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MSc Finance and Investments

Valuation of Solstad Offshore ASA

With particular focus on credit risk in one of the world's most capital intensive industries

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Acknowledgement

This master thesis is written as a final part of our Master of Science degree at Copenhagen Business School (CBS) where our field of major is Finance and Investments. The choice of topic is based on the interest in the Norwegian offshore supply vessel (OSV) industry. We have found it intriguing to investigate credit risk through a valuation model since the offshore industry is profoundly debt financed. Collecting historical data proved to be the most difficult and time-consuming process. However, all the effort has left us with a greater understanding of the market and how it operates with the complicated capital structures. We would like to thank our supervisor, Søren Plesner, for his valuable guidance, comments, and discussions through this period.

Executive summary

This thesis investigates the current market situation of the Norwegian OSV industry and how it has impacted the value of companies in the OSV industry, in particular, Solstad Offshore ASA. After the rapid decline in the oil price in 2014, the oil and gas companies have experienced a decrease in E&P investments and rig activity resulting in a lower demand for OSV services. The imbalance between supply and demand has resulted in historically low freight rates and companies have seen it necessary to merge, restructure and refinance their debt in order to avoid bankruptcy.

It is revealed that there is significant credit risk related to investing in Solstad and the respective stock. Companies in the OSV industry are almost entirely debt financed and particularly sensitive to changes in WACC through changes in variables such as interest rates, yield spread, and the leverage ratio. A research of the capital structure of Solstad both before and after the merger with REM reveals that the respective banks demand collateral in vessels while having a significant number of covenants in order to protect themselves from the difficult conditions in the OSV industry. Figure 1 displays the debt structure of Solstad.

Standard and Poor's credit rating method has evaluated Solstad to a rating of B which states that Solstad is vulnerable to challenging conditions but currently being able to meet their financial obligations. The fixed income market further confirms this with the bond trading significantly below par. An average of different approaches to estimate the probability of default yields a default probability of 36.86 percent.

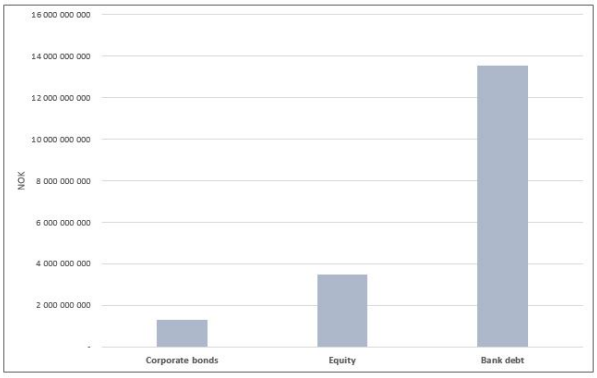


Figure 1: Capital structure of Solstad

A DCF analysis was implemented based on the external and internal analysis which revealed improved market conditions. This resulted in a share price of 16.68 NOK. This is a potential upside of 42.58 percent from the market price as of 04.01.2017 of 11.70 NOK. Even though the share price of Solstad recommends a buy situation, this cannot be recommended as the company is considered high-risk and the market is very uncertain. However, the low share price of the companies in the OSV industry suggests growth opportunities in relation to mergers and acquisitions. Solstad is expected to arise from the challenging condition with an extensive fleet and therefore achieve a strong market position.

Contents

1. Introduction

1.1 Motivation

The findings of oil and gas in the North Sea has been substantial for Norway's economic growth. Today, Norway is in the global top 5 exporters of crude oil. 67 percent of Norway's export is within this sector, and it constitutes to approximately 22 percent of Norway's GDP[1]. The discoveries have contributed to the focus on the Offshore Supply Vessel (OSV) market in Norway. This market offers service to offshore rigs and it is within this industry Solstad Offshore ASA (hereafter Solstad) operates. Solstad was founded in 1964 and has since then supplied the market with mainly medium and large sized supply vessels.

The profitability of the OSV market is dependent on the oil price and cyclical changes. Since 2014 the commodity prices have plummeted, and since June 2014 the spot price of oil has declined with 51 percent[2]. After the freight rate decline caused by the low oil prices, this extremely leveraged industry has been forced to cut costs, merge with competitors or default. Solstad's stock is listed on the Oslo Stock Exchange (OSE). In the beginning of June 2014, the stock was trading at 106.63 NOK per share, by the date of the valuation as of 04.01.2017 the stock was trading at disappointing 11.70 NOK per share[3]. Figure 1.1 demonstrates the strongly correlated relationship between Solstad's share price[4] and the oil price[5].

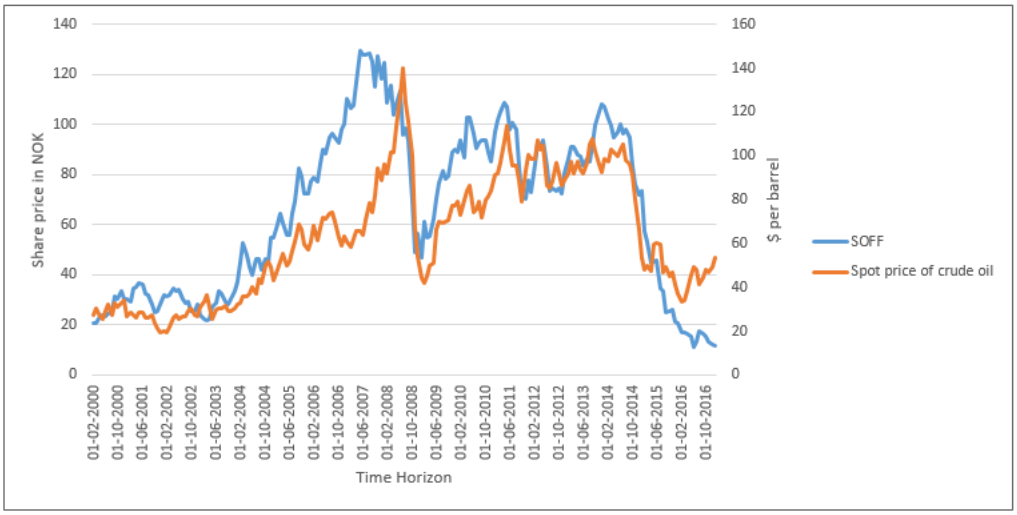


Figure 1.1: SOFF vs Crude Oil Brent

Another essential factor for this industry is that it is one of the most capital-intensive industries in the world. Hence, a large part of this industry's balance sheet consists of expensive ships

[1]European Commission (2016)
[2]E24 (2016)
[3]E24 Børs (2016)
[4]Yahoo Finance (2017)
[5]IndexMundi (2017)

which are debt financed. The debt to equity ratios found in this segment is staggering high. The low freight rates have led to large impairment losses of loan portfolios for Nordic banks such as DNB and Nordea, this since a large fraction of their loan portfolio is within this sector[6]. This captured our interest in credit risk as the offshore industry is extremely sensitive to their respective freight revenues in order not to default on the heavy debt financing. Small changes in the OSV industry can lead to extreme outcomes due to the capital structure of most market participants. Further, many of the Norwegian OSV companies has taken on more debt trying to survive the distressed state of the market.

The mentioned factors above define the motivation for this thesis. Based on the importance of the oil price for the Norwegian economy, the decline in freight rates which places this industry in a depressed and challenging state, and the fact that this industry is one of the most geared industries steered the thesis towards the offshore shipping industry.

1.1.1 Problem statement

Based on the current market situation and how it affects the OSV industry it is both informative and valuable to perform a standard financial valuation in order to get a better understanding of how the industry is performing, in particular, Solstad. Since the company is highly leveraged it is both interesting and necessary to include credit risk in the valuation in order to see how it affects the share price and in turn the value of the company. With this background, the following problem statement is generated for further research:

To what extent does the credit risk impact the valuation of Solstad Offshore ASA as of 04.01.17?

This leads towards a valuation which will focus on the analysis of credit risk. Since this is an exploratory problem statement examining the impact of credit risk on the share price, sub-questions are created which will give a better understanding of the credit risk impact on the share price. It is believed that credit risk will have an impact through the WACC which is affected by the cost of debt and the cost of equity, but it is uncertain to what degree. Parameters that are affected by credit risk is developed as it is necessary in order to investigate how the credit risk is reflected in the share price of Solstad and how sensitive the share price obtained from a DCF analysis is to changes in credit risk. Based on this the following sub-questions are created in order to reach an adequate answer to the problem statement. It is of opinion that these sub-questions will assist in answering the problem statement and give an understanding of what impact the credit risk has on the valuation of Solstad.

What variables of credit risk have an impact on the share price?

[6]Maritime Portal (2016)

How is credit risk reflected in the share price of Solstad?

How sensitive is the share price to changes in credit risk?

1.2 Methodology

This thesis is based on publicly available information as well as non-public available information. Some of the data such as freight rates, corporate bond information, and current market conditions have been collected from the investment bank Arctic Securities and their respective shipping department. This information is non-public but is needed in order to estimate an accurate valuation. Solstad's annual reports provide the financial information and cover the fiscal year of 2016. The valuation date is set to 04.01.2017. The information available up until this time point has been used in order to perform the valuation.

In order to answer the problem statement and its respective sub-questions, it is of importance that the valuation is conducted thoroughly. If the valuation relies on weak data, strategy, and assumptions the reflection of credit risk in the share price might not be accurate. The following methodology is used to create a strong foundation for answering the problem statement and sub-questions.

1.2.1 Strategic analysis

In order to do an extensive analysis of Solstad, the strategic analysis is split into an external and internal part. The shipping market model is used to describe the external factors that affect the enterprise value of Solstad. This model covers Porter's Five Forces but also additional factors that affect freight rate dynamics. Furthermore, the model will be the foundation for the forecast and future market expectations. The internal analysis takes advantage of the VRIO framework to analyze Solstad's resources and to what degree they are utilized. The framework will investigate Solstad's future position in the market in relation to its company strategy.

1.2.2 Financial statement analysis

The analysis of financial statements is derived from the last 7 years, mainly 2010 to 2017. The time horizon was set to observe both the cyclicality of the industry, as well as conditions both before and after the oil price plummet. A profitability analysis is performed of Solstad and the peer group to determine how the competitors are performing financially compared to Solstad. This group has similarities in fleet size and operations. The idea is that comparing key financial ratios will develop an understanding of the OSV industry and Solstad's position in the market. Further, a liquidity analysis is applied to recognize how the increased gearing and industry recession has left Solstad with the focus on meeting future financial obligations.

In order to perform a valuation, a weighted cost of capital (WACC) has been estimated. This is

done by estimating the main input parameters. Beta is estimated through an average of different approaches to determine the cost of equity. The cost of debt has been estimated with the use of yield spread from the Merton model. The WACC is the most important variable as it will reflect credit risk and impact the share price. The methodology behind this is discussed further in the credit risk section.

1.2.3 Credit risk

In order to answer the problem statement and sub-questions which focus on credit risk, a variety of different methods and theory has been applied. Credit risk will as mentioned be measured in the share price through the WACC estimate. Further, to build a strong foundation of the variables that shapes WACC an analysis of the capital structure of Solstad has been created. This in order to observe the exposure of debt and equity owners in the event of default determined by covenants and collateral restrictions. Continued, the leverage ratio, NIBOR and yield spread will capture credit risk and affect the WACC. The leverage ratio impacts the beta of the company, and in turn cost of equity. The NIBOR rate and the yield spread will affect the cost of debt. The yield spread is determined by the Merton model and a sensitivity analysis is conducted in order to observe the changes in yield spread in relation to changes in the Merton model. The NIBOR rate is predicted by Bloomberg and gives an insight to future developments. In order to support the focus on credit risk, probability of default and distance to default will be measured with different approaches such as historical default probabilities, default probabilities on corporate bonds and the Merton model. Further, a sensitivity analysis of the leverage ratio, NIBOR and yield spread in relation to the share price will be conducted and discussed further in the valuation section.

1.2.4 Freight rates

Freight rates is an essential part of the valuation as they directly impact the earnings and in turn the value of Solstad. The future freight rates are relevant in order to determine the growth in freight revenues. In order to create an accurate and reliable forecasting model, the future freight rates have been predicted through the Ornstein-Uhlenbeck model which follows the characteristics of freight rates. This is done with Monte Carlo simulation. This will ensure that the valuation model will reflect accurate estimates for the impact of credit risk in the share price. The structure of the future freight rates will determine the profitability of the company and hence determine their ability to meet their future financial obligations.

1.2.5 Valuation

As mentioned it is expected that the credit risk will be reflected in the valuation through the WACC and freight rates as mentioned above. The valuation is performed with a DCF-model, however, multiples have been used as an additional approach ensuring strength in estimates of share price and in turn its reflection of credit risk. A scenario analysis is applied, however,

one of the scenarios will be the reference case in order to answer the problem statement and sub-questions. The sensitivity analysis relies solely on the reference case, as it is being held constant except for the WACC when a range of leverage ratios, yield spreads, and NIBOR rates is applied. The changes in these variables will as mentioned turn out in the WACC, and will then capture the influence on the share price. In order to investigate the importance of freight rates and NIBOR rates on the share price of Solstad a Monte Carlo simulation has been applied.

2. Company overview

2.1 Short history

Solstad Offshore ASA was established under the name Solstad Rederi AS in Skudesneshavn, Norway in 1964. During the first 10 years of Solstad's history, the fleet consisted of 10 vessels in the dry cargo segment. In 1973 Solstad expanded their business to offshore by investing in a total of 13 vessels within this segment. From 1974 to 1982 they invested further in these two segments. In 1982 Solstad changed their strategy by only focusing on the offshore market, hence a sale of all dry cargo vessels was conducted. After 1982 further investments in the offshore segment was made. However, some investments which were later sold in 1998 was mainly in the dry bulk market[1].

In 1996, a more thorough strategy was executed which focused on expansion and renewal in order to have a modern fleet which was well adapted to current and future demand. Since the new strategy, Solstad's fleet has advanced substantially in term of size, strength and by advancement in equipment. Solstad's offshore fleet today consist of 61 vessels and has been developed to be a global operator[1]. Solstad has been listed on the Oslo Stock Exchange (OSE) since 1997 under the ticker SOFF[1].

2.2 Organization

Solstad is a global company that operates advanced vessels all over the world and they have branch offices in Aberdeen, Singapore, Rio de Janeiro, Perth, and Manila, in addition to their head office in Norway (Skudeneshavn). The company has around 1600 employees. Approximately 66 percent of the freight revenue in 2016 came from operations outside the North Sea. The company aims their activities towards the offshore petroleum industry, with vessels divided into three segments. The three segments are platform supply vessels (PSV), Anchor handling tug supply vessel (AHTS) and construction service vessels (CSV). The further description of Solstad's vessels will be discussed in section 2.3.

Solstad is in a restructuring process where they have increased their fleet and capital intensity. The company finalized their merger with REM Offshore ASA in December 2016. This resulted in an increase of the total fleet of Solstad from 44 to 61 vessels. The restructuring process has raised the balance sheet due to an increased fleet.

[1]Solstad Offshore ASA (2016)

2.3 Fleets

As mentioned, Solstad currently operates 61 vessels. Their fleet consists of 26 CSV vessels, 16 AHTS vessels, and 19 PSV vessels. Currently, the company has 3 vessels operating in Brazil, 2 in Mexico, 2 in Australia and New Zealand, 3 in Asia, 1 in the Middle East and 20 vessels in the North Sea. All the remaining vessels are in layup[2].

The vessels in the AHTS and PSV segment will be divided into categories by vessel size throughout the thesis, however, there is little data on the CSV vessels and it will therefore not be divided by sizes. The split of different vessels and size is done to account for the difference in spot freight rates in accordance with the size of the vessels. Figure 2.1 explains how the vessels of Solstad is distributed through contracts, layup, options and the spot market.

	PSV		AHTS		CSV	
	Nr of vessels	Options	Nr of vessels	Options	Nr of vessels	Options
Layup	13		8		4	
Contract	5	3	5	2	21	12
Spot	1		3		1	
Total	19		16		26	
Layup %	68.42		50.00		15.38	
Contract %	26.32		31.25		80.77	
Option %	60.00		40.00		57.14	
Spot %	05.26		18.75		03.85	

Table 2.1: Activity distribution of fleet

2.3.1 Platform supply vessels

Solstad currently owns 19 platform supply vessels. PSV vessels transport wet and dry bulk cargoes for offshore platforms, deck cargoes, and pipes for pipelaying purposes. PSV vessels are classified according to dead weight tonnage (dwt) and/or deck area (sqm)[3]. The PSV vessels will be divided into two categories by deadweight throughout the thesis, which are vessels with size above or equal to 3,500 dwt and below 3,500 dwt.

2.3.2 Anchor handling tug supply vessels

AHTS vessels tow and anchor mobile platforms, cranes and pipelaying vessels. They also supply cargoes for platforms. AHTS vessels are classed according to brake horsepower (bhp) and/or bollard pull (bp)[3]. The AHTS vessels are divided into two categories, based on brake horsepower

[2]Solstad Offshore ASA (2016)
[3]Pareto Securities (2010b)

through the thesis. These categories are vessels above or equal to 20,000 bhp and vessels with bhp below 20,000.

2.3.3 Construction support vessels

CSV vessels are used for subsea installation and construction, remote operations, and dive support activities. The various operations require different vessel sizes and capacities. CSV vessels are classed according to crane capacity and bollard pull (bp)[4]. This segment is more diverse than the two other segments in what operations it can conduct[5].

2.3.4 Vessel age

Vessel age is a commonly used indicator for vessel quality in the OSV industry. Solstad's PSV vessels have an average age of 8.16 years, their AHTS vessels have an average age of 11.06 and their CSV vessels have an average age of 8 years. This will be discussed further in section 5.1.

2.4 Peer group

There are several OSV companies listed on the Norwegian Stock Exchange but it has been decided to only focus on the Norwegian OSV companies when creating the peer group. This since Norway has an extensive offshore industry as mentioned in the introduction. The peer group is constructed with the focus on companies with similarities such as fleet size, fleet composition, market value, and operations. Table 2.2 demonstrates the peer group in which Solstad is found[6].

Company	Ticker	Head quarters	Estd.	Fleet	Newbuild order	Market value
Solstad	SOFF	Skudeneshavn, NO	1964	61	0	827.042.311
Dof	DOF	Bergen, NO	1981	67	2	1.969.845.912
SIEM	SIOFF	Kristiansand, NO	2005	29	0	1.692.462.974
Deep Sea	DESSC	Grimstad, NO	2005	39	0	448.648.533
Eidesvik	EIOF	Bømlo, NO	1978	24	0	184.518.000
Farstad	FAR	Ålesund, NO	1956	56	0	51.870.000
Havila	HAVI	Fosnavåg, NO	2003	27	0	23.238.291

Table 2.2: Peer Group

Figure 2.3 shows the current fleet composition of each company in the sector. It gives an overall picture of which sectors each of the company in the peer group has chosen to target. The only expectations are Eidesvik and Siem who also operate some vessels in other segments.

[4]Pareto Securities (2010b)
[5]Solstad Offshore ASA (2016)
[6]E24 børs (2016)

	Solstad	Deep Sea	Eidesvik	Siem	DOF	Farstad	Havila
PSV	19	25	9	13	18	22	14
AHTS	16	12	0	10	20	27	9
CSV	26	0	5	5	30	7	3
Other	0	0	9	18	0	0	1

Table 2.3: Fleet composition of Solstad and peer group

2.5 Contract coverage

The industry that Solstad operates in is both risky and volatile and exposed to numerous external factors. Therefore, it is considered valuable to have predictable freight income in an industry that is considered both uncertain and cyclical. Predictable freight income can be achieved by having a part of the fleet on contract settlements. The market development that has happened over the past years has made it even more important that Solstad has a high percentage of their fleet on contract. Table 2.4 display Solstad and its peer group's distribution of vessels that are on contract, in layup, and in the spot market.

The contract coverage for Solstad and the peer group is reported at the end of 2016. Havila currently has a total fleet of 27 vessels. However, the company is restructuring their firm and therefore has sold one vessel and have seven vessels out for sale. These vessels are not considered in Havila's total contract coverage.

	Solstad	Deep Sea	Eidesvik	Siem	DOF	Farstad	Havila	Avg.
Layup %	40.98	45.95	0.00	28.57	05.88	25.00	26.32	24.67
Contract %	50.82	40.54	77.78	46.43	57.10	53.57	57.89	54.88
Spot market %	08.20	13.51	22.22	25.00	37.02	21.43	15.79	20.45
Option %	54.84	66.67	64.29	x	67.00	96.67	90.91	x

Table 2.4: Contract coverage of Solstad and peer group

The contract coverage is estimated based on the given information about vessels on contract reported in the respective companies' quarterly reports.

2.5.1 Layup

Solstad currently has 40.98 percent of their fleet in layup, which is above average. However, Eidesvik and DOF which has respectively none and four vessels in layup affects the average calculations severely. The layup percentage in table 2.4 shows how the whole industry suffers from the drastic market conditions and how the companies place vessels in layup in order to focus on cost saving strategies.

2.5.2 Long-term contracts

As the market conditions are uncertain most companies want to secure their fleet on long term contracts. Vessels that are on contact usually have a higher utilization rate than vessels in the spot market. This is due to that the vessels on contracts have secured payments through the entire contract period. 50.82 percent of Solstad's fleet is on long-term contracts. Solstad and its peer group have about the same fraction of their fleet on contract. The exception is Eidesvik which lays a bit above average and has a quite high contract coverage. As the market is suffering it is becoming harder to secure the companies' fleet through long-term contracts.

Solstad has option contracts on 54.54 percent of their long-term contracts. Option contracts are valuable as they trigger the option clause which is preferred in the cause of renegotiating. However, considering the market conditions there is some uncertainty whether how many of the options will be exercised. Since these extension options were made when the contracts were settled the rates might have decreased further since. It is not expected that all options will be exercised since market participants can choose among a high number of companies and lowered freight rates to fulfill their requests.

2.5.3 Spot market

Rates in the spot market are volatile and hard to predict. Solstad has 8.20 percent of their vessels in this market. This reflects the uncertainty of the spot rates, where companies rather want to have their vessels on contract when the market conditions are deteriorating. These future spot rates are predicted in section 9.1. Solstad only has a few vessels in the spot market. However, a large fraction of their laid up vessels would be operating in this market if market conditions allowed it.

3. Industry overview

3.1 Industry description

The offshore supply industry mainly derives from the need for transportation of goods or personnel to oil platforms. The OSV industry is normally divided into two parts; subsea vessels and supply vessels. Solstad used to mainly operate within the supply vessel segment however after the new merger their focus has expanded to the subsea segment. The OSV shipping industry is highly dependent on the prices of commodities such as oil and gas. After 2014 the conditions have been though and forced shipping companies to extreme lengths of cost cutting or even default.

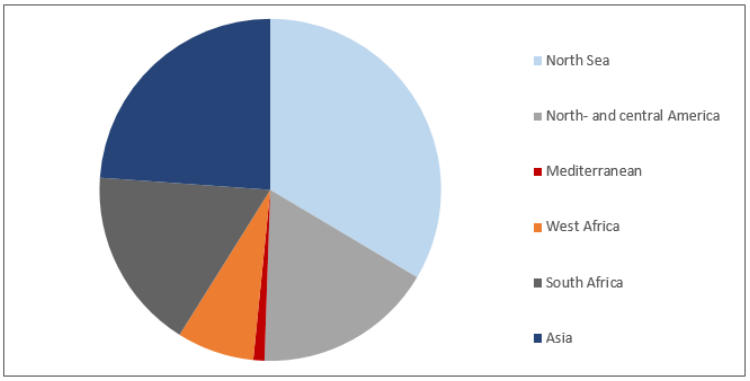


Figure 3.1: Revenues split into regions

North-West Europe

Markets in North-West Europe is difficult. Maersk stated in their annual report that their low income was just partly offset by cost saving initiatives in the troubled regions such as Latin America, North-West Europe, and Africa[1]. However, Maersk has cut exploration costs to focus on past high-profit locations such as the North Sea. Two major development projects were also started by the end of 2016 in the North Sea by Maersk. As mentioned in section 2.3 Solstad currently has 20 vessels operating in this region. It used to be highly profitable and one can assume that this is where a large fraction of revenues is generated. The North-West region will be further discussed in the freight rate modeling section. Shipping Watch state that the Norwegian oil and gas sector has become somewhat more optimistic about the future and that it is now expected that more investments will be made in 2017 than predicted earlier[2]. This indicates expected increased future profit.

[1] A.P. Moller Maersk (2016)
[2] Shipping Watch (2017)

Brazil

Maersk states that the Brazilian economy is stabilizing[3]. Offshore Support Journal states that the demand for offshore support vessels could be picking up again[4]. The reason behind the good future outlook is that Brazil's president Michel Temer newly has made numerous decisions that could improve the offshore oil and gas and thereby the OSV industry[4]. However, a large OSV giant was given priority status by Merchant Marine Fund (FMM) to build six large PSVs over the next few years. FMM offers low-interest loans to encourage shipbuilding and repairs in Brazil and has not been offered the 18 previous months[4]. This means increased competition in a market that is expected to improve.

Asian Pacific

The Asian Pacific is a huge market for offshore support vessels. This market has been weak since the oil crash with low utilization and day rates. The Middle East has remained quite stable in this challenging period compared to the other regions. Based on this some of the companies in the Asian Pacific has chosen to deploy their vessels to the Middle East in order to meet higher demand and rates[5]. The challenging conditions have resulted in lower utilization rates for the vessels operating in this region. In mid-2016 the utilization for the standard water segment in this region went down to 75 percent and to 52.5 percent in the deep-water segment[5].

West Africa

Offshore Support Journal states that "after some reflection, a fair summary of the offshore vessel market in West Africa in 2016 should at least contain the following four themes; departure of household name owners, field developments generating long-term contracts, new floating production units entering the region and unforeseen events that can, for owners, create continuous demand"[6]. The conditions in West-Africa has been characterized by extremely low freight rates in 2016. The Norwegian shipping company Siem Offshore even abandoned the market. This implies that this market used to have opportunities, however, many companies could not afford to act on them based on their margins. Despite this, there was increased field work related to Floating Production Storage and Offloading, where DOF Offshore has landed a contract. This signalizes hopes for increased activity[6].

3.1.1 Cyclicality and seasonality

Cyclicality

Cyclical industries are sensitive to the business cycle, which means that they generate higher revenues in periods where the market is doing well and is in expansion and lower revenues in times where the market is experiencing an economic downturn. Companies in the OSV industry

[3]Shipping Watch (2017)
[4]Offshore Support Journal (2016b)
[5]Alix partners (2016)
[6]Offshore Support Journal (2016a)

handle this volatility by cutting costs during economic recessions and expanding their fleet and supply during good times[7].

The business cycle comprises four phases respectively; market trough, recovery, market peak and collapse. These phases will be discussed in this section.

In the first phase, which is the trough phase, the industry sees signs of excess capacity of vessels, and freight rates that fall to the level of operating cost of the least efficient vessels, which moves the vessels in the direction of layup. The low freight rates and tight credit produces negative cash flows for the companies. At this point, there is a financial pressure building up in the industry, which leads to a stagnation as tough decisions are put off and finally distress because of the market pressure. In extreme times the companies are forced to sell their modern vessels at lowered prices in order to raise cash. The price they are being offered for their vessels are often below the book value and older vessels fall to the price of scrapping. This leads to a demolition market and the industry is starting to face recovery[8].

The next phase is the recovery phase. During this phase the market moves towards a balance between supply and demand, the freight rates starts to increase and reach a level above the operating expenses, and the number of vessels in layup decreases[8]. There is still uncertainty in the market, but the market participants are more confident as the market conditions and liquidity of the companies are raising to a more comfortable level.

The third phase of the business cycle is the peak phase. At the peak phase, the relation between supply and demand is tightened and companies' fleet operates at full speed and utilization. There is a minimal amount of ships in layup and the freight rates are usually at a level two to three times the operating expenses[8]. The increased freight rates result in higher revenues and earnings for the companies and they experience a higher liquidity. The improved market conditions lead to companies ordering newbuilds in order to meet the demand in the market.

The last phase is the collapse. A collapse happens as the supply in the market is greater than the demand and the freight rates starts to fall[8]. Because of delays and lags when ordering newbuilds, some of the newbuilds ordered in the peak phase now enters the market contributing to even greater supply.

At what time and which phase a company is in the business cycle depends on the level of activity in the market[8]. The OSV industry has been in the collapse phase over the past years due to a severe fall in the oil price. This has led to decreased freight rates and declining revenues. When the market is in a good state there will be increased investments and activity in exploration

[7]Investopedia (2017)

[8]Stopford, M. (2009)

and production. This demands higher capacity from the OSV companies, which will order newbuilds in order to meet the demand in the market. However, as mentioned there is a delay in meeting this demand as newbuilds take about three years before they enter the market. This has been the effect in the OSV industry where many of the newbuilds entered the market after the oil crash, resulting in a higher supply and even more vessels in layup. The low response time to changing market conditions makes it difficult to exactly predict demand and in turn the respective revenues.

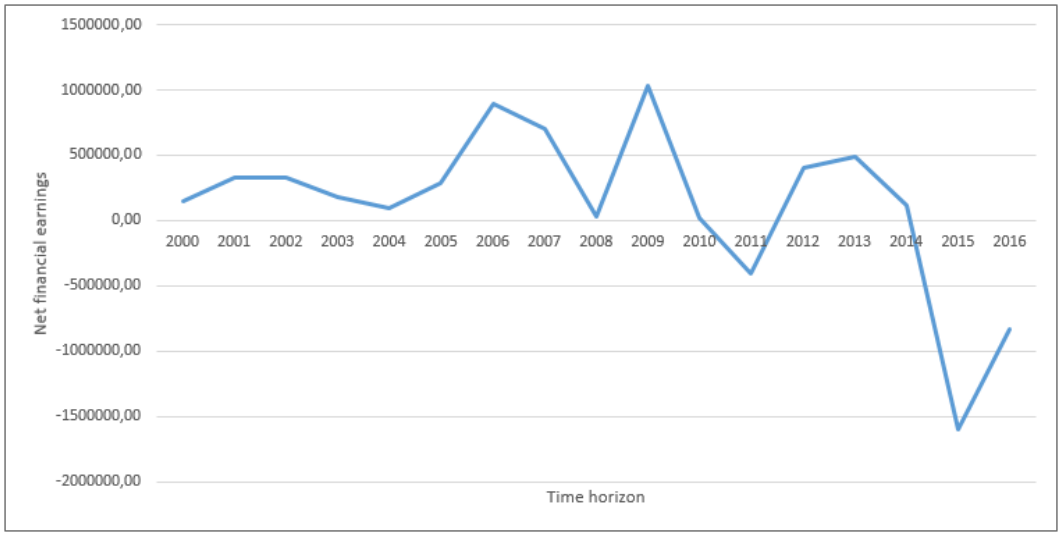


Figure 3.2: Cyclical changes in earnings

By taking into account and identifying the cyclicality of Solstad a better and more accurate forecast can be performed. Figure 3.2 shows a clear pattern of cyclical trends. The figure shows that Solstad was in the trough phase from end 2003 to 2004. During 2004 the company started to recover which lasted until the beginning of 2006 when Solstad reached its peak point. Between 2006 and 2007 it occurred a collapse, which lasted until mid-2008. The business cycles continue over the historical period in a more drastic manner. This is due to economic recessions because of the financial crisis in 2008 and the oil plummet that happened in 2014. The rapid and drastic fall in the oil price following 2014 has made it challenging for companies' dependent on the oil price to maintain their position and do business. Figure 3.2 shows signs of a recovery in Solstad's earnings from the beginning of 2015, however, due to the current market conditions there will still be a while until the company reaches a normal business cycle.

Seasonality

Seasonal cycles are regular fluctuations through the year[9]. In the shipping, industry companies experience seasonal cycles through fluctuations in freight rates. These fluctuations usually happen due to variations in demand for sea transportation which is dependent on the specific

[9]Stopford, M. (2009)

season[10]. Companies in the shipping industry operate in markets with historically large seasonality in demand, which affects the freight revenues. There is a higher demand for oil in the winter season. This affects the seasonality as companies have to have more in stock in order to meet the increased demand affected by the Northern Hemisphere winter[10].

3.1.2 Shipping markets

The market of ships is defined by three sub-markets; the newbuilding market, the second-hand market, and the scrap market. Most ship sales and purchases are in connection with specialist brokers, except for newbuilding contracts which may be ordered by investors to shipyards directly[11].

Factors determining ship prices

The factors determining ship prices can either be market-specific or vessel-specific. Vessel-specific factors relate to the particulars and condition of the vessel, such as size, type, age, general condition, quality of design, build, equipment and engine[11]. Market-specific factors depend on the vessels current and expected operational earnings over their economic life, which again is determined by the general state of the freight market[11].

The newbuilding market

This is the market for newly built ships, which takes between several months and a few years to deliver dependent on the specification of the vessel ordered. Ship prices in this market are determined by supply and demand factors. Newbuilding prices depend on factors such as the market condition, steel prices, the level of freight rates, the backlog of the shipyard and terms of contract[11].

Second-hand market

This market is known as one of the most competitive markets in the world, this since it is an open market with no sort of price regulations[11]. It is often referred to as the sale and purchase (S&P) market, and consists of vessels ready for trade and aged between a year and 20, or even more. Since there are no price restrictions the prices are determined by supply and demand. In other words, current and expected world economic activity, current and expected freight market conditions as well as expected ship prices[11]. Hence, it directly depends on the profitability of the market.

The scrap or demolition market

This market exists for ships that are not economical to operate and they are either sold for demolition or scrapping. The age of which ships are sold for scrap varies over time and largely

[10]Stopford, M. (2009)

[11]Alizadeh, A. H. and Nomikos, N. K. (2009)

depend on the condition of the freight market, steel prices, as well as the conditions in the second-hand, newbuilding and the scrap markets[12].

3.2 Freight rates

The cost of providing offshore transportation service is represented by freight rates and is not classified as a tangible commodity. In other words, it cannot be stored. It is defined as a specified amount of money per day to hire a ship or a specified amount per ton of cargo transported between two ports, that the shipowner agrees to provide with a service to the charterer[12]. The global freight rates are at a historical low and it has probably never been cheaper to ship goods around the world[13]. Freight rates are dependent on market cycles that are prevalent in the shipping industry. These market fluctuations were discussed in section 3.1.1 about cyclicality.

3.2.1 Forward freight agreements

Use of derivatives in the shipping industry is substantial as this leveraged industry is exposed to changes in interest rates, currency and most important changes in the very volatile freight rates. Options is often preferred when hedging because of the unlimited potential upside, however premiums are costly. Another choice is futures, however they are often very standardized, therefore both shipowners and charterers tend to turn to forward freight agreements (FFA).

A forward freight agreement is an over-the-counter (OTC) derivative. OTC derivatives are often more tailored for the purpose of the contract and one needs to go through a broker. A FFA is an agreement between two counterparties to settle a freight rate or hire rate, for a specified quantity of cargo or type of vessel, for one or a basket of the major shipping routes at a certain date in the future. FFAs are settled in cash on the difference between the contract price and an appropriate settlement price which is an average of the past spot rates[12].

3.2.2 Spot freight rates

The spot freight rate is a price quoted for immediate settlement. It is also called the "spot price" and is based on the current and expected future market conditions, hence how much buyers are willing to pay and how much sellers are willing to accept[14]. The spot freight rate is often averaged out by a period of time, often a week or a month, depending on the route and contract. This is known as the settlement rate and is frequently used to calculate the settlement of the forward contracts mentioned previously. The reason behind this average rate is done to avoid market manipulation due to few trips on some routes and to ensure that rates are not susceptible to large moves due to very high volatility[14]. Throughout the thesis this rate will be frequently referenced to as the freight rate, it is also the rate that will be predicted in section 9.2.

[12] Alizadeh, A. H. and Nomikos, N. K. (2009)
[13] Petersen, R. (2016a)
[14] Investopedia (2016)

3.3 Types of risks in the shipping industry

The risk is often defined as any factor that might have a negative impact on the expected net cash flow. For shipping companies three categories of risks are frequently discussed; price risk, credit risk, and pure risk[15]. These risks are significant for the profitability and hence needs to be managed and monitored frequently.

3.3.1 Price risk

Price risk can be defined either as output or input price risk. Input price risk refers to changes in prices a firm must pay while output price risk refers to the changes in prices that a firm can demand[15]. Further, price risk can be divided into the four categories as follows.

Freight rate risk

Freight rate risk refers to the volatility in earnings due to changes in freight rates. This is considered as the most important factor of price risk since it directly affects the earnings of the shipping company[15]. It is mostly hedged with forward freight agreements or options. Future freight rates as mentioned in the methodology section will be modeled as they determine the ability to meet future financial obligations.

Interest rate risk

Interest rate risk is a significant factor for shipping companies. The shipping industry is an extremely capital intensive industry and most vessel acquisitions are debt financed. These loans are often determined by the floating rate such as LIBOR or NIBOR. Shipping companies are therefore very sensitive to changes in interest rates. Future interest rates will be discussed further in section 8.8. Shipping companies have currency risk as well as they have to convert freight income in US dollars to another currency or in cases where they have debt in one currency and freight income in a different currency[15]. Currency risk is also directly related to interest rate exposure since each currency is linked with a different interest rate yield curve[15]. These risks are mostly hedged with financial derivatives.

Operational cost risk

Operational cost risk refers to the volatility in factors such as fuel oil cost called bunkers. These costs often account for more than 50 percent of voyage costs for shipping companies. These costs are strongly correlated with the oil price[15].

Asset price risk

The shipping industry is experienced as volatile and complex, therefore investors are faced with important and difficult choices about the timing of investments and divestment. A major concern

[15]Alizadeh, A. H. and Nomikos, N. K. (2009)

for banks, shipyards and shipping companies has been the volatility in ship prices. Hence, market participants tend to monitor the volatility in ship prices and incorporate such information in their lending, investments, portfolio construction and divestment decisions[16]. Lenders take collateral in vessels and therefore a decrease in value can affect the creditworthiness of shipping companies[16]. Derivatives traded on ship prices is extremely uncommon as there consists no market where one could trade these. This risk is, therefore, difficult to hedge but is mostly done with FFA's as ship prices and freight revenues are highly correlated.

3.3.2 Pure risk

Pure risk is defined as the risk of reduction in value of business assets due to physical damage, accidents, and losses. However, it also covers the risk of physical risk such as technical failure and human errors when operating the company's assets. This could be collision or accidents[16]. Pure risk is hedged through insurance contracts.

3.3.3 Credit risk

Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms[17]. One need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any organization[17]. Considering the capital structure of Solstad it is recognized that equity owners are extremely exposed as the debt structure is heavy. There are several tranches of debt financing Solstad. Banks and fixed income participants dominate the claims in the event of default. There are several approaches to measuring the credit risk within a company. Since this is a vital part it will be discussed further in section 6.1.

[16] Alizadeh, A. H. and Nomikos, N. K. (2009)
[17] Basel Committee on Banking Supervision (1999)

4. External analysis

4.1 Shipping market model

To analyze the development in freight rates, the shipping market model, developed by Martin Stopford, has been applied. Earnings in the shipping market are highly correlated with the development in freight rates. As mentioned in section 3.2, freight rates are defined as a specified amount of money per day for ship hire, or per ton of cargo transported between two ports[1]. The freight rates are controlled by supply and demand[2]. It is a well-documented fact that demand depends on factors such as world economic activities, international seaborne trade, seasonality and cyclical changes for different commodities transported by sea, the distance between sources of production, and consumption of commodities. Supply, on the other hand, depend on the stock fleet available for trading, shipbuilding production, scrapping rates and losses, fleet productivity and the level of freight rates in the market. Therefore, freight rates at any point in time reflect the balance of supply and demand[2]. Since the shipping market model was intentionally made for the traditional shipping markets such as bulk, tanker and container market some adjustments has been done on the original model. Therefore, some of the original factors have been replaced by other factors more suitable for the OSV industry. The findings in this section influence the predictions of future freight rates and utilization rates estimated in the forecasting section.

Demand	Supply
World Economy	Newbuilding
Oil Price	Scrapping
E&P Spending	Total Fleet
Rig Activity	

Table 4.1: Shipping Market Model

4.1.1 Demand

The demand for shipping services is hard to predict and can often change by as much as 10 to 20 percent in one year. There are several factors known to influence the demand and the four most significant factors are listed in table 4.1.

World Economy

The world economy is the most important single influence on the demand for ships. It is well documented that the state of the world economy correlates with the demand for OSV services. The most common approach is to use the gross domestic product (GDP) as a proxy. Growth

[1] Stopford, M. (2009)

[2] Alizadeh, A. H. and Nomikos, N. K. (2009)

in GDP is highly correlated with an increase in seaborne trade and activity, which increases demand for the OSV industry. Hence, when the economy is in a good state there is increased demand for energy, i.e. the oil sector. Figure 4.1 shows the relationship between GDP and oil demand over the past thirty years. It is observed that the development of the world economy growth[3] is followed by the demand for oil[4].

