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Valuation of Ocean Yield ASA

A fundamental analysis and valuation of Ocean Yield ASA

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Abstract

This thesis aims to value the equity of Ocean Yield ASA. With a bottom-up approach, each vessel in the fleet is valued based on the contracted backlog of charter hire and the expected sales price from purchase obligations and exercised purchase options, or the expected residual value at redelivery of the vessel. The cost of capital is determined by computing a beta coefficient for each vessel type using the MSCI World Index as benchmark index. The current fleet is valued at NOK34.4 per share.

A growth component is added to reflect the opportunities emerging from unsustainably low vessel orderbooks. Segments highlighted as particularly interesting for fleet growth are containerships and dry bulkers. The current strong freight rates in both segments should increase newbuild orders going forward. Containerships is the preferred segment due to the solid counterparties. The value of growth and value accretive reinvestments to maintain the fleet size is estimated to NOK5.7 per share.

The thesis concludes with a fair equity value of NOK40.1 per share. Vessels that are unemployed, namely the FPSO *Dhirubhai-1* and the two AHTS vessels *Far Senator* and *Far Statesman*, are valued at the expected scrap price and at the level of the outstanding debt facility, respectively. The upside to valuation of these three assets in the event of firm long-term employment, and a fleet growth beyond the assumed fleet run-rate of 80 vessels, implies upside to the NOK40.1 fair value estimate.

Preface

This thesis concludes my MSc in Business and Administration at the Norwegian School of Economics (NHH), with major in Financial Economics and minor in International Business. The thesis has combined core knowledge and theory obtained from courses such as Valuation, Corporate Finance, Investments and Shipping Economics and Analytics.

After finishing three semesters at NHH, my attendance in the course Shipping Economics and Analytics gave me the opportunity for full-time employment as an Equity Research Analyst. Covering the shipping sector, Ocean Yield soon became a personal favourite among the companies I followed due to its financial complexity and ability to generate risk-adjusted excess returns. It also became evident that a bottom-up valuation at a vessel specific level is an unusual approach to Ocean Yield and this thesis became an opportunity to look at the company from a more fundamental angle.

During my work on the thesis, I have spent many hours contemplating the different risks Ocean Yield is exposed to and how to quantify these within a theoretical framework. I have also sought to build my analysis on topics I know to be of interest to investors in Ocean Yield. The end result is a thorough assessment of existing assets, growth opportunities, risks and cost of capital. This is, in my view, the core of financial valuation and constitutes a thesis I am proud of.

Lastly, I would like to thank my supervisor André Wattø Sjuve for his flexibility and good feedback.

Oslo, June 2021

Andreas Nibe Nygård

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1. Introduction

Many investors view Ocean Yield ASA (hereby called “Ocean Yield”) as a dividend yield company where earnings and dividends are expected to be recurring. This thesis aims to take a different approach and quantify the risks associated with each of the owned assets and discount the contracted cash flows with individual discount rates. An analysis of different market outlooks will seek to identify growth opportunities, as well as uncovering segments with elevated risks. The goal of this thesis will be an estimate of the fair equity value of Ocean Yield.

The thesis is structured with an aim to create an understanding of the development in the asset portfolio (hereby called “the fleet”), how some of the projects have experienced unfavourable outcomes and the actions taken to prevent shareholder dilution. This is important to understand the position Ocean Yield is in at the time of this valuation.

The business model is then presented with the aim to show how Ocean Yield differs from a typical shipping company. This is followed by an overview of the vessels owned by the company, and a market analysis based mainly on previous works of the author of this thesis. The market analysis focuses on the development in the world fleet and freight rates. It is not an analysis of Ocean Yield’s competitive landscape.

Thereafter follows a chapter explaining the relevant theory for the valuation of Ocean Yield and the choice of non-company specific input factors. Valuation of Ocean Yield is divided into the existing fleet and growth opportunities. As some of the key company specific inputs are undisclosed, a thorough example of a project valuation is provided while the complete fleet valuation is conducted on an aggregate level. Valuation of growth opportunities is based on a discretionary assessment of the company’s current position and the opportunities uncovered in the market analysis.

The main focus of this thesis is on valuation. It builds on well-established theoretical frameworks and the authors in-depth knowledge of the company. *Investments* by Bodie, Kane & Marcus (2014), *Investment Valuation* by Damodaran (2012) and *Valuation* by McKinsey (2020) have been the most important theoretical references. Senior Vice President Finance & Investor relations at Ocean Yield, Marius Magelie, has been an important source of insight to the operations of the company.

2. The company

2.1 Company history

2.1.1 Establishment and purpose

Ocean Yield was established in March 2012, for the purpose of owning vessels to be chartered out on long-term contracts. It was listed at the Oslo Stock Exchange in July 2013 under the ticker "OCY".

The assets owned by Ocean Yield were primarily oil-service vessels, namely "Aker Wayfarer" – an Offshore construction vessel, "Dhirubhai-1" – a Floating Production, Storage and Offloading (FPSO) vessel and the "Geco Triton" – a Seismic Survey Vessel. The new company also held NOK1bn of bonds in the American Shipping Company. At the establishment of Ocean Yield, these assets were transferred from Aker ASA and Aker ASA held 100% of the equity capital in the new company (Ocean Yield AS, 2012).

The purpose of Ocean Yield was to build a financial vehicle able to invest in vessels with secured long-term employment, generating a Return On Invested Capital (ROIC) greater than the company's Weighted Average Cost of Capital (WACC). The ability to do so stemmed from the strong track record within oil service built in Aker ASA and the strong relationships Aker ASA had with its banks. By creating a single-purpose company and listing it, equity capital for new investments would be easier and Cost of Equity (CoE) lower due to increased visibility. Ocean Yield aims to return capital to shareholders through dividends, with at payout run-rate of 85% of earnings per share (EPS). Thus, the share price performance of the company has been closely related to dividend expectations.

From the establishment in March 2012 to the Initial Public Offering (IPO) in July 2013, Ocean Yield issued a NOK600m senior unsecured bond, invested in two newbuild Pure Car Truck Carriers (PCTC) with delivery in 2014, acquired the offshore construction and cable lay vessel "Lewek Connector" and invested in two newbuild Anchor Handling Tug Vessels (AHTS) with delivery in June 2013. At the IPO in June 2013, USD145m of net equity proceeds were raised (Ocean Yield ASA, 2021).

2.1.2 Timeline

After the IPO in July 2013, Ocean Yield has continued to invest in vessels with already secured long-term employment. From the eight vessels owned or committed to buy at the time of the IPO, the fleet has grown to 69 vessels by the end of 2020. The main events are listed below[1].

In 2013, after the IPO in July, Ocean Yield invested in two newbuild PCTC vessels with delivery in 2016 and a 12-year charter to Höegh Autoliners. The first quarterly dividend was later announced for Q3 2012 at USD0.12. The total dividend for 2012 was USD0.2425 per share.

In 2014, NOK1bn of bonds were issued while the NOK600m bond issued in 2012 was bought back. Two four-year old PCTC's were acquired and chartered out to Höegh Autoliners and investments in three newbuild gas carriers were made. The diving support and offshore construction vessel "SBM Installer" was also acquired and employed on a long-term charter to SBM Offshore. The total dividend for 2014 was USD0.5350 per share.

In 2015, twelve new vessels were acquired. Eight of these were chemical tankers with 15-year charters to Navig8 Chemical Tankers while four were LR2 product tankers with 13-year charters to Navig8 Product tankers. Ocean Yield also issued a NOK1bn bond with maturity in 2020. The total dividend for 2015 was USD0.6200 per share.

In 2016, a 49.5% equity stake in six container newbuilds was acquired. The vessels were employed on a 15-year charter to an undisclosed counterparty. Two chemical tankers with 12-year charters to Navig8 Group were acquired and one of the gas carrier newbuilds announced in 2014 was cancelled. NOK862m of equity was raised and a NOK750m bond issued. The total dividend for 2016 was USD0.7000 per share.

In 2017, six new vessels were acquired. Two of these were Platform Supply Vessels (PVS) on bareboat charter[2] to Aker BP until 2029. The remaining four vessels were Suezmax tankers, out of which three were employed on 10-year bareboat charters to Nordic American

[1] The company timeline is mainly retrieved from the web page of Ocean Yield ASA (2021).

[2] See 3.1.4 for definition

Tankers, and the last one on a 14-year bareboat charter to Okeanis Eco Tankers. The total dividend for 2017 was USD0.7505 per share.

In 2018, a total of 17 new vessels were acquired. Four of these were Very Large Crude Carriers (VLCC) with 15-year bareboat charter to Okeanis Eco Tankers. Seven were dry bulk Handysize vessels, out of which five were employed on 10-year bareboat charters to Interlink Maritime and two were employed on 12-year bareboat charters to Louis Dreyfus Armateurs Group. Four 3,800 twenty-foot equivalent (TEU) container vessels were acquired and employed on 12-years bareboat charter to CMB. Two chemical tankers were employed on 12-year bareboat charter to Ardmore Shipping Corporation.

A NOK750m bond with maturity in 2023 was issued and NOK759m of new common equity was raised in a private placement. The total dividend for 2018 was USD0.7635 per share.

In 2019, 12 new vessels were acquired. One Suezmax with a 13-year bareboat charter to Okeanis Eco Tankers. Two Ultramax dry bulk vessels with exhaust gas cleaning systems ("Scrubbers") installed, with 11-years bareboat charters to Scorpio Bulkers (known as "Eneti" today). Three Newcastlemaxes, one with a 15-year bareboat charter to CBM and two with 13-years bareboat charters to 2020 Bulkers. One Handysize dry bulk vessel with a 10-year bareboat charter to Interlink Maritime. One Ethylene gas carrier was acquired with a 13-year bareboat charter to Navigator Gas. Four scrubber-fitted long-range II ("LR2") product tankers, with bareboat charters to Navig8 Group with an undisclosed duration concluded the year.

A NOK750m bond with maturity in 2024 was issued and NOK717m of new common equity was raised. A perpetual hybrid bond of USD125m with a coupon of LIBOR + 6.50% was also issued. The total dividend for 2019 was USD0.7640 per share.

In 2020, three dry bulk vessels were acquired with a 9-12-years bareboat charters to Scorpio Bulkers. These were later sold in Q4 2020 and Q1 2021 as Scorpio Bulkers decided to exit the dry bulk space. The 2019 acquired Ultramaxes on bareboat charter to Scorpio Bulkers were also sold. Navig8 Chemical Tankers declared two purchase options on the vessels *Navigate Aquamarine* and *Navig8 Amessi*. The 75% equity stake in *SBM Installer* was sold to SBM Holding Inc. In June, the car carrier *Hoegh Xiamen* caught fire and was later declared a total loss; Ocean Yield received USD26m in insurance proceeds. Two Suezmax newbuilds with 10-year bareboat charters to Nordic America Tankers with delivery in 2022 were acquired in Q4 2020. In December, the dry bulk vessel *La Loiras* was sold as the bareboat charterer Louis Dreyfus Armateurs declared an option to sell the vessel to a third party. In January 2021, Navig8 Chemical tankers declared an option to buy the chemical tanker *Navig8 Topaz.*

The quarterly dividend was cut from USD0.1910 in Q4 2019 to USD0.0500 in Q1 2020. The quarterly dividend increased to USD0.0530 in Q4 2020 and the total dividend for 2020 was USD0.2045.

2.2 Assets and events of particular importance

2.2.1 The FPSO *Dhirubhai-1*

In the timeline above, the most notable events are left out as they need a more thorough explanation. Since the autumn of 2018, the lack of employment for two key assets, the FPSO *Dhirubhai-1* and the cable-lay vessel *Connector*, has been the main concern for Ocean Yield and its stakeholders. Understanding these events and their impact on the value of the Ocean Yield equity is essential for the main objective of this thesis.

The floating production, storage and offloading (FPSO) unit *Dhirubhai-1* was built in 1979 and was one of the three vessels originally separated from Aker ASA to establish Ocean Yield in 2012. The vessel was on a 10-year bareboat charter to Reliance Industries Ltd. until September 2018 when it was redelivered to Ocean Yield. Reliance Industries had a purchase option at the end of the charter but chose not to exercise it. In the first half of 2018, the FPSO generated USD116m of earnings before interest, tax, depreciation and amortisation (EBITDA) (34% of total EBITDA adjusted for lease repayments[3]). The asset continued to perform in accordance with its contract until it ceased production and generated no significant revenue from October 2018.

In 2017, Ocean Yield paid out USD110m in dividends. Assuming USD25m of quarterly amortization of outstanding debt, and that USD15.5m was on the *Dhirubhai-1* facility, the

[3]For operating leases, the all-in hire is recognized as income and the asset depreciates over the profit and loss (P&L) statement. The equivalent of depreciation on financial lease receivables is not recognized over the P&L statement, but as a repayment of lease in the cash flow statement, while the interest expense on the lease is recognized as income. EBITDA adjusted for lease repayments includes the lease repayment on financial leases. This is a measure of cash flow from operating assets.

FPSO contributed 40% of the free-cash flow after debt service[4]. With the FPSO unemployed, the dividend level was unsustainable, despite repaying all outstanding debt on the asset in the first half of 2018. However, the dividend level was kept at USD121m annually (11m of common shares were issued in Q1 2018) throughout 2020, as the company had high hopes for redeployment of the asset.

In February 2019, Ocean Yield and Aker Energy came to an option agreement for the FPSO Dhirubhai-1 in which Aker Energy had the option for a 15-year bareboat charter of the FPSO in the event of a final investment decision to undertake a project offshore Ghana. Aker Energy paid USD3m for the option, and it included the option to extend the maturity at 1st of May 2019 (Ocean Yield ASA, 2018). The maturity was extended to 30th of May, then 1st of September and at last 31st of December 2019. As of 1st of January 2020, Dhirubhai-1 was classified as an asset held for sale with a book value of USD146m after USD68m of impairments in 2019.

The acquisition of 12 vessels in 2019 alone, with c. 80% debt financing per vessel, put pressure on the 25% equity ratio covenant[5]. Per 31st December 2018 this ratio was 31%, but the USD532m increase in lease receivables (net of repayments) and USD423m increase in interest-bearing debt implied an average equity ratio in the new vessels acquired of 20.5%. This alone pushed the equity ratio on 30th September 2019 (end Q3) to 26.9%, while the USD68m impairment of the FPSO left the equity ratio at 25.1%. This would leave Ocean Yield unable to fulfil its commitments to acquire seven vessels in Q4 2019 without breaching the 25% equity covenant. Thus, USD125m of hybrid capital was raised through a perpetual bond with a coupon of LIBOR + 6.50%. Hybrid capital is recognized as equity in the balance sheet, and the equity ratio including the perpetual bond was 28.3%[6].

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[4] Free-cash flow after debt service is a metric for a sustainable and distributable cash flow to shareholders. The conventional free-cash flow metric includes capital expenditures but excludes debt repayments. The business model for Ocean Yield, where acquired assets have limited lifetime and are pledged for mortgages with a fixed repayment schedule (to account for the depreciation of the security in the pledged asset), leaves little room to discretionary debt repayments.

We exclude capital expenditures from this metric as it will typically be funded by new mortgages and retained earnings or proceeds from an equity issue, and not affect the available cash for distribution to shareholders.

[5]

$$Equity\ ratio = \frac{Shareholder's\ equity + hybrid\ capital}{Total\ assets}$$

[6] See Appendix for balance sheet implications.

