratios himself rather than relying on WSJ or Yahoo Finance; by calculating the ratio himself, the author ensures that the definition of each ratio remains consistent for the period of analysis, which consequently, allows for comparability across the years.

	2015	2016	2017	2018	2019	2020
Profitability & Efficiency Analysis						
Revenue Growth	6%	12%	18%	-16%	42%	3%
EBITDA Margin	39%	41%	41%	40%	36%	23%
NP Margin	28%	42%	14%	30%	18%	10%
ROE	35%	44%	14%	7%	13%	5%
Asset Turnover	77%	69%	71%	58%	48%	35%
Liquidity Analysis						
Current Ratio	4,74	7,22	3,54	6,35	4,79	5,17
Cash to Current Debt	0,25	0,60	0,51	0,84	1,42	0,61
CFO / Current Liabilities Ratio	1,85	2,15	2,42	2,41	1,12	0,62
Solvency Analysis						
Debt to Total Assets Ratio	0,34	0,34	0,30	0,30	0,35	0,34
Times Interest Covered (Op. EBITDA/Interest)	45,03	49,96	59,22	102,34	95,55	29,41
Net Financial Expenses Coverage	258,61	31,68	61,90	104,69	43,84	16,39
Debt to Equity Ratio	0,52	0,53	0,42	0,42	0,54	0,51
Equity/Debt and Equity Ratio	0,66	0,66	0,70	0,70	0,65	0,66
CFO / Total Debt	0,57	0,45	0,95	0,53	0,23	0,11

Table 2: Summary of Bakkafrost's ratios over the years; Data Source: Annual Reports

Based on the ratios calculated in Table 2, one can see that the revenue of Bakkafrost has grown over the years. However, there was a decline in revenues in 2018. The decrease in revenues in 2018 was primarily due to a significant decrease in production. There was also a ban by Russian Government to import Bakkafrost's salmon in quarter 4 of 2018 due to health risks, the ban was later lifted in quarter 1 of 2019 (Bakkafrost, 2019), and the ban contributed to decline in revenues in 2018. One of the reasons for decline in margins in 2018 was the shift from medicinal treatment of sea lice to mechanical treatment, which forced the company to go on a learning curve and face initial losses. The company has also faced decreasing asset turnover ratio; however, this seems to be primarily because of the fact the company has been expanding (both organically and inorganically), thereby, increasing the asset base whereas the higher revenues from this expansion are expected to flow in the future. The decline in ROE can be, in part, attributed to the fact that equity has grown over the years due to increase in retained earnings. However, a significant decline in ROE can be witnessed in 2020, primarily because of the issuance of new equity in Q4 of 2019 to fund acquisition of Scottish Salmon Company (SSC).

Liquidity refers to a company's ability to meet all its near-term cash obligations (Berman et al, 2005). The liquidity position of Bakkafrost is strong, even though it has fluctuated over the years. Its current ratio is currently more than 5 for the year 2020, and even though one might argue that a current ratio of 5 is unreasonably high, it is in part because Bakkafrost has a high amount of "biological assets" which are classified as current assets. The cash to current debt has fallen below 1 in 2020, signifying that the if all current liabilities were to fall due on 31st December 2020, the company would not be able to meet it with the cash on hand. However, given that salmon is a commodity and that the cash is generated on a regular basis, it can be deduced that the cash to current debt ratio of less than 1 is not an issue. Another important measure for liquidity is Cash Flow from Operations (CFO) to Current Liabilities ratio, and it measures how many times can all the current liabilities be paid off solely by the year's operational cash flow. Bakkafrost's CFO to Current Liabilities ratio has fluctuated within the range of 0,62 and 2,42 in past 6 years (and has decreased over the years); it is currently at its lowest of 0,62. This signifies that the operational cash flow alone cannot cover all the current liabilities.

Solvency refers to a company's ability to meet *all* its financial obligations, both current and non-current (Hayes, 2021). Bakkafrost's solvency, based on CFO to Total Debt ratio has decreased in past two years, this could be due to two reasons: i. In 2019, IFRS-16 was implemented which required operational leases to be accounted for as debt, hence, increasing the debt on balance sheet; ii. New debt was issued for acquisition of Scottish Salmon Company (SSC) in 2019, this significantly increased the debt Bakkafrost holds (acquisition was financed by a mixture of equity and debt). However, CFO/Total Debt is not the most important measure of liquidity and solvency since paying off the entire company's debt by a single year's CFO is not something that a "going concern" company does. A better measure is times interest covered[20] ratio, which remains, as mentioned previously, higher than the industry average and was over 29 for the year ended 2020. Moreover, since the financial expenses include expenses other than purely interest charges, the author has calculated the ratio of Net Financial Expenses/EBITDA, and this ratio – despite a decrease over the years – is over 16 for the year

[20] The interest coverage ratio (or times interest covered) in this section (5.1.2) does not match the same ratio in sub-section 5.1.2. This is because there can be multiple variations in how the ratio has been calculated. In this sub-section, all ratios have been calculated by the author whereas in section 5.1.1 all ratios have been taken from Wall Street Journal – nonetheless, since the ratios are NOT being compared across the sections, they can be used without worrying about challenges of consistency and comparability.

2020; this means that EBITDA alone can cover the net financial expenses of Bakkafrost over 16 times, hence signifying that Bakkafrost can comfortably fulfil its interest (and financial) obligations. Debt to Total Assets has remained relatively stable over the years, indicating that the company continues to finance its assets (and growth) with a relatively stable percentage of debt.

5.1.3 Summary of Analysis of Financial Health

All in all, the author would classify Bakkafrost's financial position as solid, not least because it has a high interest coverage ratio and a relatively stable current ratio. The leverage position has remained relatively stable over the years, even as Bakkafrost has increased its capital outlay. In addition, the company has been able to achieve top line growth almost every year, and has liquidity, solvency and ROIC position that is superior to its peers.

5.2 Capital Structure & Company Strategy

In this section, capital structure of salmon farming industry will be discussed in light of literature from strategy as well as finance. However, it must be noted that optimal capital structure varies from industry to industry. The purpose of this section is not to comment on what *would* be the optimal capital structure for salmon farming companies and Bakkafrost, rather the aim is to *explore* the capital structure and try to understand the reasons for it – this is not exactly an empirical or scientific exercise and hence, the interpretation of the capital structure in light of theories mentioned below could vary from person to person. This section does not contribute to the valuation of Bakkafrost, nonetheless, it helps understand how the industry's (and Bakkafrost's) capital structure is and what could be the reasons for that.

5.2.1 Capital Structure in Finance

One of the earliest concepts that every student of financial economics is taught is Modigliani and Miller's proposition from the 1950s that in perfect capital markets, the capital structure of the corporation is irrelevant. In practice, no corporation operates in a perfect capital market. However, "M&M's basic insight is important not only for understanding determinants of optimal capital structure but also for other corporate financial policies" (Luehrman, 2016, p. 3). As a result of the insights provided by M&M, several capital structure theories have

emerged. These theories explain how corporations determine their optimal capital structure while trying to balance (often conflicting) imperfections present in the markets.

One of the most well-known capital structure theories is the pecking order theory. This theory is grounded in the problem of asymmetric information between company insiders and outsiders. The theory argues that corporations prefer to fund projects using internal funds, if internal funds are unavailable then they prefer to use debt financing and fund their operations/projects from equity issuance only if the two other options are unavailable (Berk & DeMarzo, 2013, p. 570). In cases where corporations do go for equity issuance, they try to time the market and issue more equity only when some favourable news has been announced, in a bid to reduce information asymmetries (Berk & DeMarzo, 2013, p. 571).

Another widely known capital structure theory is the trade-off theory. By definition, this theory stipulates that corporations try to balance the trade-off between the benefits and side-effects of leverage (Berk & DeMarzo, 2013, p. 550). The benefit of debt arises from the interest tax shield that it provides whereas the side-effects are the direct and indirect costs of financial distress.

5.2.2 Capital Structure in Strategy

A corporation's capital structure will have an impact on its strategy as well. In this sub-section, impact of capital structure on product-market behaviour and alliances will be discussed briefly.

Parsons and Titman (2008) find that a corporation's capital structure impacts the relationship the corporation has with its non-financial stakeholders and competitors. As per Parsons and Titman (2008), the non-financial stakeholders will also suffer if the corporation goes out of business. Hence, they argue, that a corporation's capital structure will reflect its relationship with customers, partners, and competitors. For instance, corporations following "differentiation" strategies rather than "low-cost" strategies in their product market behaviour are more likely to use equity finance rather than debt finance (Parsons & Titman, 2008). They argue this is because of multiple reasons. Firstly, customers of a company following differentiation strategy have higher stakes than customers of a company following low-cost strategy[21], hence, due to the higher stakes of customers, the indirect bankruptcy costs for the

[21] A company following differentiation strategy will most likely impose switching costs on its suppliers and customers in case it goes bankrupt (Parsons & Titman, 2008).

corporation following differentiation strategy increases. Secondly, Parsons and Titman (2008) argue, companies following differentiation strategy are likely to have high-quality products and demand for these products is usually cyclical, increasing the cash flow risks. They also argue that "… debt magnifies the effects of economic downturns and predation …" (Parsons & Titman, 2008. p. 231), and economic downturns tend to hurt cyclical products more.

Zambuto et al. (2014) find that corporations prefer to form alliances with companies with a capital structure similar to their own (in terms of leverage) in order to minimize costs ex post. They also suggest that corporations maintain a low-leverage ratio on purpose to attract alliance partners. They demonstrate that use of equity in alliance agreements increase as a corporation's "… leverage increases and as the *difference* in leverage across the alliance partners increases" (Zambuto et al., 2014, p. 150), the use of equity here refers to structuring the alliance as a Joint Venture, i.e., if the capital structure is not similar across alliance partners, then they tend to involve equity financing to structure alliance as a JV.

5.2.3 Application of Capital Structure Theories on Industry & Bakkafrost

Industry Level Analysis

While looking at the capital structure of salmon farming companies listed on the Oslo Børs, one can see in Table 1 above that the average of total debt to total equity (excluding Bakkafrost) is 0,59 (it rises to 0,65 when Bakkafrost is excluded); however, variations in the structure are visible with Bakkafrost's total debt to total equity under 0,30 and Greig Seafood's total debt to total equity above 0,95. Nonetheless, with an average of 0,59 of total debt to equity, the capital structure cannot be considered highly leveraged, rather the author would classify it as moderately leveraged. This could be due to multiple factors. To begin with, salmon is a commodity and its prices have fluctuated significantly over the years. Fluctuations in prices, coupled with fluctuations in salmon harvests (due to fish health, diseases, extreme weather events, etc.), could lead to significant fluctuations in cash flows. Therefore, it could be the case that salmon farming companies avoid a highly leveraged capital structure to avoid liquidity problems due to unforeseen challenges. Secondly, salmon, as compared to other meat proteins, is relatively expensive. This could imply that salmon sales could be cyclical (the argument being that salmon is a more premium and differentiated meat protein as opposed to other meats), and hence, an economic downturn could magnify the challenges to salmon farmers, in line with the arguments of Parsons and Titman (2008) mentioned in section 5.2.2. above. Nonetheless, a review of leverage ratios by industry shows that the "agricultural

production livestock and animal specialties" industry had median total debt to equity ratio of a mere 0,04 in 2020 (ReadyRatios, n.d.). Salmon farming industry, with its average debt to equity of 0,59 (as calculated in Table 1 above) is highly leveraged *vis-à-vis* the industry, and as per the author's discussion with an industry expert, this is because the production of salmon is more industrialized and intensive than other agricultural products, and consequently, requires more capital.

Company-specific Analysis

Bakkafrost had total debt to total equity ratio (as of 6th March 2021) of approximately 0,30 (refer to Table 1 above), which is significantly lower than the industry average total debt to total equity of 0,65. Bakkafrost's equity ratio for the past six years has remained within the range of 0,66 to 0,70. One reason why Bakkafrost has maintained low leverage as opposed to the industry average *could* be that *within* the salmon industry, Bakkafrost's products are premium (in VAP segment) and superior (in fresh fish segment)[22], and hence, due to its relatively "differentiated strategy" vis-à-vis other players, Bakkafrost might have preferred maintaining low leverage in line with the argument of Parsons and Titman (2008) that companies with more differentiated products tend to maintain low leverage. However, this could not be the only reason for why Bakkafrost has low leverage because other salmon farmers also have premium and superior salmon products.

Moreover, despite its relatively less-leveraged capital structure vis-à-vis the industry average, the company remains open to adding debt to its capital structure. In fact, the internal financial policy of Bakkafrost allows for equity ratio of as low as 0,35, with interest coverage ratio of just 2x (Bakkafrost, n.d.-a); the interest coverage currently is over 9x (refer to Table 1 above). This shows that the company is willing to increase debt. The willingness to add debt could be the result of multiple reasons. Firstly, given its strong liquidity and solvency position vis-à-vis the industry average, Bakkafrost can afford to add more debt without creating liquidity and solvency challenges for itself. Secondly, given that all other comparable companies have higher debt ratios than Bakkafrost, Bakkafrost's willingness to acquire more debt would not make it an outlier, therefore, whatever the negative effects of debt maybe in terms of alliance formation [as mentioned by Zambuto et al. (2014)], Bakkafrost would not suffer since other

[22] Premium & Superior are the highest qualities globally.

salmon farmers have higher leverage than Bakkafrost. Finally, the company has numerous capital expenditures planned both in the Faroe Islands and in Scotland, and hence, the willingness to take more debt is absolutely in line with the pecking order theory, as Bakkafrost might be more interested in taking debt rather than issuing equity to finance its planned capital investments.

It must be kept in mind, however, that this leverage ratio is based on book values of debt and equity and have been taken from the Wall Street Journal (to ensure consistency across companies, it is presumed that WSJ would calculate these ratios in similar manner across companies). If the same ratios are calculated with market values of debt and equity, it is likely that leverage will fall significantly because the stock prices (and P/E ratios) are very high (discussed further in multiple's valuation chapter). Nonetheless, for the purposes of liquidity and solvency, it is not uncommon to use book values for analysis rather than market values.

5.2.4 Summary of Capital Structure & Company Strategy

In the capital structure section, it has been seen that Bakkafrost's debt and leverage ratios are significantly lower than the industry averages. The company is willing to take more debt, however, its current policy is not to have total debt to total equity ratio higher than 0,65 – this is in line with the industry average.

The reasons for moderate level of leverage in the industry (as opposed to the economy) could be multiple; to begin with, the industry is cyclical (and produces meat which is relatively more expensive than other types of meat) and hence, to avoid the magnification effects of debt, the incumbents might avoid high leverage in its capital structure (as cyclical products are more likely to cause cash flow issues when the economy is not doing so well). Secondly, the industry is capital intensive and growing, which would mean that a low leverage of debt is difficult as debt is needed to fund capital intensive projects (primarily in line with the pecking order theory). The fact that the salmon farming industry is capital intensive is also the reason why leverage in salmon farming industry is significantly higher than "agriculture production livestock and animal specialties" sector, as per the author's discussion with an industry expert. Moreover, debt provides interest tax shield. Consequently, the incumbents avoid extreme ends of debt ratios vis-à-vis the general economy and maintain debt levels which can be considered moderate vis-à-vis the general economy. Furthermore, now that moderate level of debt in the industry has become norm, it is likely that the individual players would not want to diverge

significantly from the mean because it could lead to challenges in forming alliances, in line with Zambuto et al.'s (2014) arguments that companies tend to form alliances with companies having a similar capital structure.

5.3 Summary of Financial Health & Capital Structure

In this chapter, the financial trends of salmon farming industry and Bakkafrost's position within the industry were discussed. The industry has lower volatility than the market (as measured by beta) and, in general, has relatively high interest coverage ratios (as per ratios given by WSJ). Bakkafrost's position within the industry is strong and its financial health is sound. It has lower than industry's average leverage and higher than industry's average interest coverage ratio. Over the years, Bakkafrost has been able to achieve top-line growth and the company achieved higher ROIC than most of its peers (except for SalMar) as per the data available on 17th May 2021.

All in all, the company is characterized by strong liquidity, solvency and profitability positions and its capital structure is less leveraged than its peers.

6. Review & Selection of Valuation Framework

As suggested by Hitchner (2017), there are two major approaches to value companies and/or projects: income approach and market (also known as multiples) approach. The market approach uses comparable assets to value the company's assets. The income approach calculates the company's value by using the future stream of cash flows the company will generate. The income approach is discussed in this chapter, while the market approach is covered in chapter 11.

However, before delving deeper into the frameworks of the income approach, it is important to mention that the challenge with all financial valuation models is that they require certain assumptions and understanding not only about the company/project under consideration but, in most cases, also about factors exogenous to the company. These models require that the person conducting valuation understand not only financial theory but also understand other business areas. This creates a challenge: most of the information that must be considered for valuation is qualitative rather than quantitative. How that qualitative information is quantified requires business judgement – this judgement, needless to say, differs from person to person. Schill (2017) warns that "… valuations are rarely identical across analysts" (p. 1); and this is starkly visible in the case of Bakkafrost, e.g., as of 18th May 2021, out of the 8 institutional analysts covering Bakkafrost, 4 recommended "HOLD" position, 3 recommended "BUY" position, and 1 recommended "SELL" position. This shows the difference of opinion amongst the most experienced and professional analysts.

The main models under the umbrella of income-based approach are listed and discussed below, followed by a discussion of why the author has chosen FCFF-based DCF model to value Bakkafrost. The main models are:

1. Discounted Cash Flow (DCF)
2. Economic Value-Added (EVA)

6.1 Discounted Cash Flow

The most popular method under the income approach is the Discounted Cash Flow method. The DCF method essentially states that the present value for any project/company/security should equal all the future net cash flows from that company, discounted at a rate appropriate to the risk of the company.

Within the discounted cash flow method, there are different variants and if applied correctly, these variants must yield the same result. Which variant from within the category of discounted cash flow methods is used depends primarily on a company's capital structure (and expected changes), the available discount rate, and the insights the analyst is seeking – since some valuation variants can offer more insights than others. The discount rate used also changes from variant to variant. The three variants are:

a. Free Cash Flow to the Firm (FCFF)
b. Free Cash Flow to the Equity (FCFE)
c. Adjusted Present Value (APV)

All DCF methods require a significant number of assumptions and therefore, it is recommended to do DCF valuation using a range of assumptions (Lerner & Willinge, 2011). Schill (2017) also warns that, due to the assumptions involved, "… virtually every number used in a DCF valuation is…" erroneous (p. 11). Hence, the author considers it appropriate to apply a 10% confidence interval, i.e., as long as the estimated price of the stock is within +/- 10% of the market price (as of 17th May), the final recommendation would be to "HOLD" the stock.

The different variants in the DCF approach are discussed below.

6.1.1 Free Cash Flow to the Firm

The DCF method gained prominence in the 1970s and within the DCF method, valuation model based on FCFF became "… the standard…" (Leuhrman, 1997a, p. 3). The FCFF variant of DCF method discounts the future FCFF at weighted-average cost of capital (WACC)[23]. The

[23] By definition, WACC is computed as a weighted average of cost of debt and cost of equity to the company. A detailed discussion on calculation of WACC is carried out later in this chapter.

resulting value from the above model provides the enterprise value of the company, which is a measure of a company's "total value" (Fernando & Kindness, 2021, subsection: "Key Takeaways"). Therefore, to calculate value of the company to only equity holders (as is the aim in this thesis), net debt must be deducted from the enterprise value[24]. The resulting value is the value of company to its equity holders. If this resulting value is divided by number of total undiluted shares outstanding, the resulting figure is price per share (Koller et al., 2015)

The calculation of the FCFF itself is complicated and has been dealt with separately later. However, for a clearer understanding of FCFF method, it must be noted here that FCFF does not account for debt payments and therefore, FCFF is also called unlevered cash flow (Mitra, 2010). In FCFF method, any benefits of tax (due to interest tax shield) are accounted for in the cost of capital, i.e., in WACC (Mitra, 2010).

FCFF model is best suited when the company's leverage ratio is relatively stable (Koller et al., 2015). Limitations of FCFF model stem from the fact that it uses a single WACC to discount the cash flows. A fluctuating leverage ratio would lead to changes in the weights assigned to cost of debt and cost of equity (Berk & DeMarzo, 2013). Any increase in leverage would lead to an increase in cost of equity – since the cash flow available to equity providers will be riskier because the debt holders will have a preferential right to cash flows – and therefore, if a firm does not have a stable debt to equity ratio, its WACC will fluctuate every time the capital structure is changed (Berk & DeMarzo, 2013). It is possible to use different WACC for different periods if the company is unlikely to keep its leverage ratio stable, however, that would be complicated and in such a scenario, use of APV method is recommended (Koller et al., 2015).

6.1.2 Free Cash Flow to Equity

As explained earlier, FCFF takes CF available to *all* the investors of the firm (both debt and equity) and discounts it at WACC. FCFE method differs from the FCFF method in two ways:

1. The free cash flow that is discounted in FCFE approach are the cash flows available to equity investors only, i.e., FCFE is calculated from FCFF by deducting interest

[24] Net Debt = Short- & Long-Term Debt *less* Excess Cash & Equivalents

expense[25] and debt repayments (in other words, adjusting FCFF for transactions with debt holders) (Mitra, 2010). This cash flow is also called levered cash flow (Mitra, 2010). Koller et al. (2015) provide an alternative method of calculating FCFE as "… dividends plus share repurchases minus new equity issues" (Koller et al., 2015, p. 159).

2. The discount rate used in FCFE based valuation is not WACC but is rather the cost of equity.

The resulting valuation figure from FCFE method is the company's value to equity investors only. This equity value can then be divided by number of outstanding shares to find price per share.

6.1.3 Adjusted Present Value Method

Modigliani and Miller, in their well-known paper "The Cost of Capital, Corporation Finance and the Theory of Investment" have argued that in a perfect capital market, capital structure is irrelevant (Modigliani & Miller, 1958). APV method is, essentially, a practical manifestation of M&M's proposition. It was developed by Stewart Myers in 1974 (as cited in Luehrman, 1994) and divides a company's cash flows into 2 streams based on their nature. Myers stated that there were two types of cash flows related to any project: "real" cash flows, i.e., the cash flows of operations; and "side effects" related to its capital structure, and Myers suggested that two cash flows be evaluated separately (Myers as cited in Luehrman, 1997a), and this is what APV approach does.

The advantage of dividing the cash flow of any project in two different categories is that the analysis conducted on these cash flows allow the managers to see how the value is divided (Luehrman, 1997a). Luehrman has taken the APV approach recommended by Myers even further and recommended a "modified APV" approach where the cash flows are not only divided into "real" and "financial side-effects" but also incorporate growth options (1994).

Luehrman argues that, apart from the managerial insight APV offers, APV approach is superior to WACC-based approach because it "… works when WACC does, and sometimes

[25] FCFF is unlevered CF whereas FCFE is the levered cash flow as it accounts for payment of financial obligations.

when WACC doesn't…" (Luehrman, 1997a, p.3). APV method is a preferred method of valuation when the leverage ratio or effective tax rate is changing (Lerner & Willinge, 2011). This is because APV separates operating cash flows from financing "side-effects" and values both separately and then adds them up to reach a final value (Lerner & Willinge, 2011).

However, the WACC-based FCFF approach remains widely used.

6.2 Economic Value Added (EVA)

Apart from discounted cash flow, economic value added is another major method of valuation within the category of income approach.

It is similar to the DCF method except for the way the company's operations are valued. Here, free cash flows are replaced with future economic profits. Economic profits are defined as the difference in the after-tax profits of the company and the cost of capital being employed to generate these profits (Desai & Ferri, 2006). A company might have accounting profits on its income statement; however, those profits could be less than what the investors were expecting or promised; EVA method helps see whether this is the case or not, and whether the company has generated value. The formula to calculate economic profits is as follows:

Economic profits = NOPLAT – (Invested capital x WACC)

The economic profits are then discounted using the relevant discount factors to calculate total present value of economic profits. This method could make managers more efficient by promoting efficient allocation of capital (Desai & Ferri, 2006). With a constant capital structure, both DCF and EVA will yield the same results – and hence, can be used to ensure that the calculations are correct (Koller et al., 2015).