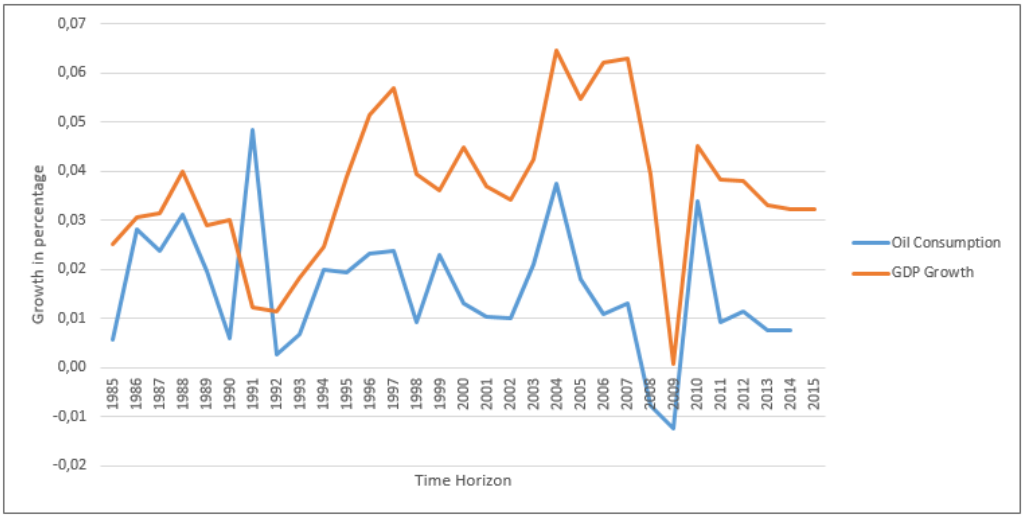


Figure 4.1: Oil Consumption vs. GDP

Development in GDP After the financial crisis and the oil plummet the global economy experienced a substantial downturn. The crisis led to a depreciation in the demand for oil and a drop in the global GDP. Uncertainty and stalling global activity have made a significant impact and the global growth decreased to 2.3 percent in 2016. This performance is the weakest since the financial crisis. The world economic activity is projected to pick up in 2017 and 2018 after a tame outcome in the previous years. The global growth is estimated to be 2.7 and 2.9 percent in 2017 and 2018 respectively[5]. The pace is predicted to pick up, especially in emerging markets and developing economies. However, there are some uncertainties regarding the possible outcomes considering the politics of the US and its global ramifications.

Donald Trumps effect on shipping It is very likely that Trump will be a supporter of the US domestic energy markets. This will affect fossil fuel producers, including the miners of steam coal. The impacts of Trump's politics on shipping will depend on shifts occurring to a global matrix of origins and destinations[6]. A higher level of US shale oil could possibly threaten the oil price and in turn, depreciate the price. This as shale oil is very cost effective to produce compared to brent oil. One could also argue that it will widen the spread of brent

[3]The world bank (2017)
[4]Investing.com (2017)
[5]The World Bank (2017a)
[6]Parker, Barry (2016)

and WTI oil and that there could be arbitrage opportunities for refined products[7]. There is also uncertainty related to how strict Trump favors the "national security" aspects of shipping, such as the Jones act. The Jones act, founded in 1920, forbids any foreign built or foreign flagged vessel from engaging in coast-wise trade within the US[8]. In Bill Clinton's years, US flagged (but not necessary the US built) liner vessels in foreign trades was allowed to gain annual subsidies[9]. However, the grade to which the act is fulfilled by Trump is hard to predict.

Oil Price

Historical perspective of the oil price The oil price is driven by the relationship between the supply and demand of oil and as mentioned is GDP growth an important factor for the global demand. As shown in figure 4.2 the oil price[10] has been quite volatile over the last 35 years and it has significantly increased in the years after the financial crisis. One of the main reasons that the oil price has fallen dramatically over the last couple of years is due to the high production in relation to demand.

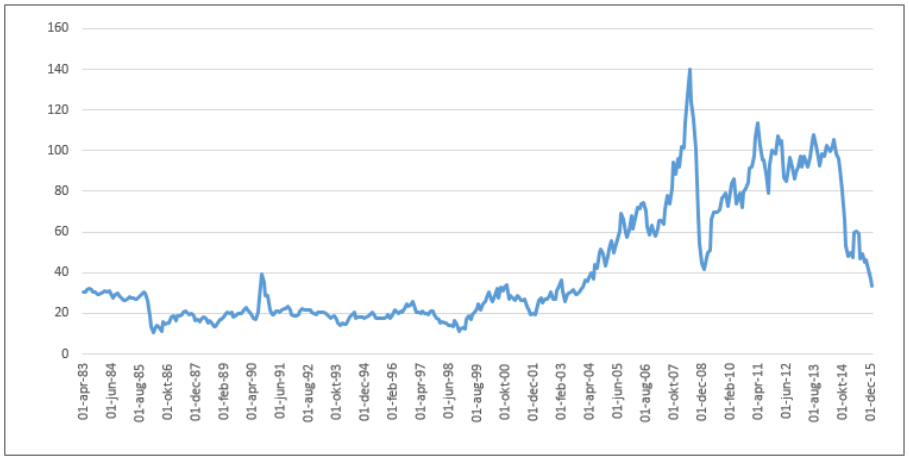


Figure 4.2: Historical oil price

High and stable oil prices result in increased activity in the OSV industry. The market development has been influenced by the drop in the oil price over the last couple of years. Factors that have influenced the oil price over the years is cut in OPEC production, strong US dollar, financial crisis, changes in spare capacity and wars and revolutions. The OSV industry and general offshore activity are threatened by the development of the extracting of shale oil. Many argue that one of the reasons for the steep decrease in the oil price the last couple of years is the shale oil, which in turn has shifted the balance of demand and supply significantly[11]. High production in relation to demand is one of the main factors resulting in that the oil price has fallen from 115/bbl in June 2014 to below 46/bbl in January 2015, which is a decrease of roughly

[7]Parker, Barry (2016)
[8]Maritime Law Center (2016)
[9]Parker, Barry (2016)
[10]IndexMundi (2017)
[11]Fearnley finance (2016)

60 percent[12]. The Organization of Petroleum Exporting Countries (OPEC) have since the 1960s worked as a cartel that controls the supply of oil from several oil producing countries in order to stabilize the price at a profitable and sustainable level. The organization is led by Saudi Arabia, which is the world's greatest oil-producing country. By cutting the oil production and decreasing the volume made available to the market the organization has managed to establish a price level that normally lies over the break-even levels of oil production. Following an announcement in late 2014 where OPEC agreed to not cut production resulted in an oil price decline. At this point, the brent crude oil fell to its lowest point since 2010[13]. Two years later, in late 2016, OPEC agreed to a meeting to start production cuts in order to seek stability in the market. If the plan succeeds this will be the first production cut since the financial crisis. The plan is that if the deal is fully implemented it will effectively end the price war started two years ago by Saudi Arabia and re-balance the market[14]. The oil price has experienced a small increase since the cartel announced their plan to cut oil production. However, there is large uncertainty to which degree the OPEC countries will cut production.

Supply and demand of oil Decreasing oil prices are resulting in harder times for the OSV industry and fewer freight contracts being settled. Reduction in oil prices results in a decrease in the demand for seaborne transportation, which leads to falling freight rates. This results in fewer deals and contracts being settled, whereas the OSV companies have to cut costs by for example reducing rig count and activity, which reduces the supply of OSV services.

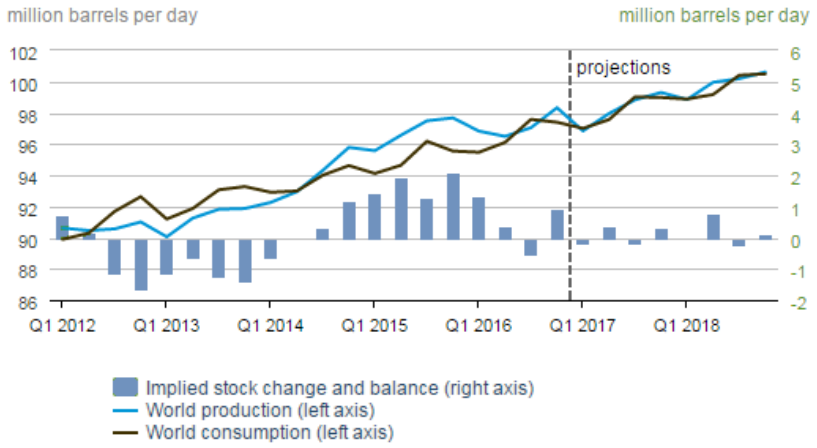


Figure 4.3: Relationship between oil production and consumption. Source: U.S. Energy Information Administration.

Figure 4.3 shows that until the oil downturn in end 2014 the consumption of oil was higher than the production of oil. After the oil crisis hit there has been a higher supply of oil in the market

[12]International energy agency (2017)
[13]BBC (2014)
[14]E24 (2017)

than demand. This has led to an increased oil stock. However, in late 2014 the global production of oil reached a higher level than the consumption of oil in the market. As seen in the figure, the U.S. Energy Information Administration expects the balance between the supply and demand of oil to be at a more even point from 2017[15]. Even though there are made decisions in order to cut production and re-balance the market there will be a slight increase in the oil stocks in the near future.

Since the oil price is driven by the relationship between supply and demand, which is uncertain, and market conditions that are affected by high volatility it is hard to predict a reasonable estimate of the future oil price. However, it is possible to get an expectation by combining fundamental analysis of historical and future conditions with the pricing of oil futures. Looking at these factors will give an estimation of how the oil price will develop in the years to come. Because of the uncertainty in the market, the prediction will be better and more precise the closer the time horizon. A recovery of the oil price is dependent on the OPEC agreement discussed earlier. The OPEC production cut has set some restrictions on the industry and can help to reduce the global oil stocks. The demand for oil is assumed to pick up as participants in the market has chosen to take actions in order to re-balance the market conditions[15]. However, this takes time. The International Energy Agency states in their report from 2016 that the world demand for oil in 2016 increased to 1.6 million barrels per day and that it will continue to increase with 1.4 million barrels a day in 2017[15].

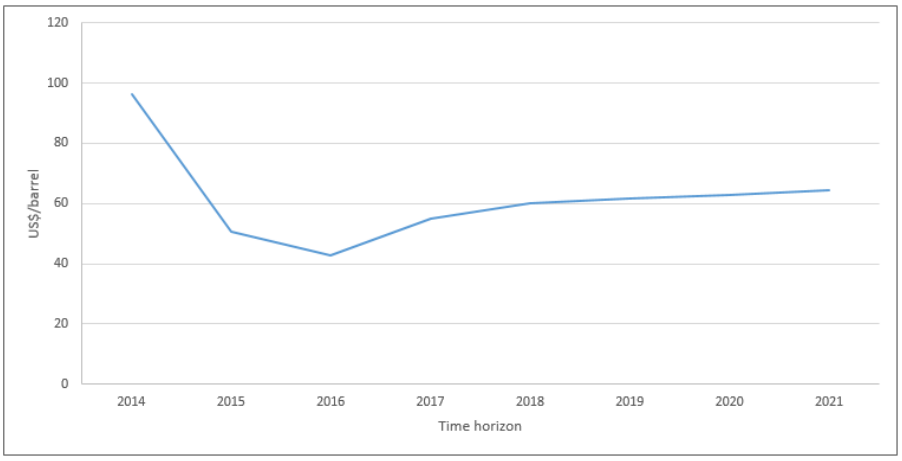


Figure 4.4: Future expectations of the crude oil price. Source: The World Bank

The World Bank expects the oil price in 2017 to increase to an average of 55 US$/barrel. This is an increase in the oil price of 29 percent from the previous year[16]. As shown in figure 4.4, the oil price is expected to have a slow and steady increase over the next couple of years and reach a price per barrel of 64.5 US dollars in 2021[17].

[15]US Energy Information Administration (2017)
[16]The World Bank (2016)
[17]The World Bank (2017b)

Exploration and Production Spending

One of the most important drivers for activity within the OSV industry is exploration and production (E&P) spending. E&P spending represents the oil companies' willingness to make investments in the offshore service market[18]. The OSV vessels are needed for the operations related to E&P activities. Accordingly, if an oil company chooses to increase their activities within E&P the vessels within the OSV industry will be needed in order to operate and maintain the platforms.

Relationship between E&P spending and oil price E&P spending is highly impacted by the oil price. The reason is that the oil price is the main driver for oil companies' investments in E&P, and thus the demand for OSV services. Companies in the oil and gas industry will increase their E&P spending budget and activities if the market is experiencing a strong demand for oil and continual high oil prices[19]. Companies in the OSV industry participate in E&P activities such as field search and well drilling, construction and drilling and operation and production of the oil rigs. Therefore, if the market experiences a reduction in the E&P activity it leads to less demand for OSV vessels. Even though it is a high correlation between the oil price and the investments in E&P, most companies want to observe the oil price over a period before they make investments in order to eliminate uncertainties. This is especially the case when the market has suffered from a recession and challenging market conditions. Figure 4.5 shows the relationship between the demand for oil and E&P activities[19].

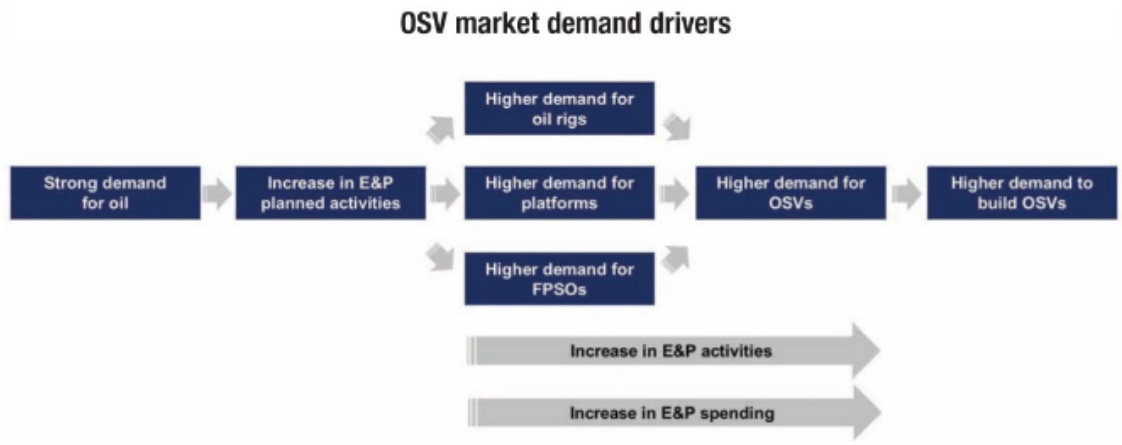


Figure 4.5: Relationship between demand and E&P activities. Source: Marine Money Offshore.

Activities related to E&P spending reached a peak in 2013. Since then the activities related to E&P spending has almost halved. As mentioned, OPEC has decided to start production cuts which will make companies in the oil and gas industry more confident in relation to E&P

[18]Stopford, M. (2009)

[19]Pareto Securities (2010a)

spending. However, the market is still experiencing high uncertainty and the recovery of the oil price is in an early stage at this point[20].

Outlook E&P spending The E&P spending is still in a depressed state, but Barclay's expect the global oil and gas companies' spending to increase with 7 percent in 2017[20]. This is the first increase in E&P activities in three years[20]. Since the E&P spending is dependent on the oil price companies will evaluate the oil price and the growth before they decide on any drastic changes in their investment budgets and activities. An increase in E&P spending is good news for the companies in the OSV industry as this will lead to a higher demand for the vessels.

Rig Activity

To get an indicator of the demand for products used in complementing, drilling, producing and processing oil and gas the active rig count is used. Rig activity is the most important factor within the segments of AHTS and PSV vessels. Active rigs lead to activity in the OSV industry in numerous ways. AHTS vessels can be used to move rigs to new areas or within the exploration area, and to set up and reposition anchors for floatable rigs. PSV vessels are used to transport essential materials and equipment to the rig platform. Construction CSV, also called subsea vessels, prepare in order for drilling and production in new fields to be done. The preparation is done through the installation of underwater systems with help from remotely operated underwater vehicle (ROV) vessels. Knowing the distribution of work for the different vessels, AHTS vessels will be affected to a larger degree directly if new rigs to the market are reduced. PSV and CSV also perform work related to active rigs and will, therefore, experience a longer cyclical lead-time when they are affected by a lower rig activity in the market.

When the oil price started to drop in 2014 E&P companies started to reduce rig counts. A combination of fewer contracts being settled and new rigs entering the market leads to a higher rig availability in the market. A way to improve the high availability of rigs is layup and scrapping, i.e. available rigs can be placed in layup in hope for the market to recover within a few years. This will be explained further under scrapping in the supply section. The rig count decreased with 203 rigs from April 2015 to April 2016, which indicates that there is a low demand for rig activity and hence OSV vessels that tow and maintain rigs[21]. The high oil price in front of end 2014 resulted in a global increase in the E&P spending. The oil boom in the market caused a higher demand in the market after new rigs, which resulted in the market being almost entirely sold out of available rigs[22]. The high utilization rates in front of 2014 caused companies to have a historically large order book. When the oil price started to drop in end 2014 it caused the freight rates to drop because of an oversupply in the market. The rest of

[20] Barclays Investment Bank (2017)
[21] IHS Markit (2017)
[22] Alix Partners (2016)

the order book that was placed pre-2014 are now entering and has entered the market at a time where it is already a to big supply in the market, which leads to a further drop in the utilization and freight rates. Figure 4.1 shows how the rig count has decreased over the last couple of years.

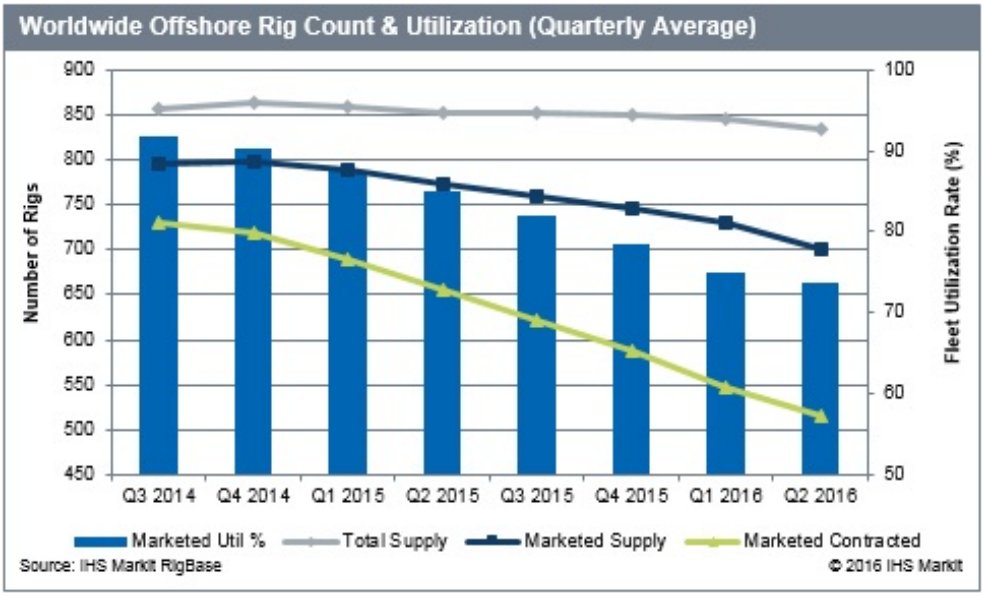


Figure 4.6: Worldwide rig count and utilization. Source: IHS Markit

Outlook for the rig market Witnessing the oil price makes a good implication of how the rig activity will develop in the years to come. If the oil price faces a recovery over the next years, it will result in a slow but steady recovery of the rig market. It is expected that the oversupply will continue into 2017, with no drastic changes considering the rigs in layup[23].

Conclusion demand

The main underlying factor for demand in the OSV industry is the demand for oil[24]. The demand in the industry has decreased by about 10 percent each year since 2014. IHS Markit expects this decrease to continue into 2017 due to the growth in the global OSV fleet[25]. As discussed, this decline is because of the high ordering of new vessels before the market experienced a recession, historically low oil prices and freight rates, and decreased utilization.

Even though there are some ramifications in the market at this point, such as OPECs production cuts, there is still severe uncertainties in the industry. 2017 is expected to be the last year for the industry to suffer from cuts and significantly hard market conditions, and it will start to flat out and improve a bit from 2018.

[23]Hegnar (2017)
[24]Pareto Securities (2010a)
[25]IHS Markit (2017)

4.1.2 Supply

The supply is adjusted when the demand for sea transportation does not turn out as expected. This relationship between supply and demand is the key feature of the shipping market model[26]. Since the order book for newbuilds and scrapping of vessels is public information it is easier to predict the supply than the demand. It takes about two to three years from a vessel is ordered until it is delivered to the company. This fact results in a slow and ponderous reaction in supply to a change in the demand, which prevents the market from having a fast response to a sudden and unexpected change in demand.

Newbuilds

In times when the market is doing well (high utilization and freight rates) the OSV industry experiences large order books in order to meet the high demand in the market. When the industry is in a recession the opposite happens, i.e. the companies are reluctant to order any newbuilds. Three years ago the freight rates were close to a historic high. An effect of this was that most companies invested in new and larger ships expecting that the freight rates would remain high and a continued rapid growth in the global trade[27]. After the oil crash, there has as mentioned been a decline in the demand for OSV services. This, in addition to the newbuilds ordered, has led to an oversupply in the market. It is expected that the supply in the market will remain high as some of the vessels ordered when the market was doing well are still under construction and now entering the market.

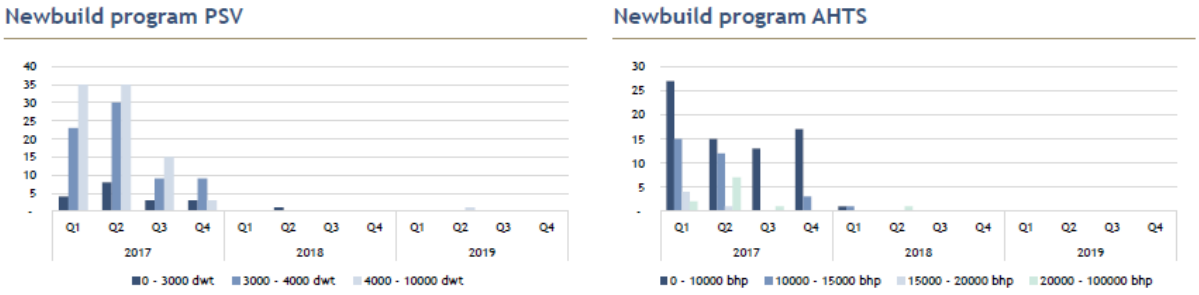


Figure 4.7: Newbuild program for AHTS and PSV. Source: Arctic Securities.

The fall in the oil price over the last two years has resulted in companies being reluctant to order new vessels as the market already suffers from an oversupply. As shown in figure 4.7, 182 PSVs and 117 AHTSs are expected to enter the market during 2017[28]. This will result in an even greater supply. However, it is difficult to estimate the exact number of vessels that will be delivered during 2017 and onward as deliveries are being postponed, buyers try to stop their orders and some vessels are built by speculators that are awaiting a buyer. A number of the vessels are already built and ready for delivery, but still stored at the shipyards awaiting better

[26] Alix Partners (2016)
[27] Petersen, R. (2016b)
[28] Arctic Securities and Nor-Ocean Offshore (2017)

market conditions. From 2018 and onwards there are a low amount of newbuilds expected to enter the market. This will help to cause a better balance between the supply and demand in the market.

Scrapping

The average lifetime of a new vessel is estimated to be roughly 25 years. This indicates the difficulty in deciding exactly when the vessel is going to be scrapped. The reason for this difficulty is that scrapping market, as mentioned in section 3.1 depends on a number of factors such as scrap price, age, current earnings, technical obsolescence and market expectations. Combining these factors and the lifetime of a vessel creates some flexibility in deciding when to scrap a vessel. Because of the high vessel age, there is only a limited amount of the companies' fleets that is being scrapped each year.

Companies in the OSV industry are reluctant in scrapping their vessels. The shipyards scrapping vessels make their profit from the prices of the materials that can be retained from the vessels, such as steel and aluminum. However, vessels belonging to companies in the OSV industry often includes technical equipment, which makes the companies reluctant to scrap their vessels and rather choose to maintain the standard of their vessels. There was limited scrapping of OSV vessels in 2016 because of a low scrap value. Low scrap values are mostly on vessels with specialized tanks and/or wooden decks. Even though companies are reluctant to scrap their vessels, vessels with an age above 30 years can be expected to be taken out of the market (layup or scrapping) at a higher pace than previous years as there is still an oversupply of vessels in the market.

Considering the current market situation there has not been a high amount of vessels being scrapped. It seems that most of the market participants choose to save costs by putting vessels in layup, rather than scrapping them. This is due to the low age of the vessels, whereas the companies want to keep their vessels by temporary holding them in layup. However, the average age and the technical requirements of the global fleet will increase over the years and it can be expected that it will occur more frequent scrapping in the future.

Total Fleet

The growth rate of the world fleet is determined through the balance between scrapping and layup of vessels and delivery of newbuilds. It has been a substantial increase in the global OSV fleet over the last ten years. This is due to the boom in the market in mid-2000 when OSV companies focused on high E&P investments, which resulted in large order books. A noteworthy fleet growth is experienced two to three years after the order has been placed due to the delivery time of new vessels. Poor market outlooks and the need for cost savings have resulted in that many companies have chosen layup as the best alternative for some of their

vessels. The scrapping and layup of vessels in several segments, in accordance with the delay of newbuilds, can reduce the total fleet, which in turn will reduce the high supply in the market[29].

AHTS and PSV segment As mentioned in section 2.3 AHTS vessels are used to anchor and tow rigs. The declining rig activity is affecting the AHTS vessels with rigs in layup and lower utilization. However, AHTS vessels can be used to tow rigs to layup or scrapping but this is not enough to keep the vessels utilized. The low demand for AHTS vessels is resulting in the companies considering different alternatives to utilize their vessels. Some companies are considering to operate in different segments, such as fish farms, in order to prevent placing their vessels in layup. The conditions are drastic for the companies in the OSV industry, which in 2015 and 2016 experienced the spot rates of both PSV and AHTS vessels below or at OPEX level.

In November 2016 there was more than 150 PSVs and AHTS vessels in layup in the North Sea, and close to 1000 vessels in layup worldwide. This explains the drastic changes companies has to make in order to cut costs and try to maintain their operations. Figure 4.8 shows the development of vessels in layup over the past three years[30]. Until 2015 there were almost no vessels in layup, whereas there has been a steep increase in the number of vessels in layup from 2015 until the beginning of 2017.

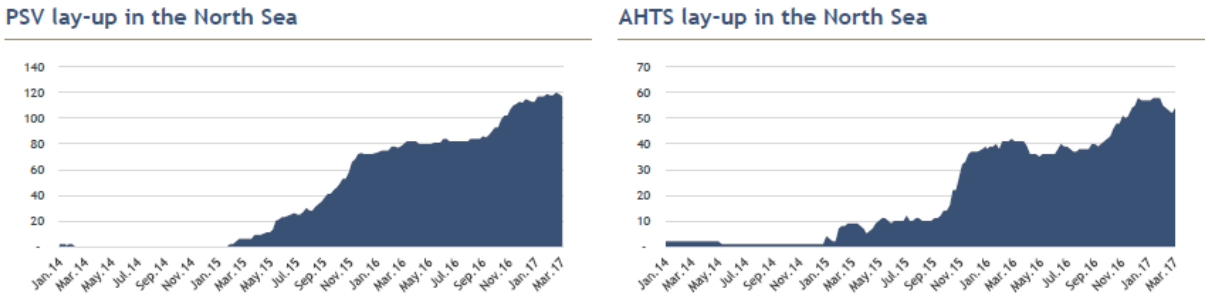


Figure 4.8: Layup of AHTS and PSV vessels in the North Sea. Source: Arctic Securities.

CSV segment The CSV segment has also experienced lower utilization and day rates over the last years, which decreases the revenues of the companies. However, as mentioned the CSV segment is more diverse in what operations in can handle than the two other segments. Therefore, this segment has not experienced the same significant drop in utilization and freight rates as PSV and AHTS. CSV vessels can operate in the wind power market and it is expected that this market's demand for modern tonnage CSVs will increase through 2017[31]. This will be further debated in the profitability section.

[29] World Oil (2016)

[30] Arctic Securities and Nor-Ocean Offshore (2017)

[31] Solstad Offshore ASA (2016)

Outlook fleet growth A key factor for the growth of the total fleet is the E&P activities. Higher activities lead to a higher demand for active vessels and a potential fleet growth. A factor that can stop the growth of the fleet is the aging vessels. Especially AHTS vessels are experiencing a high age and with the years to come, they will require a higher amount invested in order to repair and maintain the vessels.

The amount of vessels, especially in the spot market that is in layup, is a factor contributing to a more suitable level between the demand and supply in the market. With a high percentage share of the total fleet in layup, the market can experience no available vessels at some point. If this happens it will highlight how close the industry is to a market balance if the demand and activity in the market were to pick up. However, this assumes that the vessels in layup are not all re-entering the market at once.

Conclusion supply

Companies in the OSV industry has taken actions in order to re-balance the relation between supply and demand. As mentioned, there are a significant amount of vessels in layup worldwide at this point. Most of the remaining newbuilds have already entered the market in 2016 and it is likely that some of the newbuilds that are expected with delivery in 2017 and onward will be postponed. With a few new vessels entering the market and a significant amount of vessels in layup, it is reasonable to assume that the supply in the market will remain stable and not continue with a steep increase in regards to the demand.

The low activity in the OSV industry, combined with the oversupply of vessels, is expected to continue through 2017. As mentioned, some companies will consider new projects which will be positive for the oversupply in the market. Taking the current market conditions into account and how the market is expected to develop, it is expected that the overall utilization of AHTS and PSV vessels will stay at a level of about 50 percent over the next three years[32].

4.1.3 Utilization and freight rates

Freight rates are the link between the supply and demand as the OSV companies negotiate prices on the vessel service with their customers. As explained in the shipping market model, this relationship is based on the number of available vessels in the market and a number of customers in need of OSV services. As a result of the oil plummet in 2014 with resulting low activities in E&P spending there has been less demand for OSV services. This has forced many of the companies in the industry into the spot market, which is less favorable than to have vessels on contract. With weak market conditions and low demand, the OSV industry has been forced to accept low day rates in the spot market. This explains how the rates in the industry are highly dependent on the relationship between supply and demand.

[32]Hellenic Shipping News Worldwide (2016)

Utilization is a measurement that compares the actual freight revenues generated by a company to the maximal revenue potential of the company. As freight rates have declined and companies have seen it necessary to put vessels in layup it is not surprising that the utilization rates of PSV and AHTS vessels have decreased after 2014. As it is preferable to have vessels on contract many companies has offered lower day rates for longer contracts. This strategy enables the companies to keep their utilization levels higher for longer periods of time and also avoids the alternative of putting vessels in layup. However, as shown in figure 4.9 this strategy has not been enough to keep the utilization stable and at comfortable levels[33].

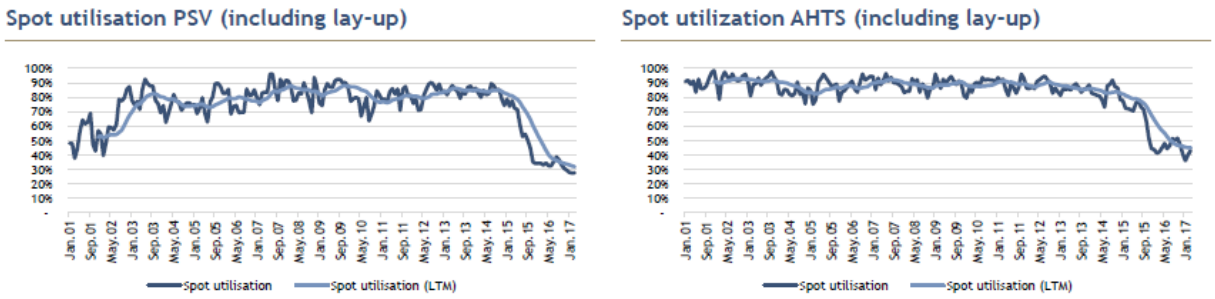


Figure 4.9: Spot utilization in the North Sea. Source: Arctic securities.

The OSV companies have little power in regards to the demand in the market. The OSV companies are dependent on an increase in the oil price and higher activity, which leads to a higher demand for, especially AHTS and PSV vessels. In regards to the supply side, they have some more power. As explained the decrease of supply has to be done through the selling of vessels to other industries than the OSV industry and having vessels in layup or scrapping. As the market conditions start to re-balance it will contribute to higher utilization and freight rates.

[33]Arctic Securities and Nor-Ocean Offshore (2017)

5. Internal Analysis

5.1 VRIO analysis

In order to analyze the internal resources of Solstad, the VRIO framework is appropriate. A VRIO analysis is a qualitative tool to determine if the internal resources of Solstad represent a competitive advantage or disadvantage. This analysis will be convenient in the forecast section.

5.1.1 Physical resources

The fleet

In the shipping industry, the main physical resource is the fleet as this is the main generator of revenues. The fleet is, therefore, the most significant resource for companies functioning in the OSV market. Age is an important factor as it determines different costs and opportunities in the shipping industry. A newer ship is often associated with lower operating costs, fewer maintenance requirements and less frequently repairments. As mentioned in section 4.1 having a younger ship is also beneficial operationally as they tend to have higher capacity, can operate in harsher conditions, have broader functionality and is environmental friendly[1]. As for competition, forward freight agreements are often preferred on a newer vessel, in other words, a high average fleet age will strike opportunities and might lower future earnings. Offshore Support Journal state that "vessels that are 10 years old or older, unless adequately impaired, there is little likelihood of a competitive future"[2]. Therefore, having a low average fleet age could be beneficial and a competitive advantage. Solstad's average fleet age is reliant on the different vessel categories as discussed in section 2.3. For PSV vessels it is approximately 8.16 years. AHTS is divided by brake horsepower into 15.000 and above, and smaller than 15.000. For vessels below 15.000 the average fleet age is 9.00 years and for vessels above it is 12.00 years. The CSV vessels have an average age of 8.00 years. Since most of the vessels are below 10 years this has been considered a competitive advantage.

Geographical location

Since Solstad is an international company they have branch offices and employees in Aberdeen, Singapore, Rio de Janeiro, Perth, and Manila, in addition to their head office in Norway. However, this is very common within the industry and cannot be considered to be an advantage.

[1] Stopford, M. (2009)

[2] Offshore Support Journal (2016c)

5.1.2 Individual and human resources

Crew

Solstad state that their crew is their most valuable asset and that the safety of their staff should not be compromised[3]. Having an experienced staff is of significance for the services provided and the safety for both crew and assets. It can be seen as these costs are the main fraction of the total costs in the income statement. However, this is of importance to all OSV companies and uniformity is expected.

Management

Solstad has an experienced management and is led by the family related CEO Lars Peder Solstad. The board of directors consists of five people, led by Chairman of the board, Terje Vareberg. Furthermore, he is a key shareholder with Executive Vice President / Deputy CEO experience from Statoil. The board is relatively small but experienced and they are all large shareholders. Some of the board members go as far back as 2005, while there is two relatively fresh board members. Furthermore, Solstad's management is consistent with that of their peers, as most of them has experience from the shipping industry[3].

5.1.3 Financial resources

Financial resources are of significance as they allow the company to operate in a flexible and adaptable way. Since the oil price plummet in 2014 many companies have been struggling to cut costs to be able to manage their high leverage ratios. Managing debt and equity is essential to handle a decline in freight rates. Many companies have already refinanced their loans, posted huge impairments due to a decline in ship values or went bankrupt. Solstad has a leverage ratio of staggering 5.45 and consist of 15.51 percent of equity. However, compared to the peer group in the liquidity section this is average except Deep Sea and Havila which was close to bankruptcy recently.

5.1.4 Organizational resources

Reputation and relations

Solstad has functioned within the shipping industry for well above 50 years and is considered a leading and proficient market contributor. Solstad has secured contracts with corporations such as Dong Energy Wind Power and Petrobras which can be regarded as serious and selective employers. Solstad is strictly focusing on environmental friendly operations. In 2013 they launched their own program which tracks the number of green operations performed[3]. By aiming at reducing electrical and fuel consumption Solstad is perceived as a responsible and environmentally friendly company. Through this Solstad has built a respectable reputation

[3]Solstad Offshore ASA (2016)

to shareholders, stakeholders, and the public. With the worldwide increased focus on being environmentally friendly, this could characterize a valuable resource in the future.

Contract coverage

In the current low-freight-rate environment contract coverage is essential as it gives predictability in earnings and therefore share price. This is usually done with forward contracts. Often there also exists an option to extend the contract this is discussed previously. If freight rate markets should rise the vessels currently being in layup will flood the market and the contract coverage could still be beneficial. From section 2.5 it is observed that Solstad operates in the same interval as their peers on contract coverage. It is also important to emphasize that Solstad, Dof, and Farstad has a significantly larger fleet than Siem, Deep Sea, Eidesvik, and Havila. Hence, it is more difficult for Solstad than for their peers to get their extensive fleet fully on contract. Figure 5.1 displays the conclusion of the analysis.

Resource	Valuable?	Rare?	Imitable?	Exploited?	Position
Fleet	Yes	Yes	Long run	Yes	Advantage
Location	Yes	No	Long run	Yes	Parity
Crew	Yes	No	Yes	Yes	Parity
Management	Yes	No	Yes	Yes	Parity
Financials	Yes	No	Long run	Yes	Parity
Reputation	Yes	No	Long run	Yes	Parity
Contracts	Yes	No	Long run	Yes	Parity

Table 5.1: VRIO

6. Risk analysis

In order to assess the problem statement and sub-questions, theories and models need to be explained. This chapter will focus on the relevant definitions and measurements in order to build the forecast on the right assumptions.

6.1 Credit risk theories

Credit risk is one of the most substantial risks facing the shipping industry. As mentioned previously credit risk arises because most deals, trades, and contracts are on a principal to principal basis. In other words, two parties agree to do business with each other and hence rely on each other's creditworthiness[1]. Credit risk can further be defined as the possibility of a loss occurring for a party due to the other party's failure to meet financial obligations in accordance with the agreed terms of the deal[1].

In order to define credit risk, it is substantial to determine the risks that affect the company's ability to meet future financial obligations. To clarify and qualify credit risk the focus on interest rate risk, asset price risk and freight rate risk is considered as fundamental. This since these risks contributes to the overall credit risk. The mentioned risks are often a part of qualitative and quantitative credit risk analyses[1].

Interest rate risk, asset price risk, and freight rate risk is often measured in credit valuation models for banks. Interest rate risk is essential for the extensive debt financing, asset price risk is affecting the collateral values demanded by banks for supplying loans and freight rate risk is directly related to profitability. Further, credit risk can be divided into three types of risk; default risk, downgrade risk and credit spread risk.

Default risk

Default risk often denoted as bankruptcy risk, refers to the risk of a party to a deal failing to fulfill its contractual obligations, such as repayment of a debt obligation or payments of coupons and the redemption value of a bond[1]. The probability of default will be further estimated and discussed in section 8.8.

Downgrade risk

The possibility of a downgrade is determined by so-called covenants in the loan agreements. Downgrade risk refers to the financial loss to a party of a deal caused by the deterioration of the counterparty's credit status, which is normally reported by rating agencies and regulates the counterparty's capacity to honor its contractual obligations. However, a downgrade may not

[1] Alizadeh, A. H. and Nomikos, N. K. (2009)

lead to a default. It may result in a reduction in the value of the contracts such as loans that are drawn or bonds that are issued by the counterparty[2].

Credit spread risk

Credit spread or yield spread risk refers to the risk of change in the yield premium of a debt obligation or an instrument, either a loan or a bond due to changes in market conditions. Changes in credit spread and the risk risen may result in financial losses however it does not automatically mean that the counterparty will default[2]. The credit spread is essential to estimate the cost of debt. The credit spread will, therefore, be further estimated and discussed in section 8.8.

6.1.1 Interest rate risk

Interest rate volatility may have an inverse effect on the assets and liabilities of a company. It can lead to severe liquidity problems and even mismatching of cash inflows and outflows. This is especially true in shipping markets where business cycle dynamics are proved to be catastrophic during periods of low market profitability as discussed in section 4.1[2].