Dhirubhai-1 remained classified as an asset held for sale throughout 2020, but an impairment of USD95m was recognized in Q3 2020 (Ocean Yield ASA, 2020).

2.2.2 Connector

The cable-lay vessel *Connector* was built in 2012 and was originally on a 10-year bareboat charter to Ezra Group. In February 2017, Ocean Yield terminated the contract as Ezra Group filed for Chapter 11 protection. Since then, the vessel has operated on short-term time charters while Ocean Yield has tried to secure long-term employment.

Unable to secure any long-term employment for the vessel, the risk of an impairment grew. While this would be a non-cash event, the potential covenant breach following an impairment became one of the main concerns for the company. The extreme oil price decline in the spring of 2020 implied lower investments from the big oil companies, further reducing the probability for a long-term contract for Connector, as well as the FPSO *Dhirubhai-1*. The share price dropped from NOK48 in late December 2019 to NOK22 in July 2020 in-line with reduced expectations for these assets, as well as the overhanging risk of covenant breach.

After the acquisition of the three vessels for Scorpio Bulkers in the beginning of 2020, Ocean Yield entered into an agreement with Aker Capital, its majority shareholder, to sell a 50% equity stake in seven vessels, of which three were the Suezmaxes acquired in 2017 and bareboat chartered to Nordic American Tankers, and the remaining four were LR2 tankers on bareboat charter to the Navig8 Group. From an accounting perspective, this transaction removes 100% of the seven vessels and the attached mortgages from the balance sheet, while 50% of the remaining equity stake is accounted as “Investments in associates” and the proceeds from the sale of the 50% stake increases the cash position. From an operational point of view, Ocean Yield still guarantees for the secured mortgages on the vessels in the joint venture (JV) (Ocean Yield ASA, 2020).

Due to this transaction, end Q2 2020 equity ratio was 29.6%, up from 26.5% in Q1 and would have been 27.3% without the JV. In Q3, a USD35m impairment was recognized on the vessel *Connector* and a USD95m impairment was recognized on the FPSO. This reduced the equity ratio in Q3 to 27.5%; without the JV it would have been 25.3%. In Q4, Connector was sold to the marine service company Jan De Nul for USD74m. The USD71m loss on sale[7] left the equity ratio at 27.9%[8]. The quarterly increase in equity ratio was due to prepayments of debt and the sale of the handysize dry bulk vessel *La Loiras.*

2.3 Ownership and financial structure

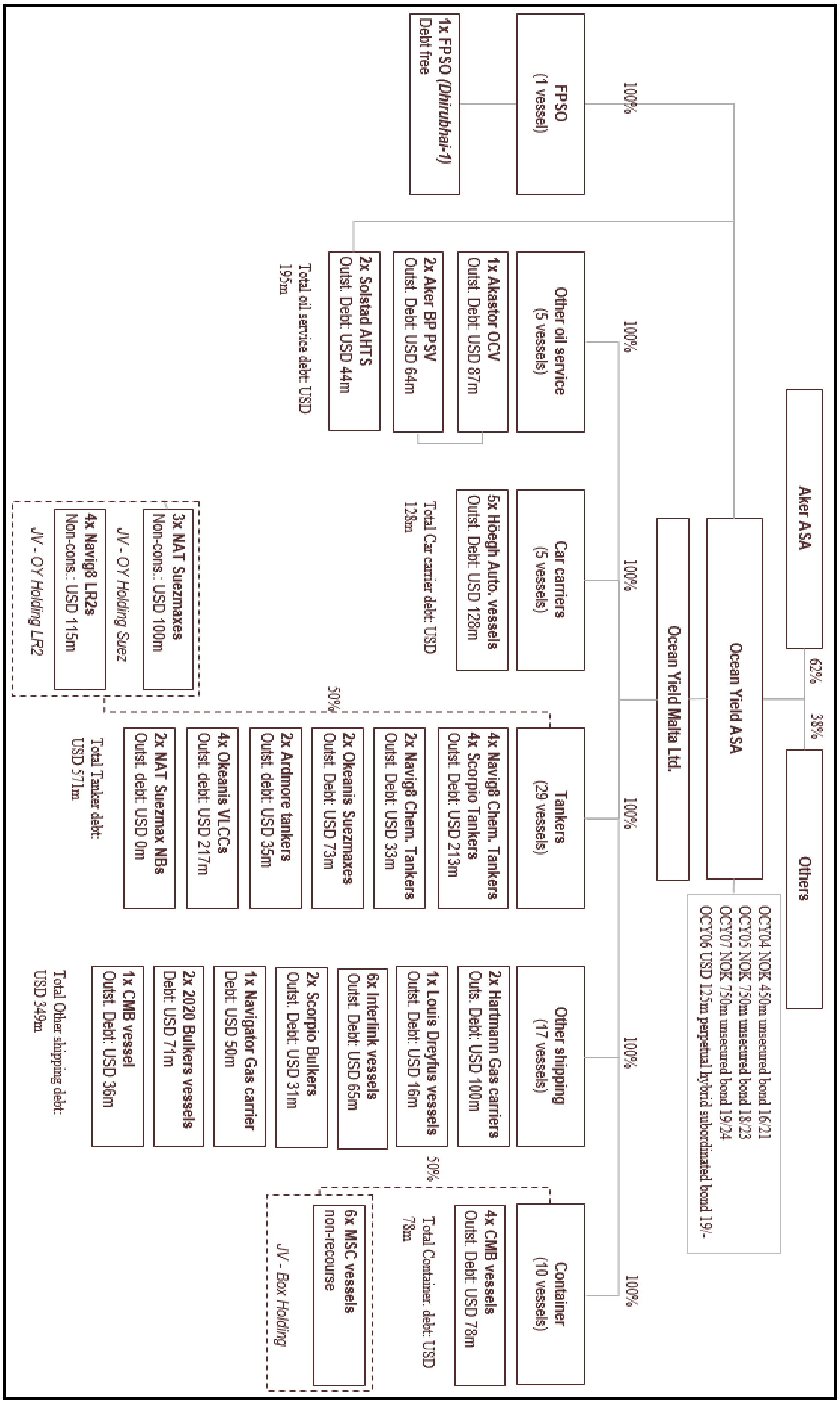
Simply put, Ocean Yield ASA owns 100% of Ocean Yield Malta ltd. who, with some exceptions, owns the vessels in the fleet. The vessels owned directly by Ocean Yield ASA are the FPSO *Dhirubhai-1* and the two AHTS vessels *Far Senator* and *Far Statesman.* With the exception of six containerships owned 49.5% and seven tankers owned 50% in JV's, all vessels and mortgages are consolidated in the Ocean Yield ASA financial statements. Ocean Yield ASA is listed on the Oslo Stock Exchange and Aker ASA (controlled by the Norwegian Kjell-Inge Røkke), also listed on Oslo Stock Exchange, owns 62% of the outstanding shares.

The vessels are divided by operating segment: Tankers, Containers, Other Shipping and Other oil service. The FPSO is left in its own segment. Each vessel, with the exception of the FPSO, are pledged as security for mortgages. On top of this, Ocean Yield has issued four bonds, of which one is perpetual and recognized as hybrid capital. 14% of outstanding debt are bonds trading at a yield-to-maturity of 4-5%, while the remaining 86% are mortgages. By pledging its vessels as security to creditors, Ocean Yield obtains interest rates on their mortgage debt of LIBOR + 1.50-2.50%. A clear distinction between secured and unsecured debt is important in Ocean Yield, as the business model depends on the company's ability to obtain cheaper debt financing from banks than traditional ship-owners.

[7] The difference between book value prior to the sale and the sales price is recognized as a loss on sale.

[8] See appendix for balance sheet implications.

Figure 1: Ownership and debt facilities



Source: (Swedbank Research, 2021)

3. Business model

3.1 Shipping – charterparties

3.1.1 Core business

Ocean Yield describes itself as a shipping bank. Its core business is to acquire vessels on behalf of its clients and charter the vessel to the client on a long-term contract. When acquiring a vessel, Ocean Yield pledges the vessel as security for a debt facility at a bank. With a diversified portfolio of vessels in various segments with various counterparts, Ocean Yield is the preferred counterparty for banks in comparison to the ship-owners that operate the vessels. This makes Ocean Yield able to generate returns on the spread between its own financing from banks, and the implied interest rate it receives from the long-term charterparty with its clients. Like ordinary banks, return on equity is a function of interest rate spread (interest receive from clients and interest paid to banks) and the leverage.

The shipping industry is complex. It stretches from container and vehicle shipping, to shipping of commodities such as crude oil and bulk commodities like grain. Orange juice is also carried in special tanks aboard chemical tankers. Ocean Yield finances vessels of all sorts, but they are not involved in the daily operations of them. Nevertheless, one needs to know how the freight market works in order to understand the role Ocean Yield plays in it. A 180,000 dwt Capesize dry bulk vessel is used as an example.

3.1.2 Voyage charter

When someone has a large cargo they need transported over a long distance, seaborne transport is often the only viable solution. If you are a Chinese steel forgery you need iron ore. Brazil is the second largest iron exporter (after Australia). You might therefore buy 180,000 tonnes of iron from a Brazilian mining company. To transport the iron ore from Brazil to China, you need a dry bulk vessel, and Capesizes (180,000+ dwt) are the only ones capable of this cargo size. Looking at the Capesize vessels in the vicinity of the load port available to load in the period you have agreed with the mining company, you bid on the hire of the suitable vessels. Say you agree to pay USD20 per tonne of iron ore transported from Brazil to China, the total expense for transportation is USD3.60m. The ship-owner covers its expenses from the voyage with this lump sum (Stopford, 2009).

The Chinese steel mill has chartered in a Capesize for this single voyage, and after discharging the 180,000 tonnes of iron ore in China, the vessel is free to sail of to take on new cargoes.

3.1.3 Time charter

The Chinese steel mill needs a continuous supply of iron ore, and dependent on the availability of vessels offshore Brazil, the cost for transport of the iron ore is volatile. It would suit the steel mill to have one vessel in shuttle with iron ore from Brazil to China, but without operating the ship itself. In the time charter market, ship-owners and charterers agree upon fixed prices for longer-term charters where charterers rent the ship and its crew for periods of typically one to three years. Chartering in a vessel on a time charter contract, the charterer pays a rate that (in normal circumstances) covers operating and administrative expenses for the vessel, as well as interest expenses and the cash amortization of the mortgage on the vessel (fixed expenses). On top of this, the charterer will cover bunker expenses, port costs, canal fees and other variable expenses related to the operations of the vessel.

To adjust for the variance in bunker cost and length of contracts, and make different charterparties comparable, the industry convention is to use time charter equivalent rates (TCE), i.e. revenues after variable voyage cost, on a daily basis[9]. The USD20/tonne lump sum of USD3.60m equates to a daily TCE rate of USD28,500/day, assuming 80 days Brazil-China-Brazil (incl. days in port) with a daily consumption of 40 tonnes of bunkers at USD350/tonne and USD200,000 of port and other cost.

For a Capesize vessel, the typical cash breakeven is USD13-14,000/day[10] and ship-owners will generate positive cash flows to equity at levels above this and thus be willing to charter out their vessel (dependent on market conditions). If the Chinese steel mill got an offer to charter in a Capesize vessel on a one-year time charter at a TCE rate of USD20,000/day, this

[9] The convention in shipping is US dollars/day, as contract lengths vary substantially. A simplified formula for this is $\frac{\text{lump sum}\left(\frac{\$}{\text{tonne}}\right) - \text{variable voyage expenses}}{\text{voyage duration (incl.ballast days to load port)}}$ (Stopford, 2009).

[10] Cash breakeven is the daily TCE rate that covers all cash expenses for the ship-owners. Assuming USD5,500/day in operating expenses, USD1,000/day in administrative expenses and 70% leverage on a USD50m Capesize with 25 years to maturity and 5% interest the daily debt service is USD6,720/day. Total USD13,220/day.

could be profitable compared to hiring vessels in the spot market (voyage charters). The variable voyage cost would come on top of this USD20,000/day rate, but these costs would also be reflected in the lump sums paid in the spot market.

3.1.4 Bareboat charter

The relevant charter for Ocean Yield is the bareboat charter. As the name implies, one charters the vessel and nothing more, typically for 10 years or more (Stopford, 2009). Bareboat is the industry term for a lease. This is merely a way of financing a vessel rather than a reflection of expectations of higher or lower freight rates[11]. The convention in bareboat chartering is also US dollars per day, but it is, simply put, the daily cash payment for a loan with a given repayment profile, tenor and interest rate. For instance, if one is to bareboat charter-in a Capesize with a market value of USD50m for the remaining lifetime (25 years) and assume that the owner will scrap it for USD7.5m in 25 years, you efficiently have a mortgage of USD42.5m with a 25-year repayment profile. If the interest rate is fixed 5%, the daily bareboat hire rate is USD8,262/day[12].

3.2 Leases

3.2.1 Operating lease

Ocean Yield provides financing of vessels for ship-owners through leases. It is the charter-out part in bareboat contract (lessor). When Ocean Yield acquires a vessel, the bareboat charter-out contract is already agreed and the vessel is handed directly from the shipyard (if it is a newbuild) or the seller of the vessel, to the charter-in part of the contract (lessee). Ocean Yield does not operate vessels themselves. Two distinctions are made when it comes to leases; operating and financial – residual risk or counterparty risk.

An operating lease leaves most of the risk with the lessor (Stopford, 2009). The typical operating lease is a time charter, as discussed earlier, where administration and operations of the vessels is done by the ship-owners for an additional payment. A standard bareboat

[11] If you believe the spot market will improve, you charter-in a vessel on a time charter contract and trade it in the spot market, if you believe the spot market will soften, you charter-out a vessel on a time charter contract.

[12] PMT-formula divided by 365 days.

charter is also an operating lease, where the lessee pays a hire to cover the expected depreciation of the vessel over the period, and an interest on the outstanding principal vessel value. A ship-owner will – theoretically and with the assumption that the ship owner's expectations to freight market development does not deviate from market consensus – commence in a bareboat charter (or time charter) when the present value of the expected residual value of the vessel and the hire payments, discounted by the ship-owner's WACC, exceeds the market value of the vessel.

At the end of the lease agreement, the vessel is redelivered to the lessor who bears the residual risk of the vessel. If the market value of the vessel has depreciated more than expected over the period of the lease, the IRR on the lease decreases. In an operating lease, the owner transfers the right to use his property to the lessee. The lessee bears no risk of the ownership of the asset and is not concerned with the value of the asset after the lease period (Damodaran, 2012). Of course, when entering into an operating lease of an asset, the riskiness of the residual value should affect the implied interest rate of the lease.

3.2.2 Financial lease

A financial lease transfers the residual risk of the asset from the lessor to the lessee. In this way, the lease agreement becomes an alternative to an ordinary bank loan. The risk to the lessor becomes the lessee's ability to honour its obligations of lease payments, rather than the market value of the underlying asset. One out of four criteria need to be met to qualify as a financial lease: 1) the lease life exceeds 75% of the lifetime of the asset; 2) there is a transfer of ownership from the lessor to the lessee at the end of the lease term; 3) the lessee has the option to purchase the asset at a bargain price at the end of the lease term, i.e. well below expected market value; and 4) the present value of the lease payments, discounted at an appropriate discount rate, exceeds 90% of the market value of the asset (Damodaran, 2012).

