Bakkafrost (BAKKA.OL)

Investment Memo

Date: 4/30/2020; Closing stock price: 506.5 NOK

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Executive Summary

Bakkafrost is the leading producer of top-quality salmon from the Faroe Islands – a self-governing archipelago which is part of the Kingdom of Denmark. The company is listed on the Oslo stock exchange but publishes IFRS accounting in Danish Krone. The Faroe Islands are comprised of 18 rocky, volcanic islands between Iceland and Norway in the North Atlantic Ocean and have a population of 52,110 as of January 2020[i]. Fishery products, including farmed salmon, represent more than 95% of the total Faroese goods export and around 20% of the Faroese GDP, of which Atlantic salmon represented 11% of total harvest volume in 2019[ii]. The fish industry employs approximately 15% of the labor force[iii].,. As the largest producer of salmon in the Faroe Islands, Bakkafrost is a major contributor to the country's economy and one its largest employers.

On the surface, farming is a competitive industry – ~70% of farms have an operating profit margin (OPM) of less than 10%[iv] and the average net cash farm income for farm businesses specializing in cattle and calves is expected to decline to $24,600 per farm in 2020[v]…*farming for a living is hard work.*

However, Bakkafrost currently has an OPM of ~ 30% and generates 25%+ returns on invested capital, on average.

The business was established in 1968 by two brothers, Hans and Roland Jacobsen. By extending its value chain in salmon production, the company is the world's most vertically integrated salmon farmer and controls the entire value chain – from fishmeal and fish oil to sales & marketing operations. Bakkafrost consistently delivers strong performance and best in class EBIT margins.

L R T
CAPITAL MANAGEMENT

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Company History

In 1968, Bakkafrost was founded by two brothers, Hans and Róland Jacobsen. They started the business by catching and processing seafoods such as herring, blue whiting, and flatfish. Herring and blue whiting have now become the most commonly used species for feeding salmon.

In 1986, the production of farmed salmon and smolt started. Regin Jacobsen, the son of Hans Jacobsen, served as CEO of the company in 1989, and has been the CEO for over 30 years. During the last three decades, farmed salmon has gained much more share of salmon supply than wild salmon[vi].

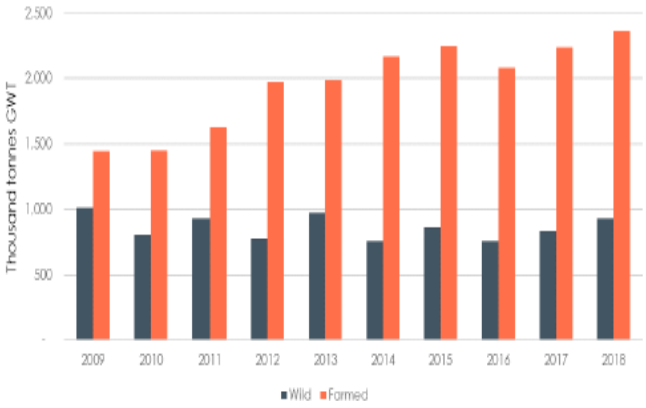


Figure 1: Wild salmon vs farmed salmon supply, 2009-2018

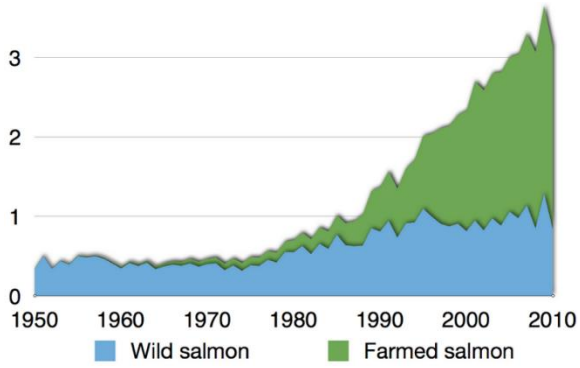


Figure 2: Wild salmon vs farmed salmon supply, 1950-2010

Under Regin's tenure, Bakkafrost expanded its value chain and capacity steadily.

- In 1995, a value-added product (VAP) [1] factory for salmon was built. Bakkafrost increased the capacity of the plant around 2000.
- From 2006 to 2010, Bakkafrost grew through acquisitions and mergers, increasing capacity significantly.
- In 2011, the company acquired P/F Havsbrún, a modern, internationally renowned producer of fishmeal, fish oil and fish feed situated in the Faroe Islands.
- From 2013 to 2018, Bakkafrost made its first 5-year investment plan to increase operational efficiency, to increase organic growth, to reduce the biological risk, and to build a new live fish carrier.
- In 2018, the company took full responsibility of the Faroese broodstock program. Broodstock are group of mature fish used in aquaculture for breeding purposes.
- In 2019, Bakkafrost acquired The Scottish Salmon Company.

Regin Jacobsen and his mother Oddvør hold 15.57% of the shares outstanding, giving Bakkafrost a stable governance and long-term view in capital allocation. We believe the large insider ownership secures a strong alignment of shareholder's and management's interest. Regin won a prize as the best director for middle-sized companies which are listed on the Oslo Stock Exchange. Aside from the strong skills and stability of the management team, enthusiasm, professionalism, and transparency can also be found in their letters, interviews, and transcripts.

[1] Value added products are things such as smoked or cooked salmon. Value added products (VAP) are sold on longer term contracts to retailers and wholesalers, such as packaged salmon, ready-to-eat salmon, etc. The VAP contracts are at fixed prices, based on the salmon forward prices at the time they are agreed.

Growth Profile / Opportunity

Salmon is typically high in Omega-3 fatty acid, which provides health benefits by lowering blood pressure, decreasing inflammation, reducing the risk of cancer, etc. As a healthy and premium source of protein, salmon consumption grew 7% over the last two decades. At the same time, the consumption growth rates of beef, pork, and chicken are 1.1%, 1.4%, and 2.7%, respectively[vii]. Salmon still currently only contributes less than 1% of global protein supply. Figure 1 shows the salmon export volume and price in Norway (*which contributes over 50% supply in the world*). **Strong global demand growth outweighs the supply growth and will support the current price & potential future price increases.**

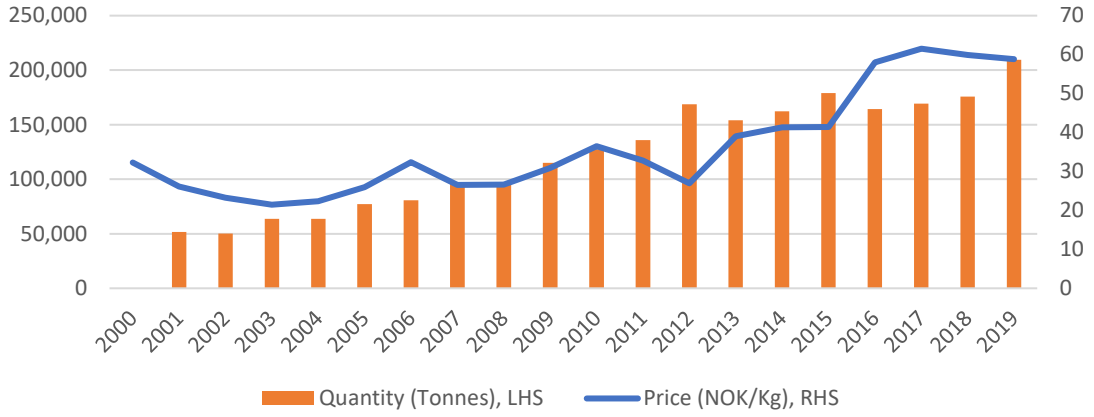


Figure 3: Norway Fresh Salmon Export Price & Quantity[viii]

As Warren Buffett said: "Life is like a snowball. The important thing is finding wet snow and a really long hill." Salmon farming businesses have a very 'long hill.' Whether you are in developed or emerging markets, the growth rate of salmon is over 2x the GDP growth rate. The EU accounts for ~45% of global salmon consumption and its volume per capita is the highest in the world…but the salmon demand increase still remains much stronger than the GDP growth rate. In the US, consumption of salmon growth is steady and strong as well – ~6% over the last decade. It would not be far-fetched to assume that underdeveloped markets, such as China, will provide a long-term growth runway and future opportunity for salmon farmers.

