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Valuation of Marine Harvest

FUNDAMENTAL ANALYSIS OF THE VALUE OF MARINE HARVEST ASA

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Master Thesis, Business & Administration, Finance

NORWEGIAN SCHOOL OF ECONOMICS

i. ABSTRACT

This thesis examines the value of Marine Harvest ASA per December 17, 2015. The analysis was performed by using fundamental and relative valuation approaches and the assumptions made in the analysis was made on the basis on throughout analyses of the macro, industry and firm-specific drivers of value in the salmon farming industry. The share price was derived exploring six key factors affecting the cash flows, risk and financial structure of MHG. First, the strategic analysis finds that economic conditions are favorable for the export of Norwegian salmon, but that opportunities for organic growth are limited because of health- and environmental issues and the strictly regulated access to licenses. The industry has consolidated largely and this is likely to be the main driver of growth for MHG. Second, I find that operational margins have been persistently stable, and hence I conclude that historical margins will also be applicable for the forecast period. Third, the salmon prices are expected to increase slightly from the current levels while feed cost is expected to decrease due to MHG's upstream integrations into feed production. MHG's harvest volumes are expected to increase in line with historical growth consolidation and limitations of licenses taken into account. Fourth, the income growth from the VAP market is predicted remain strong, much due to the acquisition of Morpol in 2013. Fifth, the cost of capital is expected to remain relatively low as a result of historically low interest rates in the Norwegian economy that is expected to persist. The risk associated with an investment in MHG is moderate, considering MHG's strong financial position and that the food industry is less volatile than the overall market. Last, the fundamental valuation suggests that the fair share price of MHG is NOK 125, which is also supported by the relative valuation. Hence I conclude that MHG is slightly undervalued at the current trading price, and a buy recommendation is appropriate.

Key words: valuation, salmon farming, aquaculture, discounted cashflow analysis

ii. CONTENT

iii. PREFACE

With this thesis I complete my Master of Science in Economics & Business Administration at the Norwegian School of Economics (NHH). My major is Financial Economics and with this thesis I comprise theory from a variety of courses I have undertaken.

In the course of my master degree I have completed courses in corporate finance, investments and valuation, which has given me a sound theoretical foundation and an understanding of methodology to conduct a valuation. However, I have experienced the importance of the strategy courses I have completed, as the strategic analysis is critical to forecast the cashflows and growth rates which are ultimately the core drivers of value.

The aquaculture is daily exposed in the media because of the increased focus on aquacultures' importance in feeding a growing population. As the currency exchange rate has been dropping heavily the past months, the conditions for export of aquaculture products has been very beneficial. With this thesis, I wanted to determine whether the financial markets have indeed fully valued the potential upside of the company that is the global leader in a sector that very well might be one of Norway's strongest assets in the years to come. The experience I have gained during my work with this thesis has been a challenging yet rewarding exercise.

I wish to state my gratitude towards my supervising professor Frode Sættem, who has given me valuable feedback and advice throughout the process. His presence and involvement has been critical, enabling me to remain focused in my work and maintain confident in my analyses. He has always been welcoming and willing to share his knowledge.

Bergen, December 21, 2015

ABBREVIATIONS

APV – Adjusted Present Value
CAGR – Compounded Annual Growth Rate
Capex – Capital expenditures
CAPM – Capital Asset Pricing Model
DCF – Discounted cash flow
DDM – Dividend Discount Model
EBIT – Earning Before Interest and Taxes
EBITDA – Earnings before Interest, Taxes, Depreciation and Amortization
FCFE – Free Cash Flow to Equity
FCFF – Free Cash Flow to Firm
GWE – Gutted fish (84% of total weight)
LW – Live weight (100% of total weight)
MAB – Maximum Allowed Biomass
MHG – Marine Harvest ASA
MHG.OL – Ticker Marine Harvest Oslo Stock Exchange
OSEBX – Oslo Stock Exchange benchmark index
VAP – Value-Added Processing
WACC – Weighted Average Cost of Capital
WFE – Harvested weight (93% of total weight)

1. INTRODUCTION

The continual increasing population on earth will offset a greater demand for protein in the future. The supply of land-based animalistic protein is already scarce because of competition for water, available land, feed and energy. Protein from aquaculture is therefore believed to constitute a significant role in feeding the growing population of the world[1].

"Aquaculture can potentially increase to meet the protein needs of 500 million more people by 2050 [...] by 2050 there will be an additional three billion middle class people with spending power to be selective in their food purchasing."

Dr. Fraser Thomson, McKinsey Institute

The increased spending power has been showed to make major impact on people's choice of food, both concerning environmental- and nutritional issues. People typically consume food with increased nutritional value and that is more environmentally sound with rising spending power. Salmon contains high levels of vitamins, minerals and omega-tree acids in addition to being more environmental friendly than many other sources of animalistic protein.

Aquaculture is Norway's largest industry after the oil and gas industry. Last week the price per barrel of North Sea oil dropped to its lowest level since the financial crisis in 2009, which has had a huge impact on the unemployment rates and exchange rates in Norway. The Norwegian krone is now trading at its lowest level since the mid 1980's compared to several of the major currencies. Nevertheless, development in the exchange rate has left the aquaculture industry in a unique position where import of Norwegian aquaculture products has become relatively more attractive. The exported volumes of salmon have been record high in 2015 and there is broad consensus among leading Norwegian analysts that the exchange rate is not going to strengthen in the near future. Marine Harvest Group ASA (MHG) is the leading producer of salmon in the world, with their largest production

[1] According to Dr. Fraser Thomson formerly of the McKinsey Institute at the AquaVision conference in Stavanger 2012

volumes in Norway. Therefore, the development in the currency exchange rate indicates favorable future prospects for the export of Norwegian salmon.

In the backdrop of the above I will in this thesis shed light on key drivers of the salmon farming industry to retrieve MHG true value. The drivers presented above are specific for the economic development today. However, the salmon farming industry is affected by other drivers specific for the salmon farming industry.

The remainder of the thesis is structured as follows. Section 2 present the overall industry and MHG. Section 3 and 4 describes methodology for different valuation methods and draw conclusion on the best method to use for MHG. Section 5, 6 and 7 presents the macro, industry and firm analysis respectively. Section 8, 9, 10, 11 and 12 reviews historical accounting figures and present estimates for the forecasting period. Section 13, 14, 15 and 16 presents the discount rate and the the results from the valuation with corresponding sensitivity analysis.

2. PRESENTATION OF MARINE HARVEST AND THE INDUSTRY

This chapter will present Marine Harvest and elaborate on important aspects of the salmon farming industry that will serve as a sound basis for further analysis.

2.1 MARINE HARVEST

Marine Harvest is the leading producer of Atlantic Salmon in the world and is one of the world's largest seafood companies. The company, as we know it today, is a result of the merger between Pan Fish, Fjord Seafoods and Marine Harvest N.V. in 2006. Since then, Marine Harvest has grown in several of its services. The company established its own feed manufacturing plant in Bjugn in 2012 and are now ~80% self-sufficient of feed supply in Norway. In addition, the processing division has grown with the acquisition of Morpol in 2013 and the farming division has grown with the merger with AquaChile in 2014.

MHG's long-term strategy, under the parole "***Leading the Blue Revolution",*** is to become a leading protein producer with a fully integrated value chain. Both the acquisition of Morpol and the development of the feed plant in Bjugn have strengthened the company's efforts of becoming a fully integrated company in the entire value chain of fish farming.

Table 1 shows MHG's national and international scope, where MHG is the largest single player in all regions producing salmon except Canada. The accumulated market shares of the largest companies also comprise a significant share of the total market. MHG's global market share is in the range of 25-30%, which is likely to increase as a result of the acquisition of AquaChile. However, high mortality rates have long been a severe issue in Chilean salmon farming, and these unfavorable conditions are expected to continue for at least 2 more years. After that it is assumed that the volumes will pick up in 2018 because that is when the new production cycle of Chilean salmon is ready to be harvested. The anticipated harvest volumes for 2015 is 430,000 tons, which is an increase of 2.7% from 2014 (Marine Harvest ASA, 2015).

Norway	Harv	UK	Harv	Canada	Harv	Chile	Harv
MHG	258	MHG	49	Cooke	34	MHG	68
Salmar	141	Scottish Salmon	30	MHG	27	Salmones	54
Lerøy	133	Scottish Seafarms	28	Cermaq	19	AquaChile	52
Cermaq	53	Grieg	19	Northern Harvest	15	Cermaq	49
Nordlaks	39	Cooke	17	Grieg	6	Pesquera	47
Nova Sea	38					Camanchaca	35
Grieg	38					Blumar	35
AlsakerRoyal	26					Australis	26
NRS	23					Humboldt	20
Sinkaberg-Hansen	21					Cooke	18
Total top 10	768	Total top 5	143	Total top 5	101	Total top 10	403
Market size	1079	Market size	154	Market size	109	Market size	525
Market share top 10	71 %	Market share top 5	93 %	Market share top 5	92 %	Market share top 10	77 %

Table 1: MHG is the largest player in all regions producing salmon except Canada (ibid).

In addition to operations in the countries presented in figure 1, MHG has operations in Ireland and on the Faroes, and their products are sold to 23 countries. In 2014 the total turnover was NOK ~25B, an all-time high revenue, resulting from both high prices for salmon and record high harvest volumes. They are currently employing 11,715 people, where the largest workforce are employed in their processing plants in Europe (Marine Harvest ASA, 2015).

Figure 1 exhibits the historical share price development of MHG since 2006, which has been very volatile. Currently the price is NOK 116.30 and their volume 450,086 million shares outstanding, which makes their total market capitalization ~52.345 billon at December 17, 2015 (Bloomberg, 2015).

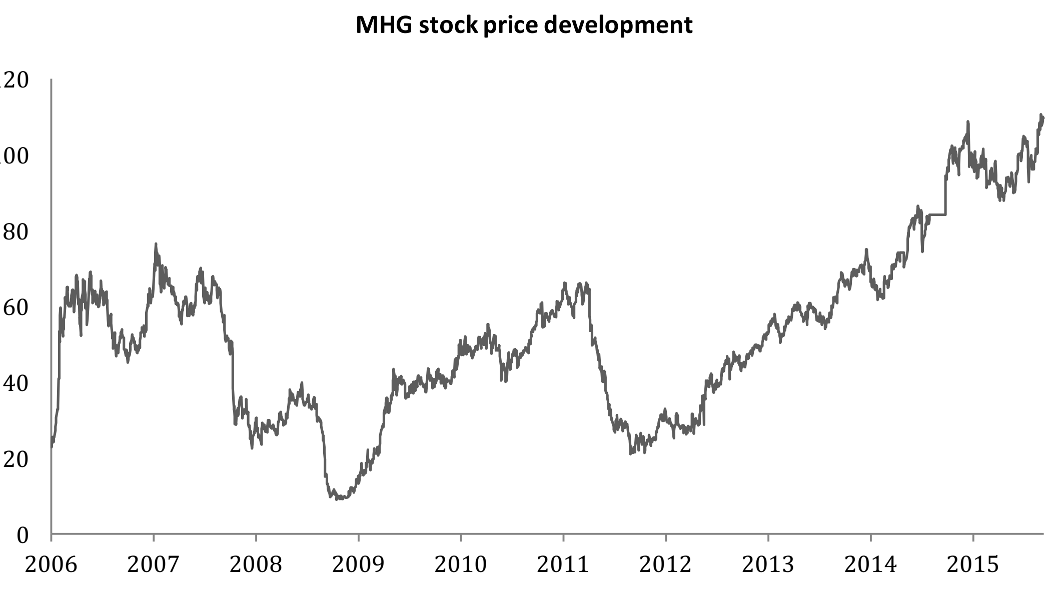

Figure 1: MHG's share price has increased significantly since 2012 (Yahoo , 2015)

2.2 THE SALMON FARMING INDUSTRY

Salmon derives from the family Salmonidae, which included several species of salmon and trout, among them Atlantic salmon, Pacific salmon, brown trout and seawater trout. Most of these species are available from both wild and farmed sources, however the majority of commercially available Atlantic salmon is farmed (Marine Harvest ASA, 2015). Figure 2 exhibit an overview over the harvested volumes of different Salmonidae species in 2014, which show that the harvest of Atlantic salmon is considerably higher than other species in the family.

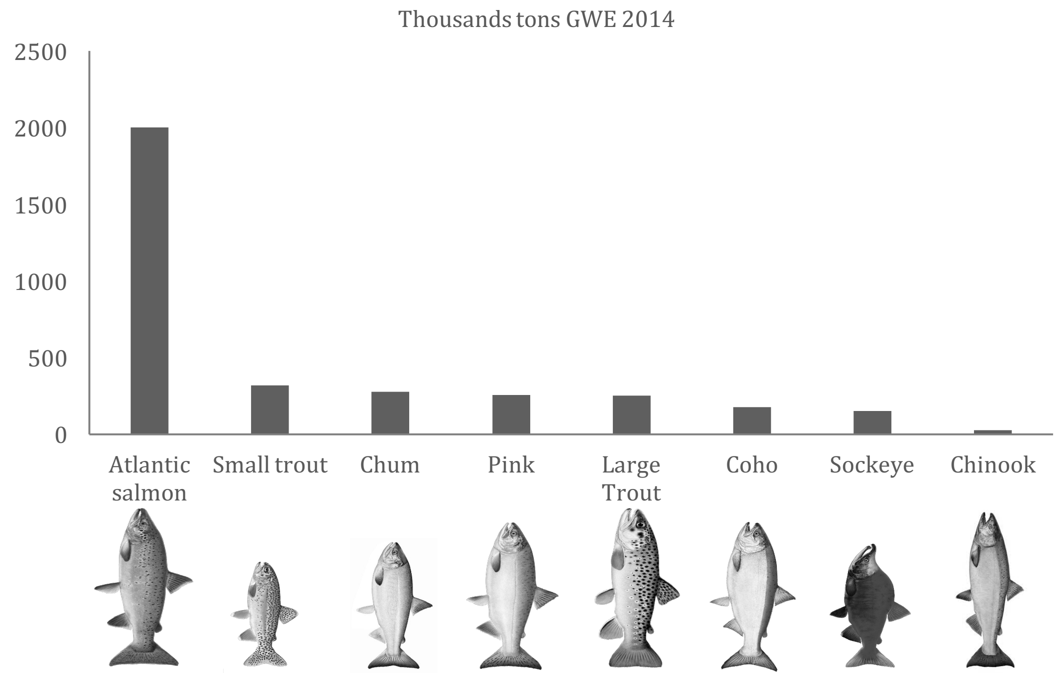

Figure 2: Harvested volumes of Atlantic salmon is considerably higher than volumes of other Salmonidae species (Marine Harvest ASA, 2015)

Salmon farming first became an industry in Norway in the 1980s after being on a relatively experimental level since the 1960s. The industry later came to Chile in the 1990s (GSI, 2011). Since then the salmon farming industry has grown substantially and today around 70% of the global supply of salmon is farmed (Marine Harvest ASA, 2015).

Today, Salmonidae species contribute to 4.2% of the global seafood supply (Marine Harvest ASA, 2015). Further, salmon and other sources of protein from the ocean comprise 17% of the total animalistic protein sources for human consumption (FAO, 2015). The supply of fish protein is relatively low compared to land-based protein considering that 70% of the world's surface is covered by water.

Nevertheless, the UN expects the population to reach 9.7 billion by 2050, and expects that the demand for protein will double from current levels. The UN also forecast that the fisheries and aquaculture is going to play a significant role in feeding the growing population as increase in supply of land-based protein will be low. Currently, protein supply from aquaculture is outpacing population growth. In addition, continuous encouragement from governments to eat healthy food is expected to increase the consumption of fish (FAO, 2014). Salmon has a high content of omega-3 and protein in addition to being a good source of minerals and vitamins.

The trend per capita in fish consumption is diverse across regions. Today, ~170 million tons live weight (LW) of aquaculture is available for human consumption, which has almost doubled since 2000. China is the largest single market comprising 62% of the global aquaculture market and the accumulated share in Asia is 88% (FAO, 2014). OECD and FAO estimates that the growth in aquaculture production of fish in Asia will continue to be high and especially in China and India were growth in supply of fish is predicted to be higher than 25% in the period between 2015 and 2024. The growth is also estimated to stay high in regions producing salmon; both Norway, Chile and Canada are estimated to see growth rates in production of fish from aquaculture over 25% between 2015 and 2024 (OECD/FAO, 2015). Farmed salmon is one of Norway's most important export commodities and with the gradually withdraw from extraction of oil, the industry's importance is likely to be greatly enhanced.

2.3 The global market for salmon

2.3.1 Historical Production Levels and Prognosis

Between 1994 and 2014 the supply of salmon has increased by 428%, which corresponds to an annual growth of 9%. However, the growth has diminished in recent years, as the annual growth rate dropped to 6% p.a. between 2004 and 2014 and is predicted to decline to 3% to 2020 by Kontali Analyse. The reason for the expected decline is that the industry has reach a biological roof, where further increases in production capacity can offset lice problems and diseases, thus increase mortality of salmon and environmental damages.

The industry therefore requires progress in technology, pharmaceutical products and innovation in other non-pharmaceutical techniques to cope with increased salmon farming capacity (Marine Harvest ASA, 2015).

Only a few coastlines are available for salmon farming, because of climate and biological constraints. A prerequisite for optimal salmon production is water temperatures ranging from 8 to 14 °C. In addition, salmon farming also requires a certain degree of current to secure circulation of water in the net cages. However, the current must be weak enough to enable salmon to move freely in the cages. Last, licenses are required for harvesting salmon, which can limit the output a company wish to achieve. The main regions producing salmon today are Norway, Iceland, Faroe Islands, UK, North America and Chile. The estimated production volumes for each region is displayed in figure 3 (ibid).

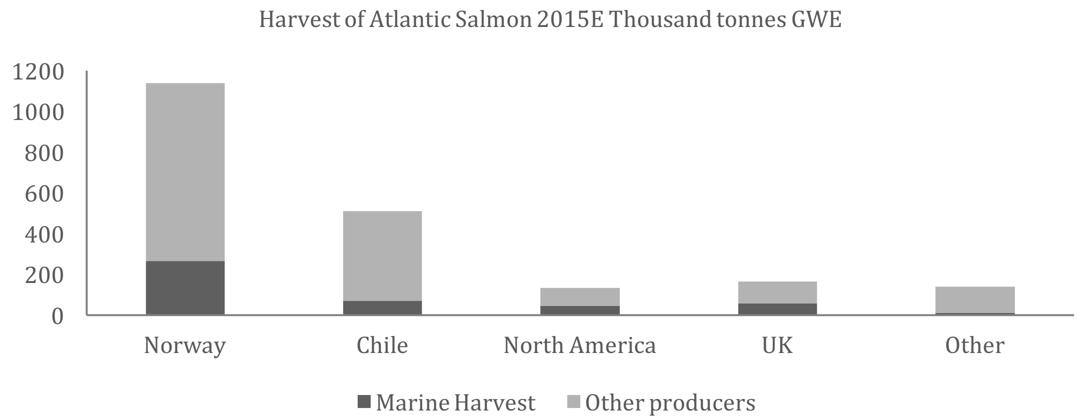

Figure 3: The production volume in Norway is significantly higher than in other regions (ibid)

2.3.2 Trade and Flow of Goods

Salmon is a commodity that is traded globally. Figure 4 gives an overview of the trade and flow of salmon products in the global market. The regions producing salmon are marked by “harvest” and the regions buying salmon is marked by “market”. Traditionally, each region producing salmon has supplied regions nearby, as illustrated in figure 4. Norway’s largest markets are the EU, Russia and Asia, Chile’s main markets is USA, South America and Asia, Canada’s main market is USA, while Scotland has mainly supplied its domestic market (Marine Harvest ASA, 2015).

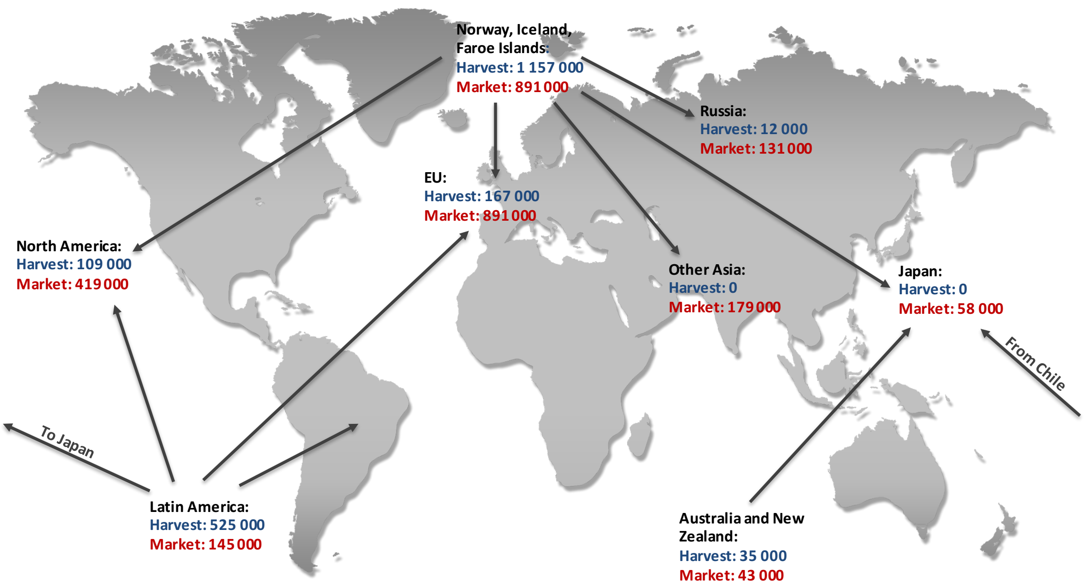

Figure 4: Export of salmon is mostly supplied to nearby markets (ibid)

The reason for supplying nearby markets has its origin in salmon being a fresh commodity and that it is sensitive to time usage and cost related to transportation. Using transatlantic suppliers requires air transport, which means that the price differential has to be significant in order to justify the increased cost of the trade. Price differentials varies and occur as a result of mismatch between supply and demand of salmon in the market. An issue threatening the traditional trade patterns is the supply of frozen salmon, especially from Chile to the European market. Still, the frozen category is diminishing and the traditional trade pattern is therefore expected to sustain (ibid).

2.3.3 Price formation

The price of salmon is to a large extent determined on the basis of the preferences of the customers concerning price and quality. The production cycle of salmon is between two to three years and the volumes are therefore subject to minimal adjustments once the production cycle has been initiated, hence the volume is inelastic in the short-term. In addition, the salmons' short shelf life means that the salmons have to be supplied and consumed in the same period. Both the inelastic short-term supply and the short shelf life make salmon farmers price takers in the short-term market, because the supply cannot be increased on short-term notice and that salmon cannot be storage for a long time. However, salmon can be frozen which will increase its shelf life and harvest can be postponed or advanced to some degree, enabling sale when market conditions are more favorable (Marine Harvest ASA, 2015).

2.3.4 Industry Structure

Continual consolidations have characterized the industry in recent years and is expected to continue going forward. In Norway the number of companies in the industry producing 80% of the farmed salmon has decreased from 70 in 1997 to 23 in 2014. Similar figures for Chile, Scotland and Canada is from 34 to 13, 11 to 4 and 9 to 4 respectively. The reason for the higher fragmentation of companies in Norway has its origin in the policies of the Norwegian government, which priorities decentralized structures and local ownership. Opposite, Chile has less policies on structures, which is a mean to grow the industry faster (Marine Harvest ASA, 2015).

2.3.5 Production of Salmon

As mentioned in a previous section, the production cycle for salmon is between two and three years and the process is thoroughly depicted in figure 5. During the first year the eggs are fertilized, which takes approximately 60 days. The subsequent step is spawning, where the fertilized eggs are transferred to a hatchery and put into a controlled freshwater environment where the fish grows to approximately 100 grams. The spawning process requires two tanks of different size and the hatched fish is moved to the larger tank as the fish grows to fry. After the spawning process, the fish is transported to net cages in seawater for a period of 14-24 months, during which the fish gains a bodyweight of approximately 4-5 kg. The growth in bodyweight is strictly determined by water temperatures, which vary by season and regions. Last, the salmon is harvested before it is slaughtered and gutted at a primary processing plant. The production cycle in Chile is slightly faster as Chile has more optimal sea temperatures for salmon farming (Marine Harvest ASA, 2015).

Producers in Norway release smolt into seawater two times a year. Harvested volumes are spread relatively even throughout the year; largest in the last quarter of the year as sea temperatures provide the best growth in this period and lowest in the summer due to harvesting pattern shifts generation. After the fish has been harvested from a site, the site has to be fallowed for between 2 and 6 months (ibid).

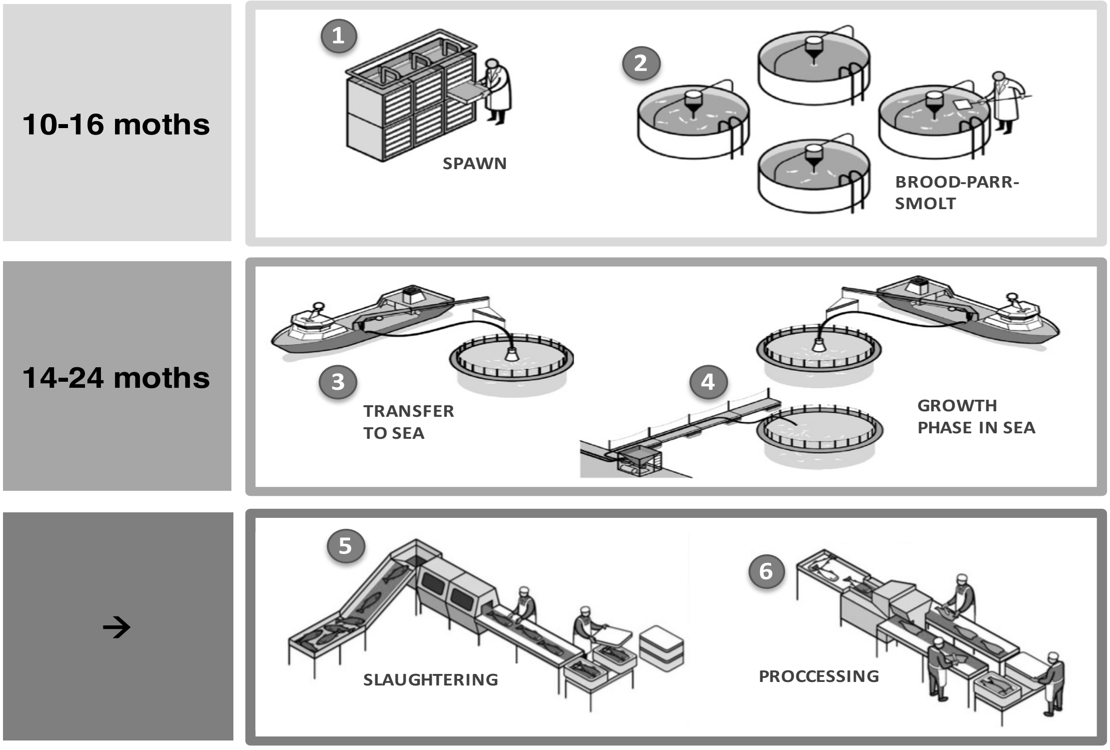

Figure 5: The production of salmon is a six step process from spawning to processing (ibid)

2.3.5 Cost Dynamics

Table 2 is an overview of the operational cost per kg GWE in the different regions MHG is operating for 2014, where feed cost is clearly the most significant, constituting 60% of COGS. The following paragraphs will elaborate on the most significant operational cost and what drives them.