Most "Euro-bank" loans in the Euro-currency market bear interest at the London Interbank Offered Rate (LIBOR) floating rate[2]. It is widely used and quoted as a benchmark for banks borrowing funds from each other within London for a specified time interval. It is therefore used in standardized quotations, loan agreements, derivative transactions both in exchanges and OTC markets[2]. Hence, the LIBOR rate is affected by such as local interest rates, bank's expectation of future rates, the profile of contributor banks, liquidity in the London markets and maturity. One can observe that Norges Bank's future key rates are predicted to increase in 2018 as shown in figure 6.1[3]. This increase can be converted to an increase in the Norwegian Interbank Offered Rate (NIBOR). Solstad has bonds trading in the fixed income market with coupon payments determined by the NIBOR rate.

[2]Alizadeh, A. H. and Nomikos, N. K. (2009)
[3]Norges Bank (2016)

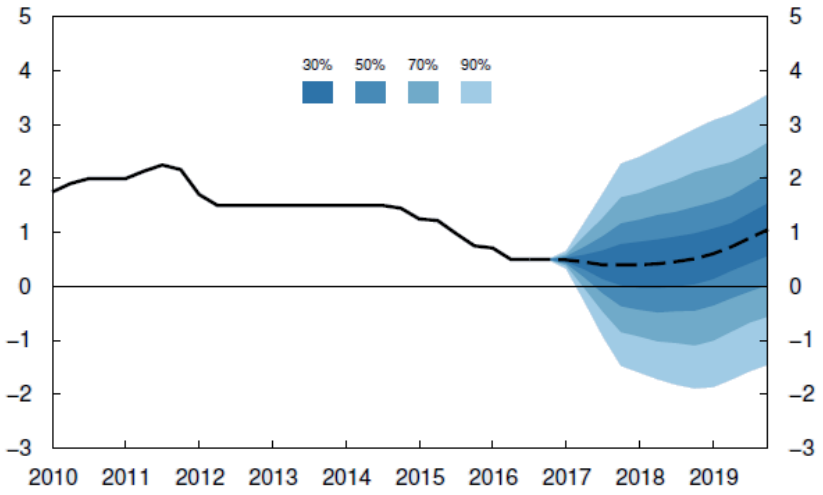


Figure 6.1: Predictions about future key rates

By the forecast by Norges Bank, one can expect Solstad to experience increased interest rates. Solstad has a leverage ratio of 4.83 which implies high risk in relation to interest rates. This is consistent with approximately 16 percent of equity and 84 percent of debt. The ratio increased by approximately 90 percent after the merger with REM as discussed in 2.2. Hence, Solstad is very sensitive to changes in interest rates. This will be further discussed in section 8.8, where future NIBOR rates predicted by Bloomberg is discussed.

6.1.2 Asset price risk

It can be argued that the volatility in ship prices can be time varying and dependent on changes in the freight rate market. Hence, the uncertainty and volatility in freight rates can be transmitted to ship prices using a discounted present value model where the main pricing factor is the revenue from freight operations[3]. According to Solstad's balance sheet vessels amount to 83 percent of total assets. Hence, Solstad is very sensitive to changes in ship prices.

6.1.3 Credit risk analysis

Credit worthiness is a visible factor and there exist many factors influencing the credit worthiness of a company. They can either be qualitative or quantitative[4]. Qualitative factors are firm-specific factors which are not quantifiable and qualitative factors that can be measured through a variety of approaches. Table 6.1 shows the different factors affecting the credit worthiness of a company.

[4]Alizadeh, A. H. and Nomikos, N. K. (2009)

Qualitative Variables	Quantitative Variables
Reputation/Business history	Financial health of the firm
Managerial expertise and track record	Firm size
Relative standing in the market	Earnings (interest coverage)
Financial flexibility and capital structure	Gearing (debt to equity ratio)
Strength and operating flexibility	Turnover and ROC
Strategic plans and contingencies	Market conditions
	Interest rates
	Cash flow uncertainty

Table 6.1: Credit Analysis

The qualitative factors have been discussed within the Shipping Market model and the VRIO framework previously. Most of the quantitative factors in table 6.1 will be analyzed in the following sections.

6.2 Credit risk measurements

In general, and especially at this point in time the shipping industry is experienced as high risk. Market participants are exposed to freight rate and price fluctuations due to market changes. Hence, there is always a possibility that agents cannot fully meet their contractual agreements and therefore default[5]. The default risk is, therefore, the most essential risk within credit risk for the OSV industry. There exist several quantitative measurements of credit risk.

6.2.1 Probability of default

The probability of default (PD) refers to the probability that the counterparty cannot meet its contractual obligations fully on time[5]. This estimate is critical in order to determine how the capital structure is affecting Solstad with the focus on credit risk.

Historical default probabilities

The probability of default can be estimated through the use of historical data. Rating agencies such as Standard & Poor estimate the percentage of claims and obligations issued by companies with different credit ratings that have defaulted in the past[5]. Hence, the rating agencies report the probability of default based on the rating of the company.

Extracting default probabilities from traded bonds

One can estimate the PD from a bond issued by the company with the use of the yield spread. Expected loss is calculated as the difference in present value between the corporate bond and

[5]Alizadeh, A. H. and Nomikos, N. K. (2009)

a treasury bond with the same maturity[6]. The recovery rate is dependent on the type of debt and the security. The probability of default is calculated as:

$$P(default) = \frac{Expected\,Loss\%}{1 - Recovery\,Rate} \tag{6.1}$$

Merton model

The Merton model is based on the option pricing theory of Black Scholes and Merton. The Merton model assumes that a company can default if, and when, the value of its assets is less than its liabilities. Hence, the value of the company to the shareholders at time t, E_t, is equal to the payoff of a call option with a strike price equal to the face value of its debt (X)[6].

$$E_t = max(A_t - X, 0) \tag{6.2}$$

Furthermore, A_t is the market value of the total assets of the company. This implies that the value of the debt to the lender at maturity (T), D_t, is the asset value when the value of a company's assets is less than its debt and the company is in default, or X, when the company's assets are worth more than its debt and the company, is not defaulted[6]. Therefore:

$$D_t = min(A_t, X) \tag{6.3}$$

Furthermore, the same argument can be used to explain the position of the lender of the debt. This can be explained as a short put option on the assets of the company and a risk-free debt X[6], as follows:

$$D_t = X - max(X - A_t, 0) \tag{6.4}$$

If the value of the company's assets at the maturity of the debt is greater than its debt, the debt holders receive X in full, but when the company's asset value is less than its debt ($X > A_t$), the holder of the debt only receives the asset value A_t. Also, at any point in time, total assets A_t should be equal to the sum of the market value of D(t,T) at time t for maturity T, and equity E_t of the company[6].

[6]Alizadeh, A. H. and Nomikos, N. K. (2009)

$$D(T,t) + E_t = A_t \tag{6.5}$$

Since it is established that the value of the company's equity to shareholders is a call option on the company's assets, the Black-Scholes-Merton option-pricing model can be used to evaluate the fair price of the option as follows[7]:

$$E_t = A_t N(d_1) - e^{-r(T-t)} X N(d_2) \tag{6.6}$$

where $N(d_1)$ and $N(d_2)$ are cumulative normal probabilities for d_1 and d_2 respectively, r is the risk-free rate, and d_1 and d_2 is calculated as:

$$d_1 = \frac{Ln(\frac{A_t}{X}) + (r + \frac{\sigma^2}{2})(T-t)}{\sigma_A \sqrt{T-t}} \tag{6.7}$$

$$d_2 = d_1 - \sigma_A \sqrt{T-t} \tag{6.8}$$

where σ_A is the standard deviation of the company's asset value. Once the value of equity at time t, E_t, is estimated using equation (6.6), it can be deducted from the asset value of the company at time t, A_t, to obtain the debt value[7].

$$D(t,T) = A_t - E_t \tag{6.9}$$

$N(d_2)$ is the risk-neutral probability that at the maturity of the debt the company's asset value is greater than its debt, and the company does not default. Hence, 1- $N(d_2)$ is the risk-neutral probability that at maturity, the company's asset value will be less than its debt, and the company defaults. After obtaining the value of debt, D(t,T), at time t for maturity T one can calculate the yield[7] on the debt as:

$$y(t,T) = \frac{Ln(X) - Ln(D_{t,T})}{T-t} \tag{6.10}$$

To obtain the credit premium and default probability one can compare the yield on a risk-free instrument with the same maturity. However, one can also directly calculate the risk-neutral probability of default from $N(d_2)$[7]. When calculating the value of debt with no default

[7] Alizadeh, A. H. and Nomikos, N. K. (2009)

probability, by setting the spread to zero, one can estimate the expected loss. Further, expected recovery and distance to default can be estimated as follows:

$$Expected\,Recovery = \frac{Expected\,Loss\%}{P(default)} \tag{6.11}$$

$$Distance\,to\,Default = \frac{A_t - D}{\sigma_A * At} \tag{6.12}$$

Distance to default is a purely statistical measure of credit risk and is defined as the number of standard deviation drops in the asset value that can trigger a default[8].

It is worth mentioning that the Merton model is based on several assumptions which may not hold in reality. The company can have several debt obligations and other assets in its portfolio with different risk levels. Hence, estimating the total asset value and asset volatility could also add to the challenge. The basic Merton model can be extended to accommodate different and more complex situations[8]. A one year Merton model has been estimated with an approach further explained and estimated in the 8.8.

[8] Alizadeh, A. H. and Nomikos, N. K. (2009)

7. Financial analysis

In order to implement the forecast of the company, it is important to have knowledge of their historical performance. The financial analysis intends to clarify how Solstad is doing today and how the company has developed over the analyzed time period, 2010 to 2016. Stopford states that a typical business cycle in the shipping industry is between seven and nine years. Therefore, the analyzed time period is chosen to be seven years in order to include business cycles that might occur.

The financial analysis consists of an explanation of the analytical income statement and balance sheet and how the original financial statements have been reformulated into analytical statements. The analytical statements are used in order to estimate the profitability of the company. When estimating the profitability, it is beneficial to separate between operating and financing items, this since operating items is considered the vital source of value creation for investors, while operating profit is considered the main foundation of servicing debt by credit providers[1]. The estimation of the future performance of Solstad will be more reliable by understanding the development of the drivers that creates value.

Further on, the financial analysis considers the company's historical profitability perceived through different ratios and a liquidity analysis. Solstad's performance will be compared to the peer group created in section 2.4. The combination of the financial and strategic analysis is what makes the foundation for the forecast of Solstad's future performance.

7.1 Analytical income statement and balance sheet

7.1.1 Analytical income statement

The income statement is reformulated into an analytical income statement which separates between financing and operating items. The reformulated income statement gives a better understanding of the different sources that drive value creation. The analytical income statement reach important performance measures, such as EBITDA, EBIT and NOPAT[1]. These performance measures provide the basis for the forecasting when estimating the free cash flow and the enterprise value.

Gain(loss) from sale of assets

The company periodically have gain (loss) from the sale of assets. This is classified as an operating item as it is recurring and part of Solstad's operations to optimize their fleet. Comparing Solstad's fleet to the peer group it is seen that they have a quite young and modern fleet. This is

[1]Petersen, C.V. and Plenborg, T. (2012)

achieved through the buying and selling of their vessels in regular intervals. It is worth noticing that sales of vessels in the industry have increased since the oil boom.

Result from joint ventures and associated companies

The income from investments in joint ventures consists of partly owned companies that operate within the OSV industry. Hence, they have the same business operations and environmental conditions as Solstad. This item is therefore classified as an operating item in both the analytical income statement and balance sheet and included in the invested capital. Income from investments in associated companies is categorized as a financial item because some of the participants within this category are not operating in the same competency as Solstad. However, they are operating in the same environmental conditions and in line with Solstad's financial reports they are considered as financial activities.

Reported tax

The analytical income statement is created by using the effective tax rate which is dependent on the procurement of new vessels. Shipping companies in the Norwegian industry pay tonnage tax. This tax is paid once when the company has procured new vessels. This explains the relatively low effective tax rate in the analytical income statement. Solstad reports that their net taxable financial income is taxed according to the shipping regime, with a tax rate of 27 percent[2].

7.1.2 Analytical balance sheet

The analytical balance sheet classifies the items as operating or financing in order to match the analytical income statement. The balance sheet separates their operating items as operating assets and operating liabilities and results in invested capital from operations. This is derived by subtracting operating liabilities from operating assets. The financial items include total equity and net interest bearing debt which consists of interest bearing debt and interest-bearing assets. The invested capital of financial activities is reached by adding the net interest bearing debt to the total equity. The invested capital is the amount that the company has invested in operating and financing activities and hence requires a return[3].

Derivatives

Solstad reduces their risk associated with interest rates and foreign currency fluctuations through financial derivatives such as foreign currency contracts and interest rate swaps[2]. It is debatable whether the profit and loss from the hedges should be classified as an operating or financing item, however, to separate between what is financing and operating related to this is normally not recommended[3]. Derivatives are therefore classified as interest-bearing assets, which reduces the interest bearing debt.

[2]Solstad Offshore ASA (2015)

[3]Petersen, C.V. and Plenborg, T. (2012)

Bank deposits and cash equivalents

Cash can be reported as both operating cash and excess cash. If the company's cash position is below ten percent of revenue it is reasonable to consider it as an operating item[4]. However, Solstad's average bank deposits and cash equivalents divided by revenue is 34 percent and is therefore classified as excess cash within interest bearing assets. Their cash and cash equivalents are most likely held in an interest bearing account as security for their high loans.

Deferred tax

Deferred tax is the difference between the taxable value of assets and liabilities and the amount that is being booked. It is estimated for assets and liabilities where future realizations will lead to payable taxes[5]. The deferred tax falls within the category of operating assets and is therefore not part of the financial activities. It is, therefore, reasonable to consider the deferred tax as an operating item.

Long term debt

Solstad has experienced a high increase in their long-term debt from 2015 to 2016. This is due to their merger with REM and the delivery of their newbuild, CSV Normand Maximus[5]. Long term debt is considered as a financial activity and is therefore classified as interest bearing debt.

7.2 Profitability analysis

A company's profitability is an important measurement of a company's future development and expectations. The financial ratios are based on the end of year balances rather than the average of the beginning and ending balances as it represents the most current data of the companies. This is done in order to analyze the most updated data. Average balance numbers tend to even out potential changes in the balance sheet of the companies[4].

7.2.1 ROIC

Return on invested capital (ROIC) is a ratio used to evaluate how well a company is generating returns on its invested capital. It is important to take into consideration that ROIC is likely to overvalue companies that have a high degree of gearing. Due to this, the ratio is seldom used as the only measurement of a company's financial position. It is more attractive to offer loans to companies with a higher ROIC, and the company will, therefore, achieve cheaper financing. The ratio is decomposed into profit margin and turnover rate of invested capital in order to show whether the profitability is driven by revenues and costs through the profit margin or capital utilization through the turnover rate of invested capital[4].

[4]Petersen, C.V. and Plenborg, T. (2012)
[5]Solstad Offshore ASA (2016)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**00.36%**	**01.22%**	**07.32%**	**07.70%**	**06.34%**	**-02.33%**	**-03.89**
Deep Sea	-55.17%	00.43%	00.69%	03.13%	02.17%	-26.95%	-21.22%
Eidesvik	-54.33%	04.41%	06.17%	07.11%	04.28%	04.63%	-06.90%
DOF	02.65%	03.21%	08.99%	04.97%	10.62%	05.40%	-00.46%
Siem	02.05%	04.75%	02.13%	05.68%	04.46%	-08.95%	-02.08%
Farstad	06.57%	07.62%	05.30%	05.47%	05.83%	-05.51%	-26.51%
Havila	-04.02%	05.54%	02.69%	00.96%	00.74%	-16.76%	-19.33%
Mean	-14.59%	03.91%	04.81%	05.00%	04.92%	-07.23%	-11.51%

Table 7.1: ROIC after tax (end of year)

Solstad and its peer group have moved in the same direction over the past years. From 2010 to 2014 the companies experienced a positive trend after the financial crisis that affected the industry. Through this positive trend in the market conditions, several market participants expanded their fleet by investing in new vessels which increased their invested capital. In line with the depressed state of the market since 2014, all the examined companies have experienced a drastic decline in ROIC. Examining the ratio from a valuation perspective shows that both Solstad and its peer group's estimated values have decreased with a significant amount since their peak in 2013-2014. This development is in line with how the share price for the different companies has moved since the market started to experience a recession.

The market conditions have stroked quite equally on all the companies in the OSV industry. Solstad has experienced a better ROIC than the historical average of the peer group. The average of 2016 is highly affected by Deep Sea, Farstad, and Havila which are all experiencing significant challenging conditions during this market crisis. It is concluded that the development over the last seven years has been very similar for all the companies in the OSV industry. This suggests that all the companies have been affected by the same tendencies in the industry, i.e. the financial crisis and the oil price decrease that started in 2014. In the following two sections, ROIC will be decomposed into profit margin and turnover rate of invested capital in order to better understand if the development in ROIC is driven by an improved relation between revenue and costs or a better capital utilization.

Profit margin

Profit margin is a supportive ratio in developing an insight of how the company is doing and if the company is doing better or worse than the peer group[6]. When several companies within an industry experience low profit margins it is an indicator of depressed market conditions.

[6]Petersen, C.V. and Plenborg, T. (2012)

Variation in revenues are common for companies in the OSV industry as the industry is highly volatile and revenues often follow the business cycle and trends in the industry. The profit margin is estimated through equation 7.1.

$$Profit\,margin = \frac{NOPAT}{Net\,revenues} \tag{7.1}$$

Cost inflation has characterized the margins in the OSV industry after the financial crisis. This has affected revenues negatively, meaning that they have not generated the returns and development equal to the invested capital. This effect resulted in profit margins and ROIC to drop at some time points in the historical period especially in the aftermaths of the financial crisis and during the oil plummet.

	2010	2011	2012	2013	2014	2015	2016
Solstad	**01.85%**	**05.72%**	**28.02%**	**27.23%**	**24.76%**	**-08.98%**	**-28.04%**
Deep Sea	-253.64%	02.22%	10.59%	18.44%	16.39%	-1201.48%	-319.61%
Eidesvik	-237.40%	18.48%	28.90%	29.62%	19.56%	18.16%	-34.97%
DOF	09.65%	12.56%	27.27%	13.47%	22.14%	10.91%	-01.99%
Siem	12.17%	21.74%	08.22%	23.85%	16.70%	-32.79%	-08.60%
Farstad	22.91%	26.00%	18.94%	20.13%	21.35%	-21.10%	-118.19%
Havila	-16.45%	28.48%	15.24%%	04.97%	03.29%	-63.63%	-77.53%
Mean	-65.84%	16.46%	19.60%	19.67%	17.74%	-185.56%	-84.13%

Table 7.2: Profit margin after tax

Over the past seven years, Solstad has had a yearly increase in their total operating expenses (OPEX) from 1.6 million in 2007 to 2.3 million in 2015. However, the analytical income statement shows that Solstad has reduced their total operating expenses in 2016 with 25 percent from the previous year. This could be due to their large focus on restructuring and cost saving strategies, in addition to the vessels, they have put in layup in order to save costs. As shown in the trend analysis in section 7.2.2 the revenues of Solstad, and the peer group has had a decline in the years of the oil crash. This negative trend has led to profit margins and thus ROIC dropping through parts of the historical period. Since the market and OSV industry is suffering, it is expected that the whole peer group has experienced a decline in their profit margin after 2014.

Solstad has a focus on the segments of AHTS, PSV, and CSV. The larger vessels often require a more talented and professional crew as they are more complex to operate. The change in operating expenses is often closely related to changes in revenues as is the case for Solstad.

Solstad has also experienced an increased international focus the last couple of years, for example with their location in Brazil. This is one factor that could explain the increased personnel costs until 2013, where the personnel costs started to stabilize. Expanding their location to several geographical areas can make it difficult to maintain the cost level[7].

The profit margin is being affected by Solstad's vessel performance. The revenue of the companies in the OSV industry is affected by the freight rates which has been in a recession since the market conditions started to decline. The ratio has decreased over the last couple of years which is in line with the oil crash and decreased E&P spending. Solstad has done quite well over the years compared to its peer group with a profit margin above the average over the historical period.

All companies in the peer group have experienced low or decreased profit margins in 2015 and 2016, which is in line with the depressed market industry. Deep Sea has experienced a significant decline in their revenues after 2014 and increased operating expenses. This explains their drastically changed profit margin in the years 2014 to 2016. The low profit margin of the companies affects the ROIC negatively resulting in a lower ROIC or even negative. The trend and common size analysis in section 7.2.2 and 7.2.2 displays how the revenues and costs of the companies have developed over the historical period, in addition to the invested capital.

Turnover rate of invested capital

Companies' ability to use their invested capital is expressed through the turnover rate of invested capital. The measurement is used to show whether the relation between revenues and expenses and the capital utilization have improved or worsened over the period[7]. The turnover rate of invested capital is expressed through the following equation:

$$Turnover\,rate\,of\,invested\,capital = \frac{Net\,revenue}{Invested\,capital} \tag{7.2}$$

A high turnover rate is ideal but this is dependent on the industry. The turnover rate in the OSV industry is generally low as the companies are capital intensive and are expected to be so as the companies have high costs related to operation and maintenance of vessels.

[7]Solstad Offshore ASA (2016)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**0.19x**	**0.21x**	**0.26x**	**0.28x**	**0.26x**	**0.26x**	**0.14x**
Deep Sea	0.22x	0.19x	0.06x	0.17x	0.13x	0.02x	0.07x
Eidesvik	0.23x	0.24x	0.21x	0.24x	0.22x	0.26x	0.20x
DOF	0.24x	0.25x	0.29x	0.35x	0.37x	0.39x	0.33x
Siem	0.17x	0.22x	0.26x	0.24x	0.27x	0.27	0.24x
Farstad	0.29x	0.29x	0.28x	0.27x	0.27x	0.26x	0.22x
Havila	0.24x	0.19x	0.18x	0.19x	0.23x	0.26x	0.25x
Mean	0.23x	0.23x	0.22x	0.25x	0.25x	0.25x	0.21

Table 7.3: Turnover rate of invested capital

Solstad's turnover rate has been slightly decreasing over the years and lies around the average level of its peer group. During the analyzed period which captures both the aftermath of the financial crisis and the oil crash the turnover rate of invested capital of the companies has remained quite stable. The exception is Deep Sea which has suffered from an unstable turnover rate over the historical period. The companies have invested in vessels over the analyzed period but this has not affected the turnover rate for the period by much because of the depressed market conditions the OSV industry is experiencing. The effects of the turnover rate are one of the most important factors that trigger ROIC. In some of the periods especially until 2014, the company's revenues increased at a faster pace than the invested capital which resulted in a higher ROIC and turnover rate. This is an effect of the newbuilds the companies ordered when the market was doing well and increased day rates in that period.

EBITDA margin

EBITDA is used to measure the operating profitability of a company[8]. EBITDA does not take depreciation and amortization, interest and taxes into account and therefore provides a strong view on the company's operating profitability[9]. Since EBITDA only takes revenues and costs into account it is considered a cleaner measurement than the EBIT margin. Calculating the EBITDA margin allows people to compare and contrast companies of different sizes in different industries because it breaks down operating profit as a percentage of revenue. This means that an investor, owner or analyst can understand how much operating cash is generated for each dollar of revenue earned and use the margin as a comparative benchmark.

[8]Petersen, C.V. and Plenborg, T. (2012)

[9]Investopedia (2017e)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**37.16%**	**36.16%**	**42.80%**	**42.07%**	**43.27%**	**39.43%**	**35.31%**
Deep Sea	35.54%	27.09%	37.00%	40.31%	43.87%	-483.70%	-30.13%
Eidesvik	43.53%	47.66%	58.03%	58.97%	52.60%	64.39%	57.44%
DOF	30.56%	30.99%	34.29%	29.63%	28.92%	28.82%	31.18%
Siem	37.18%	36.55%	32.63%	39.04%	41.94%	30.49%	30.02%
Farstad	41.64%	39.38%	35.27%	37.96%	37.44%	33.98%	18.98%
Havila	38.83%	35.59%	38.52%	47.36%	51.80%	46.07%	35.38%
Mean	37.78%	36.20%	39.79%	42.19%	42.83%	-34.36%	25.45%

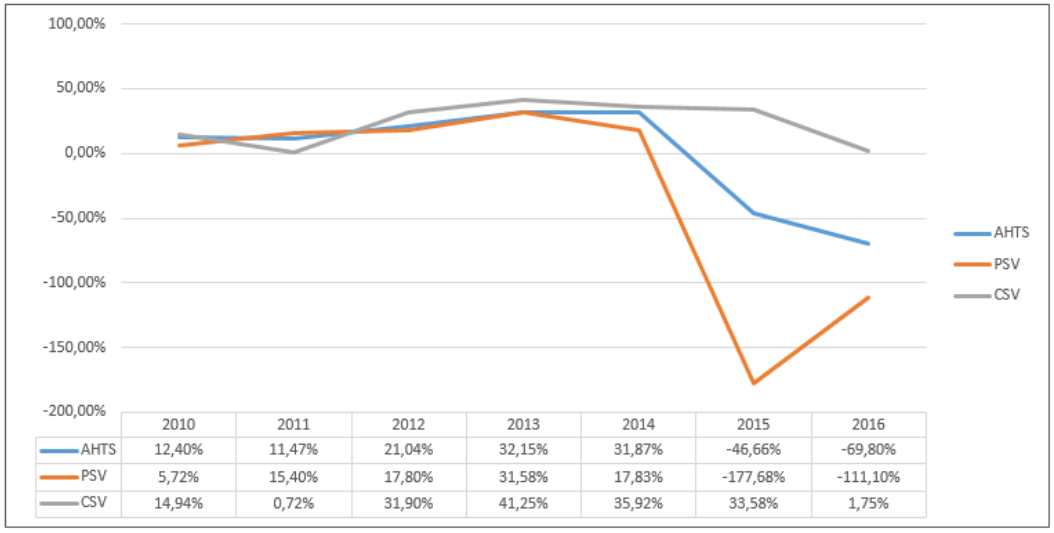
Table 7.4: EBITDA margin in percentage

Solstad has had a positive trend in their EBITDA until 2014. However, their EBITDA has decreased with 45 percent from 2014 to 2016 which is expected considering the current market situation and by looking at their development in revenues and expenses. The decrease is due to the increased operational expenses compared to their revenues over the last couple of years. The freight revenues of Solstad has been highly affected by the drop in the freight rates after the oil downturn. The freight revenue is Solstad's main driver of revenue, and with decreasing freight rates it is necessary to decrease their expenses in order to have a balanced relation between their revenues and expenses. Comparing Solstad to the peer group determines that they are doing quite well with an EBITDA margin above the majority of their peers. The only company that overall has a better margin than Solstad is Eidesvik which affects the average margin of the peer group.

EBITDA margin per vessel segment

Table 7.1 indicates that the subsea (CSV) segment has done significantly better than the two other segments especially after the oil crisis hit in 2014. Solstad is currently in a restructuring process where they will have an improved focus on their CSV segment. They state that their subsea operations could be world leading[10]. However, as with the AHTS and PSV segment, the CSV segment has experienced a drop in the EBITDA margin from 2015 to 2016. This is because of lower utilization of some vessels and lower freight rates.

[10]Solstad Offshore ASA (2016)



	2010	2011	2012	2013	2014	2015	2016
AHTS	12,40%	11,47%	21,04%	32,15%	31,87%	-46,66%	-69,80%
PSV	5,72%	15,40%	17,80%	31,58%	17,83%	-177,68%	-111,10%
CSV	14,94%	0,72%	31,90%	41,25%	35,92%	33,58%	1,75%

Figure 7.1: EBITDA margin per vessel segment

PSV is the segment that has contributed to the lowest fraction of the income in the historical period. Even though Solstad has 3 more PSV vessels than AHTS vessels in 2016, the total freight revenue of the PSV vessels has been lower. This indicates that the freight rates of the PSV segment lie at a lower range than for the AHTS segment. This will be further explained in section 9.2. The PSV segment has experienced a rapid decline in the freight revenue from 2014 to 2015 and picked up a bit in 2016. The rapid decline in from 2014 to 2015 is due to considerably high operating expenses in 2015. The AHTS segment has also experienced a drastic decline in the EBITDA margin after the oil plummet and has reached their lowest point in 2016 with an EBITDA margin of minus 70 percent. This segment has as with the PSV segment suffered from decreasing freight rates which has affected the freight revenue of the segment. Solstad currently has 50 percent of their AHTS fleet in layup. Due to this, it is expected that their freight revenues will be lower than in previous years. As mentioned, the CSV segment has not experienced the same rapid decline in the freight rates as the two other segments. However, this segment is also experiencing lower freight rates and utilization, but Solstad has managed to keep the relation between operating expenses and freight revenues for this segment at the same level in 2016 resulting in an EBITDA margin of 1.75 percent.

EBIT margin

The EBIT margin is a measurement of a company's operating profit after depreciation and amortization[11]. Solstad's EBIT margin have been quite stable until 2015 where it experienced a significant drop from 32 percent in 2014 to minus 9 percent in 2015 which has continued for the rest of the historical period. The decreased margin is due to increased operating expenses and substantial write-downs on fixed assets. The current market situation has affected most of the companies in the peer group. As shown in table 7.5 several of the comparable companies has also

[11]Petersen, C.V. and Plenborg, T. (2012)

seen the importance of adjusting the value of their fixed assets. The only companies that have been able to maintain a reasonable EBIT margin are Siem and DOF. This is due to the fact that the two companies have chosen to not conduct huge write-downs. Hence, the higher ratio can be explained by that they are delaying their impairment losses, not necessarily performing better than Solstad and the peer group. Eidesvik did also hold a quite good EBIT margin until 2015 compared to the other companies. However, after 2015 their ratio has decreased dramatically to an EBIT margin of minus 35 percent.

	2010	2011	2012	2013	2014	2015	2016
Solstad	**12.97%**	**05.62%**	**25.63%**	**30.40%**	**31.60%**	**-08.84%**	**-27.66%**
Deep Sea	08.00%	02.28%	08.31%	19.42%	13.44%	-1200.09%	-320.69%
Eidesvik	15.52%	19.48%	29.09%	30.99%	19.55%	17.87%	-35.03%
DOF	08.98%	17.19%	20.65%	17.79%	18.67%	13.85%	-03.55%
Siem	12.95%	12.84%	10.99%	19.88%	17.34%	-32.00%	-08.65%
Farstad	26.13%	24.26%	19.72%	21.66%	17.91%	-20.29%	-115.57%
Havila	23.72%	20.54%	26.66%	34.48%	36.25%	-62.89%	-77.14%
Mean	15.47%	14.60%	20.15%	24.94%	22.11%	-184.63%	-84.04%

Table 7.5: EBIT margin in percentage

Solstad has done impairment tests on some of their vessels in 2015 and 2016, which has resulted in higher write-downs for the company. This affects the EBIT of the company and has actually resulted in a negative EBIT in the two mentioned years. The write down is of course not the only factor that has contributed to the negative EBIT. The EBIT is as the EBITDA also affected by the decreased revenues and expenses that are not in relation with the revenue level.

Conclusion ROIC

Solstad has had a performance at the average and above the chosen peer group for the entire historical period. The noteworthy low profit margin in 2010, 2015 and 2016 is in line with the current market situation due to the effects of the low oil price and the financial crisis which has affected the ratios. The low profit margin has affected the ROIC negatively. In advance of this ROIC analysis, it was expected that the ratios would be affected by the suffering market conditions over the past years. The low profit margin for the entire peer group confirms that the industry as a whole is struggling, not just individual companies. The turnover rate of invested capital has as mentioned remained steady during the challenging times in the industry. It, therefore, expresses that the companies have experienced lower revenue increase in relation to their expenses over the period.

7.2.2 Common size and trend analysis

A trend and common size analysis are used in order to get a deeper understanding of the evaluation of the revenue and cost relation, the capital utilization efficiency and how it has developed over the historical period[12]. The peer group is also analyzed as it is beneficial to compare the results with companies of the same size and area.

Common size analysis

Each item of the income statement is stated as a percentage of the freight revenue in the common size analysis. Through this analysis, it is easy to define whether there have been any drastic changes in a company's financials or to identify what the variations in the profit margin is caused by. The common size analysis shows the effect of the low oil price where companies have experienced a severe increase in their costs and a drop in their revenues.

[12]Petersen, C.V. and Plenborg, T. (2012)

Tot OPEX	2010	2011	2012	2013	2014	2015	2016
Solstad	**63.46%**	**64.02%**	**59.28%**	**61.22%**	**60.11%**	**64.72%**	**69.78%**
Deep Sea	64.46%	73.10%	63.58%	62.50%	58.54%	96.60%	130.13%
Eidesvik	53.36%	53.26%	46.33%	46.66%	50.03%	41.70%	49.26%
DOF	69.44%	69.01%	65.71%	70.37%	71.08%	71.18%	68.82%
Siem	62.82%	63.45%	67.37%	60.96%	58.06%	69.51%	69.98%
Farstad	58.36%	60.62%	64.73%	62.04%	62.56%	66.02%	81.02%
Havila	70.83%	68.67%	62.65%	53.40%	49.04%	55.00%	66.06%
Personnel exp	2010	2011	2012	2013	2014	2015	2016
Solstad	**36.40%**	**38.65%**	**35.96%**	**37.81%**	**35.21%**	**36.83%**	**37.31%**
Deep Sea	x	x	x	x	x	x	x
Eidesvik	36.59%	35.37%	28.69%	30.35%	31.46%	23.87%	27.21%
DOF	46.01%	47.99%	38.93%	41.71%	39.99%	40.41%	68.62%
Siem	x	x	x	x	x	x	x
Farstad	34.90%	38.58%	40.90%	39.11%	39.88%	42.57%	49.75%
Havila	28.69%	33.48%	40.83%	34.67%	32.53%	36.76%	38.77%
Other exp	2010	2011	2012	2013	2014	2015	2016
Solstad	**26.44%**	**25.20%**	**21.25%**	**20.12%**	**21.53%**	**23.74%**	**27.38%**
Deep Sea	x	x	x	x	x	x	x
Eidesvik	19.88%	16.97%	13.27%	10.68%	15.94%	11.74%	15.35%
DOF	23.43%	21.02%	26.78%	28.66%	31.09%	30.76%	30.49
Siem	x	x	x	x	x	x	x
Farstad	23.46%	22.04%	23.83%	22.93%	22.68%	23.45%	31.26%
Havila	31.69%	30.52%	18.25%	17.88%	16.74%	17.43%	25.34%

Table 7.6: Common size analysis based on total OPEX, personnel expenses and other operating expenses

The common size analysis is divided into total operating expenses, personnel expenses, and other operating expenses. This is in order to observe the main cost driver of each company. The common size analysis shows that Solstad's total operating expenses have been relatively stable over the historical period with an increase of 10 percent from 2010 to 2016. Most of the companies have total operating expenses at a level of about 60 percent of their freight revenue. It is observed from table 7.6 that there has been a substantial increase in the companies' expenses in relation to their revenues in 2015 and 2016. The increase in the ratio is a combination of higher operating expenses and lower revenues. Siem and Deep Sea only characterizes their costs as operational costs and have therefore only been included in the calculation based on total operating expenses. They do also have personnel or leasing costs related to this but they have

not included this as one specific post in their financial statement.

Trend analysis

The trend analysis is used in order to get an idea of what will happen in the future based on previous years[13]. The analysis identifies trends in different revenue and cost items such as revenue, total operating expenses and invested capital which are shown in table 7.7. As the trend analysis has the reference year in 2010 it is chosen to not include this year in the table.

Revenue	2011	2012	2013	2014	2015	2016
Solstad	**116.47%**	**125.80%**	**133.73%**	**143.00%**	**135.69%**	**94.41%**
Deep Sea	87.57%	32.15%	44.65%	66.53%	53.01%	35.94%
Eidesvik	94.74%	86.02%	89.65%	93.06%	106.23%	70.78%
DOF	120.36%	150.58%	174.26%	188.71%	190.47%	150.55%
Siem	140.25%	156.31%	161.81%	209.24%	178.73%	199.10%
Farstad	108.20%	111.26%	120.59%	131.70%	120.50%	80.74%
Havila	124.15%	129.31%	139.40%	164.89%	149.84%	103.02%
Tot. OPEX	2011	2012	2013	2014	2015	2016
Solstad	**117.51%**	**117.51%**	**129.02%**	**135.45%**	**138.39%**	**103.81%**
Deep Sea	99.30%	31.71%	43.29%	60.42%	79.43%	72.54%
Eidesvik	94.56%	74.68%	78.38%	87.25%	83.01%	65.33%
DOF	120.63%	139.07%	177.36%	181.48%	187.60%	149.26%
Siem	141.66%	167.65%	157.03%	193.41%	197.77%	221.81%
Farstad	112.39%	123.42%	128.19%	141.17%	136.31%	112.09%
Havila	120.36%	114.37%	105.08%	114.15%	116.34%	96.08%
Inv capital	2011	2012	2013	2014	2015	2016
Solstad	**104.35%**	**94.83%**	**95.05%**	**112.46%**	**106.17%**	**139.69%**
Deep Sea	104.35%	94.83%	95.05%	112.46%	106.17%	117.70%
Eidesvik	97.87%	107.70%	102.88%	108.62%	118.09%	100.47%
DOF	118.68%	125.87%	120.92%	123.94%	120.54%	112.43%
Siem	108.17%	101.71%	114.45%	132.02%	110.31%	138.98%
Farstad	105.87%	114.04%	127.30%	138.30%	132.47%	103.29%
Havila	143.54%	157.76%	155.05%	156.70%	122.45%	89.17%

Table 7.7: Trend analysis, based on revenue, OPEX and invested capital

Solstad's revenue has increased by 43 percent from 2010 until their peak year in 2014. As

[13]Petersen, C.V. and Plenborg, T. (2012)

explained earlier their revenues have decreased after the oil plummet which has resulted in a minor decrease in the freight revenues from 2010 to 2016. The development of the revenues is in line with the how the freight rates have developed after the oil crash in 2014. In the same period, the total operating expenses of Solstad has increased with 3.81 percent from 2010 to 2016 which affects Solstad's profit margin negatively. This since there is a higher increase in the expenses in relation to the company's revenues. The analysis of the turnover rate of invested capital revealed a stable development over time for Solstad. Solstad have increased their invested capital with 39.69 percent over the historical period. Looking at the development of the invested capital for the entire peer group Solstad is the company with the largest increase in their invested capital. As mentioned, Solstad's revenues increased at a slower pace over the period, leading to a lower turnover rate of invested capital.

7.2.3 ROE

Return on equity (ROE) takes both financial and operating leverage into account. The ratio is used to measure companies' ability to transform shareholder's investments into profit[14]. ROE is decomposed into gearing, spread and return on invested capital in order to show how gearing impacts the shareholder value.

ROE	2010	2011	2012	2013	2014	2015	2016
Solstad	**00.38%**	**-09.21%**	**08.66%**	**09.78%**	**02.24%**	**-43.74%**	**-23.92%**
Deep Sea	-413.92%	00.49%	-02.69%	02.79%	-00.20%	-51.79%	-129.71%
Eidesvik	-253.05%	03.64%	12.94%	06.00%	-10.85%	-11.75%	-24.89%
DOF	-03.20%	-07.57%	05.21%	-00.84%	07.25%	-06.25%	-06.46%
Siem	01.26%	-00.84%	01.87%	02.71%	08.58%	29.51%	-14.75%
Farstad	06.56%	07.23%	04.60%	03.78%	-00.13%	-49.95%	-364.92%
Havila	-21.03%	-15.73%	-03.75%	-00.94%	-00.93%	-225.25%	108.66%
Mean	-97.57%	-03.14%	03.83%	03.33%	00.85%	-59.77%	-65.14%

Table 7.8: Development of ROE, Solstad and peer group

ROE has had the same tendencies as ROIC over the past years with a drop in the ratio in the aftermath of the financial crisis and a steep decrease beginning at the end of 2014. Looking at the historical period, the ROE of Solstad has moved in the same direction as the average of the peer group. However, Solstad experienced a large drop in their ROE from 2014 to 2015. This could be due to a larger decrease in their market value of equity compared to the peer group while still financing their operations with debt. Deep Sea, Farstad, and Havila have also experienced the same significant drop in their ROE between 2014 and 2016.