It is worth noting here that the assumptions that are taken for implementation of EVA method are the same as the ones taken for the DCF method.

6.3 Selection of Method

The method used for fundamental valuation in this thesis is the DCF. As discussed above, DCF method has 3 major variations, however, all lead to the same value. In this thesis, FCFF method would be used rather than APV or FCFE method. The reason for choosing FCFF method stems from its ease of use along with the constraints posed by non-FCFF methods due to limited availability of data.

Whereas APV method is the recommended method when capital structure and/or tax rates are fluctuating, and it is also true that the use of APV method would allow greater control over tax shields and help see how much value is generated by the operations and how much value is generated by "side-effects", the problem however remains that the value of future debt is unknown. Since the exact levels of debt for the future remain unknown, assumption is that that the debt-to-equity ratio would remain constant (this does not mean that debt in DKK terms would remain the same)[26]. Since a fixed debt to equity percentage is being assumed, the use of FCFF/WACC based calculation makes the most sense since WACC is determined by leverage ratio rather than the amount of debt in DKK (or any other currency); APV method would require debt to be reported in DKK for calculation of tax shields and DKK values of debt cannot be forecasted with certainty. Moreover, since the debt levels in DKK are not known, the transactions with debt holders cannot be estimated, thereby ruling out FCFE approach. Consequently, FCFF method will be used.

Along with the FCFF based DCF method, multiples-based valuation will be carried out. Furthermore, since Bakkafrost has had historically paid dividends, Dividend Discount Model (DDM) could be used as well. However, since companies tend not to pay 100% of their earnings as dividends, the dividend-based valuation will understate the true value of the company and hence, this approach will not be used (and has consequently, not been discussed in detail in this chapter).

Economic Value Added (EVA) approach could be conducted as well along with DCF approach, however, since the EVA approach will result in same valuation as DCF approach,

[26] The reasons for presuming constant debt-to-equity ratio are discussed in chapter 8.

the author does not consider it of any added value and will consequently, not use EVA approach.

6.4 Chapter Summary

In this chapter, different valuation methods have been reviewed, and the author has decided to use FCFF based DCF method for valuation of Bakkafrost, with a 10% confidence interval. Moreover, the author has decided not to use the EVA approach because it adds little value since it would give the same estimate of share price as the DCF approach. Nonetheless, the DCF method will be complimented by multiples-based valuation.

7. Financial Statements Normalization, Reorganization and Analysis

In the last chapter, several methods of valuation were discussed. However, how the cash flows – both historical and future – are determined was not deliberated upon. In this chapter, the focus will be on the normalization and reorganization of historic financial statements of Bakkafrost. Based on the normalized and reorganized financial statements, the relationships between different line items in the financial statements will be discerned, which will be instrumental for forecasting in the next chapter. The reorganization of financial statements will also allow for calculation of Invested Capital and NOPLAT, both of which later feed into FCFF and Return on Invested Capital (ROIC) calculation.

7.1 Selection of Time Period for Analysis

The primary purpose of historic financial statements analyses is to uncover underlying trends, which will then be used for forecasting. However, an underlying assumption here is that past trends are a good proxy for future. This raises a fundamental question: how further back in the past one must go for financial statement analyses (Koller et al., 2015)? If one goes too far in the past, there is a risk that past trends which are no longer relevant might influence forecasting, this could be due to M&A's, restructuring, a general change in the competitive environmental or a change in the economy (the list is not exhaustive). However, by focusing only on recent years, one runs the risk of biasing their analysis due to one-off events (for instance, by focusing only on recent years, financial analysis of most companies is likely to be distorted by US-China trade war and Covid-19 pandemic, amongst other factors).

Keeping the above in view, one must decide how far back to conduct financial analysis for Bakkafrost. Koller et al. (2015) recommend going as far back as possible, but at least 10 years. However, the author has decided to go 5 years back, from 2016-2020 (both years inclusive) for Bakkafrost[27]. The reason for doing so stems from the fact that Bakkafrost was listed on the stock exchange in 2010 and since then has underwent several acquisitions, with the last one being in the fourth quarter of 2019. In 2011, Fish Oil & Feed was added to the value chain and

[27] In addition, accounts of 2015 have been provided because the closing figures of 2015 will be opening figures of 2016 and hence, are important.

in 2014, a new hatchery was built, and in the same year a packaging facility was built. Since all of these are essential part of value chain of Bakkafrost of today and of future, it makes little sense to conduct analysis of years prior to 2015 because what are now major components of Bakkafrost's business model were missing then. Post 2015, Bakkafrost has conducted further acquisitions and investments, including establishment of a Biogas plant in 2020 and acquisition of the Scottish Salmon Company in 2019. This could be used as an argument to not use the period of 2016-2019 for analysis and rather focus only on 2020 since the acquisition of SSC has materially changed Bakkafrost's operations (and since no major acquisitions in the future seems to be planned). It is certainly tempting to follow this argument and use figures of 2020 alone; however, due to Covid-19, significant historical fluctuations in prices of salmon, dependence of salmon quality & output on environmental conditions which can fluctuate from one year to the next, and little knowledge of potential synergies of recent acquisitions, using only one year's financial statements could lead to misleading results. Therefore, for this thesis, 2016-2020 years will be used for analysis.

7.2 Normalization & Reorganization of Financial Statements

The financial statements which are published by listed companies (including Bakkafrost) on quarterly and annual basis are prepared in line with either IFRS or US GAAP accounting principles, with minor adjustments for national accounting regulations. Bakkafrost uses IFRS. These financial standards rest on several principles and these principles shape the nature and quality of information available in the published financial statements. IFRS is a principles-based method, and is based on accounting's conceptual framework (Deloitte, n.d.), which allows for consistency and reliability in accounting information within and across companies (Palmer & Scott, 2021). However, the published financial statements are not well suited for valuation as they mix operating and non-operating items (Koller et al., 2015). Koller et al. (2015) recommend reorganizing the items in the financial statements into three streams: operating items, nonoperating items, and sources of financing (p. 165). This requires intricate knowledge of the financial standards which the company have used, as the notes to the accounts need to be read in conjunction with the concerned financial standards. Moreover, the categorization of line items into operating, nonoperating and financing items require judgement as companies do not explicitly divide them (Koller et al., 2015).

In this chapter, financial statements have been normalized & reorganized, and based on them, NOPLAT and Invested Capital has been calculated, which serves as an input for FCFF calculation. Details of normalization, reorganization, NOPLAT calculation, and Invested Capital calculation are presented later in this chapter. However, it must be kept in mind that reorganization of the financial statements has been done while keeping the concept of materiality in view for valuation, whereas an item is considered material if "… it would affect or influence the decision of a reasonable individual …" (Accounting Principles, n.d., subsection: "Materiality principle"). In cases where an item has been determined to be immaterial, little effort has been made to analyse it in detail.

7.2.1 Bakkafrost's Reorganized Income Statement & Statement of Financial Position

Bakkafrost's Income Statement & Statement of Financial Position have been reorganized into operating and non-operating items while keeping in view the recommendations of Koller et al. (2015) and are presented in Tables 3 and 4 below, respectively.

Detailed explanations for classifying items as operational and non-operational are provided after the presentation of reorganized financial statements. The reorganized statements are later used to calculate NOPLAT and Invested Capital.

Reorganized Income Statement

All figures in 1000s DKK

	Explanatory Notes	2015	2016	2017	2018	2019	2020
Operating Revenue		2 850 363	3 202 686	3 770 049	3 177 422	4 511 107	4 651 892
Purchase of goods		-992 497	-920 148	-883 871	-1 074 645	-1 354 921	-2 358 623
Gross Profit		**1 857 866**	**2 282 538**	**2 886 178**	**2 102 777**	**3 156 186**	**2 293 269**
Change in inventory and biological assets		215 432	58 874	-141 406	199 696	-29 423	401 679
Salary and personnel expenses		-281 085	-327 825	-400 267	-353 756	-512 762	-608 347
Other Operating Expenses		-683 532	-715 372	-783 268	-674 907	-978 788	-1 062 719
Total Operating Expenses		-749 185	-984 323	-1 324 941	-828 967	-1 520 973	-1 269 387
Other Income	2	0	0	0	0	0	44 041
Operational EBITDA		1 108 681	1 298 215	1 561 237	1 273 810	1 635 213	1 067 923
Depreciation & Amortization		-108 098	-133 261	-183 590	-198 898	-310 115	-446 765
		1 000 583	1 164 954	1 377 647	1 074 912	1 325 098	621 158
Revenue Tax	4	0	-108 450	-119 681	-95 867	-99 128	-53 584
Operational EBIT		**1 000 583**	**1 056 504**	**1 257 966**	**979 045**	**1 225 970**	**567 574**
Non-Operational Items							
Fair value adjustments of biological assets	5	-27 578	608 195	-693 540	195 819	-220 567	118 003
Income from associates		6 757	14 821	17 302	9 369	13 812	5 546
Onerous Contracts	6	-51 004	-16 372	67 376	0	0	0
		-71 825	606 644	-608 862	205 188	-206 755	123 549
(Badwill)		0	10 440	0	0	0	0
Total Non-Operational Items		-71 825	617 084	-608 862	205 188	-206 755	123 549
EBIT		**928 758**	**1 673 588**	**649 104**	**1 184 233**	**1 019 215**	**691 123**
Financial Items							
Financial income	10	3 599	1 524	1 395	2 651	4 996	1 399
Net interest expenses	10	-24 622	-25 983	-26 365	-12 477	-17 114	-36 317
Net currency effects	6	23 350	-12 355	4 173	1 419	-12 670	-13 096
Other financial expenses	10	-6 614	-4 159	-4 423	-3 760	-12 513	-17 125
Net Financial Income (Expenses)		-4 287	-40 973	-25 220	-12 167	-37 301	-65 139
EBT		924 471	1 632 615	623 884	1 172 066	981 914	625 984
Tax		-114 296	-293 727	-112 482	-211 774	-180 031	-163 139
Profit (Loss) from Continuing Operations		**810 175**	**1 338 888**	**511 402**	**960 292**	**801 883**	**462 845**
Profit or loss for the year attributable to:							
Non-controlling interests		0	0	0	0	-8 382	0
Owners of P/F Bakkafrost		810 175	1 338 887	511 402	960 292	810 267	462 845
		810 175	**1 338 887**	**511 402**	**960 292**	**801 885**	**462 845**

Table 3: Historic reorganized Income Statement of Bakkafrost; Data Source: Annual Reports; All figures in DKK 1000s.

Reorganized Statement of Financial Position

All values in 1000s DKK	Explanatory Note	2015	2016	2017	2018	2019	2020
Assets							
Operating Current Assets							
Total Inventory		1 482 239	2 214 039	1 402 509	1 797 309	2 450 237	2 893 056
Accounts Receivables		199 263	292 009	262 493	269 348	625 993	490 075
Tax Receivables		0	0	0	0	0	72 143
Total Other Receivables	9	26 883	51 520	72 526	22 935	45 520	61 431
Cash & Cash Equivalent	1	39 192	46 565	99 147	111 341	175 211	171 535
Operating Current Assets		1 747 577	2 604 133	1 836 675	2 200 933	3 296 961	3 688 240
Non-Operating Current Assets							
Excess Cash	1	62 660	188 431	210 404	205 553	1 134 335	295 404
Total Other Receivables	9	153 089	58 340	84 630	0	0	0
Non-Operating Current Assets		215 749	246 771	295 034	205 553	1 134 335	295 404
Total Current Assets		1 963 326	2 850 904	2 131 709	2 406 486	4 431 296	3 983 644
Non-Current Assets							
Land buildings & other real estate		585 740	874 907	1 148 571	994 353	1 174 428	1 555 019
Plant machinery & other operating equipment		797 449	906 045	957 857	926 334	1 420 379	1 703 233
Other operating equipment		44 095	59 001	97 654	160 063	210 749	242 147
Vessels		0	278 518	366 347	356 514	341 259	332 254
Prepayments for purchase of PPE		104 208	0	0	447 059	633 684	387 946
Leased Assets	3	0	0	0	0	332 824	353 192
Total Tangible Assets		1 531 492	2 118 471	2 570 429	2 884 323	4 113 323	4 573 791
Intangible Assets							
Licenses	7	290 138	372 138	372 138	372 138	3 720 158	3 720 158
Total Operational Non-Current Assets		1 821 630	2 490 609	2 942 567	3 256 461	7 833 481	8 293 949
Goodwill	7	4 537	4 537	4 537	17 607	567 129	664 837
Brands	7	0	0	0	0	108 400	108 400
Total Goodwill & Brands		4 537	4 537	4 537	17 607	675 529	773 237
Non-Current Financial Assets							
Investments in Associates	10	105 785	34 111	51 406	57 497	63 766	67 141
Investments in stocks & shares	10	25 108	25 296	25 296	55 269	55 318	55 318
Long-term Receivables		0	12 660	0	9 200	4 422	8 101
Deffered Tax Assets		0	0	0	0	37 593	26 934
Non-Current Financial Assets		130 893	72 067	76 702	121 966	161 099	157 494
Total Non-Current Assets		1 957 060	2 567 213	3 023 806	3 396 034	8 670 109	9 224 680
Total Assets		**3 920 386**	**5 418 117**	**5 155 515**	**5 802 520**	**13 101 405**	**13 208 324**
Liabilities & Equity							
Operating Current Liabilities							
Short-term interest bearing debt		0	0	378 300	0	0	0
Trade Payables		195 223	138 873	189 548	204 500	584 435	563 857
Current Tax Liabilities		155 359	142 016	198 141	152 655	195 484	37 422
Short-term Debt Liabilities (Leasing)		0	0	0	0	107 808	131 336
Other Current Liabilities		12 409	46 513	33 699	21 536	23 732	27 885
		362 991	327 402	799 688	378 691	911 459	760 500
Non-Op Current Liabilities							
Financial Derivatives	6	0	0	127 255	320	13 493	9 710
Provisions for onerous contracts	6	51 004	67 378	0	0	0	0
		51 004	67 378	127 255	320	13 493	9 710
Total Current Liabilities		413 995	394 780	926 943	379 011	924 952	770 210
Non-Current Liabilities							
Deferred Taxes		349 546	545 699	455 448	534 430	1 123 796	1 222 222
Long-term interest-bearing debt	10	447 559	827 146	146 696	812 053	2 328 231	2 219 690
Long-term leasing debt		0	0	0	0	225 585	265 235
Additional Debt Taken							
Derivatives	6	128 804	101 456	0	0	1 966	1 480
Total Non-Current Liabilities		925 909	1 474 301	602 144	1 346 483	3 679 578	3 708 627
Total Liabilities		**1 339 904**	**1 869 081**	**1 529 087**	**1 725 494**	**4 604 530**	**4 478 837**
Equity		2 580 482	3 549 035	3 626 429	4 077 029	8 496 875	8 729 487
Total Liabilities & Equity		**3 920 386**	**5 418 116**	**5 155 516**	**5 802 523**	**13 101 405**	**13 208 324**

Table 4: Historic reorganized Statement of Financial Position of Bakkafrost; Data Source: Annual Reports.

7.2.2 Explanatory Notes: Division into Operating, Non-Operating & Financing Items

As mentioned previously, reorganization of financial statements requires business judgment. In the case of Bakkafrost, fortunately, this is relatively easy since the company's portfolio is limited. Each of the major line items that has been reorganized (or has not been reorganized due to lack of materiality) is discussed in detail below.

- **Explanation 1: Excess Cash**

Koller et al. (2015) recommend a rule of thumb that only 2% of cash and cash equivalents be treated as operational. Damodaran (n.d.-a) also states that defining operating cash as a percentage of revenue is an accepted convention/method. Opler et al (1998), however, provide more detailed insights into a corporation's cash holdings. Opler et al. (1998) find that growing firms and firms with relatively "… riskier cash flows hold relatively high ratios of cash to total non-cash assets" (p. 1), whereas the opposite is true for corporations with high credit ratings and access to capital markets (Opler et al., 1998). They suggest that a corporation's optimal cash holding is the equilibrium between cost of cash shortage and opportunity cost of holding cash. The opportunity cost of holding cash is presumed to be constant whereas the cost of shortage has positive convexity, i.e., the cost of cash shortage decreases as the amount of cash held by the company increases, as shown in Figure 7 below (Opler et al., 1998, p. 8). Whereas it is relatively simple to grasp the argument of equilibrium between cost of cash shortage and marginal cost of holding cash, it is much harder in practice since quantifying several qualitative costs associated with cash shortage is extremely difficult, not least because Opler et al. (1998) do not provide a framework to do so.

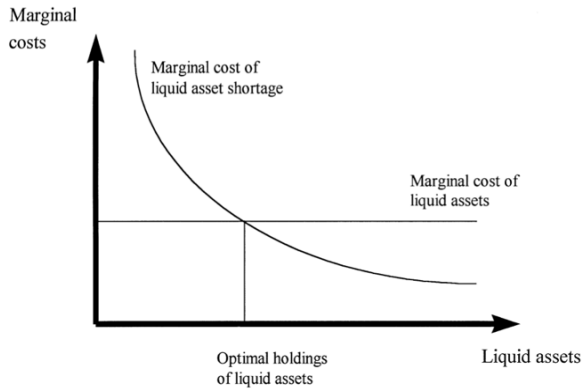

Figure 7: Illustration of marginal cost of cash shortage against opportunity cost of holding cash; Figure taken from: (Opler et al., 1998, p. 8)

Furthermore, Bates et al. (2009) show that between 1980 and 2006, the cash holdings of the US-based corporations, as measured by cash-to-assets, have more than doubled from 10,5% to 23,2% - with an almost linear increase of 0,46% annually. As per traditional financial theory, large cash holdings could be a sign of agency problems and entrenched management. However, Bates et al. (2009) show that the increase in cash holdings is due to the "… precautionary motive for cash holdings…" (p. 1985) as the cash flows have become more volatile and they "… find no consistent evidence that agency conflicts contribute to the increase" (p. 1). Given the improvements in derivative markets, they propose that the precautionary demand for cash should have decreased, rather than increased over the years. However, since the opposite has happened, they suggest that the increase in cash holdings is due to "… a higher volatility in unhedgeable risks…" (p. 1980).

Fresard (2010) has explored the link between a corporation's cash holdings and its product market behaviour and strategies, he argues that "… cash holdings strategically influence product market outcomes" (p. 1119) and has competitive value. He also argues that the cash holdings are influenced by competitor's "… financial status and competitive position…" (p. 1119).

Keeping the above in view, the author does not consider it appropriate to use Koller et al.'s (2015) 2% rule of thumb, not least because salmon farming's cash flows are open to fluctuations due to diseases, weather events & salmon prices. Therefore, the author has used the cash in bank to revenue ratio of Mowi Group[28] as a proxy for what should be considered operational cash for Bakkafrost, with 1% addition to compensate for Bakkafrost's relatively smaller size vis-à-vis Mowi Group. The reason for this is relatively straight forward: Mowi Group is the largest salmon producer in the world, and as such, it has easy access to capital markets and has a strong competitive position. Therefore, as opposed to other smaller players, it is less likely to hold excess cash as it can raise cash relatively easily due to its competitive position. Bakkafrost, on the other hand, due to its relatively smaller size and arguably weaker

[28] Mowi Group is used as a proxy because it is presumed it has easier access to capital and money markets by virtue of its position as market leader. The calculated cash in bank to revenues percentage of Mowi Group is then increased by 1% to adjust for Bakkafrost's size, and the adjusted rate is presumed to be Bakkafrost's operational cash as a percentage of revenue for that year.

position than Mowi Group, is likely to hold excess cash. Hence, cash ratio of Mowi Group has been used as a proxy for operating cash.

Table 5 below shows the calculation of operating cash to revenue ratio for years 2015-2020.

Operating & Excess Cash

All figures in 1000s EUR	2015	2016	2017	2018	2019	2020
Cash Ratio - Mowi ASA						
Revenue	3 093 400	3 502 800	3 626 100	3 749 800	4 074 200	3 732 200
Cash in Bank	11 600	15 900	59 100	93 900	117 500	100 300
Restricted Cash	60 100	88 000	12 600	11 400	1 100	6 900
Total Cash	71 700	103 900	71 700	105 300	118 600	107 200
Mowi's Cash in Bank to Revenue %	**0,37%**	**0,45%**	**1,63%**	**2,50%**	**2,88%**	**2,69%**
Add: 1% to adjust for size	1,00%	1,00%	1,00%	1,00%	1,00%	1,00%
Bakkafrost's Cash Ratio (as a % of Revenue)	**1,37%**	**1,45%**	**2,63%**	**3,50%**	**3,88%**	**3,69%**

Table 5: Operating Cash as a percentage of Revenue calculation of Mowi & Bakkafrost Group; Data Source: Annual Reports.

- **Explanation 2: Other Income**

Between 2015-2020, other income was reported only once, and the amount was only DKK 44041. Therefore, the treatment of other income will not have any material impact on past trend analysis and forecasting. However, since the company itself has regarded "other income" as operating, the author has done the same.

- **Explanation 3: Operating Leases**

Until 2018, IAS 17 governed the treatment of leases (IFRS, n.d.). For the lessee, IAS 17 allowed for leases to be classified either as operating or financing, based on certain criteria. For finance leases, at the beginning of the lease, lease liability and its corresponding assets were recognized on the statement of financial position. However, the operating leases were expensed as incurred, with no recognition of liability.

Liability is defined as "a present obligation of an entity to transfer an economic resource as a result of past events" (IFRS, 2018a, p.8). Operating lease did create a liability in spirit; however, under IAS 17 this liability was not mentioned on the balance sheet, leading to off-balance sheet financing. If operating leases were listed as a liability, the capital structure of the corporation would have changed (become more leveraged) and thereby, impacted WACC. Keeping this in view, Koller et al. (2015) recommend combing through the notes for operating leases, discounting the operating leases at the company's incremental cost of borrowing, and adding the discounted value to the liabilities of the company (Koller et al., 2015; PwC, 2016). The difference between the actual lease payments and the interest charged on these operating

leases as calculated by the company's incremental cost of borrowing is to be treated as depreciation (Koller et al., 2015).

In 2019, however, IAS 17 was superseded by IFRS 16. The latter abolished the concept of operational leases and since then all leases are treated as finance leases, and the depreciation of formerly finance leases are now properly stated in the accounts of the lessee. Keeping this in view, Bakkafrost's financial statements for the years ending 2019 and 2020 need not be restated for operational leases since they are already made in line with IFRS 16. Prior to 2019, the author has not converted operational leases into finance leases because the capital structure and cost of capital that will be used for valuation is of 2020, and hence, the operating leases of 2018 will have no impact on the valuation. However, prior to 2018, the operating leases will nonetheless understate the depreciation and overstate the ROIC, but the author views their impact to not be material enough to set the valuation off-course.

- **Explanation 4: Revenue Tax**

Since this tax is directly applied on the revenue of the company and is a tax-deductible expense, the author considers revenue tax to be operational. It must be noted here that there is no revenue tax on Scottish operations[29].

- **Explanation 5: Fair Value Adjustments on Biological Assets**

A relatively less known line item that exists in Bakkafrost's income statement is "fair value adjustments on biological assets". Biological assets are governed by IAS 41 which requires these assets to be reported at their net fair market value (Bakkafrost, 2021). Bakkafrost's biological assets include salmon in different lifecycle stages.

Fair value adjustments on biological assets, in line with IAS 41, are considered non-operational. The company itself also classifies these adjustments to be non-operational.

- **Explanation 6: Derivatives, Currency Effects, Onerous Contracts & Pension Assets/Liabilities**

All derivatives and currency effects have been treated as non-operating. This follows the argument that currency movements and derivatives gains & losses are not related to the core operations of a salmon farming company.

[29] Revenue tax was explained in the PESTEL analysis.

Onerous contracts are not considered operational. This is based on the definition of onerous contracts, which are defined as contracts in which costs exceed the expected economic benefits (IFRS, 2018b). Onerous contracts can happen due to several reasons, but primarily happen for Bakkafrost when the price of fulfilling the contract exceeds the revenue from it. Since this has nothing to do with the core operations, it is regarded as non-operational expense. It is interesting to note, however, that in the last 3 years, Bakkafrost has had no onerous contract.

