Evaluation of a Stochastic Freight Rate Model for Valuating Shipping Companies

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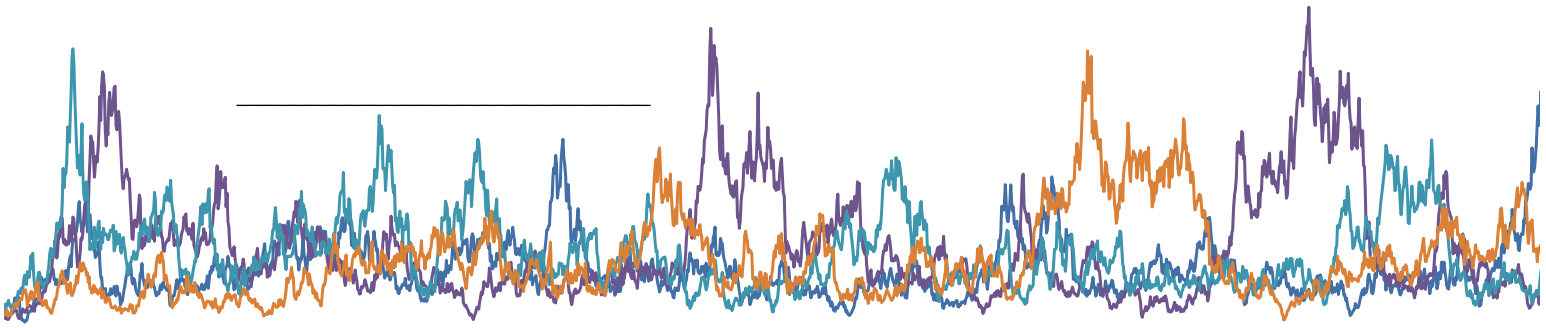

Executive Summary

The valuation of companies in volatile markets is problematic using the discounted cash flow model, because the forecasting of revenues often relies on the analysts' guestimation of a revenue growth rate. In the thesis "*The Valuation of Shipping Companies – A Stochastic Freight Rate Valuation Model*" by A. D. Rasmussen a one-factor stochastic process for forecasting freight rates is developed, that in conjunction with a company's portfolio of ships will generate possible revenues for the DCF model. By applying a Monte-Carlo simulation to this process it is possible to obtain a share price distribution instead of the best, base and worst case scenarios otherwise used. In his thesis Rasmussen only tests the model on a single shipping company and ends up with a fairly good result.

The purpose of this thesis is to evaluate whether or not the model developed by Rasmussen is generally applicable in the valuation of shipping firms regardless of their firm-specific characteristics. This is done by applying the model to five different shipping companies with different financial structures and fleet portfolios.

The thesis starts out by explaining the components of the mean reverting stochastic process that drives the simulation of the freight rate indices; then moves on to describe the state of the shipping industry using Porters Five Forces framework, before applying real world data to the model and examining the results.

The model simulates 8 freight rate indices in total. 4 in the dry-bulk market and 4 in the wet-bulk market. The markets are assumed to be uncorrelated. The valuation of the five companies is done retrospectively, with a valuation date in mid 2009. This is in part done to back-test the models estimated revenues with the actual reported revenues for the companies in the period. The model performance is evaluated based on its ability to generate precise share price estimates and accurate revenues, though the precision of the share price has been given the most weight in the final assessment. To measure precision and compare it between companies the relative standard deviation has been used.

In assessing the accuracy and precision of the results for each company it was found that the accuracy of the revenue estimation to a large extent depended on the accuracy of the analyst's expectations for the development in the fleet portfolio; effectively moving the analyst guesstimation of a revenue growth rate to a guesstimation on fleet development. This is however considered to be a simpler task to accurately estimate due to the fact that most companies do have fairly good estimates of their future fleet development listed in their annual reports. The model was found to be applicable to all five companies, though the quality of the results produced varied greatly from company to company.

A range of sensitivity analysis has been conducted on the size of the fleet portfolio and the amount of debt carried. A linear relationship between revenue and fleet size was found, confirming the expectations from the model results. Furthermore the amount of debt carried by the companies, and consequently their WACC was found to have a profound impact on the models ability to generate precise share price estimates.