	Norway (NOK)	Canada (CAD)	Scotland (GBP)	Chile (USD)
Feed	12.35	2.26	1.62	2.08
Primary processing	2.62	0.55	0.31	0.41
Smolt	2.28	0.54	0.31	0.48
Salary	1.49	0.56	0.18	0.15
Maintenance	0.89	0.22	0.09	0.19
Well boat	0.98	0.21	0.21	0.28
Depreciation	0.76	0.2	0.13	0.13
Sales & Marketing	0.62	0.02	0.04	0.01
Mortality	0.34	0.04	0.15	0.02
Other	3.34	1.14	0.25	0.77
Total	25.67	5.74	3.29	4.52

Table 2: Feed comprise the largest part of the operational cost of producing salmon (Marine Harvest ASA, 2015)

2.3.5.1 Feed cost

As mentioned feed cost is the most significant operational cost, and variation in the feed cost largely depends on input prices for commodities used in feed production, transportation cost and the feed conversion ratio. The feed conversion ratio is the amount of feed in kilos needed for the salmon to put on 1 kilo of bodyweight, which is currently a ratio of 1.1. The feed conversion ratio largely depend on the age of the salmon, were younger fish typically has a lower feed conversion ratio than older fish (Marine Harvest ASA, 2015).

2.3.5.2 Eggs

The production of fish eggs is international and dominated by four suppliers; Aquagen AS, Fanas Fisheries Ltd, Lakeland and Salmobreed AS. The supply of fish eggs is more elastic than the harvested volumes as the breeding of fish for egg production takes place the season before the eggs are put into fresh water. The salmon farming companies therefore has some flexibility to adjust their demand for eggs to the expected demand for salmon (Marine Harvest ASA, 2015).

2.3.5.3 Smolt

The smolt production is vertically integrated by most salmon farming companies. The production takes place in either lakes or land-based plants, where the latter is more capital expensive because of the equipment and the replacement of water required in the operation. In addition, there has been an increasing trend of growing the smolt to 100-1000 grams (compared to the norm of 60-100 grams) in order to decrease the time and cost at sea. The UK has relatively high cost of smolt because of low scale production. Chile, on the other hand, has relatively low cost because of using lake-based production and enjoy low labor cost (Marine Harvest ASA, 2015).

2.3.5.4 Salary Costs

Norway has the highest level of automation among the countries producing salmon, which partially offsets that Norway also has the highest wage levels. Chile is the complete opposite, with the lowest level of automation in the industry yet the lowest wage levels. The wage- and automation levels will drive the salary cost in the opposite direction, still the total salary cost in Chile is slightly lower than in Norway (Marine Harvest ASA, 2015).

2.3.5.5 Electricity

The energy cost is largest during the earliest and latest stage of a salmon's life cycle. During the smoltification the energy cost is highest for land based plants as the temperatures in the tanks have to be regulated. The energy cost is the highest when temperatures are low and comprise 4-5% of the smolt cost in Norway. The size of the smolt also drives the cost, as larger smolt has longer production cycles in the plant. Processing carried out after the salmon is harvested also require energy and is highly depends on the level of automation. The energy cost of processing comprise approximately 2-3% of total harvest cost in Norway. The cost also largely depends on the energy prices in the region (Marine Harvest ASA, 2015).

2.3.5.6 Mortality

The mortality expense is relatively low in 2014, but has been considerably higher earlier, for instance when the Panacea Disease broke out in Chile in 2008/2009. Mortality can be affected by temperatures, as high temperatures increase the risk of disease, which again can lead to high mortality rates. Low temperatures will on the other hand directly increase the risk of mortality. Temperatures vary more in the Northern regions and are the most stable in Chile, which gives the region a competitive advantage (Marine Harvest ASA, 2015).

3. VALUATION MODELS

In the previous section I elaborated on the mechanisms of salmon farming to give the necessary backdrop to conduct the proper valuation of MHG. This chapter will present different valuation approaches describing the methodology for each approach and where the approach is most suitable, that will provide a basis for the choice of valuation method for MHG.

According to Damodaran of Stern Business School at New York University there are three approaches to valuation in general terms; discounted cash flow valuation (DCF)[2], relative valuation and contingent claim valuation. The first approach calculates the value of an asset using the future expected cash flows generated by that asset. The second approach uses prices of comparable companies relative to a common variable to estimate the value of an asset. The third approach uses option pricing models to value an asset (Damodaran, Investment Valuation, 2012). In the following chapters each approach will in turn be elaborated.

3.1 FUNDAMENTAL VALUATION

The underlying theme in fundamental analysis is that a firm's true value can be computed based on its financial characteristics, i.e., the firm's growth prospects, risk profile and its cashflows. Deviations from the value derived in the fundamental analysis imply that the stock is incorrectly priced by the market. It can be argued that the fundamental valuation constitutes the foundation on which all other valuation approaches are built. The fundamentals in a discounted cashflow model has to be understood in order to conduct a relative valuation and one often have to begin with a cash flow analysis to conduct an option pricing valuation (Damodaran, Investment Valuation, 2012).

There are three variations of the discounted cash flow valuation; (i) value the equity stake in the firm, (ii) value the stake of all claimholders in the firm and (iii) value the firm in pieces. The latter begins with valuing operations and then adding the effects of debt and equity (ibid).

[2] DCF methods refers to all valuation approaches which include discounting future cash flows, i.e. WACC-, FTE- and APV approaches.

In some cases, the discounted cashflow model is less applicable to value the stock of a company. For distressed firms with negative earnings and cashflow, the model will yield a negative value of equity for the firm even though the firm will survive. The model can also be less applicable for highly cyclical firms as they can look troubled during a recession and analyst estimates for economic outlook is highly biased. Since the DCF model base its valuation on the cash flow generated by assets, the value can be underestimated if the firm has a lot of unutilized assets. The same applies for firms with patents or product options. The DCF model can also be less suitable for firms in the process of restructuring, as major changes in investment and financing policies affects the riskiness of the firm. The same applies for firms involved in acquisitions, where the change in management affect the riskiness of a firm in a hostile takeover. Also, the estimation of the potential synergies which affects the cashflow can have implications for the accuracy of the model. Last, the model is more difficult to apply for private firms as it can be hard to obtain an appropriate risk parameter because of the lacking data of historical prices (ibid).

Another factor which has to be considered when doing a fundamental analysis is the life cycle of the firm. The phase in the life cycle the firm is in determines whether a one-stage, two-stage or three-stage growth model should be used. The three different approaches use one, two and three growth rates respectively to value the firm. Young firms typically experience rapid growth, which declines when the firm becomes more mature and then stabilize at a long term growth, hence a three-stage model should be used. For mature firms a two-stage model is typically used and for firms that are in the stability phase a one-stage model is sufficient (ibid).

3.1.1 Flow-to-equity Method (FTE)

The flow-to-equity method uses the cashflow available to equity holders discounted at the cost of equity to value the firm, as showed in equation 1. The free cash flow to equity (FCFE) is the free cash flow that remains after adjusting for interest payments, debt issuance and debt repayment. The cost of equity is the return required by equity investors in the firm (Berk & DeMarzo, 2014).

$$Value\ of\ Equity = \sum_{t=1}^{t=n} \frac{CF\ to\ Equity_t}{(1+k_e)^t}$$

Equation 1: Value of equity

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The dividend discount model is a specialized case of equity valuation, where the value of the equity is the present value of expected future dividends, which is presented in section 3.1.3.

The disadvantage with the FTE approach is that it requires stable debt levels, as the risk, and hence the cost of equity, increases (decreases) with increasing (decreasing) levels of debt. Another disadvantage is that the debt capacity has to be determined in order to compute interest rates and net borrowing to retrieve the free cash flow available to equity holders. For this reason, the WACC method is often easier to apply. However, in cases where the company structures of the firm are complex the FTE approach can offer an advantage to the WACC and APV approach as the equity value is computed directly. In contrast the WACC and APV approach compute the enterprise value and has to adjust for other components in the capital structure. In addition, the FTE method is deemed as a more transparent method for estimating the benefit to shareholders (Berk & DeMarzo, 2014).

3.1.2 The Weighted Average Cost of Capital Method (WACC-method)

The WACC method uses the cash flows to all stakeholders discounted by the WACC to value the firm, seen in equation 2. The free cash flow available to the firm is the after-tax EBIT plus depreciation, and less change in net working capital and capital expenditures. The WACC is the after-tax cost of capital, which is the cost of the different financing components of the firm, weighted by their marked value proportions. WACC incorporates the benefit of tax shields by using the firm's after-tax cost of debt (Berk & DeMarzo, 2014). The calculation of WACC will be further elaborated on in section 12.1.

$$Value\ of\ Firm = \sum_{t=1}^{t=n} \frac{CF\ to\ Firm_t}{(1+WACC)^t}$$

Equation 2: Value of levered firm

The WACC method is frequently used as it is simple and straight forward. In addition to the FTE approach the WACC method also requires stable debt levels and the model (Berk & DeMarzo, 2014). Further Damodaran assigns two additional problems with the WACC model. One is that the free cash flow to equity is a more intuitive model. The second is that using firm cash flow can result in ignorance of firms with problems of survival. On the other hand, the model is beneficial when the leverage of a firm is expected to change significantly over time, as the cash flow related to debt is not considered (Damodaran, FCFF Valuation Models , 2005).

3.1.3 Dividend Discount Model (DDM)

The dividend discount model is the simples of the equity valuation models, where the value of the stock is the present value of the expected future dividends, given by equation 3:

$$Value\ per\ share\ of\ stock = \sum_{t=1}^{t=\infty} \frac{E(DPS_t)}{(1+k_e)^t}$$

Equation 3: Dividend discount model

Hence, the dividend discount model has a stricter definition of cash flow to equity than the FTE model, which is dividends on the stock and residual cash flow after meeting all financial obligations and investment needs respectively (Damodaran, Investment Valuation, 2012).

Whilst the DDM is the simplest valuation model, it is also usually the least accurate. The dividends depend upon many factors – growth, competition, profitability, changes in legislation, exchange rates and general economic conditions which make it difficult to accurately measure future dividends (Berk & DeMarzo, 2014). In addition, the value of the firm can be skewed if the firm are paying out less dividend than they can afford to. Also, the model does not incorporate other ways of returning cash to stockholders than dividends (Damodaran, Damodaran Online, 2007).

3.1.4 Adjusted Present Value Model (APV)

In the APV valuation method the levered value of the firm (V^L) is calculated by computing the unlevered value of the firm, V^u, as if the firm had no debt and then adding the value of the interest tax shields, shown in equation 4. The interest tax shield is the benefit of borrowing as the interest cost is tax deducible (Berk & DeMarzo, 2014).

$$V^L = V^U + PV(Interest\ Tax\ Shields)$$

Equation 4: Levered value of the firm using the APV method

The value of the unlevered firm can be obtained by adjusting the current after-tax operating cash flow to the firm by future growth and depreciate by the unlevered cost of capital, given in equation 5:

$$Value\ of\ Unlevered\ Firm = \frac{FCFF_0(1+g)}{p_u - g}$$

Equation 5: Value of unlevered firm

Further the unlevered cost of capital can be obtained by using the capital asset pricing model (CAPM) with the unlevered beta of the asset, given in equation 6:

$$\beta_{unlevered} = \frac{\beta_{current}}{1 + (1-t)\frac{D}{E}}$$

Equation 6: Beta calculation

The tax benefit associated with debt is a function of the tax rate of the firm and leverage, and is discounted at the cost of debt to reflect the riskiness of the cashflow, given in equation 7:

$$Value\ of\ Tax\ Benefit = \frac{(Tax\ Rate)(Cost\ of\ Debt)(Debt)}{Cost\ of\ Debt} = (Tax\ Rate)(Debt) = \tau_c D$$

Equation 7: Value of tax shield calculation

The tax rate used in the calculations is the marginal tax rate of the firm and it is assumed to stay constant over time (ibid).

Like the FTE model the APV approach requires predetermined debt levels in order for the interest tax shield to be calculated. The strengths of the model are that it allows for alternative leverage policies other than a stable debt ratio over time (Berk & DeMarzo, 2014). In addition, the method separates debt into different components and allows for using different discounts rates for each component (Damodaran, Investment Valuation, 2012).

3.2 Relative Valuation

The aim of relative valuation is to value assets by using the market prices of similar assets. There are two components of relative valuation. The first is to standardize prices in order to value assets on a relative basis, which is usually done by converting prices into multiples of earnings, book value or sales. The second to find suitable firms for peers with similar risk, growth potential and cash flows (Berk & DeMarzo, 2014).

In a relative valuation, the value of an asset is derived from the pricing of 'comparable' assets, standardized using a common variable such as earnings, cash flows, book value or revenue. The model assumes that the market, on average, prices these firms correctly, but makes individual errors in pricing individual stocks. Another assumption is that a multiple comparison will allow us to identify these errors and that they will be corrected over time. Commonly used multiples are price-earnings ratio, price-to-book ratio, price-to-sales ratio and enterprise value-to-EBIT(DA) (Damodaran, Investment Valuation, 2012).

The model is easy to manipulate and misuse, because the decision of what is a comparable company can be very subjective. Another problem is that it builds on errors concerning over and under valuation. On the other hand, a relative valuation can be completed with far less assumptions than a discounted cash flow valuation. In addition, the value derived from a relative valuation is more likely to yield values closer to the market price of the asset. Also, the model is less time consuming to use and is simpler to understand than a discounted cashflow valuation (ibid).

These strengths can also be weaknesses of relative valuation. If the group of comparable firms differ in terms of risk, growth prospects and cashflows the value derived form a relative valuation can be over- or under estimated. The relative valuation is also sensitive to the market expectations of the comparable firms, where overly optimistic and overly pessimistic expectations can lead to an over- or under estimated value (ibid).

3.2.1 Trading peer analysis

Peer comparison is widely used approach and is often used to complement a comprehensive fundamental analysis, and is frequently used by both individual and professional analysts. The multiple analysis is often based on EBITDA multiples as it is unaffected by capital structure and different depreciation policies across countries (Koller, Goedhart, & Wessels, 2010). The EBITDA measure is therefore a good measure as the peers differs in terms of leverage and has operations in different countries. The EBITDA/kilo is also a widely used multiple for measuring for the margins per kilo in the salmon farming industry. Combining the two multiples by multiplying them the EV/kilo multiple is obtained. The multiple measures the value of all assets less cash to the harvested volumes in the company in kilos. Nevertheless, the EV/kg multiple is sensitive to mortality caused by health issues and escapes caused by weather. Consequently, the EV/EBITDA multiple will be used for the peer analysis.

3.2.2 Precedent transaction analysis

This analysis targets transaction values from past M&A transactions of comparable companies to estimate the price of an asset, using deal multiples such as EV/EBIT(DA). The transaction values often embed a premium as the potential consolidated company will most likely benefit from synergies. On average, the deal premiums are in the 20-30% range, but can vary significantly depending on the characteristics of the company that is acquired (Rosenbaum, Pearl, & Perella, 2013).

3.2.3 Sum of the Parts Analysis (SOTP)

In a sum-of-the-parts (SOTP) valuation the different divisions are valued as separate units, as if the divisions were spun off or divested to another company. The analysis builds upon volume multiples on enterprise value (EV/kg) to value each different segment. The multiples are different across different geographical locations, and varies in the different steps of the value chain. As upstream and downstream business areas can have quite divergent characteristics, the multiples used can vary largely. The appropriate multiple for each division should reflect both of these aspects.

3.3 Contingent Claim Valuation

In some cases, the value of an asset may not be greater than the value of expected cash flows if the cash flows are contingent on the occurrence or non-occurrence of an event. The model applies for, for example, patents undeveloped reserves and other which can be considered a real option. The reason for the use of this model is that the cash flow models tend to understate the value of assets that provide payoffs that are contingent on the occurrence of an event (Damodaran, Damodaran Online, 2007).

The model assumes that the variance and dividend yields is constant, which does not conflict short-term options in a high degree, but is in conflict with long-term options. Real options are not traded, which has implications for estimation errors when measuring volatility and the underlying asset.

4. Choice of Model and Method

To this stage I have explained the mechanisms of salmon farming and introduced the different valuation models available. This chapter will elaborate on the selected valuation method for MHG, which is based on the available information on public sources, firm specific factors, reliability of valuation, industry and phase in life cycle.

4.1 Access to Information

Data sources available for MHG is numerous. The information that can be retrieved from MHGs annual report and web pages include all information to complete a thorough fundamental valuation. In addition, there exist large amounts of publicly available information about future prices and and harvest volumes. Hence, a fundamental valuation should be conducted.

In addition, sufficient data on precedent transactions in the salmon farming industry, and data from peers are available to conduct different multiple analyses. Therefore, a multiple analysis should be performed to support the results retrieved in the fundamental analysis.

4.2 Firm-Specific Factors

MHG has had positive, relatively stable earnings historically and they are utilizing all their assets, which suggest using fundamental valuation. Further, WACC-based models works best when a company has a relatively stable debt-to-value ratio (Koller, Goedhart, & Wessels, 2010). MHG's historical debt levels has been relatively stable varying around 21% to 29%, and it is reasonable to assume that the current debt ratio is going to remain relatively stable going forward as MHG is predicted to lead the consolidation trend in the industry which will require funding. In addition, the financial structure of MHG is relatively transparent, which suggest that a WACC approach is the most appropriate for valuation.

However, the fundamental valuation should be supported by a relative valuation as MHG is expected to lead the consolidation trend in the industry, which may affect the risk and cashflows of the firm. In the multiple analysis, both a SOTP analysis, peer analysis and precedent transactions analysis will be conducted. The sum of the parts analysis is beneficial for MHG as they operate within feed production, salmon farming and salmon processing. Hence, conducting a sum of the parts analysis will indicate whether all their operations are profitable. A peer analysis is beneficial because it will give insight on whether MHG is trading on a premium/discount relative to its peers, to support a trading recommendation formed on the basis of the fundamental analysis. The precedent transaction analysis will not be emphasized in the same degree as the peer analysis and SOTP analysis in drawing a conclusion about MHG's price. This is because MHG is in a unique position as being the undisputed largest player in the industry, and are therefore likely to trade at a market leader premium. Smaller companies will be acquired at a discount compared to MHG's trading multiples. Another issue, is that acquisitions often imply high premiums that are higher than the true market value of the target, however I believe MHG's size and market leader premium will overshadow the transaction premiums found in the precedent transaction analysis. In addition, the salmon farming industry is in a high cycle far larger than what was found when the majority of these deals were completed, as will be discussed in section 14.3. Hence, the precedent transaction analysis is likely to undervalue MHG's true enterprise value.

4.3 Reliability

The market based approaches assume that the market prices on the stocks are correct on average, but makes errors when pricing individual stocks. Consequently, to retrieve a reliable value by using MHG peers, a prerequisite is that the peers are priced correctly by the market. If the peers are underprized by the market the value implied for MHG will most likely underprice the company. The opposite is true if the peers are overpriced. Hence, a fundamental analysis of MHG's cash flow should be emphasized more when drawing conclusions about MHG's value.

4.4 Industry

The salmon farming industry is characterized by volatile salmon prices and input prices for feed. At the same time the harvest volumes may fluctuate widely as a result of fish health issues and license restrictions. At the same time the industry has seen a continual consolidation trend, which is likely to increase the economies of scale for the large remaining players in the industry. The volatile prices and the increasing number of consolidations in the industry supports using a fundamental analysis.

4.5 Phase in the Life Cycle

The overall industry expects lower compound annual growth rates (CAGR) of 3% on average in the forecast period, lower than the CAGR from 2004 to 2014 of 6%. However, MHG is already the player driving the consolidation trend in the industry and it is therefore no reason to expect MHG's income growth to change considerably in the forecasting period. It is also reasonable to assume that the growth rates for MHG will approach the overall growth rate in the economy as MHG becomes an increasingly dominant player in the a highly consolidated market. This indicates using a two-stage model when valuing MHG.

In the backdrop of the above, a fundamental analysis will be conducted using the WACC approach, which will be supported by three market based analysis; sum-of-the-parts, peer analysis and precedent transactions.

4.6 Fundamental Valuation and Market Based Approach

A fundamental valuation consists of a multitude of factors that will each play a determinant role in deducting the firm value. Figure 6 describes the valuation approach when using a fundamental analysis. To calculate the enterprise value, the free cashflow to firm has to be estimated for a given period, referred to as the forecasting period. The forecasting period should reflect the time range when the firm is expected to have moderate growth. After that, the terminal value is calculated, reflecting the value of all future cashflows after the last year in the forecasting period at a low and stable growth rate. To calculate the value of the stock today, the terminal value and the free cashflows in the forecasting period has to be discounted with a discount rate reflecting the associated risk of the cashflows.

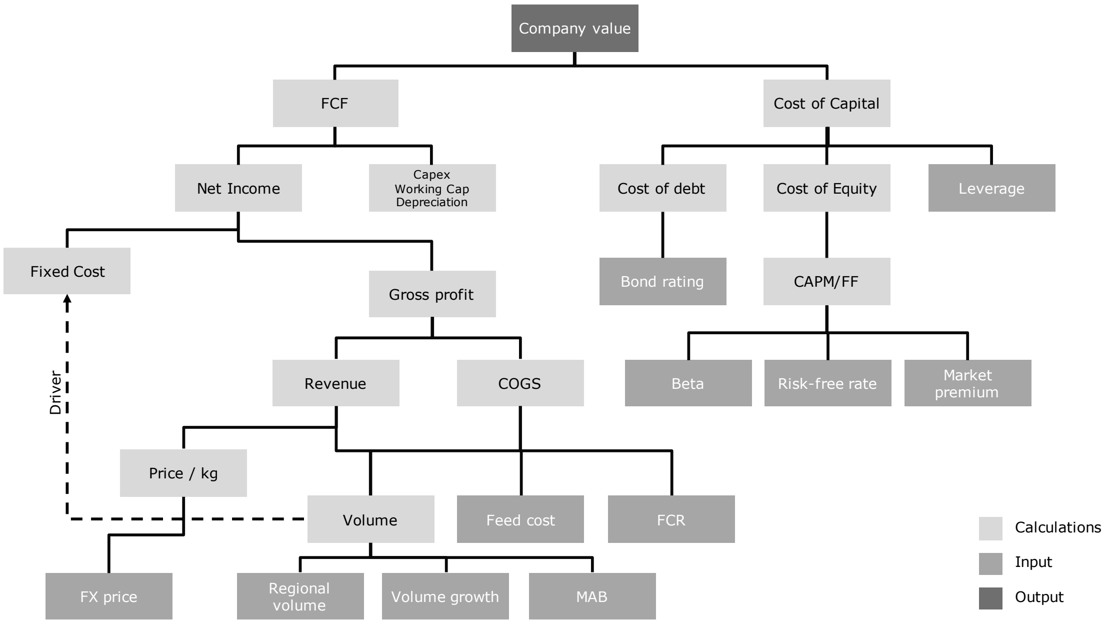

Figure 6: To determine the company value, the FCF and cost of capital have to be estimated

5. Analysis of Macroeconomic Relationships

At this point, the mechanisms of salmon farming have been described. Further, the different valuation approaches have been presented and it has been determined that the WACC method, supported by relative valuations, is the most appropriate analysis for conducting the valuation of MHG. This section presents the macroeconomic factors affecting the salmon farming industry. The macroeconomic analysis is divided into five sub-chapters comprising, political, economic, socio-cultural, technological, environmental and legal factors respectively. Here, the political and legal factors will be discussed as one, because the licenses are granted by the government.

5.1 Political and Judicial Aspects

Concessions limit the size of MHG's operations in the different regions where they are present, which have a great impact over the future harvest the company can expect to achieve. Further, sanctions from Russia and China has had a large impact on the demand achieved in for Norwegian salmon in Asia in the resent years. In the following paragraphs I will elucidate on the impact from recent news on licenses in the different regions MHG is operating and the consequences and likely development of the sanctions in the future.

5.1.1 Licenses

5.1.1.1 Domestic license distribution

In order to produce salmon in Norway, a license from the government is required. The license system in Norway is regulated by the Aquaculture Act of 2005 (Regjeringen, 2005). The licenses are granted by the Norwegian Ministry of Trade, Industries and Fisheries and administered by the Directorate of Fisheries. Each license allows salmon farming both in fresh water for smolt production and at sea and the limit of number of sea licenses in Norway is currently 974. There are no such limitations for licenses for salmon farming in fresh water and these licenses can be applied for continuously. The production limitations in Norway is regulated by maximum allowed biomass (MAB), which is set for each license and for each production site. The MAB for each license is 780 tons (945 tons in Troms and Finnmark) and sites generally has a MAB between 2,340 and 4,680. The licenses can be traded among the players in the industry. However, further limitations restrict a player to control no more than 50% of the total biomass in any of the regions and 25% of the accumulated biomass in Norway. In addition, a player needs to apply to the Directorate of Fisheries in case where the volume exceeds 15% of the total Norwegian outstanding biomass (Marine Harvest ASA, 2015).

Since 1982, only a limited amount of licenses has been rewarded in the years 1985,1988,199, 2001, 2002 and 2009 in Norway (Marine Harvest ASA, 2014). Further the license system has been criticized for granting discounted licenses. In 2013, 45 green licenses for salmon farming was issued by the Norwegian Ministry of Trade, Industry and Fisheries, which required the salmon farming companies to comply with certain environmental standards. 35 of the 45 licenses required an exchange of an old license to obtain a new (Regjeringen, 2013). MHG was granted only one of the 45 licenses, as the Norwegian government was seeking to benefit the small and mid-sized players in the industry in order to secure the competition, and most of the concessions were granted Salmar and Cermaq (Intrafish, 2015).

At the same time, The Norwegian Parliament voted on a white paper on aquaculture, which allows a maximum growth of 6% every two years given that certain environmental criteria are fulfilled (Marine Harvest ASA, 2015). It has also been suggested to implement a rolling MAB system by the Seafood Norway (former Fishery- and Aquacultures National Association), which allows increased production when the sea temperatures are more favorable. The system allows increased MAB during the fall when the temperatures are high and the salmon is growing faster, however the system requires the average biomass in a given year not to exceed the MAB. The system is expected to create more stable production cycles and increase the production from current levels. However, high temperatures also increase the risk of sea lice and diseases. This has created debate about whether the system is sustainable among players in the Norwegian salmon farming industry and the proposal has not yet been adopted (Intrafish, 2015).

The EFTA Surveillance Authority (ESA) argues that the Norwegian fish farming regulations do not comply with the EEA Agreement. ESA monitors compliance with European Economic Area rules in Norway, Liechtenstein and Iceland, enabling the countries to participate in the European internal market. For the past two decades there has been disagreements between Norwegian authorities and EU authorities on how Norway should regulate its fish farming industry. Norwegian authorities argue that fisheries and aquaculture policies are not a part of the EEA Agreement, and hence should be decided on domestic level. It is the Norwegian Government's opinion that EEA law does not limit Norway's discretion to distribute the production capacity of its domestic fish farming. Contrary, the ESA claims that Norway has to comply with the regulations given by the EEA Agreement (EFTA Surveillance Authority, 2014).