Moreover, the group does not have any liabilities or assets in its pensions plan.

- **Explanation 7: Intangible Assets**

Bakkafrost has 3 categories of intangible assets: goodwill, licenses, and brands. Of these 3 intangible assets, the only asset that has been impaired in Bakkafrost's history is goodwill, which was impaired in 2018, 2019 and 2020. Accumulated impairment for goodwill is DKK 2 113 000 as of 31st December 2020.

Licenses are treated as operational assets because they give the right to conduct fish farming. Goodwill and Brands, however, are not core operational intangible assets.

It is recommended to compute invested capital twice, once with and once without goodwill [and brands] (Koller et al., 2015). Computation of invested capital without goodwill and acquired intangibles allow for computation of ROIC that explores the corporation's operational performance, whereas the calculation of invested capital with goodwill and acquired intangibles "… measures the competitiveness of the underlying business" (Koller et al., 2015, p. 175).

It is worth mentioning here that for the purposes of ROIC calculations, licenses are treated the same was as PPE because without the licenses, fish farming operations cannot be conducted. However, brands and goodwill are treated as "intangibles".

- **Explanation 8: Operating Tax (Cash & Accruals Basis)**

The determination of operating tax, both on accruals and cash basis, is one of the crucial inputs for a good valuation (Koller et al., 2015). However, Koller et al. (2015) warns that calculating operating cash tax is tricky, not least because of limited information that is disclosed by the companies. The tax calculation below has been done in line with the suggestions of Koller et al. (2015) and is based on previous work done by Malin et al. (2016).

Before delving deeper into the calculation, it is important to state that Bakkafrost provides details of different tax items in the tax related notes. In Table 6 below, all the information has been taken from the notes to the accounts, and the author has only classified the line items into operating and non-operating based on business judgement.

Classification into Operating & Non-Operating Temporary Differences *All figures in 1000s DKK*							
Operating Net Specific Temporary Liabilities Differences	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Licenses	293 675	293 675	375 678	375 678	375 678	3 248 272	3 624 015
PPE	305 251	669 378	897 044	1 021 867	1 187 172	1 394 634	1 518 528
PPE (22,5%)	298 113	0	0	0	0	0	0
Biomass	1 013 958	1 065 828	1 858 433	1 096 667	1 358 472	1 728 203	1 308 942
Receivables	-492	-54 006	-70 745	-2 644	-2 644	-156	1 318
Losses Carried Forward	0	0	0	0	0	0	0
	1 910 505	**1 974 875**	**3 060 410**	**2 491 568**	**2 918 678**	**6 370 953**	**6 452 803**
Non-Operating Net Specific Temporary Liabilities Differences							
Financial Assets	10 553	16 620	26 972	44 572	50 556	67 927	78 742
Currency Effects	94 515	79 226	45 736	121 833	583	-1 534	0
Derivatives (Equity Posted)	-116 929	-128 804	-101 456	-127 256	-317	3 733	147
Losses Carried Forward	0	0	0	-450	-444	49	0
Other Differences	0	0	0	0	0	0	510
	-11 861	**-32 958**	**-28 748**	**38 699**	**50 378**	**70 175**	**79 399**
Total Net Temporary Differences: Liabilities (Assets)	**1 898 644**	**1 941 917**	**3 031 662**	**2 530 267**	**2 969 056**	**6 441 128**	**6 532 202**

Table 6: Division of temporary liabilities differences into operating & non-operating items; Data Source: Annual Reports; positive values mean liability and negative values mean assets.

Moreover, each year's deferred tax liability has also been provided in the notes. Since net deferred tax liability (DTL) and net specific temporary differences have been provided, the tax rate for each year's temporary differences can be calculated as DTL divided by Net Specific Temporary Differences, as shown in Table 7 below.

Calculation of Tax Rate on Deferred Taxes	2014	2015	2016	2017	2018	2019	2020
Net Defered Tax Liability (Asset)	414 014	349 546	545 699	455 448	534 430	1 086 203	1 195 289
Total Net Temporary Differences: Liabilities (Assets)	1 898 644	1 941 917	3 031 662	2 530 267	2 969 056	6 441 128	6 532 202
Tax Rate (Net DTL/Total Net Temporary Differences)	22%	18%	18%	18%	18%	17%	18%

Table 7: Calculation of tax rate on deferred taxes; All figures in DKK 1000s; Data Source: Annual Reports

The calculation of operating tax every year is relatively straightforward as well. The company discloses each year's effective tax rate in the notes. This effective tax rate can simply be

multiplied with EBITA (operational) to get operating tax. The difference between total tax for the year and operating tax is, by definition, non-operating tax for the year, as shown in the Table 8 below. The total tax calculated in the table below matches the tax figures as reported in the income statements.

Calculation of Operating Tax (Accruals Basis)	2015	2016	2017	2018	2019	2020
Operational EBITA	1 000 583	1 056 504	1 257 966	979 923	1 226 848	567 931
Effective Tax Rate (Given)	12%	18%	18%	18%	18%	26%
Operational Tax (Op EBITA*Effective Tax Rate)	123 672	189 854	226 811	177 072	224 881	148 003
Non-Op Tax (Total Tax - Op Tax)	-9 376	103 492	-114 329	34 702	-44 850	15 136
Total Tax	**114 296**	**293 346**	**112 482**	**211 774**	**180 031**	**163 139**

Table 8: Calculation of operating tax on accruals basis; All figures in DKK 1000s.

Conversion of operating tax into cash operating tax is shown in Table 9 below. Table 9 has operating deferred taxes (opening and closing); this is calculated by multiplying the deferred tax rate with operating temporary difference each year (calculated in Table 6 above). Once opening and closing DTL have been calculated, the cash operating tax is calculated by the logic of T-Accounts (with opening liability and year's tax expense being credit & closing liability being debit, with the difference going to cash), or as Koller et al. (2015) state, the operating DTL is calculated by "… subtract[ing] the increase in operating deferred-tax liabilities (net assets) from operating taxes" (p. 187).

Calculation of Operating Tax (Cash Basis)	2015	2016	2017	2018	2019	2020
Opening Operating DTL	416 600	355 478	550 874	448 482	525 362	1 074 369
Add: Year's Operating Tax	123 672	189 854	226 811	177 072	224 881	148 003
Less: Closing Operating DTL	355 478	550 874	448 482	525 362	1 074 369	1 180 760
Cash Tax	**184 794**	**-5 541**	**329 203**	**100 192**	**-324 126**	**41 612**

Table 9: Calculation of operating tax on cash basis; All figures in DKK 1000s.

Based on all the calculations above, the next step in reorganizing the statement of financial position would be to remove the current and non-current liabilities mentioned in the balance sheet and replace those line items with the operating and non-operating DTL (the sum of operating and non-operating DTL calculated above equals current and non-current liabilities mentioned in the balance sheet). However, this division into current and non-current operating DTL is problematic because the above calculations have resulted in operating and non-operating deferred taxes, along with operating cash taxes. However, it is not possible to further divide the given deferred taxes into "current" and "non-current" components, given the limited disclosures by the company. It would seem a reasonable assumption that all the operating deferred tax calculated above be classified as a current liability – however, the author does not agree with this assumption on the grounds that this would lead to current DTL figures which

are significantly and materially higher than current tax liability reported by the company in the annual report (e.g., the company reports current tax liability for the year ended 2020 at DKK 37 422 000, whereas the closing operating DTL as per the calculations above are DKK 1 180 760 250). This would materially overstate current DTL and understate non-current DTL. Hence, the author has decided not to reclassify the current and non-current tax liabilities mentioned in the annual report and has let them remain as is on the reorganized statement of financial position. Nonetheless, the calculation of cash operating taxes will be used for historic NOPLAT calculation.

- **Explanation 9: Operating Current Assets & Operating Current Liabilities**

Operating capital is calculated as the net of current operating assets and current operating liabilities (Koller et al., 2015).

Most of the assets listed under the head of current assets are considered operating assets. The contentious items in the current assets are the line items of “other receivables” and “cash”. Treatment of cash and cash equivalents was discussed in “Explanation 1” above. “Other receivables” has been broken down into its component parts, with some of the items considered as operational and some as non-operational. Specifically, “receivables from associate companies” and “deposit for interest and current swap” line items within other receivables are considered non-operating, with the rest being considered operating.

All liabilities under the head of current liabilities are considered operating, except for derivatives and provisions for onerous contracts, as explained in explanation 6 above.

Operating liabilities are deducted from operating assets to calculated working capital, which feeds into invested capital calculation and is also needed for FCFF calculation.

- **Explanation 10: Financial Investments, Non-Current Liabilities & Financial Expenses**

All financial expenses and non-current liabilities are treated as non-operational.

Investments in financial assets are considered as non-operational assets and their incomes are considered as non-operating incomes. Detailed explanation of how financial investments are accounted for in valuation is provided in chapter 8.

7.3 NOPLAT

NOPLAT is an acronym for Net Operating Profit Less Adjusted Tax (Koller et al., 2015). As mentioned previously, NOPLAT feeds into the calculation of FCFF, which is then discounted by relevant cost of capital to reach enterprise value. Therefore, correct calculation of NOPLAT is necessary for correct calculation of FCFF.

7.3.1 NOPLAT's Calculation Framework

As the name suggests, NOPLAT is calculated by deducting operating expenses from operating revenues and then deducting taxes related to operating profits only. Koller et al. (2015) recommend using cash operating tax rather than accruals based operating tax for NOPLAT's calculation (calculated in explanation 8 above). Mathematically (Koller et al., 2015):

NOPLAT = EBITA *less* Operating Cash Taxes

where

EBITA = Net Operating Profit

As can be seen, the NOPLAT equation declares EBITA to be operating profit. Using EBITA as operating profit, consequently, means that depreciation is considered as an operating expense whereas amortization is not considered an operating expense. This raises two questions.

i. Firstly, why not use EBITDA instead of EBITA as operating profit (Koller et al., 2015)? This is because depreciation is a good proxy for the cost of using an asset[30]. Hence, by accounting for depreciation, the cost of using asset is accounted for. This is highly important in capital intensive industries, like salmon farming, because the cost of using equipment is one of the major costs.

ii. Secondly, why not use EBIT instead of EBITA as operating profit (Koller et al., 2015)? Koller et al. (2015) argue that, since IFRS does not allow for capitalization of internal intangibles (except for R&D and that too after commercial and technical

[30] By definition, depreciation is the cost of an asset spread over its useful life.

feasibility has been established), the amortization is expensed in the period it was incurred; and even with acquired intangibles, any additions are expensed as incurred. Since the intangibles are expensed as incurred, rather than capitalized like PPE, using EBIT metric would understate NOPLAT since the intangibles have already been expensed when incurred. However, those intangible assets which are capitalized, such as licenses and computer software, are to be treated in a manner like PPE and their amortization needs to be deducted from NOPLAT. For Bakkafrost, licenses have not experienced any amortization historically and no software is reported as an intangible asset by the company.

7.3.2 Bakkafrost's Historic NOPLAT Calculation

NOPLAT is calculated by first reorganizing the income statement into operating and non-operating items (based on adjustments explained in notes above), and then deducting cash operating tax from operating EBITA. Calculation of operational EBIT has already been done in the reorganization of income statement. The operating cash tax for 2015 is inflated because the opening operating tax figure for 2015 is presumed zero. Details of calculation of historic NOPLAT is presented in Table 10 below.

NOPLAT Calculation

	2015	2016	2017	2018	2019	2020
Operational EBIT	1 000 583	1 056 504	1 257 966	979 045	1 225 970	567 574
Add: Amortization	0	0	0	878	878	357
Operational EBITA	1 000 583	1 056 504	1 257 966	979 923	1 226 848	567 931
Less: Operating Tax	184 794	-5 541	329 203	100 192	-324 126	41 612
NOPLAT	**815 789**	**1 062 045**	**928 763**	**879 731**	**1 550 974**	**526 319**

Table 10: Calculation of historic NOPLAT; All figures in DKK 1000s.

7.3.3 Reconciliation of NOPLAT to Net Profit from Continuing Operations

Koller et al. (2015, p. 188) recommend reconciling NOPLAT to net income to ensure that there has been any no error (p. 188). The reconciliation table (Table 11) is presented below and has been made in line with Koller et al.'s (2015) suggested methodology. The reconciliation for 2015 has been excluded because the reconciled profit does not match the profit from the income statement; this is because of missing 2014 figures.

It is worth re-mentioning here that for the purposes of analysis, 5-year period is being used, i.e., 2016-2020, and the figures for 2015 were taken so that opening figures for 2016 would be available.

NOPLAT Reconciliation with Operating Profit

	2016	2017	2018	2019	2020
NOPLAT	1 062 045	928 763	879 731	1 550 974	526 319
Less: Amortization	0	0	878	878	357
	1 062 045	928 763	878 853	1 550 096	525 962
Add: Decrease (Increase) in Operating DTL	-195 395	102 391	-76 880	-549 007	-106 391
	866 650	1 031 155	801 973	1 001 089	419 571
Add: Total Non-Operational Items	617 084	-608 862	205 188	-206 755	123 549
	1 483 734	422 293	1 007 161	794 334	543 120
Add: Net Financial Income (Expenses)	-40 973	-25 220	-12 167	-37 301	-65 139
	1 442 761	397 073	994 994	757 033	477 981
Less: Non-Op. Tax for the year	103 492	-114 329	34 702	-44 850	15 136
Net Profit for the Year	**1 339 269**	**511 402**	**960 292**	**801 883**	**462 845**

Table 11: Reconciliation of NOPLAT with Operating Profit; All figures in DKK 1000s.

7.4 Invested Capital

For a company to generate value, the return on invested capital (ROIC) needs to be greater than the cost of capital (Koller et al., 2015, p. 17). For the purposes of valuation, however, invested capital constitutes only of those assets and liabilities which are essential for "core" operations of the company (Koller et al., 2015). As mentioned previously, the invested capital presented in financial statements do not differentiate between core and non-core assets & liabilities and therefore, to be able to separate them one needs to go through the notes to the accounts. An important point to mention here is that the FCFF is the cash flow available to *all* investors, i.e., both equity and credit investors, and the invested capital should include *only* those liabilities which are relevant for core operations – the remaining liabilities are considered part of financing category (Koller et al., 2015).

7.4.1 Invested Capital's Framework

The invested capital includes summation of operating working capital, fixed assets, net other long-term operating assets "… and, when appropriate, intangible assets…"[31] (p. 172).

[31] Discussion on intangible asset is presented below.

Hence, mathematically (Koller et al., 2015):

Invested Capital = Working Capital + Long-Term Operating Assets + Intangibles

where

Working Capital = Operating Current Assets – Operating Current Liabilities

The sum of working capital & operating long-term assets lead to invested capital. The sum of invested capital and nonoperating assets results in total funds invested in any corporation (Koller et al., 2015, p. 176). Mathematically:

Total Funds Invested = Invested Capital + Non-Operating Long-Term Assets + Non-Operating Current Assets

7.4.2 Bakkafrost's Invested Capital

Detailed explanations of "contentious" individual line items have been provided in section 7.2.2., along with the arguments for why an item has been classified as operating, non-operating, and financing. Brief explanation for items which are deemed not contentious is provided in the paragraph below in this section, followed by calculation of Bakkafrost's invested capital.

All interest-bearing liabilities have been considered non-operational, in line with recommendations of Koller et al. (2015, p. 172). Moreover, all long-term tangible assets have been regarded as operating, in line with recommendations of Koller et al. (2015, p. 174). Licenses have been treated like tangible assets because they are at the core of salmon farming and are central to operations, unlike goodwill. Intangibles other than licenses have been treated with care – and invested capital has been calculated twice, once with and once without goodwill. Calculation of invested capital in two different methods is recommended because it allows one to see the operational performance as well as the performance of the entire business – this is explained in detail in "Explanation 7 – Intangible Assets" earlier. Associate companies, joint ventures and other equity investments have been treated as non-operating assets as per Koller et al.'s recommendations (Koller et al., 2015). For Bakkafrost, no hybrid securities and no pension liabilities (underfunded or otherwise) exist, hence, no adjustment

need to be made for those. Moreover, no adjustment has been made for leases prior to 2019, as explained in section 7.2.2. Non-operational current liabilities, all non-current liabilities and equity are considered financing items and are together called “liabilities & equity”.

Below in Tables 12A and 12B, Bakkafrost’s invested capital (and liabilities and equity) are presented.

Invested Capital Calculation

All figures in 1000s DKK		2015	2016	2017	2018	2019	2020
Operating Current Assets							
Total Inventory		1 482 239	2 214 039	1 402 509	1 797 309	2 450 237	2 893 056
Accounts Receivables		199 263	292 009	262 493	269 348	625 993	490 075
Tax Receivables		0	0	0	0	0	72 143
Total Other Receivables	9	26 883	51 520	72 526	22 935	45 520	61 431
Cash & Cash Equivalent	1	39 192	46 565	99 147	111 341	175 211	171 535
Operating Current Assets		1 747 577	2 604 133	1 836 675	2 200 933	3 296 961	3 688 240
Operating Current Liabilities							
Short-term interest bearing debt		0	0	378 300	0	0	0
Trade Payables		195 223	138 873	189 548	204 500	584 435	563 857
Current Tax Liabilities		155 359	142 016	198 141	152 655	195 484	37 422
Short-term Debt Liabilities (Leasing)		0	0	0	0	107 808	131 336
Other Current Liabilities		12 409	46 513	33 699	21 536	23 732	27 885
Operating Current Liabilities		362 991	327 402	799 688	378 691	911 459	760 500
Working capital		**1 384 586**	**2 276 731**	**1 036 987**	**1 822 242**	**2 385 502**	**2 927 740**
Non-Current Assets							
Land buildings & other real estate		585 740	874 907	1 148 571	994 353	1 174 428	1 555 019
Plant machinery & other operating equipment		797 449	906 045	957 857	926 334	1 420 379	1 703 233
Other operating equipment		44 095	59 001	97 654	160 063	210 749	242 147
Vessels		0	278 518	366 347	356 514	341 259	332 254
Prepayments for purchase of PPE		104 208	0	0	447 059	633 684	387 946
Leased Assets	3	0	0	0	0	332 824	353 192
Total Tangible Assets		1 531 492	2 118 471	2 570 429	2 884 323	4 113 323	4 573 791
Intangible Assets							
Licenses	7	290 138	372 138	372 138	372 138	3 720 158	3 720 158
Total Operational Non-Current Assets		1 821 630	2 490 609	2 942 567	3 256 461	7 833 481	8 293 949
Goodwill	7	4 537	4 537	4 537	17 607	567 129	664 837
Brands	7	0	0	0	0	108 400	108 400
Totall Goodwill & Brands		4 537	4 537	4 537	17 607	675 529	773 237
Total Non-Current Assets (Except Financial Assets)		1 826 167	2 495 146	2 947 104	3 274 068	8 509 010	9 067 186
Working capital		1 384 586	2 276 731	1 036 987	1 822 242	2 385 502	2 927 740
Invested Capital (with Intangibles)		**3 210 753**	**4 771 877**	**3 984 091**	**5 096 310**	**10 894 512**	**11 994 926**
Invested Capital (without Goodwill & Brands)		**3 206 216**	**4 767 340**	**3 979 554**	**5 078 703**	**10 218 983**	**11 221 689**
Non-Operating Current Assets							
Excess Cash	1	62 660	188 431	210 404	205 553	1 134 335	295 404
Total Other Receivables	9	153 089	58 340	84 630	0	0	0
Non-Operating Current Assets		215 749	246 771	295 034	205 553	1 134 335	295 404
Non-Current Financial Assets							
Investments in Associates	10	105 785	34 111	51 406	57 497	63 766	67 141
Investments in stocks & shares	10	25 108	25 296	25 296	55 269	55 318	55 318
Long-term Receivables		0	12 660	0	9 200	4 422	8 101
Deffered Tax Assets		0	0	0	0	37 593	26 934
Non-Current Financial Assets		130 893	72 067	76 702	121 966	161 099	157 494
Total Funds Invested		**3 557 395**	**5 090 715**	**4 355 827**	**5 423 829**	**12 189 946**	**12 447 824**

Table 12A: Calculation of Invested Capital; Data Source: Annual Reports; All figures in DKK 1000s.

Liabilities & Equity

		2015	2016	2017	2018	2019	2020
Non-Op Current Liabilities							
Financial Derivatives	6	0	0	127 255	320	13 493	9 710
Provisions for onerous contracts	6	51 004	67 378	0	0	0	0
		51 004	67 378	127 255	320	13 493	9 710
Non-Current Liabilities							
Deferred Taxes		349 546	545 699	455 448	534 430	1 123 796	1 222 222
Long-term interest-bearing debt	10	447 559	827 146	146 696	812 053	2 328 231	2 219 690
Long-term leasing debt		0	0	0	0	225 585	265 235
Additional Debt Taken		0	0	0	0	0	0
Derivatives	6	128 804	101 456	0	0	1 966	1 480
Total Non-Current Liabilities		925 909	1 474 301	602 144	1 346 483	3 679 578	3 708 627
Total Liabilities		976 913	1 541 679	729 399	1 346 803	3 693 071	3 718 337
Equity		2 580 482	3 549 035	3 626 429	4 077 029	8 496 875	8 729 487
Total Liabilities & Equity		**3 557 395**	**5 090 714**	**4 355 828**	**5 423 832**	**12 189 946**	**12 447 824**

Table 12B: Calculation of Invested Capital (Liabilities & Equity section, also called “financing items”); Data Source: Annual Reports; All figures in DKK 1000s.

7.5 FCFF

FCFF is the cash flow that is available to all the investors of any company, both debt and equity.

7.5.1 FCFF's Calculation Framework

In traditional corporate finance courses, free cash flow is calculated as:

FCFF = EBIT*(1-T) + Non-Cash Expenses - Increases in Net Working Capital – CAPEX

However, for valuation it is preferred that operating and non-operating assets be valued separately, hence, the use of traditional FCF calculation methodology is not well-suited to this thesis. Furthermore, the FCFF figure provided by the company in its annual report is of little use for precisely the same reason – it mixes operating and non-operating items.

For the purposes of FCFF calculation for valuation purposes, Koller et al. (2015) provide a different framework. They recommend using the following formula:

FCFF = NOPLAT + Non-Cash Expenses - Increases in Net Working Capital – CAPEX

Alternatively, the following can be used as well (Koller et al., 2015):

FCFF = NOPLAT + Non-Cash Expenses – Increase in Invested Capital

where

Increase in Invested Capital = Increases in Net Working Capital + CAPEX

They argue that FCF calculation for valuation should begin with NOPLAT rather than EBIT, followed by addition of noncash operating expenses and deduction of investments in invested capital; where non-cash operating expenses are depreciation and amortization related to operations, and investments in invested capital is the change in net invested capital from one year to the next. Calculation of net capital expenditures, however, is tricky (Koller et al., 2015).

Assistant Professor of Finance, Dr. Howard Keen, at Temple University, USA points out that, despite the widespread use of FCFF in valuation, there is confusion with regards to how capital expenditure and depreciation are to be accounted for (Keen, n.d.). He points out that this confusion is due to "… the widespread failure to define capital expenditure…" (Keen, n.d., p. 2). Specifically, he points out that the confusion stems from whether capital expenditure is to be taken at its net value or its gross value (Keen, n.d.).

To clear up this conclusion, Keen (n.d.) differentiates between gross and net investment in PPE. He clarifies that if Gross Increase in PPE is being treated as CAPEX then depreciation needs to be added back only once, however, if Net Increase in PPE is being treated as CAPEX then depreciation needs to be added back *twice.* In the latter, one might mistakenly think that depreciation is being added twice, however, Keen (n.d.) clarifies that since the Net PPE figure already includes depreciation expense, the depreciation is being added 2nd time to cancel out the effect of depreciation in Net PPE, while it was added the first time because it is a non-cash expense (Keen, n.d.).