[14]Petersen, C.V. and Plenborg, T. (2012)

Financial gearing

A higher gearing indicates that the company is more susceptible to downturns in the economy and business cycle[15]. The financial gearing is obtained through equation 7.3 and shown in table 7.9. The financial gearing is an important ratio when analyzing the OSV industry as the performing companies all have a significantly high debt in relation to equity. The financial gearing is determined through the following equation (7.3).

$$Financial\,gearing = \frac{NIBD}{Book\,value\,of\,equity} \tag{7.3}$$

Higher gearing ratios could indicate that a company is more sensitive to changes in the economy such as interest rates and the business cycle. This is because companies that have a higher leverage have a smaller fraction of equity. Therefore, entities with a high gearing ratio have higher amounts of debt to service. Companies with a lower financial gearing ratio have more equity to rely upon when financing is needed.

Gearing	2010	2011	2012	2013	2014	2015	2016
Solstad	**01.75**	**02.25**	**01.82**	**01.64**	**02.06**	**02.98**	**04.56**
Deep Sea	02.77	02.70	03.22	00.42	00.57	00.77	04.53
Eidesvik	01.36	01.21	01.16	00.91	01.23	01.53	01.71
DOF	02.28	02.92	03.13	03.20	02.98	04.14	02.04
Siem	00.89	01.04	00.88	01.09	01.33	01.41	02.11
Farstad	00.76	00.80	00.95	01.15	01.42	02.54	11.15
Havila	01.48	01.29	01.26	01.06	01.30	06.20	-03.95
Mean	01.61	01.75	01.77	01.35	01.55	02.80	03.16

Table 7.9: Financial gearing, Solstad and peer group

Looking at table 7.9 it is clear that the companies in the OSV industry have suffered from a rough time the last couple of years. With struggling times in the industry, the companies are having difficulties in managing their high level of debt. The financial gearing has increased in the years between 2014 to 2016 and shows a high long-term liquidity risk. This is linked to the sharp drop in oil prices, which led to that the companies in the OSV industry have fallen sharply on the stock exchange which again has sacrificed the market value of equity of the discussed companies. The ratio shows that the companies, except Eidesvik, has been struggling to deal with their high amount of debt through these difficult times in the industry. The capital

[15]Petersen, C.V. and Plenborg, T. (2012)

structure of the industry has been quite aggressive with an average of staggering 03.16x in 2016. The increased gearing over the historical period substantiates the claim that the companies have taken on a lot of new debt when ordering newbuilds in the peak period as well as the need of taking on more debt in order to sustain their operations. Even though it could be expected that the companies would have a higher financial gearing than what is considered normal the increase in the ratio for Solstad and the peer group implies that the industry is not in a good state and that there is high economic uncertainty related to this industry.

Spread

Spread is the difference between the net borrowing cost and the ROIC of companies. A company is not profitable i.e. loses money on its loans if the net borrowing cost is higher than the ROIC[16]. If ROIC is higher than the net borrowing costs the opposite happens. As a result of the historically low ROIC, most of the companies in the OSV industry has experienced a negative spread in the period between 2014 and 2016. The companies with the most capital intensive structure with a large fraction of debt will experience a higher negative spread based on the leverage. The results of the spread calculations are shown in table 7.10.

Spread	2010	2011	2012	2013	2014	2015	2016
Solstad	**00.01%**	**-04.64%**	**00.73%**	**01.27%**	**-02.00%**	**-13.90%**	**-04.40%**
Deep Sea	19.38%	00.02%	-01.05%	-00.80%	-04.20%	-32.28%	-23.97%
Eidesvik	37.82%	-00.63%	05.85%	-01.21%	-12.28%	-10.73%	-10.55%
DOF	-02.44%	-03.66%	-00.89%	-01.75%	-01.34%	-02.53%	01.53%
Siem	-00.89%	-05.38%	-00.30%	-02.72%	03.11%	-14.62%	-06.00%
Farstad	-00.02%	-00.49%	-00.73%	-01.47%	-04.19%	-17.51%	-30.36%
Havila	03.42%	-16.44%	-05.10%	-01.79%	-01.29%	-33.60%	-32.38%
Mean	08.18	-04.46	-00.21%	-01.21%	-03.02%	-17.88%	-15.16%

Table 7.10: Spread, Solstad and peer group

As shown in the table, the spread has experienced a hefty decline after 2014. The reason behind the increased negative spread is the historically low ROIC which was discussed earlier. The reason for this negative decline is the cost of borrowing is related to the companies taking on more debt and the fact that the OSV industry is highly leveraged.

Conclusion ROE

The development in the market over the past few years has made a significant impact on the ROE for the companies in the OSV industry. Most of the companies, including Solstad, has seen it necessary to take on more debt in order to be able to continue with their operations. As will

[16]Petersen, C.V. and Plenborg, T. (2012)

be discussed in section 8.10, Solstad has a capital structure that is vastly weighted towards debt. The market participants are all struggling as a consequence of the market situation which affects their financial gearing and spread and in turn has caused the ROE to drop to a disturbingly low level.

7.3 Liquidity analysis

Liquidity is essential for companies. A company that does not have enough liquidity cannot meet its payment obligations or execute profitable investments. In some instances, the lack of liquidity can lead to default[17]. Solstad has invested heavily in new vessels and maintenance of their vessels over the past years in order to hold a young and modern fleet. Considering that new vessels are financed almost entirely through debt it is important to analyze the robustness after this heavy debt financing and explore whether it has negatively affected the financial risk of the company.

As previously mentioned, the OSV industry is highly leveraged and it is, therefore, important to measure the ability to meet their obligations. The companies' liquidity is an essential element in the understanding of the robustness and payment capabilities. The short-term liquidity measurement expresses the ability to satisfy the short-term liabilities as they mature[17]. The long-term liquidity ratio measures the financial robustness to meet the future obligations. Further, the analysis gives an overview of the companies' room for maneuver in relation to investments and resistance to changing market conditions[17].

7.3.1 Short-term measurements

Companies' in the OSV industry are not characterized by accruing large inventories and receivables in the same way as companies that sell physical goods and services. Based on this it is reasonable to look at the current ratio and the liquidity cycle.

Current ratio

The current ratio gives an insight into how the short term and most liquid assets cover the decaying short-term commitments of the company. A high current ratio gives an indication of low short-term liquidity risk. There is no optimal level for the current ratio as it changes from industry to industry but in the OSV industry, it is preferred to have a high ratio. A high ratio gives an indication that the company has low liquidity risk in relation to being able to cover the current liabilities in periods where the earnings of the company are not able to cover these. However, there is a weakness with a too high current ratio as companies that have a high current ratio might not manage their resources efficiently enough[17].

[17]Petersen, C.V. and Plenborg, T. (2012)

$$Current\,ratio = \frac{Current\,assets}{Current\,liabilities} \tag{7.4}$$

	2010	2011	2012	2013	2014	2015	2016
Solstad	**00.97x**	**01.11x**	**01.01x**	**01.32x**	**01.13x**	**01.28x**	**01.10x**
Deep Sea	01.37x	01.31x	01.22x	02.18x	01.60x	01.28x	01.19x
Eidesvik	00.98x	00.99x	00.92x	01.00x	00.94x	01.04x	01.07x
DOF	00.97x	00.96x	01.10x	01.23x	01.26x	01.27x	01.13x
Siem	01.08x	00.99x	01.28x	01.10x	00.91x	00.91x	00.88x
Farstad	01.00x	00.99x	01.06x	01.04x	00.95x	00.95x	01.12x
Havila	00.68x	01.01x	00.96x	00.97x	00.15x	00.12x	00.76x
Mean	01.01x	01.05x	01.08x	01.26x	01.13x	01.12x	01.04x

Table 7.11: Current ratio, Solstad and peer group

The industry has on average experienced a decline in their ability to cover short-term obligations. The companies in this industry rely heavily on their fleet, and it is preferable to both have a young fleet and enough vessels to meet the demand. As a consequence of this, the industry has made investments through some points of the historical period at the same time as they have decreased their cash reserves. This has resulted in a decline in the current ratio for some companies during the historical period. The decrease in the current ratio is not considered critical to the companies on average are able to cover their obligations.

Liquidity cycle

Liquidity cycle is the number of days it takes for the company to convert their working capital to cash. One should strive to reduce their liquidity cycle since the cash flow of the company is positively affected by a lower liquidity cycle[18].

$$Liquidity\,cycle = \frac{365}{Turnover\,rate\,of\,NWC} \tag{7.5}$$

$$Turnover\,rate\,of\,NWC = \frac{Revenue}{NWC} \tag{7.6}$$

[18]Petersen, C.V. and Plenborg, T. (2012)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**-06.22**	**18.97**	**02.31**	**56.54**	**26.51**	**41.27**	**37.27**
Deep Sea	148.17	88.71	178.83	308.09	142.65	711.58	98.55
Eidesvik	-02.90	-01.46	-14.87	-00.27	-15.68	09.65	20.16
DOF	-10.40	-10.55	17.18	33.50	41.85	39.30	22.84
Siem	20.96	-03.10	52.15	18.33	-19.59	-21.65	-29.14
Farstad	-00.78	-01.59	13.82	08.74	-13.19	-13.27	24.28
Havila	-160.80	02.35	-08.57	-05.28	22.55	15.71	-91.43
Mean	-01.71	13.33	34.41	59.95	26.44	111.80	11.79

Table 7.12: Liquidity cycle, Solstad and peer group

The idea of the liquidity cycle is that the fewer days it takes to convert working capital into cash the better the cash flow of the company[19]. Table 7.12 determines that the companies in the liquidity ratio are varying from company to company. However, it could be argued that the liquidity cycle is not as essential and the most appropriate measurement for the OSV industry as it does not hold large inventories and receivables.

7.3.2 Long-term measurements

Interest coverage ratio

Interest coverage reflects the companies' abilities to satisfy and cover net interest expenses with their operating income. Since depreciation and amortization do not include real cash flow the interest coverage ratio will be based on EBITDA. The long-term liquidity risk of the company is lower the higher the ratio[19]. To measure the interest coverage ratio financial expenses is taken into account without currency and unrealized/realized agio. The equation used in order to estimate the interest coverage ratio is expressed in equation 7.7 and the results are listed in table 7.13.

$$Interest\,coverage\,ratio = \frac{EBITDA}{Net\,financial\,expenses} \tag{7.7}$$

[19]Petersen, C.V. and Plenborg, T. (2012)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**02.65x**	**02.01x**	**02.78x**	**03.45x**	**03.77x**	**03.11x**	**01.78x**
Deep Sea	01.58x	01.00x	01.71x	02.82x	04.15x	-04.59x	-00.60x
Eidesvik	03.39x	03.90x	04.60x	04.55x	04.12x	05.06x	03.35x
DOF	01.73x	01.69x	02.04x	02.06x	02.18x	02.40x	02.24x
Siem	03.25x	02.80x	02.95x	04.28x	03.84x	02.44x	02.64x
Farstad	03.51x	03.45x	03.00x	02.75x	02.66x	02.03x	00.79x
Havila	01.56x	01.22x	01.23x	01.60x	01.61x	01.38x	00.97x
Mean	02.52x	02.30x	02.62x	03.07x	03.19x	01.69x	01.60x

Table 7.13: Interest coverage ratio EBITDA

Since the companies in the OSV industry has taken on a severe amount of debt over the last years, it is a natural effect that they are experiencing increased interest expenses. Solstad has a relatively high amount of debt so the interest expenses are a significant fraction of the income. The increase in the interest coverage ratio over the years is due to that Solstad has acquired more debt over the period discussed. The operating income of the company has not followed in the same way as the operating expenses over the last couple of years, which gives an indication of long-term liquidity risk. Observing the average of the peer group, the same applies to them which in turn suggests that Solstad is not standing out in any significant way.

Solvency ratio

Solvency ratio is a variation of the financial leverage[19]. The ratio shows the relation between equity and invested capital in a company. A company has a higher probability of defaulting on its debt obligations, the lower the solvency ratio[20].

$$Solvency\,ratio = \frac{Equity}{Tot.\,liabilities + equity} \tag{7.8}$$

A low solvency ratio indicates a high long-term liquidity risk. It is reasonable that companies within the OSV industry have a low solvency ratio at certain times since they finance most of their new vessels with debt.

[20]Investopedia (2017d)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**00.30**	**00.27**	**0.30**	**0.30**	**0.27**	**0.21**	**0.14**
Deep Sea	00.20	00.22	0.19	0.55	0.52	0.42	00.15
Eidesvik	00.35	00.36	00.37	00.37	00.35	00.30	00.28
DOF	00.23	00.20	00.20	00.19	00.20	00.15	00.26
Siem	00.42	00.39	00.43	00.40	00.35	00.30	00.26
Farstad	00.39	00.43	00.40	00.36	00.31	00.22	00.07
Havila	00.23	00.22	00.22	00.23	00.23	00.07	-00.12
Mean	00.30	00.30	0.30	0.34	0.32	0.24	00.15

Table 7.14: Solvency ratio, Solstad and peer group

Solstad lays below the average of its peer group over the entire historical period. Their financial gearing has increased from 01.75x to 04.56x over the period and combined with their low solvency ratio the long-term liquidity risk can be interpreted as high. This cost is reflected in the levered beta which drives the cost of equity upwards.

Net interest bearing debt (NIBD) vs. EBITDA

By comparing Solstad and the peer group's net interest bearing debt to their EBITDA will give an indication of how many years it will take before the companies have paid back their debt if both NIBD and EBITDA is held constant[21]. If the ratio is higher than 3 times EBITDA it is considered high gearing. The measurement is often used as an indicator of the companies' ability to handle issued debt.

$$NIBD\,vs.\,EBITDA = \frac{NIBD}{EBITDA} \tag{7.9}$$

[21]Petersen, C.V. and Plenborg, T. (2012)

	2010	2011	2012	2013	2014	2015	2016
Solstad	**08.92x**	**08.99x**	**05.77x**	**05.22x**	**06.07x**	**07.31x**	**16.75x**
Deep Sea	09.50x	13.97x	31.82x	04.31x	06.22x	-04.02x	-40.93x
Eidesvik	05.78x	04.82x	04.33x	03.37x	04.79x	03.68x	05.56x
DOF	09.28x	09.68x	07.54x	07.28x	06.94x	07.22x	06.57x
Siem	07.50x	06.38x	05.53x	05.61x	05.09x	07.02x	09.37x
Farstad	03.62x	03.85x	04.94x	05.18x	05.74x	08.09x	21.56x
Havila	06.88x	10.71x	10.89x	08.04x	06.29x	07.55x	13.16x
Mean	07.36x	08.34x	10.12x	05.57x	05.88x	05.26x	04.58x

Table 7.15: NIBD/EBITDA, Solstad and peer group

A ratio that is higher than 4 to 5 is considered critical and gives an indication that the company is less able to take on more debt[22]. However, the ratio differs from industry to industry and looking at the historical data most of the companies experiences a significant liquidity risk with a historical average of 4.50 times EBITDA in 2016. Companies in the OSV industry finance their new fleets through taking on more debt which results in a higher ratio. Solstad's net interest-bearing debt to EBITDA has increased significantly from 2015 to 2016 due to the merger with REM. When the companies were experiencing better market conditions until 2008 and between 2010 to 2014 they ordered newbuilds in order to meet the demand in the market. However, this has been at the expense of the industry's ability to repay debt through refinancing under favorable market conditions.

Conclusion liquidity analysis

Through the analysis, it is revealed that Solstad is operating at an average level of its peer group and is not standing out in any disturbing way. However, this is in relation to other companies within the same industry which are all suffering from the rough market conditions at the moment. Based on the above analysis it is hard to conclude that Solstad is doing any worse than their peers. In some cases, they are even performing better. This since everyone lies at an all-time low. However, many of the mentioned companies have already gotten their loans written down or went through heavy restructuring processes. There is no guarantee that Solstad will escape this.

[22]Petersen, C.V. and Plenborg, T. (2012)

8. WACC

WACC is the weighted average cost of capital and describes the cost of the capital based on the structure and characteristics of Solstad. The WACC includes the weighted cost of equity financing and debt financing. It is within the WACC the variables of credit risk will be implemented. By applying a range of values for these variables one should be able to recognize the change in the WACC. Further, the WACC determines the final value of the cash flows generated and impact the valuation and share price. The WACC will be generated with equation (8.1).

$$WACC = W_e * r_e + W_d * r_d * (1 - t_c) \tag{8.1}$$

Where r_e is the cost of equity, W_e is the weight of equity, r_d is the cost of debt, W_d is the weight of debt and t_c is the corporation tax rate.

The focus on credit risk will be calculated for both the cost of equity financing and debt financing, as the leverage ratio affects the cost of equity, while the NIBOR rate and the credit spread affects the cost of debt relation. In the next sections, the inputs of the WACC formula will be estimated and further discussed.

8.1 Capital structure of Solstad

In order to analyze the financial situation of Solstad, it is essential to start by breaking up the capital structure. Figure 8.1 displays the relationship between Solstad's debt owners and equity owners[1].

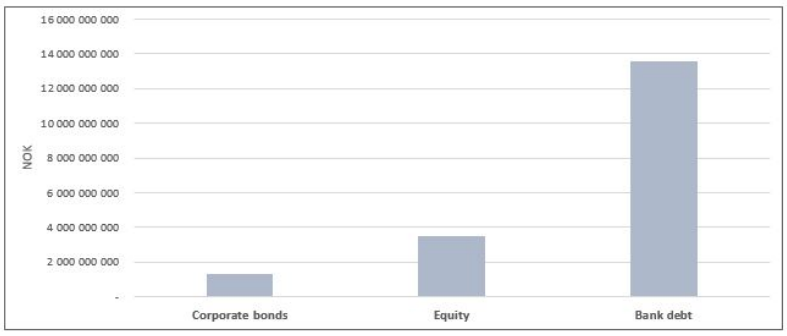


Figure 8.1: Distribution of capital, including the merger with REM

It is clear that the equity owners and the corporate bond owners face substantial risk in the event of default. The debt is greater than three times the size of equity and corporate bonds combined. In the event of default, the corporate bond holders would claim the equity and the

[1] Arctic Securites (2016)

banks would claim collateral in balance sheet items such as the fleet. This structure hence leaves equity holders extremely exposed if default should occur. It is also vital to look into the debt structure of Solstad. This in order to determine the claims of debt holders in the event of default. Figure 8.2 displays the distribution of Solstad's debt owners without including the merger with REM.

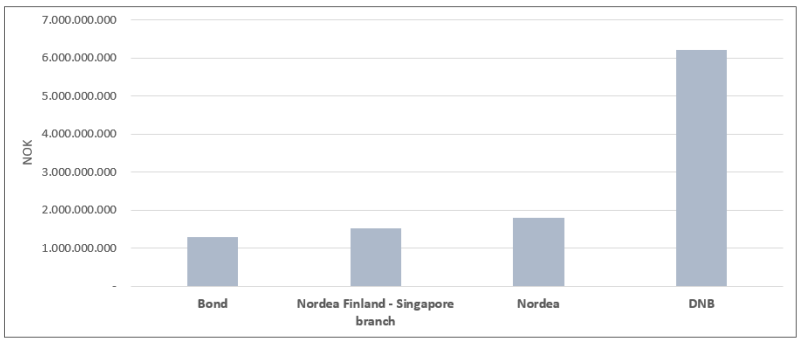


Figure 8.2: Distribution of debt owners, excluding the merger with REM

It becomes clear that DNB controls most of Solstad's debt followed by Nordea. The bond holders, therefore, perceive their position as particularly unsafe with the focus on the covenants. The covenants allow DNB and Nordea to take control of most vessels in Solstad (excluding the REM vessels in this example). Looking into the document describing the heavy debt financing, claims and downgrade triggers[2] one discovers numerous covenants Solstad must uphold in order not to be downgraded or declared default. Sixteen covenants were protecting both DNB and Nordea against several happenings such as dividends and low cash accounts. The most substantial covenant was that the market value of the vessels should be at least 100 percent of the outstanding debt[3]. Further, a consolidated cash sweep account is created in order to prevent Solstad from investing their cash in conflict with the covenants. The cash sweep account can be further defined as a bank account that transfers amounts that exceed, or fall short of, a certain level into a higher interest-earning investment option at the close of each business day[4]. Further, in the event of default, it is common to arrange so-called "fire sales". The vessels are sold off as fast as possible to the first bidder offering the collateral values the banks can claim. This means that banks sell off vessels at high discounts as long as they get the amount they are entitled to. If a fire sale should take place one could expect bond holders to be left with nothing as the fleet is a subject to collateral for DNB and Nordea respectively.

Further, it is essential to look into the additional debt structure as a consequence of the merger with REM. In other words, all the loans REM has taken on while still functioning as a separate entity. Figure 8.3 displays the relationship between REM's debt owners.

[2]Arctic Securites (2016)
[3]Solstad Offshore ASA (2016)
[4]Investopedia (2017c)

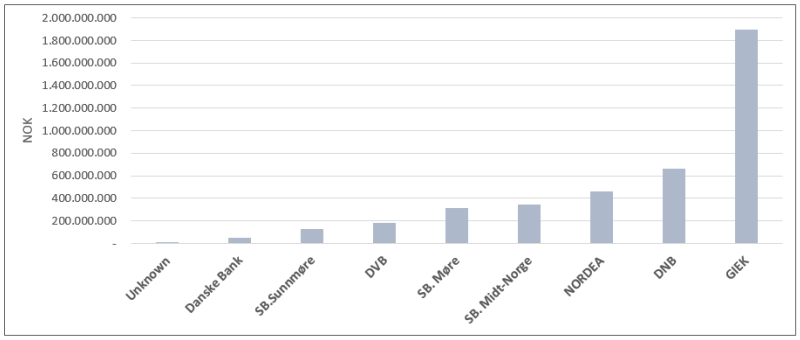


Figure 8.3: Distribution of debt owners of REM

One can perceive this debt structure of REM as extremely complicated since there exist nine different investors having claims to different vessels. The main debt holder is GIEK which has a claim to roughly 47 percent of the fleet. DNB and Nordea own fractions of the debt as well. Smaller banks have contributed to the debt financing, hence one could expect that they are more exposed. The risk of these loans lies in both impairment losses and freight rates. This relates to the volatility of ship prices and they are heavily reliant on the freight rates generated as discussed frequently. There are fewer covenants protecting the banks than in the case of Solstad. However, there is a covenant stating that the vessels are required to have a minimum value, namely, requiring the fair market value of each vessel to be equal to at least 100 percent of the loan(s) relating to the relevant vessel, from and including 1 January 2018 [5]. These minimum amounts cover all the respective loans. A sweep cash account has been created for REM as well. The covenants state the same restrictions on dividends and prohibit financial supports to other group companies. Further, it is vital to get an overall overlook of the total new capital structure of Solstad after the merger with REM. Figure 8.4 displays the new debt structure after taking REM's owners into account.

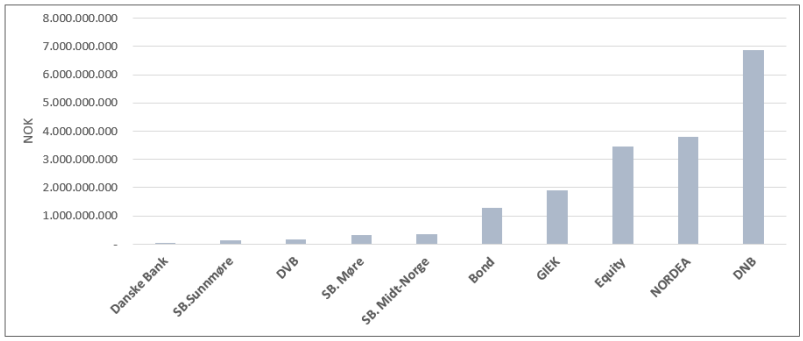


Figure 8.4: Full distribution of owners of Solstad

The overall capital structure reveals a complicated and heavy debt structure reliant on the market value of vessels as collateral in the event of default. It is furthermore extremely sensitive

[5] Arctic Securites (2016)

to changes in freight rates and market conditions. As described by the financing document by Arctic Securities several banks have reduced the quarterly down payments. However, these will be increased under better market conditions. Equity owners and corporate bond owners have no collateral and are the last priority in the event of default. Furthermore, since Nordea and DNB have senior bonds which are expected by the amount lent out their claims are more sensitive to changes in ship prices. The covenants can be regarded as a protection against the credit risk that lies within the capital structure of Solstad. This is a proof of little future financial flexibility as result of a capital intensive structure dependent on debt.

8.2 CAPM

The capital asset pricing model (CAPM) is well known in the financial world for assessing the expected return on assets with respect to systematic risk. In other words, CAPM is widely used for estimating the cost of equity and debt. It is particularly used for pricing stocks and risky securities[6]. The information about the cost of debt and equity as outputs from the CAPM can be used to calculate the weighted average cost of capital (WACC). The inputs used to estimate the final weighted average cost of capital will be discussed in the next section.

8.3 Beta

Beta is an essential variable in the capital asset pricing model (CAPM). Beta is a measure of volatility or systematic risk for a single asset or a portfolio of assets in comparison to the market as a whole[7]. Hence, beta explains the correlation between market returns and stock returns. Further, a beta of 1 implies that the share price moves with the market. A beta larger than 1, implies that the share price is more volatile than the market and vice-versa for betas below 1. As discussed earlier the offshore supply vessel industry is extremely volatile and moves with the freight rates created by demand and supply factors. Hence, it is expected that Solstad's beta lies in the interval around 1. These factors are previously discussed in the shipping market model.

There are several acknowledged methods for estimating the beta of a company. Four methods have been selected and an average of these methods has then been applied to construct the unleveraged beta. The beta has then been levered to take debt financing risk into consideration. The beta has also been adjusted for the Blume effect which is a well-known fact of mean aversion/reversion of betas. The methods, results, and difficulties will be discussed in the next sections.

[6]Investopedia (2017b)
[7]Investopedia (2017a)

8.3.1 Regression

Since beta is known to be the correlation between stock returns and market returns the regression is conducted on data representing exactly those variables. Hence, 17 years (01.01.2000-01.01.2017) of data for the stock price of Solstad and the Oslo Børs Benchmark Index has been used. This index holds a representative selection of all the listed companies on Oslo Børs. The index is revised every sixth month and the adjustments are completed in December and June. The returns on both the index and stock are calculated. Then the following regression is applied to estimate the beta:

$$R_S = Rf + \beta * R_M \tag{8.2}$$

where R_S is the return of the stock, B_1 is the intercept which can be interpreted as the risk-free rate, B_2 represents the beta and R_M represents the market return. This yields a beta of 0.88.

Regression Statistics	
Multiple R	0,5384
R Square	0,2899
Adjusted R Square	0,2863
Standard Error	0,0849
Observations	203

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,5918	0,5918	82,0460	0,0000
Residual	201	1,4499	0,0072		
Total	202	2,0417			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-0,0049	0,0060	-0,8068	0,4207	-0,0167	0,0070	-0,0167	0,0070
X Variable 1	0,8871	0,0979	9,0579	0,0000	0,6940	1,0802	0,6940	1,0802

Figure 8.5: Regression of Beta

The advantage of this process is that it is very quick and easy to conduct. However, the regression relies on historical data, meaning that the model expects the past to be a correct predictor of the future. It, therefore, is also dependent on the time horizon chosen, in other words, if it is a volatile or stable time horizon chosen. Furthermore, it assumes a static beta. It is also known that CAPM applies ex-ante data while the regression applies ex-post data. The regression also expects liquidity in the trading shares, this will be discussed further in section 8.6. R^2, which determines how much of the variability in Solstad's stock price that is explained by movements in the market, is approximately 29 percent. This means that the model only explains 29 percent of the movements in the share price of Solstad. The explanatory factor can be increased by adding more explanatory variables in the model. One can also claim that the index applied does not perfectly correlate with the stock analyzed. The stock index also holds stocks in different

industries. One could create an OSV index by adding the adjusted closing prices and weigh them according to market capitalization. This could potentially be a better proxy. However, there are few OSV stocks on Oslo Børs and most of them are in Solstad's peer group. Since a peer group beta analysis is conducted as a separate approach the creation of a pure OSV index was assumed not to be the best method.

8.3.2 Fama-MacBeth

While the regression method assumes a constant beta throughout time one can use the Fama-MacBeth method to estimate the time-varying betas. The time-varying beta is estimated using regression and a chosen time interval. Beta was estimated using a rolling window of 24 months for 17 years of data. The regression is then conducted on the excess stock return and the excess return for the market to create the betas. One can look at the equation as the CAPM solved for Beta. The left side of the equation becomes the excess return on the stock and the right side is the excess return of the market.

$$R_S - Rf = \beta * R_M \tag{8.3}$$

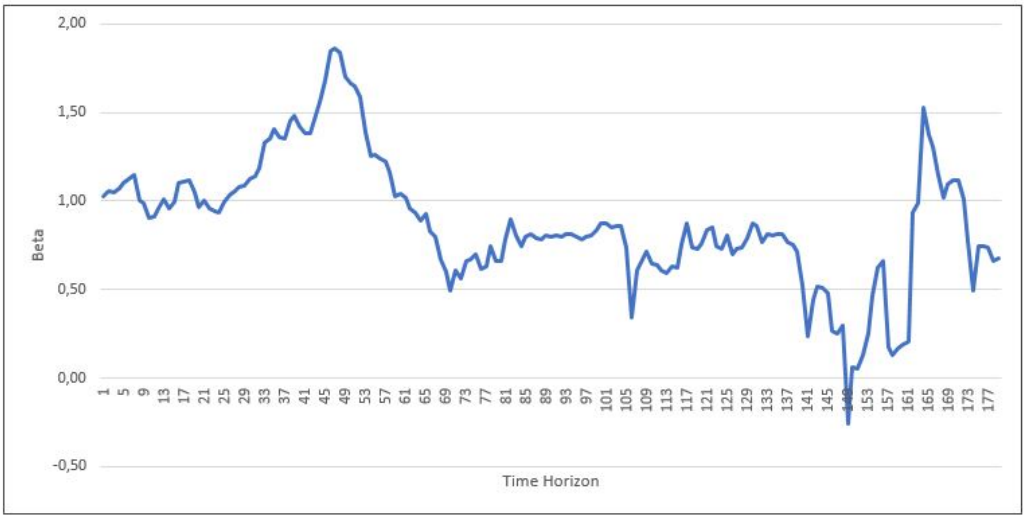


Figure 8.6: Time varying beta for Solstad

The approach gave 179 betas, creating an average of the 179 betas yield a beta of 0.87. Figure 8.6 further confirms the volatility in this industry. The downside of this approach is that each beta is weighted equally when generating the rolling window. This is especially true since some of the movements in betas as shown in figure 8.6 can be considered extreme observations. If these outliers are far in the past one could argue that these betas should be weighted differently. This in order to weigh the newest past observations considerably higher than the ones far in the past. Hence, the newest observations are a better predictor of the future observations. However,

this approach gives a decent overview of the systematic risk of Solstad the past 17 years.

8.3.3 Peer group beta

Another well-known approach is collecting the betas of the peer group from a trusted financial source in order to create an average beta as a proxy for the company to be evaluated. The collected betas are shown in figure 8.1[8].

Company	DOF	Siem	Deep Sea	Eidesvik	Farstad	Havila
Beta	1.68	0.16	0.14	1.04	1.17	1.52
Average						**0.95**

Table 8.1: Peer group beta

The method gives an average beta of 0.95. This general and straightforward approach reveals large variability in betas of the peer group. One could possibly be critical to both Siem and Deep Sea's low betas which drag the average beta downwards. The difference in betas can rise from factors which are not easily observed and there is always a possibility that the peer group chosen is not optimal. However, based on the OSV industry of Norway this is the most optimal peer group from the Oslo Stock Exchange.

8.3.4 Industry beta

Another approach is to collect the industry beta from known financial sources. Damodaran is regarded as a trustworthy source for estimating such variables. Based on 148 firms in the oil service and equipment industry the average unleveraged beta is estimated to 1.11[9]. This method is easy to apply and avoids the pitfalls of regression. However, some firms could face different risks even though they operate in the same industry. Damodaran uses data from the US and the differences in risk could very likely vary with country.

8.3.5 Average beta

The four approaches used to estimate beta yield an average unleveraged beta of 0.95. The estimate of the unleveraged beta appears to be realistic as it is very close to our predictions discussed previously.

[8]Reuters (2017)
[9]Damodaran (2017)

Method	Beta
Regression	0.88
Fama Macbeth	0.87
Peer group	0.95
Industry sector	1.11
Average	**0.95**

Table 8.2: Average beta

8.3.6 The Blume effect

The Blume effect refers to empirical results which claim that beta over time is both mean averting and reverting. Hence, beta over time will regress to the grand mean of all betas[10], which is 1.

$$\beta = (2/3) * \beta + (1/3) * 1 \tag{8.4}$$

Adjusted beta for the Blume effect gives an unleveraged beta of 0.97.

8.3.7 Leveraged beta

As mentioned the beta of 0.97 is unleveraged and needs to be adjusted for debt[11]. The levered beta will hence reflect the risk for equity owners through the leverage ratio.

$$\beta_L = \beta_U * (1 + ((1 - t) * (D/E))) \tag{8.5}$$

The leverage ratio is staggering 5.45 and this provides a levered beta of 4.83. This result may appear high, however, Solstad operates with 16 percent equity. If the leverage ratio was 1 (50 percent equity and 50 percent debt) the levered beta would be 1.68 which appears to be reasonable. It is perceived as the equity owners of Solstad demands a hefty premium for supplying capital. This since Solstad has financed its operations with trenches of debt, where the bank debt is the only debt collateralized. Meaning that the remaining fixed income investors have a claim to the leftovers from the banks. Further, there is a risk that equity owners will be left with nothing in the event of default. One can especially argue this in these depressed market conditions where vessel values have suffered from large impairment losses. Solstad in relation to its peers with the focus on gearing will be further analyzed in the liquidity section.

[10]Blume, M. (1975)

[11]Ibankingfaq (2017)

The effect of leverage ratio on the share price will be measured in section 10.7 as it is vital in order to reveal how credit risk affects the share price.

8.4 Market risk premium

The market risk premium is an important variable in the capital asset pricing model. It can be defined as the difference between the expected return on the market portfolio and the risk-free rate[12]. Damodaran estimates the risk premium of Norway, which is an AAA rated country to 5.69 percent[13]. PWC estimates the risk premium of Norway to 5.00 percent[14]. An average of Damodaran's and PWC's estimates gives a market risk premium of 5.35 percent.

8.5 Risk-free rate

The risk-free rate is the return a shareholder will acquire by investing in a theoretical risk-free security. Treasury bills are often used as a representation of the risk-free rate since empirical evidence has shown that there is low risk tied to these securities.

The basic approach is to use a ten or thirty-year government bond, the bond should be denominated in the same currency as the company's operating cash flow[15]. A ten-year Norwegian government bond has these qualifications and is AAA rated. Hence, there is no risk associated with investing in this bond. The risk-free rate is therefore estimated as the average of the yearly average of daily listings (2007-2016) of a ten-year Norwegian government bond[16].

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Rate (%)	4.78	4.47	4.00	3.52	3.12	2.10	2.58	2.52	1.57	1.33	**3.00**

Table 8.3: Risk free interest rate

Historical data for ten years was used to capture the fluctuations in interest rates through time. Estimating the risk-free interest rate with this approach yields a risk-free rate of 3.00 percent.

8.6 Liquidity premium

When the security traded cannot easily be converted into cash for its fair market value investors often demand a premium. Hence, a high premium is demanded illiquid assets. The liquidity premium is a compensation for the added risk of investing over a long period of time since valuations tend to fluctuate with market movements[17].

A regular liquidity premium varies between 3.5 to 5.0 percent. Since the industry has slow growth

[12]Investopedia (2017f)
[13]Damodaran (2017)
[14]PWC (2016)
[15]Petersen, C.V. and Plenborg, T. (2012)
[16]Norges Bank (2017)
[17]Investopedia (2017a)

prospects and bonds traded[18] in this market trades at a large discount a liquidity premium of 3.5 percent has been selected. These high yield bonds will be further discussed in the cost of debt section.

8.7 Cost of equity

Using the capital asset pricing model as previously described one can estimate the cost of equity with equation (8.6). Where α is the liquidity premium.

$$r_e = \alpha + Rf + \beta * (E[rm] - rf) \tag{8.6}$$

Levered beta	Market risk premium	Rf	Liquidity premium	R_e
4.8340	0.0535	0.0300	0.0350	**0.3234**

Table 8.4: Cost of equity

The estimates previously acquired yields a cost of equity of 32.42 percent as shown in table 8.4. The estimated cost of equity is substantial. The risk is driven upwards by the levered beta and is reflecting the current debt situation of Solstad. The cost reflects the significant threat for equity owners in the event of default. Hence, they require a noteworthy return by investing in this company.

8.8 Estimating credit risk

The probability of default (PD) is an important factor for estimating the credit risk in a company. In this section, the credit spread, probability of default and distance to default will be estimated through a variety of approaches. Further, a sensitivity analysis of the credit spread will be conducted. This since the credit spread is an input to the WACC and will, therefore, determine some of the credit risks in the share price. Different aspects of the approaches will be discussed in the following sections.

8.8.1 The Norwegian fixed income market

Since Solstad has a bond trading in the fixed income market it is hence essential to elaborate on the Norwegian fixed income market. Corporate bonds contribute to 25 percent of the total bond volume in Oslo[19]. Half of the 25 percent can be considered investment grade and the other respective part could be considered high yield. PWC states that Norwegian Investment banks have been substantially successful in raising bond capital within the shipping industry[19]. Hence, the interest in the Norwegian bond market is significant and growing at a high pace which is

[18] Arctic Securities and Nor-Ocean Offshore (2017) [19] PWC (2017)

attracting foreign investors. Since the capital restrictions have hit the banks hard a consequence has been that the cost of borrowing has increased[20], especially within the shipping industry because of its capital insensitivity. In general, companies prefer corporate bonds as they usually are issued as bullet bonds, hence there are no down payments only interest payments. This is favorable, especially in market recessions.

8.8.2 Estimating probability of default with historical data

Solstad has been projected to a rating of B, which is estimated in section 8.9. Solstad has one bond trading in the fixed income market. It is a floating rate bond which matures 24.09.2021[21]. The rating approach by Standard and Poor estimates Solstad's default probability to 29.58 percent on the current bond[22].

8.8.3 Estimating probability of default with bonds

The corporate bond is a callable senior unsecured bullet bond with maturity date 24.09.2021. The coupon rate is NIBOR 3 Months plus 4 percent. It has a quarterly payment structure and was last traded as of 08.12.2016[21] on 62.37 (face value 100). This shows a considerable discount which could imply that investors are uncertain about getting their investment paid back in full. Two different approaches were applied to calculate the yield to maturity (YTM) for the corporate bond. Yield to maturity (YTM) is the total return expected on a bond if the bond is held until the maturity[23].

The first approach determines the YTM by keeping the coupon rate constant at the last interest rate the bond was traded at which is 5.18 percent. This method does not yield exact values as NIBOR does not stay constant over time. Furthermore, this approach estimates the YTM to 18.03 percent. One could argue that since this is distressed debt the YTM is not particularly sensitive to changes in NIBOR.

The second approach builds on a future prediction of NIBOR by Bloomberg. By using these rates for specific time intervals and adding the 4 fixed percent one can determine the YTM with a more precise approach. Since the bond usually has coupon payments one or two weeks after the updated 3 months NIBOR, the NIBOR before coupon payments was weighted 90 percent while the new NIBOR estimate was weighted 10 percent. Furthermore, this approach estimates a YTM of 18.29 percent. As seen in figure 8.7 rates are forecasted to reach a peak point at 14.03.2025 at a rate of 2.65 percent. This gives respective coupon payments of 6.65 percent for Solstad. The estimation of the YTM for the respective bonds can be found in the appendix.

[20] PWC (2017)
[21] Arctic Securities and Nor-Ocean Offshore (2017)
[22] Alizadeh, A. H. and Nomikos, N. K. (2009)
[23] Investopedia (2017e)

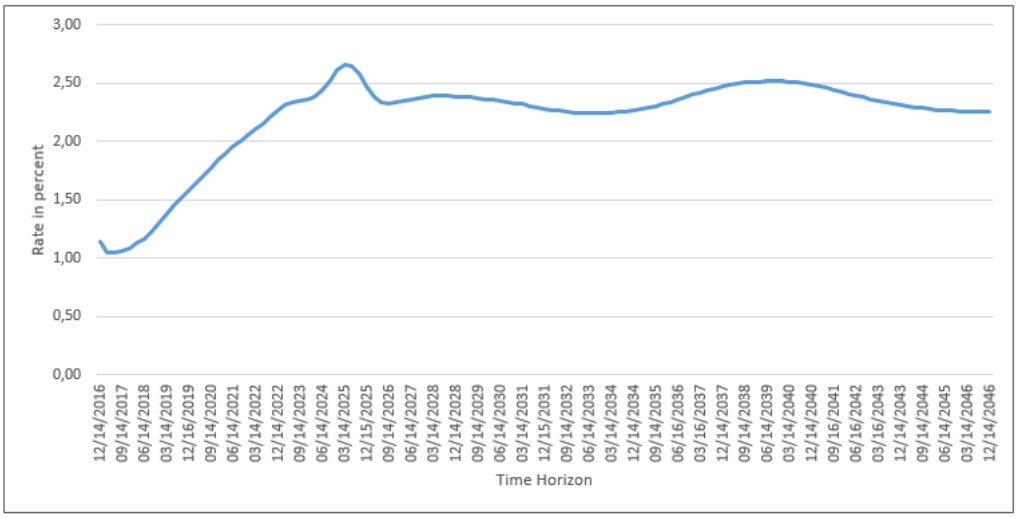


Figure 8.7: NIBOR predicted by Bloomberg

The YTM for a 5 year US Treasury bond is 1.94 percent[24]. The expected loss is therefore calculated to 15.09 percent. The bond is as mentioned senior and unsecured which produces a recovery rate of 36.80 percent[25]. Using the YTM for the bond with the time varying NIBOR yields a probability of default of 23.87 percent. This estimate appears to be reasonable as it is relatively close to the historical default probability of 29.58 percent.