In conclusion the accuracy of the revenue estimates is considered to be dubious – at best. And that the fairly precise result obtained by Rasmussen had as much to do with the financial structure of the company he was valuating as the stochastic generation of freight rates. It could not be concluded that the results produced by the model provided better results for an analyst compared to that of a classic DCF model. The information contained in the analysis and estimation of the share price distribution is however very interesting for other fields, such as risk management.

Introduction

The discounted cash flow (DCF) model is well known, well tested and widely used by analysts around the world in valuating companies for mergers and acquisitions or stock market advice on whether to buy or sell a given stock. It is used in valuating everything from real estate to start-ups, but it is common knowledge for anyone who has ever used the discounted cash flow model that the valuation result is extremely sensitive to the analysts' expectations for the future, and thus the expected future revenue and consequently free cash flow generated by the company. Traditionally the forecasting of revenues is done by guesstimating a growth-rate that the revenues are assumed to follow.

While this approach works well in many scenarios and different markets it does creates problems when applied to companies operating highly volatile markets, such as the shipping industry. This increased uncertainty in the growth rate guesstimations will inevitably create an even greater emphasis on the uncertainties of the final valuation. The final valuation is often examined in a sensitivity analysis where different growth rates are tested usually resulting in the classic best, base and worst case scenarios.

In the thesis "*The Valuation of Shipping Companies – A Stochastic Freight Rate Valuation Model*" by A. Rasmussen from 2010 the author develops a model variation of the DCF that replaces the guesstimation of the revenue growth rates with a mean reverting stochastic model (an Ornstein-Uhlenbeck process) to forecast freight rates, and in turn derive the revenue for the DCF model based on the company's portfolio of ships. Mean reverting stochastic processes are fairly common in the world of financial modelling, but the application of them in the field of valuation is not.

By using a Monte-Carlo simulation to capture the effects of the volatile market this approach has the very desirable consequence; that instead of returning one "fixed" result for a valuation, or the best, base and worst case scenarios, it generates a valuation distribution, based on the characteristics of the freight rate indices and the shipping company's portfolio of ships. The case scenarios are no longer needed as analysts will be able to construct confidence intervals instead and the inherent uncertainties would now be visible in the shape of the valuation distribution.

In his thesis Rasmussen (2010) used a single company, D/S Norden, to test his model. His results were promising to say the least. At the time D/S Norden traded at 36 USD per share, his model estimated a share price of 47 USD with a 95% confidence interval going from 42 to 56 USD. Even though the lower band of the confidence interval was well above the trading price at the time, the share price rose over the next couple of months and ended up inside the confidence interval and fairly close to the estimated 47 USD.

Due to limitations in computing power Rasmussen's Monte-Carlo simulations were all limited to 500 iterations; this is very low and might have had an influence on his results. In his sensitivity analysis Rasmussen examines various parameters in the model; most of them related to the simulation of the freight rates in order to determine their influence on the share price estimation.

Problem Specification/Research Question

While the work done by Rasmussen and the results he got are very interesting, one good result with a single company does not necessarily mean that the model will produce equally good results for other shipping companies. The only sensitivity analysis Rasmussen conducted on a company specific parameter was on the fleet portfolios exposure to the spot market, the rest was on market specific parameters. This thesis will take the model to the data on a larger scale in an attempt to determine if the model will produce similar results

regardless of company – and if not then examine what company specific factors that are influential on the models performance.

Research question: Is the stochastic freight role model developed by Rasmussen (2010) generally applicable in the valuation of shipping firms regardless of their firm-specific characteristics?

In order to answer the research question the following sub-questions will be examined:

1) What are the underlying assumptions behind the model, and how is the model specified?
2) How can the model's performance be evaluated? How is it measured?
3) What are the characteristics of shipping firms, and how do different characteristics such as fleet size and leverage affect the model performance?
4) How will the stochastic DCF model perform when applied to multiple shipping companies with different fleet portfolios and financial gearing?
5) Will an analyst seeking to determine whether or not a shipping company is over or undervalued by the market be strictly better off by using the stochastic DCF model as opposed to the classic?

Limitations and assumptions

Please note that this is a model evaluation; *not* a valuation project. The objective is not to determine if company A or company B is over- or undervalued compared to market value that is merely a bi-product of the project. The primary objective is to evaluate the performance and applicability of the stochastic DCF model developed by Rasmussen; that is, his exact model, there will be made no changes to the model. Parameters will be re-estimated but the framework and "engine" is as developed by Rasmussen.