Ocean Yield has the majority of its fleet categorized as financial leases. Criteria 1) and 4) are not met in any of the leases Ocean Yield is engaged in; the typical bareboat charter has a term of 10-15 years while a vessel typically has a lifetime of 25-30 years and thus the present value of the lease repayments does not come close to 90% of the market value of the asset. The leases do however include purchase options with deep in-the-money strike prices, or obligations to purchase the asset at the end of the lease term. This effectively transfers the residual value risk from Ocean Yield to its clients as they are either obliged to buy the asset at a pre-determined price or has the option to buy the asset at a price substantially below the expected market value of the asset at the end of the lease term.

When excluding the FPSO *Dhirubhai-1* and the two AHTS-vessels *Far Senator* and *Far Statesman*, 15 vessels are categorized as operating leases and 42 vessels are categorized as financial leases. The average unlevered IRR for financial leases is 6.5% while it is 9.2% for operating leases. The difference of 2.8% is statistically significant. The IRR calculation for the financial leases assumes that the lessee honours its obligation to buy the vessel at the pre-determined price or exercises the purchase option at the end of the lease term.

The question then becomes what type of lease is preferred. Either an operating lease with residual risk, or a financial lease with counterparty risk. Firstly, both types of leases involve counterparty risk; the lessee could default regardless of the type of lease it is engaged in. So, regarding the residual risk: what IRR-spread is sufficient compensation for the residual risk the lessor takes on in an operating lease compared to a financial lease[13]? It is not within the scope of this thesis to investigate this matter further, but the sensitivity table below shows the realised project IRR with different premiums and realised residual values[14]. Historically, the annual depreciation of a Capesize from newbuild to 10-year old has outperformed a 25-year straight-line depreciation by 25% (Clarkson Research, 2021). This would make the realised IRR 5.03% instead of the expected 6.50%.

Table 1: Operating lease IRR dependent on recovery rate (RR) compared to straight-line depreciation expected residual value

		Project premium/discount (bps) to average 6.50% IRR								
		-200	**-150**	**-100**	**-50**	**0**	**50**	**100**	**150**	**200**
Realised residual vs. expectation	**150%**	7.16%	7.60%	8.04%	8.48%	8.92%	9.37%	9.81%	10.26%	10.70%
	100%	4.50%	5.00%	5.50%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%
	75%	2.85%	3.40%	3.94%	4.48%	5.03%	5.57%	6.11%	6.65%	7.18%
	50%	0.86%	1.48%	2.08%	2.69%	3.29%	3.89%	4.48%	5.07%	5.66%
	25%	-1.66%	-0.94%	-0.24%	0.46%	1.15%	1.84%	2.51%	3.18%	3.84%

Source: Own calculations

[13] Assuming that the cost of capital does not differ from operating to financial leases.

[14] Assuming a 10-year lease agreement with an expected residual value following a straight-line depreciation over 25 years to a scrap value of 12% of cost and that all lease payments are honoured throughout the lease term.

4. Fleet

Here follows an overview of the Ocean Yield fleet. A breakdown of the daily charter hire rates will not be disclosed in this thesis, but they are applied in the cash flow estimates. The table includes the name of each vessel, type of vessel, counterparty, type of lease, reporting segment, ownership, age of the vessel and the lease term end date.

Two newbuilds with delivery in 2022 are included while vessels announced sold are excluded.

Table 2: Fleet overview

Name	Vessel type	Counterparty	Lease	Reporting segment	Ownership	Age	Contract end
Dhirubhai-1	FPSO		Operating	FPSO	100%	13.0	
FAR Statesman	AHTS		Operating	Other oil services	100%	7.6	
FAR Senator	AHTS		Operating	Other oil services	100%	7.8	
Aker Wayfarer	OCV	Akastor	Financial	Other oil services	100%	10.3	Sep-27
NS Frayja	PSV	Aker BP	Operating	Other oil services	100%	6.3	Aug-29
NS Orla	PSV	Aker BP	Operating	Other oil services	100%	6.5	Nov-29
Hoegh Tracer	PCC	Höegh Autoliners	Operating	Car Carriers	100%	4.8	Jan-28
Hoegh Trapper	PCC	Höegh Autoliners	Operating	Car Carriers	100%	4.6	May-28
Hoegh Jacksonville	PCC	Höegh Autoliners	Operating	Car Carriers	100%	6.8	Mar-26
Hoegh Jeddah	PCC	Höegh Autoliners	Operating	Car Carriers	100%	6.3	Jul-26
Hoegh Beijing	PCC	Höegh Autoliners	Operating	Car Carriers	100%	10.5	Jun-22
MSC Leanne	Container	MSC (JV)	Financial	Containers	50%	3.8	Jan-32
MSC Rifaya	Container	MSC (JV)	Financial	Containers	50%	3.9	Jan-32
MSC Mirjam	Container	MSC (JV)	Financial	Containers	50%	4.2	Nov-31
MSC Eloane	Container	MSC (JV)	Financial	Containers	50%	4.3	Sep-31
MSC Ingy	Container	MSC (JV)	Financial	Containers	50%	4.5	Jul-31
MSC Diana	Container	MSC (JV)	Financial	Containers	50%	4.5	Jun-31
Genoa Express	Container	CMB	Financial	Containers	100%	6.4	Jun-30
Detroit Express	Container	CMB	Financial	Containers	100%	6.5	Jun-30
Livorno Express	Container	CMB	Financial	Containers	100%	6.5	Jun-30
Barcelona Express	Container	CMB	Financial	Containers	100%	6.4	Jun-30
Nordic Cygnus	Suezmax	Aker Capital (JV)	Financial	Tankers	50%	2.4	Aug-28
Nordic Aquarius	Suezmax	Aker Capital (JV)	Financial	Tankers	50%	2.5	Jul-28
Nordic Tellus	Suezmax	Aker Capital (JV)	Financial	Tankers	50%	2.3	Oct-28
NAT NB #1	Suezmax	Nordic American	Financial	Tankers	100%	-1.2	Mar-32

NAT NB #2	Suezmax	Nordic American	Financial	Tankers	100%	-1.2	Mar-32
Milos	Suezmax	Okeanis Eco Tankers	Financial	Tankers	100%	4.2	Feb-32
Poliegos	Suezmax	Okeanis Eco Tankers	Financial	Tankers	100%	4.0	May-31
Nissos Antiparos	VLCC	Okeanis Eco Tankers	Financial	Tankers	100%	1.4	Jun-34
Nissos Santorini	VLCC	Okeanis Eco Tankers	Financial	Tankers	100%	1.5	Apr-34
Nissos Despotiko	VLCC	Okeanis Eco Tankers	Financial	Tankers	100%	1.6	Apr-34
Nissos Reina	VLCC	Okeanis Eco Tankers	Financial	Tankers	100%	1.8	Apr-34
STI Symphony	LR2	Scorpio Tankers	Financial	Tankers	100%	4.9	Jan-29
STI Sanctity	LR2	Scorpio Tankers	Financial	Tankers	100%	4.8	Feb-29
STI Steadfast	LR2	Scorpio Tankers	Financial	Tankers	100%	4.7	Apr-29
STI Supreme	LR2	Scorpio Tankers	Financial	Tankers	100%	4.4	Jun-29
Navig8 Tanzanite	Chemical	Navig8 Chemical Tankers	Financial	Tankers	100%	4.2	Oct-31
Navig8 Turquoise	Chemical	Navig8 Chemical Tankers	Financial	Tankers	100%	4.8	Mar-31
Navig8 Azotic	Chemical	Navig8 Chemical Tankers	Financial	Tankers	100%	5.3	Aug-30
Navig8 Aronaldo	Chemical	Navig8 Chemical Tankers	Financial	Tankers	100%	5.6	May-30
Navig8 Constellation	Chemical	Navig8	Financial	Tankers	100%	7.3	Oct-28
Navig8 Pride	Chemical	Aker Capital (JV)	Financial	Tankers	50%	2.4	Sep-28
Navig8 Providence	Chemical	Aker Capital (JV)	Financial	Tankers	50%	2.4	Sep-28
Navig8 Prestige	Chemical	Aker Capital (JV)	Financial	Tankers	50%	2.0	Nov-28
Navig8 Precision	Chemical	Aker Capital (JV)	Financial	Tankers	50%	2.3	Jan-29
Ardmore Defender	Chemical	Ardmore Shipping	Financial	Tankers	100%	5.9	Oct-30
Ardmore Dauntless	Chemical	Ardmore Shipping	Financial	Tankers	100%	5.9	Oct-30
Interlink Levity	Handysize	Interlink Maritime	Financial	Other shipping	100%	7.0	Mar-28
Interlink Sagacity	Handysize	Interlink Maritime	Financial	Other shipping	100%	5.4	Mar-28
Interlink Dignity	Handysize	Interlink Maritime	Financial	Other shipping	100%	5.4	Mar-28
Interlink Priority	Handysize	Interlink Maritime	Financial	Other shipping	100%	5.3	Mar-28
Interlink Amenity	Handysize	Interlink Maritime	Financial	Other shipping	100%	5.3	Mar-28
La Fresnais	Handysize	Louis Dreyfus Armateur	Financial	Other shipping	100%	3.0	Jan-30
GasChem Orca	LEG	Hartmann/SABIC	Operating	Other shipping	100%	3.6	Jul-27
GasChem Beluga	LEG	Hartmann/SABIC	Operating	Other shipping	100%	4.2	Dec-26
Mineral Qingdao	Capesize	CMB	Financial	Other shipping	100%	0.5	Aug-35
Interlink Eternity	Handysize	Interlink Maritime	Financial	Other shipping	100%	1.3	Sep-29
Navigator Aurora	LEG	Navigator Gas	Financial	Other shipping	100%	1.2	Dec-32
Bulk Shanghai	Capesize	2020 Bulkers	Financial	Other shipping	100%	1.3	Sep-32
Bulk Seoul	Capesize	2020 Bulkers	Financial	Other shipping	100%	1.2	Oct-32

Source: (Ocean Yield ASA, 2021)

5. Market and risk analysis

5.1 Risk

Ocean Yield has exposure to car carriers, containerships, oil tankers, dry bulkers, gas carriers and oil service vessels/FPSO. While not directly exposed to the spot market for freight rates, the indirect exposure through counterparty risk is certainly present. If spot market rates are below the level to cover operating expenses for a vessel, the EBITDA for a lessee of an Ocean Yield-vessel will be negative and the lessee will be unable to honour its obligation to pay charter hire to Ocean Yield. Normally, cash holdings suffice when spot earnings turn below the level needed to cover operating expenses and charter hire, before the market improves again. The industry term for the freight rate needed to cover all cash costs is known as cash-breakeven (CBE). This includes operating expenses, overhead expenses (SG&A), interest expenses (interest element) and debt amortisation (lease repayment). Obviously, debt service will always come second to operating expenses and overhead expenses, without whom a vessel will be unable to sail and generate any revenues.

This leaves the question this chapter tries to answer: will the freight rates that Ocean Yield is indirectly exposed to keep above CBE? The short answer is that this is impossible to predict for the long-run. Of course, the need for crude tankers will eventually diminish, but if this is in 20 years of 50 years is too early to tell. However, how the market will develop in the coming 2-3 years is possible to have a well-funded opinion about, and it is through this type of analysis potential problems for the company could be uncovered before consensus, and a profitable short position in the share could be initiated.

The market views in this chapter is mainly based on research from the international equity brokerage firm Kepler Cheuvreux, in particular from the Head of Shipping Petter Haugen and Equity Research Analyst Andreas Nibe Nygård.[15]

[15] This is the author of this thesis.

5.2 Containerships

5.2.1 Risk

Containership are currently experiencing unprecedented strong freight rates. The leading spot index, SCFI, quotes 3,433, 302% above the average since 2009 of 1,138. The increase has come over the last year as owners of containership tonnage deactivated large portions of their fleets to adjust supply of container freight to the sharp decline in demand for freight when Covid-19 struck in the spring of 2020. When demand rebounded faster than expected, supply was unable to keep up and prices for freight of containers spiked. Haugen & Nygård (2021a) points to the record low orderbook of new vessels now at 10% of the current fleet (compared to 15% and 20% over the last five and ten years), should lead to an annual supply growth of containership capacity of 2-3% in 2021-2023. With expected demand growth of 4-6% in the same period, they expect a high fleet utilisation and freight rates to remain strong.

A worrying data point is the increased newbuild ordering seen after the date of the report mentioned above. Some newbuild orders were expected on the back of the very strong freight rates, but after Q1 2021 the newbuild orders equated to an orderbook-to-fleet ratio of 30% annualised. It would probably put pressure on container freight rates after 2023 (it takes 2-3 years to build a large vessel). On the other side, the container shipping industry is much more industrialised the other shipping segments. AP Møller Maersk is for instance investment graded by Moodys, a rarity in shipping. MSC, the largest counterparty to the Ocean Yield fleet, is only second to AP Møller Maersk in containership fleet size in the world. Should the rapidly increasing containership orderbook put serious pressure on freight rates after 2023, MSC should be among the last players in the industry to default on its obligations.

5.2.2 Growth opportunities

The increasing orderbook should be seen as an opportunity for Ocean Yield to grow its fleet. Currently, 474 containerships are on order, with an average size of 8,911 TEU (Clarkson Research, 2021). Adjusted for size, the average price for newbuild orders over the last two years has been USD89m, while the last recorded orders made in April 2021 were done at USD112m (adjusted for the average size over the last two years).

As expected when rates are high and shipowners earn a ROIC>WACC, shipowners invest in new vessels and bid up prices to the point where expected RONIC=WACC. As long as prices remain below the point where NPV becomes neutral, shipowners will – in theory – buy as many vessels as the shipyards can produce, driving volumes too. As financing of ordered vessels is something shipowners often manage after placing the order, Ocean Yield should see opportunities arising for sale-leaseback[16] transactions in the coming years. An especially attractive part of containership financing is the size of the transactions, and the solid counterparties.

5.3 Car carriers

5.3.1 Risk

Car carriers were struck hard by the outbreak of Covid-19. The simple explanation was that car manufacturers shut down their production lines and households stepped back on investments in durable goods with high income elasticity (Haugen & Nibe Nygård, 2020). However, the rebound was much swifter than the market had anticipated. Shipowners adjusted their active fleets to match demand while the fiscal stimuli supported consumer spending on durable goods. The one-year timecharter rate for a 6,500 car equivalent unit (CEU) PCTC carrier fell from USD17,000/day in December 2019 to USD10,000/day in May 2021, and was in April 2021 quoted at USD21,000/day (Clarkson Research, 2021).

In its Q1 2021 report, the Norwegian shipowner Wallenius Wilhelmesen pointed to a positive outlook for demand of both personal vehicles, but with an even stronger outlook for the need of seaborne transportation of industrial vehicles for use in agriculture and mining. The main driver behind this is the increased investment capacity due to increasing commodity prices and operational cash flow (Wallenius Wilhelmsen, 2021). On top of this, the orderbook for car carriers is now at 2.3% of the fleet and supportive of strong fleet utilisation over the coming years. Haugen (2021) expects the strong container freight market to impact car carriers positively as it now has become cheaper to transport containers on car carriers than on containerships. This should lead to more volumes carried, at an increased

[16] It is called a sale-leaseback when a shipowner sells the newbuild contract to a third-party and commits to lease the vessel for a long period. The buyer of the newbuild contract then pays the yard for the vessel. Sale-leaseback of non-newbuild vessels is also common.

freight rate as the willingness-to-pay for containers transported on car carriers is set by the currently 66% higher container freight rates (Haugen, 2021).