Norwegian aquaculture is both included and excluded from EU policies. On one side, Norway is not participating in EU's common fishery policies, and hence decides on how to manage its own aquaculture resources. At the same time, Norway does not have free access to the EU markets, and has to comply with quotas and duties on import. In order to converge to EU regulations, The Norwegian Ministry of Trade, Industry and Fisheries proposed in May 2013 to change the rules of ownership control of the aquaculture industry. It is proposed to increase the ownership ceiling for a company from the current level of 25% to 40% of production capacity in the salmon farming industry. At the same time, there will be more stringent requirements for activities in coastal districts, hereby including requirements for R&D spending, which will be an important measure against the spreading of sea lice (Ministry of Fishery and Coastal Affairs, 2013).

I want to highlight that there is significant political risk related to both today's MAB license system and the disperse regulations in Norway and the EU. However, former minister of fisheries has been positive to the change in the ceiling of ownership share in the Norwegian aquaculture sector (Undercurrent News, 2013). The recently instated minister of fisheries, Per Sandberg has also expressed positive attitudes towards growth in the Norwegian aquaculture sector, and his political party (FRP) also known to be against high involvements from the EU.

In the volume forecasts I have assumed that the ceiling for ownership is increased above 25% in the next few years, allowing MHG to continue its growth within the 6% biannual allowed increase in biomass within each region, given the green efforts discussed above.

5.1.1.2 Foreign license distribution

Scotland: In Scotland there are no distributions of licenses, but the operations of sites have to be approved by different institutions. The MAB in Scotland is not uniformly set and depends on the environmental concerns, and generally varies between 100 tons and 2,500 tons. Applications are given for a 25-year period and any company's total production capacity is limited by the Competition Commission Authorities (Marine Harvest ASA, 2015).

Chile: In 2010, licenses in Chile were no longer grated for infinite periods, but for a 25-year period, and the licenses will be renewable at the end of the period. The Chilean government is also looking to freeze the allocation of salmon licenses in the southern regions until 2020, in a bid to organize and better regulate the sector. The need for proper organization of the affairs in the region stems from the infectious salmon anemia (ISA) crisis in the region between 2008 and 2009, which led to thousands of redundancies and pushed several companies to the verge of bankruptcy (Intrafish, 2014).

Canada: Licenses are issued for a period between 5 and 15 years and a typical license will range in size from 2,000 MT to 5,000 MT of MAB. New licenses will be issued as of July 2015 for a six-years period at the time, which will only be renewed for one year at a time. Application of 8 new licenses has been applied for by the industry, were four of those are by MHG.

The impact of license regulation is likely to slow down the growth in harvested volume in Norway as Norwegian production is approaching the maximum allowed biomass, which will be further deliberated under chapter 11. It is also reasonable to assume that MHG will have harvest volume growth close to or equal to the maximum allowed biannual growth of 6% as the economic condition in Norway favor export of salmon. However, it is difficult to suggest future harvest volumes in the other regions where MHG is operating based on licenses, as the regulations are less concrete than in Norway. However, MHG has a large amount of their Chilean operations in the Southern parts of Chile - it is therefore unlikely that growth in harvest volumes in Chile will come from existing operations, and must therefore come through acquisitional growth (Marine Harvest ASA, 2015).

5.1.2 Sanctions

After the Nobel's Piece Prize was awarded the controversial dissident Liu Xiaobo in 2010, the market for Norwegian Salmon is now almost totally dismantled (E24, 2015). The Chinese market was previously an important market for the export of Norwegian salmon comprising 90% of the total market share in China. Given the rapid growth in Chinese economy and a continuous growing middle class, predicting whether the sanctions will cease is an important indicator to estimate the growth in sales for Norwegian salmon. Earlier this year, the Norwegian and Chinese governments agreed on a certificate which again allowed for export of Norwegian salmon to China. Even though the export is not yet significant, the certificate indicates a future for Norwegian salmon in the Chinese market (Aftenposten, 2015).

At the same time, Russia's actions in Ukraine has lead to sanctions from USA and Europe, where Russia has been banned from a wide range of American and European markets. Russia's response to this action was banning import on several goods from European and USA markets, which has also influenced the export Norwegian salmon to Russia. Nevertheless, Trond Davidsen, director for aquaculture in the Fishery and Aquaculture Industry Association in Norway, believes the sanctions introduced for Norwegian salmon will not be enhanced as suppliers of salmon are relatively few. The Russian market is the single largest market for Norwegian seafood, and additional retrenchment from the Russian government will therefore have great impact on Norwegian suppliers of salmon (ibid). This year, Russia has started retreating troops from Ukraine and has resumed their supply of gas, which could indicate an advancement for peace in the Crimean region. If this continues sanctions may cease, supporting greater supply of Norwegian salmon to the Russian market (NRK, 2015).

Norway's relationship to Russia and China has improved considerably during the last year and it is wide consensus that the Asian demand for Norwegian salmon will improve going forward. Therefore, it is reasonable to expect increased demand and hence increased production volumes going forward. Nevertheless, the increased demand is dependent on the availability of licenses in the future, but since MHG has operations in many different regions it is reasonable to assume that the Asian demand can be supplied from other regions.

5.2 Economical Aspects

An overview of the global trade flow of farmed Atlantic salmon was given in the overview in figure 4 in the chapter 2.3.2. The Norwegian market is predominantly exporting to Europe, Russia and Asia whilst the Chilean market is predominantly exporting to USA, South America and Asia. Since the majority of MHG's production is in Norway and Chile, it is vital to address the economic condition in the countries that are Norway's and Chile's prime markets.

The consumers of salmon are predominantly middle class, therefore an analysis of GDP per capita in the major export countries can give an indication for the future market for harvested salmon. The analysis is conducted for the main markets of Norwegian and Chilean salmon, as Norway and Chile comprise the majority of MHG's harvested volumes. However, both the Chilean and Canadian operations export to the US and MHG's other European plants predominately export to Europa. The following analysis therefore represents the majority of MHG's operations and will provide a good estimate of the likely demand in the future. The overview in figure 7 below show the development in GDP per capita in the Europe, China and Russia, which is main markets for Norwegian salmon. Further it shows the GDP per capita development for Japan, Latin America and USA, which are main markets of Chilean salmon. The graph shows historical development from 2005 until today and estimated GDP per capita until 2020. The growth in GDP per capita is expected to be slightly increasing for Europe, Russia, Latin America, and China. The GDP per capita is expected to grow at a faster rate in the US than in the other countries. The GDP for Japan is expected to decline until the end of 2015 and then increase but at a slower rate than historically (Knoema, 2015).

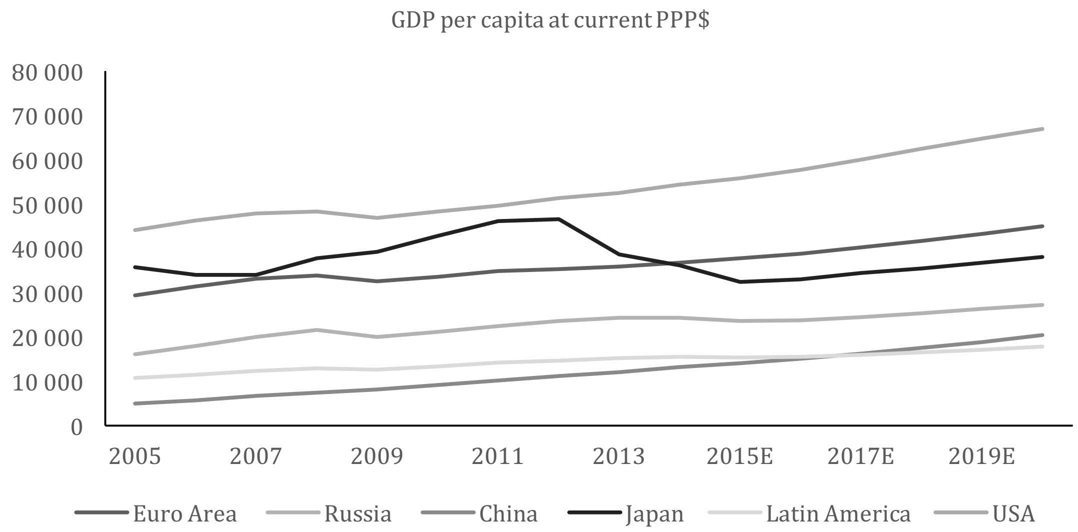

Figure 7: GDP per capita is expected to increase in the most important markets for Norwegian and Chilean salmon (Knoema, 2015)

A weaker Norwegian currency compared to the British pound, the US Dollar and the Euro, as seen in figure 8, has stimulated the export of Norwegian salmon. The result of this has been an accumulated export this year that is larger than at the same period last year (iLaks, 2015). In addition, it is wide consensus among major Norwegian banks that the weak Norwegian Krone will sustain for an extended period time (E24, 2015).

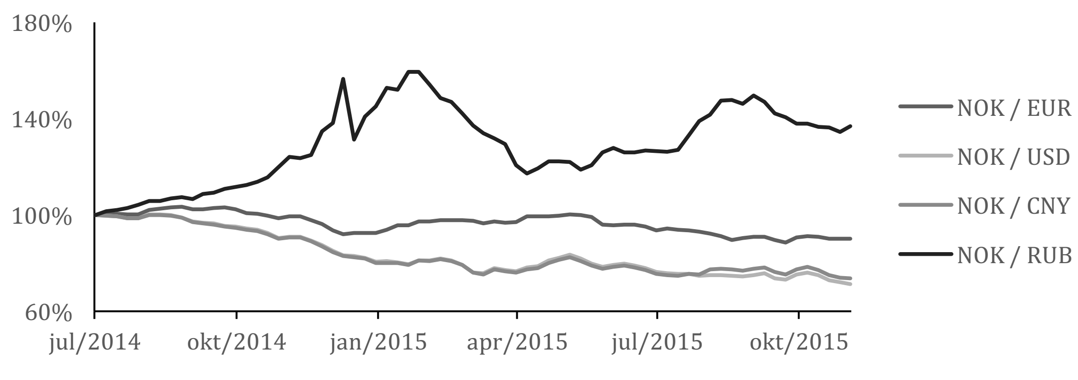

Figure 8: The Norwegian Krone has weakened to the currency in its most important markets (Oanda, 2015)

Increases in GDP per capita in MHG's prime markets for salmon suggest that the demand for salmon is likely to increase, because of socio-cultural factors outlined in section 5.3. In addition, the weaker Norwegian currency is likely to increase demand for Norwegian salmon, all else equal. However, the harvested volumes in Norway is nonetheless still dependent on the available licenses, and this will put an ultimate cap on the growth potentials.

5.3 Socio-Cultural Aspects

Some of the growth in demand is due to a rapidly increasing middle class and the general increase in disposable income among customers in export countries can be ascribed to the positive correlation of increased lifestyle and health, and environmental consciousness to disposable income. Increase in income often results in the desire to purchase food richer in minerals and vitamins, and 'green' and ecological products. Salmon is, as previously mentioned, rich in omega 3 acids, proteins, minerals and vitamins and is recognized as a product of great nutritional value in addition to being more environmental friendly than other animalistic protein, supporting greater supply of salmon with GDP per capita growth (Marine Harvest ASA, 2015).

Feed conversion ratio measures how productive the different protein productions are by dividing the kilograms of feed needed to increase the animal´s bodyweight by on kilogram. Salmon has a feed-conversion ratio that is considerable lower than other sources of protein that is potential substitutes to salmon, shown in the figure 9 below. The divided feed-conversion ratio for cattle is due to difference in feed; grass and cereal respectively. In addition, salmon production is viewed as more climate friendly than the production of other animalistic protein sources. With growing population in the world, the production of salmon is therefore expected to be an important source of protein whilst limiting the negative impact on the environment. In addition, the salmon feed industry has started to use less fish oil and fish meal and more vegetable ingredients in their feed, which is more sustainable and environmental friendly (ibid).

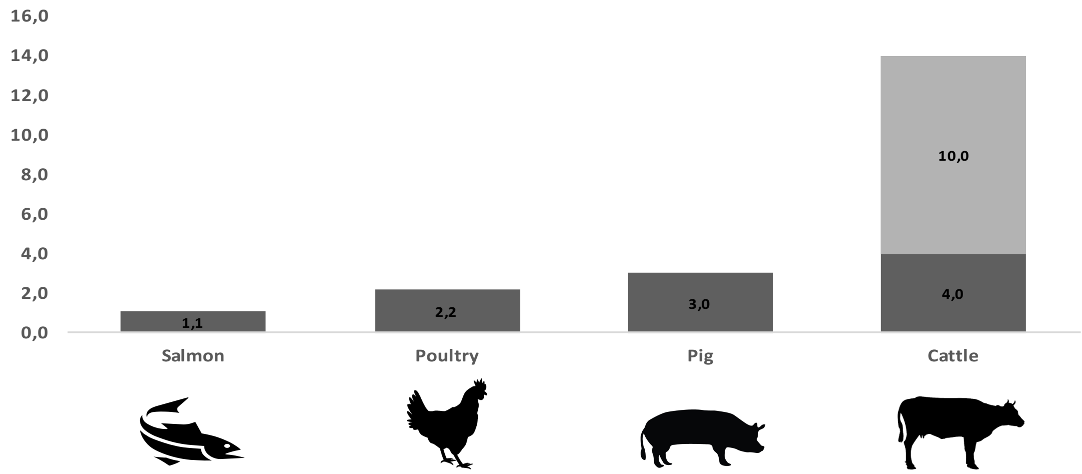

Figure 9: The feed conversion ratio of salmon is considerably lower than other animalistic protein (ibid)

Table 3 shows an overview of the carbon footprint and water consumption of different animalistic protein which are clearly oust by salmon.

	Salmon	Poultry	Pig	Cattle
Carbon footprint (kg CO2/kg edible meat)	2.9 kg	3.4 kg	5.9 kg	30.0 kg
Water consumption (liter/kg edible meat)	1,400 liter	4,300 liter	6,000 liter	15,400 liter

Table 3: Salmon is significantly more environmental friendly than other animalistic protein (ibid)

5.4 Technological and R&D Aspects

Since 1994 the supply of Atlantic salmon has increased by 428%, which corresponds to an annual growth of 9%. Between 2003 and 2014 the annual growth has been 6% and Kontali Analyse predicts further decline in annual growth rates to 3% between 2014 and 2020.

The reason for the decline in growth rates is that the industry has reached a production level where biological boundaries are being pushed. The recent ISA crisis in Chile has stressed the need to keep the growth in line with the industry's biological footprint. This situation has raised the need for increased R&D efforts to find find pharmaceutical solutions to combat salmon lice (Marine Harvest ASA, 2015). The Norwegian industry is spending a total NOK 50 million on R&D directly related to the combat of salmon lice on a yearly basis, which illustrates the scale of the problem (Lusedata, 2015).

The technological and R&D aspects suggest that greater supply can be achieved if the industry takes action in combating the problems with fish health. MHG is seeking to enhance their R&D efforts in dealing with biological assets, which may cause the the mortality rates to decline and hence harvest volumes to increase. In addition, improved fish health also increases the quality of the fish and consequently the price achieved for salmon. Another reason for increased R&D efforts is that the Norwegian government requires a certain level of R&D spend and fulfill certain lice-to-salmon ratios to obtain new licenses, and achieve a higher share of the Norwegian harvest volume. As MHG is expected to drive the consolidation trend previously discussed, the R&D spending will continue to increase for this very reason as well (Marine Harvest ASA, 2015).

5.5 Environmental Aspects

Some environmental factors were discussed under socio-cultural factors as people become more concerned with environmental friendly products with increased spending power. However, there are several other environmental factors affecting the volumes and price achieved for salmon, outlined below.

The production of salmon is sensitive to climate and weather as well as force majeure events such as earthquakes. Climate changes has caused raising sea temperatures and acidifications of the ocean, which are large threats to the production of salmon. As discussed in section 2, the optimal temperature for the production of salmon ranges from 8 to 14°C and rising temperatures are therefore threatening the survival of the industry, especially Chile where the average temperature 12 degrees. Acidifications of the ocean may cause decreasing growth pace of salmon and in the worst case death, which has an impact on the production pace and price of salmon (Marine Harvest ASA, 2015).

Another challenge is extreme weather such as storms and hurricanes that strikes the coastlines, which causes salmon escapes from the net cages and therefore has a negative impact on the harvested volumes (and could cause high fines). In addition, earthquakes can both cause harm to the net cages and salmon to escape and can therefore decrease production volumes and make additional capital expenditures necessary. However, the threat of earthquakes will only be applicable to the operations in Chile for geological reasons (ibid).

It is impossible to predict whether the occurrence of storms and force majeure events is likely to change from current levels in the different regions producing salmon. However, the rapid climate changes over the last century which has been showed to rise the global temperatures and the occurrence of storms and other force majeure events, suggest that the salmon farming industry will experience more escapes and mortality in the future. Nevertheless, a historical global climate treaty was signed by 195 countries in December 2015, which is believed to achieve eminent reductions in global emissions among experts, which may cause the temperatures and force majeure events to stabilize in the future.

Summarized, the macroeconomic analysis supports increasing volumes of harvested salmon in the future, even though the growth rate will be at lower levels in some regions due to the biological challenges. In addition, more stabilized weather conditions and temperatures and technology and R&D effort are likely to increase the price the salmon farming companies can expect to achieve as the quality of the fish improves, all else equal.

6. INDUSTRY ANALYSIS

So far, the mechanisms of salmon farming have been explained, and the appropriate valuation methodology has been determined. An analysis of the macroeconomic conditions has concluded that there is a favorable outlook for the demand of salmon in the future, but that the industry is limited by regulations in form of licenses. In this chapter I will focus on the salmon farming sector itself and address competitive situation in the salmon farming industry by looking at the risk of new entrants, supplier power, consumer power, and substituting products.

To be able to analyze the future prospects of Marine Harvest it is vital to conduct an industry analysis to get a sense of their competitive position. In order to do that one needs to properly define the players in the industry. I define the industry that MHG operates in to be salmon farming and processing. The implications of this is that the other kinds of seafood will be considered substitutes of harvested salmon. Marine Harvest has recently entered into the feed production market, and are by now ~80% self-sufficient in Norway, and is planning to expand their feed production to other regions. Consequently, MHG's upstream suppliers will also be commodity vendors of the input in salmon feed, in addition to feed producers even though the relevance of these will diminish going forward.

6.1 NEW ENTRANTS

Geographical locations with conditions suited for salmon farming is limited. Board member of MHG, Cecilie Fredriksen, emphasized in a speech given at NHH in September that this natural limit of harvesting localities represents a large barrier of entry for potential new competing companies. Farmed salmon is only produced in Norway, Chile, UK, Faroe Islands, Ireland, North America and New Zealand due to biological constraints concerning temperature requirements and other natural constraints.

Another large constraint is the licenses regime introduced by the authorities in the countries mentioned above. The licensing regime limit the amount of harvest of each company and varies in the different regions, which was discussed under the macroeconomic analysis.

Nevertheless, in 2015 the Minister of Fisheries in Norway stated that the government were open to assign permissions for land-based salmon production. This is a threat for sea based players as the land-based players are neither exposed to the environmental problems such as rising sea temperatures, storms and acidification of the ocean nor fish health problems caused by salmon lice. On the other hand, land-based production imply a significantly higher cost both in capital expenditures due to more technically advanced fish cages and operational costs due to circulation of water in the cages (Sysla, 2015).

The salmon farming industry is very capital intensive, which creates a major barrier of entry. Long production cycles of salmon imply high working capital levels, as biological assets are categorized as capitalized assets before the salmon is harvested, which is a period of 2-3 years which can be seen in figure 5 in section 2.3.5. In addition, the industry requires high capital expenditures to acquire property, plant and equipment necessary for production (Marine Harvest ASA, 2015). Land-based production therefore requires high salmon prices to break even, and is thus extra sensitive to the highly volatile salmon price, and it is therefore considered unlikely that this will pose a large threat for MHG in the short to medium term.

There has been a growing trend of consolidations in all regions in the industry during the last decade, which is expected to continue (Marine Harvest ASA, 2015). This will result in fewer, but larger companies in the industry, consequently leading to larger benefits from economies of scale. Therefore, this trend will make it even harder for new companies to enter the industry. Analysts expect MHG to lead this trend because of their strong balance sheet and standing relationship with loan facilities (iLaks, 2014). In addition, the industry are spending millions per year to achieve FHL's recommended salmon lice ratio of 0.5 per fish in average, and since the largest players in the industry has more funds, small players are not capable to maintain the same R&D efforts that are required for achieving the recommended sea lice ratio. (Sysla, 2015).

Last, the USAs Food and Drug administration (FDA) has approved production of genetically modified salmon, which could threat the traditional production of salmon because of reduced production cycles. The genetically modified salmon can be produced in 16 to 18 months, while the production cycle for Atlantic salmon is 30 months (almost twice as long), consequently their operational cost and working capital will be dramatically reduced. Nevertheless, only two hatcheries, one in Canada and one in Panama, have got the permission from the FDA to produce genetically modified salmon today. Still, if the production is successful and the demand is good, the FDA and food surveillance in other countries producing salmon might give out permissions to more players, which can threaten the traditional production of Atlantic salmon (E24, 2015). On the other land, SalmoBreed, a breeding company specializing in genomics selection, believes there is a long way from a FDA permission to commercially viable genetically modified salmon (iLaks, 2015). MHG is also seeking to develop their own fish egg plants in the future and it is assumed that MHG have the necessary financial funding to keep up with the most efficient production methods seen in the market today.

The risk of new entrants is assumed to be low, because the industry is highly capital intensive, licenses are often distributed to existing players and there is a consolidation trend in the industry. In addition, the development of genetically modified salmon is in the early stages of testing and development and has not yet received many approvals for commercially production. Potential development of land-based plants is not considered as a treat for traditional salmon farming as the land-based plants are highly capital intensive and dependent on a high price for salmon to break-even.

6.2 SUPPLIERS

Since Marine Harvest supplies ~80% of their own feed in Norway and is looking to expand their operations it is therefore appropriate to introduce the historical and future prices on commodities used in salmon feed.

As previously mentioned, the industry has gone from using a majority of fish oil and fish meal in production to vegetable ingredients consisting of rapeseed oil, soymeal and wheat. The share of each ingredient in production of feed in Chile and Norway today can be seen in the graphs 10 below.

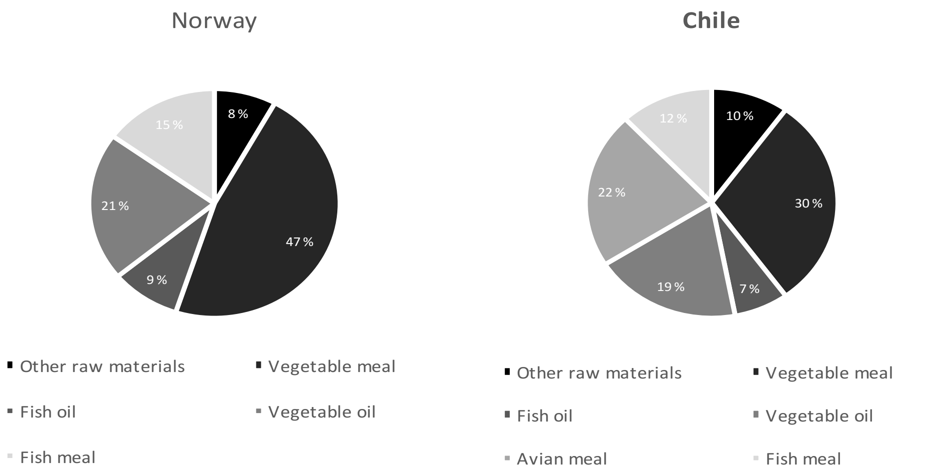

Figure 10: Vegetable meal and oil are the main ingredient in Norwegian feed, while vegetable meal and oil and avian meal are the main ingredients in Chilean feed (Marine Harvest ASA, 2015).

The prices in USD per tons for the ingredients is shown in figure 11 below. The prices for fish oil and fish meal has increased steadily since 2009 and is considerable higher than the prices for the vegetable ingredients. The price for rapeseed oil has varied considerable, while the price for soymeal and wheat has been relatively stable (Knoema, 2015).

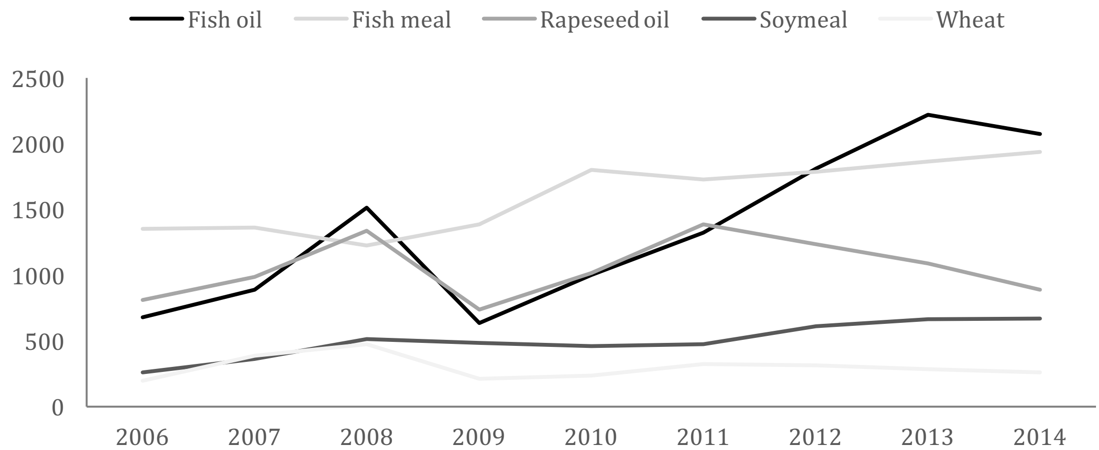

Figure 11: The price for fish meal and fish oil has increased greatly during the last five years (Index Mundi, 2015)

It is reasonable to assume that it will take a few years before Marine Harvest is totally self-sufficient of feed to their operations in all regions. Hence, an analysis for the main salmonid feed producers is necessary. The industry of feed production has gone through a period with many consolidations and has since 2008 been controlled by three large producers; BioMar, Ewos and Skretting, which are all operating globally. The share of the largest players in the salmonid feed industry can be seen in the figure 12 below. Not only are these companies the suppliers of feed, but also make up MHG's competitors as MHG have become vertically integrated into feed production (ibid).

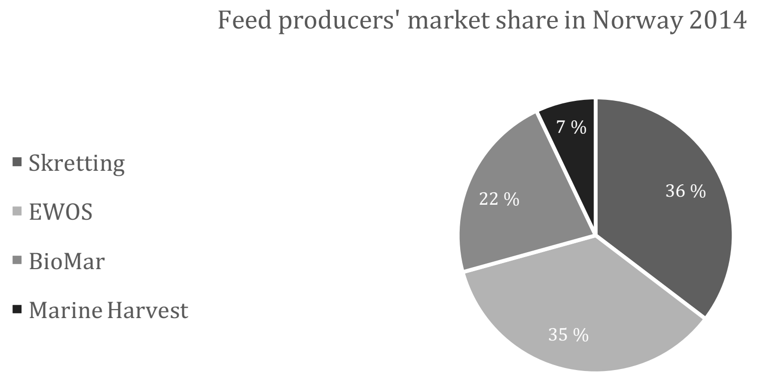

Figure 12: Skretting (36%) and EWOS (35%) are the largest players in the feed market (ibid)

The salmonid feed companies typically operate with cost-plus contracts, which fully reimburses the contractor for the cost of materials and an additional premium for the cost of the job. Consequently, by producing feed internally, salmon harvesting companies do not pay the additional premium. With fewer players in the salmonid feed industry, it is reasonable to assume that the premiums the players can charge is higher (ibid).