	EU	US	China
GDP	1.6%	2.3%	6.9%
Salmon	4.0%	6.0%	24.0%

Table 1: GDP growth rate vs salmon consumption growth rate, 2010-2019[ix]

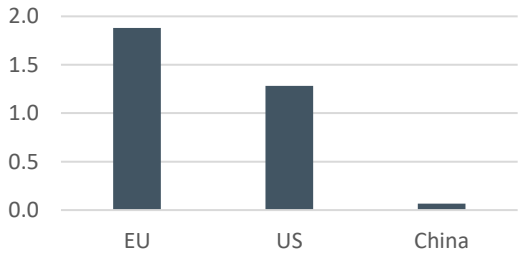


Figure 4: Consumption volume of salmon, kg/year per capita

While demand growth remains strong, supply is constrained by location, regulations, and biological risks. The annualized growth rate was 5.2% from 2007 to 2019. Bakkafrost's production in the Faroe Islands remains a tiny part of the global supply as the company plays only the most valuable premium segment of the market.

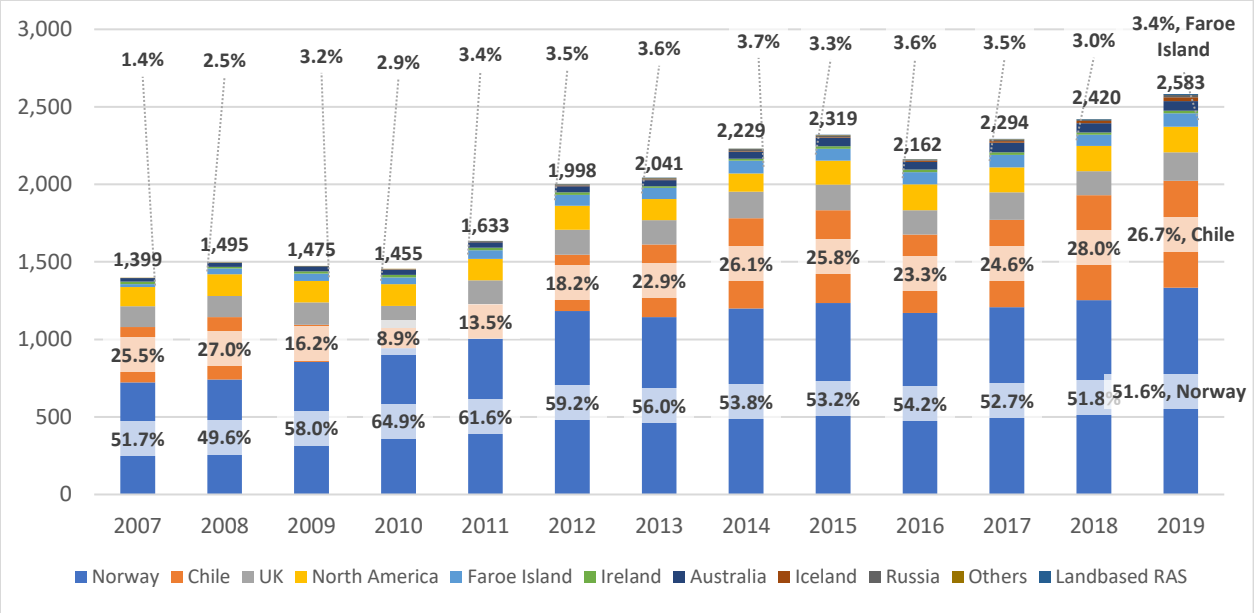


Figure 5: Global harvest of Atlantic Salmon by country, in thousand tonnes WFE[2] & market share of Norway, Chile and Faroe Islands

Location is a key factor in salmon farming business. Salmon (at any stage) needs cold, clean, oxygenated water to survive – which means only ~0.5% of our sea can be used for farming salmon. Although land-based farming is an option for the other farmers, the cost and price are more than double farming in the sea. For example, Oriental Ocean sold its land-based salmon at ¥158/kg in China, however the salmon from Norway was sold at ¥70/kg at the same time.

Secondly, the regulations surrounding salmon farming are becoming more and more strict. For example, regulators in Norway and Chile set maximum allowed growth rates for salmon farming. The maximum allowed growth rate per year depends on how the company controlled their biological risks in the previous year.

Lastly, biological risks, such as sea lice, ISA (infectious salmon anemia), algae bloom, etc. also limit the supply. The mortality rate is between 13% and perhaps as much as 20% due to these diseases. For instance, the Chilean salmon farming industry had a serious outbreak of infectious salmon anemia (ISA) which began in 2007. This outbreak caused severe impacts on Atlantic salmon production which formerly represented two thirds of Chilean salmonid output.

[2] WFE: Whole Fish Equivalent

Moat

Location

Only ~0.5% of our sea is suitable for farming salmon. Aquaculture facilities are always located where there are good currents and cold fresh water. The optimal temperature range for salmon is between 8°C and 14°C, but salmon can survive anywhere from 4°C up to 18°C. **The water temperature in the Faroe Islands is steady, with only a 6°C fluctuation throughout the course of a year.** The coastlines are within certain latitude bands in the Northern and Southern Hemisphere. However, the current must be below a certain level, allowing the fish to move freely around in the sites. Such conditions are typically found in waters protected by archipelagos and fjords…ruling out many coastlines[x].

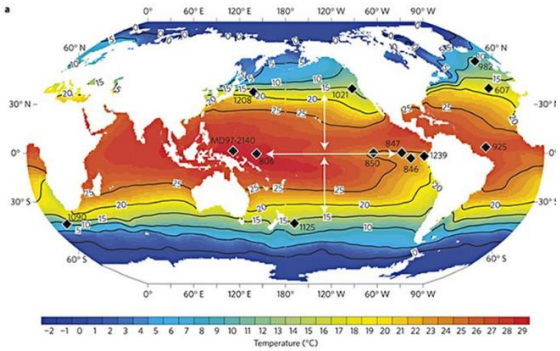


Figure 6: World sea temperature

Figure 7: Locations of salmon production

Risk of disease (sea lice) increases in seawater temperatures higher than 8°C, and mass mortality becomes more likely with temperatures below 0°C – both of which cause the growth rate to fall[xi]. **We believe that the Faroe Islands are located in the best possible location for salmon production**. The warm North Atlantic Current keeps the Faroe Islands free of ice, and the Arctic Current helps keep the water cooler than south Norway, which is at same latitude. The steady, cool water temperature helps Bakkafrost lower its cost on sea lice treatment and decrease the mortality rate.