To answer the research question and to simplify an otherwise very complex world, certain limitations and assumptions will be made. Numerous assumptions will be made throughout the thesis; they will all be marked clearly.

General assumptions, limitations and information on used software, tools and services:

- The project will only consider dry and wet bulk shipping markets.
- It is assumed that there is no correlation between wet and dry-bulk markets.
- All valuations are done as if they had been conducted in 2009 and with a valuation date of 16-06-2009.
- Only the DCF valuation framework will be examined. Other valuation models and approaches, such as the residual income model will not be included in the evaluation.
- A large amount of data has been collected through Bloomberg, unfortunately Bloomberg have altered the academic license which CBS uses, so some data that Rasmussen had access to, is no longer available. Efforts to gain access to this data have been taken but to no avail. Instead data is taken from Rasmussen (2010).
- All modeling and simulation is done using Excel 2007.
- SAS Enterprise Guide 5.1 has been used for statistical calculations and analysis when they have been beyond the scope and capabilities of Excel.

The thesis is divided into 7 sections. Section 1 and 2 will go through the methodology and math of the model, most emphasis will be put on the Ornstein-Uhlenbeck process and the technical aspects of it. Section 3 will describe and discuss the characteristics of the shipping market. In this the Porters Five Forces framework will be applied. Section 4 takes the model to the data; starting with a brief description of the

companies, and will apply the methodology explained in Section 1 and 2. Section 5 is an in depth analysis of the model results followed by a sensitivity analysis in section 6. Section 7 concludes on the findings of the project and ends with a discussion of the model, critique points and possible areas for further studies.

1. Section 1 – Methodology

1.1.1. Assessing performance

When assessing the performance of a particular model statistics operate with the two terms *accuracy* and *precision*. Accuracy is often defined as the models estimate being close to the actual value and precision as the model having a small confidence band. Put another way, precision is the term used when talking about the range of possible outcomes returned by the model and accuracy is the distance that the models estimation is from the actual observed value.

Precision will be measured as the relative standard deviation (RSD); that is the standard deviation of the results (obtained from the Monte Carlo simulation) divided by the mean of the model results. To avoid a negative RSD it is calculated by dividing with the absolute value of the mean.

$$RSD = \frac{S.D.}{|Mean|} \quad \text{Eq. 1}$$

Generally the lower the RSD the more precise the model is, there is however no clear-cut rule specifying whether an RSD above or below a certain value is the same as a precise result. The RSD also pose a potential problem when the mean is close to zero, in which case it will explode towards infinity, even though the standard deviation is low in monetary value. Therefore each assessment must be made as a subjective evaluation and depends on a variety of factors, like model construction and the need for precision. However a standard deviation equal to or greater than mean (RSD >= 1) is usually considered a poor precision. Though closely related to the RSD the precision assessment will also consider the range of the confidence band. Relative standard deviation and RSD will be used interchangeably throughout the project and will be reported in percentages.

Accuracy is measured as the distance between the model estimation and the actual value. Since a "true" value is required to measure accuracy and the share price per definition isn't a "true" value (otherwise valuating companies would be meaningless since the result should always be equal to the traded value) revenues will be used as proxies as they have a profound impact on the valuation result, and they are "true" values that can be measured accurately and without subjective interpretation (assuming good and concise accounting principles have been used). The actual measurement of accuracy will be done using the coefficient of determination - R^2, a statistical coefficient for measuring "goodness-of-fit".

Of the two, the precision will mainly be applied to the results of the share price and as such will be the primary factor in determining the models overall performance. This is done because the accuracy of revenues is meaningless unless the end-result and primary reason for using the model, obtaining a share price estimate for a company, is precise enough to be of any value to an analyst.

1.1.2. The Companies

The model will be applied to 5 different shipping companies. The companies have all been chosen based on the availability of their annual reports, they must have annual reports dating back to 2004, and the vast majority of their revenue must be generated from shipping operations in either the dry-bulk market and/or

the wet-bulk market. All monetary values in the annual reports must be in USD and they must provide information on their portfolio of ships. The chosen companies are:

- Dampskibsselskabet NORDEN A/S (NORDEN)
- Frontline Ldt (Frontline)
- Golden Ocean Group Ltd (Golden Ocean)
- Overseas Shipholding Group, Inc (OSG)
- A/S Dampskibsselskabet TORM (TORM)

Both NORDEN and TORM are Danish companies, but with very different financial gearing, they are both listed on the Danish stock exchange in Copenhagen. Frontline was originally a Swedish company but later moved to Bermuda (presumably for tax purposes). Frontline is listed on the Norwegian stock exchange and NYSE. Golden Ocean is a spin-off from Frontline but is an independent company, although with close ties to Frontline. OSG is an American company, they are primarily focused on shipping, but their operations vary to some extend from the other 4 companies. This is done to evaluate how the model responds to "non-standard"[1] shipping operations.