In addition, it is reasonable to assume that the input prices are the same for all players in the salmonid feed market, as the ingredients are fresh goods and prices should therefore be relatively close to the spot price found in the market. Consequently, the profitability of vertically integrate feed production is depended on the additional cost of feed production relative to the premium charged by salmonid feed producers.

A considerable cost component, however far smaller than the feed cost, in producing farmed salmon is the cost of fertilized eggs. The supply of fertilized eggs is, as mentioned, dominated by four suppliers. A market dominated by few suppliers, facing a larger amount of customers allows for price fixing and it is reasonable to assume the salmon farming companies to a large extent is price takes in this market. Most fish egg suppliers operate with quantity discount and and different prices for spawn in their early-, mid- and late stage of life where late stages are the most expensive and early stages the least expensive. MHG is likely to achieve the maximum quantity discount with their vast production volumes. Looking at AquaGen's price list from 2013-2015 the price for one egg has increased by approximately NOK 0.3-0.6 for different categories (AquaGen, 2015) (AquaGen, 2013).

The power of suppliers is assumed to be low as MHG has developed their own feed plant and is seeking to be entirely self-sufficient in feed supply in the future. Nevertheless, the ingredients used in feed production are traded in the spot market which reduces the bargaining power of the customer. In addition, MHG is dependent on external supply of fertilized eggs, which is produced by few large suppliers decreasing their bargaining power additionally. The power of suppliers is therefor assumed to be high.

However, the supplier power is likely to decrease if MHG becomes self-sufficient in feed supply also in their international regions and pursuit their strategy of integrating fertilized egg supply in their internal operations. The latter will be discussed further under the firm specific analysis.

6.3 Consumers

The buyer power depends on the levels of supply and demand and characteristics of the product. Since salmon is a fresh good and has to be sold immediately the buyer power is strong and the salmon farming is therefore price takers meaning they have to lower the price if the demand is low and is able to raise the price if the demand is high. Nevertheless, the salmon supply can be regulated to some extent with freezing the salmon, which increases the durability or postpone/accelerate the harvest volumes to some extent to when the market conditions are more favorable. However, this is assumed to have only limited impact on the bargaining power. Further, farmed salmon is a relatively homogenous product, which increase the buyer power additionally. A homogenous product reduces the bargaining power of the salmon farming companies because consumers will screen the market for the product with the lowest price as they regard the products as identical. Still, MHG also sells processed products that are more differentiated than the farmed salmon. This is assumed to reduce the bargaining power of consumers slightly. The customers of MHG's processed products are to a high degree large supermarket chains, buying vast volumes. Also in this sector there has been a consolidating trend that has left only a few giants with large purchasing power within the regions the supermarket chains operate in.

The power of customers is assumed to be high as salmon is a fresh good and a highly a homogenous product, where the customer base is highly consolidated. However, MHG has increased their second processed marked with the acquisition of Morpol and the segment now comprise a large share of MHG's total revenues, supporting slightly lower bargaining power.

6.4 SUBSTITUTES

Land animal still dominates protein sources for consumption, which can be seen in the figure 13.

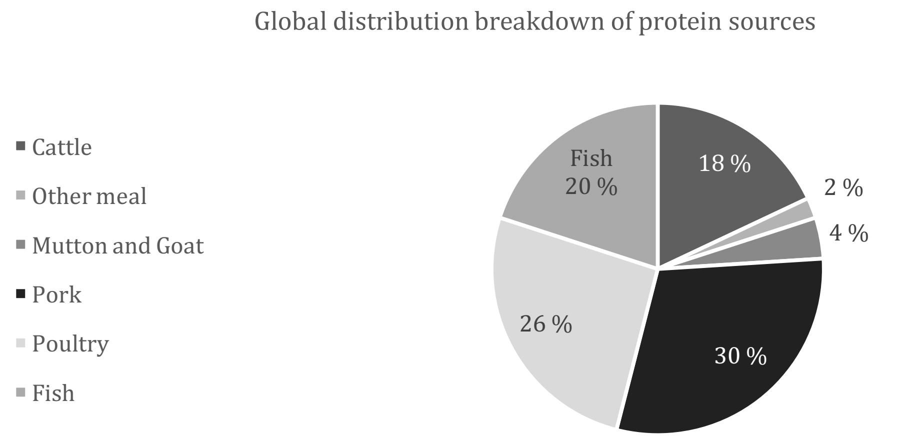

Figure 13: Land based animals dominate the animalistic protein consumption (Marine Harvest ASA, 2015).

Under the environmental analysis in chapter 5.5, the feed conversion ratios for different types of animalistic protein were introduced. The analysis showed that salmon oust other types of animalistic protein with a feed-conversion ratio of 1.1.

The prices for different types of animalistic protein in outlined in figure 14, which shows that the price of salmon has declined over the past 5 years. Still the price of salmon is trading above the prices for other sources of animalistic protein. The buyers of animalistic protein are assumed to be price sensitive, which the lower consumption volumes of salmon compared to other animalistic protein indicates. Still, the increasing amount of consolidation in the industry is likely to reduce the cost as the fewer yet larger players will probable benefit from increased economies of scale.

At the same time the economic conditions in the main markets are expected to improve, seen in the GDP per capita graph introduced under the economic macro analysis. As previously mentioned, increased income is assumed to raise the customers' awareness of healthy and environmental products. Salmon is both viewed as healthier and more environmental sound than the other sources of animalistic protein presented below.

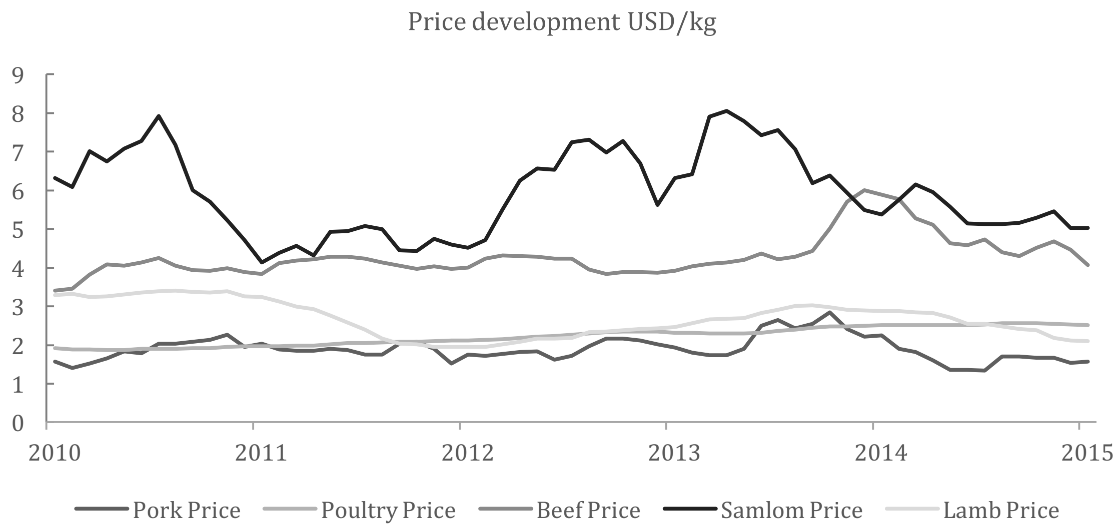

Figure 14: The price for salmon has showed a decreasing trend in recent years, but is still considerable higher than prices for other animalistic protein (Index Mundi, 2015).

'Tilapia and other cichilds' and 'Alaska pollock' still dominates the global consumption of fish species and other seafood, illustrated by the size of the bar in figure 15.

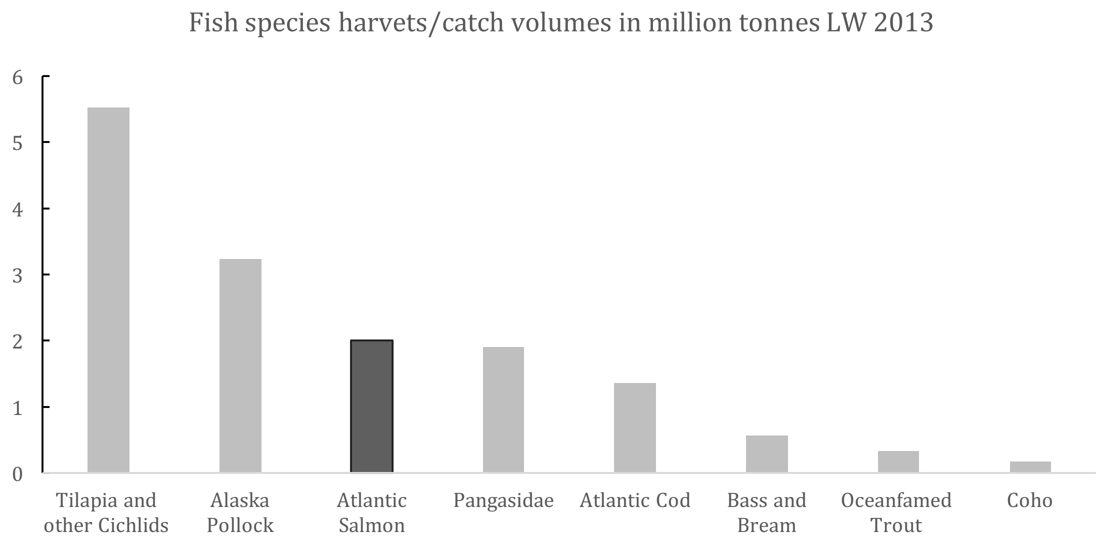

Figure 15: White fish still dominates the global consumption of protein from aquaculture (Marine Harvest ASA, 2015).

Nevertheless, production of salmon is associated with the lowest level of risk and the highest degree of industrialization among other fish species, depicted in the figure 16 below. Consequently, the production of salmon has higher barriers of entry than its substitutes because of capital intensive production. It is also reasonable to assume that the volumes are more stable in the production of salmon as a consequence of the lower level of risk.

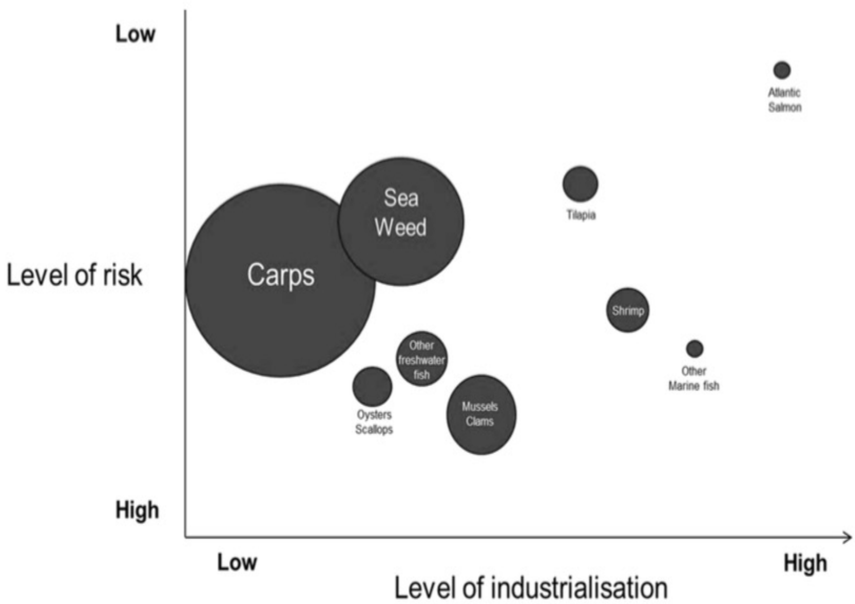

Figure 16: Production of salmon is in a unique position compared to production of other fish species because of low levels of risk and high level of industrialization in production (ibid).

The power of substitutes is assumed to be high as the prices of other sources of protein are relatively lower and that consumers are price sensitive. Still, the cost of producing, in addition to health and environmental concerns, is more beneficial for salmon. In addition, salmon farming has a higher degree of industrialization and lower level of risk than other fish species which suggest a better competitive position compared to the other fish- and seafood types. However, consumers are price sensitive when it comes to protein and the threat from substitutes is therefore set to a medium to high level.

6.5 Rivalry

I have previously described the ongoing consolidation trend in the salmon farming sector, which has left a few large players. MHG is by far the largest of the market players, and enjoy a market leader position in most of the regions where the company is present. Further, the salmon farming industry is regulated by the governments, controlling market shares by requiring licenses to operate. This will limit the degree of rivalry between the different market players, as they have limited leeway to rapidly increase their market share.

Further, I have discussed the benefits from scale in salmon farming. MHG is the only major player that has a fully integrated value chain, and they will most likely benefit largely from this, as their bargaining power with their upstream suppliers is superior to that of their competitors. The scale benefits will also be an important factor in the combat against sea lice to keep the mortality rates at a sufficiently low level, as large R&D efforts are required to stall the losses from fish deceases and loss of quality. This will further reduce the degree of rivalry in the sector.

Lastly, farmed salmon is a highly commoditized good, and is trading at spot price in a freely traded market. This facilitates for price competition between the players. Lately, the salmon price has been increasing due to increased demand, and the sector has been more and more demand driven. As long as there are regulative limitations to volume, and the demand is high, the price is remaining high and will benefit the profitability for the entire sector. However, MHG also offers a large product range in the processes salmon market, and these products are far more differentiated than primary processed salmon. Overall, the rivalry in the sector is at a medium to high, due to MHG's dominating position as a vertical integrated market leader and the demand driven price development.

MHG's position in the competitive market will be more thoroughly discussed in the next section, where I will elaborate on MHG's competitive strengths and weaknesses.

6.6 SUMMARY OF COMPETITIVE SITUATION

The competitive situation in the salmon farming industry is summarized in figure 17, where customer power is high, supplier power and threat of substituting products is medium/high and threat of new entrants is low. Summarized the degree of rivalry in the salmon farming industry is deemed to be medium/high.

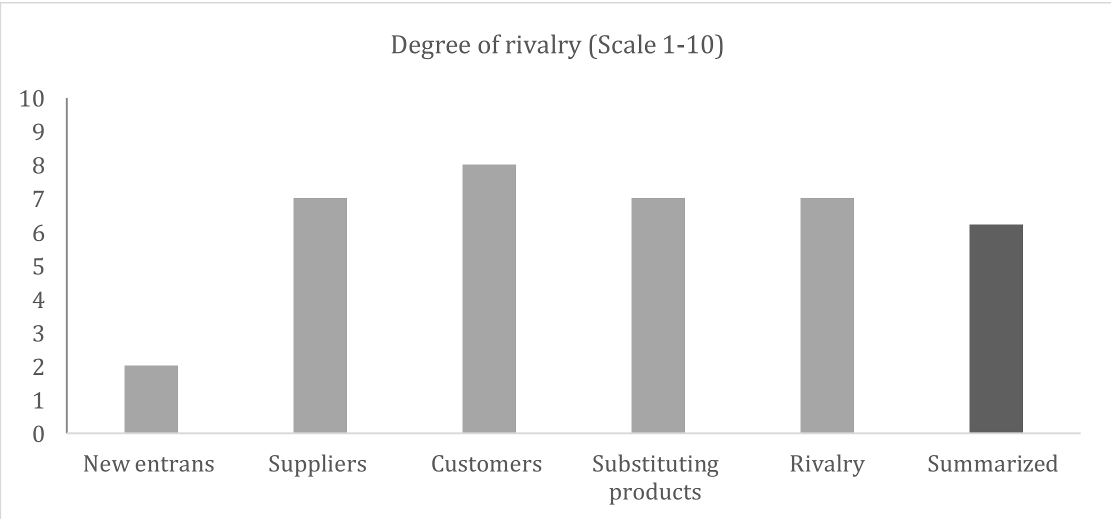

Figure 17: Customers is deemed to have the highest bargaining power in the salmon farming industry

7. Company Analysis

To this point the mechanisms of salmon farming has been explained, and it has been determined that the WACC method is the appropriate valuation method for MHG. It has also been concluded that the macroeconomic conditions are favorable to MHG, although restricted by regulations. Further the competitive situation in the salmon farming sector has been assessed to be at a medium to high level. This chapter will present MHG's capabilities, and will in turn address the strengths, weaknesses, opportunities and threats of MHG in order to determine how well they are positioned in relation to other players in the salmon farming industry.

S

- Strong market leader
- Vertically integrated business model
- Geographically diversified production
- Delivering on long-term strategy

W

- Not self-sufficient in egg supply
- Volatility in earnings due to spot prices
- Long production cycles

O

- Engage in further consolidations
- Self-sufficiency in egg supply
- Expanding feed production and optimizing feed ingredients
- Expansion into other fish species

T

- Biological issues such as sea lice and diseases
- Natural disasters leading to escapes and mortality
- Excessive supply growth leading to weak prices
- Small and mid sized firms prioritized in license distribution

Figure 18: MHG is expanding in all their segments, however they are threatened by governments prioritizing SMEs out of consideration for competition.

Figure 18 outlines MHG's main strengths, weaknesses, opportunities and threats, which are both company-specific, industry-wide and macroeconomic factors. Since the two latter has been discussed in the previous chapters, I will only elaborate on the firm-specific factors in this chapter

7.1 STRENGTHS

MHG is the market leader in every region producing salmon except in Canada where MHG is the second largest producer. The industry has, as previously mentioned, entered into a consolidation phase, where MHG is expected to lead due to their strong financial position and superior size. MHG has acquired Morpol in 2013, a leading player in the processing segment, which has significantly increased the VAP segments contribution to accumulated income. The increasing VAP segment achieved by acquiring Morpol can also increase the pricing power of MHG as more of the accumulated income steams from secondary processed products that are more generally enjoying higher margins.

In addition, MHG Chile merged with AquaChile in 2014 and MHG now owns 42.8% of the combined entity, with an option to increase shareholding to at least 55% (Marine Harvest ASA, 2015). The merged entity is the second largest salmon farming company in the world by volume after MHG itself. Going forward the increasing consolidations could reduce MHG's cost as a result of increasing economies of scale. In addition, increasing consolidation can solve the problem with access to additional licenses in existing corporations. Further, the accumulated volume in Norway is reaching towards the MAB, which will be discussed in chapter 11. Consolidations can therefore provide MHG with additional volumes in Norway, presumed they do not exceed the limit of 25% share of accumulated Norwegian MAB and the 6% biannual limit on volume growth.

MHG changed their strategic course by deciding to become a fully integrated producer of seafood protein in 2012 (Marine Harvest ASA, 2013) and has in subsequent years entered into the salmonid feed production industry. Including in-house feed production in their value chain is likely to give them a competitive advantage in the salmon farming industry as their COGS potentially could be lower than competitors using external suppliers that operate with "cost plus" contracts. MHG is the only salmon farming company who is somewhat self-sufficient in the feed segment and it is reasonable to believe that the advantage will persist as the investment required for developing the feed plant in Bjugn was NOK 700 million (Marine Harvest ASA, 2014). MHG is significantly larger in size and financial strength than its peers and Lerøy, the next largest salmon farming company in Norway, is only 38% of MHG size measured by volume. Assuming that volume determines the size of the feed plant required to cover in-house needs, Lerøy is faced with an investment of NOK 260M developing their own feed plant. This is a substantial investment and may be harder for Lerøy and other peers to justify as they do not achieve the same degree of economies of scale because of lower volumes than MHG. It is reasonable to believe that MHG will increase their pricing power as ingredients used in feed are fresh goods and their price is therefore highly dependent on demand. At the same time MHG can enter into futures contracts on commodities used in feed to hedge the price risk.

The biological assets are vulnerable and especially in their early stages of life, where the highest mortality rate occurs in the first 1-2 months after smolt is transferred to seawater (Marine Harvest ASA, 2014). Having the process of spawning and smolt integrated in their operations will therefore mitigate a large share of the risks associated with mortality in biological assets. At the same time, the introduction of in-house feed production has made MHG more vertically integrated and their value chain now almost comprise all process between eggs and secondary processed products presented in figure 19.

	Eggs	Spawning	Smolt	Farming	Fish Feed	Processing		Sales	Distribution
						Primary	Secondary		
MHG	○	●	●	●	◑	●	●	●	●

Figure 19: MHG has a highly integrated value chain

MHG is also diversified in their operations, with presence in all regions suitable for salmon farming except New Zealand. A diversified production limits the biological risk as this restricts the magnitude of losses caused by force majeure events, weather and diseases.

7.2 WEAKNESSES

MHG was self-sufficient in fertile egg supply until they in 2012 decided to sell off their 31.3% share in AquaGen, a supplier of fertilized salmon eggs (Marine Harvest ASA, 2012). This has made MHG dependent on external producers for fertilized eggs, but they are however seeking to again produce their own eggs in the future to ensure the best selection of generic properties. Since the production of fish eggs is easy to scale, an in-house egg-production will provide MHG with more flexibility in adjusting the volume to prices and demand than being dependent on an intermediary.

7.3 OPPORTUNITIES

MHG is expected to lead the consolidation trend in the salmon farming industry. In 2014 MHG acquired region XI in Chile and merged with the Chilean salmon farming firm AquaChile (Marine Harvest ASA, 2015). The two actions are likely to strengthen MHG's competitive position in Chile and increase their output in the region when the fish health issues have been resolved. In addition, consolidations can solve the problem with obtaining additional licenses, especially in Norway, elaborated on in section 6.1.

Further, if MHG decides to develop additional feed plants in other regions, their operational costs is likely to decrease even further, hence enhancing their completive advantage in other regions. Being self-sufficient in feed supply also allows MHG to optimize the feed ingredients used in production. The share of fish meal and fish oil, which has had rapidly increasing prices historically, still comprise 20-25% of total ingredients as shown in figure 10 in section 6.2. Reducing the amount of ingredients from fish can therefore reduce the operational cost, as feed cost comprise ~50% of total operational cost (ibid).

MHG also has the opportunity to expand their operations by introducing other fish species in their product range. To estimate whether the product is strategically wise to implement it is beneficial to assess different fish species by two dimensions; the amount of cost and capability sharing and the amount of customer sharing. Other breeding fish is assumed to have relatively high cost and capability sharing as salmon, as the PP&E required for breeding and smolt production is similar. However, harvest of wild fish is assumed to have some degree of cost and capability sharing as primary processing plants and distribution channels already exist. However, the production of wild fish will most likely require a large capital expenditure in fishing boats. I therefore find it unlikely that expanding in the wild fish segment will be most profitable. Further, the fish is assumed to have large customer sharing with salmon because the fish vastly used in the secondary processed segment and it has the same nutritional value as salmon. Cod, trout and arctic charr are both apparent in the secondary processed market and can all be produced by breeding. I will argue that the trout is the fish specie with the highest customer sharing to salmon, as the nutritional value is similar and that smoked salmon and smoked trout comprise the majority of secondary processed products of the fish species. These fish species could therefore also potentially enjoy cost sharing in the VAP segment, and I argue that producing trout is the choice with the most cost synergies and hence the most obvious. However, producing trout can cannibalize existing salmon products, which may favor cod.

MHG holds all the necessary PP&E to expand in the luxury VAP segment, and I find it likely that a preferred first-step for expansion is into producing luxury processed goods such as high quality sashimi. This good has relatively low customer sharing with current products as most of the income steams from primary processed goods, even though the customer sharing between smoked salmon and sashimi is likely to be higher. Figure 20 exhibits the market definition matrix for different fish products and their associated cost and customer sharing with salmon.

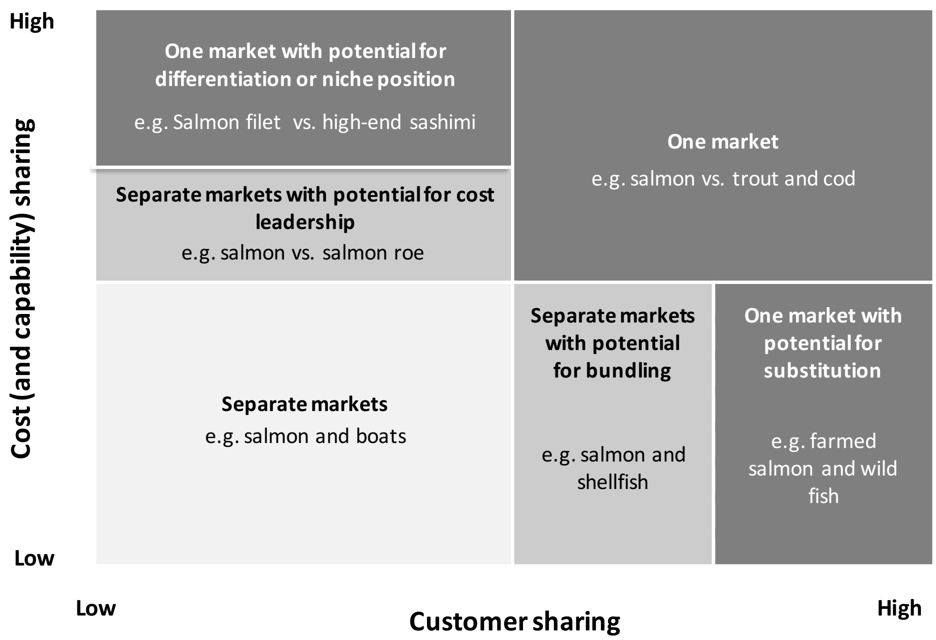

Figure 20: Market definition matrix

7.4 THREATS

Small and mid-sized salmon farming companies was prioritized when licenses was distributed in Norway in 2014. Since MHG is the largest player in almost every region producing salmon, they might face problems of getting additional licenses because of competitive concerns. MHG share of total volume produced in Norway in 2014 was ~22.3%, and is therefore approaching the maximum of 25% of the total outstanding biomass. However, I find it likely that the 25% limit will be raised or removed as has been discussed by the government and I therefore base future harvest volumes on the suggested maximum biannual growth of 6%.

The firm analysis finds that MHG holds a strong position in its peer group - a position that is likely to be enhanced considering the predicted consolidation trend in the future. The Norwegian laws also favor growth in the sector and it is discussed whether the stringent regulations regarding the maximum limit of total biomass should be removed, which can drive further consolidations in Norway for MHG. At the same time MHG is becoming increasingly vertically integrated in their value chain and has ambitions to become entirely integrated in the future. Expanding the feed production initiative to other regions is likely to decrease the feed cost as MHG avoids the “cost plus” contracts of salmonid feed suppliers.

MHG is also seeking to become self-sufficient in egg supply, which can be critical in reducing the mortality rates as the biological risk is the largest in the salmons’ early stages of life. Fertilized eggs are currently supplied by external suppliers and therefore represents a weakness in MHG’s operations. In addition to opportunities regarding further consolidations and vertical integration, MHG has the necessary scope and equipment to expand into other fish specie markets or increased presence in VAP segment supplying the luxury market of salmon. However, their potential scope is currently limited by the stringent regulations, but it is suggested that the regulations will be eased in the future.

8. HISTORICAL ACCOUNTING FIGURES

At this stage I have assessed the strategy and concluded that MHG is a strong company endowed to defend its position as market leader in an industry with healthy outlooks. I have also determined that the WACC approach is the appropriate valuation method. In the following chapter I will present the historical accounting figures of MHG to form the basis for normalization and earnings quality analysis conducted in chapter 9.