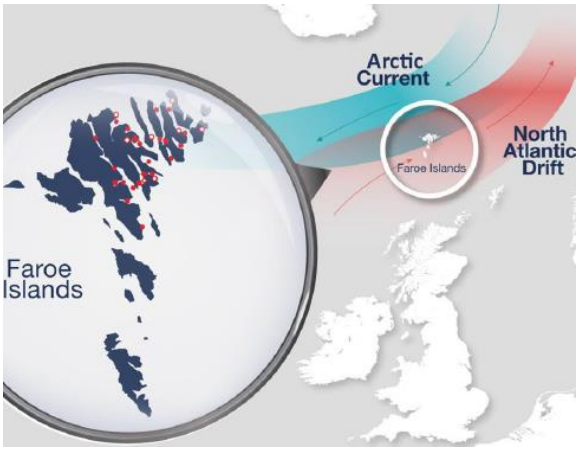


Figure 8: Ocean current around Faroe Island

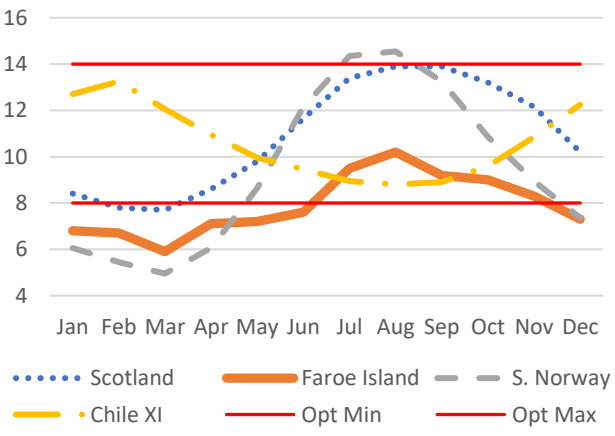


Figure 9: Seawater temperature

Unlike the fragmented production seen in Norway and Chile, there are only three salmon farmers in the Faroe Islands. Bakkafrost is less directly exposed to the competitive dynamics witnessed outside of the Faroe Islands – leading to more efficient production and coordination, thus avoiding the tragedy of the commons.

Licenses & Regulation[xii]

Faroe Islands

Salmon farming is heavily regulated by licenses. The sea farming licenses in the Faroe Islands are defined as the right to utilize a given area of fjords for farming fish. The size of the area and density limits for each of the 22 sea licenses vary greatly. Bakkafrost currently holds 17 sea licenses and has a very high share of production in Faroe Islands, ~70%.

In 2012 and 2018, the Government of the Faroe Islands announced revised aquaculture regulations with the aim of securing sustainable growth in the industry by implementing anti-trust regulations that a fish farming company cannot hold more than 50% of the total sea licenses. The 50% cap does not apply to licenses held by each individual company today. These rules also set a cap of 20% for either direct or indirect foreign ownership in Faroese fish farming companies. As a result, Mowi Faroes, the largest competitor, can only keep its current 3 seawater licenses and 1 smolt license…but cannot expand its business in the Faroe Islands.

Norway

Production limitations in Norway are regulated as "maximum allowed biomass" (MAB), which is the defined maximum volume of fish. The level of sea lice in these areas decides if the MAB can increase (+6%), stay the same, or decrease (-6%) in these areas. The conditions for this growth are A) below 0.1 lice per fish, and B) a maximum of one treatment during the last cycle of production.

The number of seawater licenses for salmon in Norway grew very slowly, from 929 in 2007 to 1,041 in 2018.

Chile

In 2018, Subpesca (regulator) made changes to the Stocking Reduction Program (PRS) aimed at reducing risks and improving health in salmon farming[xiii].

There were already very high barriers of entry in the salmon farming industry – start-up capital needs, as well as operating leverage *(falling production costs as quantity increases)*. New companies in salmon production will experience higher average production costs. **The added regulation and license requirements only build the barriers of entry higher for the salmon farming industry – resulting in more concentration.**

PRS criteria	Growth rate
Antibiotics 0~150 g/t & mortality rate ≤ 10%	9%
Antibiotics 150~300 g/t	6%
Antibiotics 300~600 g/t	3%
Antibiotics >600 g/t or mortality rate > 14%	Reduction

Table 2: PRS criteria and allowed growth rates

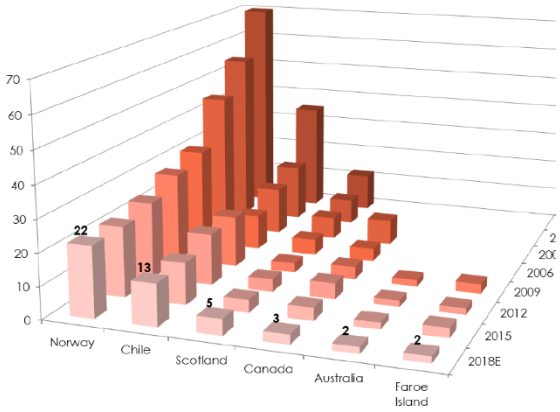


Figure 10: Industry concentration has increased

Brands

Bakkafrost provides the world with premium salmon products. An unrivalled vertical integration makes for some of the freshest, most sustainable, and healthy food on the planet. Bakkafrost utilizes a streamlined transportation infrastructure that makes it possible to get fresh salmon to any international market within 24 hours.

Premium Salmon

Larger fish warrant a price premium in the market, as well as better leverage fixed costs. The average gutted weight (GW) of Bakkafrost's salmon is 5.4 kg – significantly higher than the average GWs in both Norway (4.7 kg) and Chile (4.2 kg). **Bakkafrost achieves this by keeping the diet of their fish closer to the natural diet of wild salmon – this provides larger, healthier, and superior salmon.** Their feed recipe contains 28% fish meal and 16% fish oil, compared to the standard feed recipe of 11% fish meal and 9% fish oil. Other components of fish feed include wheat, vegetable oil, SPC Soy, and vital wheat gluten – see the appendix for details. In an experiment completed by Stale Refstie, the research concluded that during the first 28 days the growth was both faster and the feed conversion was also more efficient in Atlantic salmon fed the fish meal control diet[xiv] (*similar to the Bakkafrost diet*).

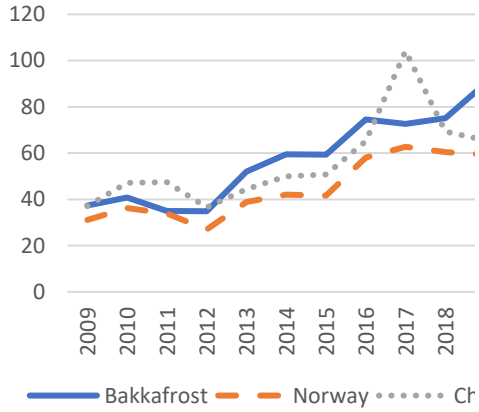


Figure 11: Salmon Price in NOK per kg[xv]

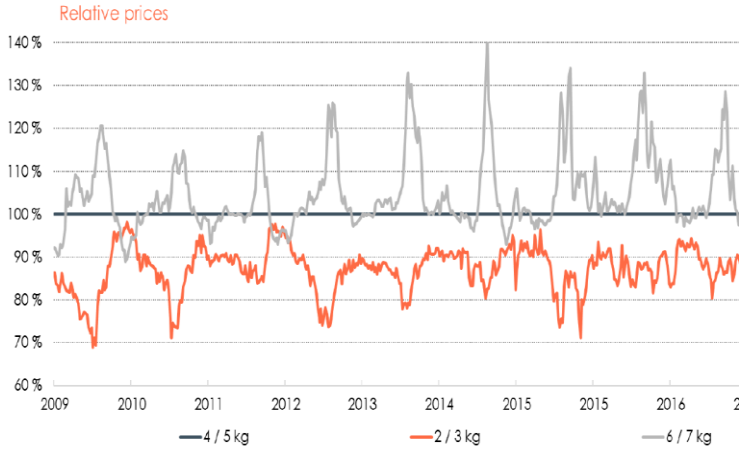


Figure 12: Relative premium and discount, based on 4-5 kg[xvi]

Sustainability

Sustainability is at the top of the agenda for salmon farmers. Bakkafrost has the longest value chain in the industry – meaning that the company controls all aspects of production. Bakkafrost is the market leader in producing healthy salmon and reducing biological risks. For example, since October 2017, no use of chemical bath treatments for sea lice have been done by Bakkafrost.