5.3.2 Growth opportunities

The low orderbook in the car carrier space is certainly an opportunity for new investments as owners of car carriers will have to renew their fleets as older vessels are scrapped. Assuming a lifetime of 25 years, the orderbook-to-fleet-ratio needs to be >4% to meet growing demand.

Another implication of the promising outlook for car carriers is the increase in expected residual value of the five car carriers in the Ocean Yield fleet. The car carriers chartered out to Hoegh Autoliners are operating leases, thus Ocean Yield carries the residual risk when the charter expires. *Hoegh Beijing* will be redelivered to Ocean Yield in June 2022; increasing timecharter rates supports the probability for swift redeployment or a contract extension. In the case of no new employment, good market conditions should drive the achievable price in the second-hand market close to or above the expected residual value[17]. The next car carrier to be redelivered is the *Hoegh Jacksonville*, but this is in April 2026 and the market environment at that time is too early to have a qualified opinion about.

5.4 Oil tankers

5.4.1 Risk

Due to the swing tonnage mechanism in the tanker market where clean petroleum product tankers can carry crude oil if freight rates are better for crude oil than product, and chemical tankers can carry petroleum products if product freight rates are better than for chemical freight, crude tankers set the floor for freight rates in all tanker segments. Thus, the outlook for crude tankers will be the determinant for both clean petroleum tankers and chemical tankers (Haugen & Nygård, 2021b). With 26 out of 60 vessels in the tanker segment

[17] Hoegh Beijing has a 4,900 CEU capacity while Clarkson quotes a 6,500 CEU one-year timecharter rate at USD21,000/day. Assuming a linear relationship between timecharter rates and size, this equates to USD15,831/day. Assuming USD6,000/day in operating expenses and SG&A, the bareboat equivalent rate is USD9,831/day. This is significantly above the charter rate required over the remaining lifetime of the vessel to defend the expected residual value.

(including JV's), the outlook for the tanker market is of particular importance to Ocean Yield.

In April 2021, quoted spot freight rates for VLCC's were negative[18]. The explanation is simple; Covid-19 restrictions have limited all forms of traveling, reducing demand for all types of fuel, leading to less crude oil demand from refineries and thus the demand for crude oil transport from production sites to refineries. In December 2019, the demand for crude oil was 102.3 barrels per day. This declined sharply to 80.6 bpd in April 2020, but had rebounded to 93.7 bpd by January 2021. Haugen & Nygård (2021b) expects a normalisation back to 2019 levels by the end of 2022. With an orderbook currently at 9% of the crude tanker fleet (including smaller tankers), they expect demand growth for crude oil transportation to outperform supply growth, effectively increasing the fleet utilisation, and expect VLCC spot rates above USD40,000/day from 2022 onwards. In turn, product tankers and chemical tankers are expected to follow suit. This positive outlook is supported by the increase in prices for second hand crude oil tankers during the spring of 2021, indicating an increasing belief in a market rebound which shipowners position themselves to benefit from.

Should this forecast prove wrong and crude tanker freight rates not improve reasonably soon, tanker shipowners will start running out of cash. This is perhaps the worst case scenario for Ocean Yield with its large exposure to tankers. In this case, it is reasonable to believe that both dividend payments and new investments would be halted to protect the balance sheet. If charterers start to default on charter hire payments, Ocean Yield might end up with terminated charters and redelivery of vessels. This could in turn lead to sales of vessels at prices below the value of the original outstanding lease, destroying value for shareholders in Ocean Yield.

5.4.2 Growth opportunities

The orderbook for both crude, petroleum and chemical tankers have been declining over the last years. The crude tanker orderbook stands at 9% of the fleet, while product tankers and chemical tankers stands at 10% and 5%, respectively. One of the key explanations to why shipowners have been reluctant to place newbuild orders have been the uncertainty regarding

[18] This implies that the gross payment for crude oil freight is too low to cover voyage expenses, for a standard VLCC. The vessels sailing on these rates are however the most modern vessels with less fuel consumption and lower overall expenses, to the extent that they receive contribution margin from voyages.

propulsion technology[19]; at some unknown point in the future, running vessels on bunkers will be illegal and shipowners does not want to take on the risk of investing in an asset with a lifetime of 25-30 years without knowing that it will be in compliance with regulations that are expected to be implemented sooner rather than later. The latest development suggests that ordering vessels with engines that has the ability to run on Ammonia will lead to increased new orderings in the coming years.

With shipowners more comfortable with ordering Ammonia-ready vessels, opportunities for Ocean Yield should arise. Oil tankers by no means are viewed as green investments, but they are nonetheless needed in the transition period before seeing a CO2-neutral world. However, banks might reduce their lending to shipping in general, and oil tankers in particular, to reduce carbon footprint[20]. This should in turn increase the probability and profitability of new investments in this segment.

5.5 Dry bulk

5.5.1 Risk

The dry bulk freight market is mainly governed by the demand and supply of oceangoing transport of iron ore, coal and grain. The trade in 2020 was 3,343 million tonnes of these three commodities, of which iron ore held the lion's share of 45%. Coal was 35% while grain was 20%. The main iron ore exporters are Australia and Brazil, while the largest coal exporters are Australia and Indonesia. China is the largest importer. On the supply side, the orderbook-to-fleet-ratio is 5.7%, barely above the level needed to preserve the fleet size as is (Haugen & Nygård, 2021c).

Dry bulk shipping has experienced a very strong start to 2021 with freight rates above USD15,000/day for all vessels sizes on average throughout April. The driver behind this is a surging demand for grain and iron ore. Demand for coal took a hit in 2020, but is expected to rebound in 2021. The strong demand for coal and iron ore from industries where fiscal stimuli has led to increased production, has driven up domestic prices for these commodities,

[19] This has also affected newbuild orderings for other vessel types.

[20] DNB ASA, the largest Norwegian bank, reduced its exposure to shipping and offshore during 2019. Whether to reduce cyclical exposure or to reduce carbon footprint, is not disclosed (DNB ASA, 2020).

in turn increasing imports of relatively cheaper commodities from overseas, increasing fleet utilisation and thus freight rates. The market fundamentals for the coming years are strong in dry bulk shipping, with an expected growth in volumes of 3% while the net capacity growth is expected at 0-2%, adjusted for port congestions and trade lane distances. This will keep fleet utilisation high, supporting strong freight rates.

5.5.2 Growth opportunities

The dry bulk segment is an attractive investment universe; fitted with an Ammonia-ready engine, a dry bulk vessel is both compliant with, and needed in, a world without fossil fuel (on the contrary to oil tankers). With an orderbook-to-fleet-ratio of 5.7%, new orders will be needed in the coming years, which Ocean Yield should benefit from. Ocean Yield's fleet currently consists of 10 dry bulkers; adding more in this segment would also improve the diversification in the fleet. As dry bulk vessels are cheaper than other vessel types of the same size[21], capital can be allocated to more vessels with more counterparts, diversifying the portfolio of counterparts and thus counterparty risk. The opportunity to diversify on both an asset-level and a counterparty-level, makes dry bulker among the most attractive segments for growth, alongside containerships.

5.6 Gas carriers

Ocean Yield owns three liquefied ethylene gas (LEG) carriers. These vessels can also carry LPG, Ammonia, Propylene and other liquefied gasses. The tanks are more sophisticated than in pure LPG carriers, increasing the newbuild price significantly above pure LPG carriers of similar size. The ability to carry LPG makes theses LEG carriers a derivative of the market for pure LPG carriers. The mechanism is the same as in oil tankers, if rates for LPG transport are higher than LEG, LEG carriers will swing into the LPG market. Thus, the LPG market sets a floor for the freight rates in the LEG market.

The LPG freight market is dependent on the demand for LPG. In 2020, USA was the largest exporter of LPG, exporting 55.3m tonnes of LPG. China, India and Japan are the biggest importers of LPG with 40% of world imports. The market balance is currently dependent on

[21] Dry bulkers are relatively unsophisticated compared to other vessels, consisting only of a hull with hatches.

the US production of LPG; the voyage distance from the US to Asia is much longer than from the Middle East, tying up more capacity per LPG cargo. The relative price difference for LPG between Asia and the US then becomes the willingness to pay for LPG freight, and the price setting mechanism in the market, given that the fleet utilisation is at decent levels. This touches upon the worry in LPG shipping; the orderbook-to-fleet-ratio. It is currently at 16%. This implies a significant fleet growth over the coming years, but demand is expected to offset most of this (Haugen & Nibe Nygård, 2021). Fleet utilisation will likely stay at decent levels in the coming years, supporting LPG rates above CBE. This should set a floor for LEG carriers above the rate needed to honour the hire payments to Ocean Yield. That said, investing in more gas carriers is not good for an LPG freight market already struggling with a high orderbook – this is not the preferred segment for more investments.

5.7 Oil service/FPSO

Oil service assets are highly cyclical. The two PSV's, *NS Fraja* and *NS Orla*, on bareboat charter to Aker BP are not of great concern as Aker BP is an investment graded company (Aker BP, 2021), and the downside on the residual is limited[22]. The offshore construction vessel *Aker Wayfarer* is on a bareboat charter to Akastor, guaranteed by Aker Solutions. This vessel is accounted as a financial lease, as Akastor has several options to purchase the vessel over the lifetime of the charter. Hence, these three vessels are not considered to be of extraordinary concern.

With respect to the FPSO *Dhirubhai-1*, the market outlook is gloomy. Redeployments of idle FPSO's are rare, as new projects often involve newbuilds to get the correct project specifications. A typical FPSO-project contains a contracted period with extension options. The debt financing obtained to finance the newbuild is paid down during the firm period of the contract, while the cash flow generated in option periods (if exercised) are returned to shareholders (Olsvik, 2020). Due to its relatively small size, *Dhirubhai-1* is not suitable for many of the new projects sanctioned. For projects of a viable size, the capital expenditure needed to rebuild the vessel to meet project specific requirements makes the breakeven oil price too high for many potential projects to be sanctioned. On the back of this,

[22] The vessels will be 15 years at the expiration of the current contract. The bareboat hire rate needed for the remainder of the lifetime of the vessels to defend the expected residual value, is at 32% of the current bareboat hire rate.

redeployment of the FPSO seems unlikely. Should the FPSO be deployed to a new project, the capital expenditures to rebuild the vessel could leave Ocean Yield with an elevated residual risk on an asset that has proven difficult to redeploy. A sale of this asset at a price above scrap is a preferable solution.

The AHTS' *Far Senator* and *Far Statesman* are currently in a pool of eight AHTS' where Ocean Yield receives a proportionate share of all cash generation for the entire pool. Although yielding a positive cash flow, the contribution is not enough to cover interest expenses and debt amortisation. The AHTS fleet has struggled with overcapacity and low fleet utilisation for several years, but this seemed to change into 2020 (Kyrkjeeide, 2019). However, Covid-19 and the sharp fall in the oil price put a stopper to this. The market now looks difficult and any long-term contract for these two vessels seems unlikely.

6. Valuation methods and cost of capital

6.1 Valuation methods

6.1.1 Refining the thesis

The three branches of valuation are relative valuation, discounted cash flows (DCF) and contingent claim valuation (Damodaran, 2012). The most relevant method for Ocean Yield is DCF-valuation as the terms in the leases are known and cash flow estimates are relatively accurate. Relative valuation is also applicable as a source for cost of capital, but as the asset exposure is of a unique character in this company, an applicable peer group is not obtainable. It will not be put any particular emphasis on contingent claim valuation, but the purchase options written by Ocean Yield in its financial leases will be considered. Hence, the focus of this thesis will be a DCF-valuation.

6.1.2 Discounted cash flow

The basic idea behind cash flow valuation is to estimate the cash generated by the operations of a company, less the investments in assets needed to generate the cash. When cash is invested in an asset, it is with the expectation that the asset through its operations will generate cash for a period in the future. Since the asset will be subject to uncertainties regarding both cost and revenues, the amount of cash genereated will be uncertain. Thus, capital providers needs a compensation for this uncertainty to prefer it over a risk-free investment in for instance government bonds. The percieved riskiness of the amount of cash generated is the basis of the required rate of return on an investment. Discounting cash flows at an appropriate discount rate is the most commonly used valuation method and covered in all indtroductory courses to finance. Damodaran (2012) provides an overview of different cash flow valuation methods and theoretical fundations.

The fundamental equation for valuation of an asset is :

$$Value = V = \sum_{t=1}^{t=n} \frac{net\ cash\ generated\ in\ period\ t}{(1 + required\ rate\ of\ return)^t} = \sum_{t=1}^{t=n} \frac{CF_t}{(1+r)^t}$$

Where *n* = Lifetime of the asset (Damodaran, 2012).

This formula can be rearranged to accommodate for a variety of assumptions and levels of detail. Growth in cash flow is, together with required rate of return, the most important assumption when valuing an asset. Although growth can be incorporated into the equation above easily by growing the cash flow for each period and estimating *n* years of cash flow, at some point it is easier (and just as accurate) to estimate a perpetually growing cash flow. The simplest way to do this is by estimating the cash flow one year ahead, and assuming that this is the basis for all future cash flows with an annual growth rate in perpetuity. $V_0 = \frac{CF_1}{(r-g)}$, where g = the annual growth rate of the cash flow, is the simplest form of incorporating growth. This can be further expanded to assume different growth rates during different periods before reaching a terminal growth rate.

In the case of Ocean Yield, each vessel has a visible backlog of cash flow, with a final payment expected as purchase options are exercised or purchase obligations are honoured, or the vessel is sold in the market. The cash flows are simple to compute, as the only operating costs for Ocean Yield is Sales, General and Administration (SG&A) and depreciation of operating lease assets. Incorporating growth in cash flow estimates will thus make little sense; it is more viable to estimate value generation as a function of the (RONIC-WACC)[23]-spread and expected new investments undertaken. It becomes obvious that with a highly visible cash flow and no particular growth assumptions, the required rate of return – the cost of capital – is of great importance.

6.1.3 Free cash flow to firm

Before delving into the cost of capital, a distinction of Free Cash Flow to Firm (FCFF) and Free Cash Flow to Equity (FCFE) is made. The difference is in how debt, interest expenses and taxes are treated. Table 3 shows how the cash flows are derived. When estimating FCFF, interest expenses in the P&L are excluded while income tax is paid on the basis of operating profit. From this the NOPLAT is derived. Depreciation is deducted as it is a non-cash item, while capital expenditures for investments in assets or general maintenance is included. At last net investments in net working capital is included. The net cash flow generated will thus cover both interest payments on outstanding debt and the required return to shareholders. When estimating the FCFE, interest expenses are included in the P&L and the NOPLAT will

[23] Excess return on new invested capital

equate to the net profit. Debt drawdowns are included as a positive cash flow while debt repayments are deducted.