8.8.4 Estimating probability of default and distance to default with Merton

As discussed in section 6.2 the Merton model can be applied to estimate the relevant credit spread, the probability of default and distance to default.

To apply the Merton model the asset value and the asset volatility has to be estimated. Time-varying liabilities and time-varying interest rates have been used in order to come closer to market values as these variables are based on the information the market has at a particular date[26]. It has been assumed that Solstad only has liabilities that mature in one year since structural models often are used to produce one-year default probabilities. Further, firms often have relatively stable maturity structures as they often issue new debt once some part of the old debt is retired[26].

The ten-year Norwegian government bond which was estimated in section 8.5 has been used as the risk-free rate[27]. The model relies on a time horizon from 15.12.15 to 15.12.16. The market value of equity is created by multiplying the number of stocks outstanding in the respective quarters with the share price and the book value of liabilities are given by the quarterly reports for Solstad.

[24] US Department Of The Treasury (2017)
[25] Alizadeh, A. H. and Nomikos, N. K. (2009)
[26] Löffler, G. and Posh, P. N. (2007)
[27] Norges Bank (2016)

The book about credit risk modeling estimates the asset value and asset volatility through calculations of the asset values at each time point by adding together the market value of equity and book value of liabilities. Further, the asset value is estimated with a second approach[28] as follows:

$$A_t = [E_t + L_t\, e^{-rt}\theta(d_2)]/(d_1) \tag{8.7}$$

The log returns are estimated on the asset values which was initially obtained through the market value of equity and book value of liabilities. The standard deviation of the log returns is then multiplied by the square root of the number of observations. Furthermore, the sum of squared errors is calculated between the two different methods of estimating the asset values at different time points. Continued, a VBA code is run to minimize the sum of squared errors to approximately zero. The sub in the VBA states that as long as the sum of errors is larger than zero the asset values found by equation (8.7) is copied to the asset values obtained by the market value of equity and book value of debt[28]. The VBA codes created can be found in the appendix. The drift, also known as mu, is estimated as follows:

$$\mu = LN(1 + (Rf + \beta * E[rm] - rf)) \tag{8.8}$$

Based on the relevant variables estimated in the previous sections such as the unleveraged beta of 0.97, the risk-free rate of 3.00 percent and the market risk premium of 5.35 percent yields a drift of 7.87 percent. This approach generates an asset volatility of 61.50 percent. This may seem high, however, Bloomberg has estimated Solstad's asset volatility to approximately 60 percent. The asset value is estimated to 19,843,956. The total debt given by the balance sheet is 18,902,730. Maturity is as discussed previously one year. With these estimates, it is possible to determine the market value of debt with and without default probability. The Merton model gives the following outputs:

[28]Löffler, G. and Posh, P. N. (2007)

Information	Debt value - default probability	Debt value - no default probability
Asset value	19 843 956	19 843 956
Debt face value	18 902 730	18 902 730
Volatility	0.6150	0.6150
Interest rate	0.0300	0.0300
Time to maturity	1	1
Equity value	5 397 787	5 397 787
Bond value	14 446 169	18 344 489
Promised yield	0.2689	0.0300
Yield spread	**0.2389**	0.0000
Initial equity volatility	1.5109	1.5109
d1	0.4352	0.4352
d2	-0.1797	-0.1797
Φ(d1)	0.6683	0.6683
Φ(d2)	0.4287	0.4287
Drift	0.0787	0.0787
d2(drift)	-0.1004	-0.1004
P-def probability	0.5400	0.5400
Q-def probability	0.5713	0.5713
Expected loss	**0.2125**	
P(default)	**0.5713**	
Expected recovery	**0.6280**	
Distance to default	**0.0771**	

Table 8.5: The Merton model

It is observed that the probability of default is staggering 57.13 percent. This is high compared to the previous estimates in this section. One could claim that if a longer time horizon was applied for estimating volatility and asset value the probability of default might be lowered. The distance to default is 0.0771. This implies that only 0.0771 of standard deviations drops in the asset value could trigger a default. Furthermore, the yield spread is estimated to 23.89 percent. The yield spread can be perceived as high. One possible reason could be that the Merton model does not take into account the different obligations and their respective risk weights. In other words, it does not take the capital structure into consideration.

8.8.5 Sensitivity of yield spread

The yield spread can be defined as the difference in yield between two bonds or two types of bonds. It can be used to compare the maturity, credit rating, liquidity and risk of two bonds, or of one bond to a benchmark[29]. The yield spread is essential in order to estimate the cost of debt and to observe the reflection of credit risk in the share price. Hence, a sensitivity analysis has been conducted in order to estimate the changes in yield spread when changes in main variables of the Merton model occur.

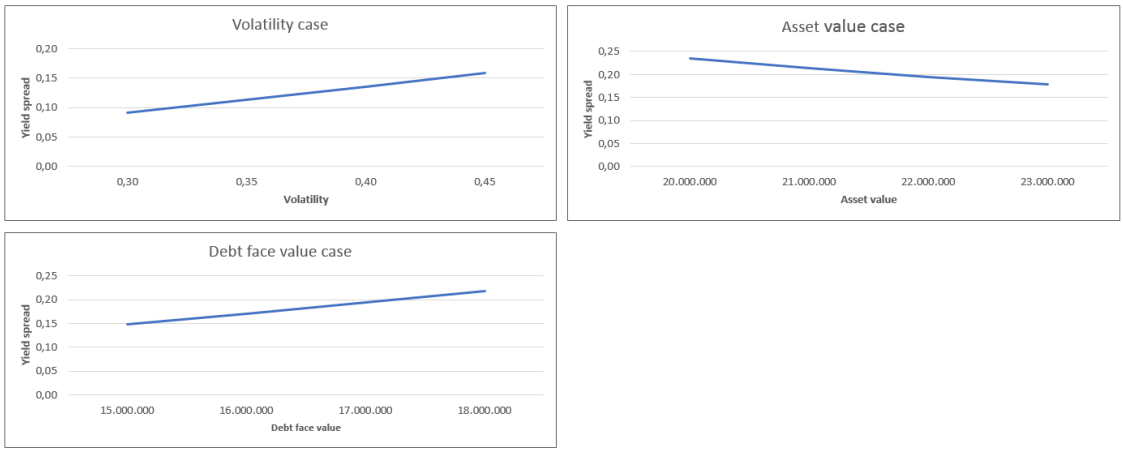


Figure 8.8: Credit Spread sensitivity

It is detected that the yield spread increases when the volatility increases and the other way around. One can also observe that when the asset value increases the yield spread decreases. This since the debt is constant and as a result, the equity value increases. Further, when the face value of debt rises the yield spread increases, this due to that the larger the fraction of debt the smaller the fraction of equity is left in the company. Overall, the yield spread is very sensitive to volatility changes, asset value changes and debt value changes. The yield spread can be seen as credit risk that lies within the stock. Since it is interesting to observe the impact yield spread has on the share price a sensitivity analysis will be conducted for this purpose in section 10.7. Further, yield spread tends to narrow in good economic times and vice versa. Since the economy is weak in Norway compared to historical periods one should, therefore, expect a higher yield spread. Yield spreads also tend to be higher for bonds which are callable as the bond of Solstad. As mentioned the liquidity of the bond is important. When the bond is less liquid it trades at a larger discount and the yield spread is higher[29].

8.8.6 Conclusion

The three methods has yielded the following estimates of credit risk as shown in table 8.6:

[29]Valuation Academy (2017)

Method	Probability of Default (%)	Distance to Default	Yield spread (%)
Historical	29.58		
Bonds	23.87		
Merton	57.13	0.0771	23.89
Average	**36.86**		

Table 8.6: Summary of Credit Risk

All models show great signs of credit risk. The first reason could be that the significant increase in debt as a consequence of the merger with REM offshore, as mentioned in section 8.1, leaves Solstad with a small portion of equity. This will drive the risk of the bond upwards as they have a claim to the equity. It is witnessed that Siem Offshore has senior unsecured bonds in the fixed income market trading at respectively 53.00 and 54.00 (face value 100), in other words, below par as of 10.03.2017[30]. This could reflect the skepticism market participants have to the OSV industry and its respective profitability. The required return for investing in bonds in this segment is significantly high due to the slow growth outlook and the default risk which is a consequence of complicated layers of debt financing with numerous covenants protecting banks. In the event of default, the respective banks have the first priority to the collateral leaving corporate bond owners with potential losses. Further, one should consider the liquidity premium of these bonds. This since these OSV bonds can be perceived as "more difficult to trade" and therefore less liquid than for example investment grade bonds. This was discussed in section 8.6. This factor could possibly contribute to lowering the price as well. One could also claim that the bond investors do not worry about the respective coupon payments. The payments are currently moderately low, however, what is of concern is the rollover of the bond. Usually, when a bond matures as the bullet bond of Solstad the principal value is not settled but rolled to a new maturity date. This rollover is hence dependent on the financial situation of the company. The low price could, therefore, reflect the possibility of the investment banks not being able to rollover the bond because of the market recession and heavy debt financing of Solstad. Further, if the bond cannot be rolled it is relatively difficult to issue new bonds and the coupon rate would hence be higher. In other words, lending in the fixed income market would be more expensive. However, Solstad's bond value has increased to 73.25[30] after the merger with Farstad and Deep Sea as mentioned in section 11. The appreciation in bond price could possibly reflect the fixed income market's expectations of Solstad to become the fourth largest OSV company in the world.

It is witnessed that the Merton model yields higher estimates for the probability of default. There are several reasons that possibly could explain this. The models are based on different

[30] Arctic Securities and Nor-Ocean Offshore (2017)

assumptions and theories. However, all models display the significant credit risk with an average probability of default of 36.86 percent. The probability of default confirms the fact that investing in Solstad comes with high risk and this is further confirmed by the fixed income market where the bond is trading below par.

8.9 Cost of debt

The cost of debt reflects the overall returns creditors such as banks and private investors demand supplying capital. This cost should reflect the overall risk within the debt, therefore; how likely it is for the creditors to get their invested capital paid back in full with their required rate of return.

Analyzing Solstad's balance sheet it is noticed that the long-term debt has increased by approximately 90 percent from 2015 to 2016. This was previously mentioned in section 7.1 and was due to the merger between Solstad and REM Offshore. This increases the risk for the debt holders in the company especially since the fleet is the only collateral available. The impairment losses as mentioned earlier have contributed to lowering the collateral values for the banks.

8.9.1 Credit rating

There are several techniques in order to measure the cost of debt and the belonging risk. One common way of doing so is by using Standard and Poor's credit rating method. The assessment of credit quality relies on accounting numbers and ratios that are measuring the financial health of the company. These ratios describe measures of risk and profitability of the company in question[31]. By quantifying the outcomes of the ratios one can determine the rating of the ratio. The average of ratings for all the different ratios in the given year determines the final rating. The rating lies in the interval AAA to CCC, where AAA to BBB is regarded as investment grade and below BBB is regarded as speculative grade, hence riskier. The given intervals for the ratings and the calculated ratios for Solstad are shown in table 8.7 and 8.8.

Type	AAA	AA	A	BBB	BB	B	CCC
EBIT interest cover	21.4	10.01	6.1	3.7	2.1	0.8	0.1
EBITDA interest cover	26.5	12.9	9.1	5.8	3.4	1.8	1.3
Operating cash flow/total liabilities(%)	84.2	25.2	15.0	8.5	2.6	-3.2	-12.9
Return on invested capital(%)	34.9	21.7	19.4	13.6	11.6	6.6	1.9
Total liabilities/Total capital(%)	22.9	37.7	42.5	48.2	62.6	74.8	87.7

Table 8.7: Ranking

Table 8.7 illustrates the given intervals for ranking of measurements[31]. However, these intervals

[31]Petersen, C.V. and Plenborg, T. (2012)

are given for US industrial long-term debt. Clearly, this ranking is not specific to the Norwegian offshore industry. Furthermore, one can assume that there could be different thresholds and that the ranking could vary between industries and may change over time[32].

Type	2010	2011	2012	2013	2014	2015	2016
EBIT interest cover	BB	CCC	BB	BB	B	<CCC	<CCC
EBITDA interest cover	BBB	B	BB	BB	B	CCC	AA
Operating cash flow/total liabilties	BB	BBB	A	A	A	A	BB
Return on invested capital	CCC	CCC	B	B	B	<CCC	<CCC
Total liabilites/Total capital	BB	B	BB	BB	B	B	CCC
Average rating	BB	B	BB	BB	BB	B	B
Average rating three last years	**B**						

Table 8.8: Solstad Rating

The estimations suggest that Solstad is given a rating of B by using the specific values yielded for the three last years. In other words, Solstad is "more vulnerable to adverse business, financial and economic conditions but currently, has the capacity to meet financial commitments". It is also observed that Solstad had a rating of B in 2015 as well. These findings reflect the struggles of the levered OSV industry.

8.9.2 Estimating cost of debt

From table 8.9 one can observe that the yield spreads measured over a two year period using a US treasury bill across different ratings differ. The credit spread covers a premium for the exposure to default risk[32]. Hence, this premium covers credit risk and has a direct influence on the cost of debt as mentioned earlier.

US treasury, 10 year	AAA	AA	A	BBB	BB	B
3.38	1.9	2.4	3.6	4.7	11.2	13.1
3.38	0.6	0.7	0.8	1.3	2.6	3.2

Table 8.9: 10 year US treasury bill

The cost of debt is estimated with equation (8.9) where rf is the risk-free rate and r_S is the credit spread.

$$r_d = (rf + r_S) * (1 - t_c) \tag{8.9}$$

[32]Petersen, C.V. and Plenborg, T. (2012)

The US treasury bill was disregarded due to high risk because of the complicated capital structure of Solstad. From the financial statements as well as the restructuring document it is observed that most of the bank debt was issued at NIBOR 3 months plus approximately 3.5 percent. Further, the bond was issued at NIBOR 3 months plus 4 percent. The NIBOR rate is often perceived as the risk-free rate and the mark-up as the premium. A lot has happened the last two years. The oil price hit an all-time low and freight rates followed. As a result, the heavy debt financing in this industry has led to large losses for banks. The covenants in the loan agreements are provided in order to protect banks from larger impairment losses in the future and there is no collateral left in Solstad as the complete fleet is demanded by a variety of banks. It is, therefore, safe to assume that debt issued in the past would not be issued today at the same premiums. This is further confirmed by the estimated default probability and the bond trading at a discount. Since there is no market for bank debt the corporate bond is the best proxy to observe what result the downturn has had on the demanded premiums. Merton generated a yield spread of 23.89. However, Merton does not take into account the different obligations, collateral, and therefore their respective risk weights. One can, therefore, assume that Merton yield spread is the premium that the banks would demand further lending. The NIBOR is treated as the risk-free rate and the yield spread is determined by Merton, this generates the cost of debt. This means that Solstad has to pay up the interest rate of their currently trading bond of 1.18 (NIBOR 3 months) percent plus the spread of 23.89 percent which equals 25.07 percent.

Using the current interest rate of the bond, the respective credit spread and the standard Norwegian tax rate the cost of debt for Solstad is estimated to 18.30 percent. The credit risk of Solstad lies in the NIBOR 3 months' rate and the credit spread which is considerably higher compared to other securities. It supports that lenders and investors require a compensation for higher credit risk. However, one should be aware that spreads do not stay constant over time[32].

In order to capture the impact on the yield spread from different inputs in the Merton model, a sensitivity analysis was conducted in section 8.8. The impact from a range of credit spreads will also be measured against the change in share price in the valuation section. Further, holding NIBOR at a constant level might not be the optimal solution. Therefore, a sensitivity analysis of the NIBOR rate is conducted in the valuation section as well.

8.10 Estimation of WACC

All inputs have been estimated as shown in table 8.10.

r_e (%)	r_d (%)	Tax rate	W_e (%)	W_d (%)	Equity	Liabilities	WACC (%)
32.34	18.30	0.2700	15.51	84.49	3.455.727	18.829.155	**16.30**

Table 8.10: WACC

The estimation yields a weighted average cost of capital of 16.30 percent. The small but significant equity portion drives the cost of capital upwards. One can also argue that the high yield spread estimated from the Merton model drives the WACC in the same direction. The book value of both equity and liabilities have been used, this since the share price of Solstad has been experienced as significantly volatile.

9. Modelling

9.1 The Ornstein-Uhlenbeck process

An Ornstein-Uhlenbeck process has been estimated in order to forecast future freight rates. The rates will be used to estimate the growth in revenues for Solstad. The approach and the outcomes will be discussed in this section.

9.1.1 The process

As mentioned in the shipping market model freight rates are determined through supply and demand. However, there are some important characteristics of freight rates. There is empirical evidence that returns of freight rates have mean reversion and seasonality incorporated[1]. Also, characteristics such as limitation of supply and inelastic demand have been shown to affect freight rates. In periods where freight rate volatility is low, there is often an oversupply and any changes in demand or shock to the market can be absorbed without any significant changes. However, in periods of tight supply and demand, any change in demand due to seasonal, cyclical or random shocks results in a sharp change in freight rates and high volatility. This behavior is known as volatility clustering[1].

As mentioned the freight rates in the OSV industry are highly fluctuating and is one of the major sources of uncertainty. The Ornstein-Uhlenbeck process is the most elementary mean-reversion stochastic process, which is appropriate to apply to the shipping industry. A mean-reversion stochastic process is a random process that tends to revolve around its long-term mean over time. When forecasting freight rates the result clearly relies on the method applied. There are different methods for estimating the volatility in freight rates. Some of the methods incorporate factors which are essential to the process of the underlying, however, there are advantages and disadvantages with the different approaches. Through the model, it will be possible to derive the formulas for the value of simple freight rates assuming that the spot freight rate is the single most important driver for returns in the shipping markets[2]. The process is shown in the stochastic differential form in equation (9.1), as is the most common, where the model depicts the change in a process X at time t.

$$dX_t = k(\theta - X_t)dt + \sigma dW_t \tag{9.1}$$

where X_t is referred to as the spot freight rate, k is the speed of mean reversion, where a higher k leads to a faster mean reverting process, θ is the constant long-term mean, σ is the

[1] Alizadeh, A. H. and Nomikos, N. K. (2009)

[2] Jørgensen, P. L. and DeGiovanni, D. (2009)

instantaneous volatility of the spot freight rates, and W_t is a standard Wiener process defined on some probability space[2]. The Wiener process is the random part of the process as a Wiener process is a continuous-time stochastic process[3]. Properties of the Wiener process is being standard normal distributed *iid* $\sim$ *N(0,1)* which implies that the future spot freight rates are normally distributed.

To make the volatility of freight rates depend on the freight rate level the following processes is commonly used[4]:

$$dP = k(\theta - P)dt + \sigma P dW \tag{9.2}$$

Dixit and Pindyck (1994) suggested the volatility term σPdW and this has become known as the geometric Ornstein-Uhlenbeck processs[5]. However, one is often interested in estimating the process in discrete time, this can be conducted using the approximation of equation (9.2) as follows:

$$Pt = P_{t-1} + k(\theta - P_{t-1}) + \sigma P_{t-1}\epsilon_t \tag{9.3}$$

where dt = 1 and $\epsilon_t \overset{iid}{\sim}$ N(0,1)[6]. The variability in future prices is highly dependent on the volatility parameter and the mean reversion parameter.

9.1.2 Estimation of the Ornstein-Uhlenbeck process

Equation (9.3) can further be expressed as

$$R_t = -k + \frac{1}{P_{t-1}}k\theta + \sigma\epsilon_t \tag{9.4}$$

where R_t is defined as

$$R_t = \frac{P_t - Pt - 1}{P_{t-1}} \tag{9.5}$$

Hence, the parameters of the process can be estimated through regression[5] as follows:

$$R_t = \alpha + \beta\frac{1}{P_{t-1}} + \epsilon_t \tag{9.6}$$

[3]Reid, S. (2015)
[4]Chen, S. and Insley, M. (2010)
[5]Dixit, A. and Pindyck, R. (1994)
[6]Chen, S. and Insley, M. (2005)

The regression gives the following outputs of the variables: k = -α, θ = -β/α and σ is the residual standard error of the regression.

9.1.3 Regression parameters

The outputs from the regression is shown in table 9.1.

Vessel	Regression
PSV <3.500	$P_t = P_{t-1} + 0.0734 * (1662.7553 - P_{t-1}) + 0.3718 * P_{t-1}\epsilon_t$
PSV >3.500	$P_t = P_{t-1} + 0.0549 * (1898.8550 - P_{t-1}) + 0.3972 * P_{t-1}\epsilon_t$
AHTS <20.000	$P_t = P_{t-1} + 0.0832 * (5033.8307 - P_{t-1}) + 0.6498 * P_{t-1}\epsilon_t$
AHTS >20.000	$P_t = P_{t-1} + 0.0333 * (4872.8033 - P_{t-1}) + 0.5766 * P_{t-1}\epsilon_t$

Table 9.1: Simulation equations

The small PSV vessels have high mean reversion and the lowest volatility. Hence, it is expected that the future rates will have few outliers. The largest PSV vessels have a higher volatility and a lower mean reversion speed, hence they are expected to have a larger volatility in future freight. The small AHTS vessels have the highest volatility and mean reversion, it is therefore expected to have more extreme values since the volatility term is approximately 65 percent. However, some of the rates for this vessel segment should lie close to the mean. The large AHTS vessel shows low mean reversion and high volatility. These rates can be expected to have high fluctuation and some extreme outcomes. One could claim that the larger vessels which show greater sign of volatility are due to the market downturn starting in 2007 and 2014. The smaller vessels were less affected than the ones in the large segments. This since the smaller vessels is more flexible and do not require the high freight rates. The r-codes can be found in the appendix.

9.2 Freight rate modelling

The modeling was performed on a monthly data set of historical freight rates for the vessel sizes defined in section 9.1. The data set used had historical freight rate values for the defined vessel segments from 2001 to 2017. The long time horizon was used to capture the fluctuations and market movements during both booms and recessions. Future freight rates will be based on the market of North-West-Europe and this will be discussed in the forecast section.

Because of the market downturn, some freight rates during this time period was not captured, simply because there was not enough data/voyages to estimate any values. Regression between the different vessels segments for the respective vessel type was used to estimate the missing values. This approach yield relatively similar values as the ones in t_{-1} for the individual missing freight rates.

The data set of historical monthly freight rates presented high volatility for all segments, especially for the larger vessel sizes. This due to the mentioned market decline, in addition, freight rates are generally volatile and this can also be observed for the volatility parameter in the Ornstein-Uhlenbeck regression being between 37 to 65 percent. Hence, the modeling generated similar extreme outcomes.

Estimating the Ornstein-Uhlenbeck was completed through 50,000 simulations with the approach discussed in section 9.1. The approach yielded 50,000 freight rates which were very volatile due to the high volatility estimates found through the regression. It was therefore concluded to use the average of the 50,000 simulations and repeat the process until it yielded 60 monthly future freight rates. This to reduce the number of outliers the approach resulted in.

The accuracy of the estimated freight rates is highly dependent on the model selected for estimating the volatility of the underlying asset, the behavior of the variable as well as the assumptions regarding the distributional properties of returns. One can argue that historical data is not the best predictor for future data. It is also assumed that the freight rates are normally distributed through the Wiener process. The volatility is also held constant which could be criticized as the volatility might move with market conditions. One could also argue that freight rates are somewhat seasonal which might not be captured by the model.

9.2.1 Freight rate forecast

The outcomes of the Ornstein-Uhlenbeck results in the future freight rates and is revealed in this section. The future freight rates will generate the revenue growth parameter in the forecast of Solstad. The future freight rates affect the revenues and thereby the credit risk. Freight rates have been estimated on different data sets belonging to the respective vessel segments and their respective sizes. The sections below will further discuss the outcome of the Ornstein-Uhlenbeck process.

PSV vessels smaller than 3,500 dwt

The Ornstein-Uhlenbeck model yields the following estimates for the PSV vessels smaller than 3,500 dwt for 60 months of future freight rates as shown in figure 9.1.

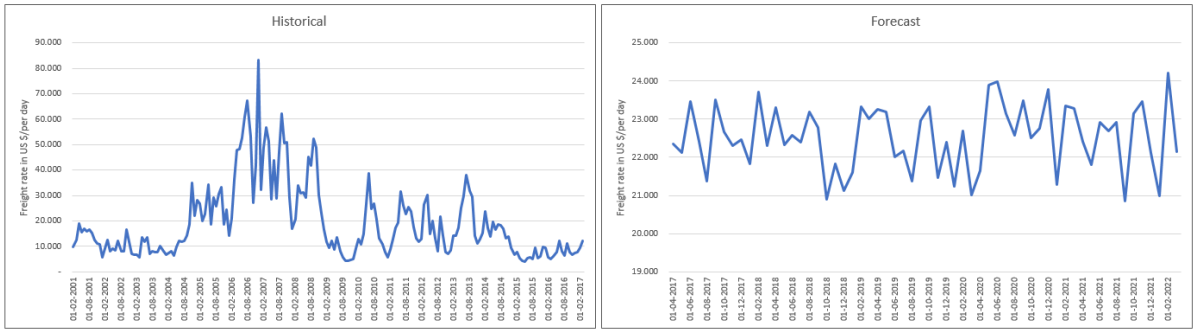


Figure 9.1: Historical and future freight rates for PSV smaller than 3,500 dwt

It is observed that the simulation outcomes generally lie in a lower interval than the historical rates but with a higher mean. The simulation yields lower volatility which is observed as the standard deviation is significantly lower. This might be due to the high number of simulations and the creation of the average freight rates from the outcomes of the model.

PSV vessels larger or equal to 3,500 dwt

The Ornstein-Uhlenbeck model yields the following estimates for the PSV vessels larger than or equal to 3,500 dwt for 60 months of future freight rates as shown in figure 9.2.

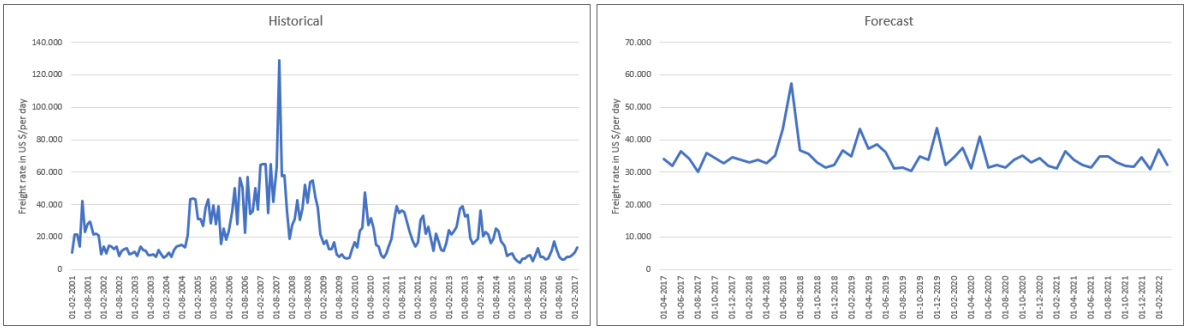


Figure 9.2: Historical and future freight rates for PSV larger or equal to 3,500 dwt

The larger PSV vessel simulation repeatedly shows sign of lower volatility than the historical rates. Hence, the standard deviation of the simulation versus the historical rates is significantly lower. Further, the minimum and maximum values of the simulation are not as far apart as the historical data set. The simulation model yields a higher mean, however, it is not impacted by the market crash in the same degree as the historical rates as the simulations are numerous and averaged.

AHTS vessels smaller than 20,000 bhp

The Ornstein-Uhlenbeck yields the following estimates for the AHTS vessels smaller than 20,000 bhp for 60 months of future freight rates as shown in figure 9.3.

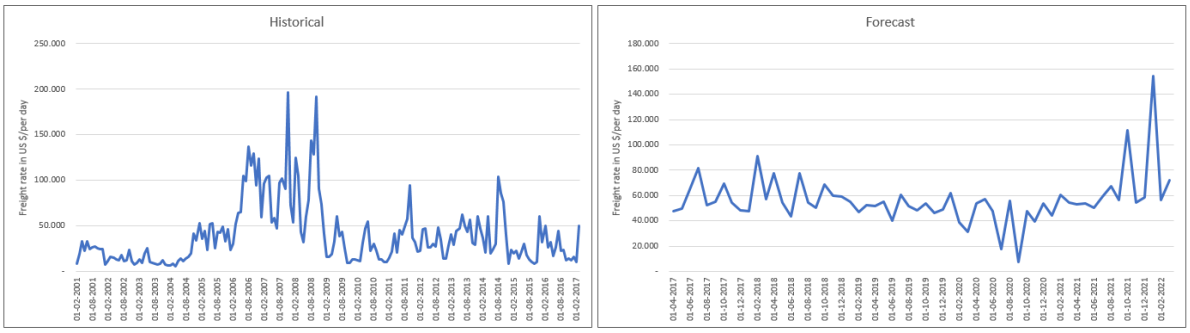


Figure 9.3: Historical and future freight rates for AHTS smaller than 20,000 bhp

The smallest AHTS vessels historically show a high level of fluctuations while the simulations have a lower standard deviation. As mentioned a possible reason would be the large number of simulations averaged out. The minimum and maximum values are close to both types of rates.

AHTS vessels larger or equal to 20,000 bhp

The Ornstein-Uhlenbeck model yields the following estimates for the AHTS vessels larger than or equal to 20,000 bhp for 60 months of future freight rates as shown in figure 9.4.

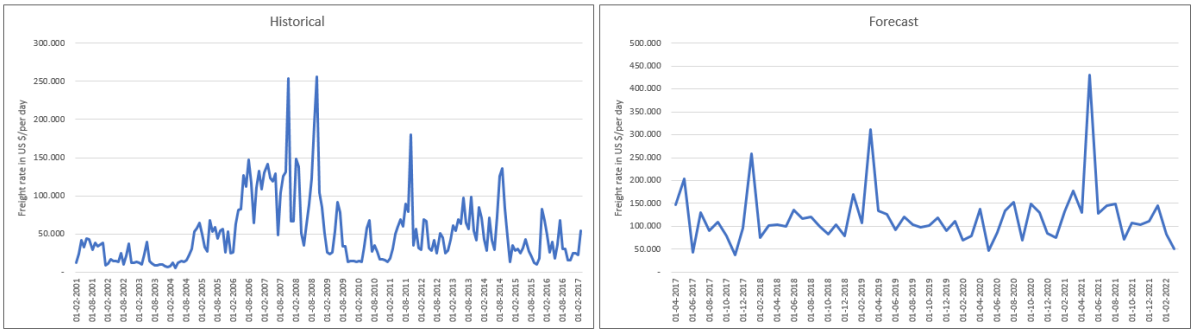


Figure 9.4: Historical and future freight rates for AHTS larger or equal to 20,000 bhp

For the larger AHTS vessels, the result was disappointing as it was large variation between mean, maximum and minimum points compared to the historical rates. The estimated rates showed greater sign of volatility than the historical rates. However, these vessels are the largest in size and have the highest freight rates which are why the market downturn have impacted the historical rates greater than the small and flexible vessel rates. The number of simulated freight rates before making an average did not significantly affect the outcome of this model the results were still very fluctuating compared to the other vessel types and sizes.

CSV freight rates

The historical freight rates for the CSV segment was not possible to obtain. This might be due to the fact that they are not that commonly used in the offshore segment. They are relatively small in vessel size as well. The CSV vessels are however very flexible; they are often used for

all kinds of missions. They were therefore not that affected by the market downturn as the AHTS and PSV segment. This was discussed in section 7.2. Further, CSV vessels lie in the same freight rate intervals as the large PSV segment. It was therefore decided to use the large PSV rates forecasted and multiplying them by 90 percent. It was believed that this was the optimal solution since the CSV rates would rely on simulation as well. However, one could argue that doing so it does not capture the real historical rates of CSV since they are less sensitive to changes in the market conditions than the PSV vessel segment. One also use the rates of the large AHTS instead of the PSV rates since the sensitivity to the market is more equal to the development of the CSV. However, these rates are higher and less equal the real CSV rates. This is hence not the best solution.

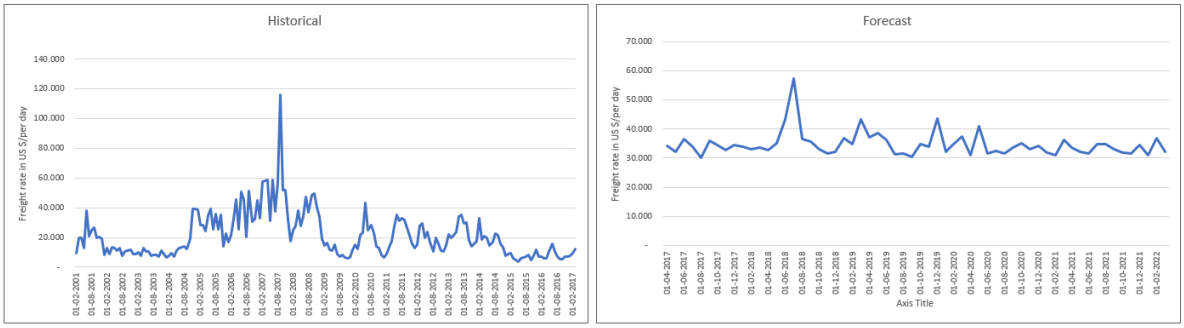


Figure 9.5: Historical and future freight rates for CSV

Using the approach of valuing the CSV rates to 90 percent of the large PSV segment yields the same trends that are observed for the large PSV vessels.

Conclusion

The overall outcomes from the simulation are satisfying for the smaller vessels. The larger vessels show greater volatility as discussed in both this section and section 9.1.3. However, these rates will be used going forward as the predictions of the future outlook of the market as this is the most commonly used approach and since most rates seem reasonable. The monthly estimated freight rates will be averaged to create the yearly freight rate to forecast the growth of the freight revenue. It can, therefore, be expected that the extreme outcomes will be lowered.

10. Valuation

The valuation of Solstad is an important factor in order to determine the relation between credit risk and changes in the share price. In order to conduct a valuation of Solstad, there are several approaches that need to be determined. In this section, different aspects of the valuation will be explained. The share price of Solstad will be determined through a forecast that consists of five future years in addition to one terminal period. This is done with the applied approaches explained in this section.

10.1 Discounted Cash Flow model

The valuation is estimated through a discounted cash flow (DCF) model. The model is used to estimate the attractiveness of the company and what to expect in the next couple of years. The value of the company is positively affected by a higher free cash flow and a lower WACC[1]. This since the model is based on the Free Cash Flow to Firm (FCFF). The credit risk will be reflected through the WACC in the DCF analysis and further exploited through different scenarios in a sensitivity analysis. The DCF model takes into account the discounted FCFF as the market value of equity. Net interest-bearing debt (NIBD) is then considered as a part of the enterprise value combined with the market value of equity. The model estimates the share price of Solstad and it is then possible to discover if the share price is over- or undervalued.

10.2 Economic Value Added model

The Economic Value Added (EVA) model determines the value of the company through three key components such as NOPAT, the amount of initial invested capital and the WACC[2]. Based on these key components the model estimates the present value of future EVAs and subtracts the NIBD in order to reach the total market value of equity. In relation to the DCF model, the EVA approach is affected by changes in the EVA and WACC[1]. This model confirms that the DCF model is set up correctly and gives the exact same share price. The EVA approach is included in the appendix.

10.3 Drivers

Drivers are used to finding the future cash flows of the firm. They are determined by ratios based on historical data. Furthermore, one needs to set these drivers to expectations of how they will develop in the future. It is common to apply an average of historical drivers for the future.

[1]Petersen, C.V. and Plenborg, T. (2012)
[2]Investopedia (2017d)

10.3.1 Growth drivers

The most important factor is the growth in freight revenues. As discussed throughout the thesis these are determined by the freight rate modeling discussed in section 9.2. In order to calculate the future growth one needs to determine the utilization of the vessels in the future. The utilization from 2017 and onward is determined by the current information on utilization.

10.3.2 Cost drivers

Cost drivers are determined by the fraction of costs in relation to freight revenues. They tend to increase/decrease with higher/lower freight revenues.

10.3.3 Investment drivers

Investment drivers are determined as a fraction of freight revenues as well. These determine the future amount invested in the fleet and the future Net Working Capital (NWC).

10.3.4 Financial drivers

Financial drivers are considered in relation to invested capital. Net interest-bearing debt, interest payments, and total non-interest-bearing debt is considered to be financial drivers.

10.3.5 Other drivers

These drivers such as depreciation are measured as a fraction of non-current operational assets, namely the fleet. The effective tax rate is measured in the past through the analytical statements. This tax rate increases when newbuilds are delivered.

10.4 Forecast

In this section, the enterprise value and the respective share price of Solstad will be estimated. The forecast is conducted in order to answer the problem statement and to get the ability to detect how credit risk within the company is reflected in its share price. The approach, assumptions, and outcomes will be discussed in this section.

10.4.1 Data

A large fraction of Solstad's freight revenues comes from the North-West Europe, where a noteworthy fraction of their vessels is based. The data collected from Arctic Securities was purely for this area, and it was not possible to collect rates for any other respective areas in which Solstad operates. In addition, one possible reason for the missing rates for the other areas could be due to the fact that there has been less activity since 2014. This makes the freight revenues of Solstad solely depend on the data for the North-West Europe, and no other areas. However, it was decided that historical data of freight rates was a better predictor than any other possible solution.

The data collected is in US dollar per day which is standard in this industry. It was therefore decided to use the exchange rate of 04.01.17 (the valuation date) to convert the freight revenues into NOK, as the rest of the financial statements of Solstad is quoted in NOK. One could argue that these freight rates should be converted at different points in time. However, it was decided to keep the modeled freight rates constant and dependent on the factors discussed in the strategy section through supply and demand instead of making the rates dependent on the exchange rate.

10.4.2 Growth drivers

The growth in freight rates is determined by the expected utilization for the upcoming years as well as the modeled freight rates. The sixty modeled monthly freight rates was averaged down to create the yearly rates used in the forecast model. The utilization for the forecast period was determined by the current utilization. The expected utilization is based on the Shipping Marked model which outlines that the market outlook is improving. Hence, the utilization for all segments constantly appreciates throughout the model. The expected utilization rate for 2021 is considered to be 80 percent based on stabilized market conditions for this time point.

10.4.3 Cost drivers

The costs of Solstad as a fraction of revenues stays rather constant through the historical years. An average has therefore been applied to approximately 38 percent for personnel costs and 25 percent for other operating expenses.

10.4.4 Investment drivers

Total operating liabilities and total current operating assets as a fraction of freight revenues have been stable in the past. Further, an average of these investment drivers is applied for future predictions.

Total non-current assets, which mainly consist of the fleet, amounts to a large part of freight revenues. This driver can be regarded as stable until the merger with REM in 2016 where a large increase took place. Since the problem statement do not take the new merger as mentioned in section 11 into account there is not predicted a steep increase in 2017. The fraction of the fleet in relation to revenues is predicted to stay somewhat constant. In relation, depreciation and amortization will be discussed in the section for other drivers.

The NWC is varying in the historical years, from 2013 to the current date, the NWC is at its peak. This could be explained by the fact that the company's liquidity is increasing, this since vessels have been sold in the secondary market as a consequence of the market downturn.

10.4.5 Financial drivers

The financial drivers such as total non-interest bearing debt and net interest-bearing debt (NIBD) as a fraction of invested capital have historically been stable. The average is therefore applied to these drivers for the future.

Interest payments which consist of financial expenses as a fraction of NIBD have been stable in the past and an average is applied. However, one could claim that since predicted NIBOR and the key rate is predicted to increase by Bloomberg and Norges Bank respectively, these might increase in the future. Especially since the interest rates in the past can be considered a historical low. However, since our focus is on predicting the future enterprise value and no interest rates has been predicted these are held constant at average except for the analysis in the sensitivity section.