Value chain	**Improvements on sustainability**
Fish meal, fish oil, fish feed	Control the quality and quantity of feeding
Broodstock[3]	Maximize biosecurity, breeding and genetics
Farming service vessels (FSV)	Lower biological risks with closed transportation system
Processing and packaging	Meet diversified products and increase efficiency
Sales and distribution	Secure product availability, stabilize high quality and preferred products.

Table 3: How the value chain helps sustainability

[3] Broodstock, or broodfish, are a group of mature individuals used in aquaculture for breeding purposes.

Consistency

Bakkafrost continues to build its premium brand reputation. In 2019, Bakkafrost acquired Scottish Salmon Company (SSC) – another premium producer of salmon (as evident by the prices achieved relative to reference prices). Throughout the years, SSC had not only developed a range of strong flagship brands, but also continued to build its long-term partnerships with key customers – fostering a strong distribution networking with premium retailers, smokers, and restaurateurs…both in the UK and overseas.

The Scottish Salmon Company has been able to achieve premium pricing in an otherwise commoditized market. SSC has been able to achieve a price premium after launching fresh Scottish salmon with Label Rouge certification – which is the official endorsement of the French authorities for superior fresh produce. In 2018, the Scottish Salmon Company added the 'Tartan Salmon' trademarked brand name to Label Rouge Salmon range. This helped the company receive a ~13% price premium over the last two years.

Strict criteria must be maintained to establish a premium brand. 'Tartan Salmon', for example, are reared according to strict Label Rouge criteria, such as higher marine content in feed, lower stocking density in sea, full traceability, freshness guaranteed by an 'eat by date' of 10 days after harvesting, etc.

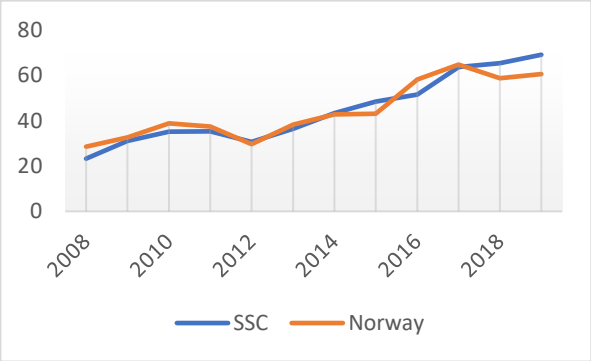


Figure 13: Salmon price (SSC vs Norway), in NOK/kg

	Industry[xvii]	Label Rouge
Marine content	20%	>50%
Stocking density (salmon/water)	2.5%/97.5%	1.5%/97.5%

Table 4: Salmon welfare (average vs premium)

Cost Advantages

Farming salmon has the fewest wastes and feeding costs relative to chicken, pork, and beef. Farmed Atlantic salmon has highest edible yield[4], lowest feed conversion ratio[5], and least land use[6].

	Farmed Atlantic	Chicken	Pork	Beef
Edible yield	**68%**	46%	52%	63%
Feed conversion ratio	**1.2~1.5**	1.7~2	2.7~5	6~10
Land use	**3.7**	7.1	11	102

Table 5: Resource efficiency by meat[xviii]

Bakkafrost has the longest integrated value chain in the industry. Control of the entire value chain is considered important to ensure availability, traceability, sustainability, and to be able to control the product flow daily. Integrated activities help the group realize business synergies and minimize costs.

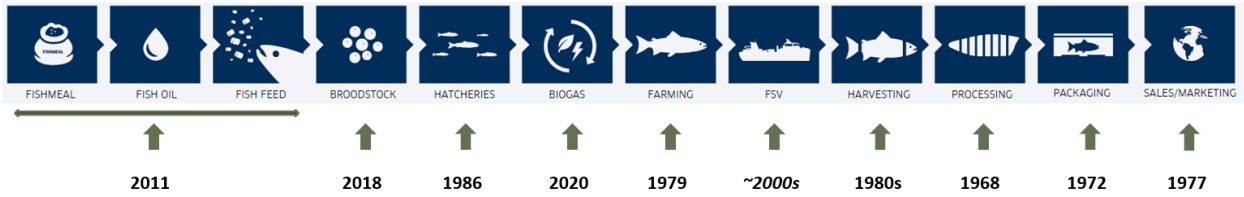


Figure 14: Control of entire value chain

Feed costs account for half of the total production costs within the salmon farming segment. In 2011, Bakkafrost acquired P/f Havsbrún, a producer of fish meal, fish oil, and fish feed in the Faroe Islands. As producers of Bakkafrost's own high-quality fish feed raw materials, Havsbrún is uniquely situated to select the very best fishmeal and fish oil for Bakkafrost's feed production. By keeping the diet of Bakkafrost salmon as natural as possible, the Group can have one of the best feed conversion ratios (Figure 12), fastest growing (Table 4) and lowest production costs (Figure 11).

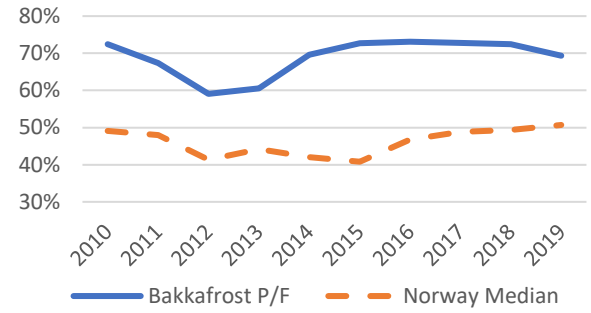


Figure 15: Gross margin, Bakkafrost vs Norway

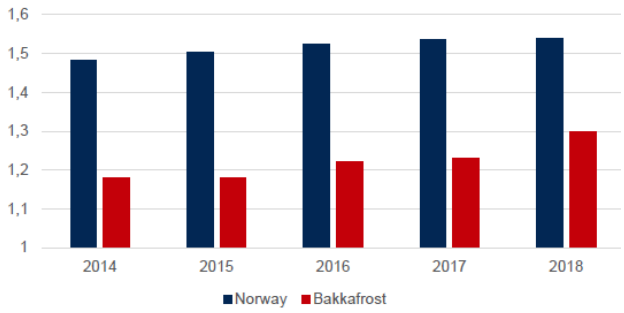


Figure 16: Feed conversion ratio, Bakkafrost vs Norway

In table 4, faster growth and more efficient feed conversion happened in Atlantic salmon fed by the fish meal control diet (FM) than in salmon fed by the diet with toasted, extracted soybean meal (SBM).[xix]

[4] Dividing edible meat by total body weight
[5] The kilograms needed to increase the animal's bodyweight by 1kg
[6] The amount of land needed (m^2) to produce 100g of edible protein