1.1.3. DCF

The model, including the DCF part is the same as used by Rasmussen (2010), and is used as it is. Therefore the same assumptions when calculating value drivers and free cash flows will be used. Minor modifications had to be made to make it fit each of the companies in question. This has primarily been the case when integrating the fleet portfolio into the DCF as the information on those differs greatly from company to company. They follow no reporting standards like the annual reports do. But no changes to the "mechanics" of the model have been made.

All data in the DCF's are obtained from the each of the company's annual reports. The valuation is conducted retrospectively, in the sense that the valuation date is 16-06-2009. There are several reasons for this. First of all the valuation is chosen to be done in the past in order to back-test the models results against the companies actual revenues for the forecasted years. Secondly due to restrictions in data access on the Bloomberg terminals, applied after Rasmussen did his thesis, certain parts of the freight rate data was unavailable, instead data found in Rasmussen's thesis have been used, this data however applies only to 16-06-2009.

The freight rate modeling is done on 8 different indices, 4 in the wet-bulk market and 4 in the dry-bulk market. They represent the four most commonly used types of vessels in each market. In the dry-bulk market the Capesize, Panamax, Supramax, and Handysize indices are used and in the wet-bulk market the Medium Range(MR), Long Range 1(LR1), Long Range 2(LR2) and Very Large Crude Carrier (VLCC) indices are used. Each company's fleet portfolio is then matched up against these indices to forecast the revenues. An Ornstein-Uhlenbeck one-factor stochastic mean reverting process is used to simulate movements in these freight rate indices based on their historical behavior and characteristics.

[1] Here non-standard refers to shipping operation that are not within the dry or wet bulk markets.

2. Section 2 – Theory and Math

The model consists of three main parts; an Ornstein-Uhlenbeck process that in layman terms can be described as the market simulator, generating possible freight rates; the DCF analysis that, based on the company's financial performance and capital structure, estimates a total enterprise value and consequently the estimated share price. The last part of the model is the Monte-Carlo simulation that (in conjunction with the Ornstein-Uhlenbeck process) generates the data for the valuation distribution, which is the primary difference between the classic and stochastic DCF models.

This section will examine the model and its components, though most focus will be put on explaining the Ornstein-Uhlenbeck process and Monte-Carlo simulation. The reader is expected to be familiar with the classic DCF model, and as such only certain crucial elements will be explained, such as the WACC, the estimation of the beta value that goes into it and the calculation of the terminal value.

2.1. The Ornstein-Uhlenbeck Process

According to Rasmussen (2010) one of the main reasons for using an Ornstein-Uhlenbeck (O-U) process to generate revenues, is due to the highly volatile nature of the freight rates and consequently revenues of shipping companies. These volatile revenues pose a problem for the ordinary DCF valuation methodology, because it relies heavily on the often linear or constant growth estimates of future revenue derived from past revenues. By implementing the Ornstein-Uhlenbeck process Rasmussen effectively circumvent this part of the valuation process, replacing it with a fairly advanced financial model. While this might seem to solve the problem of forecasting the volatile revenues it also introduces a range of other decisions and uncertainties. The following will, in short terms, describe how the Ornstein-Uhlenbeck process works, and what new estimations and uncertainties it introduces to the valuation.

An Ornstein-Uhlenbeck process is a mean reverting stochastic process. In other words, it is a random process that over time tends to revolve around its long term mean. The process is designed so that the further from the mean the process is, the stronger the "pull" back towards the mean will be (Smith, 2010). The process is mostly used in its differential form, where it depicts the change in a process X at time t.

$$dX_t = \kappa(\theta - X_t)dt + \sigma dW_t \qquad \text{Eq. 2}$$

Where $\boldsymbol{k}$ is the speed of mean-reversion and $\boldsymbol{\theta}$ the long term mean towards which the process is seeking, $\boldsymbol{\sigma}$ is the volatility of the process and $\boldsymbol{dW_t}$ is a Wiener process. A Wiener process is a continuous-time stochastic process, also called a Brownian motion. In short, this is the random part of the model. Note that the introduction of the Wiener process also introduces the assumption that the error-term in the changes of freight rate indices is normally distributed.