10.4.6 Other drivers

Since vessels have been sold and no newbuilds are expected to be delivered in the future, the effective tax rate is relatively low in 2015 and 2016. Therefore, it is not expected that Solstad will acquire any newbuilds as the merger with REM, Farstad and Deep Sea as it amounts to a significant fleet. This fact is also supported by findings in the shipping market model. The newly acquired ships have already been a subject to tonnage tax by their respective past companies.

Depreciation as a fraction of non-current operating assets has been stable in the past until 2015. After this, large impairment losses were estimated and drove this post in the income statement upwards. This was previously discussed in section 7.2. Yet, it is expected that the depreciation cost will stay rather constant and that the amortization and write-downs will be lowered. This due to the fact that better market conditions are expected and therefore the vessel values as discussed in section 6.1 will increase and hence the amortization will slow down.

10.4.7 Reference case

The reference case can be considered as the most likely outcome of Solstad in the future. With the inputs debated in this section the following reference case is created as shown in figure 10.1.

Discounted cash flow model - an enterprise value approach								
		Budgeting period				Terminal period		
	1	2	3	4	5	6	Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022	Nr shares	67.806
FCFF	8.579.926	2.292.422	1.604.306	49.320	3.531.098	1.548.701		
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%		
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041		
PV of FCFF	7.377.408	1.694.865	1.019.878	26.959	1.659.630	625.877		
PV of FCFF in forecasting horizon	11.778.740							
PV of FCFF in terminal period	5.090.177							
Enterprise value	**16.868.917**							
Net interest bearing debt	15.741.742							
Estimated market value of equity	**1.127.175**							
Share price	**16,6235**							
Discounted share price	**16,6824**							

Figure 10.1: DCF analysis of Solstad

The DCF analysis yields a total market value of equity of 1,127,175 million NOK, which results in a share price of 16.62 NOK. The forward discounted share price at 04.01.2017 is 16.68 NOK, which results in a total market value of equity of 1,131,169.62 million NOK. Since the DCF analysis yields the share price at the end of 2016 and the valuation date is set to 04.01.2017, which is four days later, it does not make a great difference in discounting the share price forward to the valuation date. On the date of the valuation, the market share price was 11.70. These results reflect that the equity market has undervalued the share price of Solstad and the share price hence has a potential upside of 42.58 percent. One could claim that this is a large potential upside, however with expected improved market conditions and the merger with REM it may not be unrealistic. However, this model could assume that the market conditions will improve at a higher pace than the market do. To not only base the decisions on this analysis a multiple analysis is conducted in order to support the findings. This analysis will demonstrate that the predictions of this model are in the same interval as Bloomberg. However, one should be careful with investing in the company as Solstad is to be regarded as high risk by investment banks[3].

As mentioned in chapter 8 describing the WACC, the credit risk impacts the share price of Solstad through the WACC. Solstad's WACC is quite high and drawn upwards as a result of a substantial yield spread and a relatively small equity portion leading to a high cost of equity. This results in a lowered share price due to significant credit risk impact on the WACC. It is, therefore, beneficial to analyze the relation between credit risk and share price. The sensitivity analysis exploring this relationship is estimated in section 10.7.

10.5 Relative valuation: multiples

A relative valuation approach is used in order to compare the value of Solstad to the value of its competitors. This is done in order to determine the financial worth of the company[4]. A valuation based on other comparable companies requires the companies compared to operate in

[3] Arctic Securities and Nor-Ocean Offshore (2017) [4] Investopedia (2017g)

the same field and have the same growth rates and expectations. The peer group was created and discussed in section 2.4. Since the companies in the OSV industry is about the same size and operate within the same segments it is reasonable to use multiples from the peer group to evaluate Solstad's performance further. The relative valuation is based on the outcomes from the forecast and the enterprise value obtained in the DCF analysis for the reference case. The multiples of Solstad's peer group is obtained by Bloomberg, which has estimated the multiples for 2017 and 2018. The estimated multiples of Solstad were compared to the multiples obtained from Bloomberg in order to check that the outcome was in line with a trusted source. The multiple of Solstad will be discussed in relation to the harmonic mean of the peer group in order to compare the value of Solstad to the peer group. The multiples chosen in the relative valuation approach is discussed further in the following sections and shown in table 10.2.

10.5.1 EV/EBITDA

The EV/EBITDA model also called the EBITDA multiple, requires that the expected depreciation rate remains identical across the companies compared. This measurement is applied as it cannot be manipulated by any changes in the capital structure of the companies and also ignores any differences in the depreciation schedules[5]. Even though the companies operate within the same industry there may still be differences in the EV/EBITDA valuation because of different company strategies [6]. This ratio also depends on the ROIC and growth of the individual companies.

10.5.2 EV/EBIT

The EV/EBIT ratio is considered as a better measurement than the EV/EBITDA ratio when the depreciation schedules of the companies are similar. This ratio is important to compare to the EV/EBITDA ratio in order to get an understanding of the effect of depreciation and amortization.

10.5.3 EV/Sales

A company's enterprise value is measured in relation to the revenues of the company through the EV/Sales multiple[7]. The EV/Sales multiple is considered a relevant multiple as the companies in the OSV industry are highly dependent on their freight income. The freight rates determining the freight revenue is uncertain and volatile and is highly impacted by changes in market conditions. Based on this it is interesting to evaluate this multiple as the earnings of the vessels are unstable at the moment. In general, it is believed that the lower the EV/Sales ratio, the more attractive or undervalued the company analyzed[7] is. However, the ratio can be quite deceptive. If the ratio is high, it might be a signal that investors believe that there will be a significant future

[5]Goedhart, M., Koller, T. and Wessels, D. (2017)
[6]Petersen, C.V. and Plenborg, T. (2012)
[7]Investopedia (2017f)

sales growth. If the ratio is lower, it can be an indication of that the company analyzed is not very attractive.

10.5.4 P/B

The price-to-book ratio (P/B) measures the market value of equity as a fraction of the book value of equity. The market value of equity is estimated through the DCF analysis in section 10.4 and the book value of equity is estimated through the forecast of the company. If a company is experiencing a low P/B ratio it can be a sign of an undervalued company. However, a low ratio may also indicate that something is wrong with the specific company[8]. In spite of this, it is important to remember that the P/B ratio may vary with different industries as is also the case for other ratios.

10.5.5 Results from relative valuation

	Multiples 2017				Multiples 2018			
Company	EV/EBITDA	EV/EBIT	EV/Sales	P/B	EV/EBITDA	EV/EBIT	EV/Sales	P/B
Solstad (Estimated)	**17,06**	**53,57**	**6,27**	**0,33**	**14,89**	**20,02**	**5,48**	**0,39**
Solstad (Bloomberg)	15,26	41,64	5,68	0,28	16,95	57,32	5,76	0,30
DOF	9,71	17,81	2,93	0,28	10,06	18,84	2,74	0,26
Siem	15,14	-	3,57	0,42	15,4	-	4,13	0,52
Deep Sea	-	-	13,07	0,67	30,42	-	8,25	-
Eidesvik	44,00	-	6,39	0,14	14,72	-	6,84	0,16
Farstad	4,61	7,64	5,26	0,60	23,52	-	4,87	1,03
Havila	24,04	-	7,68	0,17	26,92	-	8,04	0,21
Harmonic mean	16,25	4,24	6,48	0,38	20,17	3,14	5,81	0,36

Figure 10.2: Multiples of Solstad and the peer group

The different capital structures of the companies are taken into account through the enterprise value multiples. The enterprise value includes the net interest bearing debt of the companies, which is a large part of the companies' balance sheet. A general rule of thumb for the **EV/Sales** ratio is that the measurements usually lies in the interval between 1 and 3. As shown in 10.2 this is not the case for the OSV industry, where almost the entire peer group has an EV/Sales ratio above 3. The only exception is DOF. This is due to the high amount of debt in the industry which affects the enterprise value of the company. The high ratios are a result of high enterprise values in relation to the revenues of the companies. Solstad has an EV/Sales ratio of 6.27 which is about the same as the harmonic mean of the peer group. The **EV/EBITDA** multiple has a harmonic mean of 16.25 in 2017, whereas the ratio for Solstad is slightly higher. The multiple therefore shows that Solstad is being priced at a slightly higher level than its peer group. However, one must take into account that the EV/EBITDA ratio for Deep Sea was not able to obtain and this drives the harmonic mean downwards. Based on this it is not easy to evaluate whether Solstad is under- or overvalued compared to its peer group. The different

[8]Investopedia (2017b)

EV/EBITDA measurements for the companies may be due to differences in underlying factors such as growth and strategies because of the difficult market situation. Considering that it was not possible to obtain the **EV/EBIT** ratio for a large part of the peer group it is not possible to make any decisions based on this ratio. The **P/B** ratio has a harmonic mean of 0.38 in 2017 and 0.36 in 2018. However, it was not possible to obtain the P/B ratio for Deep Sea in 2018 either which does not make the harmonic mean in that specific year very valuable and trustworthy. As shown in section 7 Solstad's performance is the approximately average of its peer group. The only company standing out is Deep Sea which is the company that has experienced the market conditions in the most drastic manner. This is in line with the findings from the profitability and liquidity analysis. All examined companies are suffering from the difficult conditions in the market and have had the same tendencies over the past years. The multiples from Bloomberg are added in table 10.2 in order to display the difference between Bloomberg's estimated future multiples and the future multiples that are based on the forecast and DCF analysis of Solstad. The results are quite similar and there is no reason to believe that the estimated multiples are too far away from the market expectation. Considering Solstad's highly debt dependent capital structure it was decided not to perform a price-earnings **(P/E)** multiple even though this is a typical measurement in order to analyze capital intensive markets. The reason behind this is that the ratio holds some important limitations due to the highly leveraged OSV industry. This is because the debt of the companies can affect both the share prices and the earnings of the companies, in addition to that the leverage of the companies can skew the P/E ratios[9]. Based on this, it was decided that the P/E multiple is not an optimal measurement for the OSV industry.

10.6 Scenario analysis

A scenario analysis is conducted in order to be aware of the different situations that can occur, considering the current difficult market conditions in the OSV industry. The analysis is built on the original forecast of Solstad, called the reference case, and is done with a best case and a worst case outcome for the company. Since the freight rates are estimated in section 9.2 it is decided to keep these constant in both the best and worst case scenario and only change other decision variables.

10.6.1 Best case

Through the best case scenario, it is expected that the utilization rates will increase faster and steeper than in the reference case throughout the years. The utilization, therefore, ends at a rate of 85 percent in 2021. Even though this is considered as the best case it cannot be expected that the utilization will increase to 100 percent throughout the years. This since the market is in a depressed state and there exists a large uncertainty in relation to future rates. Considering

[9]Investopedia (2017c)

these market conditions, it is not likely that Solstad will suffer from a low supply of vessels in the future and therefore not meet the utilization completely. The drivers discussed in section 10.4 has been kept at the same levels as in the reference case. This to make the impact of improved market conditions the only influence to the enterprise value.

Discounted cash flow model - an enterprise value approach								
	Budgeting period					Terminal period		
	1	2	3	4	5	6	Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022	Nr shares	67.806
FCFF	8.579.926	1.552.241	1.616.779	(489.043)	4.739.369	1.649.655		
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%		
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041		
PV of FCFF	7.377.408	1.147.625	1.027.807	(267.318)	2.227.522	666.676		
PV of FCFF in forecasting horizon	11.513.043							
PV of FCFF in terminal period	5.421.986							
Enterprise value	**16.935.030**							
Net interest bearing debt	15.741.742							
Estimated market value of equity	**1.193.288**							
Share price	**17,5986**							
Discounted share price	**17,6609**							

Figure 10.3: DCF analysis of best case scenario

Through the best case scenario for Solstad, a total market value of equity of 1,193,288.00 million NOK is obtained through the DCF analysis which results in a share price of 17.60 NOK. Discounting the share price forward to the valuation date yields a share price of 17.66 NOK and a total market value of equity of 1,197,516.67 million NOK.

10.6.2 Worst case

In the worst case scenario, it is expected that the utilization rates will drop to a lower rate than in the reference case. It will increase by a smaller percentage fraction and hence will result in a disappointing low utilization rate of 65 percent in 2021. This scenario could possibly be the outcome if the market conditions and in turn oil price do not recover as expected in the Shipping Market model.

Discounted cash flow model - an enterprise value approach								
	Budgeting period					Terminal period		
	1	2	3	4	5	6	Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022	Nr shares	67.806
FCFF	9.513.818	2.263.700	1.919.418	59.649	3.509.856	1.140.536		
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%		
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041		
PV of FCFF	8.180.411	1.673.630	1.220.198	32.605	1.649.646	460.926		
PV of FCFF in forecasting horizon	12.756.491							
PV of FCFF in terminal period	3.748.646							
Enterprise value	**16.505.137**							
Net interest bearing debt	15.741.742							
Estimated market value of equity	**763.395**							
Share price	**11,2585**							
Discounted share price	**11,2984**							

Figure 10.4: DCF analysis of worst case scenario

The worst case scenario yields a total market value of equity of 763,396.00 million NOK which corresponds to a share price of 11.26 NOK. Discounting the share price forward to the valuation date produces a share price of 11.30 NOK and a total market value of equity of 766,100.29 million NOK.

10.6.3 Conclusion

The scenario analysis discloses that the share price of Solstad is expected to vary between the two share prices of 17.66 NOK and 11.30 NOK, with a reference share price of 16.68 NOK. This results in an up- and downside of respectively 5.87 percent and 32.27 percent. If the real market share price of 11.70 NOK as of 04.01.2017 is used instead it will result in an up- and downside of respectively 50.95 percent and 3.43 percent.

Reference case		Best case		Worst case	
Share price 31.12.2016, estimated	16,62	Share price 31.12.2016, estimated	17,60	Share price 31.12.2016, estimated	11,26
Share price 04.01.2017, Børs	11,70	Share price 04.01.2017, Børs	11,70	Share price 04.01.2017, Børs	11,70
Days until 04.01.2017	4	Days until 04.01.2017	4	Days until 04.01.2017	4
Cost of equity	0,32	Cost of equity	0,32	Cost of equity	0,32
Share price 04.01.2017, estimated	16,68	Share price 04.01.2017, estimated	17,66	Share price 04.01.2017, estimated	11,30
Change, %	42,58%	Change, %	50,95%	Change, %	-3,43%
Tot. Market value of equity	1.131.169,62	Tot. Market value of equity	1.197.516,67	Tot. Market value of equity	766.100,29

Figure 10.5: Results from forecast and scenario analysis

10.7 Sensitivity analysis

This section performs several sensitivity analyses based on both credit risk and freight rates in order to examine the impact on the share price of Solstad. To determine the uncertainty related to the freight rates of the OSV industry a Monte Carlo simulation is performed. Further, analyses of different parameters of credit risk such as yield spread, leverage ratio, and NIBOR is included in order to observe the effect credit risk has on the share price of Solstad.

Sensitivity of freight rates on share price

In order to get a realistic picture of what one could expect the share price of Solstad to be estimated by a Monte Carlo simulation could be a supportive tool. The simulation is done through the stochastic Excel add-in Crystal Ball which estimates optimal combinations of the dependent parameters and the share price of Solstad. Through this model different estimates such as the growth drivers are replaced by assumptions about the parameters probability distribution forecasts. The model is based on the original reference case and its respective DCF approach. The simulation is run precisely 50,000 times and yields a good prediction of the share price and the value of Solstad. The analysis gives an output of possible outcomes for Solstad, the probability of the outcomes occurring, which of the parameters that have the most effect on the DCF model, the value of Solstad and where Solstad should focus their efforts. The results are divided into percentiles by how possible it is that the share price is within that price interval. The report from the simulation is added in the appendix.

In order to find the optimal share price of Solstad one needs to change the dependent variables. The Monte Carlo simulation does this as it combines 50,000 simulations and by this captures the complexity of the model. It relies on a triangular distribution which means that the Monte Carlo simulation will fluctuate around the estimated forward discounted share price. Since freight rates are the main driver of Solstad's revenues and the forecast is established on the freight rates it was chosen to run a Monte Carlo simulation on the rates of the respective vessel segments in order to see how the outcome of share price would change. The simulation is run on the freight rates for the five forecasted years. It is concluded that it is reasonable to assume that the future freight rates will vary between the respective segments of minimum and maximum freight rate for the historical period.

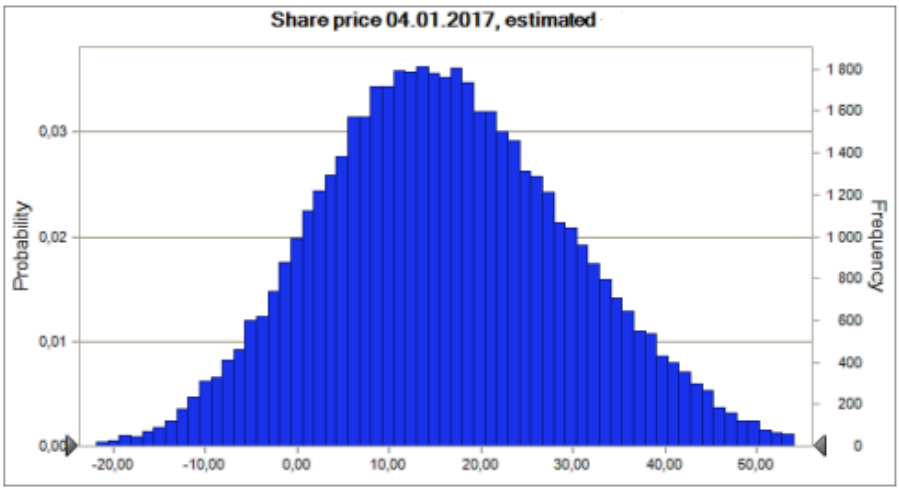


Figure 10.6: Sensitivity of share price based on freight rates

The simulation determines how important freight rates are for the OSV industry as the share price varies between -30.89 NOK and 67.63 NOK when running the simulation. This explains the uncertainty in relation to the freight revenues and how dependent the companies in the OSV industry are on these. By additionally changing the utilization through the simulation yields the same results, i.e. high uncertainty in relation to the revenues. This is in accordance with the importance of having vessels on contract in order to avoid the uncertainty of the freight rates in the spot market. The model is centered around the forward discounted share price of Solstad and results in an average of 16.09 NOK when the simulation is run 50,000 times.

10.7.1 Sensitivity analysis of credit risk

Since this thesis emphasizes the effect credit risk has on the share price a sensitivity analysis focusing solely on this purpose have been selected. Furthermore, as mentioned in section 8.3 and 8.8 there are several factors affecting the credit risk in the share price. The most substantial factors are the credit spread, the NIBOR 3 months' rate, and the leverage ratio. Moreover, changes in WACC has been estimated through changes in the cost of debt from a range of credit

spreads. The same strategy is applied for the NIBOR rate as it impacts the cost of debt as well. Continued, changes in WACC has been estimated through changes in the cost of equity from a different range of leverage ratios. These ranges of NIBOR rates/yield spreads/leverage ratios is converted to the cost of equity/debt and in turn implemented in the WACC. This approach should capture what relation there is between the share price and credit risk. It is expected that this correlation is significant and observable. It was decided to use the reference case and keep all variables except for WACC constant. This is necessary in order to be able to observe the actual effect on the share price.

Sensitivity of yield spread on share price

Formerly the yield spread was defined as the difference in yield between two bonds or two types of bonds. It can, therefore, be used to compare the maturity, credit rating, liquidity and risk of two bonds[10]. The yield spread of Solstad was estimated by the difference in yield for a Norwegian government bond and the respective corporate bond. It was estimated to 23.89 percent in section 8.8.

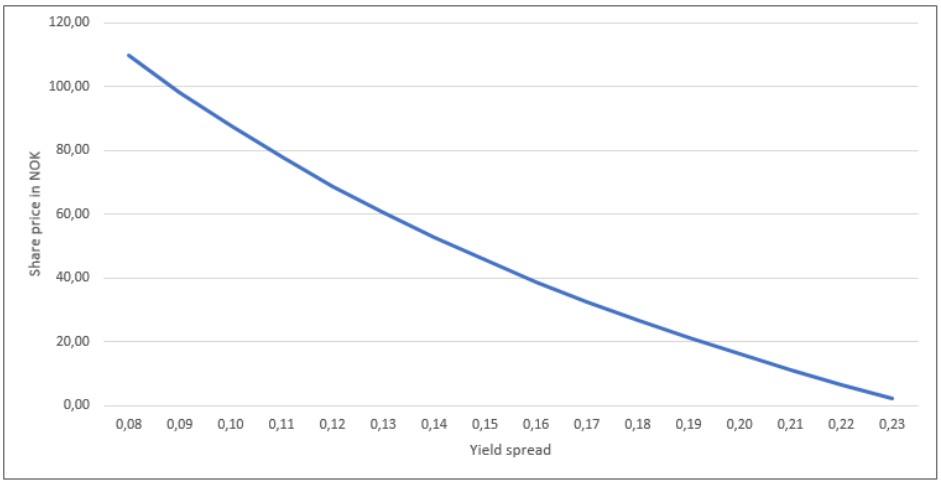


Figure 10.7: Impact of yield spread on the share price

It is observed that the yield spread which measures credit risk based on the Merton model clearly impacts the share price. Figure 10.7 shows a strong correlation between the yield spread within a company and its respective share price. When the yield spread increases the share price decreases and vice versa. Hence, the share price is negatively affected by an increased level of credit risk. This is expected for companies operating in the OSV industry as they are vastly leveraged. A larger fraction of debt increases the yield spread and in turn the cost of debt. This increase affects the WACC in a negative direction and hence reduces the value of the company and its respective share price.

[10]Valuation Academy (2017)

Sensitivity of NIBOR on share price

When the cost of debt was estimated in section 8.9 it was decided to keep the NIBOR 3 months constant at the current rate. However, there is significant credit risk related to changes in NIBOR. Since the risk-free cost of borrowing in the secondary market is set to NIBOR 3 months one could argue that a change in NIBOR will change the cost of borrowing. This borrowing cost of Solstad is extremely important due to the extensive amount of debt financing. It was therefore considered interesting to investigate what effect the predicted NIBOR rates by Bloomberg has on the share price.

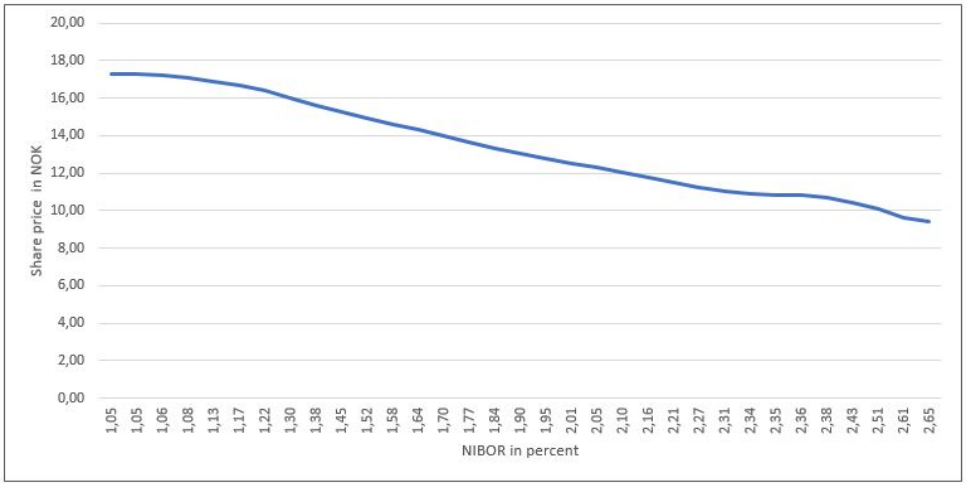


Figure 10.8: Impact of NIBOR on the share price

Figure 10.8 clarifies that the predicted and appreciating NIBOR rates have a substantial impact on the current share price of Solstad. The increased rates affect the cost of debt which contributes to an increased weighted average cost of capital. As discussed, a higher WACC impacts the share price of Solstad negatively. The analysis confirms the significant amount of credit risk related to this company. Hence, if market conditions do not improve Solstad might struggle with fulfilling their debt obligations. It is, therefore, significant credit risk related to changes in NIBOR. However, one can expect this industry to hedge most of the interest rate fluctuations. Especially since a large fraction of the loan portfolio has a floating rate. A Monte Carlo simulation was also conducted in order to develop how sensitive the share price is to fluctuations in NIBOR. The distribution from the simulation is shown in figure 10.9.

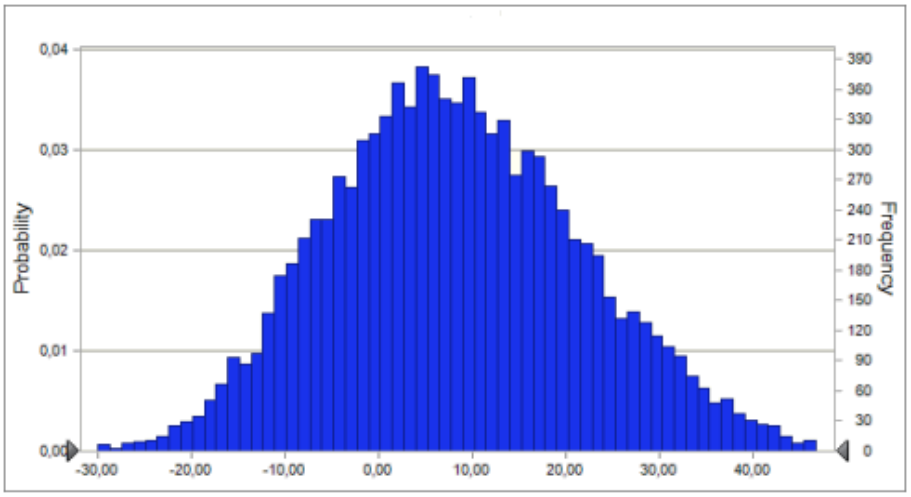


Figure 10.9: Impact of NIBOR on the share price through Monte Carlo simulation

The simulation is done through a triangular approach and assumes that the NIBOR rate will fluctuate between 0.5 to 5 percent, i.e. the model suggests the optimal combination of a change in NIBOR and the share price. As expected, the simulation substantiates the results from the first approach where the share price is highly affected by credit risk. This is revealed through the simulation as the share price fluctuates between a price of minus 37.28 NOK and 65.47 NOK, dependent on the NIBOR rate. A percentile forecast determines that there is a 30 percent probability that the share price will be below 0 NOK. A negative share price results in the company defaulting on its covenants. These results are in accordance with the default probability found in section 8.8 of 36.86 percent. When the share price varies with NIBOR it reaches a mean of 8.31 NOK. The simulation has a relatively small mean standard error of 0.14 which concludes that the model is an accurate forecast and that the simulation is run enough times. The additional results from the simulation are included in the appendix.

Sensitivity of leverage ratio on share price

The leverage ratio, which is defined by the ratio of equity to debt reflects credit risk in the cost of equity. Based on this it is interesting to analyze the effect it has on the share price. The relationship between leverage ratio and the share price is shown in figure 10.10.

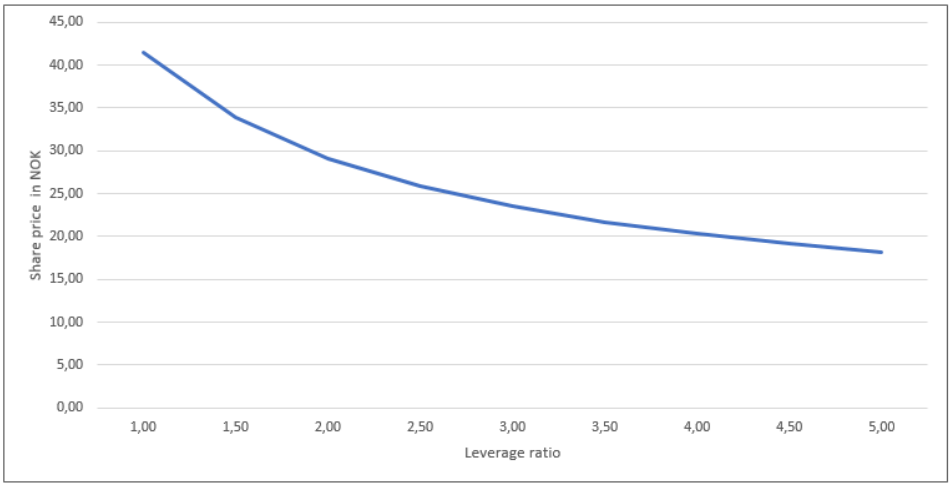


Figure 10.10: Impact of leverage ratio on the share price

The leverage ratio has a noteworthy impact on the share price where the the graph has a steep decrease before it flattens out. The curve flattens out at a leverage ratio approximately around five. This is due to that there is no equity left to impact the WACC. The equity cost rises when the equity to debt ratio increases, which support the classic financial theory. The smaller the fraction of equity the larger premium for investing. Further, the cost of equity increases substantially when the equity portion is lowered but since the cost of debt is estimated to 18.30 percent there is not a significant impact. One could claim that when a larger fraction of the capital structure is equity financed the cost of debt should decrease. This was not implemented in the analysis and the WACC for those reasons do not stay 100 percent constant when the fractions of financing vary.

Conclusion

It was expected that the yield spread has a large influence on the share price, after conducting the yield spread sensitivity in section 8.8. The change in yield spread has a large impact on the WACC as the debt of the company is weighted to approximately 84 percent. One could also argue that the yield spread is the cost of borrowing in the sense of premiums and should hence reflect the cost directly in the income statement. This means that the higher these costs are, the lower the profit of the company. Further, one should expect a high sensitivity in relation to the yield spread. The effect of changes in NIBOR on the share price shows a high correlation with share price as well. The cost of borrowing is increasing for Solstad and with the large fraction of debt financing, there is no surprise that the cost related to debt financing is risky. Furthermore, this explains why interest rates always are hedged as small changes can lead to extreme outcomes. The share price is less sensitive to changes in the leverage ratio. One could argue that this is due to the leverage ratio only affecting the cost of equity. The larger the leverage ratio the smaller fraction of equity to drive the WACC upwards. This means that a

greater leverage ratio gives an increased cost of equity, but it has little significance because of the smaller portion of equity.

All sensitivity measurements of credit risk conclude that credit risk is exposed in the share price as well as the bond price. The credit risk is highly relevant for this geared company and one needs to be aware of the significant impact credit risk has on the share price of an offshore shipping company. However, to what degree the share price is affected by credit risk is not always easy to determine by analyzing large balance sheets as the capital structure is weighted towards several layers of debt financing which is normal in the OSV industry. One can conclude that there are several factors contributing to the change in the overall credit risk of Solstad.

11. Merger

Since the merger between Solstad, Farstad and Deep Sea was announced after the start date of the thesis it was decided not to include it in the thesis and the valuation of Solstad. The reason for this is that it was not enough information and still uncertainty about whether the merger would go through. However, as the merger will contribute to making this company the fourth largest in the world it is chosen to include a chapter that will describe the event of the merger and some expectations one could have about it.

Lars Peder Solstad, CFO of Solstad, announced on the 06.02.2017 the merger between Solstad Offshore ASA, Farstad Shipping, and Deep Sea Supply. The new fleet consists of 154 vessels, with vessels within all three segments PSV, AHTS, and CSV respectively. Solstad will be the parent company of the new company, with headquarters in Skudeneshavn. The goal is to create a high-end leading OSV company. The new fleet will consist of complementary strengths such as Deep Sea's cost leading PSV operating model, Farstad's experience within the AHTS segment, and Solstad's worldwide subsea operation[1]. The merger results in the fleet being the largest fleet in Norway and the fourth largest in the world, twice the size of DOF which has been the largest fleet in Norway until the merger became known.

The announcement of the merger led to a noticeable increase in the share prices on the Oslo Stock Exchange. The share price of Solstad increased with 36 percent to 15.00 NOK, Deep Sea reached a share price of 2.00 NOK, an increase of 20 percent and Farstad experienced an increase of 40 percent to a share price of 5.90 NOK. The merger and restructuring of these three companies will make them more sustainable against recession in the OSV industry and they will be in a good position when the market starts to recover.

As observed in the profitability analysis many of the companies in the OSV industry is suffering and struggling to keep their position in the market. Compared to the peer group Solstad has been able to keep a rather stable and above average. Based on the knowledge about the industry it would be reasonable to assume that Solstad would want to acquire Havila. As Solstad will be the largest company in the Norwegian OSV industry they implicitly force OSV companies underperforming to merge or default. The profitability analysis confirms the expectations as Deep Sea and Farstad was underperforming compared to the peer group and they were both acquired by Solstad. Both companies will only own a small fraction of the new "Solstad Farstad" and the strategy can be seen as hostile.

[1] Solstad Offshore ASA (2017)

12. Conclusion

The main purpose of the problem statement and sub-questions was to assess the impact credit risk has on the valuation of Solstad Offshore ASA. Through several analyses and estimations, it is concluded that credit risk has a substantial impact on the share price of Solstad. This highly leveraged company is affected by credit risk through a complicated debt structure due to the recent merger and a small equity portion. Further, numerous banks supply funding with collateral in vessels while having an extreme number of covenants to protect themselves from large losses experienced after 2014. The fixed income market is reflecting the credit risk where the bond is trading substantially below par. There is great uncertainty about whether Solstad will be able to rollover the corporate bond with the current capital structure. Credit risk is additionally confirmed by an average default probability of 36.86 percent estimated through three different approaches. Further, the rating method by Stanard and Poor confirmed the credit risk by rating Solstad to B which represents a speculative grade rating. The credit risk is reflected in the share price through WACC where the estimated yield spread has the largest influence rather than changes in leverage ratio or NIBOR. Further, the oil price is predicted to increase in the nearest future which will increase the freight rates and in turn revenues indicating better times ahead.

To provide a realistic answer to the problem statement it was necessary to estimate the share price of Solstad as of 04.01.17 through the use of a DCF analysis and it was determined whether the stock was correctly priced at the Oslo Stock Exchange. The valuation model estimated the stock price to 16.68 NOK, with a potential upside of 42.58 percent from the stock price of the equities market. The model forecasted a total market value of 1,131,169.62 million NOK. The DCF analysis was supported by a relative valuation using multiple analysis confirming that the results reached were not unrealistic. The forecasted valuation was based on the findings from both strategic and financial analysis of Solstad in order to create a correct valuation model and reach the found conclusions.

The external analysis confirmed the perception of the struggling and currently challenged OSV industry. The main demand factors for the recession is the historically low oil price which affects the E&P spending and rig activity and results in an all-time low for freight rates and utilization rates. The supply in the market is affected by newbuilds ordered in previous years and low scrap value which forces vessels into layup. The analysis revealed that the market is expected to recover after some challenging years and that it slowly will approach equilibrium between supply and demand, beginning in 2018. The internal analysis discovered that Solstad has an advantage in their young and large fleet.

The scenario analysis confirmed the correlation between the share price and the oil price. There are high volatility and dependency on the assumptions made for the market value of Solstad. Solstad is to be considered as high risk which is supported by the historical share price of Solstad and the scenario analysis which gives a large range of up- and downside potential.

It is a well-known fact that the OSV industry is highly dependent on the respective freight rates. A Monte Carlo simulation investigated the risk of volatile freight rates and exposed that the share price highly correlates with freight rates. This since freight rates determines if the company is able to uphold the covenants in the loan agreements. The sensitivity analysis further reveals that the share price is exceptionally sensitive to changes in yield spread which can be considered the premium debt holders demand for investing in addition to the risk-free return. Further, it discovered that the degree of leverage was negatively correlated to the share price. Meaning, the higher the debt to equity ratio the smaller impact on WACC and in turn share price. This supports the classic financial theory which claims that the smaller the fraction of equity stake the more they demand in premiums for investing. The analysis also showed a sensitive relationship between floating rate loans and the share price and confirms the extensive need for hedging in this industry. This industry is overwhelmed with capital in good times especially since the financing of debt is less costly than the equity financing. The large fleets make these shipping companies able to be one of the top earning industries in the market. However, the analysis exposes the fact that extensive debt financing comes at a price in times of downturn, making shipping companies vulnerable and less flexible to small changes.

This geared and competitive industry is almost through a downturn, and it has wiped out plenty of less flexible and cost effective shipping companies. Solstad survived the crisis and arises with a larger, younger and more competitive fleet in order to be the fourth largest OSV company in the world. This leaves the industry with the most efficient and well-functioning companies in Norway and worldwide. Once the freight rates recover there is no limit to the potential in this capital intensive industry.

13. Delimitation

The thesis has been limited by its scope. Certain assumptions have been made which could influence the valuation of Solstad. One assumption is that the valuation purely relies on the North-West Europe as these was the only rates that were possible to obtain. The freight rates for the CSV vessels was impossible to acquire and hence the rates for the large PSV vessels is used as a prediction instead. As mentioned the rates lie in the same interval but the CSV vessels is not that substantial affected by the oil downturn as the PSV vessels. The future utilization rates for the respective vessels types and is hard to track down specifically. This since the future utilization relies on the future oil price. The forecasted utilization is therefore built on the analysis from the shipping market model which is predicting better conditions. The WACC was kept at a constant level through the future years however, one could assume that the NIBOR rates and yield spread do not stay constant over time. To take this into consideration a sensitivity analysis on the NIBOR rates was conducted. For the same reasons, the leverage ratio and yield spread were varied to be able to observe the impacts. The Ornstein-Uhlenbeck process was assumed the best approach to generate future freight rates as it follows the characteristics of freight rates. However, one could claim that the historical rates are not the best predictor of future rates. A one year Merton model is used to predict the probability of default and one could assume that Solstad does not retire any debt given their financial situation. It also has several debt obligations. The Merton model could have been extended to accommodate different and more complex situations.