8.1 TIME PERIOD OF ANALYSIS

The time period used for the historical figures is 7 years, which is consistent with Damodaran's recommendations. The reason for the choice of time period is that MHG was established in 2006 after being acquired by Pan Fish, and the period between 2008 and 2014 is therefore believed to reflect normal operations.

8.2 HISTORICAL PERFORMANCE

Table 4 is MHG's historical income statement, which show a relatively volatile sales growth, however the gross profit margin has been relatively stable. The EBITDA margin has been more volatile than the gross profit margin, which is due to the variations in fair value adjustments in biological assets and harvested fish.

Income statement	2008A	2009A	2010A	2011A	2012A	2013A	2014A
Revenues	13 125	14 620	15 281	15 757	15 420	19 177	25 300
Growth		*11.4 %*	*4.5 %*	*3.1 %*	*-2.1 %*	*24.4 %*	*31.9 %*
Other income	0	0	0	375	43	22	231
Revenue and other income	13 125	14 620	15 281	16 133	15 464	19 199	25 531
Growth		*11.4 %*	*4.5 %*	*5.6 %*	*-4.1 %*	*24.2 %*	*33.0 %*
Cost of Materials	8 505	8 797	7 781	8 399	9 667	9 999	13 677
COGS / Sales	*65 %*	*60 %*	*51 %*	*53 %*	*63 %*	*52 %*	*54 %*
Gross Profit	**4 620**	**5 823**	**7 501**	**7 734**	**5 797**	**9 201**	**11 854**
Gross profit margin	*35.2 %*	*39.8 %*	*49.1 %*	*49.1 %*	*37.6 %*	*48.0 %*	*46,9 %*
Fair value uplift on harvested fish	0	0	0	3 251	1 576	4 324	5 518
Fair value adjustment on biological assets	279	-301	-1 092	-1 737	-1 926	-6 118	-5 008
Salary and personnel expenses	2 140	2 167	2 203	2 213	2 419	2 674	3 321
Other operating expenses	1 394	1 448	1 454	2 063	2 164	2 582	3 350
EBITDA	**808**	**2 509**	**4 936**	**1 944**	**1 565**	**5 739**	**4 672**
EBITDA margin	*6 %*	*17 %*	*32 %*	*12 %*	*10 %*	*30 %*	*18 %*
Depreciation and amortization	685	688	653	667	677	763	966
Provision for onerous contracts	0	0	14	6	6	125	-24
Restructuring costs	241	170	4	22	1	273	53
Other non-operating items		0	0	0	0	74	168
Income/Loss from associated companies	-6	-70	-202	9	-88	-222	-150
Impairment loss	1 579	373	5	67	0	65	24
EBIT	**-1 692**	**1 348**	**4 461**	**1 174**	**969**	**4 662**	**3 634**

Table 4: Historical income statement (Marine Harvest ASA, Annual Report 2009-2014)

Table 5 offers an overview of MHG's assets, which shows that licenses and PPE comprise most of MHG's non-current assets. The reason for the drop in the value of both licenses and PP&E in 2009 is due to the downsizing of operations in Chile as a result of the Panaceas disease in the region (Marine Harvest ASA, 2015). The biological assets comprise the larges current asset, which is the value of the fish in the stage between being smolt and harvested-ready fish. The biological assets have increased sharply the past two years, which will lead to higher volume output in the following 24-month period, all else equal. The asset varies with the amount of fish being produced, length of production cycle, and diseases and escapes.

Non-Current Assets	2008	2009	2010	2011	2012	2013	2014
Licenses	5 767	5 410	5 443	5 578	5 435	6 036	6 514
Goodwill	2 240	2 143	2 112	2 146	2 116	2 375	2 417
Deferred tax assets	2 240	55	119	160	74	179	147
Other intangible assets	160	136	133	123	114	188	167
Total Intangible assets	**10 406**	**7 743**	**7 806**	**8 007**	**7 739**	**8 778**	**9 245**
Net Property, plant and equipment	4 244	3 518	3 885	4 168	4 112	6 677	7 235
Investment in associated companies	514	520	679	624	647	900	1 022
Other shares	79	119	124	92	1 009	132	166
Other non-current assets		-63	3	26	73	9	15
Total non-current assets	**15 242**	**11 837**	**12 497**	**12 917**	**13 580**	**16 497**	**17 683**
Current Assets	2008	2009	2010	2011	2012	2013	2014
Inventory	1 075	743	776	783	820	1 751	2 401
Biological assets	5 621	5 351	7 278	6 285	6 104	9 537	9 914
Net Trade receivables	1 903	1 672	1 845	1 915	1 782	3 191	3 360
Other receivables	532	552	815	610	593	1 097	1 111
Cash	373	172	319	279	335	606	1 195
Total Current Assets	**9 504**	**8 490**	**11 033**	**9 872**	**9 634**	**16 182**	**17 981**
Assets held for sale				0	0	1 059	19
TOTAL ASSETS	**24 746**	**20 327**	**23 529**	**22 789**	**23 214**	**33 738**	**35 682**

Table 5: Historical balance sheet (Marine Harvest ASA, Annual Report 2009-2014)

The table 6 gives an overview of MHG's liabilities and show that non-current interest bearing debt comprise the largest singe liability on MHG's balance sheet. The non-current interest bearing debt consists of a revolving credit facility with a EUR 555 million limit, a NOK 1,250 million bond with maturity in 2018 and to convertible bonds of EUR 350 million and EUR 375 million with maturity in May 2018 and June 2017 respectively (Marine Harvest ASA, 2015).

Current Liabilities	2008	2009	2010	2011	2012	2013	2014
Current tax liabilities	70	51	50	87	26	253	525
Current interest-bearing debt	1 366	130	430	157	378	687	7
Trade payables	1 729	1 340	1 450	1 482	1 453	2 233	2 039
Other current liabilities	2 350	1 049	1 112	1 180	1 475	1 968	3 112
Total Current Liabilities	**5 515**	**2 570**	**3 042**	**2 906**	**3 332**	**5 140**	**5 684**
Liabilities held for sale						191	0
Net Current assets							
Total assets less current liabilities	19 231	17 757	20 488	19 883	19 882	28 598	29 998
Non-Current Liabilities	2008	2009	2010	2011	2012	2013	2014
Non-current interest-bearing debt	733	5 117	5 107	6 589	5 339	7 710	10 669
Deferred Tax Liabilities	6 748	1 143	2 238	2 352	2 544	3 365	3 569
Other non-current liabilities	117	100	571	99	415	976	2 334
Total Non-Current Liabilities	7 597	6 359	7 916	9 041	8 297	12 051	16 572
Total Liabilities	**13 112**	**8 929**	**10 958**	**11 946**	**11 629**	**17 381**	**22 256**

Table 6: Historical levels of liabilities (Marine Harvest ASA, Annual Report 2009-2014)

Share capital and retained earnings comprise most of MHG's total equity exhibited in table 7. The share capital has been relatively stable throughout the historical period, while levels of retained earnings has been relatively volatile.

Equity	2008	2009	2010	2011	2012	2013	2014
Share capital	2 609	2 681	2 681	2 686	2 811	3 078	3 078
Retained Earnings	23	3 023	18	55	779	2 955	9 268
Cash flow hedge reserve	-830	117	275	172	89	58	24
Share based payment	8 693	5 918				8	31
Foreign currency translation reserve	1	-762	-403	-436	-782	-151	661
Other equity	-916	439	9 929	8 290	8 722	10 370	1 641
Non-controlling interest	45	45	71	76	69	28	16
Total Equity	**9 625**	**11 461**	**12 571**	**10 842**	**11 689**	**16 346**	**14 718**

Table 7: Historical levels of equity (Marine Harvest ASA, Annual Report 2009-2014)

In the following chapter I will conduct an earnings quality analysis and normalization of post in the income statement and balance sheet to retrieve the cost and assets which is directly related to MHG's operations in order to conduct a valuation that reflect the core operations of the company.

9. NORMALIZATION AND EARNINGS QUALITY ANALYSIS

This section presents normalization of figures in the income statement and balance sheet in order to determine the recurrent operational cost levels and balance sheet sizes, to be able to conduct a valuation of MHG's core operations.

9.1 VALUE ADJUSTMENTS BIOLOGICAL ASSETS

The biological assets are measured at their fair value less their cost to sell, with exceptions where the fair value can not accurately be measured. The market for live fish do not exist, therefore the fair value is hypothetical and is calculated based on adjusted market prices for harvested fish less harvesting cost and freight cost (Marine Harvest ASA, 2015).

The biological assets consist of salmon in different stages in production and is calculated differently depending on each stage. Salmons at or above harvest size are calculated with their full estimated fair value. The biological asset value of salmons with weight between 1 and 4 kg, calculated as their relative share of future value. Last, the smolt and broodstock with weight below 1 kg has a biological asset value equal to their accumulated cost (ibid).

The fair value is based on the expected market price, which is calculated based on the price achieved in the last months and recent contracts entered into (ibid). Nevertheless, the historical prices and contract prices do not necessarily imply anything about future prices and hence the operational income MHG will achieve. Therefore, the fair value adjustments on biological assets and harvested fish is set equal to 0 in the forecast period.

To get an overview whether the capital is tied in biological assets and has been stable, it is beneficial to compute the historic biological asset-to-sales ratio, shown in figure 21 below. The variations in biological assets can be caused by adjustments to the expected demand, mortality and escapes and revaluation and devaluation of the quality. The quality of salmon is determined by sea temperatures that heavily influence the pace of growth and can cause diseases. The temperatures vary by time of year and across regions (ibid).

The relatively low ratio in 2009, is because of the Panaceas disease that broke out in Chile in 2008 and the relatively high levels in 2013 because of the income from secondary processed products from Morpol (Marine Harvest ASA, 2015).

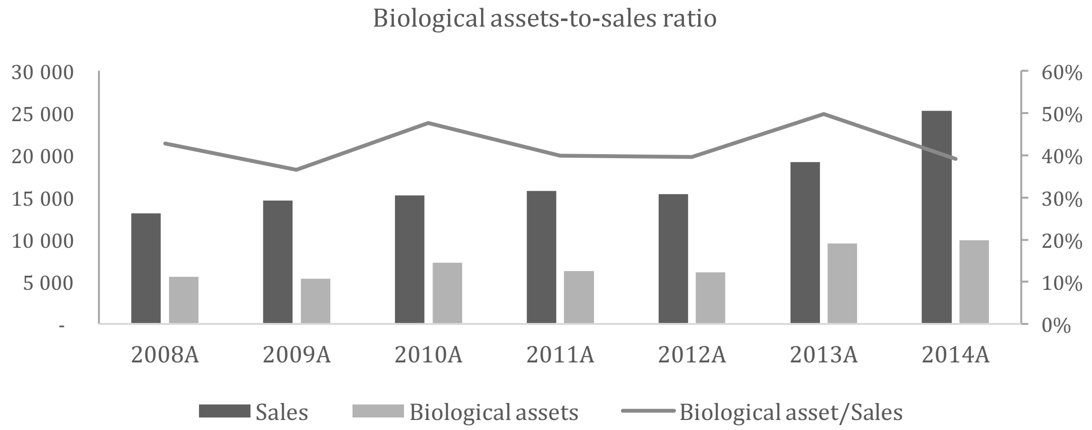

Figure 21: Days biological-to-sales ratio outstanding has varied around 40-50%.

9.2 RESTRUCTURING

The restructuring costs in MHG has varied considerably from year-to-year, and differ in magnitude from NOK 273 million in 2013, NOK 241 million and NOK 170 million to NOK 1 million in 2012. The especially high restructuring cost in 2013 was due to the approval of the restructuring plan to reduce the number of processing plants within VAP Europe from 13 to 8, which was implemented the same year as a result of sustained losses (Marine Harvest ASA, 2014). Further, the high restructuring cost in 2008/2009 was a result of the extensiveness of Pancreas disease in Chile which required downscaling of the operation and therefore resulted in high restructuring costs (Marine Harvest ASA, 2010).

It is important to decide whether the high restructuring cost discussed above can be considered as extraordinary events to be able to predict restructuring costs in the forecasting period. Combating salmon lice is still a huge problem which requires significant amounts of funds for each year, and it is therefore reasonable to expect the events in 2008/2009 to reoccur. At the same time, there are expected to more consolidations in the salmon farming industry in the future, which may raise the need for restructuring. Consequently, the exceptionally high restructuring costs is recognized as ordinary and is based on an average for the forecasting period.

9.3 SG&A

Figure 22 below shows that the historical SG&A costs has been relatively stable to sales, varying between 10% and 13%. The higher levels in recent years is partly due to the consolidation with Morpol and partly due to higher maintenance, rents, leases, third party services and other expenses. The increased maintenance cost and rent & leases cost is attributable to increased seawater activity in farming and the remaining were mainly driven by the consolidation of Morpol (Marine Harvest ASA, 2015).

Since the industry is characterized by continual consolidations, the forecast period is based on an average of the historical figures to reflect the increased operational expenses associated with a consolidation discussed above.

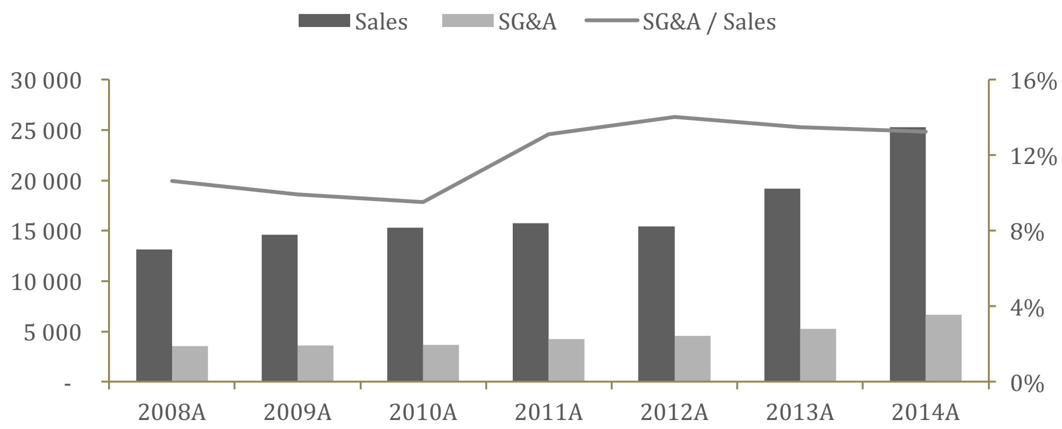

Figure 22: The SG&A-to-sales ratio has been relatively stable varying between 10-13%.

Figure 23 below show that the salary-to-sales ratio is also relatively stable varying between 13-16%. The increase in wages is both due to increased number of employees and higher gross wages. The number of employees has grown from 6,148 in 2010, after significantly staff reductions in 2008/2009 due to the Panaceas disease in Chile, to 11,715 in 2014. The salary is expected to grow with sales in the future and is based on the average of the historical period (Marine Harvest ASA, 2015).

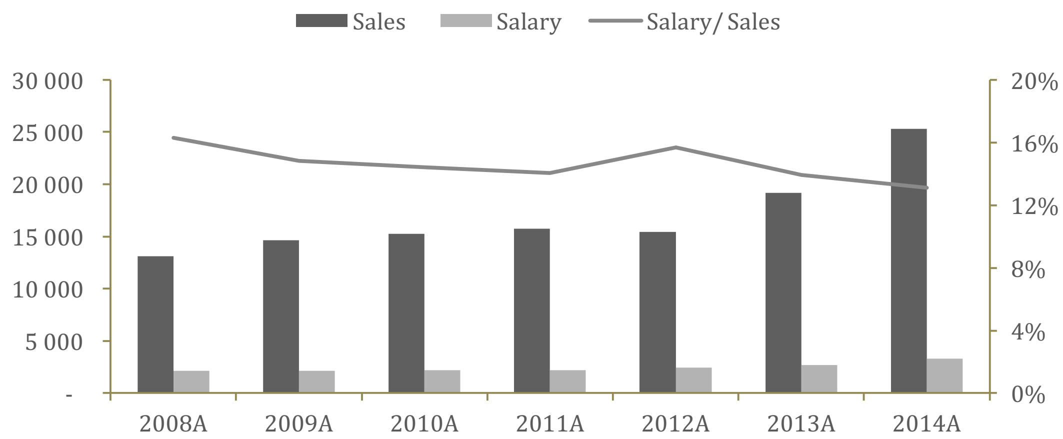

Figure 23: The salary to sales ratio has been relative stable historically, varying between 13-16%

I have argued that there are scale advantages in the salmon farming industry. MHG is expected to drive the consolidation trend that will continue also in the future, and will consequently gain scale. Cost synergies are hard to quantify without knowing the details about the companies that will be acquired, so I have chosen to take a conservative approach and assume that these synergies will be limited. I have forecasted that the EBITDA margin will remain at the current level, with only a slight increase towards the end of the forecast period.

9.4 Other Adjustments in the Income Statement

Other income mainly consists of management fees charges to MHG's business units to compensate the mangers for their time and expertise and the income is therefore internal income (Marine Harvest ASA, 2015). Consequently, other income is not representative for MHG's operational income and should therefore be entirely removed.

Provisions for onerous contracts appear when the cost of fulfilling a contract providing farmed salmon exceed the compensation from the buyer. This situation can occur both is the harvested volumes are low, causing delay for delivery and when market prices are higher than the contract price (Marine Harvest ASA, 2015). The post has varied considerable since 2008 to 2014 and is therefore estimated to comprise an average of the historical period.

Other non-operating items consist of accrual for contingent liabilities and provisions and is therefore not considered as operational cost and hence set equal to zero in the forecasting period. In addition, the cost has been zero every year except the two last years and can therefore be recognized as transitory.

Income and loss from associated companies is income from companies where MHG owns a considerable share of the company (between 20-50%) (ibid). This post has in the previous year been varying between being positive and negative. Without further analyses on each individual company, I will not make the assumption that their condition is going to improve nor worsen going forward, and I set it to zero as a fair middle point.

Last, impairment losses are resulting from a reduction in the net carrying value of an asset, which is the acquisition cost minus the accumulated depreciation. If an asset is sold because a firm no longer expects to benefit from the asset, and the price obtained for the asset is less than its net carrying value an impairment loss occurs. Since the price obtained for assets sold in the future can not be predicted, the post is set to zero, hence the assets are presumed to be sold at their net carrying value in the future.

9.5 CAPEX

To maintain the current operation capacity, reinvestments has to be made to replace depreciated PP&E. The capex in a specific year therefore has to exceed the depreciation cost in the same year for a company to grow. MHG has had capital expenditures exceeding depreciation every year since 2008 except in 2009 where the capex/depreciation ratio is below maintenance capex levels, which is displayed in figure 24 below. The almost constant capex-to-depreciation ratio is reflected in MHG's historical growth rates in sales which has been positive every year except in 2012.

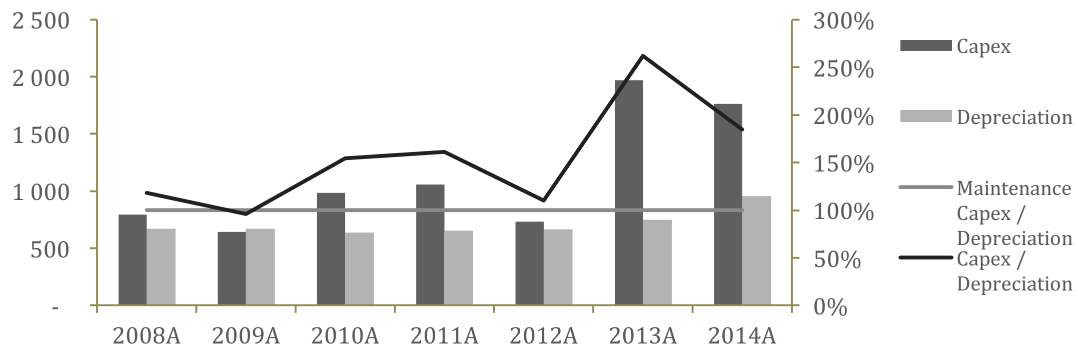

Figure 24: Capex has been higher than maintenance capex all years in the historical period except 2009, which indicates that the firm is growing its PP&E

The capital expenditures have been considerable higher in 2013 and 2014, which is due to the development of the feed producing plant. The capex-to sales ratio is outlined in the figure 25 below, where the ratio is relatively stable in all years except 2013. Since MHG has ambitions of being entirely self-sufficient of feed and fertilized eggs in all regions in the future, the future capital expenditures should reflect the capital expenditures related to the feed plant in 2013 and 2014. The capital expenditures are therefore based on 2014 figures, with a ratio slightly above average. The reason for using 2014 levels is that the main production is based in Norway and the capex made for feed production in Norway will therefore be higher than in other regions. In addition, it is reasonable to assume that the cost of developing a feed plant in Norway is relatively more expensive than developing in Chile, region with second largest harvested volumes, which enforces the argument above. At the same time, the capital expenditure estimated for next year is in consensus of analysts estimates of a capital expenditure of NOK ~900 million.

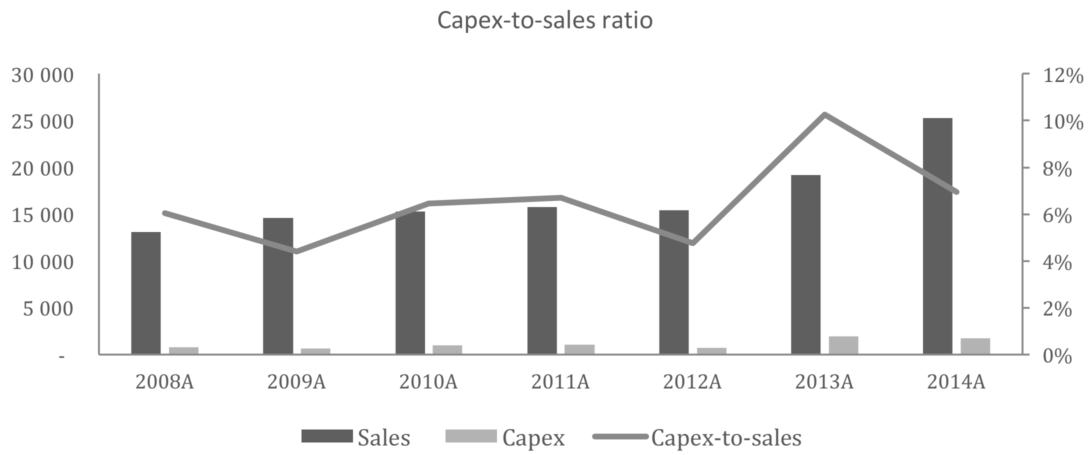

Figure 25: Capex-to-sales ratio has been relatively stable in the period, with somewhat higher levels in recent years

A relatively large fraction of plant and machinery was sold in 2011, which is illustrated by the peak in the sale of PPE to sales ratio in the figure 26 below. MHG's property pant and equipment have a useful life of 3-6 years and it is therefore reasonable to assume that the sale of assets recur frequently and that the 2011 levels are higher than normal. The sale of fixed asset is therefore based on last year levels (Marine Harvest ASA, 2015).

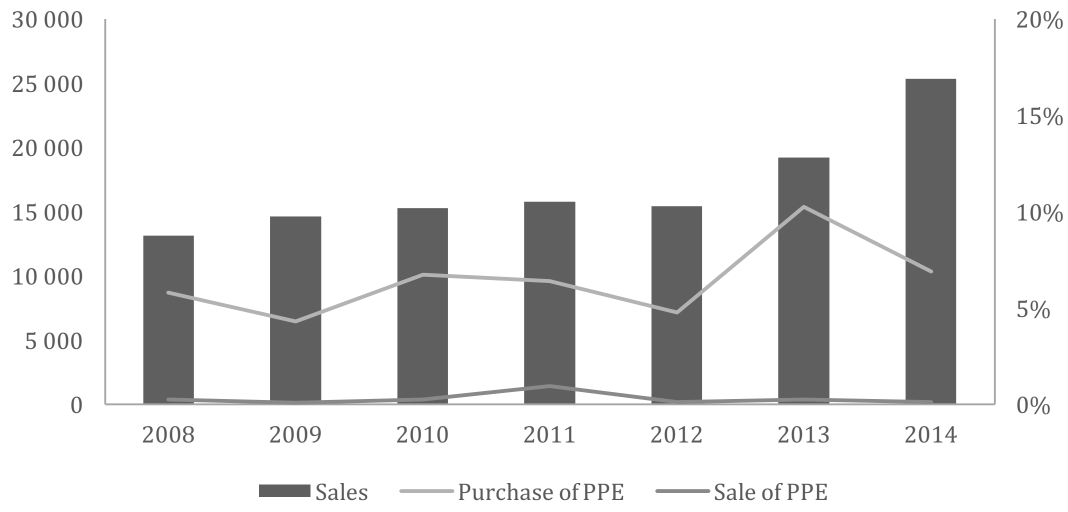

Figure 26: The purchase of PPE has varied in the historical period and has been especially high in the last couple of years

9.6 WORKING CAPITAL

Net working capital (NWC) is capital that is tied in operations, and is measured as seen in equation 8:

$$NWC = Current\ assets - current\ liabilities$$

Equation 8: Basic net working capital equation

However, net working capital is a part of the operational capital to the firm, hence only operational assets and liabilities should be included in the calculation. The NWC can therefore be written as equation 9 (Berk & DeMarzo, 2014):

$$NWC = Inventory + Accounts\ recievable\ + Cash - Accounts\ payable$$

Equation 9: Net working capital

Marine Harvest has biological assets which comprises a large share of their working capital, as production cycles for salmon varies around 150 days. Figure 27 shows an overview of the average amount of days for inventory, receivable and payables outstanding, combined also known as the cash conversion cycle.

MHG's inventory mainly comprise of feed, goods in progress, packaging materials and finished goods (Marine Harvest ASA, 2015). The average days of storage for inventory has been relatively stable around 20 days historically, but higher in recent years and in 2008 during the financial crisis. The reason for the increase is a relatively high increase in storage of inventory relative to sales (ibid).

Accounts receivable show the same trend with relative stable levels around 45 days, except in 2008 and the two last years where the average amount of days with outstanding receivables are considerably higher. The likely reason for this is increased payment deadlines to customers. Nevertheless, the bad debt to accounts receivables ratio has been stable around 1% between 2008 and 2014. This is an indication the the company expect 1% of accounts receivables to default each year. The constant ratio of 1% is a good sign that MHG has clients with stable economic conditions and that MHG has been persistent in its assessment of the customer base's ability to pay.

Days payable outstanding shows the same trend as days of inventory outstanding and days of receivables outstanding. It is worth noticing that the days of payables outstanding significantly exceeds the days of inventory and receivables outstanding. This reduces the time period that capital is tied up in operations, given by the cash conversion cycle (CCC) (Berk & DeMarzo, 2014):

$$CCC = Days\ inventory\ outstanding + \\ Days\ receivables\ outstanding - Days\ payables\ outstanding$$

Equation 10: Cash conversion cycle calculation

Still MHG has considerable amounts of capital tied up in their biological assets and their cash conversion cycle is therefore considered to be long.