The purpose of the Ornstein-Uhlenbeck process is to model the development of a range of freight rate indices. While stochastically simulating one index independently isn't that much of a challenge, once it has been established that the index is stationary and mean reverting. What makes this complicated are the constraints introduced from the correlation between the different indices. That is; when simulating one index, how do we ensure that the indices follow the same historic correlation? While at the same time ensuring they follow their historical volatility. An often used solution to this problem is applying a Gaussian Copula (see section 2.1.2 for more on Gaussian Copulas).

2.1.1. Testing For Stationarity

One of the paramount premises of using the Ornstein-Uhlenbeck process is that the freight rate indices are (weak) stationary processes, meaning that they have a constant mean, constant variance and constant covariance for each lag (Brooks, 2008 p. 318).

A common method used in testing for stationarity (or non-stationarity) is the Augmented Dickey-Fuller (ADF) test that is testing for the presence of a unit-root in the process. The test hypothesis for the ADF is as follows; H_0: series contains a unit root and H_1: series is stationary.

The Augmented Dickey-Fuller test is expressed as follows:

$$\Delta y_t = \psi y_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + u_t \qquad \text{Eq. 3}$$

Where Δy_t is the first difference of the time series being tested, ψ is the variable being estimated. We wish to test whether $\psi=0$ (H_0) against the alternative $\psi < 0$ (H_1), using the following test statistic.

$$test\ statistic = \frac{\hat{\psi}}{\widehat{SE(\hat{\psi})}}$$

If the test statistic is lower than the critical value the null hypothesis of non-stationarity is rejected.

In order to actually perform an ADF test a few decisions must be made, first one needs to decide on which type of time series that will be tested for a unit root. There are 3 different types of time-series to consider. Random walk, random walk with a drift (single mean) and random walk with drift around a deterministic trend. Since the freight rate indices all have mean returns around 0% and none of them are significantly different from 0, only the pure random walk (no drift and no trend) will be looked at (see section 4.1.1 for mean returns, statistical significance and results of the ADF).

Secondly, in order to have an unbiased estimation of ψ verifying that there is no autocorrelation in the error terms is needed. This is done by running the LM (Lagrange Multiplier) test and, in case of autocorrelation, modifying the random walk with drift equation, introducing as independent variable *i* lags of the dependent variable. This is basically what makes this an augmented Dickey-Fuller test, as opposed to a "simple" Dickey-Fuller test. There will be added as many lags as necessary to obtain a model without autocorrelation.

Stationarity tests for all indices are done using SAS Enterprise Guide 5.1, and detailed results can be found in appendix 1 Testing for Stationarity and a summary can be found in section 4.1.1.

2.1.2. Correlation and the Gaussian Copula

Not surprisingly the freight rates indices are, to varying degrees, correlated. In order to account for this the model needs to look at the interdependencies of them. In general this can be done by applying a copula function or a dependence function as they are sometimes called. A copula is best described as a function that will calculate the joint probability of random variables "moving together" (Umberto. U, 2004). The model uses a Gaussian Copula to capture these movements; more specifically a Cholesky decomposition of the correlation matrices is used, which is very common when running Monte-Carlo simulations that contain multiple stochastically generated correlated variables.

The Cholesky decomposition is any matrix **C** that satisfies:

$$\mathbf{C}^{\mathrm{T}}\mathbf{C} = \mathbf{\Sigma} \quad \text{Eq. 4}$$

Where $\mathbf{\Sigma}$ is the covariance matrix (which is the same as the correlation matrix for standardized random variables) and $\mathbf{C}$ is the Cholesky matrix. In order to use the Cholesky decomposition $\mathbf{\Sigma}$ must meet the following requirements:

- Is symmetric i.e. $\mathbf{\Sigma}^{\mathrm{T}} = \mathbf{\Sigma}$
- The diagonal elements are all positive
- It is positive semi-definite, such that $\mathbf{Z}^{\mathrm{T}}\,\Sigma\,\mathbf{Z}$ is non-negative

All properties found in a correlation matrix.