Table 3: Cash flow breakdown and simple valuation, example

Comment	P&L	FCFF	FCFE	Assumptions	
Operating profit	**EBIT**	**11**	**11**	Tax rate	20%
	Interest	0	-3	Unlevered cost of equity	10%
Earnings before taxes	EBT	11	8	Debt	60
	Tax	-2.2	-1.6	Equity	40
Net operating profit less adjusted tax	**NOPLAT**	**8.8**	**6.4**	Interest on debt	5%
Add back non-cash depreciation	Depreciation	4	4	Levered cost of equity	16%
Capital expenditures	Capex	-4	-4	WACC	8.8%
Change in net working capital	NWC	0	0		
Debt drawdown/instalments	Debt	0	0		
	CF	**8.8**	**6.4**		
Enterprise value	EV	100	100		
	Equity	**40**	**40**		

Soruce: Own calculations

The cost of capital is the blend of required equity return and required debt return. The blend is dependent on the weight of equity and debt relative to each other. It follows the formula $WACC = \frac{D}{D+E} r_D (1-\tau) + \frac{E}{D+E} r_E$ where D is the value of debt, E is the value of equity, r_D is the cost of debt (interest), r_E is the cost of equity and τ is the marginal income tax rate (McKinsey, 2020). If taxes are excluded, it is apparent that if the unlevered cost of capital is equal to the unlevered cost of equity, the cost of equity increases as more debt financing is added. This is shown with the formula $r_E = r_U + \frac{D(r_U - r_D)}{E}(1-\tau)$ where r_U is the unlevered cost of equity (McKinsey, 2020). As the debt-to-equity ratio increases, the riskiness of the equity also increases; with a fixed FCFF, an increased debt-to-equity ratio implies increased interest payments to debt and reduced payments to equity holders. However, while the volatility[24] in FCFF is unchanged, the volatility in FCFE increases.

[24] Standard deviation is the financial metric for riskiness.

Modigliani and Miller (1958) shows how the value of a company is independent of capital structure, with the exception of an added tax shield stemming from the tax deductibility of interest expenses. In a WACC approach, this tax shield is taken into account by reducing the cost of debt by a factor of (1-τ), lowering the average cost of capital. This follows directly from the idea that the underlying risk of the cash flow generated by the asset is independent of how the asset is financed. But when some level of debt financing is used, the income tax is estimated on the basis of operating profit less interest expenses and thus reducing the cash outflow to taxes. This in turn increases the FCFF and value.

The cost of debt can be found by calculating the yield-to-maturity on outstanding bonds of a company or simply by looking at the interest expenses relative to outstanding debt in the financial statements. The latter is only a viable solution of the historical interest on debt is representative for the interest level a company can obtain new or refinanced debt (McKinsey, 2020). In Ocean Yield, the cost of secured debt is broadly at LIBOR + 2.00%.

6.1.4 Free cash flow to equity and adjusted present value

Table 3 also shows the FCFE-approach to valuing the equity of a company (or asset). It differs from the FCFF-approach by including interest expenses and debt drawdowns and repayments. As this approach only differs mechanically to a FCFF-approach, the discount rate applied on the FCFE is the same as the cost of equity component used to calculate the WACC; derived from the unlevered cost of equity, the debt-to-equity ratio, the cost of debt and the marginal income tax rate (McKinsey, 2020).

The third textbook valuation practice within the space of DCF-valuation is the adjusted present value. This method divides the value of a company into two parts; the all-equity financed value of the company, i.e. the FCFF discounted at the unlevered cost of equity (no debt implies no tax shield), and the present value of the tax shield on a standalone basis. This value is derived as the future interest payments times the tax rate (the tax payments omitted due to deductible interest payments), discounted by a discount rate reflecting the risk of the interest payments. This is usually either the unlevered cost of equity or the cost of debt, dependent on whether the risk of the tax shield is more aligned with the risk of operations or the risk of defaulting on interest payments (McKinsey, 2020).

6.2 Cost of capital

6.2.1 Tax

For companies with no tax deductible interest costs, the unlevered cost of equity equates to the WACC. And if there indeed are some tax expenses, but they are irregular and not a function of operating profit (for instance due to different tax regimes in a multinational company), expecting a fixed periodically tax payment based on an average estimate and using a pre-tax cost of debt, will perhaps yield a more accurate valuation. Since 2016, Ocean Yield has paid USD4m in taxes out of USD140m, or 3%, of pre-tax profits. A correct modelling of the tax expenses in Ocean Yield calls for a thorough examination of the tax regimes that Ocean Yield conforms to, and is beyond the scope of this thesis. Hence, tax will pay no role in the computations of cost of capital, as this thesis considers tax an operational component and defined as an overhead expense.

6.2.2 Capital asset pricing model

To this point, all but one of the inputs in a DCF-valuation have been covered. The unlevered cost of equity, the cost of total capital for the underlying asset or business operations, is the key metric in any calculation of capital cost. It is commonly observed through applying a pricing model to observable market data such as asset price quotes. For listed equities, the levered cost of equity is observable, and the unlevered cost of equity can be derived from this. The capital asset pricing model (CAPM) will be the backbone in estimating the cost of capital in this thesis and will be covered in detail.

The capital asset pricing model was formulated and developed in the 1960's, building on Markowitz (1952). The main contributors to development of the theory were William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966). They argue that the only risk investors should be compensated for, is the systematic and non-diversifiable risk in an asset. The unsystematic risk in any asset can be diversified away and should not be compensated for. The model suggest that all investors hold their optimal risky portfolio of assets, and that the market portfolio is the aggregate of all optimal risky portfolios and thus becomes the overall optimal risky portfolio. It is further suggested that the pricing of each individual asset emerges from an equilibrium where a lower price would imply excess return compared to the risk it represents in an optimal risky portfolio, and where a higher price of the asset would imply excess risk to the optimal risky portfolio without adequate return compensation (Sharpe, 1964).

Another assumption behind the CAPM is the presence of a risk-free asset. This is typically referred to as Treasury Bills or Bonds issued by a solid country[25]. An investor is thus able to hold a blend of risk-free asset and the market portfolio so that the desired level of exposure to the market is obtained for the investor's overall portfolio. To reduce exposure, a portion of the overall portfolio is placed in the risk-free asset while the remaining portion is placed in the market portfolio. Likewise, shorting the risk-free asset (borrowing at the risk-free rate) enables the investor to invest more than the value of his total holdings in the market portfolio, increasing the exposure to market risk (Bodie, Kane, & Marcus, 2014).

In practise, the market portfolio is viewed as an index or a composition of indices, reflecting the overall investment universe of an investor. The cost of capital for an asset is defined by the formula $E(r_A) = r_f + \beta_A(r_M - r_f)$ where $E(r_A)$ is the expected return of an asset, r_f is the return on the risk-free asset[26], r_M is the return on the market portfolio and β_A is the measure of the asset's return covariance with the market return, as a fraction of the market return variance. This if formalised as $\beta_A = \frac{\sigma_{A,M}^2}{\sigma_M^2}$ where $\sigma_{A,M}^2$ is the covariance between the asset return and the market return, and σ_M^2 is the variance of the market return. For share price returns, the previous discussion has emphasised the increased riskiness of levered equity and thus the increased cost of equity. The beta obtained as a fraction of the covariance between the market return and an equity price return, as a fraction of the market variance, is thus a function of the leverage in the observed equity. This is the levered beta, but the increased riskiness from leverage is mechanical and deleveraging the beta is done by the formula $\beta_U = \frac{\beta_L}{1+(D/E)(1-\tau)}$ (Bodie, Kane, & Marcus, 2014). Vessels are a different type of asset where it is possible to estimate a beta. As vessels prices are quoted on an asset basis, the beta will by nature be unlevered. This will form the foundation of the Ocean Yield

[25] Typically, US Treasury Bills or US Treasury Bonds. Damodaran (2012) argues that the absence of default risk and reinvestment risk are criteria for an asset to be risk-free, but further emphasis will not be put on this matter in this thesis.

[26] The issue of post- or pre-tax risk-free rate is not considered in this thesis.

valuation. It could also be argued that the unsystematic risk in the Ocean Yield fleet is low due to diversification over several vessel segment, further supporting the CAPM as a good choice of pricing model.

6.2.3 Market risk premium and risk-free rate

The market risk premium is the last input needed before the CAPM is applicable as the source for the unlevered cost of equity in Ocean Yield. This section does not only cover the computation of a market risk premium; it also discusses the correct benchmark to represent market portfolio of the investment universe. The appropriate risk-free rate will also be considered.

Ocean Yield is listed on the Oslo Stock Exchange. With almost eight years of share price data, computing a levered beta to the Oslo Stock Exchange Benchmark Index (OSEBX) does not entail any practical issues. However, the underlying assets (the fleet of vessels) has arguably more exposure towards the general world economy than the oil-tilted Norwegian economy. Another issue is that the Ocean Yield share price and the OSEBX has different exposures to fluctuations in the USD/NOK exchange rate, as all cash flows of the firm is USD denominated. Nevertheless, the levered beta to the OSEBX in the period 2015-2019 was 0.73 and the unlevered beta was 0.21[27].

A more suitable index will be the USD denominated MSCI World Index. The index has 1,586 constituents and covers 85% of free-float adjusted market capitalisation in 23 countries defined as developed markets (MSCI, 2021). USA represents 66% of the market capitalisation in MSCI World Index. Before estimating the beta to this index, the Ocean Yield share price needs to be converted from Norwegian Kroner to USD. Running the regression on the MSCI World Index yields a levered beta of 0.97 and an unlevered beta of 0.54. This is a more sensible result as shipping is known as a high-beta industry with volatile asset prices and cyclical earnings.

To estimate a market risk premium, in this case the premium for the MSCI World Index, an appropriate risk-free rate must be deducted from the gross market return. Damodaran (2012)

[27] The unlevered beta is estimated with a regression on the development in enterprise value rather than deleveraging the levered beta. The enterprise value is defined as market capitalisation + net interest-bearing debt. Bloomberg estimates the enterprise value with quarterly updated NIBD estimates and daily changes in market capitalisation.

argues that a true risk-free asset is free of both default risk and refinancing risk. The default risk is mitigated in treasury securities issued by a solid government as it always has the option to print more money. The refinancing risk relates to the issue where the duration of the default risk-free rate is lower than that of the investment and a reinvestment at future unknown default risk-free rate. Matching the duration of the risk-free rate and the investment mitigates this problem. As the typical bareboat charter for Ocean Yield has a duration of 10 years, the yield on the 10-year US Government bond is used as the risk-free rate.

Looking at the historical risk premium on the MSCI World Index to the 10-year US Government bond, it varies substantially over different periods and period lengths. The main issue with the historical approach highlighted by Damadoran (2012) is the fact that historical risk premium reflects a view on risk compensation from a point in the past. However, when it is the market's view on risk at the current moment that is relevant for the required return on an investment made today. With access to large databases such as Bloomberg, an implied risk premium can be derived from looking at consensus estimates and current pricing. Per April 2021, Damodaran estimates an equity risk premium on the S&P500 index of 4.14% (Damodaran, Damodaran Online, 2021).

The table below shows the equity risk premium of the MSCI World Index over different periods and lengths. The geometric mean calculated over the period between 2010 and 2020 of 5.4% will be used for the valuation of Ocean Yield.

Table 4: MSCI World Index historical risk premium above 10-year US Government bond

	Mean	Geometric mean	Median	Standard deviation
1980-01/04/2021	1.7%	1.8%	8.8%	15.2%
1980-1990	4.2%	4.7%	9.0%	15.0%
1990-2000	2.8%	3.6%	7.4%	14.1%
2000-2010	-6.1%	-5.7%	2.3%	16.9%
2010-2020	4.8%	5.4%	10.6%	13.1%
2000-2020	-0.8%	-0.5%	8.7%	15.2%
2015-2020	4.3%	4.8%	9.4%	11.7%
2015-01/04/2021	6.2%	6.7%	10.6%	14.8%
2010-01/04/2021	5.8%	6.4%	11.7%	14.6%

Source: Bloomberg

7. Valuation of Ocean Yield

7.1 Methodology

The value of the Ocean Yield equity will be derived from a fleet valuation where each vessel is valued separately. The value of each vessel is based on remaining capex, the charter hire backlog, residual value/purchase option strike price/purchase obligation price and the riskiness of the cash flow. Overhead expenses (SG&A and tax) will be included in the aggregated DCF-valuation. The net interest bearing debt will be subtracted from the gross fleet value. Net working capital will be included in the valuation at book values. As the Ocean Yield fleet consists of 60 vessels, a breakdown of each vessel valuation is impractical, but a thorough example will illustrate the process.

7.2 Project example

7.2.1 Investment

A client of Ocean Yield is typically, but not necessarily, a publicly traded company. This helps Ocean Yield to conduct appropriate due diligence before entering into a contract. Further, it strengthens the client's access to capital markets if operating market conditions strains on its liquidity, reducing the counterparty risk faced by Ocean Yield. When an agreement to finance a vessel for a client is reached, it is typically for vessels ordered from a shipyard with delivery in the coming years.

In this example, a newbuild 180,000 dwt Capesize will be used. The gross purchase price from the yard is USD50m and the client will provide USD5m of minority equity while Ocean Yield will finance the remaining USD45m and be the legal owner of the vessel. The charterer will pay a freight rate of USD13,165/day, and the daily rate will be subject to LIBOR adjustments[28]. The charter period is ten years and the charterer will have the option to buy the vessel for USD15m at the end of the charter. The market value of a 10-year old Capesize has been quoted below this level twice since 1993; USD14.5m in 1998 and

[28] The USD13,165/day is the base hire. The LIBOR adjustment is simply the 3M LIBOR multiplied by the outstanding lease, divided by 365 days. Assuming USD45m outstanding and a 3M LIBOR of 0.5%, the additional daily payment will be USD616/day, totalling USD13,781/day.

USD13.5m in 2015, according to Clarkson Research (2021). Historically, a Capesize has depreciated by USD2.1m per year from newbuild to 10-year old, USD0.4m more than a straight-line depreciation would imply. The expected market value at 10-years is thus USD28m, significantly above the USD15m strike price. Assuming USD5,500/day of operating expenses and USD1,000/day in SG&A for operations of the vessel, the vessel will have a cash breakeven rate of USD19,665/day.

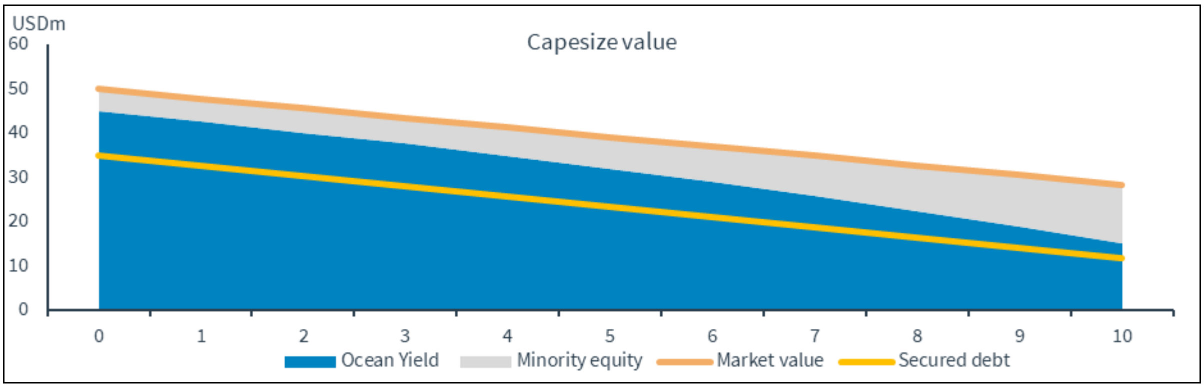
Table 5: Cash flow example

	Period	0	1	2	3	4	5	6	7	8	9	10
	Gross investment/residual	-50.0										15.0
	Charter hire		4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	Minority equity	5.0										
Unlevered IRR 5.50%	OCY CF	-45.0	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	19.8
	Debt outstanding	35.0	32.7	30.3	28.0	25.7	23.3	21.0	18.7	16.3	14.0	0.0
	Debt CF	35.0	-3.0	-3.0	-2.9	-2.9	-3.2	-2.8	-2.8	-2.7	-2.7	-14.3
Levered IRR 15.76%	OCY Equity CF	-10.0	1.8	1.8	1.9	1.9	1.6	2.0	2.1	2.1	2.1	5.5

Source: Own calculations

Obviously, the base case assumption is that the counterparty will be able to pay the daily hire over the period of the contract and then buy the asset by exercising the purchase option at the end. But from a risk management perspective, the worst case is always a default of the charterer and the following exposure to the market value of the asset. And just as obvious, when market freight rates are at levels where ship-owners are unable to pay the hire and goes into bankruptcy, the second-hand market for vessels is poor. When the 10-year old Capesize was quoted at USD13.5m in 2015, the average Capesize spot freight rate was USD6,400/day. The USD5m minority equity, also referred to as seller’s credit, acts as a buffer for Ocean Yield should the counterparty default and the market value of the asset drop.