Diet	FM	SBM
Weight, g		
0 days	109 ± 1	106 ± 3
55 days	239 ± 5^{a}	200 ± 12^{b}
Condition factor, g $(cm^3)^{-1}$		
55 days	1.11 ± 0.01^{b}	1.11 ± 0.02^{b}
SGR		
0–28 days	1.69 ± 0.03^{a}	1.31 ± 0.16^{b}
29–55 days	1.16 ± 0.04^{a}	1.00 ± 0.02^{b}
Feed intake, percent of initial weight		
0–28 days	40.3 ± 0.8^{c}	33.7 ± 2.6^{d}
29–55 days	34.1 ± 0.7	33.0 ± 0.0
FCR, g feed intake / g body weight increase		
0–28 days	0.66 ± 0.01^{a}	0.76 ± 0.02^{b}
29–55 days	0.92 ± 0.03^{a}	1.07 ± 0.02^{b}
Survival, % (cumulative)		
0–55 days	99.3 ± 0.7	99.3 ± 0.7

Table 6: Growth by diet, FM vs SBM

Treatment on biological challenges is another key cost driver. Reducing disease cases is one way of utilizing licenses in a better way. Sea lice, infectious salmon anemia (ISA), and algae bloom are three big challenges in the industry. Average loss due to disease is ~20% in Norway – **average mortality rate for Bakkafrost is below 10%.**

During a period of intense ISA outbreaks from 2001-2004, Bakkafrost had to harvest fish with much lower body weight. As a result, volume levels were depressed and the price premiums significantly lower. The operational leverage experienced in the industry affected them negatively. As a result, "The Faroese Veterinary Model" was introduced in 2003; this has resulted in one of the most predictable fish production environments ever.

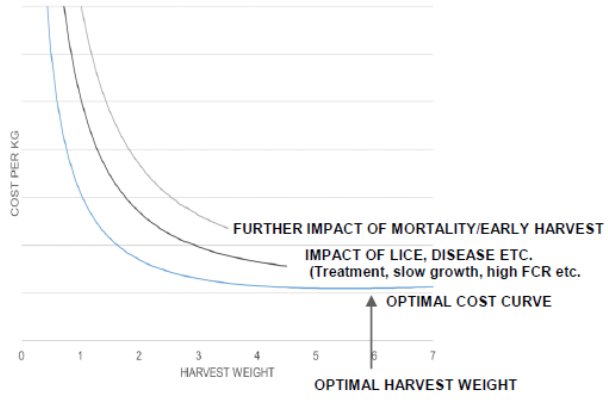


Figure 17: Illustration of cost dynamics

The Faroese Veterinary Model

- ✓ Single generation-based farming model
- ✓ Fallowing periods between each generation
- ✓ Immunization and vaccination programs
- ✓ Restricting movement of equipment and fish
- ✓ Density limits introduced
- ✓ Brood stock facilities allowed on land only
- ✓ Fish for harvest not allowed in open waiting cages at harvest stations
- ✓ Minimum distances between farms and hatcheries
- ✓ Rules to fight and control sea-lice introduced

In April 2018, Bakkafrost agreed with the Faroese government to take full ownership and responsibility of the country's broodstock program – an investment that adds to an already long value chain. The broodstock program is part of Bakkafrost's strategy to maximize biosecurity, breeding, and genetics in the industry. Body size, growth efficiency, growth rate, survival, and resistance to sea lice infections are all traits for which there is evidence of Gene–environment interactions in salmon[xx]. Bakkafrost is the market leader who focuses on using non-medical methods in treatments against sea lice – consistently investing in new technology to advance this strategy.

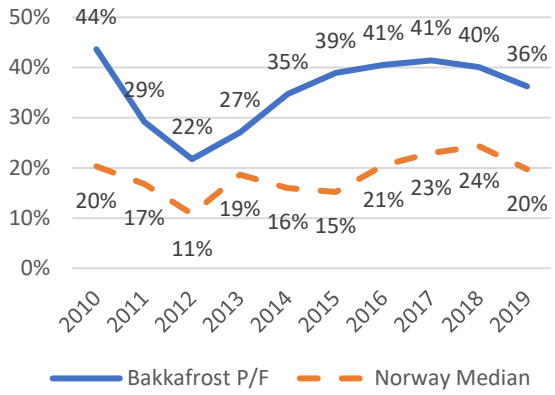


Figure 18: EBITDA margin

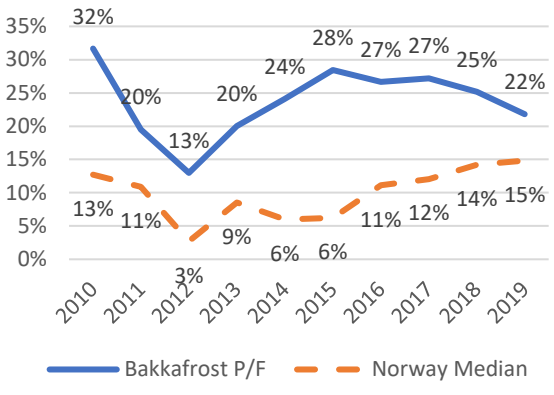


Figure 19: Net margin

Capital Allocation

Bakkafrost's main focus of capital allocation is investing in infrastructure to increase capacity as well as acquiring other farming companies and smaller competitors. The following equation shows cash inflows and out flows in millions NOK during 2007 to 2019. The company generates 25%+ returns on invested capital, on average[7].

Activity	NOK in million
Operating cash flow	9,025
Stock issued	5,095
Net debt issued	1,735
Capex	(4,873)
Acquired SSC[8]	(4,671)
Acquired FOF[9]	(1,163)
Dividends	(3,193)
Others	(297)
Cash balacne[10]	1,726

Table 7: Capital allocation from 2007 to 2019

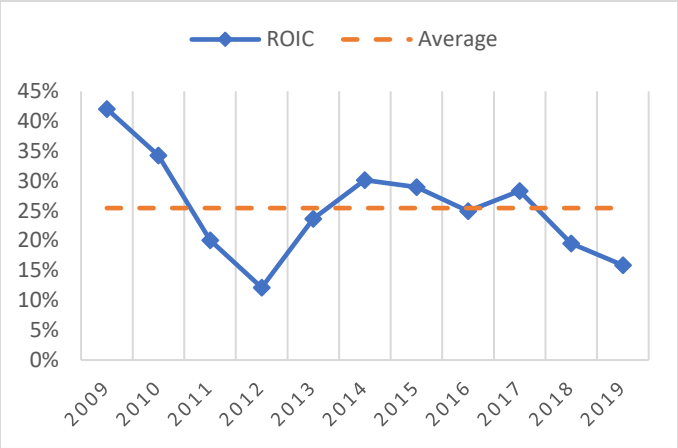


Figure 20: Bakkafrost ROIC

Dividend policy

The dividend policy is to payout ~45% of the normalized net income and the average dividend yields 3%. The Company's high free cash flow supports the dividend policy.