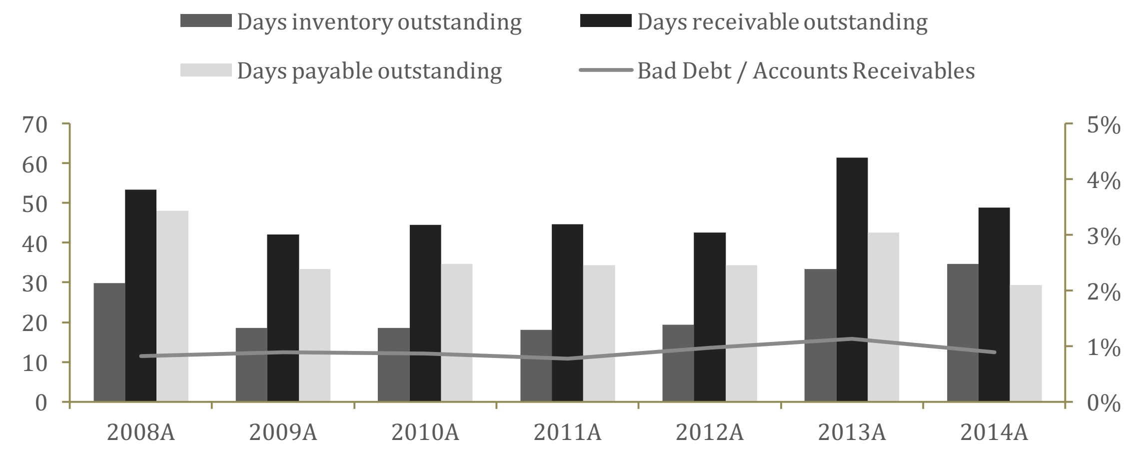

Figure 27: The cash conversion cycle has been relatively stable historically.

Last, cash included in working capital is cash that is related to operations. Table 8 exhibit the procedure to retrieve the cash value related to MHG's operations. First the cash-to-sales ratio is calculated for MHG and compared to the lower quartile and upper quartile of the cash-to-sales ratio of its peers. Further, it is assumed that the cash actually required by operations is represented by the lower quartile. The results are displayed as required liquid funds, which deviate from MHG's cash-to-sales ratio every year except 2010 were MHG represent the lower quartile among its peers. The required funds for operations is then calculated by multiplying sales with the lower-quartile cash-to sales ratio. The excess cash is the difference between MHG's cash balance and the required funds for operations.

	Estimating required liquidity for operations				
All figures in billions	2010	2011	2012	2013	2014
Liquid funds					
Cash	319	279	335	606	1 195
Assets held for sale	0	0	0	1 059	19
Short term liquids	319	279	335	1 665	1 214
Sales	15 281	15 757	15 420	19 177	25 300
Liquid funds to sales MHG	2.1 %	1.8 %	2.2 %	8.7 %	4.8 %
Lower quartile ratios	2.1 %	1.3 %	1.3 %	6.8 %	4.7 %
Median ratios	3.1 %	1.8 %	2.2 %	7.3 %	5.4 %
Upper quartile ratios	5.9 %	7.5 %	11.7 %	8.1 %	10.8 %
Required liquid funds	2.1 %	1.3 %	1.3 %	6.8 %	4.7 %
Liquid funds	319	279	335	1 665	1 214
Required liquid funds for operations	319	203	208	1 308	1 195
Excess liquid funds (Financial Assets)	0	76	127	358	19

Table 8: Required liquid funds for operations is estimated to be equal to the average of the lowest quartile of liquid funds in the industry.

9.7 CAPITALIZATION OF OPERATING LEASES

A company can either own or lease its PP&E. Even if the company has chosen to lease, the PP&E will be considered to be economically beneficial the leaseholder as is likely essential for the operations. Therefore. I will use this approach to be able to recognize the value of leased items on the balance sheet and present an adjusted balance sheet that more accurately reflects MHG's operational assets.

In the notes of the 2014 annual report, MHG's operating lease commitments are presented with maturities from less than one year to more than 5 years (Marine Harvest ASA, 2015). To calculate the appropriate length of the operating leases of more than five years, I used the average lease commitment from each of the previous years as an approximation. A fair value of the leased asset would be the PV of the operating lease commitment discounted with MHG's cost of debt. For FY'14 this adds NOK 1.54B to MHG's PP&E, which is an addition of 21.2% to the existing net PP&E – a quite significant adjustment.

Operating Leases	2008	2009	2010	2011	2012	2013	2014
Within one year	30	30	28	410	308	402	605
1-5 years	77	61	51	507	444	599	745
More than five years	69	60	69	72	82	57	58
Cost of debt	2.89%	2.89%	2.89%	2.89%	2.89%	2.89%	2.89%
Average payments in year 1-5	19	15	13	127	111	150	186
Estimated length of op. Leases (years)	9	9	10	6	6	5	5
PV of operating lease commitments	616	552	683	1 217	1 123	1 206	1 537

Table 9: Operating leases contribute a considerable amount to the balance sheet.

9.8 REFORMULATED BALANCE SHEET

All figures in billions	Operating assets				
Line items	2010	2011	2012	2013	2014
Trade receivable	1 845	1 915	1 782	3 191	3 360
Cash needed for operations*	319	203	208	1 308	1 195
Inventories	776	783	820	1 751	2 401
Biological assets	7 278	6 285	6 104	9 537	9 914
Other current assets	815	610	593	1 097	1 111
Net PP&E	3 885	4 168	4 112	6 677	7 235
Licenses	5 443	5 578	5 435	6 036	6 514
Intangible Assets + Goodwill	2 245	2 269	2 230	2 563	2 583
Deferred tax asset	119	160	74	179	147
Other assets	3	26	73	9	15
Capitalization of operating leases	683	1 217	1 123	1 206	1 537
Total operating assets	23 409	23 213	22 553	33 553	36 012

Operating Liabilities					
Trade payables	1 450	1 482	1 453	2 233	2 039
Current tax liabilities	50	87	26	253	525
Other current liabilities-Dividends	1 112	1 180	1 475	1 968	3 112
Deferred tax liability	2 238	2 352	2 544	3 365	3 569
Other liabilities	571	99	415	976	2 334
Total operating liabilities	5 421	5 200	5 913	8 794	11 580
Net operating assets	17 988	18 013	16 641	24 759	24 432
Net operating assets	17 988	18 013	16 641	24 759	24 432

Table 10: Operational assets and liabilities

Financial assets Line items	2010	2011	2012	2013	2014
Excess liquid funds*	0	76	127	358	19
Investments in associated companies	679	624	647	900	1 022
Other shares	124	92	1 009	132	166
Total financial assets	803	793	1 783	1 390	1 207
					Financial debt
Current position of LT&ST Debt	430	157	378	687	7
Long term debt	5 107	6 589	5 339	7 710	10 669
Liabilities held for sale	0	0	0	190,5	0
Total financial debt	5 537	6 746	5 716	8 587	10 676
Net financial debt	4 734	5 954	3 933	7 197	9 469
(+) Equity	12 571	10 842	11 689	16 346	14 718
(+) Equity increase from capitalization	683	1 217	1 123	1 206	1 537
Net capital	17 304	16 796	15 622	23 543	24 187

Table 11: Financial assets and liabilities

Table 10 and 11 gives an overview of the reformulated balance sheet, where MHG's assets and liabilities are divided into operational and financial character based on the discussion above. The reformulated balance sheet provides a more accurate image of the assets driving the core operational activities, hence the enterprise value of the company. It will also allow to calculate a more precise return on asset (ROA) that is applicable to the operations of MHG, not disturbed by non-operational items.

10. Driver assumptions

This section addresses estimates for the future harvest volume, salmon price and operational costs, which draws on the strategic analysis. The results will ultimately make up the future gross profit forecast that will be critical to the estimation of the free cashflow used in the WACC model.

10.1 Operating Revenue

10.1.1 Volume Analysis

The graph in figure 28 gives an overview of the historical harvest volumes (tons) in the different regions. The CAGR in harvested volumes is positive in all regions, except Chile and Canada. The harvested volumes in Norway, Scotland and Ireland and Faroes show significant growth with a CAGR of 7%, 7% and 6% respectively, while the CAGR between 2008 and 2014 has been negative for Chile and Canada (Marine Harvest ASA, 2015).

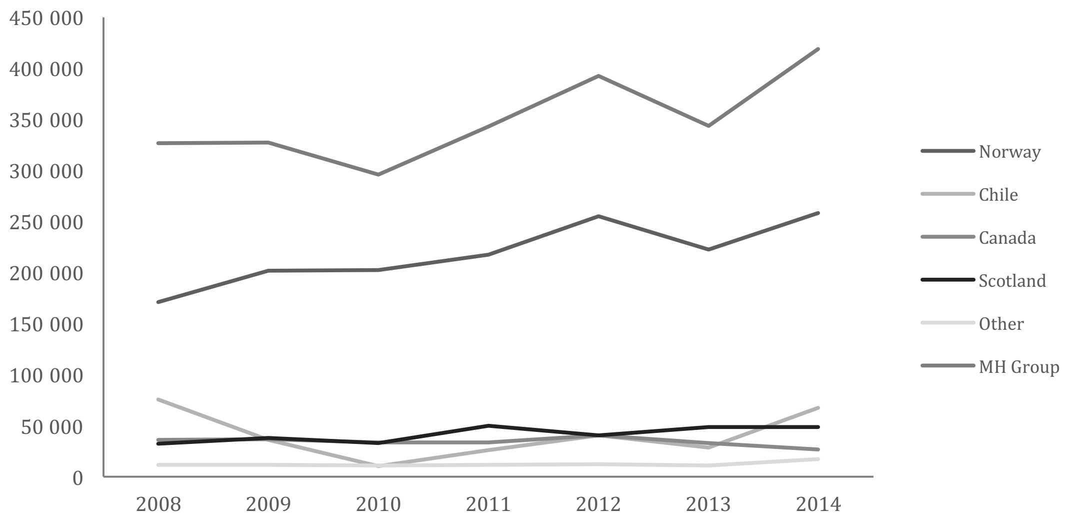

Figure 28: MHG harvested volume has been increasing in most of the regions they are operating historically (ibid)

The reason for the declining harvest volumes in Chile is the Panaceas Disease in 2008/2009, which caused the mortality rates to soar and led to downscaling of operations. Nevertheless, the volumes in Chile has increased in recent years and was in 2014 almost as high as the 2008 level. In addition, it is reasonable to assume that the volumes will increase further as MHG acquired the entire region XI in Chile and merged with AquaChile at the beginning of 2015. MHG will own 42.8% of the new entity, with an option to acquire up to a minimum of 55% after June 15, 2016. Both these events are likely to stabilize and increase the harvest volumes MHG can expect to achieve in Chile (ibid).

The decrease in Canada in the period between 2008 and 2014 is more significant in percentage than the decrease in Chile. The harvested volumes have been relatively stable all years, except in 2014 where the volumes were significantly reduced. The reduction in 2014 was due to reduced smolt stocking in 2012 and the outbreak of the Kudoa decease in 2014, which caused high mortality and hence a decrease in harvest volumes (Marine Harvest ASA, 2015). The harvested volume in Canada will most likely stay low in the immediate future because of the Kudoa disease, which in consensus with analyst estimates (Pareto Securities, 2015).

Overall, MHG has had positive CAGR of 4.2% in harvest volumes across all regions in the period between 2008 and 2014. In addition, the harvest volumes are likely to increase in the immediate years as biological assets has increased in from 2012 through 2014. Still, the growth in biological assets these years are lower than previous years, indication that the harvested volumes will increase, but at a lower growth rate.

The Norwegian salmon farming output will soon reach its regulatory limits (MAB) and this will further enhance the assumption that volume growth will not be as strong as it has been in recent years. This limit is however expected to be raised in the future. The overview in figure 29 shows how the industry in Norway has been climbing towards it's the roof of which outputs that are allowed in Norway.

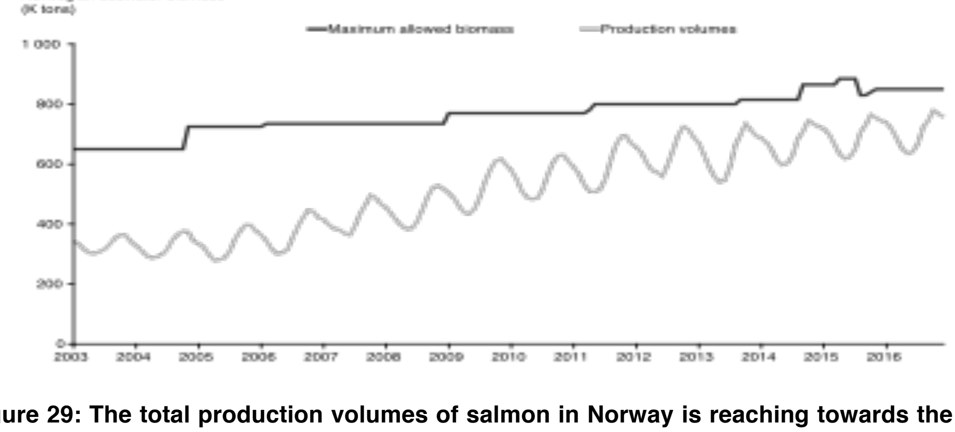

Figure 29: The total production volumes of salmon in Norway is reaching towards the maximum allowed biomass, which make additional volumes dependent on licenses (Marine Harvest ASA, 2015)

Given the slightly lower increase in biological assets in recent years and that the biological roof in Norway is approaching, the future growth rate in harvest volumes is expected to be lower than the double digit growth experienced historically in the most immediate years. This is in line with consensus from analysts. In addition, the volume growth is expected to be more stable than the historically volatile growth rates, partly due to the increased efforts in R&D targeted to combat fish deceases and sea lice.

The regulations do effectively put a cap on industry growth, and will thus also limit the organic growth opportunities of MHG. Therefore, parts of MHG's forecasted growth will come through mergers and acquisitions as a part of the ongoing consolidation trend in the salmon farming sector. As a result, MHG's total volume growth will still be positive, but in the low single digit range. This assumes that the ownership limitations of 25% that was discussed in section 5.1.1.1 will be eased to allow MHG to hold a larger share of the harvest volumes in Norway. The volume growth in 2018 and 2019 is expected to be 3% p.a., taking the proposed change in regulation into account. Further, the relative share of harvest volumes is assumed to stay constant for Canada, Scotland, Ireland and the Faroes. The share of total harvest volumes in Chile is on the other hand estimated to increase after 2018 as a result of increased production capacity due to the merge with AquaChile and the recovery from a period suffering from unfavorable health condition for Chilean salmon.

The estimated harvest volumes for each region is presented in the table 12 below. The volumes are in line with analyst estimates from Pareto and SEB (SEB, 2015) (Pareto Securities, 2015).

	2015	2016	2017	2018	2019
Norway	257	265	276	284	293
Chile	64	64	56	62	68
Canada	40	42	44	46	48
Scotland	52	56	59	61	64
Ireland	10	10	10	11	11
Faroes	2	12	8	9	9
Total	**425**	**449**	**453**	**472**	**493**

Table 12: MHG's volumes are expected to increase in all regions in the future, but at a lower and more stable growth rate than earlier

10.1.2 Price Analysis

The price of salmon is largely dependent on supply and demand. If there is shortage of salmon in the market the price is likely to increase. There are several factors that can contribute to shortage of salmon in the market. Salmon lice and fish diseases increase the mortality rate, which ultimately decrease the harvest volumes. Storms and force majeure events also increase the mortality rate and escapes from fish cages. The licenses schemes may limit the production and could also causing shortage in supply to the market. On the other hand, if there is larger supply than demand the price is likely to decrease as salmon is a fresh good and therefore has to be sold within days after harvesting. Reasons for decreased demand may be because of declining prices on competitive products or trade sanctions, to mention some.

Diseases, lice, storms, force majeure and temperature can also effect the quality of the salmon and hence the price a supplier can expect to achieve. In addition, the globalization of the market for salmon also determines the price to a large extent as buyers can easily change their supplier if the current prices they are facing is not competitive to other global players. Buyers can also enter into forward contracts, which means that the price is set and implies a loss if the market price for salmon exceeds the forward price and a gain if the market price is less than the forward price.

To be able to estimate the future prices for salmon it is appropriate to take market expectation into consideration. Future contracts on salmon gives an indication of the market expectations on the likely development of the salmon price, which is presented in figure 30.

The prices for forward contracts on salmon indicates that the price of salmon is going to increase throughout 2015 until the turn of the year were the forward prices declines. Further, the prices on forward contracts gradually declines with delivery through 2016, before they stabilize at 38.20 NOK/kg with delivery halfway into 2017 (Index Mundi, 2015).

Prices estimated by Arctic is slightly lower than the futures prices and is estimated to be 39.00 NOK/kg for the remaining of 2015, 40.00 NOK/kg for FY/16 and FY/17. SEB expect slightly higher prices than Arctic of 40.20 NOK/kg for the remaining of 2015, 42 NOK/kg for 2016 and 2017.

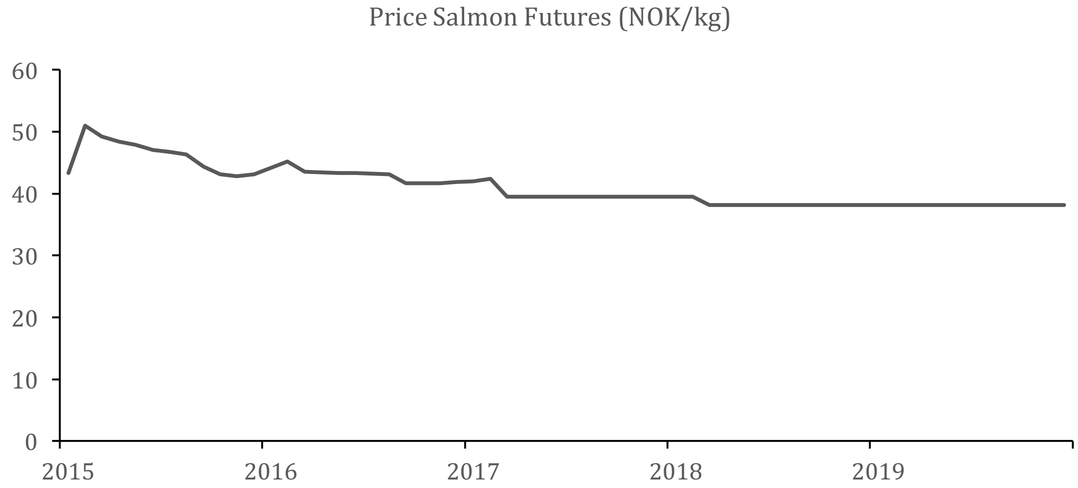

Figure 30: The futures price for salmon can indicates that the price is expected to increase in the near future and then fall slightly (Index Mundi, 2015).

The prices used to estimate future sales are given in the table 13 below which is in between the estimates from Arctic and SEB. The prices beyond 2017 is slightly above the forward price, but is supported by the moderate supply growth, the weaker NOK/EUR and NOK/USD exchange ratios and prospects for a healthy demand trend discussed in the macro and industry analysis.

	2015	2016	2017	2018	2019
NOK/kg	40.97	41.8	42	42	42

Table 13: The estimated price is expected to increase in the two following years before stabilizing at NOK 42 in 2017.

10.2 Operational direct costs

10.2.1 Cost of Goods Sold (COGS)

Figure 31 shows the development in COGS relative to sales. The COGS-to-sales ratio has been relatively volatile in the period between 2008 and 2014. Deviations in the COGS-to-sales ratio mostly arise from changes in input prices for feed, prices for smolt and in costs related to fish health (Marine Harvest ASA, 2015).

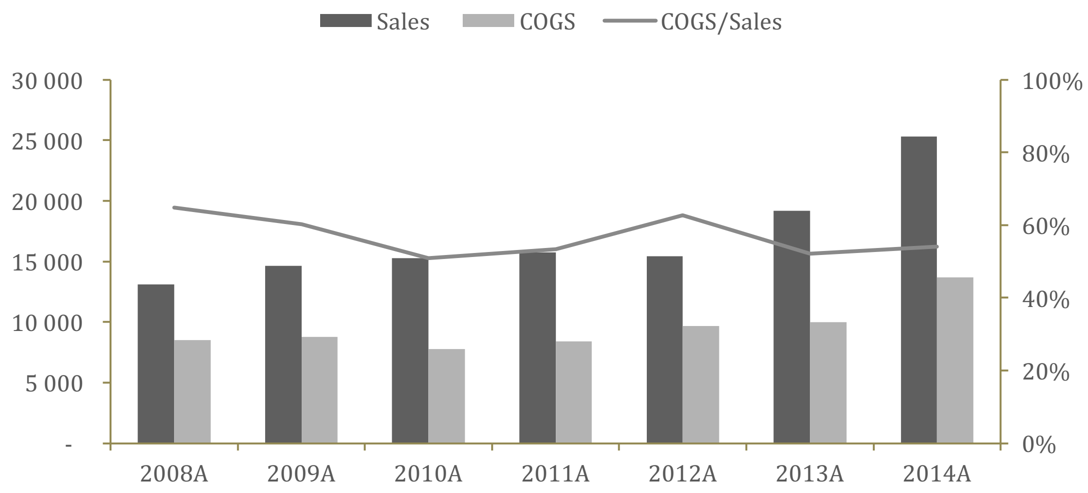

Figure 31: COGS to sales ratio has been relatively stable higher ratios are often caused by mortality and escapes

Accounting principles require the cost of goods sold to be expensed in the same period as the goods are sold, in the mean time the cost of goods are capitalized as biological assets discussed earlier. Therefore, the levels of biological assets give an indication on the amount of COGS in future years. However, salmons with a weight exceeding 1 kg is valued as biological assets at their estimated value, not only their cost of production. Hence, using biological assets to estimate future COGS has to be done with caution. Further, sales are assumed to be a good driver for COGS as both posts are expensed in the same period. The overview in table 2 in the chapter 2.3.6 exhibit the main cost components in the production of salmon and their relative importance. The feed cost is the most significant, comprising ~60% of total COGS on average in the historical period from 2008 to 2014. The feed cost also comprises a large share of total operational cost and differs in the different regions ranging from 48% in Norway to 41% in Chile (Marine Harvest ASA, 2015).

Since the feed cost comprise such a large share of total COGS, it is appropriate to conduct an analysis on the likely future prices of main ingredients in feed production. An overview of the historical price development in feed ingredients was provided in figure 11 in section 6.2. In the following paragraphs I will elaborate on the historical trend and the likely future price development of salmon feed ingredients.

Fish Oil – have steadily increased since 2009. In 2014 the average price of fish oil was approximately USD 2,300 per ton which has dropped in 2015 (Index Mundi, 2015).

Rapeseed Oil – and fish oil has had a correlating price development up until 2011 were the price of rapeseed oil started to decrease. In 2015 the price for rapeseed oil has been relatively volatile and decreased from 2014 levels. Futures contracts on rapeseed oil with maturity in December 2017 is trading 475 USD/ton, which indicates a slightly increase in future prices (Index Mundi, 2015).

Fish Meal – has had an increasing trend in price historically. Also, the price of fish meal has been higher than fish oil on average, however in recent years the prices have been more or less the same. The price has decreased significantly in 2015 from 2014 levels and is trading for 1,650 USD/ton (Index Mundi, 2015).

Soya – and corn have traditionally been a very important ingredient in fish feed. Today the demand from China is increasing faster than the production of soy and more corn is used for energy purposes. At the same time, a generic modified production of soy and corn has been developed, which has been sold at a premium. In 2014 the average price for soy and corn was USD 670 per ton. However, the futures prices for soy meal has decreased heavily throughout 2015 to 342 USD/ton, and is expected to decrease more in immediate years. The futures price for a contract with delivery in December 2017 is prices at 297 USD/ton today indicates this trend (Index Mundi, 2015).

Wheat – has generally enjoyed healthy production and balanced supply/demand, which is reflected in a rather stable price. The price for wheat has however heavily decreased in 2015. Still, the futures are trading for significantly higher values indication that the prices for wheat is likely to pick up to the stable historical levels. The future price of a wheat contract with maturity in December 2017 is trading for 545 USD/tons, which supports this view (Index Mundi, 2015).

Vegetable oils and vegetable meal comprise the major ingredients in salmon feed and since the futures prices show the opposite development in the prices, where the latter is expected to decrease and the first is expected to increase it is difficult to draw a single conclusion on the likely development of feed cost. In addition, the Norwegian currency has weakened compared to the USD and EUR, and the unfavorable currency effect might offset the decline in ingredients prices. It is hard to predict both the commodity prices and the currency exchange rates on long-term, but regardless of how these will develop, the development of MHG's own production plants will most likely decrease the feed cost as MHG avoids the "cost plus" contracts used by feed suppliers, all else equal.

	2014	2015	2016	2017	2018	2019
Feed cost	12.00 kr/kg	11.93 kr/kg	11.85 kr/kg	11.78 kr/kg	11.70 kr/kg	11.63 kr/kg

Table 14: Feed cost per kg is assumed to decline slightly as MHG's own feed production will make the company increasingly self-sufficient

The deviations in the COGS-to-sales ratio discussed initially is assumed to be normal for the salmon farming industry. Since the input prices have been volatile historically, I believe that 2014 feed cost per kg is most appropriate to estimate future levels of feed cost.

Other cost included in cost of sales is primary processing, smolt and mortality. Restructuring cost, salary and personnel expenses and other operating expenses was discussed in chapter 8 and are all based on historical average levels. The COGS not associated with feed cost has historically constituted 40% of total COGS, leaving 60% of total COGS to be feed cost. This is assumed to persist, and the impact from deviations from the historical average will be further discussed in section 15.

11. Morpol, Feed and MH VAP Europe

This chapter presents MHG's secondary processed salmon segment and historical accounting figures in order to estimate the segments contribution to the income statement in the forecast period.

MHG is also involved in the market for secondary processed salmon, which include filleting, fillet trimming, portioning, different cuttings, smoking, making ready meals or packaging with Modified Atmosphere (MAP). The secondary products are called value-added product (VAP). Fish dominates the market for processed aquaculture products in Europe, with a share of 66%. The industry is extremely fragmented with more than 4,000 companies which are fairly small, however MHG is amongst the largest in the industry. The largest players in the industry mostly produce smoked salmon and it is expected that the market will experience more demand as convenience food (ready-to-cook) and packaging that increase the durability of the product has become increasingly popular (Marine Harvest ASA, 2015).

After the acquisition of Morpol in 2013, MHG became the largest producer of smoked salmon. In the following year, MHG restructured its VAP operations by reducing the number of plants from 13 to 8 in order to concentrate production in fewer, but more efficient entities. They also combined all VAP entities to a singe entity called Marine Harvest Consumer Products as a part of their strategy to become vertically integrated (Marine Harvest ASA, 2015). The revenues of the VAP segment is highly dependent on the demand in France and Germany, which comprise 47% of the total demand for smoked salmon. In addition, most of the total demand is by European countries, as the UK, the Scandinavian countries, Italy, the Benelux countries and Spain comprise 43% of the total demand. The Historical and expected GDP per capita in France, Germany and the Euro area is exhibit in figure 32, where the GDP per capita is expected to grow in all areas (Marine Harvest ASA, 2015). The OECD expect economic growth of 1.3% in 2016 and 1.6% in 2017 in France as a result of lower oil prices, less fiscal contraction and to the effects of sustained monetary stimulus. In addition, they estimate that the wages are likely increase, however they predict that unemployment will only decline slightly as weak business confidence hinders investment (OECD, 2015). OECD expect economic growth to strengthen in Germany going forward because of a robust labor market, low interest rates and low oil prices are likely to increase private consumption. Further they expect the lower demand in emerging markets to be offset by increased demand from other European countries whose economy are expected to strengthen (OECD, 2015).