Figure 2: Project value development, example



Source: Own calculations

The unlevered IRR of 5.50% is a cost for the charterer, on top of the cost of equity on the USD5m minority equity paid up-front. Compared to an ordinary mortgage from a bank, this might seem high. Two points are important to note with regards to this. Firstly, the charterer obtains financing of 90% of the value of the vessel. 70% is from a bank and 20% is Ocean Yield's equity. The charterer then benefits from the low cost of debt that Ocean Yield is able to obtain through its diversified vessels portofolio, as well as leverage beyond what banks are usually willing to give. While Modigliani & Miller (1958) argues that the charterer will be indifferent to the leverage, as the cost of equity will be a function of leverage and keep the WACC constant, many shipowners seem to have a more fixed hurdle rate in their investments, lowering the percieved WACC with higher leverage. Ocean Yield is able to create returns on this.

7.2.2 Options

Furthermore, in the instances where Ocean Yield writes a deep-in-the-money call option on a vessel it buys and leases out on bareboat charter, the value of the option written is not isolated in the project cash flow, but found implied in the project IRR. This is part of the reason why Ocean Yield is able to offer what seems to be rather expensive external financing to shipowners, without being outcompeted by ordinary banks offering loans with lower headline interest rates.

To quatify this, the additional value from the optionality must be determined. In this example, Ocean Yield writes an option on a 10 year-old Capesize vessel with the strike

USD15m. Based on the historical annual depreciation of a Capesize from newbuild to 10 year-old of USD2.1m, the expected value at year 10 is USD28.4m. The charterer pays back an additional USD13.4m below the expectet market value, and will have the option to buy the asset for the remaining USD15m of outstanding lease. But if the market value of a 10 year-old Capesize at that time is below USD15m, the charterer would rather buy another vessel at market price instead of exercising the option. In the eyes of a shipowner, the ability refrain from buying the vessel in the unexpected event of a market value below USD15m is the source of the value of the option. With long dateseries on 10 year-old Capesize market quotes, pricing the option with the Black and Scholes formula is a good way of exposing the additional risk Ocean Yield gets paid to hold.

Black & Scholes (1973) formed the framework for option pricing. The theory is based on the notion that it is possible to obtain a hedged long/short position in an option and the underlying asset such that the total value of the position will not depend on the value of the underlying asset. For Ocean Yield, the written options will typically be European options with a specific exercise date.[29] The formula for the value of a European call option is $w(x,t) = xN(d_1) - ce^{r(t-t^*)}N(d_2)$, where $w(x,t)$ is the value of the option as a function of the price of the asset x and time to maturity t^*. r is the risk-free rate and c is the exercise price of the option. $d_1 = \frac{\ln\frac{x}{c} + (r + \frac{1}{2}v^2)(t^* - t)}{v\sqrt{t^* - t}}$ and $d_2 = \frac{\ln\frac{x}{c} + (r - \frac{1}{2}v^2)(t^* - t)}{v\sqrt{t^* - t}}$, where v is the standard deviation of the underlying asset.

In this example, the expected value of the 10 year-old Capesize, x, is set at USD28.4m while the exercise price of the option, c, is USD15m. t^* is 10 years and r is 1.58%. The last input factor is volatility, v. The historical standard deviation of the price of a 10 year-old Capesize is 38%. The value of the option is thus USD18.8m. This is USD5.4m more than the intrinsic value of the option $(x - c)$. While not shown in the raw cash flows from the project, the additional value received by the charterer in form of the option, lowers the project cost for the charterer from 5.50% to 3.57%. Put differently, the charterer pays for the option over the

[29] Some projects include several options where the charterer has several exercise dates, typically at year 5 or 7, in addition to the end of the charter.

lifetime of the project with a 1.93% spread over what would theoretically be the charter hire cost (in IRR terms) with a purchase obligation at the end of the charter period.

This example illustrates both the complexity of ship financing and it helps to explain how the unlevered project IRR's that Ocean Yield obtains are competitive to those offered by other banks that at first glance looks more attractive from a charterer's point of view.

Table 6: Charter with option

	Period	0	1	2	3	4	5	6	7	8	9	10
	Option	5.4										
Unlevered IRR	Charter hire	45.0	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-19.8
3.57%	Cash flow with option	50.4	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-4.8	-19.8

Source: Clarkson, Own calculations

7.2.3 FCFF vs. FCFE

Going back to the example with the Capesize; to finance the USD45m purchase, Ocean Yield pledges the vessel to its banks, typically at 70% loan-to-value. The mortgage profile is usually straight-line 15 years at LIBOR + 2.00%. Ocean Yield takes refinancing risk as the typical tenor of an asset backed ship mortgage is 4-5 years, while the charterer is guaranteed a vessel for 10 years. Refinancing implies additional cost with commissions to banks and legal advisory, increasing the overall cost of debt in a project. In the example cash flow in table 5, this is shown as a 1.5% commission on the outstanding amount in period 5.

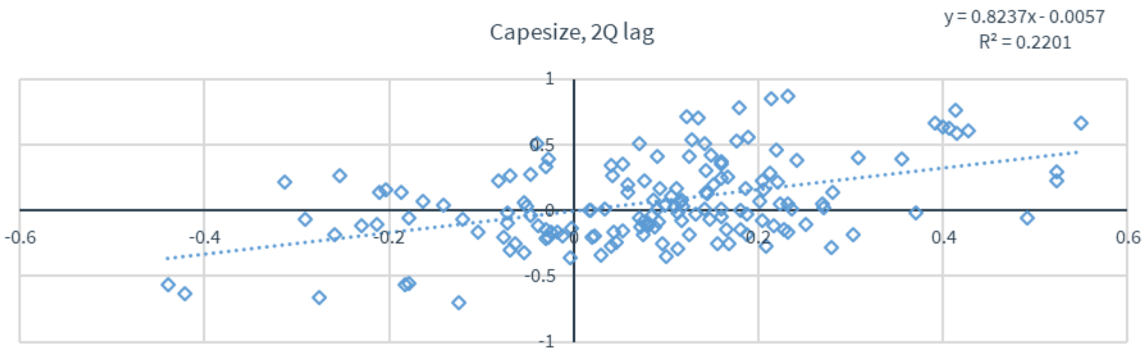
As the debt repayment profile is straight-line while the charter hire is an annuity, the loan-to-value will fluctuate over the period of the project. This implies that a FCFE-approach is unpractical as the levered cost of equity changes for each period. The FCFF-approach is however not compromised by this and the preferred valuation method.

7.2.4 Asset beta

Vessels are fairly liquid assets. Since 1995, 1,234 vessels have been sold annually. On average, 60 million dwt worth USD18bn are sold and bought each year (Clarkson Research, 2021). The Clarkson database is world leading with weekly price quotes on most vessel types. The liquidity of the market makes it possible to rely on the data and estimate a beta coefficient for each vessel type. As vessel transactions is a slow business, two quarters of lag is applied when comparing returns on vessels prices and the MSCI World Index. The choice of lag is determined by looking at what lag generated the best regression fit, R^2. The vessel used for this was a 5-year old Handysize bulker. The vessel type is chosen as it is the most liquid of the vessels in the Ocean Yield fleet with an average of 161 yearly sales since 1995, and the vintage is chosen as it is an industry standard and is in the midrange of the duration of a typical project. Two quarters yielded an R^2 of 0.1418 and beta of 0.70. While the R^2 is low, the two quarter lag also yields the best fit on Suezmax tankers (26 annual sales on average) with an R^2 of 0.4176 and a beta of 0.95. The returns are generated on a year-over-year basis with quarterly quotes.

The beta coefficient for a 5-year old Capesize is 0.824, significant with a t-value of 6.53 and an R^2 of 0.22. With an equity risk premium of 5.2%, the risk-spread[30] over US Treasury is 4.28%. As the counterpart in this example provides 10% of the gross investment as minority equity, the exposure to the asset is reduced to 90% and the risk-spread is adjusted accordingly to 3.86%.

Figure 3: Regression result, 5-year old Capesize vs. MSCI World Index



Source: Bloomberg, Clarkson Reserach

7.2.5 LIBOR adjustments

It now remains to adjust bareboat hire daily rate with the LIBOR-curve. The current swap curve is found in Bloomberg. But the swap rates are not useful in themselves, as the interest rate adjustment to the hire is based on the 3M LIBOR over a given period in the future. The interest rate needed is thus the forward rate. It can be found by looking at market quotes for forward rate agreements (FRA) or futures, or it can be calculated as the expected interest rate

[30] The term risk-spread is used to make a distinction between the risk-free part of the WACC and the additional compensation required to take on market risk. It is equivalent to risk premium.

between two yields with different maturities. The formula $(1+r_n)=\frac{(1+y_n)^n}{(1+y_{n-1})^{n-1}}$ $(1+r_n)=\frac{(1+y_n)^n}{(1+y_{n-1})^{n-1}}$ where r_n is the forward rate in period n, y_n is the interest rate from the time of observation to period n, and y_{n-1} is the interest rate from the time of observation to one period before n (Bodie, Kane, & Marcus, 2014). The forward rate then becomes the implied rate at which the proceeds from an investment at a rate y_{n-1} for n-1 periods must be reinvested at in period n-1 to get the equivalent rate of y_n over n periods. This is done in table 7 and added to the annual hire payments as an interest paid on the outstanding lease in period n-1. The value of the outstanding lease is based on a serial loan structure in this example, while it varies from project to project otherwise.

7.2.6 Net present value

Due to the interest rate sensitivity and the visibility of the project cash flows, the choice of risk-free rate tenor is important. Using the 10-year US Treasury rate would discount the early cash flows too aggressively, while using the 1-year US Treasury rate would discount the late cash flows too passively (given that the yield curve is rising). The answer is to discount each period with the individual US Treasury rate. 4-, 6-, 8- and 9-year US Treasury bonds are not traded, so interpolation is used to find the appropriate rate for these periods. The net present value of the project then becomes USD4.2m. Using the 1-year US Treasury rate would yield an NPV of USD7.7m while the 10-year would yield USD3.3m, illustrating the importance of individual period discount rates.

Table 7: Project valuation, example

Period	0	1	2	3	4	5	6	7	8	9	10
US Treasury		0.07%	0.16%	0.34%	0.59%	0.83%	1.06%	1.26%	1.38%	1.49%	1.58%
LIBOR swap rate		0.21%	0.28%	0.46%	0.70%	0.91%	1.10%	1.25%	1.38%	1.48%	1.56%
LIBOR forward rate		0.21%	0.34%	0.84%	1.40%	1.77%	2.03%	2.21%	2.25%	2.30%	2.33%
Outstanding lease	45	42.0	39.0	36.0	33.0	30.0	27.0	24.0	21.0	18.0	15.0
Libor adjustment		0.10	0.14	0.33	0.50	0.58	0.61	0.60	0.54	0.48	0.42
Libor adjusted CF	-45.0	4.9	4.9	5.1	5.3	5.4	5.4	5.4	5.3	5.3	20.2
Discount rate		3.92%	4.02%	4.20%	4.45%	4.69%	4.91%	5.12%	5.23%	5.35%	5.44%
Discount factor	1	0.96	0.92	0.88	0.84	0.80	0.75	0.71	0.66	0.63	0.59
PV of CF	-45.0	4.7	4.6	4.5	4.5	4.3	4.1	3.8	3.6	3.3	11.9
NPV	4.2										

Source: Bloomberg, Own calculations

7.3 Asset beta overview and risk-spread

An overview of the key return statistics and regression properties of the assets in the Ocean Yield fleet is found in table 8.

Table 8: Return statistics and regression analysis for traded assets

	Mean	Median	Std.dev	Min	Max	Beta	R^2
MSCI	8.8%	10.0%	17.8%	-44.0%	54.9%	1.00	1.00
5Y Suezmax	7.2%	4.7%	26.0%	-46.7%	122.2%	0.95	0.42
5Y VLCC	9.3%	4.9%	33.7%	-59.2%	170.0%	1.04	0.30
5Y LR2	-1.8%	-2.1%	20.1%	-50.6%	40.0%	0.74	0.39
5Y product tanker, 51k dwt	3.8%	6.2%	19.1%	-50.0%	50.0%	0.55	0.25
5Y product tanker, 37k dwt	4.4%	5.3%	22.0%	-51.1%	91.7%	0.56	0.21
5Y Handysize bulker	6.4%	4.3%	33.1%	-61.1%	125.8%	0.70	0.14
5Y Ultra-/Kamsarmax 75k dwt	6.0%	2.4%	32.1%	-70.6%	94.6%	0.72	0.16
5Y Capesize	6.6%	1.8%	31.3%	-70.0%	87.5%	0.82	0.22
Containership index	1.6%	-1.8%	32.1%	-62.7%	92.0%	0.86	0.22

Source: Clarkson Reserach, Bloomberg

For the assets without any historical market quotes, the unlevered beta for companies with the corresponding underlying assets is applied. For instance, the unlevered beta for the car carrier owner Wallenius Wilhelmsen is applied for the pure-car-carrier (PCC) projects with Hoegh Autoliners. For the assets with minority equity, the beta is weighted with Ocean Yields exposure to the asset, lowering the cost of capital. For instance, the unlevered beta for a Suezmax is 0.95, and the counterpart NAT provides USD11m of the gross investment of USD55m (20%), leaving Ocean Yield’s exposure to the asset at 80%, hence the risk-spread will be 80% of the unlevered cost of equity of the asset.