7.5.2 Bakkafrost's Historic FCFF Calculation

In line with the above framework, Bakkafrost's historic FCFF for 5 years ending 2020 has been calculated. Moreover, there are 2 non-cash items in Bakkafrost's accounts which have not been adjusted in the FCFF calculation above. These adjustments are:

i. Fair Value Adjustments on Biological Assets: This is a non-cash line item. However, since the author classifies it as non-operational, it has not been accounted for when calculating NOPLAT and consequently, there is no need for adjustment.

ii. Changes in Inventory & Biological Assets: This is an operational item and hence, impacts NOPLAT. However, the author has decided this account need not be adjusted in FCFF calculation. The reason for this is two-fold: Firstly, since this is an inventory account, it would be adjusted automatically by change in inventory as part of working capital, hence, adjusting it separately would lead to double-adjustment; secondly, the company itself does not adjust this account when calculating CFO in its cash flow statement, this confirms the author's assumption that changes in inventory & biological assets flow through changes in inventory and need not be adjusted separately.

It is worth noting here that depreciation of leased assets has been deducted from the depreciation reported in the income statement because the depreciation of leased assets is a cash expense that is paid out to the lessor; if the depreciation of leased assets is treated like depreciation of assets that the company owns, it would lead to overstatement of FCFF. Moreover, total non-cash depreciation has been added twice because the change in invested capital is calculated at its net value (and not at gross value), as explained in detailed discussion above. The calculation of historic FCFF is shown in Table 13 below.

Historic FCFF Calculation

All values in 1000s DKK	**2016**	**2017**	**2018**	**2019**	**2020**
NOPLAT	1 062 045	928 763	879 731	1 550 974	526 319
Depreciation & Amortization					
Depreciation & Amortization	133 261	183 590	198 898	310 115	446 765
Less: Depreciation of Leased Assets	0	0	0	41 405	118 066
Add: Total Non-Cash Depreciation	133 261	183 590	198 898	268 710	328 699
CAPEX & Working Capital					
Increase in Working Capital	892 144	-1 239 744	785 255	563 260	542 237
Increases in Tangible Assets (including Licenses)	668 979	451 958	313 894	4 577 020	460 468
	1 561 123	-787 786	1 099 149	5 140 280	1 002 705
Total Non-Cash Depreciation	133 261	183 590	198 898	268 710	328 699
Less: Total investments in CAPEX & Working Capital	1 427 862	-971 376	900 251	4 871 570	674 006
FCFF before Intangibles	**-232 556**	**2 083 729**	**178 377**	**-3 051 887**	**181 012**
Less: Increase in Intangible Assets	0	0	13 070	657 922	97 708
Free Cash Flow to the Firm	**-232 556**	**2 083 729**	**165 307**	**-3 709 809**	**83 304**

Table 13: Historic FCFF Calculation; All figures in DKK 1000s.

7.6 ROIC Trend

In the ROIC graph (Figure 8) below, it can be seen that ROIC has decreased over the years. However, despite the overall decrease in ROIC, until 2019, the ROIC was well above the company reported pre-tax WACC of 7,2%. ROIC of more than 7,2% means that the operations have been generating value.

Moreover, ROIC with and without intangibles have a very small spread, this is because Goodwill & Brands are a very small percentage of total invested capital. It is worth re-mentioning here that the licenses have been treated as part of tangible assets (i.e., invested capital without intangibles includes licenses) because of their importance to salmon farming operations.

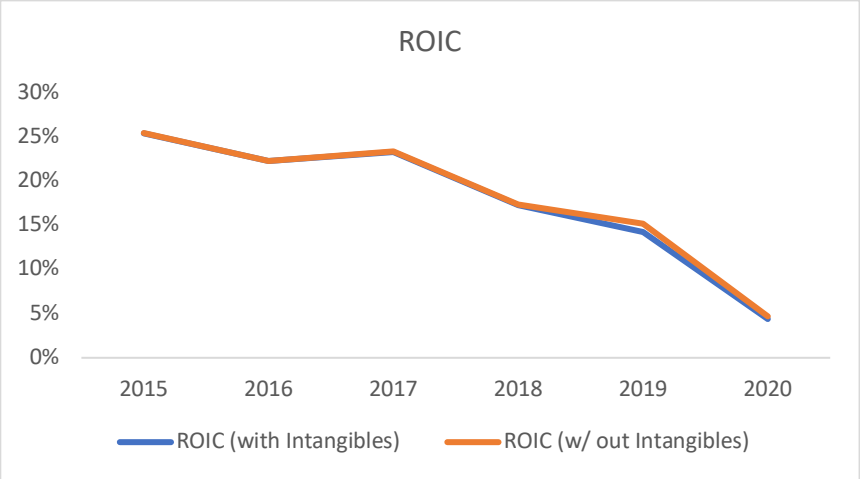

Figure 8: Plot of Bakkafrost's historic ROIC, with and without intangibles

ROIC has been further broken down into asset turnover and EBITA margin to observe what has been driving the changes in ROIC. In Figure 9 below, it can be seen that the decline in ROIC is governed largely by decline in asset turnover.

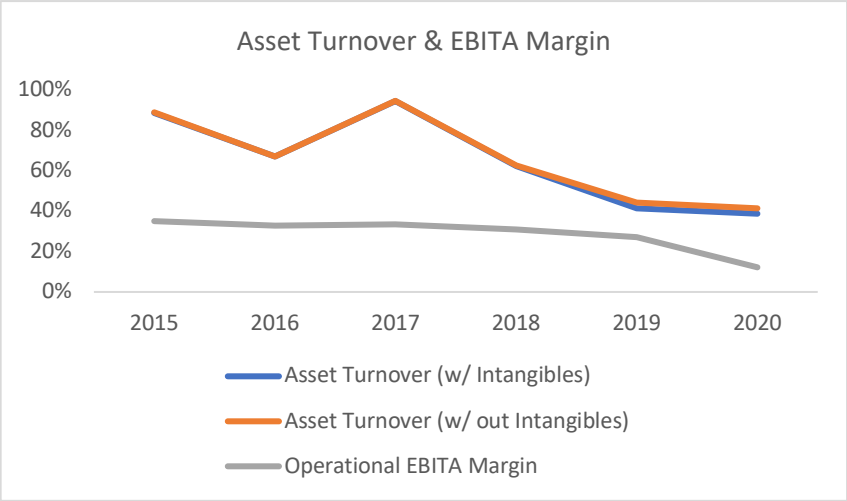

Figure 9: Plot of Bakkafrost's historic EBITA Margin and Asset Turnover (with and without intangibles).

The significant decline in ROIC (driven largely by decline in asset turnover) from 2018 to 2019 could largely be attributed to the increase in assets because of acquisition of Scottish Salmon Company (as the assets were recorded in full at the year end, the income was recorded only for the 4th quarter). Moreover, apart from investment in SSC, in recent years, Bakkafrost has made investments in smolt factories, Biogas plant and the Faroese Broodstock Program, all of these have increased the assets employed in operations, and their impact on the top line will be evident from 2021 onwards.

The significant decline in ROIC in 2020 is driven largely by decline in EBITA margin and can be attributed to the decline in spot prices of salmon from annual average of over NOK 59/kg in 2019 to annual average of NOK 55,48/kg in 2020. Furthermore, in 2020 1,2 M fish were lost because of a storm in the Faroe Islands, which reduced the harvests, thereby reducing the revenues, even though significant costs had been incurred. This would have had further supressed the EBITA margin and asset turnover in 2020.

7.7 Chapter Summary

In this chapter, Bakkafrost's historical financial statements have been reorganized based on operational, non-operational, and financing nature of individual line items. Based on the reorganized statements, NOPLAT and FCFF have been calculated. The historic trend in ROIC has been observed and brief comments have been made as to what has driven the ROIC's decline over the years.

The author has, on purpose, conducted only limited analysis of historic trends in this chapter because the capital structure and financial health of Bakkafrost have been discussed in detail in chapter 5. The primary purpose of this chapter was to divide line items into operational, non-operational, and financing categories, so that forecasting of each of the three categories can be done in the following chapter.

8. Forecasting

In this chapter, the financial statements of Bakkafrost have been forecasted. The forecasted statements are needed to calculate NOPLAT, invested capital and cash flows of the company (Koller et al., 2015). Forecasting needs to be carried out not only for operational items but also for non-operational and financial items because all three are necessary to calculate the equity value of the company and to balance the statement of financial position. The inputs from strategic and financial statement analysis carried out earlier are essential for forecasting as they allow the forecast to be grounded into not only company and industry level realities but also in macro-level trends and challenges. It must be noted that the following forecasting is done considering Bakkafrost a "going concern".

For forecasting, Koller et al. (2015, pp. 224-225) recommend the following steps (copied verbatim):

1. *"Prepare and analyze historical financials".*
2. *"Build the revenue forecast".*
3. *"Forecast the income statement".*
4. *"Forecast the balance sheet: invested capital and nonoperating assets".*
5. *"Reconcile the balance sheet with investor funds".*
6. *"Calculate ROIC and FCF".*

8.1 Forecast Length, Accuracy and Detail

Two major decisions with regards to forecasting involve how detailed forecasts need to be and how far into the future they must go (Koller et al., 2015). Another important concern is the accuracy of forecasts; Koller et al. (2015) recommend that forecasts be divided into 2 time-periods; for the first few years, the accounts are forecasted in detail and later, Koller et al. (2015) recommend valuing "… the remaining years by using a perpetuity formula…" (p. 221). The argument behind this is twofold: firstly, in the short-term, it is possible to forecast accounts in detail, whereas in the long-run forecasting individual line items becomes virtually impossible because of the assumptions and uncertainties involved; and secondly, it is assumed that in the longer run, the industry and the company becomes stable and hence, using a terminal rate is justified (Koller et al., 2015). Schill (2016) argues that super normal profits tend to be unsustainable and in the long run, the performance of individual companies tend to converge

to the mean of that industry (p. 7). The initial few years of forecast are termed "explicit forecast" by Koller et al. (2015) and they argue that "the explicit forecast period should be long enough that the company's growth rate is less than or equal to that of the economy" (Koller et al, p. 222).

Professor Lipson (2019a) from University of Virginia suggests that one must also keep in mind the reason behind forecasting, as "… the [need for] detail and accuracy …" of forecasting individual line items varies significantly based on this (p. 4). He comments that a forecast for valuation purposes "… require little detail and, improving its accuracy is likely to make little difference" (p. 4). However, he argues, if the forecasting is for managing working capital or cash then significantly higher accuracy and detail would be needed (Lipson, 2019a).

Furthermore, Lipson (2019a) informs that forecasting rarely involves "… assumptions about individual line items…" and mostly are based on relationships "… between a line item and the ultimate driver of that line item…", which mostly is either revenue or COGS (p. 2). Schill (2016) recommends using financial ratios because they "… capture relationships across financial statement line items that tend to be preserved over time" (p. 5). Hence, the forecasting in this thesis will rely heavily on past financial and operational ratios and their relationships.

8.2 Forecasting Revenues

Since most of the line items are forecasted as a ratio of revenues, it makes sense to forecast revenues first. By definition, revenues are a function of price and volume. Mathematically:

Revenues = Price x Volume

Therefore, any framework that is used to forecast revenues must account for both the volume and the price.

Koller et al. (2015) recommend two methods to forecast the revenues, dubbed as the top-down and bottom-up methods. The top-down method looks at the entire industry and its growth rates and forecasts revenues based on the concerned company's market position, i.e., how much of the total market can be captured by the company in question (Koller et al., 2015). On the contrary, the bottom-up forecast focuses more on the company itself – for instance, it could be built using the information about upcoming orders or upcoming capacity enhancements or even marketing campaigns (Koller et al., 2015). Since the focus of the bottom-up forecasts is

on the company itself rather than the general economy, such forecasts are reliable for industries and companies that are not yet mature. Moreover, due to the focus on company, coupled with the fact that it is difficult for companies to predict far in the future, bottom-up forecasts are reliable only for forecasting in the near future. On the contrary, top-down forecasts are preferable when the company and the industry are more mature and, in such cases, Koller et al. (2015) recommend relying "… on professional forecasts of the aggregate market and focus your own efforts on forecasting market share by competitor" (p. 227).

Another important question is regarding the decision of defining the market. For instance, should a company's market be disaggregated as per the geographical areas it serves? Should it be divided into product categories? Or should the disaggregation be based on something else? Barnett (1988) recommends making "… each category small and homogenous enough so that the drivers of demand will apply consistently across its various elements; [and making] … each large enough so that the analysis will be worth the effort" (p. 5).

8.2.1 Bakkafrost's Revenue Forecasting

Earlier in the strategic analysis, it was established that salmon farming is well-suited to the growing macro trends of sustainability, health, and rising incomes. It was also explained that salmon farming is a highly regulated industry and has high barriers to entry, primarily due to limitation of salmon farming licenses. This does imply that, at least in the foreseeable future, the demand of salmon is set to increase whereas the supply might be constrained – in fact, supply shocks are not uncommon in the industry because of diseases and extreme weather events. Mowi Group, the world's largest salmon producer, expects the industry's demand to grow by nearly twice as that of the supply for the next 5 years! Between 2020 and 2025, Mowi expects demand to grow by 8% annually with supply increasing by only 4% (Mowi, 2021a). Given this, it would be reasonable to presume that Bakkafrost would be able to sell all its production. Hence, with regards to revenue forecasting, there is little need to conduct top-down market growth analysis. Instead, what needs to be analysed is Bakkafrost's internal goals with regards to capacity enhancements and operational improvements. Bakkafrost does provide basics of its strategy for the next 5 years. However, for production capacity beyond 5 years, the only information provided is that post-2025, the company intends to find opportunities to increase capacity by being more active in "offshore farming".

Moreover, Bakkafrost divides its revenue into 4 segments for the purposes of reporting: Fresh Fish Faroe Islands, Value-Added Products (VAP), Fish Oil and Feed (FOF) and Fresh Fish Scotland. Bakkafrost provides revenue breakdown by geographies as well. However, it is not possible to disaggregate revenues by the geographies and segments simultaneously because Bakkafrost does not provide disaggregation on both the dimensions simultaneously. Moreover, whereas Bakkafrost does provide revenues by segment, the costs of each segment are not provided in same detail as they are provided at group level, hence calculation of key ratios, such as Gross Profit Margin, becomes impossible at segment level. In addition, the costs disclosed at segment level do not eliminate intragroup transactions. Since intragroup transactions are not always at an arm's length, including costs provided in the segment reporting for financial analysis will distort the financial analysis and thereby, forecasting. Therefore, all the income statement line items which are pegged to revenue will have to be pegged with group revenues, rather than segment revenues.

In the sub-segments below, estimations have been made about future production of Bakkafrost (in volume) and estimated future prices for Bakkafrost's products.

Calculation of Historic Premium for Each Segment

Bakkafrost claims that its salmon fetches "premium"[32] prices, however, no details have been provided about the magnitude of this premium. One can calculate this premium in different ways. One approach, as used by Larsen and Mustorp (2018), is to see the prices of salmon of different weights. Since Bakkafrost's average salmon weight in the Faroe Islands is over 6 kgs, Larsen and Mustorp (2018) calculate the premium by comparing the price of salmon over 6 kgs with price of salmon below 5 kgs, the difference being classified as premium (Larsen & Mustorp, 2018). However, the author does not agree with this approach because salmon price is not solely a function of its weight and hence, the author has used an alternative approach; a similar approach has been used by Malin et al. (2016).

[32]Here the premium refers to the difference between what Bakkafrost earns per kg of salmon and what the annual average price of salmon is as per the fish pool. This premium is not to confused with premium quality value-added salmon.

To estimate the premium that Bakkafrost earns in each segment, Bakkafrost's revenue per kg of salmon sold (for any given segment) is calculated, and the difference between Bakkafrost's average revenue per kg (for the given segment) and the average price per kg for fresh salmon (from fish pool) for the respective year is estimated to be that year's premium. The historical premium for each segment is illustrated in Table 14 below. Interestingly, in the Faroe Islands, the premium in fresh fish segment is higher than VAP[33]. The historic exchange rates are taken from OFX (n.d.).

Historic Premium Calculation by Segment

	2015	2016	2017	2018	2019	2020
Calculation of Fresh Fish/kg Price in DKK (NOK figures from Fish Pool)						
NOK to DKK (Source: OFX)	0,8	0,8	0,8	0,8	0,8	0,7
Annual Price Per Kg Fresh Fish (Fish Pool) - NOK	42,09	63,13	60,88	60,76	59,15	55,48
Annual Price Per Kg Fresh Fish - DKK	**35,14**	**50,57**	**48,56**	**47,15**	**44,85**	**38,62**
Premium Calculation for Segment: Fresh Fish - Faroe Islands						
Total External Revenue from Fresh Fish - Faroe Islands	1 763 498	1 973 720	2 150 939	2 226 118	2 501 646	1 548 623
Harvested Volume sold Externally (tons)	38 376	31 476	35 548	36 236	40 494	26 769
Year's Revenue/kg for Segment (DKK)	45,95	62,71	60,51	61,43	61,78	57,85
Less: Annual Price/kg Fresh Fish - DKK (as converted from Fish Pool)	35,14	50,57	48,56	47,15	44,85	38,62
Premium per kg in Faroe Islands Fresh Fish - DKK	**10,81**	**12,13**	**11,95**	**14,28**	**16,93**	**19,23**
Premium Calculation for Segment: VAP - Faroe Islands						
Total External Revnue from VAP Segment	736 657	880 945	998 778	364 827	964 484	1 116 216
VAP Sold Externally (tons)	18 195	18 120	19 067	8 355	16 690	23 931
Year's Revenue/kg for Segment (DKK)	40,49	48,62	52,38	43,67	57,79	46,64
Less: Annual Price/kg Fresh Fish - DKK (as converted from Fish Pool)	35,14	50,57	48,56	47,15	44,85	38,62
Premium per kg in Faroe Islands VAP - DKK	**5,35**	**-1,96**	**3,82**	**-3,48**	**12,94**	**8,02**
Premium Calculation for Segment: Scotland	**EUR**	**EUR**	**EUR**	**EUR**	**EUR**	**DKK**
Total External Revenue from Fresh Fish - Scotland	100 360	109 921	150 946	180 125	111 804	1 595 561
Harvested Volume Sold Externally (tons)	25 569	24 342	25 272	29 913	18 463	34 986
Year's Revenue/kg for Segment (in EUR)	3,9	4,5	6,0	6,0	6,1	-
EUR to DKK (Source: OFX)	7,5	7,4	7,4	7,5	7,5	7,5
Year's Revenue/kg for Segment (DKK)	29,3	33,6	44,4	44,9	45,2	45,6
Less: Annual Price/kg Fresh Fish - DKK (as converted from Fish Pool)	35,1	50,6	48,6	47,1	44,8	38,6
Premium per kg in Scotland Fresh Fish - DKK	**-5,86**	**-16,95**	**-4,13**	**-2,26**	**0,38**	**6,99**

Table 14: Calculation of historic premium in each segment; Revenue figures in 1000s, Volume in tons.

One of the segments that Bakkafrost currently operates is its Fish Oil and Feed (FOF) segment. However, the external sales of FOF segment have decreased over the years and it is presumed that all sales will be internal from 2022 and beyond. This is presumed because in 2021 the external contracts for procurement of fish feed in Scotland are due to expire and hence, the little amount of feed that is currently sold externally will be utilized internally, as per the company (Bakkafrost, 2021). For 2021, nonetheless, the revenues from FOF are presumed to

[33] This is not entirely surprising because VAP segment for Bakkafrost has historically been less profitable than Fresh Fish segment. For example, in 2020 and 2019, VAP segment had EBIT/kg of DKK 5,84 and 3,82 respectively (Bakkafrost, 2021, p. 8); for the same years, the group's total EBIT/kg from the farming operations (Fresh Fish + VAP) in the Faroe Islands was DKK 11,59 in 2020 and DKK 20,40 in 2019 (Bakkafrost, 2021, p. 8). Given the stark difference between EBIT/kg of VAP and EBIT/kg of VAP and Fresh Fish combined, it can be inferred that fresh fish is significantly more profitable segment.

be the same as 2020. However, due to internal sourcing of fish feed from 2022 and onwards, the company expects to have DKK 70 M savings annually (Bakkafrost, 2021, p. 145), and the author has deducted this from 'cost of products' indefinitely from 2022 to account for the cost savings.

Incorporating Growth due to M&A's

Another important aspect when forecasting is to differentiate between organic and inorganic growth. Organic growth is the growth because of a company's natural growth whereas inorganic growth is the increase in revenues due to M&A's. As mentioned previously, Bakkafrost has had numerous acquisitions since its listing on the Oslo stock exchange. However, going into the future, the assumption is that there would be no M&A's. This assumption rests on multiple pillars:

I. Bakkafrost has recently acquired Scottish Salmon Company and taken over the Faroese National Broodstock Program, and currently, the management's plans are to make Scottish operations more efficient and increase the smolt size both in the Faroe Islands and Scotland. Therefore, for the next 5 years, it can be reasonably presumed that the management is pre-occupied with developing synergies and increasing operational performance rather than looking for growth by acquisitions.

II. Beyond the next 5 years, the only information provided by the management is that it will look towards "offshore" farming for growth. No further details have been provided on this, except that the company has already applied for offshore farming licenses in the Faroe Islands. Moreover, Bakkafrost has already applied for off-shore farming licenses in the Faroe Islands, which could signify that the management plans to develop off-shore farming organically, rather than by acquisitions. That is not to say, however, that acquisitions (both for in-land and off-shore farming) cannot be considered – but no information has been provided.

III. Whereas the above 2 points indicate that the management will not conduct another acquisition within the foreseeable future, it nonetheless remains true that corporations do conduct several M&A's over their lives. However, in this case, the challenge is that acquisitions are difficult to predict since no plans have been disclosed by Bakkafrost.

Hence, the assumption for the purposes of this thesis is that Bakkafrost will not conduct further M&As. Consequently, it is also assumed that intangible assets which are only recognized upon recognition, e.g., brands & goodwill, will not increase.

Forecast of Production (Volume)

In this sub-section, forecast of Bakkafrost's production volume has been made.

An important consideration for forecasting suggested by Professor Michael Schill at University of Virginia (2016) is to recognize biases in human psyche (Schill, 2016, p. 9); and the two biases he particularly recommends looking out for are "… optimism bias and overconfidence bias" (p. 9). To adjust for these biases, the author has presumed that Bakkafrost will not be able to meet 100% of its production targets. A report by Kontali Analysis has found that companies tend to miss their harvest forecast by 3% to 10% every year (Nystøyl, 2021). Therefore, the author presumes that Bakkafrost will miss its targets in the Faroe Islands by 6,5% (midway point)[34]. In Scotland, the volume has not been adjusted down for years 2022-2030 because the growth in Scotland has not been provided by the company, rather the author has presumed it to be 4%, which is in line with expected global increase of 4% in volume. Nonetheless, since the company has given its production estimate in Scotland for 2021, the author has adjusted it downwards by 6,5%.

The capacity in the Faroe Islands by 2025 is expected to be 100 000 tons HOG. The current capacity has not been provided, however, the expected salmon harvest in the Faroe Islands in 2021 is 66 000 tons gutted (tgw) (Bakkafrost, 2021, p. 10). Based on the expected volume for 2021 and expected capacity of 2025 at 100 000 tons, the harvest (expected volumes) for years 2022-2025 has been calculated with linear increase such that by 2025 the capacity is 100 000 tons. The capacity enhancements in Scotland have not been given and the author presumes that capacity growth in Scotland until 2025 will be in line with expected global growth of 4%. For 2021, Scotland's forecasted harvest has been provided at 40 000 tons gutted (tgw) by Bakkafrost (Bakkafrost, 2021, p. 10), and hence a downward adjustment of 6,5% has been done for Scotland's production in 2021 keeping in line with the report of Kontali Analysis referred to above. Furthermore, beyond 5 years, the growth of the salmon market and

[34] For clarification: 6,5% downward adjustment has been made ONLY for the years in which the company has given its production targets.

Bakkafrost cannot be estimated with reasonable precision. Hence, it is assumed that between 2026-2030 (both years inclusive), Bakkafrost's volume will grow by 4% (this rate is equal to the growth rate Mowi predicts for salmon industry for 2020-2025).

In the Faroe Islands, 45% of volume is presumed to be used for VAP production because the Group's long-term strategy is to have 40% to 50% of its Faroe Islands' sales in the VAP segment (Bakkafrost, 2021). The fish from Scotland are all sold as fresh fish.