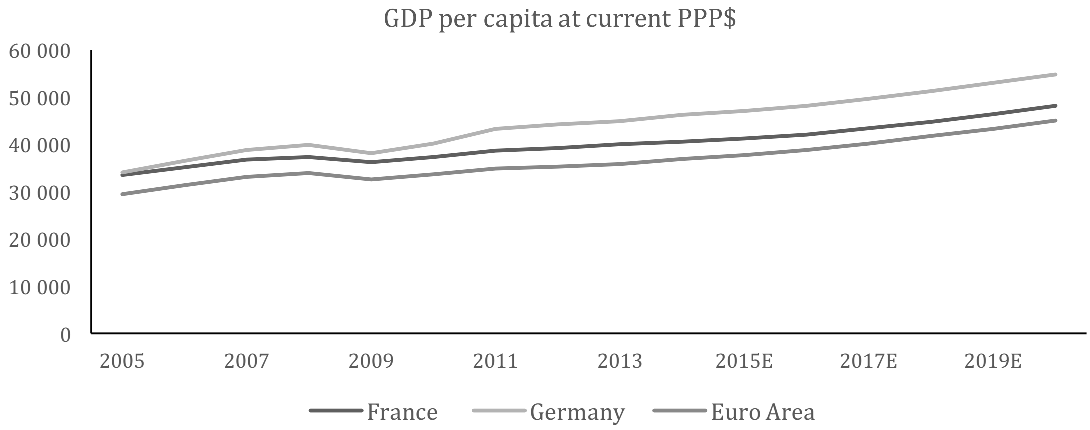

Figure 32: GDP per capita of VAP main markets (Knoema, 2015)

The positive growth prospect of the economic conditions in Europe is likely to increase the expansive growth seen in most of the entities in the processing segment historically. In addition, the restructuring which took place is likely to decrease the high cost in the segment which caused a negative EBIT in MH VAP Europe in 2014.

MHG's processing of feed industry is kept separate from it farming industry and therefore has to be valued separately. The information about the revenue and cost associated with the processing and feed industry is very limited, where only revenues, EBITDA and EBIT is included in the notes under segment summary in the annual report.

To compute the COGS and SG&A for the processing and feed segment, the historical average of total SG&A and COGS relative to the accumulated cost of SG&A and COGS is used to estimate future levels. The result is a historical average COGS ratio of ~67% and SG&A ratio of ~33% to accumulated SG&A and COGS. The estimated historical COGS and SG&A for the processing and feed segment is then calculated by multiplying the difference between revenue and EBITDA given in the notes in the annual report with the respective ratios. Further, the growth in revenue of each segment is based on their CAGR in the period between 2008 and 2014, which is ~13% for MH

Markets, ~5% for MH VAP Europe, ~13% for Morpol and ~38% in other markets. Since the feed segment has only been operating for 1 year, it is not possible to calculate a CAGR, the growth is therefore based on expectations by Marine Harvest outlined in the annual report of ~5% (Marine Harvest ASA, 2015). The future EBITDA is calculated based on the average EBITDA margin to be able to retrieve future levels of COGS and SG&A, which is the difference between future sales and EBITDA multiplied by 67% and 33% respectively.

The historical and estimated accumulated Sales, COGS, SG&A EBITDA of the processing and feed segments is presented in table 15, which shows an increasing development in EBITDA in the future, which is consistent with the historical development.

	2008A	2009A	2010A	2011A	2012A	2013A	2014A	2015E	2016E	2017E	2018E	2019E
Revenue	4 509	4 494	4 239	4 111	4 512	5 577	8 244	9 216	10 320	11 574	13 004	14 638
COGS	2 931	2 922	2 756	2 673	2 933	3 626	5 360	5 996	6 718	7 542	8 484	9 564
SG&A	1 434	1 429	1 348	1 308	1 435	1 774	2 622	2 933	3 287	3 690	4 151	4 679
EBITDA	143	143	135	131	143	177	262	287	314	342	369	395

Table 15: The estimated EBITDA of VAP markets in based on the historical increasing development

12. COST OF CAPITAL

In section 3 I established that the WACC method is the most appropriate to use to calculate the enterprise value of MHG. In this methodology the WACC is used to discount the free cash flow. Value of the firm is obtained by discounting expected cash flows to the firm to both debt and equity owners (Damodaran 2012), given by equation 11:

$$EV = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t} + \frac{\frac{FCF_n(1+g)}{(WACC-g)}}{(1+WACC)^n}$$

Equation 11: Enterprise value of the levered firm

where the n is the last year in the forecasting period, hence 2019, and g is the long term growth rate. The second part in the equation represents the terminal value, which is the present value of cash flows generated after 2019. The long-term growth rate should not exceed the overall growth in the economy. The reason for this is that the companies will eventually be unrealistically large relative to the aggregate economy (Koller, Goedhart, & Wessels, 2010) This will be further discussed in section 13.

The following sections presents the methodology for calculating the cost of capital and results obtained for MHG. The sections comprise the methodology and results of the calculation of cost of equity and followed by the methodology of the calculation of cost of debt. The cost of equity will be calculated using the CAPM methodology and the chapter therefore contains estimates of the risk-free rate, beta and market risk premium.

Cost of equity calculations		WACC calculations	
Market premium	5.4 %	Cost of debt	2.89 %
Risk free rate	1.82 %	Cost of equity	6.16 %
Smoothed Unlevered Beta	0.66	Debt ratio	31.3%
Smoothed Levered Beta	0.80	Equity ratio	68.7%
Unlevered Cost of Equity	5.36 %	Effective tax rate	27 %
Levered Cost of Equity	6.16 %	**WACC**	**4.89 %**

Table 16: Calculation of cost of equity and weighted average cost of capital

12.1 Cost of Equity

Actual return can be very different from expected returns that gives a source of risk. There are two types of risk; systematic and unsystematic risk. Systematic risk, or market risk, is risk arising from market wide risk sources. Characteristics for market risk is that it cannot be diversified away and affect many, if not all, investments in varying degree. Unsystematic risk, or firm-specific risk, is risk that arise from risk factors specific for a firm. Characteristics for firm-specific risk is that it can be diversified away (Brealey, Myers, & Allen, 2010)

Most risk- and return models agree on that risk comes from distributions of actual returns around the expected return and that risk should be measured based on a marginal investor who is well diversified. However, the different models vary in the way the non-diversifiable market risk is measured.

The risk and return model that is used the most and has been in use the longest is the Capital Asset Pricing Model, CAPM. This model assumes that there is no transaction cost, that everyone has access to the same information, consequently investors can keep diversifying without additional cost. In the CAPM world all investor therefore holds different combination of the riskless asset and the market portfolio relative to their risk preferences. There are two additional assumptions in the CAPM model. The first is that a riskless asset exists, and the second is that investors can borrow and lend at the same riskless asset to arrive at their optimal allocation (Damodaran, Investment Valuation, 2012).

The CAPM measure the cost of equity given by equation 12;

$$CAPM = R_f + \beta(E_r - R_f)$$

Equation 12: Cost of equity by the capital asset pricing model

where R_f is the risk free rate, β is the stock beta and $(E_r - R_f)$ is the market premium. The beta is the risk of a company's investments relative to the market. The beta calculation is presented in section 12.1.2.

12.1.1 Risk-Free Rate

There are certain requirements for an asset to be considered risk free. One is that the asset must have no risk of default. The only securities that has a chance of being risk free is government securities, because the government control the printing of currency. Further the expected return has to be know with certainty, hence the actual return is equal to the expected return. If this prerequisite is to be redeemed, there cannot be any reinvestment risk. The bond should also have a duration that matches the duration of the cash flows of MHG to the furthest extent possible (Damodaran, Investment Valuation, 2012). Consequently, a 10-year Norwegian government zero-coupon bond is used as a proxy for the risk-free rate. A potential pitfall is that the 10-year bond could be priced with a liquidity premium and a premium for inflation risk, which would not make it fully risk-free. Nonetheless, it is the closest proxy available, and is consistent with the approach described by Brealey, Myers & Allen (2012) and most frequent used by the market (PWC, 2014).

Since the beta is measured based on prices June 23, 2015, it is most consistent to use listings of a 10-year zero-coupon bond at this date in the CAPM to be consistent. Especially considering the stable key interest rate throughout 2015, seen in figure 33.

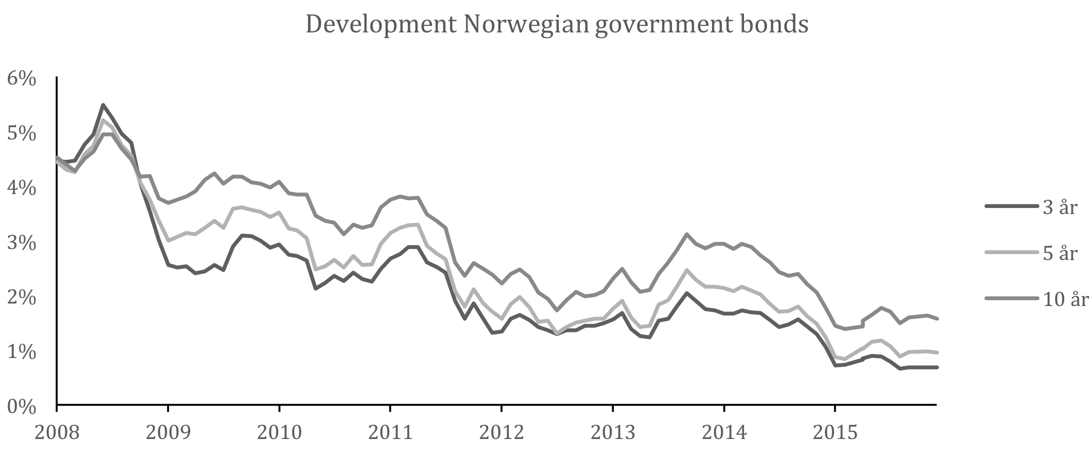

Figure 33: Development in 3-y, 5-y and 10-y government bonds has been decreasing ever since the financial crisis (Norges Bank, 2015)

The decreasing trend in interest rates for government bonds since 2008 is likely to continue for the future. The December 17, 2015 the Norwegian National Bank presented their estimates for the key interest rate, which is unchanged from the current level of 0.75%. This supports the stable development in the interest rates in governmental bonds during 2015 and solidify the assumption of using the historically low interest for 10-y governmental bonds as a proxy for the risk free rate going forward.

12.1.2 Beta

Since all invertors hold the market portfolio, the risk to an investor of an individual asset will be the additional risk the individual asset add to the market portfolio. The additional risk is measured by beta, which is given by the following formula (Brealey, Myers, & Allen, 2010);

$$\beta_i = \frac{Covariance\ of\ asset\ i\ with\ Market\ Portfolio}{Variance\ of\ the\ Market\ Portfolio} = \frac{Cov_{im}}{\sigma_m^2}$$

Equation 13: Beta of an asset i

As the market have a beta value of 1 asset that are riskier than average have a beta value greater than 1, while assets that are less risky than average have a beta less than 1. A riskless asset has a beta value of 0 (Brealey, Myers, & Allen, 2010).

To measure the beta, I first calculated the beta for MHG and its peers by regressing the weekly return of stock prices against the weekly return of the market, using two years of weekly historical data of stock prices and the Oslo Stock Exchange index collected from Yahoo Finance (Yahoo , 2015). The results for MHG are shown in figure 34. I used MHG peers to retrieve an average unlevered beta, as stocks tend to move towards industry averages. To eliminate the effect of differences in financing of peers[3], I unlevered all betas and calculated the average unlevered beta, which I re-levered by MHG's leverage ratio. This method of calculating the leveraged beta considers the tendency of betas within the same industry to converge. Further the beta is adjusted by the Bloomberg method by multiplying the raw beta by 2/3 and adding 1/3, as betas tend to converge towards the market beta of 1 (Damodaran, 2012).

[3] The historical prices for peers is also retrieved from Yahoo Finance and the information about their financial structure from the BvD Zephyr database.

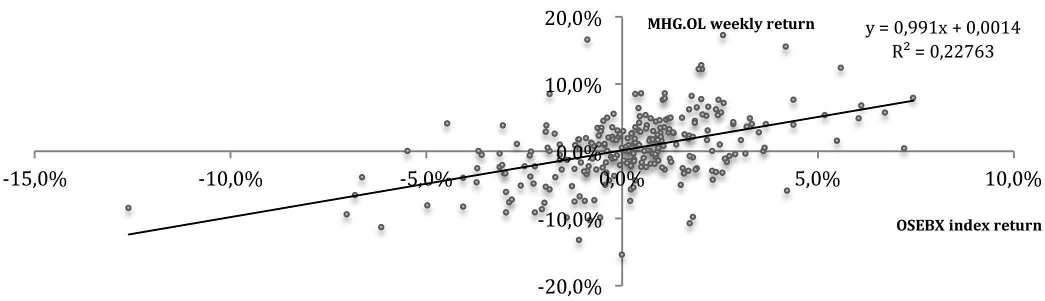

Figure 34: Beta regression of OSEBX and MHG.OL weekly return

Form the graph presented above one can see the distributions of MHG returns over market returns. The distributions over market return has varied considerably, which can be seen from the relatively low R^2 coefficient, which indicate that changes in market returns are not much related to changes in MHG returns. The most likely explanation for this low relation is that the index is highly sensitive to oil price fluctuations, while this is not the case for MHG.

The choice of using the Oslo Stock Exchange as index is made to be consistent with the choice of peers. MHG and all peers used in the beta calculation is Norwegian companies, with the majority of their operations in Norway. Therefore, I believe a Norwegian index is most suitable even though Marine Harvest is also listed on NYSE and have international operations.

The choice of using weekly data from the last two years is because of the Morpol acquisition in early 2013. The stock prices can fluctuate widely during an acquisition and not reflect the actual operations of the firm and I therefore believe the returns earned in MHG after 2013 is more representative to measure the risk.

Manual calculations vs OSEBX index					
	MHG	**LERØY**	**SALMAR**	**BAKKAFROST**	**GRIEG**
Covariance	0.0006	0.0004	0.0005	0.0002	0.0005
Market variance	0.0006	0.0006	0.0006	0.0006	0.0006
Beta formula	**0.991**	**0.710**	**0.882**	**0.396**	**0.860**
Slope	**0.991**	**0.488**	**0.659**	**0.322**	**0.343**
Net debt	21 061	5 418	4 820	934	12 140
Market cap diluted	46 269	15 937	15 069	12 410	3 082
Leverage ratio	46 %	34 %	32 %	8 %	394 %
Unlevered beta	**0.68**	**0.53**	**0.67**	**0.37**	**0.17**
Median asset beta	0.53				
Average asset beta	0.48				
MHG levered beta	**0.70**				
Smoothed MHG levered beta	**0.80**				

Leverage					
	MHG	LERØY	SALMAR	BAKKAFROST	GRIEG
Net debt/Total Equity	46 %	34 %	32 %	8 %	394 %
Net debt/Total Capital	57 %	36 %	48 %	27 %	80 %
Net debt	21 061	5 418	4 820	934	12 140
Market Cap	46 269	15 937	15 069	12 410	3 082
Total capital	36 974	14 858	10 124	3 463	15 222

Table 17: The smoothed leveraged beta is 0.8 which is consistent with analyst estimates

The calculations give a smoothed beta of 0.8 which is a consensus among analyst estimates. Considering that the food industry is generally less affected by economic situations than other industries I believe the beta is sufficient.

12.1.3 Market Risk Premium

The market risk premium (MRP) measures what an investor demand over and above the risk-free rate for investing in equities as a class. The estimate depends on two factors; the risk aversion of investors and the perceived risk of equity an an investment class. There are three ways to measure the market risk premium. The first is to measure the MRP based on surveys of investors, were MRP is estimated to be the average of all desired risk premiums by the investors in the survey. The second is to base the future market risk premium on historical estimates of the risk premium. The last is to estimate an implied, forward looking, premium in today's assets prices. The limitation of the first approach is that the investors do not assure any constraints on reasonability, the estimates are often very volatile and short-term. The historical estimates are sensitive to time periods, whether government bonds or bills are used as the risk-free rate and whether geometric or arithmetic averages are used. The general rule here is to use long time periods, consistent use of the risk-free rate and geometric averages. If the stocks are deemed to be correctly priced in the aggregate and it is possible to measure cash flows from buying stocks, it is possible to measure an internal rate for return, which subtracted by the risk-free rate gives an implied equity risk premium (Damodaran, Damodaran Online, 2007).

The associated problems with using a market risk premium based on historical figures and using surveys of investors suggest using an implied market risk premium. According to PWC's yearly survey on the Norwegian market risk premium from 2014 the implied MRP is 5.4%, which will ultimately be used in the WACC calculations (PWC, 2014).

12.2 Cost of Debt

The return lenders expect to make on their investment includes a premium for default risk and that expected return is called cost of debt. The cost of debt is determined by the riskless rate, the default risk and the tax advantage associated with debt. The cost of debt increase with the default risk, as a higher probability of default increase the risk of the firm, which in turn the cost of borrowing. The tax rate also determines the cost of debt as interest is tax deductible (Damodaran, Investment Valuation, 2012).

I have used three methods to estimate the cost of debt; (i) recent borrowing history, (ii) synthetic rating and (iii) the yield for other corporate bonds with similar rating. Using the recent borrowing history, one has to look at the firm's recent borrowings and get a sense of the spreads charged to come up with the cost of debt. The alternative approach is to estimate a synthetic rating based on a firm's interest coverage ratio. The synthetic rating can then be used to estimate the default spread which can be used to measure the cost of debt (ibid).

Two approaches have been conducted to estimate MHG's cost of debt, while the third is used to support the first two. One is based on a weighted average of MHG's liabilities and their corresponding interest cost, which is exhibit in table 18. The weighted average is a cost of debt of 2.85%.

Interest rate	Value	Weights	Average	Description
3.00 %	3 773	35 %	1.06 %	Non-current interest bearing debt
3.00 %	7	0 %	0.00 %	Current interest bearing debt
4.62 %	1 241	12 %	0.54 %	Bond
2.38 %	2 267	21 %	0.50 %	EUR 350 mill 2013-bond
2.12 %	2 554	24 %	0.51 %	EUR 375 mill 2014-bond
3.00 %	833	8 %	0.23 %	Other
Long-term debt	**10 675**	**100 %**	**2.85 %**	
Weighted average debt interest rate	2.85 %			
Adjusted for yields shifting	2.80 %			

Table 18: Weighted average of MHG liabilities and corresponding interest rate gives a cost of debt of 2.8%

To support the findings in the approach above an approach suggested by Damodaran is used. The approach measures the cost of debt using synthetic ratings calculated by the interest coverage ratio, exhibit in table 19 and further details are available in appendix A.2. The interest coverage ratio for MHG suggest a rating of A/A- which is consistent with paying a spread of 1.15 % above the risk free rate. The result is a cost of debt of 2.97 % which is close to the results in the book cost of debt approach.

Synthetic rating and interest spread	
MHG's implied rating is currently A/A-	
Interest coverage ratio	6.67
Spread added for A	1.00 %
Spread added for A-	1.30 %
Average added spread added	1.15 %
5yrs treasury bonds	1.82 %
Cost of debt	**2.97 %**

Table 19: Damodaran's synthetic rating gives a cost of 2.97%

MHG issued bonds have an estimated A/A- rating using Damodaran's synthetic rating approach. Since a significant amount of MHG's liabilities consist of bonds, similar-risk A-rated bonds can be used to estimate their cost of debt, by computing the yield to maturity (Benninga, 2008). The yield for MHG's bonds where therefore computed by using the the yield curve for A-rated bonds, which is shown in figure 35. Then the extreme outliers were removed to find the sane yield for corporate A-rated bonds. Subsequently, a third polynomial trend line is computed, which enables computing an average yield when the data fluctuates around a curved line. The equation for the yield is given by (y) in figure 35. The X in the equation is the weighted average maturity of MHG's bonds which is 3.374 years, shown in table 20. The yield obtained when inserting the weighted maturity for MHG's bonds in the equation is 2.43%, which is below the cost of debt calculated using the previous approaches.

Only the historic borrowing and synthetic rating approach will be used to calculate the cost of debt used in the WACC calculation. The reason for this is that the interest coverage ratio gives a rating for MHG in between A- and A. Since the bond screeners publicly available[4] only provide S&P credit rating without separation of +/-, but only A, AA and so on. Therefore, the yield calculated using this approach may undervalue MHG's true cost of debt. In addition, the coefficient of determination (R^2) is 52.85%, which may be caused by different variation in the corporate A-rated bonds – callable and convertible bonds is likely to have a different yield that ordinary bonds for instance. However, the yield curve confirms that the cost of debt is directionally right and therefore supports the results computed in the previous two approaches.

[4] Yahoo Finance Bond Screener (Yahoo, 2015)

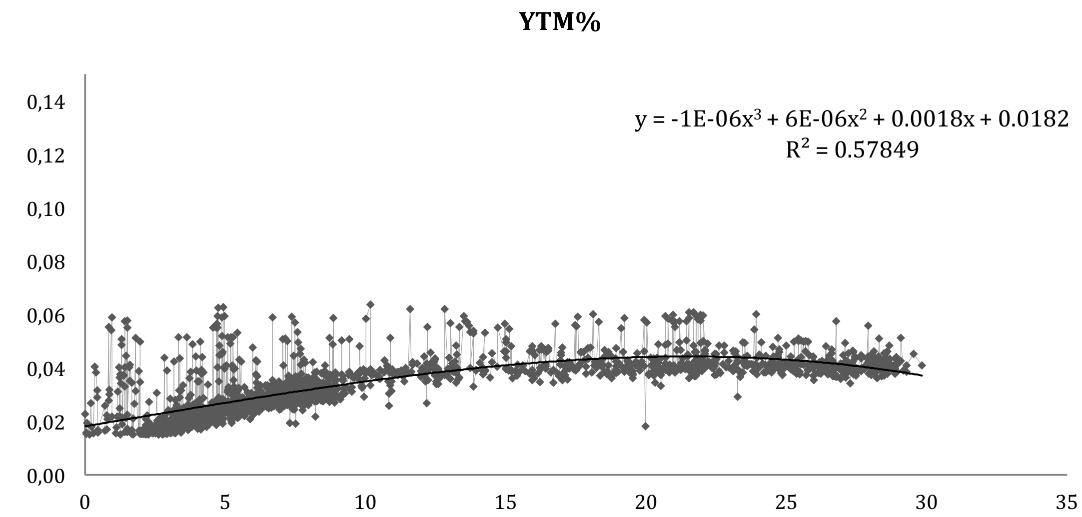

Figure 35: Yield curve for corporate A-rated bonds

Maturity	Years to maturity	Value	Weighted average maturity (years)
2018	3	1 241	0.614
2019	4	2 267	1.496
2018	3	2 554	1.264
		6 062	3.374

Table 20: Weighted average maturity of MHG's bonds

The average cost of debt based on the results in the two approaches presented above is given in table 21 and suggest that MHG has a cost of debt equal to 2.89 %.

Estimation of cost of debt	
Reported cost of debt	2.80 %
Damodaran approach	2.97 %
Average	**2.89 %**

Table 21: An average of the two approaches gives a cost of debt of 2.89%

Since it is reasonable to assume that the cost of debt retrieved using the MHG real liabilities include a premium for risk of default and the results is consistent with the synthetic rate approach. I will not add a premium for risk of default. The low cost of debt is supported by a high implied rating and generally low interest rates in the economy.

12.2.1 Tax

Since the interest expense save taxes at the margin, the tax rate that should be used to arrive at the after-tax cost of debt is the marginal tax rate. A prerequisite for the interest tax benefit is that the firm has income to cover their interest expense.

Damodaran suggests three approaches to deal with different tax rates, where two will be elaborated on further. One is to use a weighted average of the marginal tax rate in the different regions MHG is operating, shown in table 22 (Damodaran, Investment Valuation, 2012). The approach suggests using a tax rate of 25.27% for future operations. However, the problem by using a weighted average of regional nominal tax rates is that the production volumes in the regions is likely to change over time affecting the weights in the analysis. Volumes in different regions are for instance determined by the access to licenses in different regions. In addition, the tax rate is expected to rise considerably I Chile during the next couple of years (KPMG, 2015). Since MHG's operations in Chile are the largest of their international operations, the approach is deemed insufficient.

	Norway	Chile	Canada	Scotland	Ireland	Faroes	France	Poland	Average
Operational revenue	10 432	2 729	1 079	1 975	253	499	4 911	4 755	
% share of total revenue	39.17 %	10.25 %	4.05 %	7.42 %	0.95 %	1.87 %	18.44 %	17.85 %	
Nominal tax rate[5]	27.0 %	20.0 %	26.5 %	21.0 %	12.5 %	23 %	33 %	19 %	**25.27 %**

Table 22: The weighted average of tax rates in regions where MHG is operating is 25.27%

The other approach assumes that the income generated in the different regions eventually will have to be repatriated in the country of origin (Damodaran, Investment Valuation, 2012), hence the marginal tax rate should be the Norwegian marginal tax rate of 27%. However, the approach assumes that the tax rate in the home country is the highest of all other countries. Table 22 show that the tax rate in Norway is higher than all regions except France, were the majority of the MHG VAP market segment is based. Although, the tax rate in France is larger than in Norway, the tax rate in Poland is correspondingly smaller. Since the processing segment generates equivalent share of total revenue in the two countries the approach of using the Norwegian tax rate to estimate future cash flows is believed to provide a suitable rate for future estimates.

[5] Nominal tax rates are collected from KPMG 2015 (KPMG, 2015)

13. Final Future Accounts and Valuation

So far, a thorough strategic analysis has been conducted to determine the key assumptions making the basis of the cash flow used in the WACC method. Future harvest volumes and prices has been estimated and normalization has been conducted in order to retrieve the cash flows in the forecasting period that reflect MHG's core operations. Further, MHG's risk of financing has been estimated to compute the appropriate discount rate for MHG. This section presents the estimated stock price using the WACC method for fundamental valuation.

Table 23 exhibits the assumptions for the fundamental analysis, which has been discusses previously.

Assumptions	
Terminal growth	2.00 %
WACC	4.89 %
Volume CAGR Norway 2018/19	6 %

Table 23: The different assumptions made for estimating future cash flows

The free cash flow calculation is calculated as described in section 3. The output from the valuation model is presented in table 24 below, and the cash flow appears to be negative in the first year due to high working capital requirement, but is forecasted to increase thereafter at a steady growth rate.

Free cash flow calculation	2015	2016	2017	2018	2019
EBIT	3 455	3 867	4 246	4 725	5 412
Tax rate	27 %	27 %	27 %	27 %	27 %
EBIT (1-t)	2 522	2 823	3 100	3 449	3 951
Plus: Depreciation and amortization	916	827	764	708	690
Less: Capital Expenditure	(807)	(869)	(913)	(979)	(1 053)
Less: Δ Net working capital	3 008	1 485	1 507	1 229	1 319
Free cash flow to firm (FCFF)	(377)	1 296	1 443	1 949	2 269

Table 24: The estimated cash flow show a steady increase each year

The present value of cash flows in the forecasting period and the terminal value when using the WACC valuation is illustrated in figure 36, showing that the terminal value accounts for the majority of the enterprise value. I have assumed a long-term growth rate of 2.0%, which is slightly lower than the current inflation target in Norway. The reason for the choice of a long-term growth rate of 2.0% is that the inflation has been lower in recent years and is expected to increase in 2016, but then fall in 2017 and continue to decrease in 2018 (Norges Bank, 2015).