Table 9: Project beta and risk-spread

Name	**Vessel type**	**Owner -ship**	**Counterpart**	**Asset beta**	**Risk-spread**	**Comment**
Dhirubhai-1	FPSO	100%				Not valued by DCF
FAR Statesman	AHTS	100%				Not valued by DCF
FAR Senator	AHTS	100%				Not valued by DCF
NS Frayja	PSV	100%	Aker BP	1.26	6.80%	Aker BP unlevered beta
NS Orla	PSV	100%	Aker BP	1.26	6.80%	Aker BP unlevered beta
Hoegh Tracer	PCC	100%	Höegh Autoliners	0.94	5.08%	Wallenius Wilhelmsen unlevered beta
Hoegh Trapper	PCC	100%	Höegh Autoliners	0.94	5.08%	Wallenius Wilhelmsen unlevered beta
Hoegh Jacksonville	PCC	100%	Höegh Autoliners	0.94	5.08%	Wallenius Wilhelmsen unlevered beta
Hoegh Jeddah	PCC	100%	Höegh Autoliners	0.94	5.08%	Wallenius Wilhelmsen unlevered beta
Hoegh Beijing	PCC	100%	Höegh Autoliners	0.94	5.08%	Wallenius Wilhelmsen unlevered beta
GasChem Orca	LEG	100%	Hartmann/SABIC	0.83	4.47%	BW LPG unlevered beta

GasChem Beluga	LEG	100%	Hartmann/SABIC	0.83	4.47%	BW LPG unlevered beta
Aker Wayfarer	OCV	100%	Akastor	0.70	3.81%	Akastor unlevered beta
Genoa Express	Container	100%	CMB	0.86	4.65%	Clarkson secondhand containership index
Detroit Express	Container	100%	CMB	0.86	4.65%	Clarkson secondhand containership index
Livorno Express	Container	100%	CMB	0.86	4.65%	Clarkson secondhand containership index
Barcelona Express	Container	100%	CMB	0.86	4.65%	Clarkson secondhand containership index
Milos	Suezmax	100%	Okeanis Eco Tankers	0.95	4.47%	Clarkson 5Y Suezmax
Poliegos	Suezmax	100%	Okeanis Eco Tankers	0.95	4.45%	Clarkson 5Y Suezmax
Nissos Antiparos	VLCC	100%	Okeanis Eco Tankers	1.04	5.00%	Clarkson 5Y VLCC
Nissos Santorini	VLCC	100%	Okeanis Eco Tankers	1.04	5.00%	Clarkson 5Y VLCC
Nissos Despotiko	VLCC	100%	Okeanis Eco Tankers	1.04	5.00%	Clarkson 5Y VLCC
Nissos Reina	VLCC	100%	Okeanis Eco Tankers	1.04	5.00%	Clarkson 5Y VLCC
STI Symphony	LR2	100%	Scorpio Tankers	0.74	3.78%	Clarkson 5Y LR2
STI Sanctity	LR2	100%	Scorpio Tankers	0.74	3.78%	Clarkson 5Y LR2
STI Steadfast	LR2	100%	Scorpio Tankers	0.74	3.78%	Clarkson 5Y LR2
STI Supreme	LR2	100%	Scorpio Tankers	0.74	3.78%	Clarkson 5Y LR2
Navig8 Tanzanite	Chemical	100%	Navig8 Chemical Tankers	0.55	2.68%	Clarkson 5Y product tanker, 51k dwt
Navig8 Turquoise	Chemical	100%	Navig8 Chemical Tankers	0.55	2.68%	Clarkson 5Y product tanker, 51k dwt
Navig8 Azotic	Chemical	100%	Navig8 Chemical Tankers	0.56	2.72%	Clarkson 5Y product tanker, 37k dwt
Navig8 Aronaldo	Chemical	100%	Navig8 Chemical Tankers	0.56	2.72%	Clarkson 5Y product tanker, 37k dwt
Navig8 Constellation	Chemical	100%	Navig8	0.55	2.47%	Clarkson 5Y product tanker, 51k dwt
Ardmore Defender	Chemical	100%	Ardmore Shipping	0.56	3.02%	Clarkson 5Y product tanker, 37k dwt
Ardmore Dauntless	Chemical	100%	Ardmore Shipping	0.56	3.02%	Clarkson 5Y product tanker, 37k dwt
NAT NB #1	Suezmax	100%	Nordic American	0.95	4.09%	Clarkson 5Y Suezmax
NAT NB #2	Suezmax	100%	Nordic American	0.95	4.09%	Clarkson 5Y Suezmax
Interlink Levity	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
Interlink Sagacity	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
Interlink Dignity	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
Interlink Priority	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
Interlink Amenity	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
La Fresnais	Handysize	100%	Louis Dreyfus Armateur	0.70	3.79%	Clarkson 5Y Handysize bulker
Mineral Qingdao	Capesize	100%	CMB	0.82	4.45%	Clarkson 5Y Capesize bulker
Interlink Eternity	Handysize	100%	Interlink Maritime	0.70	3.79%	Clarkson 5Y Handysize bulker
Navigator Aurora	LEG	100%	Navigator Gas	0.83	4.47%	BW LPG unlevered beta
Bulk Shanghai	Capesize	100%	2020 Bulkers	0.82	4.45%	Clarkson 5Y Capesize bulker
Bulk Seoul	Capesize	100%	2020 Bulkers	0.82	4.45%	Clarkson 5Y Capesize bulker
MSC Leanne	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
MSC Rifaya	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
MSC Mirjam	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
MSC Eloane	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
MSC Ingy	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
MSC Diana	Container	50%	MSC (JV)	0.86	4.65%	Clarkson secondhand containership index
Navig8 Pride	Chemical	50%	Aker (JV)	0.74	3.57%	Clarkson 5Y LR2
Navig8 Providence	Chemical	50%	Aker (JV)	0.74	3.57%	Clarkson 5Y LR2
Navig8 Prestige	Chemical	50%	Aker (JV)	0.74	3.57%	Clarkson 5Y LR2
Navig8 Precision	Chemical	50%	Aker (JV)	0.74	3.57%	Clarkson 5Y LR2

Nordic Cygnus	Suezmax	50%	Aker (JV)	0.95	3.96%	Clarkson 5Y Suezmax
Nordic Aquarius	Suezmax	50%	Aker (JV)	0.95	3.96%	Clarkson 5Y Suezmax
Nordic Tellus	Suezmax	50%	Aker (JV)	0.95	3.96%	Clarkson 5Y Suezmax

Source: Clarkson Research, Bloomberg

7.4 Fleet valuation

The basis for the valuation of Ocean Yield is year-end 2020. Balance sheet items used in the valuation are as per 31st of December 2020. In the cash flow projections, period 1 is 2021 and period 2 is 2022 etc.

The last project ends in period 15, but for practical purposes period 10-15 is aggregated in table 10. Table 10 shows the expected cash flows from the entire fleet. USD8m of capex is due in period 1 and USD80m is due in period 2 for two Suezmax newbuilds. Announced sales of vessels that are not included in the project overview table are included in cash flows in period 1, discounted by the WACC of the corresponding vessel type. The remaining cash flows are LIBOR-adjusted charter hire, using the forward LIBOR rates shown in table 7. The WACC is the cash flow-weighted average risk-spread in each period, added to the US Treasury rate. Overhead expenses of USD8m is expected in each period, although this would probably see a decreasing trend if new projects are not added to the portfolio. However, assuming that new projects will be added, it is a fair assumption that overhead expenses will keep up. Tax payments are included here.

If the market analysis had uncovered segments where the expected cash flow is less than the contracted charter hire implies, adjustments would be made for individual projects. However, the market analysis does not expose segments where adjustments to expected cash flows are needed. This is a discretionary assessment.

The discount factor is multiplied by the sum of project cash flows and overhead cost to get the present value of each period cash flow. The value of the fleet sums to USD2,625m and the value-weighted average beta of the fleet is 0.84.

Table 10: Cash flow from fleet and valuation.

Period	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10+**
US Treasury	0.07%	0.16%	0.34%	0.59%	0.83%	1.06%	1.26%	1.38%	1.49%	1.58%
WACC	4.05%	4.77%	4.75%	5.00%	5.24%	5.58%	5.57%	5.77%	6.08%	5.79%
Project cash flow	459	225	292	298	299	411	362	378	261	752

Overhead cost	-8	-8	-8	-8	-8	-8	-8	-8	-8	-48
Discount factor	0.96	0.91	0.87	0.82	0.77	0.72	0.68	0.64	0.59	0.52
PV	433.0	197.6	246.8	238.3	225.5	290.7	242.5	236.3	148.6	365.8

Source: Bloomberg, Own calculations

7.5 Growth potential

Having established a fair value of the current fleet, the favourable market outlook with increasing vessel orderbooks leaves room to make assumptions on fleet expansion. This could be omitted by assuming that new investments are done at ROIC = WACC, but as the USD2,625m fleet value implies a 10% premium to invested capital[31], it is likely that RONIC>WACC.

Valuation of growth will build on four key assumptions; what will the new project IRR's be, what will the WACC be, how much capital will be invested annually and for how long. Firstly, the most important assumption is that IRR on new projects are higher than WACC. As mentioned, the V/IC[32] multiple is estimated at 1.10x on the current fleet. Assuming improved performance by the investment team in Ocean Yield and that expected increase in demand for financing will lead to higher spreads, the expected RONIC/WACC is set to 1.20x. This implies that all new investments are expected to be value accretive. The WACC is set as the average WACC in the financial lease projects, representing investments in dry bulk, tanker and container vessels. The current fleet consists of 60 vessels. Assuming the average price for a new vessel is USD50m, USD315m (gross investment USD350m, 10% minority equity) in periods 2, 3 and 4 would leave a fleet of 80 vessels going into period 4. With an average project length of 10 years, 8 new projects must be undertaken annually to keep the fleet size unchanged as vessels are sold at the end of the lease period (purchase options are exercised), amounting to USD360m of investments in vessels annually.

Investing USD360m[33] with an IRR of 4.53% for a period of 10 years, yields a NPV of USD13.7m with a WACC of 3.77%. With a D/E-ratio of 3.5 and a cost of debt at 2.00%, the

[31] Invested Capital = book values of net interest bearing debt + equity. Proportionate JV debt is included, and book values of Dhirubhai-1, Far Senator and Far Statesman are excluded.

[32] Value/Invested Capital

[33] Eight vessels, USD50m each, 10% minority equity.

implied cost of equity is 9.97%. Thus, the value of reinvesting to maintain the fleet at a RONIC>WACC is NOK4.1 per share, discounted to period 0. The value of investments for fleet growth in period 2 and 3 is NOK1.6. In total, the value of growth and reinvestments is estimated to NOK5.7 per share.

Note that the calculations above are done without any risk-free rate. This is possible as WACC is a spread over the risk-free rate and the charter hire is adjusted with LIBOR, making IRR a spread over LIBOR. Due to the tight correlation and arbitrary difference between the 10 year LIBOR swap and the 10 year US Treasury, no further adjustments are done to the valuation of growth in this respect.

Table 11: Valuation of reinvestmens

IRR	WACC	Annual investment	Annual value creation	COE	Perpetual value	Discounted to period 0	Per share
4.53%	3.77%	360	13.7	9.97%	138	86	4.1

Source: Own calculations

7.6 Other assets and net interest-bearing debt

The three assets *Dhirubhai-1*, *Far Senator* and *Far Statesman* are not included in the fleet valuation. *Dhirubhai-1* is without any employment and is expected to be scrapped in period 1. The scrap value is estimated at USD15m, as a function of the 43.000 tonnes of lightweight steel in the asset, and a USD350/tonne expected scrap price. The present value is USD14m. *Far Senator* and *Far Statesman* are sister ships and the cash flows from these assets have low visibility and are uncertain. When the vessel Connector was sold in 2020, the price was equal to the outstanding debt. This approach is reasonable as the two vessels currently covers their operating costs and are not of great worry from an operational point of view. The possibility for a market upswing at a point in the future is still present, making it likely that the company will demand a debt-cancelling price or above to sell the assets. The outstanding debt is USD47m combined, and this is used as the fair value. The total value of these three assets is estimated to USD61m. The upside potential to valuation is significant should these vessels find firm employment.

With regards to debt, the book value of USD1,611m is used as the three outstanding bonds trades at par. The USD125m perpetual bond also trades at par and, and as this is a valuation of the listed Ocean Yield equity, it is included as debt. USD330m is Ocean Yield's share of JV debt and is also included. This totals gross USD2,066m and nets to USD1,976 after deducting USD144m of cash and including USD25m of negative working capital. The net asset value of USD710m equates to NOK34.4 per share. Adding the NOK5.7 value of growth and reinvestments, the fair value of the Ocean Yield equity is estimated at NOK40.1.

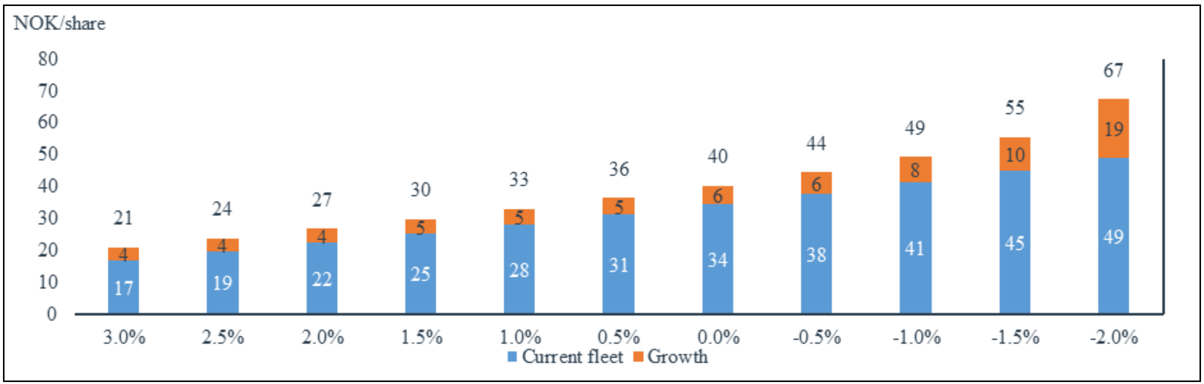
Table 12: Valuation summary

NPV of fleet (USDm)	2625
Dhirubhai-1, Far Senator and *Far Statesman* (USDm)	61
Net interest-bearing debt, incl. JV debt, hybrid bond and WC (USDm)	-1976
Net Asset Value (USDm)	710
NAV per share (NOK, 175.2m shares outstanding, USD/NOK 8.5)	34.4
Value of growth and reinvestments (NOK per share)	5.7
Ocean Yield Equity value (NOK per share)	40.1

Source: Own calculations

The valuation of the fleet is sensitive to WACC. The graph below shows the change in the value of the total equity with change in WACC. With a 2% lower WACC, the cost of equity in the growth component gets very close to zero (cost of debt assumed constant at 2.00%), driving the value of growth and reinvestments to NOK18.6 per share.

Figure 4: Equity value per share sensitivity to change in WACC



Source: Own calculations

8. Conclusion

The risk of each vessel and the charters attached to them has through this thesis been considered in the well-established theoretical framework known as CAPM. The expected free cash flow from each vessel is discounted at an unlevered cost of equity, aggregating to the value of the fleet Ocean Yield currently owns. Further, assumptions are made on value accretive growth and reinvestments of proceeds from expected vessel sales.

The valuation of the current fleet is aimed to be unbiased. Sensitivity analysis does however show significant sensitivity to the WACC. The key source of uncertainty in the valuation is the applied equity risk premium. The addition of a growth element in the valuation is discretionary and based on a market analysis of the expected demand for ship financing in the coming years. The market analysis also aims to uncover segments where discretionary adjustments to expected cash flows are needed, but no adjustments are done on the back of this. Vessels without firm employment are valued on a conservative basis.

Investments in new vessels are key for Ocean Yield going forward. The thesis argues that the company invests with a ROIC >WACC, creating shareholder value with each investment. This leaves upside to the value of growth, both in terms om value accretive fleet expansion to a size above the 80 vessels expected in this thesis, as well as the increased number of reinvestments needed annually to maintain the fleet size.

The aim of this thesis was to estimate a fair value of the Ocean Yield through a fundamental analysis. The valuation yielded an estimated equity value of NOK40.1 per share. This is 34.6% above the latest quote from the Oslo Stock Exchange of NOK29.78 on the 1st of June 2021. Based on this view, an investor should hold an overweight of the Ocean Yield share in comparison to its weight in the market portfolio.