Letting $\mathbf{Z}$ be an n by m matrix of randomly generated variables and suppose $Z_{i,j} \sim N(0,1)$ i.i.d. for i=1,...,n and j=1,...,m. then $\mathbf{C}^{\mathrm{T}}\mathbf{Z}$ will create an n-by-m matrix with the covariance (and thus the correlation) properties defined in $\mathbf{\Sigma}$.

$$\mathbf{C}^{\mathrm{T}}\mathbf{Z} = \mathbf{K} \quad \text{Eq. 5}$$

Implementing this into the model is then a matter of calculating the Cholesky decomposed matrix of each the correlation matrices and matrix multiplying it with the randomly generated variables - here the Wiener process from Eq. 2.

2.1.3. Parameter Estimation

One of the challenges of using the O-U process is getting accurate parameter estimations. The O-U process uses three parameters: The standard deviation $\boldsymbol{\sigma}$, the speed of mean reversion $\boldsymbol{k}$, and the long term mean $\boldsymbol{\theta}$.

The differential form (Eq. 2) of the process can be written for any size of Δt, and is shown in Eq. 6 (Smith, 2010)

$$\underbrace{X_T}_{y} = \underbrace{\left(1 - e^{-\kappa\Delta t}\right)\theta}_{a} + \underbrace{e^{-\kappa\Delta t}X_{t-1}}_{bX} + \underbrace{\sigma\sqrt{\frac{1 - e^{-2\kappa\Delta t}}{2\kappa}}dW_t}_{\varepsilon_t} \quad \text{Eq. 6}$$

By recognizing that this is a linear equation of the form: $y = a + bx + \epsilon_t$, it is easy to see that by running a regressions analysis the estimated parameters **a** and **b** can be used to express $\hat{k}$ and $\hat{\theta}$. Specifically, it's found that (Smith, 2010):

$$\hat{k} = -\frac{\ln(b)}{\Delta t} \quad \text{Eq. 7}$$

$$\hat{\Theta} = \frac{\mathrm{a}}{1 - b} \quad \text{Eq. 8}$$

The standard deviation $\hat{\sigma}$ is estimated based on the historic returns of each index, rather than by regression analysis.

That the parameter estimates are important is clearly visible in Figure 1 where processes with different values of **k** show examples of just how profound an impact misestimating **k** can have. In estimating **k**, it is also crucial to note whether or not the estimate is positive. A negative **k** will result in an unstable process that in time will explode either towards ∞ or -∞. Figure 1 shows a process where k is -0,0005 ends up being negative.

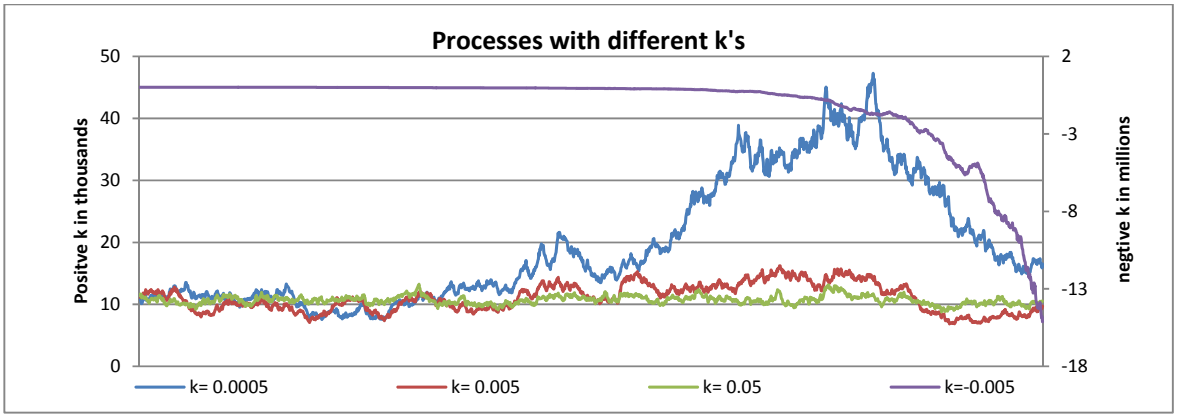

Figure 1: Examples of the O-U process with different k, speed of mean reversion. θ = 10.663 and σ = 1,89%. Source: Own making

2.1.4. Monte Carlo Simulation

So far only the technical specifications of the O-U process has been looked at, but once the models parameters are estimated, and all of the financial data plugged into the DCF we need to instigate a Monte Carlo simulation in order to get anything but a single randomly generated result. The Monte Carlo (MC) simulation is widely used in modelling throughout the financial world.