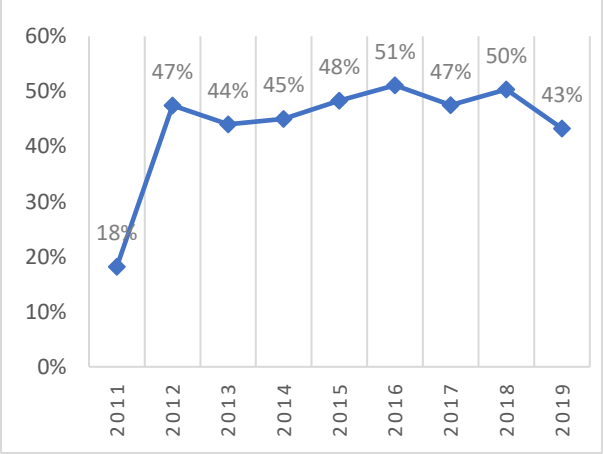


Figure 22: Payout ratio as normalized net income, 2011-2019

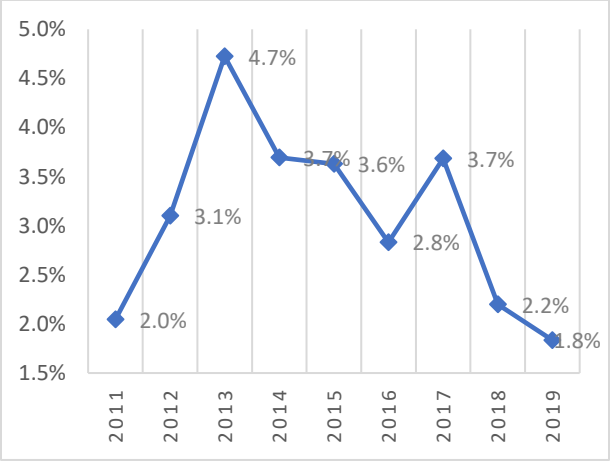


Figure 21: Dividend yield, 2011-2019

[7] Based on NOPAT/net assets
[8] Total acquisition cost is 5,480 million NOK
[9] Fishmeal, Oil and Feed (P/f Havsbrún)
[10] Difference is caused by currency translation (DKK to NOK by Sentieo)

Investing in Organic Growth

Farming salmon usually has four phases[xxi] (figure 25):

1. Salmon start their lives on land, in an incubator tray. The fertilization of the roe takes place in fresh water. The roes are kept at a constant temperature for around 80 days before hatching.
2. After hatching, the salmon fry has a sac on its stomach that it uses to feed itself. Four to six weeks after hatching, the fry begin to eat feed and are now transferred to larger freshwater tanks.
3. After 10-16 months in freshwater, salmon are ready to be placed into the sea. At this stage, each fish weighs about 100g, but it has gone through a great change known as “smoltification”. This change enables a salmon to live in saltwater, and it is now called smolt.
4. Salmon are reared in aquafarms in the sea and in fjords for 14–22 months. When the fish has reached a weight of 4–6 kg it’s ready to be processed.

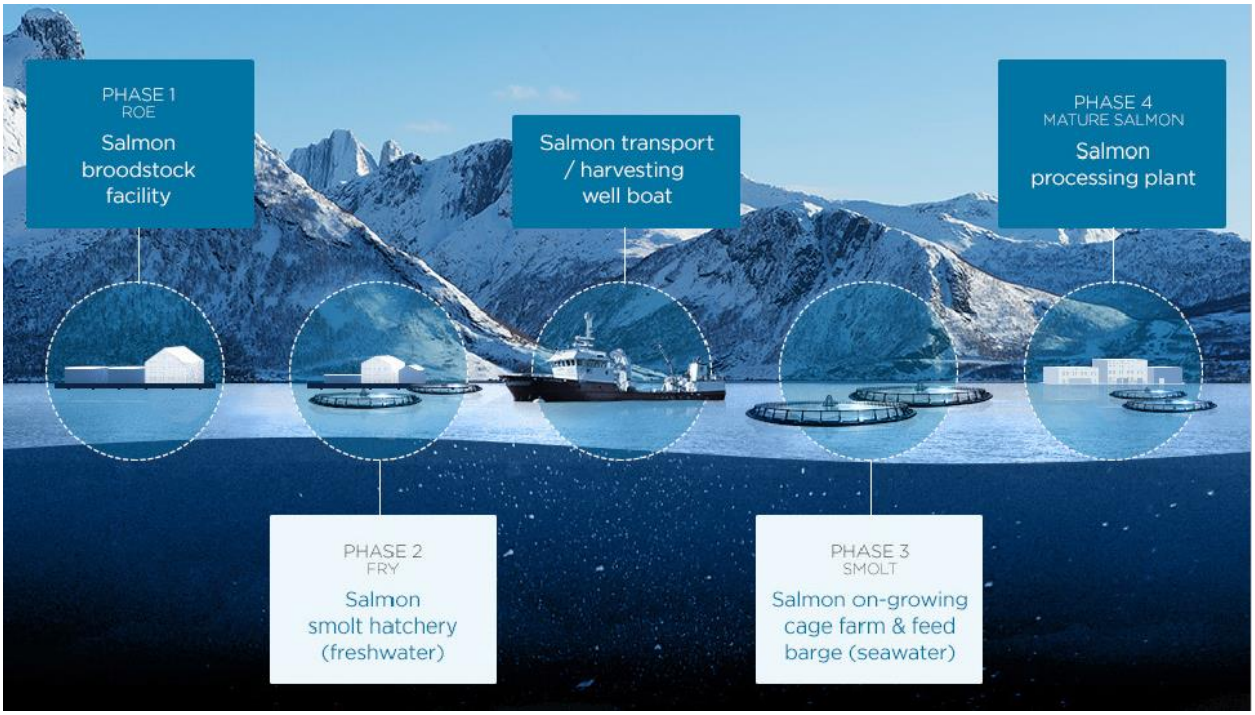


Figure 23: Four phases of farming salmon

Bakkfrost continues to invest in the development of their capacity constraints. During 2013-2018, they invested nearly 1b DKK in smolt, 500m DKK in farming, 400m DKK in vessels, and 750m DKK in harvesting & processing. The capacity maximum reached 60,000 tonnes in 2018 with estimates reaching 100,000 tonnes by 2022 with an additional 2.5b DKK investment.

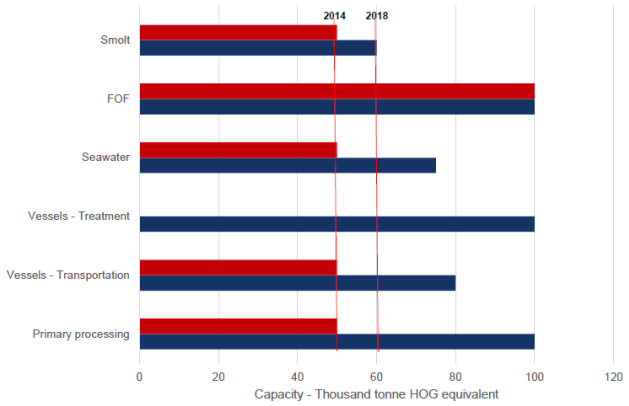


Figure 24: Development in capacity, 2014~2018

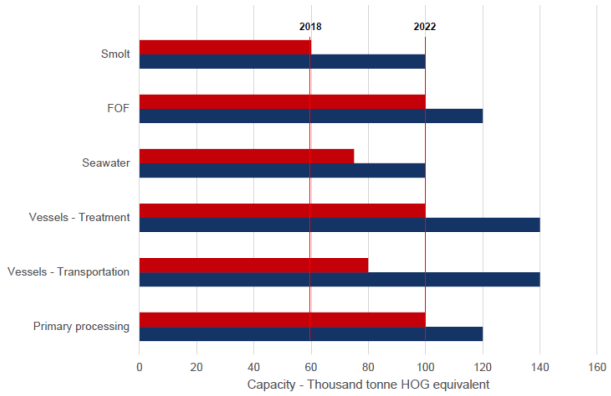


Figure 25: Development in capacity, 2018~2022

In 2016, Bakkafrost began its large smolt strategy – providing a positive effect on the biological risk and the future growth potential, as larger smolts will reduce the production time at sea in the farming sites. Smolt size will gradually increase from 100-200g to 500g by 2022. As 30% reduction in fjord sea stage, the turnover will increase by 30% in 2022. **Bakkafrost's utilization of licenses, production, and capacity in the sea will only continue to improve.**