Keeping this in view, the expected volume (in tons) is calculated in Table 15 below[35].

Forecasted Volume	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
All volume figures in tons										
Faroe Islands										
Growth Rate	-	10,95%	10,95%	10,95%	10,95%	4%	4%	4%	4%	4%
Expected Volume, Faroe Islands - (tons HOG)	66 000	73 227	81 245	90 142	100 000	97 240	101 130	105 175	109 382	113 757
Downward Adjustment	6,50%	6,50%	6,50%	6,50%	6,50%	0%	0%	0%	0%	0%
Net Expected Production, Faroe Islands (tons HOG)	**61710**	**68467**	**75964**	**84283**	**93500**	**97240**	**101130**	**105175**	**109382**	**113757**
Faroe Islands - Fresh Fish (%)	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Faroe Islands - VAP (%)	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
Faroe Islands - Distribution										
Faroe Islands - Fresh Fish (tons HOG)	33 941	37 657	41 780	46 355	51 425	53 482	55 621	57 846	60 160	62 566
Faroe Islands - VAP (tons)	27 770	30 810	34 184	37 927	42 075	43 758	45 508	47 329	49 222	51 191
Net Expected Production, Faroe Islands (tons HOG)	61 710	68 467	75 964	84 283	93 500	97 240	101 130	105 175	109 382	113 757
Scottish Operations										
Growth Rate	-	4%	4%	4%	4%	4%	4%	4%	4%	4%
Expected Volume, Scotland (tons HOG)	40 000	38 896	40 452	42 070	43 753	45 503	47 323	49 216	51 184	53 232
Downward Adjustment	6,50%	0	0	0	0	0	0	0	0	0
Net Expected Scottish Production (in tons HOG)	**37400**	**38896**	**40452**	**42070**	**43753**	**45503**	**47323**	**49216**	**51184**	**53232**

Table 15: Forecasted Volume for each segment for 2021-2030.

Estimation of Fresh Salmon Prices (2021-2030)

Estimation of future salmon prices is done in Table 16 below (this is estimation for general level of fresh salmon prices, and not the prices for Bakkafrost). The prices of salmon (in NOK) for 2021-2023 are taken from salmon forwards from fish pool. For years beyond 2023, the forwards were unavailable, so 3-year moving average of price (NOK) is taken for each year between 2024-2030. Each year's (2021-2030) NOK prices are then converted to DKK and adjusted for inflation. NOK to DKK conversion rate is presumed to stay constant at current level. Inflation rates until 2025 are taken from Statista. Beyond 2025, the rate of inflation has been presumed to stay at 2025 levels[36]. Note that no inflation adjustment has been made for

[35] The "expected volume" in the Faroe Islands (in 2026) and Scotland (in 2022) falls below the "expected volume" of preceding year because the growth rates have been applied on "Net Expected Production" of the previous year, i.e., after accounting for 6,5% downward adjustment for preceding year. Nonetheless, Net Expected Production every year is higher than Net Expected Production of the respective preceding year.

[36] Inflation predictions beyond 2025 were not reliably available.

2021-2023 because forward prices (NOK) were available. The results of estimated salmon prices (in DKK) are produced in Table 16 below.

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Inflation in Norway (Statista)	3,30%	1,80%	1,90%	2%	2%	-	-	-	-	-
Salmon Price Estimation										
Salmon Price (NOK)	56,25	59,2	58,5	57,983	58,561	58,348	58,298	58,402	58,349	58,350
NOK to DKK	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Inflation adjustment	0%	0%	0%	2%	2%	2%	2%	2%	2%	2%
Estimated Fresh Salmon Price (DKK)	**39,16**	**41,21**	**40,72**	**41,17**	**41,58**	**41,43**	**41,39**	**41,47**	**41,43**	**41,43**

Table 16: Estimated Salmon Prices; Data Source: Fish Pool & Statista.

Estimation of Bakkafrost's Revenue

After estimating the volume and prices, the total revenue expected between 2021-2030 is calculated and summarized in Table 17 below. Note that the prices in Table 16 above were only for fresh fish and were not particular to Bakkafrost. Hence, each segment's historic premium (3-year average) has been added to the price forecasted in Table 16 above to estimate Bakkafrost's revenue/kg for that segment.

Forecasted Revenue By Segment *Currency: DKK*	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Segment: Fresh Fish Faroe Islands										
Faroe Islands, Fresh Fish Harvest (tons)	33 941	37 657	41 780	46 355	51 425	53 482	55 621	57 846	60 160	62 566
Estimated Fresh Salmon Price (DKK)	39,2	41,2	40,7	41,2	41,6	41,4	41,4	41,5	41,4	41,4
Add: Segment's Historic Premium per Kg (3-Yr Avg)	16,82	16,82	16,82	16,82	16,82	16,82	16,82	16,82	16,82	16,82
Bakkafrost's Expected Revenue / Kg	55,97	58,02	57,54	57,98	58,40	58,24	58,21	58,28	58,24	58,25
Fresh Fish Revenue from Faroe Islands (in 1000s)	**1 899 688**	**2 185 032**	**2 403 935**	**2 687 914**	**3 002 972**	**3 115 004**	**3 237 605**	**3 371 411**	**3 504 006**	**3 644 183**
Segment: VAP										
Faroe Islands, VAP Harvest (tons)	27 770	30 810	34 184	37 927	42 075	43 758	45 508	47 329	49 222	51 191
Estimated Fresh Salmon Price (DKK)	39,16	41,21	40,72	41,17	41,58	41,43	41,39	41,47	41,43	41,43
Add: Segment's Historic Premium per Kg (3-Yr Avg)	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83
Bakkafrost's Expected Revenue / Kg	44,98	47,04	46,55	47,00	47,41	47,26	47,22	47,29	47,26	47,26
VAP Revenue - Faroe Islands (in 1000s)	**1 249 136**	**1 449 185**	**1 591 214**	**1 782 428**	**1 994 622**	**2 067 791**	**2 148 867**	**2 238 341**	**2 326 024**	**2 419 079**
Segment: Scotland										
Scotland Harvest (tons)	37 400	38 896	40 452	42 070	43 753	45 503	47 323	49 216	51 184	53 232
Estimated Fresh Salmon Price (DKK)	39,16	41,21	40,72	41,17	41,58	41,43	41,39	41,47	41,43	41,43
Add: Segment's Historic Premium per Kg (3-Yr Avg)	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70	1,70
Bakkafrost's Expected Revenue / Kg	40,86	42,91	42,43	42,87	43,28	43,13	43,10	43,17	43,13	43,13
Revenue from Scotland (in 1000s)	**1 528 120**	**1 669 118**	**1 716 171**	**1 803 648**	**1 893 743**	**1 962 613**	**2 039 416**	**2 124 653**	**2 207 715**	**2 296 038**
Forecasted Group Revenues										
Total Farming Revenues (Fresh Fish & VAP)	4 676 944	5 303 335	5 711 320	6 273 990	6 891 338	7 145 407	7 425 888	7 734 405	8 037 744	8 359 300
Revenue from Fish Oil & Feed	391 491	0	0	0	0	0	0	0	0	0
Total Revenues (1000s DKK)	**5 068 435**	**5 303 335**	**5 711 320**	**6 273 990**	**6 891 338**	**7 145 407**	**7 425 888**	**7 734 405**	**8 037 744**	**8 359 300**
Faroe Islands Farming Revenue										
Farming Revenue only from Faroe Islands (1000s DKK)	**3 148 824**	**3 634 217**	**3 995 149**	**4 470 342**	**4 997 594**	**5 182 795**	**5 386 472**	**5 609 752**	**5 830 030**	**6 063 262**

Table 17: Bakkafrost's Forecasted Revenue for 2021-2030; All revenue figures in 1000s DKK; The historic premiums used are 3-year averages for year ending 2020.

Moreover, the Faroe Island's farming revenue has been presented separately as well because revenue tax needs to be applied on the farming revenues from the Faroe Islands.

Beyond 2030, the rate of growth of economy is presumed to be the terminal growth rate for Bakkafrost, i.e., 2%.

8.3 Income Statement Forecasting

The need and level of accuracy for forecasting have already been discussed. The forecasting process itself involves several steps, which primarily include exploring what drives individual line items (Koller et al., 2015). Koller et al. (2015) also state that most of the items in the income statement are driven by revenues (particularly operational items). Lipson (2019a) also states that most of the line items are either driven by revenue or cost of goods sold (p. 2). Once the relationship with the drivers have been established, the next step is to "estimate the forecast ratio" (Koller et al., 2015, p. 229) and finally, "multiply the forecast ratio by an estimate of its driver" (Koller et al, 2015, p. 229).

Further explanation regarding individual line items have been provided later in this section. However, it is worth noting here that in cases where revenue is not stable, Koller et al (2015, p. 243) recommend using non-financial operating drivers; as an example, Koller et al. (2015) recommend using "… average salary per employee" (p. 243) if the technology is evolving or revenues are fluctuating. This could be critical for Bakkafrost because salmon farming is subject to frequent and significant price fluctuations, as already mentioned in industry introduction and strategic analysis.

8.3.1 Forecast Assumptions: Income Statement

Revenue forecast of Bakkafrost has been done earlier. Forecasting of most of the items of income statement are closely tied to the revenue forecast, as this is in line with recommendations of Koller et al. (2015) and Lipson (2019a). All line items of the income statement apart from revenue and other income relate to costs. Explanations for *major* line item assumptions are presented below, followed by presentation of all assumptions in a table.

Forecast Assumptions: Operating Income Statement Items

- **Purchase of Goods**

The single largest line item on the cost side in the income statement is "purchase of goods". The breakdown of this line item is not provided by the company; however, it can be reasonably presumed that it primarily consists of fish feed, raw materials for fish feed and eggs for fertilization/smolt production. To better understand what economic/operational relationship

drives this line item, analysis of cost of "purchase of goods as a percentage of revenue" as well as analysis of "cost of purchase of goods per kg of salmon harvested" has been carried out – both measures show significant fluctuations, but an upward trend can be seen, presented in Table 18 below.

	2015	2016	2017	2018	2019	2020
Purchase of Goods as a % of Revenues	35%	29%	23%	34%	30%	51%
Purhcase of Goods/kg Salmon (DKK)	38,82	37,80	34,97	35,93	73,39	67,42

Table 18: Bakkafrost's historic cost of "purchase of goods" as a % of revenue & as per kg harvest

Given the information constraints, coupled with the fact that pelagic fish are a major input in fish feed, the author presumes that the cost of goods purchased will have a correlation with the price of salmon and therefore, for the purposes of forecasting, 3- year average of cost of purchase of goods to revenue of Bakkafrost will be used.

- **Depreciation & Amortization**

Another major line item for Bakkafrost is depreciation and amortization, not least because salmon farming is a capital-intensive industry.

For depreciation forecasting, Koller et al. (2015) recommend 3 reasonable approaches (p. 231):

i. As a percentage of revenue or;
ii. As a percentage of net tangible assets (also called PPE) or;
iii. Use of internal information, such as depreciation schedules.

The third approach can be dismissed, since this paper is based on publicly available information only. Remaining two approaches were considered, and their past trends are shown in Table 19 below.

	2015	2016	2017	2018	2019	2020
Depreciation as % of Revenue	4%	4%	5%	6%	7%	10%
Depreciation as % of Net PPE	7%	6%	7%	7%	8%	10%

Table 19: Bakkafrost's historic depreciation as a % of Revenues and as a % of PPE

The depreciation has increased in year 2019 and 2020, both as a percentage of revenue and as a percentage of net PPE. The author has decided to use the ratio of depreciation to revenues

(3-year average) for forecasting. Koller et al. (2015) state that it does not matter whether depreciation is calculated as a percentage of revenue or net PPE if the capital expenditures are not lumpy (p. 231).

Amortization is presumed to be zero for the forecasting period. This is due to two reasons:

i. Amortization of acquired intangibles is done only after impairment testing; since the strategic analysis above has shown that salmon industry is well-suited to rising macro-trends and has high barriers to entry, the author finds it reasonable to presume that the acquired intangibles (i.e., goodwill and brands) will need not be amortized/impaired.

ii. Apart from brands and goodwill, the third (and the largest) intangible asset is the salmon farming "licenses". However, these licenses are presumed to be renewable and hence, no reasonable estimate can be made for their impairment or amortization. Moreover, it was also demonstrated in the PESTEL analysis that salmon farming continues to have high political acceptance in the Faroe Islands, and faces no major political challenges in Scotland. Hence, it is presumed that the licenses will not be withdrawn.

It is worth noting here that, historically, Bakkafrost has never had a material write-down/impairment/amortization charge of any intangible asset.

Considering the above, amortization is presumed to be zero in the future.

- **Salary & Employee Expenses**

With regards to salaries and employee expenses, there could be two major approaches. Salary & employee expenses can be calculated as a percentage of revenue. Alternatively, salary expense per employee over the years can be calculated and its trend analysed – and salary expense can be predicted based on future number of employees by adjusting current cost per employee by inflation. The historic trends of both approaches are presented in Table 20 below.

	2015	2016	2017	2018	2019	2020
Salary & Personnel Expenses as % of Revenue	10%	10%	11%	11%	11%	13%
Total No. of Employees	725	820	960	824	1534	1699
Salary & Personnel Expenses/Person (1000s DKK)	387	399	416	429	334	358

Table 20: Bakkafrost's historic employee expenses per person & as a % of Revenues

The second approach is considerably more attractive (i.e., calculating historic average salary per person, and adjusting it by inflation for future). However, Bakkafrost is making its operations efficient and building smolt factories in Scotland; it has also applied for offshore farming licenses in the Faroe Islands. This could potentially mean that the size of the workforce would increase. This creates a challenge because in this lies the uncertainty about future employee numbers and efficiency/effectiveness/role of those employees.

Keeping in view the challenges of salary per person forecasting method, the author has decided to forecast salary and employee expenses as a percentage of revenue (3-year average).

- **Other Income**

Analysis shows that between listing on Oslo Børs and 2020, other income has been non-zero for only one year. Therefore, other income is assumed to be a non-recurring item, and going forward, "other income" is presumed to be zero.

- **Change in Inventory and Biological Assets (at cost)**

This account has fluctuated significantly over the years. No details have been provided in the notes. However, given its significant materiality, presuming that this account would be zero in the future could lead to material undervaluation of the company. Therefore, this account is forecasted as a percentage of revenue (3-year average). The 6-year trend (as a percentage of revenue) is shown below in Figure 10:

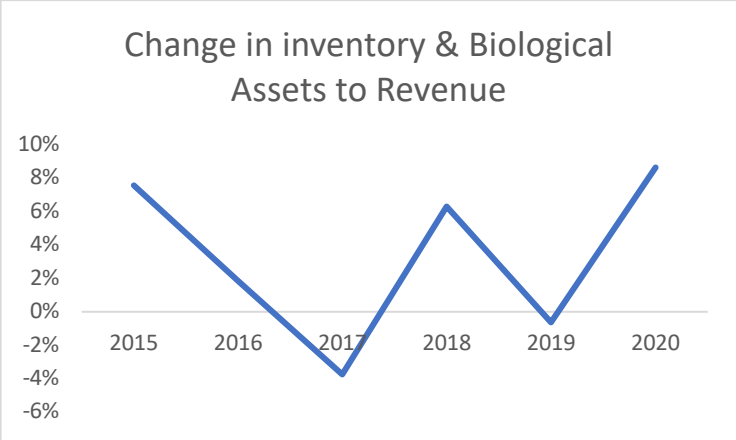

Figure 10: Historic change in inventory & biological costs as a percentage of Revenue; Data Source: Annual Reports

- **Revenue Tax**

Similar to recently introduced revenue tax on salmon farming in Norway, salmon output in Faroe Islands is also taxed. No such tax exists in Scotland. The tax rates for the Faroe Islands are reproduced below in Table 21, recreated by the author based on data from KPMG (KPMG, 2020, p. 22):

Revenue Tax - Faroe Islands	
For Avg. Price lower than DKK 32	0,50%
For Avg. Price b/w DKK 32 and DKK 36	2,50%
For Avg. Price DKK 36 or higher	5,00%

Table 21: Revenue tax rates in the Faroe Islands; Data Source: (KPMG, 2020, p. 22)

Since the expected average price per kilo in all segments is expected to be more than DKK 36, the revenue tax rate of 5% will be applied on Bakkafrost's revenues from the Faroe Islands.

- **Effective Tax Rate**

The author has presumed that effective cash tax rate would equal marginal tax rate of Bakkafrost. As a corollary to this assumption, it is further presumed that there would be no increase or decrease in deferred tax liabilities or assets moving forward. It is worth noting here that, historically, Bakkafrost's effective tax rate has been close to its marginal tax rate. The marginal tax rate is 18% in the Faroe Islands and 19% in Scotland; the marginal tax rate used by the author for valuation is 19%.

Forecast Assumptions: Non-Operating Income Statement Items

Earlier in this thesis when FCFF's definition was introduced, it was stated that instead of the traditional "EBIT*(1-Tax Rate)" [also called NOPAT] measure, NOPLAT will be used to calculate FCFF. NOPLAT, by definition, incorporates only operational items. Consequently, the non-operating items will not impact FCFF calculation, and hence, will have no impact on final valuation.

The non-operational items in Bakkafrost's income statement are the following, and all (except for interest expense) have been presumed zero for the purposes of forecasting.

- **Fair Value Adjustment on Biological Assets**

Given the challenges involved in predicting fair value movements, it has been presumed zero.

- **Income from Associates**

With regards to predicting income from associates, perhaps the best approach would be to evaluate each associated company separately and accordingly estimate Bakkafrost's share. However, given the time constraint, it is not practical to value each associate separately. Therefore, it is presumed that associates – as reported in the 2020's balance sheet – are valued fairly. The income from associates will be presumed zero in the future and the current value of associates as reported in the statement of financial position will be added to the calculated PV of Bakkafrost's operations.

- **Badwill**

Badwill was recorded only once since Bakkafrost has been listed on Oslo Børs. Since it is a non-recurring item and is of non-operational nature (as reported by Bakkafrost itself), going forward, Badwill is presumed zero.

- **Interest Expense**

Koller et al. (2015, p. 233) recommend that interest expense be calculated directly from the liability that generates this expense. Hence, interest expense is calculated as a percentage of long-term interest-bearing debt. The rate that is used for calculation of interest expense is the company's cost of debt (without interest tax shield), as later calculated in the WACC calculation. Nonetheless, interest expense remains non-operational and will have no impact on valuation. The interest tax shield that interest provides will be accounted for directly through WACC.

Summary of Income Statement Assumptions

All the income statement assumptions for 2021-2030 are summarized below in Table 22.

Income Statement Assumptions

Line Item	Nature	Pegged to	Rate
Purchase of Goods	Operating	As a % of Revenue, 3-Yr Avg.	-38,19%
Depreciation & Amortization			-7,58%
Salary & Employees Expenses			-11,86%
Other Op. Expenses			-21,93%
Change in Biological Assets			4,76%
Revenue Tax		Statutory	5,00%
Effective Cash Tax Rate		Equal to Marginal Tax Rate	19,00%
Fair Value Adjustments on Inventory	Non-Operating	*Presumed Zero*	0,00%
Income from Associates		*Presumed Zero*	0,00%
Badwill		*Presumed Zero*	0,00%
Interest Expense		Kd calculated by the author (as part of WACC calculations)	3,60%
Other Financial Expenses		*As a % of Revenue, 3-Yr Avg.*	0,25%
Net Currency Effects		*Presumed Zero*	0,00%
Divident Payout		Company Given Rate	40,00%

Table 22: Income Statement Assumptions for 2021-2030

8.3.2 Forecasted Income Statement of Bakkafrost

Based on the forecast assumptions above, Bakkafrost's forecasted income statements are presented in the Table 23 below. It is worth mentioning here again that only operational items will flow into NOPLAT and FCFF calculation. All the non-operational sources of income (i.e., assets that generate these incomes) and non-operational liabilities (i.e., financial items)[37] will be added/subtracted to/from the present value of operations later at the time of calculation of Enterprise Value.

Foorecasted & Reorganized Income Statement

All figures in 1000s DKK

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Operating Revenue	5 068 435	5 303 335	5 711 320	6 273 990	6 891 338	7 145 407	7 425 888	7 734 405	8 037 744	8 359 300
Purchase of goods	-1 935 449	-1 955 148	-2 110 943	-2 325 806	-2 561 548	-2 658 568	-2 765 673	-2 883 484	-2 999 319	-3 122 109
Gross Profit	**3 132 986**	**3 348 187**	**3 600 377**	**3 948 185**	**4 329 790**	**4 486 839**	**4 660 215**	**4 850 920**	**5 038 426**	**5 237 191**
Change in inventory and biological assets	241 044	252 215	271 618	298 377	327 737	339 820	353 159	367 832	382 258	397 550
Salary and personnel expenses	-601 074	-628 931	-677 315	-744 043	-817 255	-847 386	-880 648	-917 236	-953 209	-991 343
Other Operating Expenses	-1 111 388	-1 162 895	-1 252 357	-1 375 737	-1 511 107	-1 566 818	-1 628 321	-1 695 971	-1 762 487	-1 832 996
Total Operating Expenses	-1 471 418	-1 539 612	-1 658 054	-1 821 403	-2 000 625	-2 074 384	-2 155 810	-2 245 375	-2 333 438	-2 426 789
Other Income	0	0	0	0	0	0	0	0	0	0
Operational EBITDA	1 661 569	1 808 575	1 942 324	2 126 782	2 329 165	2 412 456	2 504 405	2 605 545	2 704 988	2 810 402
Depreciation & Amortization	-384 156	-401 960	-432 883	-475 530	-522 321	-541 578	-562 836	-586 220	-609 211	-633 583
	1 277 413	1 406 615	1 509 441	1 651 252	1 806 844	1 870 878	1 941 568	2 019 325	2 095 776	2 176 819
Revenue Tax	-157 441	-181 711	-199 757	-223 517	-249 880	-259 140	-269 324	-280 488	-291 501	-303 163
Operational EBIT	**1 119 971**	**1 224 904**	**1 309 683**	**1 427 735**	**1 556 964**	**1 611 738**	**1 672 245**	**1 738 837**	**1 804 275**	**1 873 656**
Non-Operational Items										
Fair value adjustments of biological assets	0	0	0	0	0	0	0	0	0	0
Income from associates	0	0	0	0	0	0	0	0	0	0
Onerous Contracts	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
(Badwill)	0	0	0	0	0	0	0	0	0	0
Total Non-Operational Items	0	0	0	0	0	0	0	0	0	0
EBIT	**1 119 971**	**1 224 904**	**1 309 683**	**1 427 735**	**1 556 964**	**1 611 738**	**1 672 245**	**1 738 837**	**1 804 275**	**1 873 656**
Financial Items										
Financial income	0	0	0	0	0	0	0	0	0	0
Net interest expenses	-79 909	-79 909	-81 307	-100 230	-130 112	-161 377	-179 781	-199 815	-221 848	-243 553
Net currency effects	0	0	0	0	0	0	0	0	0	0
Other financial expenses	-12 905	-13 503	-14 542	-15 975	-17 546	-18 193	-18 907	-19 693	-20 465	-21 284
Net Financial Income (Expenses)	-92 814	-93 412	-95 849	-116 205	-147 658	-179 570	-198 688	-219 508	-242 314	-264 837
EBT	1 027 158	1 131 492	1 213 835	1 311 530	1 409 306	1 432 168	1 473 557	1 519 329	1 561 961	1 608 819
Tax	-195 160	-214 984	-230 629	-249 191	-267 768	-272 112	-279 976	-288 672	-296 773	-305 676
Profit (Loss) from Continuing Operations	**831 998**	**916 509**	**983 206**	**1 062 339**	**1 141 538**	**1 160 056**	**1 193 581**	**1 230 656**	**1 265 189**	**1 303 143**
Profit or loss for the year attributable to:										
Non-controlling interests	0	0	0	0	0	0	0	0	0	0
Owners of P/F Bakkafrost	831 998	916 509	983 206	1 062 339	1 141 538	1 160 056	1 193 581	1 230 656	1 265 189	1 303 143
	831 998	**916 509**	**983 206**	**1 062 339**	**1 141 538**	**1 160 056**	**1 193 581**	**1 230 656**	**1 265 189**	**1 303 143**
Dividends	332799	366603	393282	424936	456615	464022	477432	492263	506075	521257
Retained Earnings	499199	549905	589924	637404	684923	696034	716149	738394	759113	781886
	831998	**916509**	**983206**	**1062339**	**1141538**	**1160056**	**1193581**	**1230656**	**1265189**	**1303143**

Table 23: Forecasted & Reorganized Income Statement (2021-2030).