The MC simulation can be expressed as (Martin, 2010 a):

$$\hat{Y}_n = \frac{h(\boldsymbol{X_1}) + \cdots + h(\boldsymbol{X_n})}{n} \qquad \text{Eq. 9}$$

Where h($\mathbf{X}_1$) is a function of the vector **X**, the MC simulation works under the premise of the Strong Law of Large Numbers that implies: $\hat{Y}_n \to Y \; as \; n \to \infty$ (Martin, 2010 a). Which in layman's terms says that our estimate $\hat{Y}$, will approach its true value Y as the number of iterations, n, approaches infinity. So in theory an infinite number of iterations should be ran to get the true value from the model, but since running an infinite number of iterations by definition is problematic we have to settle for a finite "large" number of iterations.

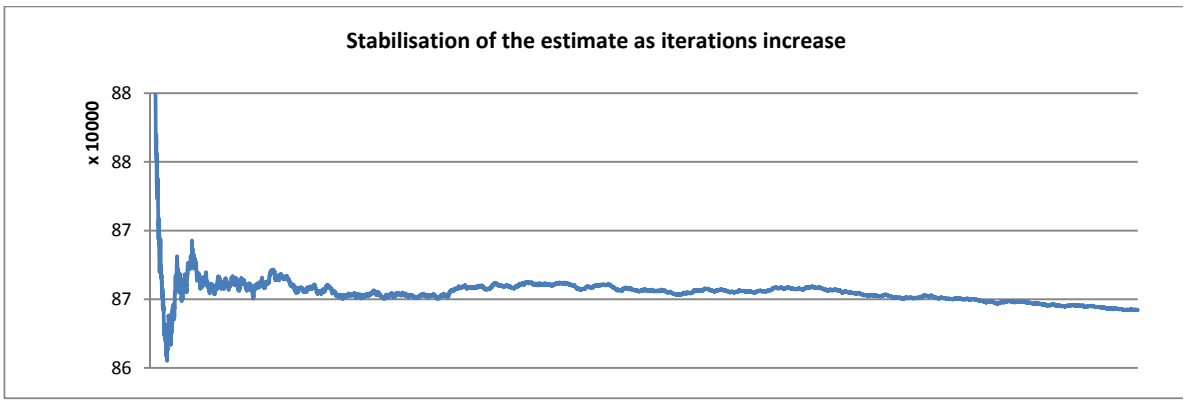

Figure 2: Example of the asymptotic stabilisation of the mean as the number of iterations increase. Source: Own making.

Methods for determining the optimal value for n exists based on a given confidence interval, but this thesis will use a predetermined value of 10.000. A number chosen based on considerations of the limitation in available computational power and the expectation that an iteration size of 10.000 is large enough to generate an estimate not too far from the true value. One indication that this is in fact the case can be seen in Figure 2 where the mean estimate is plotted against the number of iterations.

2.2. The Stochastic Discounted Cash Flow (SDCF) Model

The DCF part of the model is fairly standard; calculate the free cash flow of the company at hand and derive the enterprise value by discounting it by the company's weighted average cost of capital (WACC). All of the DCF calculations are based on annual reports from each of the companies and a five year period (2004-2008, both included) is used to calculate averages of value drivers for future estimation. And a five year prediction period is calculated before calculating the terminal value.

It is assumed that the reader is familiar with the principles of the DCF and the process of discounting cash flows and thus they will not be explained in depth here. The calculations for the WACC, terminal value and enterprise value will however be examined. The WACC, along with the short and long term revenue growth-rates, are one of the parameters in the classic DCF that will affect the end result the most. The calculations of the terminal- and enterprise values are both closely linked to the WACC and will be used in the sensitivity analysis later on. Furthermore the mechanism of capturing the modelled freight rates and transforming them into revenues in the DCF is explained.

2.2.1. Weighted Average Cost of Capital (WACC)

The WACC is calculated as follow:

$$WACC = \frac{E}{E+D} * R_E + \frac{D}{E+D} * R_D^{TC} \qquad \text{Eq. 10}$$

Where E is equity, D is debt, R_E cost of equity and R_D^{TC} is the tax adjusted cost of debt. Using the CAPM to calculate R_E we have that $R_E = \text{Risk Free Rate} + \text{Beta} \times \text{Market Risk Premium}$.