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A. Appendix

A.1 Financial statements

A.1.1 Income statement and balance sheet

Income Statement, Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-86%*	*2%*	*9%*	*-10%*	*-22%*	*2%*	*1%*
Freight income	2.613.557	3.044.104	3.287.920	3.495.073	3.737.349	3.546.418	2.467.574
Other operating income	3.308	4.998	74.283	131.066	142.824	109.542	113.768
Total operating income	**2.616.865**	**3.049.102**	**3.362.203**	**3.626.139**	**3.880.173**	**3.655.960**	**2.581.342**
Personnel costs	-960.795	-1.179.777	-1.225.124	-1.396.606	-1.394.114	-1.395.564	-992.972
Ordinary depreciation and write down	-446.002	-738.218	-417.434	-274.651	-275.032	-299.908	-367.860
Write-down fixed assets	-	-	-	-	-	-1.346.481	-1.199.371
Depreciation on capitalised periodic maintenance	-192.591	-194.035	-167.383	-156.715	-186.795	-183.157	-108.787
Other operating expeces	-697.784	-769.178	-723.932	-743.223	-852.492	-899.675	-728.814
Insurance claims	20.051	5.788	25.065	10.769	16.032	67.811	16.217
Income from investment in joint ventures	2.511	-2.229	19.929	57.207	63.779	65.878	64.083
Total operating costs	**-2.274.610**	**-2.877.649**	**-2.488.879**	**-2.503.219**	**-2.628.622**	**-3.991.096**	**-3.317.504**
Operating profit/loss	**342.255**	**171.453**	**873.324**	**1.122.920**	**1.251.551**	**-335.136**	**-736.162**
Termination lease	-	-	-86.758	-	-	-	-
Income from investment in associated companies	-	-	3.132	6.120	876	-1.021	-2.481
Interest income	26.928	18.483	6.090	7.452	20.860	9.909	7.400
Other financial income	789.234	448.789	607.030	500.126	660.053	753.078	1.353.186
Interest charges	-370.654	-549.593	-524.362	-449.970	-454.241	-480.426	-526.627
Other finance costs	-654.591	-488.118	-512.134	-645.468	-1.334.390	-1.525.590	-910.516
Net financing	**-209.083**	**-570.439**	**-507.002**	**-581.740**	**-1.106.842**	**-1.244.050**	**-79.038**
Ordinary profit before taxes	133.172	-398.986	366.322	541.180	144.709	-1.579.186	-815.200
Tax on ordinary result	-114.158	-7.581	34.103	-56.409	-31.355	-24.996	-11.309
Net profit for the year	**19.014**	**-406.567**	**400.425**	**484.771**	**113.354**	**-1.604.182**	**-826.509**

Figure A.1: Income statement, Solstad Offshore ASA

Balance sheet (assets), Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Deffered tax asset	17.362	43.061	115.397	58.934	61.966	37.987	41.154
Total intangible fixed assets	**17.362**	**43.061**	**115.397**	**58.934**	**61.966**	**37.987**	**41.154**
Vessels and new build contracts	13.490.052	13.874.368	12.400.695	11.887.534	14.460.434	13.466.612	18.046.030
Capitlalized period maintenance	252.378	241.114	245.830	230.255	290.253	270.661	394.788
Other tangible fixed assets	28.420	23.421	18.393	18.824	22.717	28.242	34.921
Total long-term fixed assets	**13.770.850**	**14.138.903**	**12.664.918**	**12.136.613**	**14.773.404**	**13.765.515**	**18.475.739**
Investment in joint ventures	-	-	189.225	270.564	302.368	344.032	408.809
Loans to associated companies and joint ventures	-	-	41.687	24.517	30.210	14.852	-
Investments in associated companies	21.300	19.648	32.847	38.967	43.323	42.302	301.889
Investments in stocks and shares	4.552	5.074	5.031	2.991	2.991	2.991	3.192
Other financial assets	40.038	31.140	51.651	21.881	4.031	2.250	1.871
Other long-term receivables	9.589	27.060	2.462	50.183	30.935	1.945	84.094
Pension funds	9.350	2.682	-	-	-	-	-
Total financial assets	**84.829**	**85.604**	**322.903**	**409.103**	**413.858**	**408.372**	**799.855**
Total long term assets	**13.873.041**	**14.267.568**	**13.103.218**	**12.604.650**	**15.249.228**	**14.211.874**	**19.316.748**
Stock	59.377	59.843	73.470	68.893	61.188	57.026	73.120
Account receivables	521.736	715.209	518.041	707.846	756.794	635.073	570.676
Other short-term receivables	215.586	163.442	199.640	267.653	357.660	282.804	370.031
Other current financial assets	11.834	14.569	25.524	-	-	-	-
Total receivables	**749.156**	**893.220**	**743.205**	**975.499**	**1.114.454**	**917.877**	**940.707**
Market based shares	321	344	394	475	382	229	10.188
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450
Total current assets	**1.680.572**	**1.610.676**	**1.624.174**	**2.284.731**	**2.496.760**	**2.000.198**	**2.774.465**
Assets held for sale	**12.790**	**4.644**	-	**135.754**	-	**24.112**	193.673
Total assets	**15.566.403**	**15.882.888**	**14.727.392**	**15.025.135**	**17.745.988**	**16.236.184**	**22.284.886**

Figure A.2: Balance sheet (assets), Solstad Offshore ASA

Balance sheet (equity and liabilities), Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Share capital (38.687.377 a 2,-)	75.588	77.375	77.375	77.375	77.375	77.375	177.374
Treasury shares	-380	-51	-11	-484	-979	-850	-251
Other paid-in capital	111.648	224.015	111.648	111.648	111.648	111.648	111.648
Share premium reserve	1.541.815	1.541.815	1.654.186	1.654.186	1.654.186	1.654.186	2.165.293
Total restricted equity	**1.728.671**	**1.843.154**	**1.843.198**	**1.842.725**	**1.842.230**	**1.842.359**	**2.454.064**
Other equity	2.836.129	2.634.061	2.823.675	3.160.846	3.304.315	1.940.140	1.064.868
Total earned equity	**2.836.129**	**2.634.061**	**2.823.675**	**3.160.846**	**3.304.315**	**1.940.140**	**1.064.868**
Minority interests	424.643	-61.301	-41.941	-49.296	-89.013	-114.924	-63.205
Total equity	**4.989.443**	**4.415.914**	**4.624.932**	**4.954.275**	**5.057.532**	**3.667.575**	**3.455.727**
Deffered tax liability	77.543	39.931	3.000	-	-	-	-
Deffered income	-	-	-	-	9.339	9.136	193.730
Pension obligations	-	-	67.998	72.018	98.781	50.672	63.490
Other financial liabilities	67.194	52.373	51.112	34.428	65.888	94.603	77.260
Total provisions	**144.737**	**92.304**	**122.110**	**106.446**	**174.008**	**154.411**	**334.480**
Other long-term loans	33.600	36.487	50.954	161.099	331.886	367.703	226.991
Debt to credit institutions	7.470.527	9.472.153	7.114.130	7.539.122	10.094.844	8.905.838	14.020.292
Leasing obligations	-	-	-	-	-	-	3.241.204
Total long-term liabilities	**7.504.127**	**9.508.640**	**7.165.084**	**7.700.221**	**10.426.730**	**9.273.541**	**17.488.487**
Accounts payable	311.048	258.684	187.303	111.495	371.529	126.178	244.643
Bank overdraft	102.734	102.205	64.938	90.933	121.908	82.656	-
Taxes payable	105.677	75.526	67.702	15.321	40.697	58.273	48.886
Accrued salaries and related taxes	50.650	58.468	46.388	89.083	51.502	40.821	50.178
Other current finanancial liabilities	5.909	18.053	-	2.653	25.961	33.648	6.615
Other current liabilities	250.200	292.001	391.754	323.112	353.750	279.079	325.172
Current interest bearing liabilities	2.101.877	1.061.092	2.057.178	1.631.593	1.122.371	2.520.002	330.694
Total current liabilities	**2.928.095**	**1.866.029**	**2.815.263**	**2.264.190**	**2.087.718**	**3.140.657**	**1.006.188**
Total liabilities	**10.576.959**	**11.466.973**	**10.102.457**	**10.070.857**	**12.688.456**	**12.568.609**	**18.829.155**
Total equity and liabilities	**15.566.402**	**15.882.887**	**14.727.389**	**15.025.132**	**17.745.988**	**16.236.184**	**22.284.882**

Figure A.3: Balance sheet (assets), Solstad Offshore ASA

A.1.2 Analytical income statement

Analytical Income Statement, Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-86%*	*2%*	*9%*	*-10%*	*-22%*	*2%*	*1%*
Freight income	2.613.557	3.044.104	3.287.920	3.495.073	3.737.349	3.546.418	2.467.574
Other operating income	3.308	4.998	74.283	131.066	142.824	109.542	113.768
Insurance claims	20.051	5.788	25.065	10.769	16.032	67.811	16.217
Income from investment in joint ventures	2.511	-2.229	19.929	57.207	63.779	65.878	64.083
Total operating income	**2.639.427**	**3.052.661**	**3.407.197**	**3.694.115**	**3.959.984**	**3.789.649**	**2.661.642**
Personnel costs	-960.795	-1.179.777	-1.225.124	-1.396.606	-1.394.114	-1.395.564	-992.972
Other operating expeces	-697.784	-769.178	-723.932	-743.223	-852.492	-899.675	-728.814
Total operating expences	**-1.658.579**	**-1.948.955**	**-1.949.056**	**-2.139.829**	**-2.246.606**	**-2.295.239**	**-1.721.786**
EBITDA	**980.848**	**1.103.706**	**1.458.141**	**1.554.286**	**1.713.378**	**1.494.410**	**939.856**
Depreciation on capitalised periodic maintenance	-192.591	-194.035	-167.383	-156.715	-186.795	-183.157	-108.787
Ordinary depreciation and write down	-446.002	-738.218	-417.434	-274.651	-275.032	-1.646.389	-1.567.231
EBIT	**342.255**	**171.453**	**873.324**	**1.122.920**	**1.251.551**	**-335.136**	**-736.162**
Tax on EBIT	-293.389	3.258	81.303	-117.046	-271.181	-5.305	-10.213
NOPAT	**48.866**	**174.711**	**954.627**	**1.005.874**	**980.370**	**-340.441**	**-746.375**
Income from investment in associated companies	-	-	3.132	6.120	876	-1.021	-2.481
Interest income	26.928	18.483	6.090	7.452	20.860	9.909	7.400
Other financial income	789.234	448.789	607.030	500.126	660.053	753.078	1.353.186
Financial income	**816.162**	**467.272**	**616.252**	**513.698**	**681.789**	**761.966**	**1.358.105**
Termination lease	-	-	-86.758	-	-	-	0
Interest charges	-370.654	-549.593	-524.362	-449.970	-454.241	-480.426	-526.627
Other finance costs	-654.591	-488.118	-512.134	-645.468	-1.334.390	-1.525.590	-910.516
Financial expences	**-1.025.245**	**-1.037.711**	**-1.123.254**	**-1.095.438**	**-1.788.631**	**-2.006.016**	**-1.437.143**
Net financial expences before tax	-209.083	-570.439	-507.002	-581.740	-1.106.842	-1.244.050	-79.038
Tax savings from debt financing	179.231	-10.839	-47.200	60.637	239.826	-19.691	-1.096
Net financial expences after tax	**-29.852**	**-581.278**	**-554.202**	**-521.103**	**-867.016**	**-1.263.741**	**-80.134**
Net financial earnings	**19.014**	**-406.567**	**400.425**	**484.771**	**113.354**	**-1.604.182**	**-826.509**

Figure A.4: Analytical income statement, Solstad Offshore ASA

Analytical income statement, Deep Sea	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-3271,25%*	*-2,59%*	*27,40%*	*-5,01%*	*21,90%*	*0,12%*	*-0,34%*
Freight revenue	132.346	115.902	42.552	59.089	88.050	70.155	47.559
Other income	-	-	-	2.056	637	2.379	-
Share of profit of inv. Accounted for using the	-	291	391	724	3.149	-60.924	-
Total income	132.346	116.193	42.943	61.869	91.836	11.610	47.559
Operating expenses vessels	-73.681	-72.124	-18.696	-23.255	-34.935	-27.354	-35.213
Operating leases	-2.925	-1.684	-	-4.475	-5.576	-	-
Administrative expenses	-8.710	-10.911	-8.359	-9.202	-11.036	-9.519	-9.340
Impairment of investment in joint ventures	-	-	-	-	-	-30.894	-
Profit/loss from sale of vessels	-	-	-	-	-	-	-17.337
Total operating expenses	-85.316	-84.719	-27.055	-36.932	-51.547	-67.767	-61.890
EBITDA	**47.030**	**31.474**	**15.888**	**24.937**	**40.289**	**-56.157**	**-14.331**
Depreciation and amortization	-36.445	-28.826	-12.319	-12.924	-27.945	-83.174	-138.188
EBIT	**10.585**	**2.648**	**3.569**	**12.013**	**12.344**	**-139.331**	**-152.519**
Tax on EBIT	-346.262	-69	978	-602	2.704	-161	515
NOPAT	**-335.677**	**2.579**	**4.547**	**11.411**	**15.048**	**-139.492**	**-152.004**
Financial income	2.233	392	349	769	1.176	1.124	571
Financial expences	-29.798	-31.454	-9.271	-8.842	-9.701	-12.246	-23.761
Other (losses) / gains - net	-	-	1.326	1.052	325	401	7.496
Currency gains / (losses)	17.060	29.225	713	2.570	-4.879	-1.295	-458
Net financial expences before tax	**-10.505**	**-1.837**	**-6.883**	**-4.451**	**-13.079**	**-12.016**	**-16.152**
Tax savings on debt financing	343.645	48	-1.886	223	-2.865	-14	54
Net financial expences after tax	**333.140**	**-1.789**	**-8.769**	**-4.228**	**-15.944**	**-12.030**	**-16.098**
Net financial earnings	**-2.537**	**790**	**-4.222**	**7.183**	**-896**	**-151.522**	**-168.102**

Figure A.5: Analytical income statement, Deep Sea Supply

Analytical income statement, Eidesvik	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-1629,63%*	*-5,17%*	*-0,65%*	*-4,42%*	*0,06%*	*1,62%*	*-0,18%*
Freight revenue	1.057.973	1.002.350	910.018	948.425	984.535	1.123.931	748.800
Other revenue	-3.268	-2.793	70.476	45.320	213	115.005	35.305
Profit from associated companies	-13.872	2.834	1.240	24.282	-	-	-
Profit from joint ventures	-41.127	17.592	22.909	60.461	54.488	77.017	82.420
Total operating income	999.706	1.019.983	1.004.643	1.078.488	1.039.236	1.315.953	866.525
Payroll and other crew expenses	365.759	360.732	288.262	327.347	326.918	314.154	235.791
Other operating expenses	151.846	157.376	133.357	115.155	147.299	154.496	133.031
Vessels on charter	46.934	15.714	-	-	18.360	-	-
Total operating expenses	564.539	533.822	421.619	442.502	492.577	468.650	368.822
EBITDA	**435.167**	**486.161**	**583.024**	**635.986**	**546.659**	**847.303**	**497.703**
Ordinary depreciation	280.010	279.650	290.146	301.762	291.511	322.106	292.459
Write-down of fixed assets	-	7.785	628	-	52.000	290.000	508.819
EBIT	**155.157**	**198.726**	**292.250**	**334.224**	**203.148**	**235.197**	**-303.575**
Tax on EBIT	-2.528.478	-10.276	-1.902	-14.762	119	3.802	541
NOPAT	**-2.373.321**	**188.450**	**290.348**	**319.462**	**203.267**	**238.999**	**-303.034**
Financial income	13.461	5.560	5.126	9.660	8.986	4.610	1.752
Financial expences	-128.255	-124.709	-126.746	-139.926	-132.678	-167.585	-148.672
Change in value of derivatives	-19.304	-7.061	19.875	20.785	18.071	20.913	-
Net foreign exchange gains (losses)	-17.400	1.764	93.511	-77.370	-327.969	-329.211	45.968
Net financial expences before tax	**-151.498**	**-124.446**	**-8.234**	**-186.851**	**-433.590**	**-471.273**	**-100.952**
Tax savings on debt financing	2.468.850	6.435	54	8.253	-254	-7.618	180
Net financial expences after tax	**2.317.352**	**-118.011**	**-8.180**	**-178.598**	**-433.844**	**-478.891**	**-100.772**
Net financial earnings	**-55.969**	**70.439**	**282.168**	**140.864**	**-230.577**	**-239.892**	**-403.806**

Figure A.6: Analytical income statement, Eidesvik

Analytical income statement, DOF	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*7,50%*	*-26,92%*	*32,08%*	*-24,29%*	*18,57%*	*-21,22%*	*-43,89%*
Operating income	5.403	6.503	8.136	9.415	10.196	10.291	8.134
Payroll expenses	-2.486	-3.121	-3.167	-3.927	-4.077	-4.159	-5.598
Other operating expenses	-1.266	-1.367	-2.179	-2.698	-3.170	-3.166	-
Total operating expenses	-3.752	-4.488	-5.346	-6.625	-7.247	-7.325	-5.598
EBITDA	**1.651**	**2.015**	**2.790**	**2.790**	**2.949**	**2.966**	**2.536**
Depreciation and amortization	-1.166	-897	-1.110	-1.115	-1.045	-1.541	-2.825
EBIT	**485**	**1.118**	**1.680**	**1.675**	**1.904**	**1.425**	**-289**
Tax on EBIT	36	-301	539	-407	354	-302	127
NOPAT	**521**	**817**	**2.219**	**1.268**	**2.258**	**1.123**	**-162**
Financial income	71	69	76	76	82	99	1.144
Financial expences	-953	-1.189	-1.365	-1.357	-1.355	-1.238	-1.134
Realised gain/loss on currencies	38	-56	-41	37	-203	-332	-437
Net gain/loss on sale of tangible assets	59	33	210	75	545	397	86
Unrealised gain/loss curreny and derivatives	100	-666	-295	-576	-553	-761	990
Net financial expences before tax	**-685**	**-1.809**	**-1.415**	**-1.745**	**-1.484**	**-1.835**	**649**
Tax savings on debt financing	-51	487	-454	424	-276	389	-285
Net financial expences after tax	**-736**	**-1.322**	**-1.869**	**-1.321**	**-1.760**	**-1.446**	**364**
Net financial earnings	**-215**	**-505**	**350**	**-53**	**498**	**-323**	**202**

Figure A.7: Analytical income statement, DOF

Analytical income statement, Siem	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-6,03%*	*69,34%*	*-25,22%*	*19,96%*	*-3,72%*	*2,47%*	*-0,65%*
Operating revenue	244.619	343.070	382.368	395.828	511.848	437.206	487.031
Operating expenses	-153.660	-217.676	-257.615	-241.291	-297.187	-303.901	-340.828
EBITDA	**90.959**	**125.394**	**124.753**	**154.537**	**214.661**	**133.305**	**146.203**
Depreciation and amortization	-59.286	-81.348	-82.749	-75.841	-125.883	-273.195	-188.345
EBIT	**31.673**	**44.046**	**42.004**	**78.696**	**88.778**	**-139.890**	**-42.142**
Tax on EBIT	-1.910	30.542	-10.592	15.709	-3.299	-3.457	274
NOPAT	**29.763**	**74.588**	**31.412**	**94.405**	**85.479**	**-143.347**	**-41.868**
Financial income	8.130	5.719	4.161	5.434	9.091	11.184	12.471
Financial expences	-28.027	-44.785	-42.302	-36.132	-55.868	-54.677	-55.312
Net currency gain/loss	2.962	-10.624	2.916	-22.651	34.092	22.110	-3.835
Unrealised agio (disagio)	-4.421	1.818	12.847	-7.388	-2.655	-30.407	-7.394
Net financial expences before tax	**-21.356**	**-47.872**	**-22.378**	**-60.737**	**-15.340**	**-51.790**	**-54.070**
Tax savings on debt financing	1.288	-33.195	5.643	-12.124	570	-1.280	352
Net financial expences after tax	**-20.068**	**-81.067**	**-16.735**	**-72.861**	**-14.770**	**-53.070**	**-53.718**
Net financial earnings	**9.695**	**-6.479**	**14.677**	**21.544**	**70.709**	**-196.417**	**-95.586**

Figure A.8: Analytical income statement, Siem

Analytical income statement, Farstad	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-12,34%*	*7,19%*	*-3,96%*	*-7,09%*	*19,19%*	*4,01%*	*2,27%*
Total income	3.328.815	3.601.798	3.703.772	4.014.211	4.383.953	4.011.114	2.687.558
Total operating expenses	-1.942.653	-2.183.363	-2.397.574	-2.490.280	-2.742.490	-2.648.057	-2.177.440
EBITDA	**1.386.162**	**1.418.435**	**1.306.198**	**1.523.931**	**1.641.463**	**1.363.057**	**510.118**
Depreciation and amortization	-516.237	-544.808	-575.928	-654.407	-754.348	-897.262	-937.524
Impairment	-	-	-	-	-101.795	-1.279.560	-2.678.519
EBIT	**869.925**	**873.627**	**730.270**	**869.524**	**785.320**	**-813.765**	**-3.105.925**
Tax on EBIT	-107.353	62.826	-28.937	-61.640	150.712	-32.623	-70.434
NOPAT	**762.572**	**936.453**	**701.333**	**807.884**	**936.032**	**-846.388**	**-3.176.359**
Financial income	74.582	64.632	48.305	49.995	35.243	32.616	29.924
Financial expences	-395.155	-410.900	-435.844	-554.201	-617.505	-670.187	-645.246
Realised agio (disagio)	108.521	25.436	15.827	25.814	71.123	-86.401	-86.457
Unrealised agio (disagio)	-165.324	-92.915	-33.861	-111.161	-281.179	-548.586	287.245
Net financial expences before tax	**-377.376**	**-413.747**	**-405.573**	**-589.553**	**-792.318**	**-1.272.558**	**-414.534**
Tax savings on debt financing	46.570	-29.754	16.071	41.793	-152.055	-51.015	-9.400
Net financial expences after tax	**-330.806**	**-443.501**	**-389.502**	**-547.760**	**-944.373**	**-1.323.573**	**-423.934**
Net financial earnings	**431.766**	**492.952**	**311.831**	**260.124**	**-8.341**	**-2.169.961**	**-3.600.293**

Figure A.9: Analytical income statement, Farstad Shipping ASA

Analytical Income Statement, Havila	2010	2011	2012	2013	2014	2015	2016
Effective tax rate	*-169,34%*	*38,66%*	*-42,85%*	*-85,58%*	*-90,93%*	*1,17%*	*0,52%*
Freight income	1.030.204	1.279.031	1.332.158	1.436.108	1.698.716	1.543.699	1.061.320
Other income	8.416	30.595	23.723	19.077	29.423	30.681	23.646
Gain on sale of fixed assets	154.402	54.038	1.738	1.605	-	-	-
Total income	1.193.022	1.363.664	1.357.619	1.456.790	1.728.139	1.574.380	1.084.966
Result from joint venture companies	-42.130	-2.913	-14.479	-6.683	3.278	-30.632	-82.033
Crew expenses	-322.103	-430.515	-456.064	-466.877	-476.948	-480.979	-340.382
Vessel expenses	-298.690	-360.165	-157.973	-165.886	-183.731	-144.194	-106.951
Other payroll expenses	-24.644	-28.943	-120.729	-39.017	-73.111	-94.938	-83.650
Other operating expenses	-42.177	-55.786	-85.355	-88.358	-102.503	-98.275	-88.126
Total expenses	-729.744	-878.322	-834.600	-766.821	-833.015	-849.018	-701.142
EBITDA	**463.278**	**485.342**	**523.019**	**689.969**	**895.124**	**725.362**	**383.824**
Depreciation	-180.288	-205.240	-161.063	-187.716	-268.689	-327.129	-320.223
Writedown of fixed assets	-	-	-	-	-	-1.388.300	-900.500
EBIT	**282.990**	**280.102**	**361.956**	**502.253**	**626.435**	**-990.067**	**-836.899**
Tax on EBIT	-479.226	108.301	-155.089	-429.812	-569.606	-11.633	-4.322
NOPAT	**-196.236**	**388.403**	**206.867**	**72.441**	**56.829**	**-1.001.700**	**-841.221**
Financial income	26.834	25.711	81.430	21.921	-30.091	5.538	36.361
Financial expenses	-296.825	-397.007	-425.616	-430.727	-556.727	-524.403	-395.595
Net financial expenses before tax	**-269.991**	**-371.296**	**-344.186**	**-408.806**	**-586.818**	**-518.865**	**-359.234**
Tax savings on debt financing	457.213	-143.561	147.475	349.843	533.583	-6.096	-1.855
Net financial expenses after tax	**187.222**	**-514.857**	**-196.711**	**-58.963**	**-53.235**	**-524.961**	**-361.089**
Net financial earnings	**-9.014**	**-126.454**	**10.156**	**13.478**	**3.594**	**-1.526.661**	**-1.202.310**

Figure A.10: Analytical income statement, Havila

A.1.3 Analytical balance sheet

Analytical Balance Sheet (Operating), Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Other tangible fixed assets	28.420	23.421	18.393	18.824	22.717	28.242	34.921
Capitlalized period maintenance	252.378	241.114	245.830	230.255	290.253	270.661	394.788
Investment in joint ventures	-	-	189.225	270.564	302.368	344.032	408.809
Deffered tax asset	17.362	43.061	115.397	58.934	61.966	37.987	41.154
Vessels and new build contracts	13.490.052	13.874.368	12.400.695	11.887.534	14.460.434	13.466.612	18.046.030
Loans to associated companies and joint ventures	-	-	41.687	24.517	30.210	14.852	-
Total non-current operational assets	**13.788.212**	**14.181.964**	**13.011.227**	**12.490.628**	**15.167.948**	**14.162.386**	**18.925.702**
Assets held for sale	12.790	4.644	-	135.754	-	24.112	193.673
Account receivables	521.736	715.209	518.041	707.846	756.794	635.073	570.676
Other short-term receivables	215.586	163.442	199.640	267.653	357.660	282.804	370.031
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450
Total current operational assets	**1.621.830**	**1.540.564**	**1.524.786**	**2.351.117**	**2.435.190**	**1.967.055**	**2.884.830**
Total operational assets	**15.410.042**	**15.722.528**	**14.536.013**	**14.841.745**	**17.603.138**	**16.129.441**	**21.810.532**
Deffered tax liability	77.543	39.931	3.000	-	-	-	-
Deffered income	-	-	-	-	9.339	9.136	193.730
Accounts payable	311.048	258.684	187.303	111.495	371.529	126.178	244.643
Taxes payable	105.677	75.526	67.702	15.321	40.697	58.273	48.886
Accrued salaries and related taxes	50.650	58.468	46.388	89.083	51.502	40.821	50.178
Other current liabilities	250.200	292.001	391.754	323.112	353.750	279.079	325.172
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450
Total non-interest-bearing debt (operating liabilities)	**1.666.836**	**1.381.879**	**1.503.252**	**1.778.875**	**2.147.553**	**1.538.553**	**2.613.059**
Invested capital (operating)	**13.743.206**	**14.340.649**	**13.032.761**	**13.062.870**	**15.455.585**	**14.590.888**	**19.197.473**

Figure A.11: Analytical income statement, Solstad Offshore ASA

Analytical Balance Sheet (Financial), Solstad Offshore ASA	2010	2011	2012	2013	2014	2015	2016
Total equity	**4.989.443**	**4.415.914**	**4.624.932**	**4.954.275**	**5.057.532**	**3.667.575**	**3.455.727**
Other current finanancial liabilities	5.909	18.053	-	2.653	25.961	33.648	6.615
Pension obligations	-	-	67.998	72.018	98.781	50.672	63.490
Other financial liabilities/derivatives	67.194	52.373	51.112	34.428	65.888	94.603	77.260
Other long-term loans	33.600	36.487	50.954	161.099	331.886	367.703	226.991
Debt to credit institutions	7.470.527	9.472.153	7.114.130	7.539.122	10.094.844	8.905.838	14.020.292
Bank overdraft	102.734	102.205	64.938	90.933	121.908	82.656	-
Current interest bearing liabilities	2.101.877	1.061.092	2.057.178	1.631.593	1.122.371	2.520.002	330.694
Leasing obligations	-	-	-	-	-	-	3.241.204
Interest bearing debt	**9.781.841**	**10.742.363**	**9.406.310**	**9.531.846**	**11.861.639**	**12.055.122**	**17.966.546**
Stock	59.377	59.843	73.470	68.893	61.188	57.026	73.120
Investments in stocks and shares	4.552	5.074	5.031	2.991	2.991	2.991	3.192
Other financial assets/derivatives	40.038	31.140	51.651	21.881	4.031	2.250	1.871
Other long-term receivables	9.589	27.060	2.462	50.183	30.935	1.945	84.094
Pension funds	9.350	2.682	-	-	-	-	-
Other current financial assets	11.834	14.569	25.524	-	-	-	-
Market based shares	321	344	394	475	382	229	10.188
Investments in associated companies	21.300	19.648	32.847	38.967	43.323	42.302	301.889
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450
Interest bearing assets	**1.028.079**	**817.629**	**998.484**	**1.423.254**	**1.463.586**	**1.131.809**	**2.224.804**
Net interest bearing debt	**8.753.762**	**9.924.734**	**8.407.826**	**8.108.592**	**10.398.053**	**10.923.313**	**15.741.742**
Invested capital (financing)	**13.743.205**	**14.340.648**	**13.032.758**	**13.062.867**	**15.455.585**	**14.590.888**	**19.197.469**

Figure A.12: Analytical income statement, Solstad Offshore ASA

Analytical balance sheet, Deep Sea	2010	2011	2012	2013	2014	2015	2016
Investments accounted for using equity	-	594	1.194	113.814	115.718	31.637	-
Deferred income tax	234	308	605	32	-	-	-
Vessels	312.684	340.179	426.751	162.820	519.074	446.516	702.536
Vessels under finance lease contracts	241.148	232.415	212.225	35.648	22.420	16.335	-
Equipment and vehicle	664	643	822	257	519	393	798
Tot. Non-current operational assets	**554.730**	**574.139**	**641.597**	**312.571**	**657.731**	**494.881**	**703.334**
Assets held for sale							
Trade receivables	26.017	29.475	30.010	22.323	21.661	10.012	9.852
Other short term receivables	9.374	6.468	9.541	13.989	4.965	3.979	6.263
Assets classified as held for sale	74220	0	0	0	0	0	0
Inventories	2.909	5.062	2.679	1.372	2.322	2.108	3.538
CIRR deposit	43.693	37.796	35.558	27.070	19.487	13.258	9.459
Cash and cash equivalents	41.932	40.318	40.423	31.693	47.289	74.186	51.202
Tot. Current operational assets	**198.145**	**119.119**	**118.211**	**96.447**	**95.724**	**103.543**	**80.314**
Tot. Operational assets	**752.875**	**693.258**	**759.808**	**409.018**	**753.455**	**598.424**	**783.648**
Current income tax liabilities	903	881	1.266	-	-	-	-
Trade and other payables	11.519	13.307	23.667	5.554	11.684	6.200	15.852
Liabilities of assets classified as held for sale	48998	0	0	0	0	0	0
Deferred gain on sale and finance leaseback	39.459	34.967	30.472	5.892	-	-	-
Deferred gain on CIRR loan	1.607	1.406	1.343	1.086	860	523	419
Cash and cash equivalents	41.932	40.318	40.423	31.693	47.289	74.186	51.202
Tot. Non-interest-bearing debt (Operating liabilities)	**144.418**	**90.879**	**97.171**	**44.225**	**59.833**	**80.909**	**67.473**
Invested capital (operating)	**608.457**	**602.379**	**662.637**	**364.793**	**693.622**	**517.515**	**716.175**
Tot. Equity	**161.581**	**162.714**	**157.009**	**257.220**	**443.148**	**291.584**	**129.600**
Pension scheme	11	124	195	20	267	-	-
Financial derivatives	529	400	1.660	1.492	386	221	-
Bank borrowings	232.242	245.547	304.873	101.595	292.830	276.793	629.743
Borrowings from related parties	-	-	25.000	-	-	-	-
CIRR loan	48.606	42.629	40.724	32.285	22.663	15.942	12.825
Other long term liabilities	1.806	873	361	-	-	-	-
Finance lease liability	211024	195895	179142	31537	27806	24890	0
Interest bearing debt	**494.218**	**485.468**	**551.955**	**166.929**	**343.952**	**317.846**	**642.568**
Financial derivatives	-	-	-	-	143	-	-
CIRR deposit short term portion	4.959	4.839	5.215	5.215	3.176	2.684	3.366
Loans to related parties	-	-	-	22.448	42.870	15.000	1.424
Other long-term receivables	455	647	687	-	-	45	-
Cash and cash equivalents	41.932	40.318	40.423	31.693	47.289	74.186	51.202
Interest bearing assets	**47.346**	**45.804**	**46.325**	**59.356**	**93.478**	**91.915**	**55.992**
Net interest bearing debt	**446.872**	**439.664**	**505.630**	**107.573**	**250.474**	**225.931**	**586.576**
Invested capital (financial)	**608.453**	**602.378**	**662.639**	**364.793**	**693.622**	**517.515**	**716.176**

Figure A.13: Analytical income statement, Deep Sea Supply

Analytical balance sheet, Eidesvik	2010	2011	2012	2013	2014	2015	2016
Investments in joint ventures	3.692	6.527	7.767	2.956	476.197	591.176	611.991
Vessels under construction	44.439	182.109	128.654	265.629	347.371	-	-
Vessels	4.288.180	4.054.774	4.579.956	4.197.778	3.938.045	4.506.172	3.706.412
Other assets	40.288	36.069	29.612	28.729	28.463	26.861	22.773
Tot. Non-current operational assets	**4.376.599**	**4.279.479**	**4.745.989**	**4.495.092**	**4.790.076**	**5.124.209**	**4.341.176**
Assets classified as held for sale	-	-	47.366	-	-	-	-
Accounts receivable	164.751	221.475	148.043	177.865	175.348	189.989	203.006
Cash and cash equivalents	229.914	211.552	254.988	582.773	549.556	702.276	547.748
Tot. Current operational assets	**394.665**	**433.027**	**450.397**	**760.638**	**724.904**	**892.265**	**750.754**
Tot. Operational assets	**4.771.264**	**4.712.506**	**5.196.386**	**5.255.730**	**5.514.980**	**6.016.474**	**5.091.930**
Tax payable	23.550	24.470	23.313	129	174	4.649	471
Liabilities related to assets held for sale	-	-	44.939	-	-	-	-
Trade payables	37.922	56.262	34.150	31.161	46.256	40.150	49.559
Other current liabilities	111.232	144.824	133.945	147.364	173.571	110.397	105.125
Cash and cash equivalents	229.914	211.552	254.988	582.773	549.556	702.276	547.748
Tot. Non-interest-bearing debt (Operating liabilities)	**402.618**	**437.108**	**491.335**	**761.427**	**769.557**	**857.472**	**702.903**
Invested capital (operating)	**4.368.646**	**4.275.398**	**4.705.051**	**4.494.303**	**4.745.423**	**5.159.002**	**4.389.027**
Tot. Equity	**1.853.663**	**1.932.960**	**2.180.283**	**2.348.288**	**2.125.385**	**2.041.815**	**1.622.439**
Pension obligation	55.367	34.301	20.840	23.303	52.426	12.260	-
Financial derivatives	74.354	81.914	59.770	41.956	165.822	9.272	-
Interest bearing debt	2.911.371	2.826.628	3.133.914	3.107.996	2.992.531	3.851.614	3.455.854
Interest bearing debt	**3.041.092**	**2.942.843**	**3.214.524**	**3.173.255**	**3.210.779**	**3.873.146**	**3.455.854**
Derivatives	14.548	1.909	2.388	759	-	-	1.756
Other current assets	93.604	62.250	108.868	34.901	36.753	47.511	136.742
Other long-term receivables	1.353	4.277	769	19.756	669	244	1.301
Cash and cash equivalents	229.914	211.552	254.988	582.773	549.556	702.276	547.748
Shares	186.690	320.417	322.741	389.051	3.765	5.930	1.720
Interest bearing assets	**526.109**	**600.405**	**689.754**	**1.027.240**	**590.743**	**755.961**	**689.267**
Net interest bearing debt	**2.514.983**	**2.342.438**	**2.524.770**	**2.146.015**	**2.620.036**	**3.117.185**	**2.766.587**
Invested capital (financial)	**4.368.646**	**4.275.398**	**4.705.053**	**4.494.303**	**4.745.421**	**5.159.000**	**4.389.026**

Figure A.14: Analytical income statement, Eidesvik

Analytical balance sheet, DOF	2010	2011	2012	2013	2014	2015	2016
Goodwill	478	401	409	403	418	436	330
Investments in associated companies and joint ventures	71	65	73	1.188	1.246	513	808
Deferred tax asset	29	211	295	327	638	1.341	951
Vessels	18.148	22.312	24.794	22.187	21.887	21.604	20.870
ROV	-	-	-	817	1.002	943	855
Newbuildings	1.925	1.969	423	406	483	106	26
Machinery and other operating equipment	1.559	1.406	1.385	478	494	535	448
Tot. Non-current operational assets	**22.210**	**26.364**	**27.379**	**25.806**	**26.168**	**25.478**	**24.288**
Assets held for sale	-	-	-	-	-	477	-
Trade receivables	1.956	2.096	1.859	2.356	2.957	2.622	2.098
Fuel reserves and other inventory	28	51	56	70	84	79	-
Cash and cash equivalents	2.644	2.040	2.145	2.218	2.610	2.056	2.192
Tot. Current operational assets	**4.628**	**4.187**	**4.060**	**4.644**	**5.651**	**5.234**	**4.290**
Tot. Operational assets	**26.838**	**30.551**	**31.439**	**30.450**	**31.819**	**30.712**	**28.578**
Tax payable	100	141	122	107	190	151	-
Deferred tax	402	219	161	78	49	42	1
Accounts payable	415	857	683	1.040	1.192	1.439	1.061
Other non-current liabilities	429	328	271	47	32	26	20
Other current liabilities	792	790	295	290	409	412	507
Cash and cash equivalents	2.644	2.040	2.145	2.218	2.610	2.056	2.192
Tot. Non-interest-bearing debt (Operating liabilities)	**4.782**	**4.375**	**3.677**	**3.780**	**4.482**	**4.126**	**3.781**
Invested capital (operating)	**22.056**	**26.176**	**27.762**	**26.670**	**27.337**	**26.586**	**24.797**
Tot. Equity	**6.728**	**6.670**	**6.720**	**6.346**	**6.867**	**5.172**	**8.146**
Pension liabilities	13	13	35	48	53	44	30
Public duties payable	80	108	86	92	101	91	-
Debt to credit institutions	13.256	16.391	16.592	14.527	13.091	17.354	16.729
Non-current derivatives	77	256	378	356	384	244	135
Bond loan	2.754	2.804	4.164	4.722	4.124	3.347	1.297
Current portion of bond loan and debt to credit institution	2.007	2.251	2.247	3.080	5.840	3.034	1.805
Liabilities directly associated with asset held for sale	-	-	-	-	-	260	-
Interest bearing debt	**18.187**	**21.823**	**23.502**	**22.825**	**23.593**	**24.374**	**19.996**
Investment in shares and units	9	7	5	5	5	5	5
Other non-current receivables	205	272	309	278	507	900	1.147
Cash and cash equivalents	2.644	2.040	2.145	2.218	2.610	2.056	2.192
Interest bearing assets	**2.858**	**2.319**	**2.459**	**2.501**	**3.122**	**2.961**	**3.344**
Net interest bearing debt	**15.329**	**19.504**	**21.043**	**20.324**	**20.471**	**21.413**	**16.652**
Invested capital (financial)	**22.057**	**26.174**	**27.763**	**26.670**	**27.338**	**26.585**	**24.798**

Figure A.15: Analytical income statement, DOF

Analytical balance sheet, Siem	2010	2011	2012	2013	2014	2015	2016
Capitalized project costs	19.102	13.570	12.153	11.027	10.965	5.381	5.623
Investment in associated companies	28.591	4.218	4.222	20.951	20.222	16.660	33.884
Deferred tax asset	6.254	6.254	6.885	11.770	12.591	11.668	11.467
Vessels under construction	105.991	105.199	108.430	127.711	130.515	185.064	8.258
Vessels and equipment	1.268.799	1.414.548	1.260.118	1.440.332	1.743.693	1.391.695	1.980.228
Intangible assets	8.903	29.441	30.020	29.737	25.937	16.849	16.977
Tot. Non-current operational assets	**1.437.640**	**1.573.230**	**1.421.828**	**1.641.528**	**1.943.923**	**1.627.317**	**2.056.437**
Assets held for sale	-	-	53.604	18.121	-	3.459	1.099
Accounts receivable	53.290	46.544	44.221	53.198	74.753	46.147	178.316
Other short-term receivables	23.035	30.730	38.461	32.737	63.877	60.657	-
Inventories	4.399	9.249	7.772	7.555	7.481	7.739	-
Cash and cash equivalents	115.185	136.635	107.068	101.206	117.623	148.753	101.323
Tot. Current operational assets	**195.909**	**223.158**	**251.126**	**212.817**	**263.734**	**266.755**	**280.738**
Tot. Operational assets	**1.633.549**	**1.796.388**	**1.672.954**	**1.854.345**	**2.207.657**	**1.894.072**	**2.337.175**
Taxes payable	14.955	3.160	8.856	3.759	5.005	3.496	-
Tax liabilities	1.936	13.337	6.799	6.679	6.368	5.483	-
Accounts payable	7.119	7.311	5.377	16.253	10.781	8.395	166.876
Other non-current liabilities	6.878	17.865	14.992	18.826	26.565	34.142	51.421
Other current liabilities	32.528	44.874	50.882	44.061	123.072	91.001	-
Deferred CIRR	3.259	2.891	2.523	2.155	1.786	1.418	-
Cash and cash equivalents	115.185	136.635	107.068	101.206	117.623	148.753	101.323
Tot. Non interest-bearing debt (Operating liabilities)	**181.860**	**226.073**	**196.497**	**192.939**	**291.200**	**292.688**	**319.620**
Invested capital (operating)	**1.451.689**	**1.570.315**	**1.476.457**	**1.661.406**	**1.916.457**	**1.601.384**	**2.017.555**
Tot. Equity	**769.070**	**769.750**	**786.397**	**793.888**	**823.648**	**665.508**	**647.985**
Pension liabilities	512	199	742	2.778	3.812	2.195	-
Derivative financial instruments	-	10.171	12.339	11.085	16.732	12.896	-
Borrowings	739.095	839.031	714.699	863.074	1.087.757	1.007.925	1.293.059
Borrowings	71.125	95.472	82.287	98.426	126.603	114.660	177.834
CIRR loan	65.006	56.469	53.194	41.718	28.453	88.002	76.215
Interest bearing debt	**875.738**	**1.001.342**	**863.261**	**1.017.081**	**1.263.357**	**1.225.678**	**1.547.108**
Other financial assets/derivatives	3.731	-	5.829	-	1.041	1.451	-
CIRR loan deposit	65.006	56.469	53.194	41.718	28.453	88.002	76.215
Long-term receivables	9.197	7.674	7.111	6.639	23.432	51.598	-
Cash and cash equivalents	115.185	136.635	107.068	101.206	117.623	148.753	101.323
Interest bearing assets	**193.119**	**200.778**	**173.202**	**149.563**	**170.549**	**289.804**	**177.538**
Net interest bearing debt	**682.619**	**800.564**	**690.059**	**867.518**	**1.092.808**	**935.874**	**1.369.570**
Invested capital (financial)	**1.451.689**	**1.570.314**	**1.476.456**	**1.661.406**	**1.916.456**	**1.601.382**	**2.017.555**