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10. Appendix

Table 13: Ocean Yield balance sheet statement 2015-20

Balance sheet (USDm)	2015	2016	2017	2018	2019	2020
Goodwill	9.8	9.8	9.8	0.0	0.0	0.0
Vessels and equipment	1,239.5	1,243.8	1,310.8	1,195.6	1,053.7	550.4
Investment in assoiciates	0.0	187.4	188.7	191.9	178.2	178.0
Finance lease receivables	388.1	703.5	719.8	1,171.8	1,703.4	1,384.2
Investment in AMSC bonds	192.6	197.5	49.0	0.0	0.0	0.0
Restricted cash deposits	24.6	23.8	1.5	16.1	22.7	1.3
Other interest bearing receivables, long	0.6	1.2	2.0	1.8	1.6	1.6
Fair value of derivatives, assets	0.0	0.0	0.0	0.0	0.0	0.0
Shares in Solstad Farstad	0.0	0.0	6.5	1.7	1.0	0.0
Deferred tax assets	36.4	20.5	2.8	0.0	0.1	0.0
Other long term assets	0.0	0.0	0.0	0.0	0.0	0.0
Total non-current assets	**1,891.6**	**2,387.5**	**2,290.9**	**2,578.9**	**2,960.7**	**2,115.5**
Trade receivables and other	15.5	21.7	53.5	37.6	7.1	4.2
Cash and cash equivalents	117.7	165.5	98.7	110.0	185.5	112.7
Other current assets	0.0	0.0	0.0	0.0	0.0	54.0
Total current assets	**133.2**	**187.2**	**152.2**	**147.6**	**192.6**	**170.9**
Total assets	**2,024.8**	**2,574.7**	**2,443.1**	**2,726.5**	**3,153.3**	**2,286.4**
Interest bearing debt, long-term	974.8	1,380.4	1,401.4	1,572.0	1,909.0	1,143.8
Deferred tax liabilites	0.0	0.0	0.0	0.0	2.6	5.2
Pension liabilites	0.3	0.4	0.4	0.0	0.0	0.0
Mobilization fee	31.2	34.5	30.6	12.2	5.7	0.6
Fair value of derivatives, long-term	68.7	26.1	11.8	26.7	23.7	13.7
Non-current provisions	26.6	28.5	30.1	25.7	12.4	0.0
Other non-current liabilities	2.2	2.8	0.0	0.0	2.6	0.6
Total non-current liabilities	**1,103.8**	**1,472.7**	**1,474.3**	**1,636.6**	**1,956.0**	**1,163.9**
Interest bearing debt, short-term	184.1	173.4	109.0	190.9	276.2	467.0
Fair value of derivates, short-term	5.6	41.3	7.5	16.0	22.5	5.3
Trade and other payables	22.5	14.4	20.8	37.3	22.0	10.1
Other current liabilites	0.0	57.7	0.0	0.0	0.0	2.2
Total current liabilities	**212.2**	**286.8**	**137.3**	**244.2**	**320.7**	**484.6**
Total liabilities	**1,316.0**	**1,759.5**	**1,611.6**	**1,880.8**	**2,276.7**	**1,648.5**
Shareholder equity	**697.2**	**804.2**	**821.1**	**845.7**	**738.4**	**512.7**
Hybrid bond	0.0	0.0	0.0	0.0	125.0	125.0
Minority interest	11.6	11.0	10.4	0.0	13.2	0.0
Total liabilities and equity	**2,024.8**	**2,574.7**	**2,443.1**	**2,726.5**	**3,153.3**	**2,286.2**

Table 14: Ocean Yield income statement with adjustments 2015-20

Income statement (USDm)	2015	2016	2017	2018	2019	2020
Operating revenues	233.1	241.7	249.3	236.3	107.1	95.7
Finance lease reveneue	23.6	45.9	65.8	83.1	114.1	112.5
Income from associates	0.0	6.7	24.0	24.1	22.9	22.4
Other income	0.0	0.0	0.0	0.0	12.9	28.5
Total revenues	**256.7**	**294.3**	**339.1**	**343.4**	**257.0**	**259.1**
Vessel operating expenses	-15.5	-17.8	-18.2	-23.2	-14.5	-10.0
Wages and personnel expenses	-12.7	-6.1	-7.4	-8.5	-9.2	-6.6
Other operating expenses	-4.5	-5.2	-7.1	-9.5	-10.3	-5.7
Write down on trade receivables	0.0	0.0	0.0	-19.5	-0.4	0.0
EBITDA reported	**224.0**	**265.2**	**306.4**	**282.7**	**222.6**	**236.8**
Depreciation and amortization	-96.5	-99.8	-102.7	-98.7	-74.3	-45.6
Impairments and gains/loss on charter/vessels	-28.6	-36.2	0.0	-32.2	-80.6	-227.8
EBIT reported	**98.9**	**129.2**	**203.7**	**151.8**	**67.6**	**-36.6**
Financial income	18.2	18.9	13.4	3.2	2.3	2.3
Financial expenses	-37.6	-54.9	-72.0	-86.0	-104.3	-84.7
Foreign exchange gain/losses	41.5	-5.9	-37.4	16.0	1.6	-39.8
Change in fair value of fin. Instruments	-40.4	6.9	41.8	-23.2	-3.7	26.8
Net profit before tax	**80.6**	**94.2**	**149.5**	**61.8**	**-36.6**	**-132.0**
Tax payable	0.0	-0.2	-2.0	-0.4	-0.9	-0.4
Change in deferred tax	24.6	-16.4	-17.9	-2.8	-2.4	-2.8
Non-controlling interest	-1.1	-1.3	-1.6	-1.4	-3.5	-10.1
Net income (loss)	**104.1**	**76.3**	**128.0**	**57.2**	**-43.4**	**-145.3**
Adjustments:						
EBITDA	**224.0**	**265.2**	**306.4**	**282.7**	**222.6**	**236.8**
Repayment on lease receivables	10.9	26.1	34.4	50.9	80.5	97.3
EBITDA adj. financial lease repayment	**234.9**	**291.3**	**340.8**	**333.6**	**303.1**	**302.3**
EBIT	**98.9**	**129.2**	**203.7**	**151.8**	**67.6**	**-36.6**
Adjustments	28.6	36.2	0.0	32.2	80.6	227.8
EBIT adjusted	**127.5**	**165.4**	**203.7**	**184.0**	**148.2**	**191.2**
Net income reported	**104.1**	**76.3**	**128.0**	**57.2**	**-43.4**	**-145.3**
Adjustments	2.9	53.3	8.0	63.0	86.0	218.8
Net income adjusted	**107.0**	**129.6**	**136.0**	**120.2**	**42.6**	**73.5**

Table 15: Ocean Yield cash flow statement 2015-20

Cash flow (USDm)	2015	2016	2017	2018	2019	2020
Net profit before non-controlling	**80.6**	**94.2**	**149.5**	**61.8**	**-36.6**	**-138.9**
Depreciation and amortization	125.2	136.1	102.7	98.7	74.3	45.6
Impairment charge and other non-recurring	0.0	0.0	0.0	32.2	80.6	226.9
Income from associate investments	0.0	-6.7	-24.0	-24.1	-22.9	-22.4
Dividends from associate investments	0.0	0.0	20.5	22.6	21.2	18.1
Net interest expense	0.0	21.9	61.6	79.9	100.4	77.4
Interest paid	0.0	-25.0	-63.9	-74.6	-96.2	-78.9
Interest received	0.0	6.9	6.5	4.9	7.4	2.4
Unrealized foreign exchange gain/loss	0.0	2.8	11.7	-15.1	-6.0	-2.3
Change in fair value of fin. Instruments	0.0	-7.0	-41.9	23.2	3.7	-26.8
Other operating activites	-16.6	-28.5	-52.3	-17.0	-6.0	-47.6
Accrued interest earings on FPSO	0.0	0.0	0.0	0.0	0.0	0.0
Net cash used in operating activities	**189.3**	**194.7**	**170.3**	**192.5**	**120.0**	**53.5**
Acquisition of vessels and equipment	-52.1	-121.6	-163.4	-2.6	-0.4	-4.3
Acquisition of financial lease receivables	-130.5	-248.6	-47.0	-411.0	-568.5	-91.0
Repayment on financial lease receivables	10.9	26.0	34.3	50.8	80.6	97.1
Investments in non-current assets	-113.3	-92.1	-0.5	-91.9	-45.8	1.9
Net change in associated companies	0.0	-104.2	-57.7	-1.6	0.0	10.2
Net change in long-term interest receivables	-4.8	1.1	175.1	33.5	-6.6	19.8
Sale of assets	0.0	0.0	0.0	0.0	0.0	207.4
Other investing activities	-0.2	0.0	0.0	1.4	0.0	42.5
Net cash investing activites	**-290.0**	**-539.4**	**-59.2**	**-421.3**	**-540.6**	**283.6**
Proceeds from issuance of long-term IB debt	513.1	630.7	225.0	530.9	772.8	195.1
Proceeds from growth debt	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of long-term IB debt	-291.5	-247.0	-290.8	-263.5	-354.2	-532.0
Repayment of growth debt	0.0	0.0	0.0	0.0	0.0	0.0
Divdends paid	-80.8	-94.0	-110.2	-119.1	-121.6	-60.0
Dividends to non-controlling interests	0.0	-2.0	-2.1	-1.8	-2.7	-9.9
Net proceeds from hybrid capital issue	0.0	0.0	0.0	0.0	123.1	0.0
Net proceeds from share issuance	2.0	105.1	0.0	95.5	77.3	0.0
Treasury shares sold	-0.2	0.0	0.1	-0.2	-0.8	0.1
Other financial items	0.0	0.0	0.0	0.0	0.0	0.0
Share buybacks	0.0	0.0	0.0	0.0	0.0	0.0
Refinancing of debt	0.0	0.0	0.0	0.0	0.0	0.0
Net cash financing activities	**142.6**	**392.8**	**-178.1**	**241.8**	**493.9**	**-406.7**
Adjustments (foreign exhange)	-0.3	-0.2	0.1	-1.6	2.5	-3.8
Net change in cash and cash equivalents	**41.7**	**47.9**	**-66.9**	**11.4**	**75.7**	**-73.4**
Cash start of period	76.4	117.7	165.5	98.7	110.0	185.5
Cash end of period	**118.1**	**165.6**	**98.6**	**110.1**	**185.7**	**112.1**

Figure 5: Ocean Yield share price development vs. OSEBX (NOK)

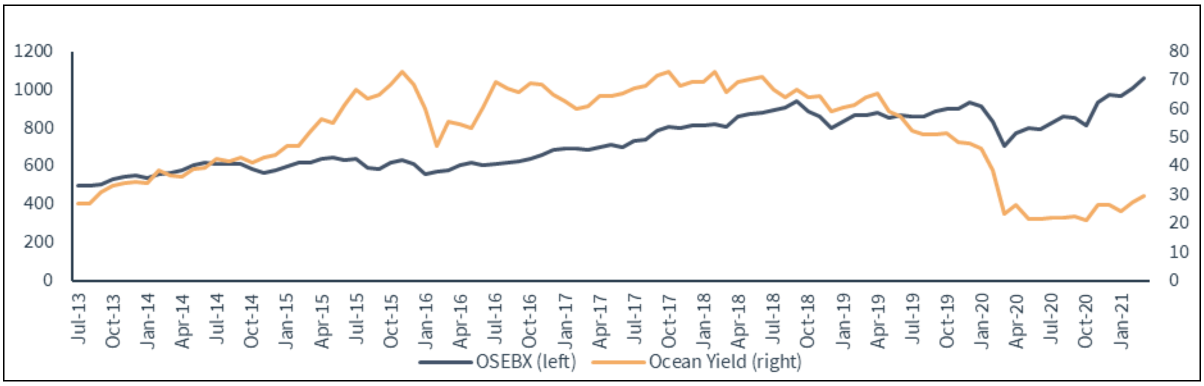

Figure 6: Ocean Yield share price development vs. MSCI World Index (USD)

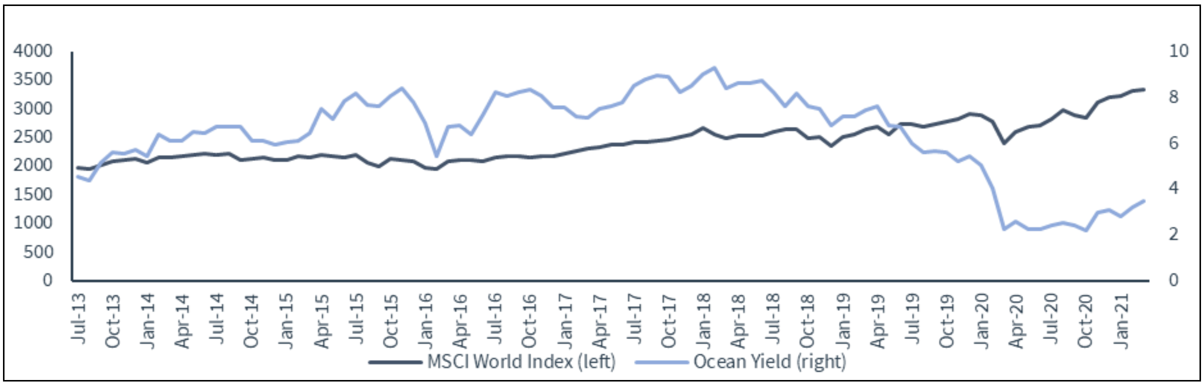

Table 16: Q3 2019 balance sheet

Balance sheet (USDm)	Q4 2018	Q2 2019	Q3 2019	Q3 2019 without hybrid
Vessels	195.6	160.2	1066.9	1066.9
Cash	110	86.9	176	52.9
Other assets	2421	2560.4	1649.1	1649.1
Total assets	2726.6	2807.5	2892.0	2768.9
Shareholders and minority equity	845.7	797	694.1	694.1
Hybrid capital	0	0	123.1	0
Equity	845.7	797	817	694
Equity ratio	31.0%	28.4%	28.3%	25.1%
Equity ratio excl. hybrid	31.0%	28.4%	24.0%	25.1%

Table 17: 2020 Balance sheet with JV

Balance sheet (USDm)	**2020**	**2020**	**2020**
	Q2	**Q2 JV accounts**	**Q2 without JV**
Finance lease receivable	1254.5	246.6	1501.1
Investment in associates	173.4		163.3
Cash	106.4		96.1
Other assets	1262.7		1262.7
Total assets	2797	246.6	3023.2
Interest bearing debt	1890	226.6	2116.6
Other liabilities	80.4		80.4
Equity	826.6	20	826.2
Equity and liabilities	2797	246.6	3023.2
Equity ratio	**29.6%**	**8.1%**	**27.3%**
	Q3	**Q3 JV accounts**	**Q3 without JV**
Finance lease receivable	1257.3	244.9	1502.2
Investment in associates	175.1		164.6
Cash	158.6		148.1
Other assets	944.5		944.5
Total assets	2535.5	244.9	2759.4
Interest bearing debt	1770.8	223.9	1994.7
Other liabilities	66.3		66.3
Equity	698.4	21	698.4
Equity and liabilities	2535.5	244.9	2759.4
Equity ratio	**27.5%**	**8.6%**	**25.3%**
	Q4	**Q4 JV accounts**	**Q4 without JV**
Finance lease receivable	1220	239.4	1459.4
Investment in associates	178		168.1
Cash	112.7		102.8
Other assets	775.6		775.6
Total assets	2286.3	239.4	2505.9
Interest bearing debt	1610.8	219.6	1830.4
Other liabilities	37.8		37.8
Equity	637.7	19.8	637.7
Equity and liabilities	2286.3	239.4	2505.9
Equity ratio	**27.9%**	**8.3%**	**25.4%**