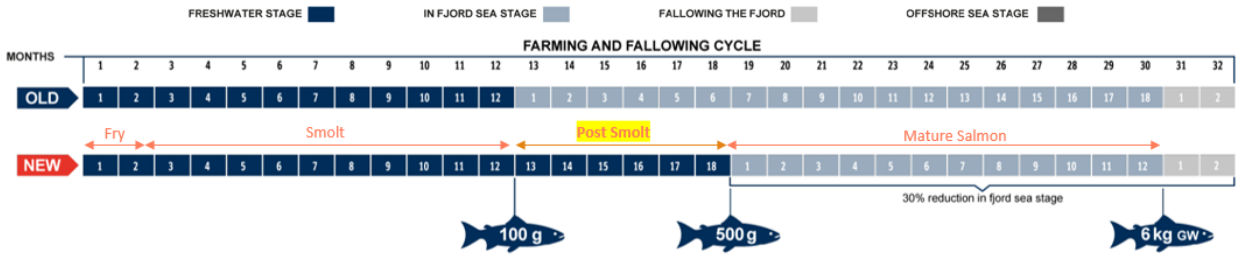


Figure 26: Bakkafrost's large smolt strategy

Bakkafrost's harvest volume in the Faroe Islands increased from 14,000 tgw in 2008 to 57,000 tgw in 2019. Assuming one-year impact lag, the capex for the incremental tgw was 3,948 million NOK, which is the accumulated capex until 2018. So the total cost per ton by investing in organic growth was 92 in thousands NOK.

Mergers and Acquisitions

The Scottish Salmon Company Case

In 2019, Bakkafrost acquired 68.6% of The Scottish Salmon Company Plc (SSC) – addi 50,000 tonnes of harvest capacity (as of Sep 25, 2019) – EV/EBITDA of SSC and Bakkafrost are 7.2x and 21.7x, respectively. The acquisition diversified the operation in premium salmon industry, as SSC is based in Edinburgh, UK

Supplying feed to SSC would result in fixed cost efficiency at Bakkafrost's feed facilities through intercompany sales of higher quality feed to SSC. Net synergy estimated at DKK 1.2 per kg feed, equating to annual synergies of approximately DKK 70 million from 2022 onwards (~NOK 2.6 / kg of SSC harvested salmon).

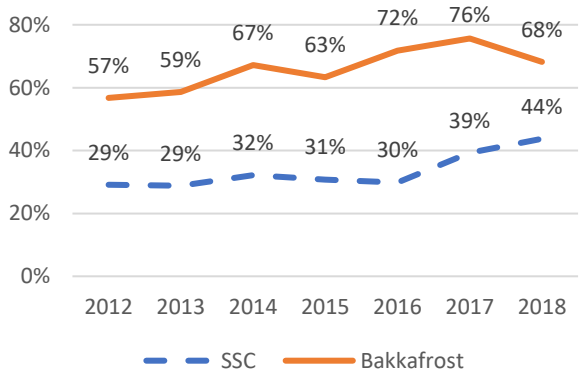


Figure 27: Gross margin, SSC vs Bakkafrost

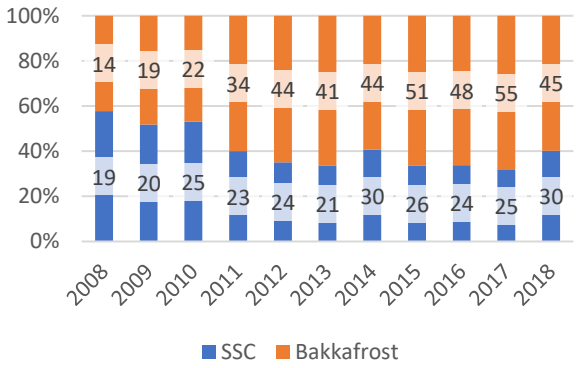


Figure 28: Harvest volumes in 000' tonnes

Total cost of acquiring SSC was 5,480 million NOK and its current capacity was 50,000 tgw in 2018. The cost per ton by acquiring SSC was 110 in thousands NOK.

The Havsbrún Group (FOF) Case

In 2011, the purchase of the Havsbrún Group in Faroe Islands brought significant opportunities to Bakkafrost, increasing utilisation of the feed as well as production capacity. The acquisition of Havsbrun added around 84 thousand tonnes of feed, 13 thousand tonnes of fish meal and 6 thousand tonnes of fish oil. At the same time, the acquisition also added 5 farming licenses, a production of 9k tons and a production capacity of around 15k tons. Havsbrun is valued at EV/EBIT 4.7x 2011, lower than BAKKA's valuation multiples of 5.8x 2011[xxii].

The market value of the farming companies P/f Faroe Farming and P/f Viking Seafood owned by P/f Havsbrún was 174k in NOK, which means Bakkafrost bought the additional capacity at no more than 46.7[11] in thousands NOK. Furthermore, the group recoginzed 126.6m DKK *badwill* related to acquisition of the Havsbrún Group.

The business synergies, created by this acquisition, are realized by extending value chain as well as econmoies of scale.

[11] P/f Havsbrún owns 78.1% of the farming companies P/f Faroe Farming and P/f Viking Seafood, with a total of 5 licenses. To be conservative, assume the market value of P/f Faroe Farming and P/f Viking Seafood calculated by minority interests does not include the licenses which market value is 233.7m DKK. (36.5/(1-78.1%)+233.7)*1.05(NOK/DKK)/9(tonnes)=46.7

In June 2018, The Ministry of Fisheries and the Directorate of Fisheries of Norway have together completed an auction of new salmon production licenses. The price per ton was ~200 in thousands NOK[xxiii], which does not include the underlying investment in plant, property and equipment. This is approximately matched with management's estimates that buying licenses would be 2.5x more expensive than Bakkafrost's investments[12]. From the table below, we can see that the management team are cautious investors as well. They were able to develop internal capacity or acquire it, at prices far below what a competitive auction has produced.

Table 8: Comparison of capacity costs

	Bakka - Havsbrún	Bakka - SSC	Bakka – internal	Norway auction
Cost (000' NOK/tonne)	**<46.7**	**110**	**92**	**200**
Year	**2011**	**2019**	**2008-2018**	**2018**

Debt

Bakkafrost has a conservative capital structure, with an average net debt/adj. EBITDA ratio of ~0.5x. Bakkafrost generates huge amounts of cash from operations and has a lot of cash on hand to make any upcoming debt payments.

Table 9: Net Debt & Adj. EBITDA

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Adj. EBITDA	90	179	289	402	403	674	931	1,109	1,298	1,561	1,273	1,634
Net Debt	87	-7	28	716	707	495	51	325	534	-241	404	826
Net Debt/Adj. EBITDA	0.9 x	0.2 x	0.0 x	0.9 x	1.8 x	0.9 x	0.3 x	0.2 x	0.3 x	0.1 x	0.1 x	0.4 x

[12] A Smolt is a stage of a salmon life cycle that is getting ready to go out to sea.