[37] The assumption is that all non-operational assets in the statement of financial position at the year-end 2020 are valued fairly and hence, can be directly adjusted in the present value of operations.

8.4 Statement of Financial Position Forecasting

Income Statement forecasting is followed by forecasting of Statement of Financial Position. Most of the line items in the statement of financial position are often linked to the revenues (Koller et al., 2015). Moreover, accounts under the operating liabilities can be expected to fluctuate significantly with cost of goods sold (Koller et al., 2015, p. 237). Hence, the author has linked the line items of statement of financial position to either revenue or cost of purchases.

8.4.1 Forecast Assumptions: Statement of Financial Position

The individual line items in the Statement of Financial Position have been forecasted primarily as a percentage of revenue or percentage of "cost of purchases", depending on what drives the line item. Most of the non-operational items are presumed to have no change over the years (i.e., 2020 values are presumed to remain indefinitely). Moreover, since the forecasted effective cash tax rate is presumed to be the same as marginal tax rate, it is presumed that no change in deferred tax assets or liabilities would occur and hence, deferred tax assets and liabilities are kept at their 2020 levels.

To balance the statement of financial position, accounts of "excess cash" and "new debt taken" have been used, in line with recommendations of Koller et al. (2015). Excess cash and new debt taken are non-operational accounts, however, the operational assets and liabilities which are financed by new debt or excess cash will be reflected in the FCFF as either change in working capital and/or increase in non-current operational assets.

Detailed explanations for key assumptions are presented in the sub-section below, followed by a summary of all Statement of the Financial Position in Table 24.

Explanations of Key Statement of Financial Position Assumptions

- **Inventory**

Salmon farming is a capital-intensive industry and salmon being farmed is the primary inventory. Since the salmon (inventory) is dependent on the licenses and tangible assets, perhaps a good way to forecast salmon (inventory) is to estimate it as a percentage of total operating current assets or PPE or licenses. However, this could lead to circularity problem. To avoid this, as an alternative, inventory is forecasted based on 3-year average ratio of inventory (salmon) to revenue.

- **Tangible Assets (also called PPE)**

Koller et al. (2015) recommend forecasting PPE as "… a percentage of net PP&E or a percentage of revenues" (p. 238), and the author has forecasted PPE as a percentage of revenues. 3-year's average of PPE to Revenues has been taken for forecasting purposes. However, the years used for average are 2017, 2018 and 2020 – 2019 has been excluded because Scottish Salmon Company was acquired in the 4th quarter of 2019 and including 2019 would significantly overstate the ratio of PPE to Revenue.

- **Licenses**

Over the years, no license has been impaired. Moreover, future increases are difficult to predict because salmon farming licenses issuance is not common. Nonetheless, Bakkafrost has recently applied for offshore farming licenses in the Faroe Islands, hence, it is likely that licenses (assets) will increase. However, Bakkafrost has not provided any details about the potential value of offshore farming licenses. Nonetheless, Bakkafrost has disclosed that it expects its harvests to increase substantially over the coming years. Hence, it is considered appropriate to forecast licenses as a percentage of revenues (3-year average).

- **Goodwill & Brands**

Goodwill & brands are recognized in the financial statements only through M&A's. Since it has been presumed that no further M&A's will happen, no increase in goodwill & brands is expected. Moreover, amortization is presumed zero, hence, decrease in brands and goodwill is zero as well.

Summary of Statement of Financial Position Assumptions

A summary of forecasting assumptions for Statement of the Financial Position is presented in Table 24 below. Wherever "no change presumed" has been written, it means that value of 2020 is presumed to remain constant indefinitely.

Statement of Financial Position Assumptions

Current Assets			
Line Item	**Nature**	**Pegged to**	**Rate**
Operating Cash	Operating		4%
Accounts Receivables		% of Revenue, Avg. of 3 years	11%
Inventory			58%
Tax Receivables		*No Change Presumed*	-
Prepayments		% of Revenue, Avg. of 3 years	0%
VAT		*No Change Presumed*	-
Other Rcv's		% of Revenue, Avg. of 3 years	1%
Total Other Receivables		Sum of Prepayments + VAT + Other Receivables	-
Excess Cash	Non-Operating	*Balancing Figure*	-
Receivables from associated companies		% of Income from Associates, 3-Yrs Avg	0%
Deposit for interest and currency swap		% of Income from Associates, 3-Yrs Avg	0%
Total Non-Op Other Receivables		Sum of Rcv from Associates and Deposits for interest & currency swaps	-

Current Liabilities			
Line Item	**Nature**	**Pegged to**	**Rate**
Short-term interest bearing debt	Operating	% of Revenue, 2-Yrs Avg	0%
Trade Payables		% of Cost of Purchases, 3-Yrs Avg	-29%
Current Tax Liabilities		*No Change Presumed*	-
Short-term Debt Liabilities (Leasing)		% of Revenue, 2-Yrs Avg	3%
Other Current Liabilities		% of Cost of Purchases, 3-Yrs Avg	-2%
Financial Derivatives	Financing Item	*No Change Presumed*	-
Provisions for onerous contracts		*No Change Presumed*	-

Non-Current Assets			
Line Item	**Nature**	**Pegged to**	**Rate**
Land buildings & other real estate	Operating		32%
Plant machinery & other operating equipment			30%
Other operating equipment		% of Revenue, 3-Yr Avg (2020, 2018 & 2017, excl. 2019)	4%
Vessels			9%
Prepayments for purchase of PPE			7%
Leased Assets		% of Revenue, 2-Yr Avg	7%
Licenses		% of Revenue, 3-Yr Avg	58%
Goodwill		*No Change Presumed*	-
Brands		*No Change Presumed*	-
Investments in Associates	Non-Operating	*No Change Presumed*	-
Investments in stocks & shares		*No Change Presumed*	-
Long-term Receivables		% of Revenue, 3-Yr Avg	0,2%
Deffered Tax Assets		*No Change Presumed*	-

Non-Current Liabilites			
Deferred Taxes	Financing Item	*No Change Presumed*	-
Long-term interest-bearing debt		% of Revenue, 3-Yr Avg	31%
Long-term leasing debt			2%
Derivatives		*No Change Presumed*	-
New Debt Taken		*Balancing Figure*	-

Table 24: Statement of Financial Position Assumptions.

8.4.2 Forecasted Statement of Financial Position

Based on the assumptions above, Bakkafrost's forecasted statement of financial position is presented in Table 25 below. It is worth noting here that whenever the forecasted non-current assets (as forecasted by the forecast ratio) falls below the previous year's levels, the previous year's value has been used. Based on the forecasted statement of financial position, invested capital has been calculated as well and attached as appendix 1.

Forecasted & Reorganized Statement of Financial Position

All values in 1000s DKK	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Assets										
Operating Current Assets										
Total Inventory	2 924 007	3 059 522	3 294 891	3 619 499	3 975 650	4 122 224	4 284 035	4 462 020	4 637 018	4 822 525
Accounts Receivables	555 646	581 398	626 124	687 809	755 488	783 341	814 090	847 912	881 167	916 419
Tax Receivables	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143
Total Other Receivables	31 323	32 775	35 296	38 774	42 589	44 159	45 892	47 799	49 674	51 661
Cash & Cash Equivalent	187 119	195 791	210 854	231 626	254 418	263 798	274 153	285 543	296 742	308 613
Operating Current Assets	3 770 239	3 941 629	4 239 309	4 649 851	5 100 288	5 285 665	5 490 313	5 715 417	5 936 743	6 171 361
Non-Operating Current Assets										
Excess Cash	270 274	113 665	0	0	0	0	0	0	0	0
Total Other Receivables	0	0	0	0	0	0	0	0	0	0
Non-Operating Current Assets	270 274	113 665	0	0	0	0	0	0	0	0
Total Current Assets	4 040 513	4 055 294	4 239 309	4 649 851	5 100 288	5 285 665	5 490 313	5 715 417	5 936 743	6 171 361
Non-Current Assets										
Land buildings & other real estate	1 608 175	1 682 707	1 812 158	1 990 689	2 186 568	2 267 182	2 356 177	2 454 067	2 550 314	2 652 341
Plant machinery & other operating equipment	1 703 233	1 611 762	1 735 754	1 906 758	2 094 379	2 171 595	2 256 837	2 350 600	2 442 789	2 540 515
Other operating equipment	242 147	226 861	244 313	268 383	294 791	305 659	317 658	330 855	343 831	357 586
Vessels	474 403	496 390	534 577	587 243	645 026	668 807	695 060	723 937	752 329	782 427
Prepayments for purchase of PPE	387 946	396 148	426 624	468 654	514 769	533 748	554 699	577 744	600 403	624 423
Leased Assets	379 380	396 963	427 501	469 618	515 828	534 845	555 839	578 932	601 638	625 707
Total Tangible Assets	4 795 285	4 810 831	5 180 928	5 691 345	6 251 361	6 481 836	6 736 270	7 016 135	7 291 305	7 582 999
Intangible Assets										
Licenses	3 794 561	3 870 452	3 947 861	3 995 236	4 000 409	4 147 896	4 310 714	4 489 807	4 665 896	4 852 558
Total Operational Non-Current Assets	8 589 846	8 681 284	9 128 790	9 686 581	10 251 770	10 629 732	11 046 984	11 505 943	11 957 200	12 435 557
Goodwill	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837
Brands	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400
Total Goodwill & Brands	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237
Non-Current Financial Assets										
Investments in Associates	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141
Investments in stocks & shares	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318
Long-term Receivables	9 701	10 151	10 932	12 008	13 190	13 676	14 213	14 804	15 384	16 000
Deffered Tax Assets	0	0	0	0	0	0	0	0	0	0
Non-Current Financial Assets	132 160	132 610	133 391	134 467	135 649	136 135	136 672	137 263	137 843	138 459
Total Non-Current Assets	9 495 243	9 587 130	10 035 417	10 594 285	11 160 656	11 539 104	11 956 893	12 416 442	12 868 280	13 347 252
Total Assets	**13 535 756**	**13 642 424**	**14 274 726**	**15 244 136**	**16 260 943**	**16 824 769**	**17 447 206**	**18 131 859**	**18 805 024**	**19 518 613**
Liabilities & Equity										
Operating Current Liabilities										
Short-term interest bearing debt	0	0	0	0	0	0	0	0	0	0
Trade Payables	555 280	560 932	605 629	667 274	734 908	762 743	793 472	827 272	860 504	895 733
Current Tax Liabilities	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422
Short-term Debt Liabilities (Leasing)	132 112	138 235	148 869	163 535	179 627	186 249	193 560	201 602	209 508	217 890
Other Current Liabilities	31 856	32 181	34 745	38 281	42 161	43 758	45 521	47 460	49 367	51 388
	756 670	768 769	826 665	906 512	994 118	1 030 173	1 069 975	1 113 756	1 156 802	1 202 433
Non-Op Current Liabilities										
Financial Derivatives	0	0	0	0	0	0	0	0	0	0
Provisions for onerous contracts	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
Total Current Liabilities	756 670	768 769	826 665	906 512	994 118	1 030 173	1 069 975	1 113 756	1 156 802	1 202 433
Non-Current Liabilities										
Deferred Taxes	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222
Long-term interest-bearing debt	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690
Long-term leasing debt	108 488	113 516	122 249	134 292	147 507	152 945	158 948	165 552	172 045	178 928
Additional Debt Taken	0	38 835	564 489	1 394 529	2 262 997	2 774 219	3 330 736	3 942 759	4 545 665	5 183 968
Derivatives	0	0	0	0	0	0	0	0	0	0
Total Non-Current Liabilities	3 550 400	3 594 263	4 128 650	4 970 733	5 852 416	6 369 076	6 931 596	7 550 223	8 159 622	8 804 808
Total Liabilities	**4 307 070**	**4 363 032**	**4 955 315**	**5 877 246**	**6 846 534**	**7 399 248**	**8 001 571**	**8 663 979**	**9 316 424**	**10 007 241**
Equity	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487	8 729 487
Add: Retained Earnings	499 199	549 905	589 924	637 404	684 923	696 034	716 149	738 394	759 113	781 886
Total Equity at Year End	9 228 686	9 279 392	9 319 411	9 366 891	9 414 410	9 425 521	9 445 636	9 467 881	9 488 600	9 511 373
Total Liabilities & Equity	**13 535 756**	**13 642 424**	**14 274 725**	**15 244 136**	**16 260 943**	**16 824 769**	**17 447 207**	**18 131 859**	**18 805 024**	**19 518 614**

Table 25: Forecasted & Reorganized Statement of Financial Position (2021-2030).

8.5 FCFF Calculation

FCFF's framework was introduced earlier in chapter 7. In the FCFF framework, the three inputs are NOPLAT, Non-Cash Expenses and CAPEX. For calculation of FCFF, Non-Cash Expenses are taken from the forecasted income statement, and CAPEX & Increase in Working Capital changes from the forecasted statement of invested capital (attached as appendix 1). However, NOPLAT still needs to be calculated.

8.5.1 NOPLAT Calculation

In Table 26 below, the calculation of NOPLAT for 2021-2030 is presented. Amortization is zero in line with the assumptions taken. Operational EBIT was calculated and presented in Table 23: Reorganized & Forecasted Income Statement. Operating tax is presumed to be the same rate as marginal tax rate of 19%.

Forecasted NOPLAT

All figures in 1000s DKK	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Operational EBIT	1 119 971	1 224 904	1 309 683	1 427 735	1 556 964	1 611 738	1 672 245	1 738 837	1 804 275	1 873 656
Add: Amortization	0	0	0	0	0	0	0	0	0	0
Operational EBITA	1 119 971	1 224 904	1 309 683	1 427 735	1 556 964	1 611 738	1 672 245	1 738 837	1 804 275	1 873 656
Less: Operating Tax	212 795	232 732	248 840	271 270	295 823	306 230	317 727	330 379	342 812	355 995
NOPLAT	**907 177**	**992 172**	**1 060 844**	**1 156 465**	**1 261 141**	**1 305 508**	**1 354 518**	**1 408 458**	**1 461 463**	**1 517 661**

Table 26: Forecasted NOPLAT (2021-2030).

8.5.2 FCFF Calculation

With all the input values now available (NOPLAT, Working Capital, and Invested Capital), the FCFF has been calculated and presented in Table 27 below. The details of how FCFF is calculated is explained in detail in section 7.5 above.

FCFF Forecast

All values in 1000s DKK	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
NOPLAT	907 177	992 172	1 060 844	1 156 465	1 261 141	1 305 508	1 354 518	1 408 458	1 461 463	1 517 661
Depreciation & Amortization										
Depreciation & Amortization	384 156	401 960	432 883	475 530	522 321	541 578	562 836	586 220	609 211	633 583
Less: Depreciation of Leased Assets	26 770	28 755	30 087	32 402	35 594	39 097	40 538	42 129	43 880	45 600
Add: Total Non-Cash Depreciation	357 386	373 205	402 795	443 128	486 727	502 481	522 299	544 091	565 332	587 983
CAPEX & Working Capital										
Increase in Working Capital	85 828	159 292	239 783	330 695	362 831	149 323	164 846	181 323	178 280	188 987
Increases in Tangible Assets (including Licenses)	295 897	91 437	447 506	557 791	565 189	377 962	417 252	458 959	451 258	478 357
	381 726	250 729	687 289	888 486	928 019	527 285	582 098	640 282	629 538	667 343
Total Non-Cash Depreciation	357 386	373 205	402 795	443 128	486 727	502 481	522 299	544 091	565 332	587 983
ess: Total investments in CAPEX & Working Capital	24 339	-122 476	284 494	445 359	441 293	24 804	59 800	96 191	64 206	79 360
FCFF before Intangibles	**1 240 224**	**1 487 854**	**1 179 145**	**1 154 235**	**1 306 575**	**1 783 185**	**1 817 017**	**1 856 358**	**1 962 588**	**2 026 284**
Less: Increase in Intangible Assets	0	0	0	0	0	0	0	0	0	0
Free Cash Flow to the Firm	**1 240 224**	**1 487 854**	**1 179 145**	**1 154 235**	**1 306 575**	**1 783 185**	**1 817 017**	**1 856 358**	**1 962 588**	**2 026 284**

Table 27: Forecasted FCFF (2021-2030).

8.6 Chapter Summary

In this chapter assumptions for forecasting Bakkafrost's financial statements have been discussed and presented. Based on those assumptions, financial statements of Bakkafrost have been forecasted, followed by the calculation of FCFF.

The most significant forecasted line item is "revenues". It has been forecasted by keeping in view not only the market's growth but also Bakkafrost's capacity enhancements and historic premiums over market price.

Most of the operating line items have been calculated either as a percentage of revenue or as a percentage of cost of goods sold. Non-operating items, both in the income statement and statement of financial position, mostly are presumed to be zero since they are not only hard to predict but also have no impact on FCFF calculated through operating profit only. The line items of "new debt taken" and "excess cash" have been used to balance the statement of financial position.

In the following chapter, Bakkafrost's cost of capital will be calculated, followed by valuation in chapter 10.

9. Cost of Capital

The DCF valuation models, as mentioned previously, require certain inputs. One of these is the cost of capital. The cost of capital is essentially the opportunity cost that an investor has for an asset with similar risk/return profile. It is meant to compensate the investor for both the time value and risks (Luehrman, 2017). For a firm to generate economic profits, it must generate returns higher than the cost of capital (Bruner et al, 1998).

9.1 Cost of Capital: WACC

Since the FCFF based DCF model is being used for valuation, the cost of capital that must be calculated is the weighted average cost of capital (WACC). It is subdivided into cost of debt and cost of equity. The methodology of calculating WACC is discussed in this section, followed by calculation of Bakkafrost's WACC is the subsequent segment.

9.1.1 Cost of Equity: CAPM

There are multiple models available to calculate the discount rate for equity investors. Of these models, some are theoretically sounder than others. The two well-known models are:

1. Capital Asset Pricing Model (CAPM)
2. Arbitrage Pricing Theory (APT)

Bruner et al. (1998) found in their survey of "27 highly regarded corporations" that CAPM is the model overwhelmingly preferred by practitioners. This could perhaps be due to the ease of use that CAPM provides (Luehrman, 2017). In fact, Fama and French note that CAPM model "is often the only asset pricing model taught in … [MBA] courses" (Fama & French, 2004, p.1). Even though CAPM requires certain assumptions which do not hold true in real markets, as per the research of Bruner et al. (1998) none of the participating companies "… cited specific modifications… to adjust for any empirical shortcomings of the [CAPM] model…" (p. 16), i.e., practitioners tend to use CAPM without modifications.

Keeping in view that CAPM is the model that underlines modern financial theory and is overwhelmingly preferred by the practitioners, the author believes that this is the model that should be used for calculating the cost of equity for Bakkafrost.

CAPM states that the cost of equity is equal to the risk-free rate *plus* a market risk premium, adjusted for the risk profile/sensitivity of the company (and measured by Beta).

CAPM results in the following equation (Kenton & Mansa, 2021):

$$\mathbf{E(R_i) = R_f + ß_i(E(R_m) - R_f)}$$

Where:

$E(R_i)$ = Expected Return of the Asset

R_f = Risk-free Rate

$ß_i$ = Sensitivity to the Market

$E(R_m)$ = Expected Return of the Market

and

$[E(R_m) - R_f]$ = Market Risk Premium

Each of the inputs in the CAPM model are discussed below.

Risk-free Rate

Risk-free rate is the return on investment one would have if one invested in an asset with zero risk. Typically, the US government's issued bills, notes and bonds are considered risk-free (i.e., they carry no risk of default). However, since the government issues bills, notes and bonds with various maturities, the practitioner must decide which risk-free rate to use. The yield curve is typically upward sloping, i.e., the interest rate increases with the length of maturity (Warnock, 2006), and the spread between 90-day T-bill and the 10-year treasury bond is roughly 1.5% on average and therefore, the choice of risk-free rate will have material impact on cost of equity, and consequently, on WACC (Bruner et al., 1998). As per Bruner et al. (1998), practitioners prefer using 10-year bonds. Practitioners' preference for 10-year treasury bonds could stem from the fact that corporations make long-term investments and hence, using long-term bonds is in line with the matching principle.

Keeping in line with the above, the author would use 10 years bond as a proxy for risk-free rate in this thesis. Question arises of why not use treasury bonds with maturities longer than 10-years; this is because beyond 10-years, the yield curve is *almost* flat (and hence, the spread becomes immaterial).

Beta

Beta is the measure of sensitivity of a company to the market. It is usually derived by linearly regressing a company's historical returns against market returns (Perold, 2004). It must be noted here that as per the CAPM, the regression is to be done against *market portfolio* (Bruner et al., 1998). This market portfolio is not observable and hence, a proxy needs to be used. In the US, S&P 500 is mostly used as a proxy for this market portfolio (Damodaran, n.d.-b).

It must also be noted that finance theory calls for the use of forward-looking betas, but since forward looking betas are unavailable, betas based on historical returns are used as proxies (Bruner et al., 1998). With the use of historical betas as proxies for the future comes an implicit assumption that past is a good predictor of the future, which might not be the case as the company's capital structure, macro environment and/or underlying operations might change.

Another challenge with calculating beta is related to the period that is chosen for regression analysis. The aim is to use historical beta that is the best proxy of the future, and therefore, it is better to use shorter estimation window for companies that have undergone changes and longer estimation windows for companies which have remained relatively stable (Damodaran, n.d.-b).

Apart from the above challenges, another decision that has to be made while estimating betas is choosing the return interval. Returns can be measured not only daily, weekly, annually, but also hourly (the list is not exhaustive)! Damodaran (n.d.-b) states that using shorter intervals increases the dataset however, this can affect beta estimation of companies which are not traded frequently (Damodaran, n.d.-b), as this would lead to "… illiquid firms reporting lower betas than they really should have and liquid firms reporting higher betas than is justified" (Damodaran, n.d.-b, p. 11). Damodaran further recommends using monthly returns as this would solve the illiquidity problem and states that for companies listed for more than 3 years, there would be sufficient observations available to estimate beta. It is noteworthy here that Bakkafrost has been listed on the Oslo Stock Exchange since 2010.

An alternative option available to practitioners is to use the beta estimates provided by companies such as Bloomberg and Value Line. In fact, Bruner et al. (1998) found in their survey of "27 highly regarded corporations", that only 30% of the companies calculated their own betas. However, the challenge here again arises that different beta publishers use different time horizons and return intervals, because of which, their betas can materially differ.

For Bakkafrost, the author will use mix of both the above approaches to calculate Beta[38].

Equity Market Risk Premium

By definition, equity market risk premium is the premium investors require for investing in equity markets relative to the risk-free investments. This premium (or spread) is due to the risk that equity market carries.

Finance theory requires that this risk premium be forward-looking. However, since future returns are unavailable at the present, practitioners use historical returns (Bruner et al., 1998). As per the survey conducted by Bruner et al. (1998), the chief difference in calculation of equity market risk premium was between choosing arithmetic vs geometric return and in "… choice of realized returns on T-bills versus T-bonds to proxy for the return on riskless assets" (Bruner et al., 1998, p. 20). Koller et al., however, argue that using a market risk premium of roughly 5% is suitable and state that "… numbers near 8 percent are too high for valuation purposes…" (Koller et al., 2015, p. 278). Schill (2017) also cites 5% as "… a reasonable estimate of the market risk premium" for non-US centric companies (p. 8).

Moreover, Damodaran (2021) has calculated Equity Market Premium for Norway and Denmark as 4,72%, after accounting for country default risk. The value of 4,72% is close to the 5% value suggested above by Koller et al. (2015) and Schill (2017).

Due to almost consensus of Damodaran (2021), Koller et al. (2015) and Schill (2017), the author will use 5% as the equity market risk premium. This is a more practical approach and resolves the challenge of choosing between geometric and arithmetic returns, since there seems to be no consensus amongst practitioners.