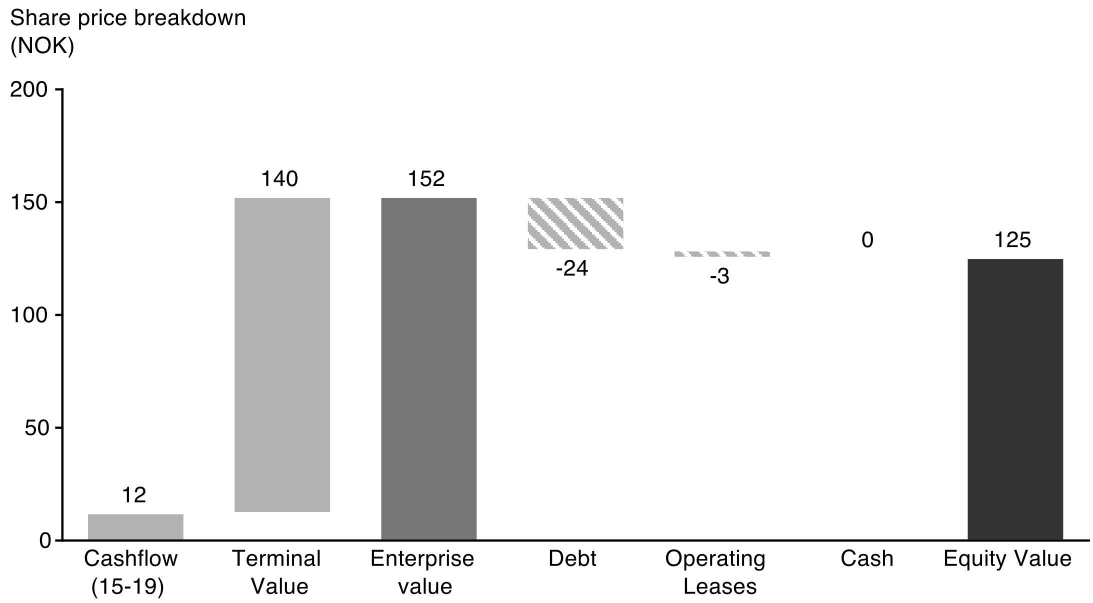

Figure 36: Value from the WACC method derives from the sum of the forecast period and the terminal value, adjusted for debt, leases and cash

To obtain a price per share from the valuation, the net debt and present value of operating leases is subtracted from the enterprise value to get the theoretical equity value, which is then divided by the number of diluted shares outstanding. The result is a share price of NOK 125 for Marine Harvest, which is in consensus with analyst estimates. Consequently, the valuation suggests that MHG is slightly undervalued as it is currently trading at NOK 116.3. Still, the valuation is based on several assumptions, making it a subject to uncertainty and address the need to support the findings using other valuation methods in addition to the WACC method. In addition, sensitivity analysis should be conducted for the main drives of the enterprise value.

Discounted Cash Flow		2015	2016	2017	2018	2019
Free cash flow		**(377)**	**1 296**	**1 443**	**1 949**	**2 269**
Terminal value						80 113
Sum of cash flows		**(377)**	**1 296**	**1 443**	**1 949**	**82 382**
Discount factor		0.953	0.909	0.867	0.826	0.788
Discounted cash flow		**(359)**	**1 178**	**1 251**	**1 610**	**64 890**
Enterprise value	**68 570**					
Less: Debt	10 669					
Less: Operating leases	1 537					
Plus: Excess cash	19					
Equity value	56 383					
Price per share	**125**					

Table 25: Price per share is NOK 125 using the WACC method

14. Market Based Approach

The market based approach is based on three analyses; sum of the parts analysis, peer analysis and precedent transactions analysis and the following paragraphs presents the results from the different approaches.

The comparable companies used in the market based analysis is other Norwegian salmon farming companies; Salmar (SALM), Grieg Seafoods (GSF), Lerøy Seafoods (LSG) and Bakkafrost (BAKKA) respectively. These companies operate in the same industry and regions as MHG and the risk the companies face is therefore assumed to be relatively uniform. In addition, the peers are assumed to have quite similar growth opportunities as they are large enough to participate in the consolidation trend in the industry and has global operations like MHG. Still, the cashflows generated by the firms can differ at some has more processed products which implies larger sales and increased cost. In addition, the operational costs can differ as MHG had entered into feed production.

14.1 Sum of the Parts Analysis

The table 26 below display the results from the sum of the parts analysis. The valuation approach is valuable as MHG has a variety of business segments, both across different geographies and in various steps of the value chain. The analysis is based on EV/kg industry multiples retrieved from analyst reports of SEB and Pareto. To compute MHG's stock price, their volumes in all segments are multiplied with the industry multiples to find each business segments contribution to the enterprise value. The enterprise value is then computed by adding the contributions from all business segments. Then the debt is subtracted and dividend added for find the market capitalization, which is then divided by MHG's number of shares to find the stock price. The stock price using this valuation method is NOK 122, which further support the results found in the WACC method.

	Harvest HOG 2019E	EV/kg	MNOK	EV/EBIT 2016E	EBIT/kg	Per share
Farming Norway	292.808	135.0x	39 529	9.2x	14.7x	88
Farming Chile	67.760	85.0x	5 760	57.7x	1.5x	13
Farming Canada	47.590	70.0x	3 331	9.2x	7.6x	7
Farming UK	63.814	70.0x	4 467	8.7x	8.0x	10
Farming Ireland	11.449	70.0x	801	7.6x	9.2x	2
Farming Faroes	9.159	100.0x	916	8.9x	11.2x	2
Farming Total	**492.581**	**111.3x**	**54 804**	**10.0x**	**11.1x**	**122**
Markets	573	10.0x	5 730			**13**
MHG VAP	300	10.0x	3 000			**7**
Feed	127	12.0x	1 524			**3**
Ass. Companies						
(48.0% share in Nova Sea)	40.000	100.0x	4 000	6.9x	14.5x	
NIBD			307			
MHG's share			**1 773**			**4**
Other/Group	-152	8.0x	(1 216)			**(3)**
Total			65 615			
NIBD			11 507			**26**
Dividend add-back			607			**1**
Market Cap			**54 714**			
Number of shares	450					
Per share	**NOK 122**					

Table 26: The sum of the parts (SOTP) analysis of MHG's operations yields a share price in line with the WACC approach

14.2 TRADING COMPARABLES

Multiples are distinguished by trailing and prospective multiples, where trailing multiples use last years figures to measure the value of a company, while the prospective multiples use next years results in to compute the company value. The peer analysis is based on prospective multiples on the basis of the current trading multiples of the companies, retrieved from BvD Zephyr company database.

Currently MHG is trading in the top range among its peers, which could support that they are slightly overvalued, but given the fact that the company has outperformed the market in the past, the relative analysis is supporting the conclusion from the WACC analysis that the company is indeed undervalued. The implied share price using the average trading multiples from the competitors is NOK 129 when using the EV/EBITDA multiple. This is largely driven up by Bakkafrost, trading at very high multiples, as they suffered from a sharp decline in earnings without the stock following the downturn. The EV/kg multiple however suggest that MHG is currently trading at a fair price. These two analyses both support a slight upside to the MHG stock found in the fundamental WACC analysis.

Company Name	Market Value	Enterprise Value	EBITDA	Harvest volume	EV/EBITDA	EV/KG
Marine Harvest	52 345	63 014	4 672	425	**13.49x**	**148.3x**
Average	**20 342**	**23 803**	**1 784**	**171**	***14.66x***	***143.3x***
Median	**16 542**	**19 040**	**1 870**	**155**	***13.49x***	***124.4x***
Grieg Seafood	3 462	5 180	259	65	**19.96x**	**80.0x**
Lerøy Seafood	17 246	19 680	1 870	158	**10.52x**	**124.4x**
Salmar	16 542	19 040	1 970	155	**9.66x**	**123.0x**
Bakkafrost	12 117	12 100	148	50	**81.76x**	**240.8x**
EV of FY '14						
Enterprise Value					70 394	64 905
Less: Debt					10 669	10 669
Less: Operating Leases					1 537	1 537
Plus: Excess cash					19	19
Equity value					58 207	52 718
Price per share					**NOK 129**	**NOK 117**

Table 27: The price obtained in the peer analysis is slightly higher although consistent with the WACC and sum of the parts approach

14.3 PRECEDENT TRANSACTIONS

The deals data collected from the BvD Zephyr M&A database provides transaction statistics on previous acquisitions. According to Rosenbaum, Pearl & Parella (2013) the most relevant deals should be identified by considering deal value, operational similarities and what at in part of the cycle the respective deal was conducted. MHG is the indisputable largest player in the industry is trading at higher multiples than its peers and the deals will therefore not represent the enterprise value potentially achieved for MHG. One can also argue that there are operational differences between MHG and its peers as MHG is the only player self-sufficient in feed and has a higher presence in the VAP segment.

Date	Acquirer	Target	Implied EV	Tons	EBIT	EV/Kg	EV/EBIT
14.01.2011	Morpol	Jøkelfjord	510	7	95.00	70.0x	5.4x
22.10.2010	SalMar	Bakkafrost	2 272	30	247.00	75.7x	9.2x
28.09.2010	Lerøy	Sjøtroll	1 298	26	186.73	49.9x	7.0x
29.10.2010	Morpol	Lakeland	29	0	n.a.	60.0x	n.a.
26.05.2010	SalMar	Rauma	416	7	n.a.	60.0x	n.a.
29.10.2007	Cermaq	Arctic Seafood	230	4	n.a.	52.0x	n.a.
21.12.2006	Cermaq	Polarlaks	51	3	n.a.	17.0x	n.a.
21.08.2006	Lerøy	Hydrotech	1 105	14	98.80	81.0x	11.2x
03.12.2007	Pan Fish	Fjord Seafood	4 943	66	n.a.	75.0x	n.a.
03.12.2007	Pan Fish	Marine Harvest	10 746	283		38.0x	
10.10.2005	Pan Fish	Aqua farms	285	8		35.0x	
Average						**55.8x**	**8.2x**
Median						**60.0x**	**8.1x**

Table 28: Relevant precedent transactions from the past decade

Table 28 shows a range of relevant precedent transaction from the past decade. As previously argued, the salmon farming sector is highly cyclical, as shown in figure 37 on next page. The acquisitions have in general been completed at a price very much in line with the EV/kg multiple that MHG itself has been trading on at the time. However, the sector is currently in a high cycle that is far above what we have seen historically, and using the deal multiples from precedent transactions would therefore undervalue the company significantly. I will therefore not emphasize this analysis when drawing my final conclusions.

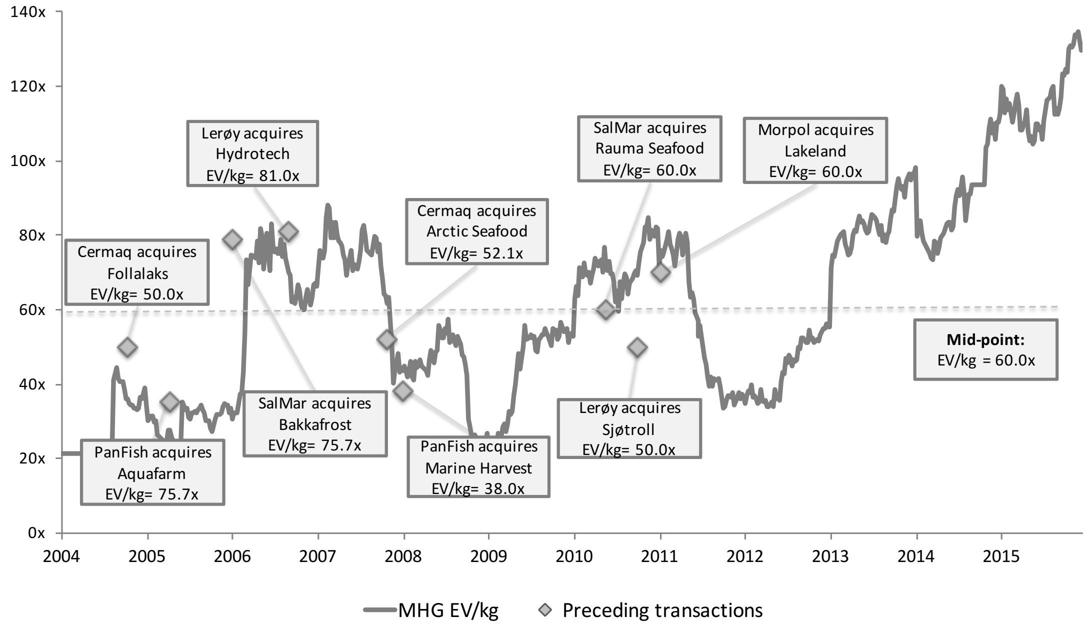

Figure 37: M&A transaction multiples on par with MHG's trading multiples

14.4 VALUATION SUMMARY

The valuation is summarized in table 29 and figure 38. The extreme points in the graph in figure 38 is based on the the lowest and highest multiples from the market based valuation and fluctuation in the price when varying the price with different discounts rates and terminal growth, as I will more thoroughly discuss in relation to the sensitivity analyses in section 15. The dotted line represents the likely interval for the true price based on the different valuation methods, which suggest that MHG's fundamental value equals NOK 125 per share.

	Enterprise value			EV/EBITDA			Price per share		
Valuation methodology	**Low**	**Midpoint**	**High**	**Low**	**Midpoint**	**High**	**Low**	**Midpoint**	**High**
WACC	73 887	67 052	79 764	15.4x	14.0x	16.6x	140	***125***	154
Sum of the parts	60 883	65 384	69 884	12.7x	13.6x	14.6x	112	122	132
Trading comparables	50 542	64 771	70 394	10.5x	13.5x	14.7x	85	117	129

Table 29: Summary of the valuation analyses yielding a share price around NOK 128 per share

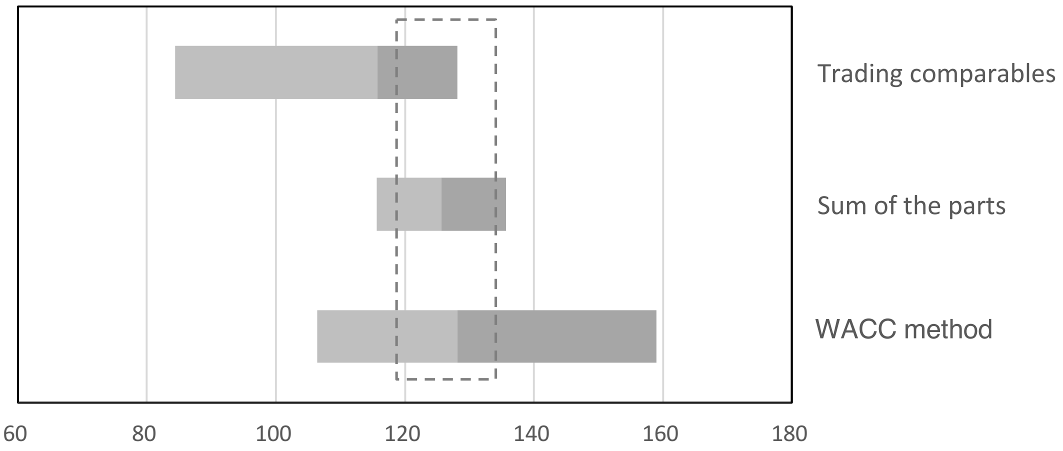

Figure 38: The likely range of the stock price found in the different approaches is in the range between NOK 120-130

15. Sensitivity Analysis

This chapter conducts a sensitivity analysis of the stock price retrieved to critical assumptions made in the fundamental analysis. I will assess how the stock price will vary with different levels of the major operational assumptions that are the largest drivers of value for MHG. Both the fundamental valuation and market based valuation is based on many assumptions, which make the results retrieved from the valuation exposed to uncertainty. It is therefore necessary to estimate how sensitive the estimated value is to changes in the main factors driving the value.

In the sensitivity analyses I will first address the impact from changes in the salmon price and the decline in feed cost that potentially could be achieved through MHG's upstream integration in feed production. Second, I will address the impact on the stock price from different levels of feed cost, mainly driven by the commodity prices on the ingredients of fish feed, and the gross margin, here depicted as the feed cost's share of the total COGS. Last, I will address the impact on the stock price with different levels of the cost of capital and the terminal growth rate.

In the following I have used the current trading price of the MHG stock as a basis for the calculation of the impact. This is done to assess not only the risk from of not fully achieving the target price of NOK 125 per share, but also to assess the downside risk of taking a position in the stock at the current trading price. The bolded number in the middle of each table is referring to the upside if the fair value calculated in the fundamental valuation in the previous chapters is reached.

15.1 Salmon Price and reduction in feed cost

The sensitivity analysis in table 30 shows that the share price is highly sensitive to even minor changes in the salmon price. A decline of NOK 1/kg will lead to a loss from the current trading price at ~8%. Investing in an aquaculture company is a bet on the commodity price of the fish that is manufactured, which becomes very obvious when assessing the stock price effect from only marginal changes in the salmon price.

Further, the potential cost reduction from MHG's upstream expansion into feed production could have massive impact on the stock price. As a base-case I have assumed a decline of ~8 øre p.a. in the forecast period, which is a conservative assumption given the cost-plus contracts from the feed producers that could be cut. There is only upside from this cost cutting initiative, and by achieving a 12 øre reduction on the current cost per kg of fish feed, the stock could potentially yield a ~15% upside to the current trading price.

Reduction in feed cost p.a.(NOK)	Salmon price 2015 (NOK/kg) 40.0 kr/kg	40.5 kr/kg	41.0 kr/kg	41.5 kr/kg	42.0 kr/kg
0.04	(18)	(9)	(0)	9	18
0.06	(14)	(5)	4	13	22
0.08	(9)	0	9	18	27
0.10	(4)	5	14	23	31
0.12	0	9	18	27	36

Table 30: Change in stock price from current trading price with variations in salmon price and feed cost reductions

15.2 Cost of Goods Sold

The sensitivity analysis in table 31 shows the impact from the feed cost, and from which share feed cost constitute of the total COGS. This can be translated into what gross margin MHG can achieve. I have already addressed the potential gain from reducing feed cost by integrating upstream into feed production. Nevertheless, the largest driver of feed cost is the commodity prices of the ingredients of the feed. Even a slight increase in the feed cost will not only diminish the potential upside of the MHG stock, but it will lead to a direct loss over the current trading price. The feed cost is estimated to account ~60% of MHG's total COGS, and will have a dramatic impact on earnings if it changes.

Further, I have addressed the assumption that feed account for 60% of COGS. If the other direct costs per kg salmon harvested would be higher the gross margin would decline. There would still be an upside to the MHG stock if the feed/COGS declined by 1%, but further declines would reduce the stock price from the current trading levels.

Feed cost of total COGS	Feed cost 11.50 kr/kg	11.75 kr/kg	12.00 kr/kg	12.25 kr/kg	12.50 kr/kg
59.0 %	24	12	(1)	(13)	(25)
59.5 %	29	16	4	(8)	(20)
60.0 %	33	21	9	(3)	(15)
60.5 %	38	26	14	2	(10)
61.0 %	42	30	18	6	(6)

Table 31: Change in stock price from current trading price with variations in feed cost and the feed cost's share of total COGS

The largest risk associated with the COGS is an increase in the feed cost, but MHG's recent upstream expansion has to some extend mitigated this risk, as they are more in control of their own feed supply, and could better hedge the price risk in the commodity market.

15.3 Long-term Growth and Cost of Capital

Last, a sensitivity analysis is conducted for the long-term growth and cost of capital (WACC), exhibited in table 32. The results show that the long-term growth is the single most important factor driving the stock price. An estimated long-term growth of 2% is a quite conservative growth rate, given the potential for salmon as an ever more important source of protein in the future. Using a low long-term growth rate will limit the potential downside of an incorrect estimate. As we see from table 32, a decline of 0.2% from the assumed long-term growth would still yield positive returns on the stock from current price, while an increase of 0.2% would yield an upside of ~17%.

The WACC is currently at a historical low level, as the interest rates has been dropping since the financial crisis, and a recovery is not expected in the near future. Both the cost of debt and the CAPM through the risk-free rate will be driven largely by the interest rate level, so large deviations from the calculated WACC of 4.9% is of low probability. However, we see that if the WACC should increase by only 0.25% there would be negative returns from the current trading price.

		WACC				
	-	4.4 %	4.6 %	4.9 %	5.1 %	5.4 %
Terminal Growth Rate	1.8 %	29	13	(0)	(12)	(21)
	1.9 %	35	18	4	(8)	(18)
	2.0 %	43	24	9	(4)	(15)
	2.1 %	50	30	14	0	(11)
	2.2 %	59	37	20	5	(7)

Table 32: Change in stock price from current trading price with variations in WACC and terminal growth rate

Concluding the sensitivity analyses above, I assess the risk from changes in the main value drivers to be high, but the assumptions I have made are quite conservative, potentially leaving a substantial upside, in line with analyst consensus who communicate target prices between NOK 120-140.

16. CONCLUSION

In this thesis I have studied and estimated the fair value of MHG's share price. I have mainly used the WACC approach to calculate the equity value of MHG. Other valuation approaches have been conducted to support the fundamental analysis, namely multiple-based relative valuation and sum-of-the-parts analysis. To support the assumptions required in the valuation analysis, I have conducted analyses on macroeconomic and industry-specific factors affecting the salmon farming industry. Further I have assessed firm-specific factors to determine MHG's competitive position, and ultimately their ability to generate cashflow that will make the foundation in a fundamental analysis.

"In 2013 we chose "Leading the Blue Revolution" as our vision. Our ambition is to become a world-leading, integrated provider of seafood protein"

Alf-Helge Aarskog CEO of MHG

In the macroeconomic analysis, I find that the economic conditions for MHG are favorable for several reasons. First, GDP per capita in the main markets for salmon are increasing and that increased spending power triggers a greater desire to purchase healthier and more environmentally friendly foods. Salmon is associated with high nutritional value and environmentally friendly, which supports greater demand. Second, the Norwegian currency has been weakened largely compared to the currencies of several of our largest trade partners the past year. The low exchange rate is expected to persist for some time, and this is favorable for the export of Norwegian salmon and beneficial for MHG as the majority of their harvested volume is in Norway. However, there are other factors that are inhibiting growth. The governmental license scheme in Norway and the continuous problem with salmon lice and diseases in several of the regions where MHG operates threatens the organic growth in the industry. The growth of MHG is therefore highly dependent on the consolidation opportunities, and the benefit from R&D activities aimed to fix the fish health issues, such as sea lice other deceases, that are causing high mortality rates and decrease in quality of the fish.

Further, the rivalry in the industry is considered as relatively high as salmon and commodities used in feed production is to a large determined by demand as being fresh goods with short shelf life and long production cycles. The salmon price is also considerably higher than the price of other animalistic protein, as the consumers is typically price sensitive with regards to food. This implies a major disadvantage for salmon. The current prices can however become more favorable if the challenges with health issues are resolved, as the quality improves and the mortality rates declines.

MHG's increased focus on the VAP market could also be favorable as the products generally enjoy higher margins and MHG's exposure to the volatile salmon price is reduced, as it become more diversified. In addition, MHG is seeking to become entirely integrated in the value chain from fertilized egg production to sales and distribution. They are currently present in every process in the value chain, except of the fertilized egg production – the ambitions are however to become self-sufficient in egg supply in the future. The ambition to become a fully integrated company will reduce the risk associated with the biological assets and allow MHG to optimize the input in feed production, which consequently can improve the profitability margins by reducing the operational cost.

Overall, the future prospects are favorable for MHG and the financial markets do not seem to fully appreciate this in the current pricing of the stock. I have chosen to focus largely on the WACC approach that yields a target share price of NOK 125, which is a ~8% premium over the current share price. The estimate is based on several assumptions, but I have chosen to take a conservative approach to the estimates, reducing the downside risk from my valuation. Sensitivity analysis on the key value drivers show that there are considerable variations in the share price with changes key input, especially the long-term growth, as ~95% of the company's enterprise value derives from the terminal value. To support the target price from the WACC analysis, I have also conducted a relative valuation based on the trading multiples of several of the closest competitors. I find that the price from my WACC analysis is directionally right, even though the price suggested is slightly lower than the target price of NOK 125 per share. My assessment is that MHG is trading on a market leader premium, and that MHG is trading on the high-end of the multiples is justified. Therefore, I uphold my target price of 125. Lastly, the SOTP analysis yields a share price of NOK 122 that reinforce my belief that the MHG stock is trading at a discount to its fair value, and that a buy recommendation is appropriate.

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APPENDIX

A.1 DATA

The financial information of MHG given in the thesis used adjusted statements in the financial report for all years. The data collected for the precedent transactions and trading peers was downloaded from DataMonitor and the BvD Zephyr M&A database, which is available for all students at the Norwegian School of Economics.

A.2 SYNTHETIC RATING APPROACH BY DAMODARAN

If interest coverage ratio is greater than	≤ to	Rating	Spread
12,50	-	Aaa/AAA	0,40 %
9,50	12,50	Aa2/AA	0,70 %
7,50	9,50	A1/A+	0,85 %
6,00	7,50	A2/A	1,00 %
4,50	6,00	A3/A-	1,30 %
4,00	4,50	Baa2/BBB	2,00 %
3,50	4,00	Ba1/BB+	3,00 %
3,00	3,50	Ba2/BB	4,00 %
2,50	3,00	B1/B+	5,50 %
2,00	2,50	B2/B	6,50 %
1,50	2,00	B3/B-	7,25 %
1,00	1,50	Caa/CCC	8,75 %
0,80	1,25	Ca2/CC	9,50 %
0,50	0,80	C2/C	10,50 %
-	0,50	D2/D	12,00 %

A.3 FORECASTED INCOME STATEMENT

Income statement FY' ended in January	2015E	2016E	2017E	2018E	2019E
Revenue and other income	*26 723*	*28 773*	*30 245*	*32 439*	*34 877*
Cost of Materials	*15 188*	*16 355*	*17 179*	*18 446*	*19 864*
Gross Profit	***11 536***	***12 253***	***12 883***	***13 788***	***15 013***
Fair value uplift on harvested fish	*0*	*0*	*0*	*0*	*0*
Fair value adjustment on biological assets	0	0	0	0	0
Salary and personnel expenses	3 907	4 207	4 422	4 743	5 099
Other operating expenses	3 149	3 244	3 343	3 503	3 702
EBITDA	**4 480**	**4 803**	**5 119**	**5 542**	**6 211**
Depreciation and amortization	916	827	764	708	690
Restructuring costs	109	109	109	109	109
EBIT	**3 455**	**3 867**	**4 246**	**4 725**	**5 412**
Interest cost	807	807	810	952	1 124
Profit on ordinary activities before taxation	**2 573**	**2 877**	**3 182**	**3 366**	**3 696**
Taxation	840	939	1 039	1 099	1 207
Net earnings from continuing operations	**1 733**	**1 938**	**2 143**	**2 267**	**2 489**