Figure A.16: Analytical income statement, Siem

Analytical balance sheet, Farstad	2010	2011	2012	2013	2014	2015	2016
Goodwill	30.247	112.090	100.032	96.778	101.938	57.793	-
Vessels etc.	11.467.552	11.759.850	12.394.071	14.179.071	15.984.824	15.383.886	11.734.441
Contract newbuilds	64.149	358.894	527.973	333.620	33.715	18.336	70.677
Deferred tax benefit	47.242	67.894	68.764	63.506	83.865	55.106	-
Tot. Non-current operational assets	**11.609.190**	**12.298.728**	**13.090.840**	**14.672.975**	**16.204.342**	**15.515.121**	**11.805.118**
Assets classified as held for sale	-	-	-	-	-	151.438	370.426
Accounts receivables, freight income	471.567	555.669	624.114	616.853	622.641	517.627	337.645
Other short-term receivables	210.853	181.273	229.635	281.865	267.003	221.655	199.632
Bunkers and other inventories	40.480	41.319	57.020	61.969	84.278	75.540	62.656
Cash and cash equivalents	2.136.364	1.342.256	1.495.147	1.800.667	2.121.076	1.578.619	758.737
Tot. Current operational assets	**2.859.264**	**2.120.517**	**2.405.916**	**2.761.354**	**3.094.998**	**2.544.879**	**1.729.096**
Tot. Operational assets	**14.468.454**	**14.419.245**	**15.496.756**	**17.434.329**	**19.299.340**	**18.060.000**	**13.534.214**
Taxes payable	46.487	38.046	27.158	31.639	26.540	38.271	21.747
Deferred tax liabilities	39.795	52.883	43.607	41.790	42.657	43.140	40.407
Accounts payable	231.161	234.242	224.170	281.623	281.949	199.127	237.476
Other current liabilities	412.534	468.783	475.595	509.485	781.233	831.550	491.961
Cash and cash equivalents	2.136.364	1.342.256	1.495.147	1.800.667	2.121.076	1.578.619	758.737
Tot. Non-interest-bearing debt (Operating liabilities)	**2.866.341**	**2.136.210**	**2.265.677**	**2.665.204**	**3.253.455**	**2.690.707**	**1.550.328**
Invested capital (operating)	**11.602.113**	**12.283.035**	**13.231.079**	**14.769.125**	**16.045.885**	**15.369.293**	**11.983.886**
Tot. Equity	**6.582.368**	**6.820.235**	**6.775.849**	**6.877.974**	**6.624.758**	**4.344.077**	**986.605**
Pension liabilities	61.901	64.469	112.324	105.431	97.043	55.324	59.424
Currency and interest swap contracts	24.900	45.791	54.970	40.633	224.694	290.618	148.991
Interest-bearing mortgage debt	6.287.220	5.855.651	6.595.642	8.702.740	9.932.526	11.287.530	1.446.900
Current portion of interest-bearing debt	991.818	1.012.058	1.295.915	945.750	1.383.119	1.036.333	10.104.219
Interest bearing debt	**7.365.839**	**6.977.969**	**8.058.851**	**9.794.554**	**11.637.382**	**12.669.805**	**11.759.534**
Other long-term receivables	27.824	35.967	5.008	17.861	16.302	2.716	540
Currency and interest swap contracts	43.364	25.076	26.456	776	-	-	-
Shares	5.204	5.209	5.078	5.071	5.059	4.936	2.803
Other current financial assets	133.338	106.661	71.932	79.028	73.818	58.318	173
Cash and cash equivalents	2.136.364	1.342.256	1.495.147	1.800.667	2.121.076	1.578.619	758.737
Interest bearing assets	**2.346.094**	**1.515.169**	**1.603.621**	**1.903.403**	**2.216.255**	**1.644.589**	**762.253**
Net interest bearing debt	**5.019.745**	**5.462.800**	**6.455.230**	**7.891.151**	**9.421.127**	**11.025.216**	**10.997.281**
Invested capital (financial)	**11.602.113**	**12.283.035**	**13.231.079**	**14.769.125**	**16.045.885**	**15.369.293**	**11.983.886**

Figure A.17: Analytical income statement, Farstad Shipping ASA

Analytical balance sheet, Havila	2010	2011	2012	2013	2014	2015	2016
Deferred tax assets	14.251	26.289	14.168	8.557	6.404	2.448	-
Investments in joint ventures	-	22.927	57.392	59.856	63.278	63.079	22.072
Vessels	5.392.018	6.939.116	7.654.302	7.516.823	7.467.143	5.837.000	4.597.100
Buildings, movables and fixtures	-	8.469	5.540	4.953	4.594	5.851	4.779
Tot. Non-current operational assets	**5.406.269**	**6.996.801**	**7.731.402**	**7.590.189**	**7.541.419**	**5.908.378**	**4.623.951**
Bunkers, fuel and other stocks	13.878	15.852	17.610	22.140	18.564	16.459	17.993
Trade receivable and other receivable	492.257	393.934	347.085	315.019	446.649	393.994	267.338
Bank deposit	603.414	355.808	497.341	402.696	350.812	204.649	554.466
Tot. Current operational assets	**1.109.549**	**765.594**	**862.036**	**739.855**	**816.025**	**615.102**	**839.797**
Tot. Operational assets	**6.515.818**	**7.762.395**	**8.593.438**	**8.330.044**	**8.357.444**	**6.523.480**	**5.463.748**
Tax payable	59.747	45.305	32.619	48.027	34.481	25.909	16.085
Other liabilities	-	-	-	-	7.302	5.769	4.789
Trade payable	110.385	49.127	60.061	70.688	77.038	65.034	18.326
Other non-current liabilities	112.642	110.279	6.481	6.481	12.333	10.630	6.495
Other current liabilities	715.083	115.376	138.792	128.393	143.690	138.677	386.662
Allocation liability in joint ventures	31.196	60.443	78.026	-	-	32.978	-
Liabilities to joint venture company	-	-	-	-	-	-	74.504
Deferred tax	2.669	20.493	80.592	104.624	83.625	63.681	50.238
Bank deposit	603.414	355.808	497.341	402.696	350.812	204.649	554.466
Tot. Non-interest-bearing debt (Operating liabilities)	**1.635.136**	**756.831**	**893.912**	**760.909**	**709.281**	**547.327**	**1.111.565**
Invested capital (operating)	**4.880.682**	**7.005.564**	**7.699.526**	**7.569.135**	**7.648.163**	**5.976.153**	**4.352.183**
Tot. Equity	**1.695.038**	**1.809.322**	**2.002.440**	**2.021.605**	**2.022.103**	**502.405**	**-699.939**
Pension liabilities	-	230	7.267	4.076	10.002	4.407	2.422
Derivatives	13.097	26.665	18.973	26.014	72.828	44.371	15.276
Borrowings	3.945.484	5.308.716	5.525.128	4.827.133	5.011.592	-	-
Current liabilities of long term debt	0	398769	736334	1106353	898759	5640366	5596585
Interest bearing debt	**3.958.581**	**5.734.380**	**6.287.702**	**5.963.576**	**5.993.181**	**5.689.144**	**5.614.283**
Derivatives	100.020	30.519	4.533	2.161	139	-	349
Shares	356	441	381	403	5.205	1.326	1.850
Trading portfolio	3.556	3.556	3.556	-	-	-	-
Long term receivables	65.590	147.814	84.803	10.786	10.966	9.422	5.495
Bank deposit	603.414	355.808	497.341	402.696	350.812	204.649	554.466
Interest bearing assets	**772.936**	**538.138**	**590.614**	**416.046**	**367.122**	**215.397**	**562.160**
Net interest bearing debt	**3.185.645**	**5.196.242**	**5.697.088**	**5.547.530**	**5.626.059**	**5.473.747**	**5.052.123**
Invested capital (financial)	**4.880.683**	**7.005.564**	**7.699.528**	**7.569.135**	**7.648.162**	**5.976.152**	**4.352.184**

Figure A.18: Analytical income statement, Havila

A.2 Economic value added model

The economic value added model							
		Budgeting period			Terminal period		
	1	2	3	4	5	6 Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022 Nr shares	67.806
NOPAT	310.508	830.725	979.908	1.164.649	1.677.225	1.710.769	
Invested capital, beg. of period	19.197.473	10.928.056	9.466.359	8.841.961	9.957.290	8.103.416	
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%	
Cost of capital	3.129.188	1.781.273	1.543.016	1.441.240	1.623.038	1.320.857	
EVA	(2.818.680)	(950.548)	(563.108)	(276.591)	54.186	389.912	
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041	
PV of EVA	(2.423.628)	(702.772)	(357.975)	(151.188)	25.468	157.575	
Invested capital (book value), beg	19.197.473						
PV of EVA in forecasting horizon	(3.610.096)						
PV of EVA in terminal period	1.281.540						
Enterprise value	**16.868.917**						
Net interest bearing debt	15.741.742						
Estimated market value of equity	**1.127.175**						
Share price	**16,6235**						
Discounted share price	**16,6824**						

Figure A.19: EVA model, reference case

The economic value added model								
	Budgeting period					Terminal period		
	1	2	3	4	5	6	Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022	Nr shares	67.806
NOPAT	310.508	901.928	1.079.483	1.354.970	1.786.556	1.822.288		
Invested capital, beg. of period	19.197.473	10.928.056	10.277.743	9.740.446	11.584.459	8.631.647		
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%		
Cost of capital	3.129.188	1.781.273	1.675.272	1.587.693	1.888.267	1.406.958		
EVA	(2.818.680)	(879.345)	(595.789)	(232.723)	(101.710)	415.329		
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041		
PV of EVA	(2.423.628)	(650.129)	(378.751)	(127.210)	(47.804)	167.847		
Invested capital (book value), beg	19.197.473							
PV of EVA in forecasting horizon	(3.627.522)							
PV of EVA in terminal period	1.365.079							
Enterprise value	**16.935.030**							
Net interest bearing debt	15.741.742							
Estimated market value of equity	**1.193.288**							
Share price	**17,5986**							
Discounted share price	**17,6609**							

Figure A.20: EVA model, best scenario

The economic value added model								
	Budgeting period					Terminal period		
	1	2	3	4	5	6	Growth	2,00%
	E2017	E2018	E2019	E2020	E2021	E2022	Nr shares	67.806
NOPAT	283.197	741.023	813.231	964.069	1.235.187	1.259.891		
Invested capital, beg. of period	19.197.473	9.966.851	8.444.174	7.337.987	8.242.407	5.967.737		
WACC	16,30%	16,30%	16,30%	16,30%	16,30%	16,30%		
Cost of capital	3.129.188	1.624.597	1.376.400	1.196.092	1.343.512	972.741		
EVA	(2.845.991)	(883.574)	(563.170)	(232.023)	(108.325)	287.150		
Discount factor	0,8598	0,7393	0,6357	0,5466	0,4700	0,4041		
PV of EVA	(2.447.112)	(653.256)	(358.014)	(126.827)	(50.913)	116.046		
Invested capital (book value), beg	19.197.473							
PV of EVA in forecasting horizon	(3.636.123)							
PV of EVA in terminal period	943.787							
Enterprise value	**16.505.137**							
Net interest bearing debt	15.741.742							
Estimated market value of equity	**763.395**							
Share price	**11,2585**							
Discounted share price	**11,2984**							

Figure A.21: EVA model, worst scenario

A.3 Forecast of Solstad Offshore ASA

		Historical period							Forecasting period				Terminal period	
Forecast of value drivers	**Average**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**E2017**	**E2018**	**E2019**	**E2020**	**E2021**	**E2022**
Growth drivers														
Growth of freight income	0,36%	na	16,47%	8,01%	6,30%	6,93%	-5,11%	-30,42%	8,99%	14,53%	11,55%	12,61%	33,11%	2,00%
Other operating income/freight income	2,55%	0,13%	0,16%	2,26%	3,75%	3,82%	3,09%	4,61%						
Other income/freight income	4,47%	0,99%	0,28%	3,63%	5,69%	5,96%	6,86%	7,86%						
Cost drivers														
Personnel costs/freight income	-38,52%	-36,76%	-38,76%	-37,26%	-39,96%	-37,30%	-39,35%	-40,24%	-38,52%	-38,52%	-38,52%	-38,52%	-38,52%	-38,52%
Other operating expenses/freight income	-24,71%	-26,70%	-25,27%	-22,02%	-21,26%	-22,81%	-25,37%	-29,54%	-24,71%	-24,71%	-24,71%	-24,71%	-24,71%	-24,71%
Other drivers														
EBITDA margin	41,24%	37,53%	36,26%	44,35%	44,47%	45,84%	42,14%	38,09%	36,77%	36,77%	36,77%	36,77%	36,77%	36,77%
Depreciation/Non-current operating assets	-6,28%	-4,63%	-6,57%	-4,49%	-3,45%	-3,04%	-12,92%	-8,86%	-6,28%	-3,14%	-3,14%	-2,50%	-2,50%	-2,50%
EBIT margin	10,23%	13,10%	5,63%	26,56%	32,13%	33,49%	-9,45%	-29,83%	11,71%	27,35%	28,92%	30,52%	33,02%	33,02%
Effective tax rate	-14,80%	-85,72%	1,90%	9,31%	-10,42%	-21,67%	1,58%	1,39%	-1,39%	-1,39%	-1,39%	-1,39%	-1,39%	-1,39%
Investment drivers														
Tot. non-current assets/freight income	474%	528%	466%	396%	357%	406%	399%	767%	399%	300%	250%	250%	150%	150%
Net working capital/freight income	7,33%	-1,72%	5,21%	0,65%	16,37%	7,70%	12,08%	11,01%	7,33%	7,33%	7,33%	7,33%	7,33%	7,33%
Tot. Operating liabilities / Freight income	58,93%	63,78%	45,40%	45,72%	50,90%	57,46%	43,38%	105,90%	58,93%	58,93%	58,93%	58,93%	58,93%	58,93%
Tot. Current operating assets / Freight income	66,26%	62,05%	50,61%	46,38%	67,27%	65,16%	55,47%	116,91%	66,26%	66,26%	66,26%	66,26%	66,26%	66,26%
Financial drivers														
Tot. Non interest bearing debt/Inv. Capital	12,14%	12,13%	9,64%	11,53%	13,62%	13,89%	10,54%	13,61%	12,14%	12,14%	12,14%	12,14%	12,14%	12,14%
NIBD/Invested capital	69,09%	63,70%	69,21%	64,51%	62,07%	67,28%	74,86%	82,00%	69,09%	69,09%	69,09%	69,09%	69,09%	69,09%
Interest rate	-5,66%	-0,34%	-5,86%	-6,59%	-6,43%	-8,34%	-11,57%	-0,51%	-5,66%	-5,66%	-5,66%	-5,66%	-5,66%	-5,66%
Profit measurements														
ROIC before tax	2,99%	2,49%	1,20%	6,70%	8,60%	8,10%	-2,30%	-3,83%	2,88%	8,90%	11,24%	11,86%	20,99%	20,99%
ROIC after tax	2,39%	0,36%	1,22%	7,32%	7,70%	6,34%	-2,33%	-3,89%	2,84%	8,78%	11,08%	11,70%	20,70%	20,70%
Invested capital turnover rate	0,22	0,19	0,21	0,25	0,27	0,24	0,24	0,13	0,25	0,33	0,39	0,39	0,64	0,64
Profit margin before tax	9,96%	12,97%	5,62%	25,63%	30,40%	31,60%	-8,84%	-27,66%	11,71%	27,35%	28,92%	30,52%	33,02%	33,02%
Profit margin after tax	7,22%	1,85%	5,72%	28,02%	27,23%	24,76%	-8,98%	-28,04%	11,55%	26,97%	28,52%	30,10%	32,56%	32,56%
Main outcomes of pro forma statement		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**E2017**	**E2018**	**E2019**	**E2020**	**E2021**	**E2022**
Most relevant factors for stock price														
Depreciation									(674.086)	(290.234)	(269.803)	(241.841)	(193.147)	(197.010)
NOPAT									310.508	830.725	979.908	1.164.649	1.677.225	1.710.769
Net financial earnings									(111.036)	465.565	638.834	780.552	1.364.639	1.391.932
FCFF									8.579.926	2.292.422	1.604.306	49.320	3.531.098	1.548.701

Figure A.22: Growth drivers

Forecast of income statement	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**E2017**	**E2018**	**E2019**	**E2020**	**E2021**	**E2022**
Effective tax rate	*-86%*	*2%*	*9%*	*-10%*	*-22%*	*2%*	*1%*						
Freight income	2.613.557	3.044.104	3.287.920	3.495.073	3.737.349	3.546.418	2.467.574	2.689.452	3.080.192	3.436.037	3.869.460	5.150.580	5.253.591
Other operating income	3.308	4.998	74.283	131.066	142.824	109.542	113.768						
Insurance claims	20.051	5.788	25.065	10.769	16.032	67.811	16.217						
Income from investment in joint ventures	2.511	(2.229)	19.929	57.207	63.779	65.878	64.083						
Total operating income	**2.639.427**	**3.052.661**	**3.407.197**	**3.694.115**	**3.959.984**	**3.789.649**	**2.661.642**	**2.689.452**	**3.080.192**	**3.436.037**	**3.869.460**	**5.150.580**	**5.253.591**
Personnel costs	(960.795)	(1.179.777)	(1.225.124)	(1.396.606)	(1.394.114)	(1.395.564)	(992.972)	(1.035.951)	(1.186.460)	(1.323.528)	(1.490.478)	(1.983.953)	(2.023.632)
Other operating expences	(697.784)	(769.178)	(723.932)	(743.223)	(852.492)	(899.675)	(728.814)	(664.539)	(761.087)	(849.013)	(956.108)	(1.272.660)	(1.298.114)
Total operating expenses	**(1.658.579)**	**(1.948.955)**	**(1.949.056)**	**(2.139.829)**	**(2.246.606)**	**(2.295.239)**	**(1.721.786)**	**(1.700.489)**	**(1.947.547)**	**(2.172.541)**	**(2.446.586)**	**(3.256.613)**	**(3.321.746)**
EBITDA	**980.848**	**1.103.706**	**1.458.141**	**1.554.286**	**1.713.378**	**1.494.410**	**939.856**	**988.963**	**1.132.645**	**1.263.496**	**1.422.874**	**1.893.966**	**1.931.846**
Depreciation on capitalised periodic maintenance	(192.591)	(194.035)	(167.383)	(156.715)	(186.795)	(183.157)	(108.787)						
Ordinary depreciation and write down	(446.002)	(738.218)	(417.434)	(274.651)	(275.032)	(1.646.389)	(1.567.231)	(674.086)	(290.234)	(269.803)	(241.841)	(193.147)	(197.010)
EBIT	**342.255**	**171.453**	**873.324**	**1.122.920**	**1.251.551**	**(335.136)**	**(736.162)**	**314.876**	**842.412**	**993.693**	**1.181.033**	**1.700.819**	**1.734.836**
Tax on EBIT	(293.389)	3.258	81.303	(117.046)	(271.181)	(5.305)	(10.213)	(4.368)	(11.686)	(13.785)	(16.384)	(23.595)	(24.067)
NOPAT	**48.866**	**174.711**	**954.627**	**1.005.874**	**980.370**	**(340.441)**	**(746.375)**	**310.508**	**830.725**	**979.908**	**1.164.649**	**1.677.225**	**1.710.769**
Income from investment in associated companies	-	-	3.132	6.120	876	(1.021)	(2.481)						
Interest income	26.928	18.483	6.090	7.452	20.860	9.909	7.400						
Other financial income	789.234	448.789	607.030	500.126	660.053	753.078	1.353.186						
Financial income	**816.162**	**467.272**	**616.252**	**513.698**	**681.789**	**761.966**	**1.358.105**						
Termination lease	-	-	(86.758)	-	-	-	-						
Interest charges	(370.654)	(549.593)	(524.362)	(449.970)	(454.241)	(480.426)	(526.627)						
Other finance costs	(654.591)	(488.118)	(512.134)	(645.468)	(1.334.390)	(1.525.590)	(910.516)						
Financial expenses	**(1.025.245)**	**(1.037.711)**	**(1.123.254)**	**(1.095.438)**	**(1.788.631)**	**(2.006.016)**	**(1.437.143)**						
Net financial expences before tax	(209.083)	(570.439)	(507.002)	(581.740)	(1.106.842)	(1.244.050)	(79.038)	(427.474)	(370.297)	(345.872)	(389.501)	(316.982)	(323.322)
Tax savings from debt financing	179.231	(10.839)	(47.200)	60.637	239.826	(19.691)	(1.096)	5.930	5.137	4.798	5.403	4.397	4.485
Net financial expences after tax	**(29.852)**	**(581.278)**	**(554.202)**	**(521.103)**	**(867.016)**	**(1.263.741)**	**(80.134)**	**(421.544)**	**(365.160)**	**(341.074)**	**(384.097)**	**(312.585)**	**(318.837)**
Net financial earnings	**19.014**	**(406.567)**	**400.425**	**484.771**	**113.354**	**(1.604.182)**	**(826.509)**	**(111.036)**	**465.565**	**638.834**	**780.552**	**1.364.639**	**1.391.932**

Figure A.23: Forecasted income statement

Forecast of balance sheet	2010	2011	2012	2013	2014	2015	2016	E2017	E2018	E2019	E2020	E2021	E2022
Operating items													
Other tangible fixed assets	28.420	23.421	18.393	18.824	22.717	28.242	34.921						
Capitalized period maintenance	252.378	241.114	245.830	230.255	290.253	270.661	394.788						
Investment in joint ventures	-	-	189.225	270.564	302.368	344.032	408.809						
Deffered tax asset	17.362	43.061	115.397	58.934	61.966	37.987	41.154						
Vessels and new build contracts	13.490.052	13.874.368	12.400.695	11.887.534	14.460.434	13.466.612	18.046.030						
Loans to associated companies and joint ventures	-	-	41.687	24.517	30.210	14.852	-						
Total non-current operating assets	**13.788.212**	**14.181.964**	**13.011.227**	**12.490.628**	**15.167.948**	**14.162.386**	**18.925.702**	**10.730.914**	**9.240.575**	**8.590.093**	**9.673.651**	**7.725.869**	**7.880.387**
Assets held for sale	12.790	4.644	-	135.754	-	24.112	193.673						
Account receivables	521.736	715.209	518.041	707.846	756.794	635.073	570.676						
Other short-term receivables	215.586	163.442	199.640	267.653	357.660	282.804	370.031						
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450						
Total current operating assets	**1.621.830**	**1.540.564**	**1.524.786**	**2.351.117**	**2.435.190**	**1.967.055**	**2.884.830**	**1.782.112,63**	**2.041.028,57**	**2.276.822,59**	**2.564.021,96**	**3.412.930,37**	**3.481.188,98**
Total operating assets	**15.410.042**	**15.722.528**	**14.536.013**	**14.841.745**	**17.603.138**	**16.129.441**	**21.810.532**	**12.513.026,68**	**11.281.603,85**	**10.866.915,73**	**12.237.673,09**	**11.138.799,69**	**11.361.575,69**
Deffered tax liability	77.543	39.931	3.000	-	-	-	-						
Deffered income	-	-	-	-	9.339	9.136	193.730						
Accounts payable	311.048	258.684	187.303	111.495	371.529	126.178	244.643						
Taxes payable	105.677	75.526	67.702	15.321	40.697	58.273	48.886						
Accrued salaries and related taxes	50.650	58.468	46.388	89.083	51.502	40.821	50.178						
Other current liabilities	250.200	292.001	391.754	323.112	353.750	279.079	325.172						
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450						
Total non-interest-bearing debt (operating liabilities)	**1.666.836**	**1.381.879**	**1.503.252**	**1.778.875**	**2.147.553**	**1.538.553**	**2.613.059**	**1.584.970,98**	**1.815.245,00**	**2.024.954,92**	**2.280.383,59**	**3.035.383,67**	**3.096.091,35**
Invested capital (operating)	**13.743.206**	**14.340.649**	**13.032.761**	**13.062.870**	**15.455.585**	**14.590.888**	**19.197.473**	**10.928.056**	**9.466.359**	**8.841.961**	**9.957.290**	**8.103.416**	**8.265.484**
NWC	**(45.006)**	**158.685**	**21.534**	**572.242**	**287.637**	**428.502**	**271.771**	**197.142**	**225.784**	**251.868**	**283.638**	**377.547**	**385.098**
Total equity	**4.989.443**	**4.415.914**	**4.624.932**	**4.954.275**	**5.057.532**	**3.667.575**	**3.455.727**	**3.377.877**	**2.926.064**	**2.733.061**	**3.077.811**	**2.504.776**	**2.554.871**
Other current finanancial liabilities	5.909	18.053	-	2.653	25.961	33.648	6.615						
Pension obligations	-	-	67.998	72.018	98.781	50.672	63.490						
Other financial liabilities/derivatives	67.194	52.373	51.112	34.428	65.888	94.603	77.260						
Other long-term loans	33.600	36.487	50.954	161.099	331.886	367.703	226.991						
Debt to credit institutions	7.470.527	9.472.153	7.114.130	7.539.122	10.094.844	8.905.838	14.020.292						
Bank overdraft	102.734	102.205	64.938	90.933	121.908	82.656	-						
Current interest bearing liabilities	2.101.877	1.061.092	2.057.178	1.631.593	1.122.371	2.520.002	330.694						
Leasing obligations	-	-	-	-	-	-	3.241.204						
Interest bearing debt	**9.781.841**	**10.742.363**	**9.406.310**	**9.531.846**	**11.861.639**	**12.055.122**	**17.966.546**						
Stock	59.377	59.843	73.470	68.893	61.188	57.026	73.120						
Investments in stocks and shares	4.552	5.074	5.031	2.991	2.991	2.991	3.192						
Other financial assets/derivatives	40.038	31.140	51.651	21.881	4.031	2.250	1.871						
Other long-term receivables	9.589	27.060	2.462	50.183	30.935	1.945	84.094						
Pension funds	9.350	2.682	-	-	-	-	-						
Other current financial assets	11.834	14.569	25.524	-	-	-	-						
Market based shares	321	344	394	475	382	229	10.188						
Investments in associated companies	21.300	19.648	32.847	38.967	43.323	42.302	301.889						
Bank deposits and cash equivalents	871.718	657.269	807.105	1.239.864	1.320.736	1.025.066	1.750.450						
Interest bearing assets	**1.028.079**	**817.629**	**998.484**	**1.423.254**	**1.463.586**	**1.131.809**	**2.224.804**						
Net interest bearing debt	**8.753.762**	**9.924.734**	**8.407.826**	**8.108.592**	**10.398.053**	**10.923.313**	**15.741.742**	**7.550.175**	**6.540.291**	**6.108.896**	**6.879.474**	**5.598.636**	**5.710.609**
Invested capital (financing)	**13.743.205**	**14.340.648**	**13.032.758**	**13.062.867**	**15.455.585**	**14.590.888**	**19.197.469**	**10.928.052**	**9.466.355**	**8.841.957**	**9.957.286**	**8.103.412**	**8.265.480**

Figure A.24: Forecasted balance sheet

Forecast of cash flow statement	2010	2011	2012	2013	2014	2015	2016	E2017	E2018	E2019	E2020	E2021	E2022
NOPAT								**310.508**	**830.725**	**979.908**	**1.164.649**	**1.677.225**	**1.710.769**
Depreciation								674.086	290.234	269.803	241.841	193.147	197.010
Changes in NWC								74.629	(28.642)	(26.084)	(31.771)	(93.908)	(7.551)
Cash flow from operations								**1.059.224**	**1.092.317**	**1.223.627**	**1.374.720**	**1.776.463**	**1.900.228**
Investments, vessels, equipment and vehicles								7.520.702	1.200.105	380.679	(1.325.399)	1.754.635	(351.527)
Free cash flow to the firm, FCFF								**8.579.926**	**2.292.422**	**1.604.306**	**49.320**	**3.531.098**	**1.548.701**
Changes in NIBD								(8.191.567)	(1.009.884)	(431.396)	770.579	(1.280.838)	111.973
Net financial expenses after tax								(421.544)	(365.160)	(341.074)	(384.097)	(312.585)	(318.837)
FCFE								**(33.185)**	**917.378**	**831.837**	**435.802**	**1.937.675**	**1.341.837**
Dividends								33.185	(917.378)	(831.837)	(435.802)	(1.937.675)	(1.341.837)
Cash surplus								-	-	-	-	-	-

Figure A.25: Forcasted free cash flow

	North-West Europe spot rates				
	E2017	E2018	E2019	E2020	E2021
AHTS >= 20 000 bhp					
Estimated Spot Rates	114.424,82	127.463,18	103.889,80	114.620,31	138.222,41
Estimated Utilization	48%	50%	61%	70%	80%
Estimated Revenues	474.559,10	550.660,04	547.559,83	693.247,70	955.426,48
AHTS < 20000 bhp					
Estimated Spot Rates	59812,26183	58337,02315	49054,04552	44937,25255	70602,70801
Estimated Utilization	50%	54%	63%	70%	80%
Estimated Revenues	258.397,94	272.186,67	267.020,25	271.789,94	488.022,86
PSV >= 3500 dwt					
Estimated Spot Rates	33.794,97	37.712,12	35.185,40	33.590,87	33.196,89
Estimated Utilization	42%	45%	60%	68%	80%
Estimated Revenues	122.639,44	146.629,81	182.407,43	197.359,90	229.464,84
PSV < 3500 dwt					
Estimated Spot Rates	22.541,35	22.361,78	22.257,30	22.973,67	22.471,20
Estimated Utilization	45%	45%	60%	68%	80%
Estimated Revenues	87.643,80	86.945,62	115.385,87	134.979,62	155.326,35
CSV					
Estimated Spot Rates					
Estimated Utilization					
Estimated Revenues	110.375,49	131.966,83	164.166,69	177.623,91	206.518,35

Figure A.26: Forecast freight rates and utilization

Solstad Vessels Spot Market	E2017		E2018		E2019		E2020		E2021	
	No. Vessels	Weighted Revenue	No. Vessels	Weighted Revenue	No. Vessels	Weighted Revenue	No. Vessels	Weighted Revenue	No. Vessels	Weighted Revenue
AHTS >= 20 000 bhp	7	3.321.913,72	7	3.854.620,30	7	3.832.918,81	7	4.852.733,88	7	6.687.985,36
AHTS < 15 000 bhp	9	2.325.581,49	9	2.449.679,99	9	2.403.182,27	9	2.446.109,46	9	4.392.205,76
PSV >= 3500 dwt	14	1.716.952,11	14	2.052.817,30	14	2.553.704,08	14	2.763.038,64	14	3.212.507,71
PSV < 3500 dwt	5	438.219,01	5	434.728,10	5	576.929,36	5	674.898,09	5	776.631,73
CSV	26	2.869.762,81	26	3.431.137,49	26	4.268.333,96	26	4.618.221,72	26	5.369.477,17
Exp. spot revenue (000 kroner)		2.689.452,14		3.080.191,76		3.436.037,25		3.869.460,45		5.150.579,55
Freight Income	2.467.574,00	2.689.452,14		3.080.191,76		3.436.037,25		3.869.460,45		5.150.579,55
Revenue Growth		8,99%		14,53%		11,55%		12,61%		33,11%

Figure A.27: Forecasted freight revenue

A.4 Corporate bonds

Bullet bond

Maturity	5,0000	T Price	62,3700	Intercept:	01-01-2017
Coupon rate	0,0518	Duration	0,2127		
Face value	100,0000	Convexity	0,4083		
Price	62,3700				
Yield	0,1803				
Payment	5,1800				

Years		2017				2018								2019										2020								2021			
Time points		42818,0000	42912,0000	43003,0000	43096,0000	43185,0000	43276,0000	43367,0000	43461,0000	43549,0000	43640,0000	43732,0000	43826,0000	43914,0000	44006,0000	44098,0000	44193,0000	44279,0000	44371,0000	44463,0000															
Time horizon	0,0000	0,2306	0,4861	0,7333	0,9889	1,2361	1,4833	1,7306	1,9889	2,2333	2,4806	2,7306	2,9889	3,2306	3,4806	3,7306	3,9917	4,2306	4,4806	4,7306															
Coupon payment	1,0000	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	100,0000														
Realization																																			
Cash flow		1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	1,2950	101,2950															
PV		1,2464	1,1947	1,1468	1,0992	1,0550	1,0127	0,9720	0,9313	0,8943	0,8584	0,8235	0,7890	0,7580	0,7272	0,6977	0,6681	0,6422	0,6161	46,2373															
NPV	62,3700																																		
weights		0,0200	0,0192	0,0184	0,0176	0,0169	0,0162	0,0156	0,0149	0,0143	0,0138	0,0132	0,0127	0,0122	0,0117	0,0112	0,0107	0,0103	0,0099	0,7413															
i*weights		0,0046	0,0093	0,0135	0,0174	0,0209	0,0241	0,0270	0,0297	0,0320	0,0341	0,0361	0,0378	0,0393	0,0406	0,0417	0,0428	0,0436	0,0443	3,5069															
Duration	0,2127																																		
(i+1)*wi		0,0057	0,0138	0,0234	0,0347	0,0468	0,0598	0,0736	0,0888	0,1035	0,1188	0,1345	0,1508	0,1661	0,1818	0,1974	0,2135	0,2278	0,2426	20,0967															
Sum	0,5689																																		
Convexity	0,4083																																		

Figure A.28: Corporate bond, fixed rate

Bullet bond

Maturity	5,0000	T Price	62,3700	Intercept:	01-01-2017
Coupon rate	0,0518	Duration	0,2126		
Face value	100,0000	Convexity	0,4083		
Price	62,3700				
Yield	0,1829				
Payment	5,1800				

Years		2017				2018								2019										2020								2021			
Time points		42818,0000	42912,0000	43003,0000	43096,0000	43185,0000	43276,0000	43367,0000	43461,0000	43549,0000	43640,0000	43732,0000	43826,0000	43914,0000	44006,0000	44098,0000	44193,0000	44279,0000	44371,0000	44463,0000															
Time	0,0000	0,2306	0,4861	0,7333	0,9889	1,2361	1,4833	1,7306	1,9889	2,2333	2,4806	2,7306	2,9889	3,2306	3,4806	3,7306	3,9917	4,2306	4,4806	4,7306															
Coupon payment	1,0000	1,2827	1,2623	1,2628	1,2650	1,2718	1,2827	1,2932	1,3077	1,3268	1,3459	1,3640	1,3805	1,3958	1,4113	1,4274	1,4438	1,4603	1,4759	1,4900															
Realization																				100,0000															
Cash flow		1,2827	1,2623	1,2628	1,2650	1,2718	1,2827	1,2932	1,3077	1,3268	1,3459	1,3640	1,3805	1,3958	1,4113	1,4274	1,4438	1,4603	1,4759	101,4900															
PV		1,2340	1,1633	1,1164	1,0713	1,0333	0,9997	0,9669	0,9362	0,9117	0,8872	0,8621	0,8355	0,8111	0,7865	0,7627	0,7383	0,7174	0,6952	45,8411															
NPV	62,3700																																		
weights		0,0198	0,0187	0,0179	0,0172	0,0166	0,0160	0,0155	0,0150	0,0146	0,0142	0,0138	0,0134	0,0130	0,0126	0,0122	0,0118	0,0115	0,0111	0,7350															
i*weights		0,0046	0,0091	0,0131	0,0170	0,0205	0,0238	0,0268	0,0299	0,0326	0,0353	0,0377	0,0400	0,0420	0,0439	0,0456	0,0473	0,0487	0,0499	3,4769															
Duration	0,2126																																		
(i+1)*wi		0,0056	0,0135	0,0228	0,0338	0,0458	0,0590	0,0733	0,0892	0,1056	0,1228	0,1408	0,1597	0,1777	0,1966	0,2158	0,2359	0,2545	0,2737	19,9245															
Sum	0,5713																																		
Convexity	0,4083																																		

Figure A.29: Corporate bond, floating rate

A.5 Monte Carlo sensitivity analysis

NIBOR sensitivity	
Percentiles	Forecast values
0%	-37,2838
10%	-8,8699
20%	-3,5651
30%	0,6031
40%	4,1996
50%	7,6153
60%	11,1588
70%	15,2262
80%	19,7644
90%	26,6018
100%	65,4721

Freight rate sensitivity	
Percentiles	Forecast values
0%	-30,8867
10%	-0,9724
20%	4,4425
30%	8,5093
40%	12,0477
50%	15,5105
60%	19,0253
70%	22,9584
80%	27,6510
90%	34,1791
100%	67,6302

Figure A.30: Percentiles from Monte Carlo sensitivity analysis

A.6 VBA-code for Merton

```
Function BSCall(S, X, h, r, v)

d1 = (Log(S / X) + (r + 0.5 * v ^ 2) * h) / (v * Sqr(h))

BSCall = d1

End Function

Sub iterate()

Do While Range("I6") > 1 Or Range("I6") < 1

'Copy asset values from iteration k+1 to iteration k

Range("F4:F266") = (Range("G4:G266"))

Loop

End Sub
```

Figure A.31: VBA code used to estimate Merton asset volatility and asset value

A.7 R-code for rolling beta

```
rm(list=ls())
require(readxl)

setwd("~/CBS/Master/Excel Files")
AdjustedClosingPrices <- read_excel("ClosingPrices.xlsx",col_names=TRUE)

SOFF = AdjustedClosingPrices[,1]
OSBEX = AdjustedClosingPrices[,2]
Rf = AdjustedClosingPrices[,3]

nrObs = length(SOFF)

# Calculating returns

ReturnsSOFF = (SOFF[2:nrObs]/SOFF[1:(nrObs)-1]-1)
ReturnsOSBEX = (OSBEX[2:nrObs]/OSBEX[1:(nrObs)-1]-1)

# Excess returns on the market portfolio
ExcessOSBEX = (OSBEX[2:nrObs]/OSBEX[1:(nrObs)-1]-1)-Rf[1:(nrObs)-1]


#constructing excess returns on Solstad

ExcessSOFF = (SOFF[2:nrObs]/SOFF[1:(nrObs)-1]-1)-Rf[1:(nrObs)-1]


# Creating the time varying betas

K = 203-24
portfoliobeta = matrix(0,1)
Y = matrix(0,24,1)  # for the first 24 months for 1 portfolio

betamatrix = matrix(0,K)

for (k in 1:K)
{
  X = matrix(1,24,2)
  X[,1] = 1
  X[,2] = ExcessOSBEX[k:(k+23)]
  Y = matrix(1,24,1)
  Y[,1] = ExcessSOFF[k:(k+23)]

  theta = solve(t(X)%*%X)%*%t(X)%*%Y
  portfoliobeta[,1] = theta[2,1]
  betamatrix[k,] = portfoliobeta[,1]
}

myval = data.frame(betamatrix)
write.xlsx(myval,file = 'Beta.xlsx')
```

Figure A.32: Fama-MacBeth rolling beta

A.8 R-code for estimating freight rates

```
rm(list=ls())
library(xlsx)
require(readxl)

setwd("~/CBS/Master/Excel Files/OU")
Rates <<- read_excel("PSVSmallerThan3500.xlsx",col_names=TRUE)

# Input prices
prices = Rates[,2]
real =Rates[,3]
nrObs = length(prices)

# Calculating the returns
R= (prices[2:nrObs]/prices[1:(nrObs)-1]-1)
returnreal = (real[2:nrObs]/real[1:(nrObs)-1]-1)

# Calculating inputs to the OU model
Z = 1/(prices[-nrObs])

# Calculating the linear regression to estimate the parameters
summary(lm(R~Z))
eta = abs( -0.07340)
mu = 1662.75535/eta
sigma = 0.3718
T = 1000

# Simulation of the prosess
p0 = mu
p = rep(p0,T)
N = 60
Freightmatrix = matrix(nrow=1,ncol=N)

for (o in 1:N){
  for (i in 2:T){
    p[i] = p[i-1]+eta*(mu-p[i-1])+sigma*rnorm(1)*p[i-1]
    Averagerate=mean(p)
}
  Freightmatrix[,o]= Averagerate
}

Freightmatrix = t(Freightmatrix)
mean(Freightmatrix)
max(Freightmatrix)
min(Freightmatrix)

# Plotting the smulations
plot(Freightmatrix,type ="l",xlab = "time",ylab = "price")

# Writing the future freight rates to Excel
myval = data.frame(Freightmatrix)
write.xlsx(myval,file = 'FinalRatesSmallPSV.xlsx')
```

Figure A.33: R-code used to estimate freight rates. The code yields different parameters for the different vessel sizes, hence the similar approach is used with different data sets for the respective vessels