9.1.2 Cost of Debt

The cost of debt is the rate at which a company can borrow *at a given* time. It includes the risk-free rate and a premium or spread which is meant to reflect the probability of default. There are primarily two methods through which cost of debt can be calculated. Both the

[38] In addition to the 2 methods of Beta estimation referred to above, there are other methods available as well, e.g., calculating median of unlevered Beta for the comparable firms and then re-levering it as per the capital structure of the company in question; another popular approach is to calculate Beta and then multiply it by 2/3 and give 1/3 weight in final Beta calculation to "1" – the argument being that, in the long term, industry and company performance will revert to market performance (i.e., 1).

methods essentially find Yield to Maturity (YTM) of the company's borrowings. It must also be noted that YTM, by definition, is the *promised* return to an investor whereas the cost of debt that is required for valuation and/or capital budgeting purposes need to be expected return. By using YTM as the cost of debt, one is assuming that the lender will not default and that all the promised payments will be made by the borrower (and on time). This is not a perfect assumption because corporate debt is not risk-free. However, academics and practitioners agree that this is an immaterial problem since companies with investment grade bonds are unlikely to default (Luehrman, 2017).

Both the methods of calculating YTM of the company's borrowings are discussed below.

- **Calculating YTM from Bonds**

Yield to Maturity is essentially the IRR of a bond, i.e., it is the rate of return an investor will receive if the investor holds the bond until maturity and receives all cash flows as promised (Fernando & Scott, 2020). YTM can be calculated by using the YTM formula and solving for YTM (Koller et al, 290). The price of the bond can be taken from financial markets whereas the coupon rate will be given on the bond.

The challenge while calculating YTM stems from the question of which bond to use for the calculation of YTM. What should be the maturity of the bond since companies' issue bonds with various maturities? Should the bond be option-free or is it okay if it has embedded sweeteners? Should the bond used for calculation be fixed rate or floating rate?

Koller et al. (2015) state that the bond used should be option-free. Luehrman (2017) argues that the bond should be fixed rate since floating rate bonds are "… pegged to a short-term benchmark" (p. 21) and short-term benchmarks are likely to be distorted by short-term noise in the macro-environment. With regards to the question of which maturity bonds to use, Lipson (2019a) warn of falling into the trap of trying to weigh bonds with different maturities separately. Rather, it is recommended that long-term bonds be used to calculate YTM. The argument for ignoring short-term debt while calculating YTM is the assumption that corporations usually roll-over short-term debt (Lipson, 2019b).

In summary, the cost of debt can be calculated by calculating YTM of a long-term, fixed rate, option-free bond of the company. However, if the bond is illiquid then finding spot-market price of the bond for the purposes of calculation of YTM would be difficult.

It must be noted that calculating YTM by simply using the coupon rate or dividing interest payments by interest-bearing debt outstanding are both flawed approaches and will give an incorrect YTM *unless* the bond is trading at par (Luehrman, 2017).

- **Determining YTM from Bond Ratings**

An alternative method to determine YTM is to use the bond ratings as provided by various ratings agencies (Koller et al, 2015, p. 291). This resolves issue of calculating YTM for companies with illiquid debt (where market price of debt cannot be observed) and/or companies that lack option-free bonds (Luehrman, 2017).

9.1.3 WACC Calculation

Once cost of debt, cost of equity, risk-free rate, tax rate and beta have been calculated, the next step is to calculate WACC. The formula for WACC is as follows:

WACC = (Weight of Equity x Cost of Levered Equity) + [Weight of Debt x Cost of Debt x (1-Tax Rate)]

The weights for debt and equity should be market weights and not book weights (Lipson, 2019b). However, finding market value of debt is often impractical because not all information about any company's debt is always available/observable publicly. In such cases, use of book values is recommended by Koller et al. (2015, p. 296), if interest rates have not changed significantly and the company has not "… entered into financial distress" (Koller et al., 2015, p. 296).

9.2 Bakkafrost's Cost of Capital Estimation

9.2.1 Cost of Equity Estimation

Risk-free Rate

The risk-free rate being used for calculation of Bakkafrost's WACC is 10-year Norwegian Government's bond. The 10-year tenor is in line with the literature provided earlier in this chapter. The reason for choosing Norwegian Government's bond rather than Danish Government's or the UK's bond is that out of these 3 countries, Norway remains the largest salmon producer and because Bakkafrost is listed on Oslo Stock Exchange. In light of these,

it is considered reasonable to use the 10-year risk free Norwegian Government Bonds. The risk-free rate, as of 1st April, is: 1,48% (World Govt Bonds, n.d.).

Beta Estimation

As mentioned previously, the method of beta estimation amongst practitioners varies. The author has chosen to estimate Beta in two different ways and then used an average of the two. Firstly, Beta is calculated as a regression against market returns. Secondly, published Beta from yahoo finance has been taken.

- **Beta Estimation 1: Regression against market returns (Oslo Børs)**

A common practice of Beta estimation is to regress the company's returns against the market portfolio. The challenge in defining the time horizon and selecting the market portfolio for Beta estimation have been explained earlier. The author has decided to take Oslo OBX index as the market portfolio since Bakkafrost is listed on the Oslo Stock Exchange. The time horizon for Beta estimation has been chosen as the 5-years ending April 2021, with interval of monthly returns, in line with recommendations of Damodaran.

It must be noted that there is no need to do the regression. Using "SLOPE" function in excel calculates the beta directly.

The calculated Beta figure is: 0,63.

- **Beta Estimation 2: Published figures from Yahoo Finance (S&P 500)**

Secondly, Beta figures from yahoo finance have been taken as given (5 year, monthly, regressed against S&P 500). The Beta for Bakkafrost is: 0,34.

- **Final Beta**

For the purposes of WACC, the Beta that has been used is the average of the two Beta's above. The final beta value is: 0,49.

Market Risk Premium

The author will use 5% as the market risk premium, in line with the recommendations of Damodaran (2021), Koller et al. (2015), and Schill (2017), as mentioned previously.

CAPM – Calculation of Cost of Equity

By putting all the above inputs together, the cost of levered equity is calculated using the CAPM equation[39] below:

$Ke = R_f + ß \times (Market\ Risk\ Premium)$

The calculated value is: 3,91%, and the calculation is presented in Table 28 below.

Cost of Equity Calculation	
Rf (Norwegian Govt. 10 Yr Bond)	1,48%
Beta	0,49
Market Risk Premium	5%
	2%
Ke	**3,91%**

Table 28: Bakkafrost's Cost of Equity Calculation.

9.2.2 Cost of Debt

In the sub-section 9.1.2, framework for calculation of cost of debt was introduced and it was mentioned that cost of debt is essentially the YTM of a company's bonds. However, calculation of Bakkafrost's cost of debt is challenging on several grounds.

1. The company does not have any published bond rating and hence, it is not possible to calculate cost of debt using the bond ratings and their relative spreads.

2. The company has not disclosed any information about its outstanding bonds. As a result, calculation of YTM on bonds is not possible. In fact, as per the given information, it seems that the company has no bond issued.

3. The company has not provided its cost of debt in the annual report.

Considering the above, the cost of debt has been calculated as the interest for the year divided by net debt of year t_{-1}. This is not the preferred approach, however, given the limitations, it is

[39] Detailed CAPM equation has been provided earlier and has not been recreated here to ensure brevity.

the only feasible approach. The cost of debt is: 3,6%; after adjusting for interest tax shield, the cost of debt lowers to: 2,9%; the calculation is shown in Table 29 below.

Cost of Debt	
All values in 1000s DKK	
Total Interest Paid (t=2020)	36 317
Interest Bearing Liabilities (t-1)	2 328 231
Less: Excess Cash (t-1)	1 134 335
Net Interest Bearing Debt	1 193 896
Kd	3,0%
Tax Rate (Marginal)	19,00%
Kd (including interest tax shield)	**2,5%**

Table 29: Bakkafrost's Cost of Debt Calculation.

9.2.3 Target Capital Structure

It is presumed that the capital structure will remain constant. This is because, historically, Bakkafrost's capital structure has shown little fluctuation, as can be seen in Figure 11 below. The historic book value of debt to total debt and equity has remained within 30% to 35% range. The presumption of constant debt to equity ratio, consequently, means that the WACC need not be re-adjusted each year for calculation of present value.

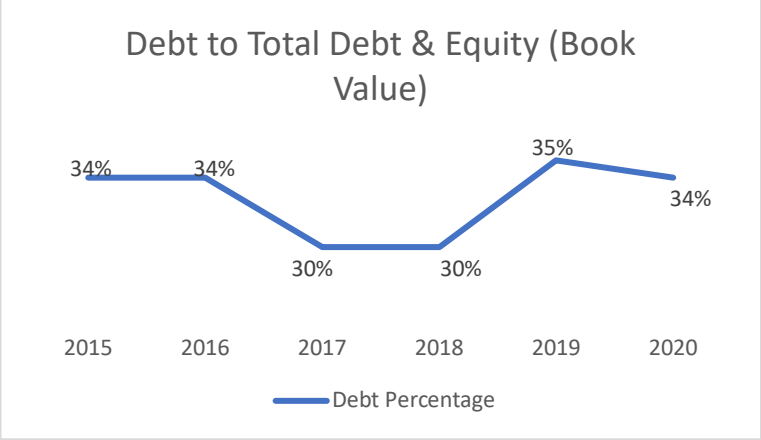

Figure 11: Plot of Bakkafrost's historic Debt to Total Debt & Equity; Data Source: Annual Reports.

9.2.4 WACC Calculation

WACC is calculated as weighted average of equity and debt cost of capital; the values are meant to be market values. However, the author has used market value of equity and book value of debt because market value of debt is not clearly observable because Bakkafrost primarily has bank issued debt. Koller et al. (2015) approve of this methodology, as mentioned previously. The calculation of debt-to-equity ratio is shown in Table 30 below, followed by calculation of WACC in Table 31. For debt calculation, excess cash has been deducted from the debt to reach the value of net debt. Debt value has been converted to NOK from DKK because share price (and consequently, market capitalization) is in NOKs.

Bakkafrost (Debt to Debt+Equity Ratio)

Equity	
Share Price (Yahoo Finance, 16 May) in NOK	685
Common Shares Outstanding (in 1000s)	59 044
Total Market Capitalization (in 1000s NOK)	**NOK 40 445 189**
Debt (2020); *all values in 1000s DKK*	
Interest Bearing Debt	2 219 690
Post-retirement obligation	0
Provisions	0
Long-term Lease Liabilties IFRS 16	262 235
Derivatives	1 480
Short-term Lease Liabilities IFRS 16	107 808
Total Non-Current Debt	2 591 213
Less: Excess cash	295 404
Total Debt (Book Value) in 1000s DKK	DKK 5 477 830
DKK to NOK (Spot rate, 18 May)	1,35
Total Debt (Book Value) in 1000s NOK	**NOK 7 395 071**
Debt/(Debt+Equity) Ratio	**15%**

Table 30: Bakkafrost's Debt to Equity Ratio.

WACC

Ke	3,91%
Weight of Equity	84,54%
Weighted Cost of Equity	3,31%
Kd (inclusive of Interest Tax Shield)	2,46%
Weight of Debt	15,46%
Weighted Cost of Debt (inclusive of Tax Shield)	2,08%
WACC	5,39%

Table 31: Bakkafrost's WACC Calculation

The estimated WACC is 5,39%.

To ensure that this WACC is not too low or too high, this WACC has been compared with the competitor's post-tax WACC's (as disclosed by companies themselves under IAS 36). The disclosed WACC of comparable companies in attached in appendix 2. Since the calculated post-tax WACC of Bakkafrost does not differ very significantly with disclosed post-tax of other companies, the author believes that the calculated WACC figure is okay to be used for valuation.

9.3 Chapter Summary

This chapter introduced the methodology for calculating a corporation's WACC. Different methods for calculating different components of WACC were discussed in detail. It was observed that the primary challenge in calculation of Bakkafrost's WACC was in calculating its cost of debt, since the company seems to have no public debt outstanding and has no debt rating issued. The author calculated cost of debt as a percentage of interest-bearing liabilities outstanding at t_{-1} and used book value of debt for estimating debt to equity ratio. The calculated post-tax WACC is 5,39%. Given the positive outlook determined by the strategic analysis, coupled with Bakkafrost's historical success, the author does deem the calculated WACC of 5,39% as appropriate and has decided to use it for valuation.

10. Fundamental Valuation

In the preceding chapters, Bakkafrost's financial statements were forecasted, followed by calculation of WACC. In this chapter, Bakkafrost's fundamental valuation would be carried out using FCFF based DCF methodology.

10.1 Terminal Value Calculation

Bakkafrost's FCFF was forecasted in chapter 8, in line with the FCFF framework. Since the FCFF has been calculated only for the years 2021-2030, beyond 2030 a terminal growth rate of 2% is assumed (i.e., the economy's expected growth rate) to calculate the continuing (terminal) value. To calculate the terminal value in 2030, 2030's FCFF is grown by the terminal growth rate; this leads to FCFF value for the year ended 2031. The FCFF value for 2031 is then discounted for 1 period using the WACC, which results in the terminal value in 2030; the calculation is shown in Table 32 below. It is important to state that the terminal value is in 2030's DKK and still needs to be discounted further to find out its value on 18th May 2021.

Terminal Value

All figures in 1000s DKK	
Long-Term Growth Rate	2%
FCFF in 2030	2026284
FCFF in 2031	2066810
WACC	**5,39%**
Terminal Value in 2030	**DKK 60 967 836**

Table 32: Calculation of Terminal (Continuing) Value of Bakkafrost's FCFF.

10.2 Valuation

Table 33 below shows the conversion of FCFF into present value. The discount factor is calculated by adjusting WACC for the period.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
FCFF		1 240 224	1 487 854	1 179 145	1 154 235	1 306 575	1 783 185	1 817 017	1 856 358	1 962 588	2 026 284
Add: Terminal Value											60 967 836
Total FCFF		1 240 224	1 487 854	1 179 145	1 154 235	1 306 575	1 783 185	1 817 017	1 856 358	1 962 588	62 994 120
WACC		5,39%	5,39%	5,39%	5,39%	5,39%	5,39%	5,39%	5,39%	5,39%	5,39%
Period	0	1	2	3	4	5	6	7	8	9	10
Discount Factor	1	0,95	0,90	0,85	0,81	0,77	0,73	0,69	0,66	0,62	0,59
Present Value	**47 732 570**	**1 176 795**	**1 339 558**	**1 007 324**	**935 613**	**1 004 934**	**1 301 368**	**1 258 239**	**1 219 738**	**1 223 586**	**37 265 415**
All values in 1000s DKK except Discount Factor & Period											

Table 33: Calculation of Bakkafrost Present Value (of Operations); All values in 1000s DKK except Discount Factor & Period.

Once the present value of operations has been calculated, all non-operating assets (as of 31st December 2020) are added to this present value and all liabilities (as of 31st December 2020) are deducted, leading to the enterprise value. The enterprise value is then divided by the shares outstanding, leading to per share value of DKK 740 as of 31st December 2020, as shown in Table 34 below. Since this thesis aims to find share price as of 18th May, an upward adjustment is made accordingly for 4,5 months. The resulting share price is as of 18th May; however, this share price is in DKK. Since Bakkafrost's stock trades in NOK on Oslo Børs, using the spot exchange rate as of 18th May, share price is converted from DKK to NOK, leading to a per share price of NOK 1019.

The entire calculation of EV and price per share is shown in Table 34 below.

Calculation of Per Share Price

Total Present Value of Operations (in 1000s)	**DKK 47 732 570**
Add: Non-Operating Assets	
Non-Operating Current Assets (including Excess Cash)	DKK 295 404
Non-Current Financial Assets; Non-operating	DKK 157 494
Total Non-Operating Assets (in 1000s)	**DKK 452 898**
Less: Liabilities	
Total Non-Current Liabilities	DKK 3 708 627
Total Current Liabilities	DKK 770 210
Total Non-Operating Liabilities (in 1000s)	**DKK 4 478 837**
Enterprise Value (in 1000s)	**DKK 43 706 631**
Shares Outstanding	59 044 071
Price Per Share (Approximate as at 31 Dec, 2020)	DKK 740,24
Price Per Share (18th May)	DKK 754,95
DKK to NOK (Spot Rate; 18 May)	**1,35**
Price Per Share	**NOK 1 019,19**

Table 34: Calculation of Enterprise Value and Price Per Share of Bakkafrost.

10.3 Sensitivity Analysis with WACC

The share price estimated above is based on several assumptions, including future salmon prices, capacity enhancement, and WACC. However, given that the future demand growth is expected to be twice the future supply growth, it is reasonable to presume that Bakkafrost will be able to sell all its output; due to the demand growth higher than supply growth, it is also reasonable to presume that the price per kg of salmon will increase *at least* by inflation, as has been presumed for forecasting. In other words, these are conservative assumptions and are grounded in economic realities and hence, unlikely to overvalue the company.

Apart from salmon prices, capacity enhancements and future demand predictions, WACC was another major input in the valuation model. WACC was calculated using the book value of debt and market value of equity, because the market value of debt was unavailable. Even

though this approach is in line with recommendations of Koller et al. (2015) when public value of debt is unavailable, this is not the optimal method of calculating WACC. Moreover, the calculation of cost of debt was done by dividing interest paid in time t by net interest bearing debt in time t_{-1}. This is not the optimal approach to calculate the cost of debt; however, this was done because Bakkafrost seems to have no public debt outstanding. In a nutshell, significant assumptions were made to calculate WACC of Bakkafrost (the estimated WACC was 5,39%). Therefore, the author considers it important to calculate share price using a range of WACCs. Figure 12 below shows that for a 1% increase in WACC, the share price falls by 26% (and reaches NOK 758 from NOK 1019 estimated at original WACC), and for a 1% decrease in WACC, the intrinsic value per share rises by 47% (and reaches NOK 1500 from NOK 1019 estimated at original WACC).

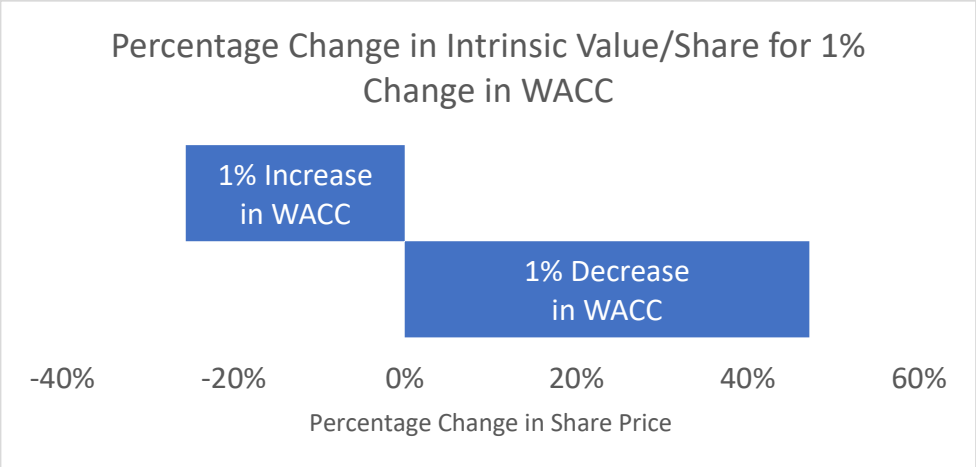

Figure 12: Percentage Change in Intrinsic Value/Share for 1% Change in WACC.

What is interesting to note here is that for an increase in WACC of 1% (that is, WACC 6,39%), the share price is NOK 758 and hence, even a WACC as high as 6,39% would lead to intrinsic share price that is at least 10% higher than the current market value of NOK 685. In other words, a WACC that is 1% higher than the WACC used for valuation purposes would still lead to a "BUY" recommendation with a 10% confidence interval vis-à-vis Bakkafrost's market share price of NOK 685 as of 17th May!

10.4 Chapter Summary

In chapters 8 and 9, FCFF and WACC were calculated, respectively. This chapter has brought together the estimated FCFF and estimated WACC and used the FCFF-based DCF approach to first calculate Enterprise Value of Bakkafrost, followed by calculation of price per share. The resulting figure is NOK 1019. Given that NOK 1019 is significantly higher than the share price of NOK 685 (as of 17th May)[40], based on fundamental valuation alone, the author recommends a "BUY" position.

Sensitivity analysis on WACC was carried out in the later part of the chapter and it was seen that even if the WACC increases by 1%, the recommendation would still remain "BUY" with a 10% confidence interval. Hence, even with 1% increase in WACC, the author would recommend a "BUY" position vis-à-vis the share price on 17th May (based on fundamental analysis alone).

In the following chapter, Bakkafrost's value is calculated using market multiples approach.

[40] The share price had already risen to over NOK 744 by 23rd May.

11. Multiples Valuation

In this chapter, methodology for multiples-based valuation approaches is introduced, followed by discussion of popular multiples. Ultimately, Bakkafrost's multiples-based value is calculated using P/E and EV/Operational EBIT multiples.

11.1 Framework

Multiples based approaches value a company in relation to the value of similar companies with the help of relevant and common metrics (Koller et al., 2015). The underlying principle in multiples-based approaches is that the market will value assets with similar risk/return profiles in a similar manner (Hitchner, 2017). A corollary to this is that markets are presumed to be efficient (Vergara-Alter & Gil, 2016). However, it must be noted that multiples-based approaches do not attempt to value an asset's intrinsic value, rather it "… is much more likely to reflect the current mood of the market" (Damodaran, 2012, p. 453). Multiples based approaches are relatively easy to implement and interpret, however, as per Professor Vergara-Alter and their researcher Gil, the simplicity offered by the multiples approach comes at the expense of accuracy (Vergara-Alter & Gil, 2016). Schill (2017) warns that "multiples can be deceptively simple" (p. 12) and could be distorted by market sentiment and accounting policies. Schill (2017) recommends using multiples to "triangulate" the valuation, and not to avoid the lengthy process of fundamental valuation.

In a nutshell, one must exercise caution while employing multiples. This approach should be conducted to compliment intrinsic valuation, and not as a substitute.

11.1.1 Methodology

Like any other model, implementation of multiples-based approaches consists of several steps. They are summarized below (identified by author from Koller et al., 2015; Damodaran, 2012; Vergara-Alter & Gil, 2016):

1. **Identifying the comparable companies** – This step is pivotal for successful implementation of multiples-based approach. The companies need not only be consistent in terms of their operations and risk profiles but comparability in terms of their capital structure, accounting methods and geographic presence need to be

accounted for as well (this list is by no means exhaustive). Damodaran warns that a key challenge here is in "… how narrowly you define a comparable firm" (Damodaran, 2012, p. 462), and he advises that "if you can find ways of controlling for differences across companies… you will get more reliable estimates…" (Damodaran, 2012, pp. 462-463). Moreover, to be able to identify comparable companies correctly, it is crucial to be able to comprehensively understand the company being valued.

2. **Choosing Relevant Multiples** – Historically, investors have relied on some well-known multiples, such as the P/E ratio and hence, it is natural for analysts to follow these multiples as well when conducting a valuation. However, such a simplistic view of using "popular" multiples can be erroneous, warns Koller et al. (2015). Multiples need to be chosen with care and, if necessary, should be tailored to the company and sector in question.

3. **Application of Multiples** – Once the comparable companies have been identified and relevant multiples chosen, the next step is to apply the multiple. It must be noted here, however, that the value of the parameter could be historical or forecasted, depending on what the multiple is being used for. Having said that, it is necessary to understand that historic parameters are useful for valuation of a company to the extent that past trends can be expected to continue in the future – which might not always be the case. Therefore, for valuation, it is recommended to use forward-looking rather than historic parameters. However, any forward-looking parameters will themselves be based on assumptions, which is a limiting factor.

11.1.2 Popular Multiples

- **EV/EBIT(DA): Recommended**

Koller et al. (2015) recommend using EV/EBITA or Net EV/NOPLAT multiple for the purposes of valuation. Vergara-Alert and Gil (2016) state that common multiples include P/E ratio, EV/EBITDA, and EV/Sales. One of the major reasons why this multiple is recommended is because it is not impacted by the capital structure and tax rates of the companies.