Historic Valuation[13]

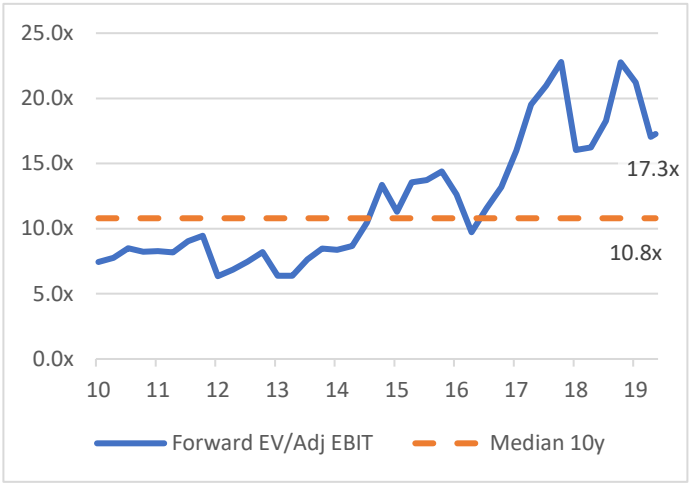


Figure 29: 10-year forward EV/Adj.EBIT

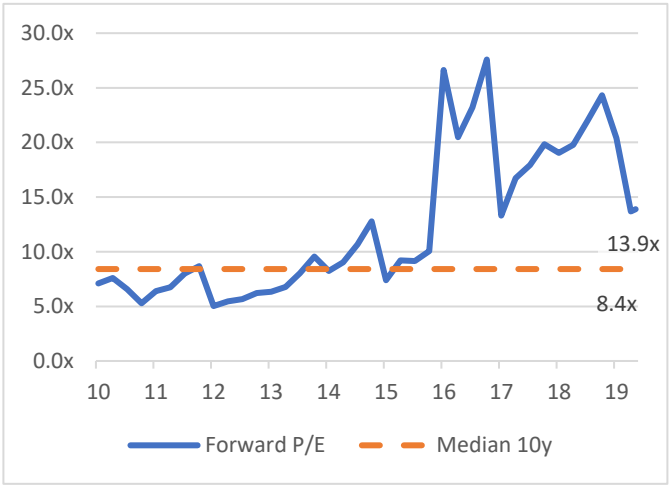


Figure 30: 10-year forward P/E

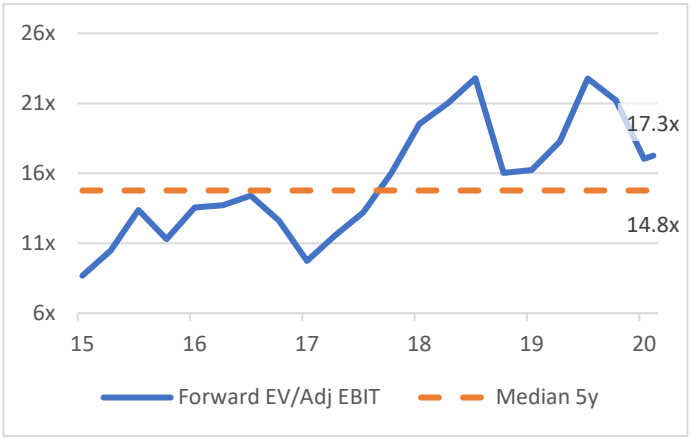


Figure 31: 5-year forward EV/Adj.EBIT

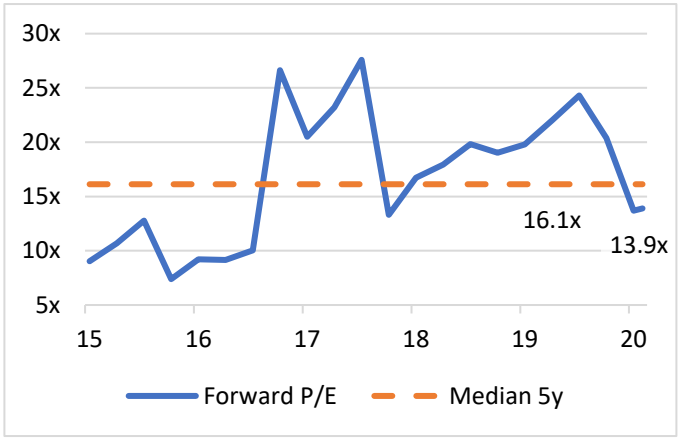


Figure 32: 5-year forward P/E

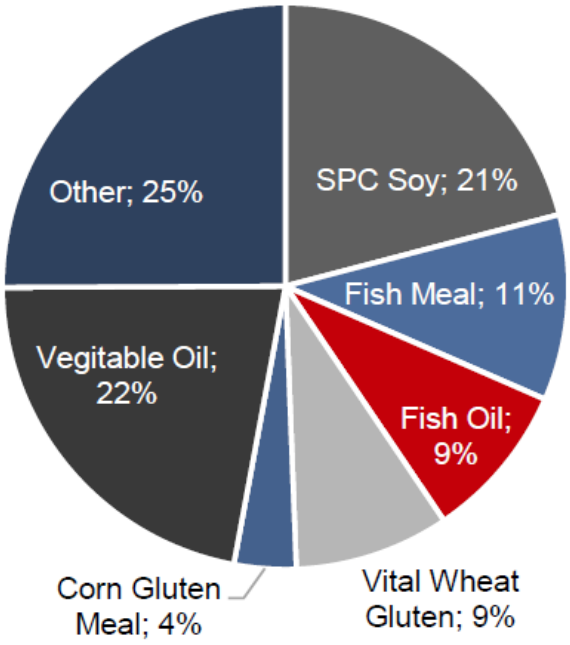
Adjusted EBIT excludes fair value adjustments of biological assets, income from associates and revenue tax and other gain or loss not related to operation.

[13] Consensus earnings for FY20, FY21. As of 4/24/2020.

Appendix

[i] Wikipedia
[ii] Faroese seafood stats
[iii] Economy of the Faroe Islands
[iv] Profit Margin Increases With Farm Size, USDA
[v] Farm Business Income, USDA
[vi] Mowi; Let's take a look at Bakkafrost
[vii] Livestock and Poultry: World Markets and Trade, USDA
[viii] Statistics Norway
[ix] World bank, European Commission, CNBC, China National Bureau of Statistics, Mowi, Customs of the People's Republic of China; For China, the time period is 2012-2019
[x] Mowi Salmon Farming Industry Handbook 2019
[xi] Third Bridge: Norwegian Salmon Farming Industry Interview with Petter Arnesen
[xii] Mowi Salmon Farming Industry Handbook 2019
[xiii] The Chilean Undersecretariat of Fisheries and Aquaculture
[xiv] Refstie et al.r Aquaculture 162 (1998) 301–312
[xv] Multiexport Foods, Bakkafrost Annual Report, Statistics Norway
[xvi] Mowi
[xvii] Salmon Academy: salmon lifecycle & farming
[xviii] Understanding Beef Carcass Yields and Losses During Processing by PSU, Mowi
[xix] Refstie et al.r Aquaculture 162 (1998) 301–312
[xx] The Atlantic Salmon Genetics, Conservation and Management, table 7.1
[xxi] Salmon Academy: salmon lifecycle & farming
[xxii] Pareto Securities
[xxiii] 13 companies paid out € 243 million at salmon license auction, by Stian Olsen

Standard feed recipe 2016E(1)



Feed recipe Bakkafrost 2015