Given the consensus in favour of EV/EBIT(DA) multiple, the author has decided to use it for the purposes of multiples valuation; nonetheless, the author has made slight change and used EV/Operational EBIT as this would, in the authors opinion, better corelate with the operational performance since the non-cash expenses, particularly depreciation, is significant for salmon farming industry since it is capital intensive.

- **P/E: Very popular, yet not recommended**

P/E ratio is perhaps the most common and widely used multiple. It essentially measures the price as a multiple of the company's earnings, e.g., a P/E ratio of 10 would mean that an investor is willing to pay 10x the (current level of) earnings to acquire one share. Generally, a high P/E ratio suggests that investors expect the company to grow. Mathematically:

P/E Ratio = Price Per Share / Earnings Per Share

and

P/E Ratio = Market Capitalization / Total Shares Issued & Outstanding

Of the inputs that go into calculation of P/E ratio, the numerator, i.e., price per share (or market capitalization) is easily observable in the market for liquid firms. The problem in the P/E ratio-based valuation is in the denominator, i.e., calculation of earnings and earnings per share (Damodaran, 2012). Damodaran (2012) states that P/E ratios can "… be computed using current earnings per share, trailing earnings per share, forward earnings per share, fully diluted earnings per share, and primary earnings per share" (p. 468). The lack of consistency in calculation of earnings per share will lead to P/E ratios which cannot be compared across companies with reasonable precision. However, this can be overcome if one defines what they mean by earnings and then consistently apply it across the companies.

Moreover, Koller et al. (2015) discourage using P/E ratio because "... it is distorted by capital structure and nonoperating gains and losses" (Koller et al., 2015, p. 332). Interestingly, however, Alford (1992) finds that adjusting "P/E multiples for differences in leverage across comparable firms decreases accuracy…" of P/E valuation (Alford, 1992, p. 96). Beaver and Morse (1978) cite research of Beaver and Dukes as an example to show that the differences in how depreciation is accounted for can lead to differences in P/E ratios; thus, pointing that accounting treatment can impact P/E ratios (the research by Beaver and Dukes was limited to treatment of depreciation only). However, Young and Zeng (2015) refer to Foster and state

that within the same industry, it is common for companies to use similar accounting treatments and methods (Foster as cited in Young & Zeng, 2015), which mitigates the chances of distortions due to accounting estimates and treatments.

Given Foster's and Alford's research referred to above, coupled with the practitioners' overwhelming use of the P/E ratio, the author consider it appropriate to use it for valuation.

11.2 Multiples Valuation for Bakkafrost

11.2.1 Identification of Comparable Companies

Correct identification of comparable companies is key for a reliable multiples-based valuation. Comparability can be on several dimensions, e.g., industry, sector, risk, etc. The author has decided to call this type of comparability "economic comparability", in line with work of Young and Zeng (2015). The higher the economic comparability between the companies, the better multiples-based valuation techniques tend to work (Young & Zeng, 2015).

Another relevant factor for deciding on comparable companies could be the accounting treatment/methods used by the companies. However, as mentioned previously, Alford (1992) refers to Foster and states that "…firms in the same industry often use similar accounting methods" (p. 95).

Considering the above, the author has decided to choose comparable companies only from within the salmon farming industry, as they not only have economic comparability but will also likely meet accounting comparability. Moreover, due to convergence of accounting methods (post-2005), the accounting aspects are presumed to have been further ironed out, in line with the findings of Young and Zeng (2015). The selected companies are all listed on the Oslo Børs[41]; they are:

i. Mowi Group

ii. Greig Seafood Group

[41] These are the same companies that are under coverage of Handelsbanken (as per their 2018 report).

iii. Lerøy Seafood Group

iv. SalMar Group

v. Norwegian Royal Salmon

11.2.2 Historical vs Forward Multiples

Koller et al. (2015) and Vergara-Alter & Gil (2016) recommend using forward estimates rather than historical values for calculation of multiples. Vergara-Alter & Gil (2016) state that forward-looking multiples have been empirically found to be "… more accurate predictors than historical multiples" (p. 5), and Koller et al. (2015) concurs. However, forward-looking multiples need to be based on "… reliable forecasts…" (Vergara-Alter & Gil, 2016, p. 5), and in case of unavailability of such forecasts, one "… must rely on historical data" (Vergara-Alter & Gil, 2016, p. 5).

The author is constrained by unavailability of Bloomberg Terminal and hence, does not have access to analysts' reports. Therefore, independent future forecasts are not available, and the author is forced to rely on historical values for the purposes of multiples valuation. The author also does not consider it appropriate to use self-created forecasts for multiples valuation because those forecasts would be backed by the same assumptions as the DCF valuation (in previous chapters) and any incorrect assumption in the DCF valuation would be reflected in multiples valuation.

11.2.3 Selection of Multiples for Bakkafrost

Based on the discussion above, the multiples the author has decided to use are P/E and EV/Operating EBIT multiples.

i. P/E Ratio

ii. EV/Operating EBIT

Why not use EV/kg of Salmon multiple?

A popular multiple within the salmon farming industry is EV/kg of salmon. However, the author believes that it is inappropriate to use EV/kg because the salmon industry of today is significantly different from the salmon industry of the past. The industry today is vertically integrated, and the value is generated not only by harvesting (or farming) fresh salmon, but

also through sale of other salmon-related products. For instance, Bakkafrost does not only sell fresh fish but also sell value-added products (packaged/processed fish) and fish feed. Moreover, the level of integration varies across companies, which would lead to comparability issues if EV/kg of salmon is used. Therefore, using EV/kg multiple for the valuation of the entire Bakkafrost group is deemed inappropriate by the author.

Nonetheless, EV/kg can be used if it is applied independently on different segments and then added together. This requires, however, that EV for each segment (of each comparable) be readily available, which is impractical in case of Bakkafrost.

In light of the above, the author has decided not to use EV/kg metric.

11.2.4 Application of Multiples

To ensure comparability across companies, the author has calculated Operational EBIT himself using relevant annual reports for the year ended 2020. The EPS figures used to calculate P/E ratio is also for the year ended 2020. This ensures consistency across companies because, as of the writing of this thesis, not all companies had disclosed their earnings for Q1 of 2021. Hence, using quarterly earnings would have impacted the comparability across companies.

Share price estimation based on EV/EBIT and P/E multiples are done below.

- **EV/Operational EBIT**

In Table 35 below, the author has calculated enterprise value and operating EBIT of comparable companies and Bakkafrost; it can be seen that there is immense variation within the salmon farming companies listed on the Oslo Stock Exchange. Mowi, world's largest salmon farming company, has market capitalization of well over NOK 109 billion whereas Grieg Seafood and Norway Royal Salmon has capitalization of a little under NOK 10 billion each. Bakkafrost has market capitalization of over NOK 40 billion.

In general, the EV/EBIT[42] can be interpreted as the payback period of acquiring a company[43], if the earnings remain at the current level. A high EV/EBIT, therefore, signifies that the investors expect the earnings to grow considerably. The range of EV/EBIT is from 12 to 46 in the salmon farming companies under consideration; with Bakkafrost having EV/EBIT of 46.

Enterprise Value/EBIT

	Mowi ASA	Lerøy	Grieg Seafood	SalMar	Norway Royal Salmon	Bakkafrost
Enterprise Value Calculation						
Shares Issued (incl. Non Controlling Interest)	517 111 091	595 774 000	113 447 042	113 531 370	43 730 307	59 143 000
Treasury Shares	0	298 000	1 171 494	232 071	653 398	98 929
Shares Outstanding, net of Treasury Shares	517 111 091	595 476 000	112 275 548	113 299 299	43 076 909	59 044 071
Share Price in NOK (as of 16th May)	NOK 211	NOK 75	NOK 73	NOK 576	NOK 199	NOK 685
Market Capitalization (in 1000s NOK)	**NOK 109 162 151**	**NOK 44 398 691**	**NOK 8 212 956**	**NOK 65 283 056**	**NOK 8 572 305**	**NOK 40 456 997**
All following figures in 1000s except exchange rate and ratios						
Total Long-Term Debt	2 362 400	8 250 870	4 817 271	6 274 864	567 786	3 708 627
Total Short-Term Debt	719 400	4 279 460	968 509	4 736 427	4 664 479	770 210
Total Debt	3 081 800	12 530 330	5 785 780	11 011 291	5 232 265	4 478 837
Less: Total Cash	107 200	2 966 407	275 427	223 447	38 753	466 939
Net Debt	EUR 2 974 600	NOK 9 563 923	NOK 5 510 353	NOK 10 787 844	NOK 5 193 512	DKK 4 011 898
EUR to NOK & DKK to NOK (Spot rate)	9,99					1,35
Net Debt (NOK)	**NOK 29 716 254**	**NOK 9 563 923**	**NOK 5 510 353**	**NOK 10 787 844**	**NOK 5 193 512**	**NOK 5 416 062**
Enterprise Value (NOK)	**NOK 79 445 897**	**NOK 34 834 768**	**NOK 2 702 603**	**NOK 54 495 212**	**NOK 3 378 793**	**NOK 35 040 935**
EBIT Calculation						
Operational EBIT (in 1000s)	EUR 325 400	NOK 1 949 655	NOK 233 057	NOK 3 007 500	NOK 246 252	DKK 567 574
EUR to NOK & DKK to NOK	9,99					1,35
Operational EBIT (in 1000s)	**NOK 3 250 746**	**NOK 1 949 655**	**NOK 233 057**	**NOK 3 007 500**	**NOK 246 252**	**NOK 766 225**
EV/Operational EBIT	**24**	**18**	**12**	**18**	**14**	**46**
Average EV/EBIT (excl. Bakkafrost)	**17,15**					

Table 35: Calculation of EV/EBIT Multiple for comparable companies & industry average; Currency spot rates as of 16th May (from Morningstar, via Google).

[42] The EBIT has been calculated by the author. It consists only of operational items and hence, is comparable across companies.

[43] This is because EV can be interpreted as amount of money one has to pay to acquire a company.

Share price calculation of Bakkafrost using EV/EBIT Multiple is illustrated in Table 36 below.

Estimated Share Price by EV/EBIT	
Shares Issued & Outstanding	59 044 071
Share Price - Bakkafrost	NOK 685,20
Market Capitalization (1000s)	NOK 40 456 997
Net Debt (1000s NOK), converted from DKK	NOK 5 416 062
EV (1000s)	**NOK 35 040 935**
Operational EBIT (1000s)	NOK 766 225
EV/Op EBIT (NOK)	**45,73**
Average EV/EBIT (excl. Bakkafrost)	17,15
Share Price - as calculated by EV/EBIT	**NOK 314,27**

Table 36: Estimation of Bakkafrost's Share Price using EV/EBIT Multiple

Based on the EV/EBIT multiple, a single share of Bakkafrost should have an approximate value of NOK 315. The current share price is NOK 685. Given that the difference between the current share price and estimated share price is significant, based on EV/EBIT ratio alone, it would seem that the market is overvaluing Bakkafrost by more than 50%!

- **P/E Ratio**

In Table 37 below, P/E ratios have been calculated for Bakkafrost and peer group companies. The P/E ratios and EPS do tend to fluctuate significantly from company to company, however, the P/E ratios of all the companies, except for Grieg Seafood Group, are significantly high. Mowi has a P/E ratio of 92 whereas Bakkafrost has a P/E ratio of 82. As a rule of thumb, the higher the growth perspectives of a company, the higher P/E ratio it has. Based on the P/E ratios, it can be said that most of the salmon companies listed on the Oslo Stock Exchange are regarded by investors as "growth stock". Greig Seafood's negative P/E ratio signifies that the company has been losing money in the last year, nonetheless, with a share price that is only NOK 1 less from Lerøy's share price, it can be inferred that Greig's negative earnings in 2020 was most likely a one-off event. This can be investigated further, however, the author has not done so since Greig falls outside the immediate scope of this thesis.

P/E Ratios

	Mowi ASA	Lerøy	Grieg Seafood	SalMar	Norway Royal Salmon	Bakkafrost
Diluted EPS (Company Reported)	EUR 0,23	NOK 1,33	-NOK 4,80	NOK 17,49	NOK 1,86	DKK 6,20
EUR to NOK & DKK to NOK	9,99	-	-	-	-	1,35
EPS in NOK	NOK 2,30	NOK 1,33	-NOK 4,80	NOK 17,49	NOK 1,86	NOK 8,37
Share Price in NOK (as of 16th May)	211,1	74,56	73,15	576,2	199	685,2
P/E Ratio	**92**	**56**	**-15**	**33**	**107**	**82**

Average P/E Ratio (excl. Bakkafrost)	**55**
Average P/E Ratio (excl. Bakkafrost & Grieg)	**72**

Table 37: Calculation of P/E Ratio for the comparable companies & industry average; Currency spot rates as of 16th May (from Morningstar via Google).

Calculation of Bakkafrost's share price using the P/E ratio is illustrated in Table 38 below. The share price has been calculated twice, once including and once excluding the impact of Grieg Seafood's negative P/E ratio. However, the author has decided to use the share price excluding Grieg Seafood's P/E ratio for calculation of Bakkafrost's share price because it is, in all likelihood, a one-off event and including it would only bring downward biasedness in Bakkafrost's estimate share price.

Estimated Share Price by P/E Ratio

Average P/E Ratio (excl. Bakkafrost)	54,53
Bakkafrost's EPS	NOK 8,37
Share Price	**NOK 456,38**
Average P/E Ratio (excl. Bakkafrost & Grieg)	71,97
Bakkafrost's EPS	NOK 8,37
Share Price	**NOK 602,36**

Table 38: Estimation of Bakkafrost's Share Price using P/E Ratio.

Based on the share price calculated using P/E ratio (calculated excluding Bakkafrost and Grieg Seafood), the market is overvaluing the company by almost 14%, the current market price is NOK 685, whereas the price estimated by P/E ratio is NOK 602.

11.3 Conclusion from Multiples Approach

From the two multiples, the EV/EBIT has led to an estimated value of Bakkafrost that is significantly lower than the current market value, whereas the P/E ratio leads to a value that is 12% lower than the current market value. The final value from the multiples approach is NOK

458, with equal weight given to both the ratios. Nonetheless, as mentioned previously, it must be kept in mind that multiples do not provide intrinsic value of a company.

Based solely on the multiples approach, the author would recommend a “SELL” position (with 50% weight to each of the two multiples).

12. Chapter: Conclusion

This thesis was sub-divided into several parts, and each part analysed Bakkafrost from a different perspective, with the aim of answering the following research question:

"Is Bakkafrost an attractive investment for equity investors as of 18th May 2021?"

Based on the strategic analysis, it was seen that in the foreseeable future, the demand for salmon outstrips the supply. The industry faces threats and challenges of salmon lice and extreme weather events. However, the industry is well-suited to the global trends of sustainability, health, and aging (and growing) population. Within the industry, Bakkafrost is well-situated to capitalize on these trends because not only does it have demonstrated expertise, but also because its affiliation with the Faroe Islands allows it to avoid diplomatic downside that being based in the EU (or Norway) brings. Furthermore, salmon farming does not have significant political and social opposition in Norway and the Faroe Islands, however, in Scotland there seems to be rising criticism of the industry, primarily with the goal to make the industry more sustainable like it is in Norway and the Faroe Islands. Moreover, salmon farming licenses are limited, because of which, the barriers to entry in the industry are high, further strengthening the position of incumbents. Therefore, based on the strategic analysis, it was concluded that Bakkafrost is a good financial statement.

Strategic analysis was followed by analysis of Bakkafrost's financial health, and no major problem was identified with the company's financial health and capital structure. Rather, it was seen that Bakkafrost's liquidity, solvency and ROIC positions were better than the industry averages. It was also seen that the industry is moderately leveraged vis-à-vis the general economy and highly leverage vis-à-vis the "agricultural production livestock and animal specialties" sector, the reason for the latter being that salmon farming is more industrialised than other livestock farming, and hence, has high CAPEX & OPEX requirements.

Strategic and financial analyses were followed by fundamental valuation and multiples-based valuation. Fundamental valuation was driven primarily by the insights gathered in the strategic analysis, and as per FCFF based DCF method, the share price was estimated at NOK 1019. With a 10% confidence interval, the author recommends a "BUY" position on Bakkafrost based on fundamental valuation alone. To check for sensitivity, the share price was calculated

again by increasing WACC by 100 basis points, and even after the WACC's increase, the estimated share price was still more than 10% higher than the share price observed in the market as of 17th May. The multiples-based approach, however, painted a relatively more pessimistic picture, with P/E ratio valuing the company at NOK 602 and EV/EBIT multiple valuing the company at NOK 314.

The final estimated share value is NOK 850 as of 18th May 2021, with 70% weight to fundamental valuation and 15% to each of the multiples. The share price in the market as of 17th May was NOK 685. Hence, the estimated share price offers an upside of over 24%. It already seems that the market has started correcting itself as the share price rose from NOK 685 on 17th May to NOK 744 by 23rd May; the share price as of 23rd May still offers more than 14% upside.

Based on the entirety of analysis, the author concludes that Bakkafrost is a good equity investment as of 18th May 2021 and recommends a "BUY" position.

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Appendix

Appendix 1: Invested Capital Forecast of Bakkafrost

Invested Capital Calculation

All figures in 1000s DKK	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Operating Current Assets										
Total Inventory	2 924 007	3 059 522	3 294 891	3 619 499	3 975 650	4 122 224	4 284 035	4 462 020	4 637 018	4 822 525
Accounts Receivables	555 646	581 398	626 124	687 809	755 488	783 341	814 090	847 912	881 167	916 419
Tax Receivables	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143	72 143
Total Other Receivables	31 323	32 775	35 296	38 774	42 589	44 159	45 892	47 799	49 674	51 661
Cash & Cash Equivalent	187 119	195 791	210 854	231 626	254 418	263 798	274 153	285 543	296 742	308 613
Operating Current Assets	3 770 239	3 941 629	4 239 309	4 649 851	5 100 288	5 285 665	5 490 313	5 715 417	5 936 743	6 171 361
Operating Current Liabilities										
Short-term interest bearing debt	0	0	0	0	0	0	0	0	0	0
Trade Payables	555 280	560 932	605 629	667 274	734 908	762 743	793 472	827 272	860 504	895 733
Current Tax Liabilities	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422	37 422
Short-term Debt Liabilities (Leasing)	132 112	138 235	148 869	163 535	179 627	186 249	193 560	201 602	209 508	217 890
Other Current Liabilities	31 856	32 181	34 745	38 281	42 161	43 758	45 521	47 460	49 367	51 388
Operating Current Liabilities	756 670	768 769	826 665	906 512	994 118	1 030 173	1 069 975	1 113 756	1 156 802	1 202 433
Working capital	**3 013 568**	**3 172 860**	**3 412 644**	**3 743 339**	**4 106 169**	**4 255 493**	**4 420 338**	**4 601 661**	**4 779 942**	**4 968 928**
Non-Current Assets										
Land buildings & other real estate	1 608 175	1 682 707	1 812 158	1 990 689	2 186 568	2 267 182	2 356 177	2 454 067	2 550 314	2 652 341
Plant machinery & other operating equipment	1 703 233	1 611 762	1 735 754	1 906 758	2 094 379	2 171 595	2 256 837	2 350 600	2 442 789	2 540 515
Other operating equipment	242 147	226 861	244 313	268 383	294 791	305 659	317 658	330 855	343 831	357 586
Vessels	474 403	496 390	534 577	587 243	645 026	668 807	695 060	723 937	752 329	782 427
Prepayments for purchase of PPE	387 946	396 148	426 624	468 654	514 769	533 748	554 699	577 744	600 403	624 423
Leased Assets	379 380	396 963	427 501	469 618	515 828	534 845	555 839	578 932	601 638	625 707
Total Tangible Assets	4 795 285	4 810 831	5 180 928	5 691 345	6 251 361	6 481 836	6 736 270	7 016 135	7 291 305	7 582 999
Intangible Assets										
Licenses	3 794 561	3 870 452	3 947 861	3 995 236	4 000 409	4 147 896	4 310 714	4 489 807	4 665 896	4 852 558
Total Operational Non-Current Assets	8 589 846	8 681 284	9 128 790	9 686 581	10 251 770	10 629 732	11 046 984	11 505 943	11 957 200	12 435 557
Goodwill	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837	664 837
Brands	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400	108 400
Totall Goodwill & Brands	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237	773 237
Total Non-Current Assets (Except Financial Assets)	9 363 083	9 454 521	9 902 027	10 459 818	11 025 007	11 402 969	11 820 221	12 279 180	12 730 437	13 208 794
Working capital	3 013 568	3 172 860	3 412 644	3 743 339	4 106 169	4 255 493	4 420 338	4 601 661	4 779 942	4 968 928
Invested Capital (with Intangibles)	**12 376 652**	**12 627 381**	**13 314 670**	**14 203 157**	**15 131 176**	**15 658 461**	**16 240 559**	**16 880 841**	**17 510 379**	**18 177 722**
Invested Capital (without Goodwill & Brands)	**11 603 415**	**11 854 144**	**12 541 433**	**13 429 920**	**14 357 939**	**14 885 224**	**15 467 322**	**16 107 604**	**16 737 142**	**17 404 485**
Non-Operating Current Assets										
Excess Cash	270 274	113 665	0	0	0	0	0	0	0	0
Total Other Receivables	0	0	0	0	0	0	0	0	0	0
Non-Operating Current Assets	270 274	113 665	0	0	0	0	0	0	0	0
Non-Current Financial Assets										
Investments in Associates	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141	67 141
Investments in stocks & shares	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318	55 318
Long-term Receivables	9 701	10 151	10 932	12 008	13 190	13 676	14 213	14 804	15 384	16 000
Deffered Tax Assets	0	0	0	0	0	0	0	0	0	0
Non-Current Financial Assets	132 160	132 610	133 391	134 467	135 649	136 135	136 672	137 263	137 843	138 459
Total Funds Invested	**12 779 086**	**12 873 655**	**13 448 061**	**14 337 624**	**15 266 825**	**15 794 596**	**16 377 231**	**17 018 103**	**17 648 222**	**18 316 181**

Liabilities & Equity

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Non-Op Current Liabilities										
Financial Derivatives	0	0	0	0	0	0	0	0	0	0
Provisions for onerous contracts	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
Non-Current Liabilities										
Deferred Taxes	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222	1 222 222
Long-term interest-bearing debt	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690	2 219 690
Long-term leasing debt	108 488	113 516	122 249	134 292	147 507	152 945	158 948	165 552	172 045	178 928
Additional Debt Taken	0	38 835	564 489	1 394 529	2 262 997	2 774 219	3 330 736	3 942 759	4 545 665	5 183 968
Derivatives	0	0	0	0	0	0	0	0	0	0
Total Non-Current Liabilities	3 550 400	3 594 263	4 128 650	4 970 733	5 852 416	6 369 076	6 931 596	7 550 223	8 159 622	8 804 808
Total Liabilities	3 550 400	3 594 263	4 128 650	4 970 733	5 852 416	6 369 076	6 931 596	7 550 223	8 159 622	8 804 808
Equity	9 228 686	9 279 392	9 319 411	9 366 891	9 414 410	9 425 521	9 445 636	9 467 881	9 488 600	9 511 373
Total Liabilities & Equity	**12 779 086**	**12 873 655**	**13 448 060**	**14 337 624**	**15 266 825**	**15 794 597**	**16 377 232**	**17 018 104**	**17 648 222**	**18 316 181**

Table 39: Calculation of Bakkafrost's forecasted invested capital

Appendix 2: Company Reported WACCs

Company Reported Comparables WACC (Under IAS 36)		
	Pre-tax WACC	**Post-tax WACC**
SalMar Norway	-	5,36%
Greig Seafood Norway	-	5%
Lerøy Seafood	6,67%	6,05%
Mowi Norway Farming	8,80%	-
Mowi Scotland Farming	8,20%	-
Mowi Feed	8,70%	-
Norway Royal Salmon	-	7,50%
Average	8,09%	5,98%
Bakkafrost (Company Reported)	**7,20%**	**-**

Table 40: Presentation of company reported WACCs of Bakkafrost and comparable companies. "-" means that the rate was unavailable.