The Risk free rate is assumed to be the same for all companies and is retrieved through Bloomberg using 5 year U.S. Bonds, and is found to be 4,7%[2]. Like Rasmussen (2010) A market risk premium of 5,3% i used, based on the paper by Dimson et al, 2003, for all the companies. This implicitly assumes that the market risk premium is the same regardless of the geographical location of the companies. This assumption is not considered harsh as the shipping industry by nature is global, or at the very least international.

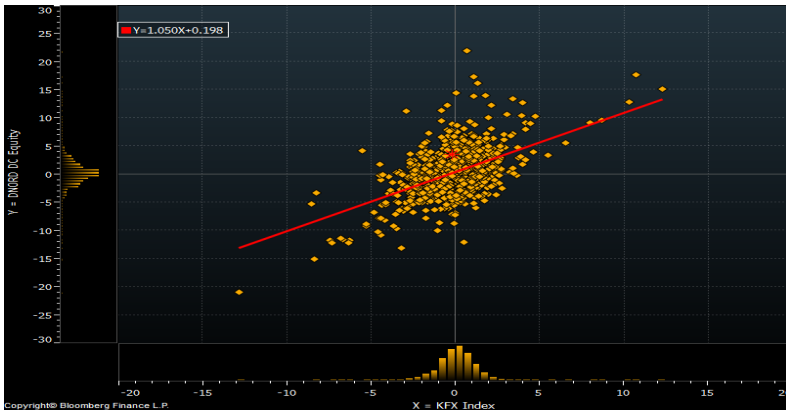

Figure 3: Estimating beta-value of NORDEN in 2008. Source: Bloomberg

In order to calculate beta-values one needs to regress the stock return against the market portfolio (market return), but since the market portfolio is impractical the S&P500 has be chosen to as a proxy for companies

[2] The risk free rate is estimated as if we were at the end of 2008.

listed on the NYSE, and the national market indices for the companies not listed on the NYSE. Bloomberg has been used to obtain the beta values rather than doing the calculation manually, this is primarily done to avoid errors in the manual matching of data and dates between the time series. Beta values are based on the S&P500 or national market indices and calculated on a daily basis; with a timeframe ranging from 8 to 4 years depending on the availability of data.

2.2.2. Revenues

The revenue used in the DCF is derived from the freight rates and the expected portfolio of ships for each company. More specifically the revenue is calculated as:

$$Revenue_t = SpotRate_t * Number\ of\ vessels_t \quad \text{Eq. 11}$$

Where the SpotRate is adjusted so it only changes every N number of days, where N is the average number of voyage days for a given vessel class (see Table 1). This is to simulate that the company captures the T/C spot rate for a period of time, and as such isn't exposed to the market during the time of the charter contract. This also assumes that all vessels of the same class capture the T/C spot rate at the same time, in this lies another assumption, namely that all vessels are utilized fully. The result is shown in Figure 4, where a modelled daily spot rate path is shown side by side with the captured spot rate.

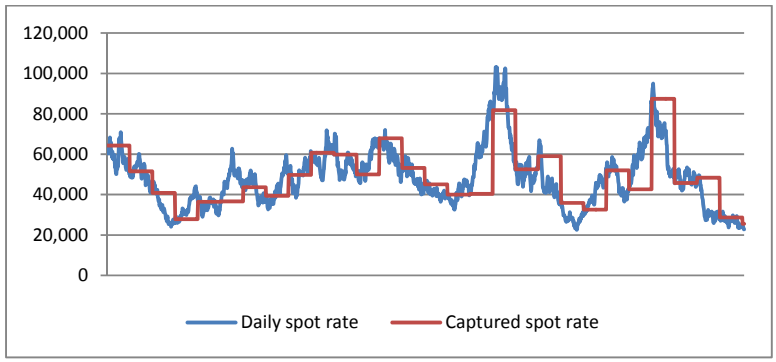

Figure 4: Daily vs. captured spot rate

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
Avg. Voyage Days	65	54	49	38	38	49	54	65

Table 1: Average voyage days for each vessel class. Source: Baltic Exchange

Note that the average voyage days for the vessels classes are assumed to be the same for all companies.

2.2.3. Terminal Value

When estimating the value of a firm or an asset, the value today is based on the free cash flow from operations in the future. But forecasting more than a few years into the future and the assumptions and validity of such forecasts quickly crumple. Instead a terminal value is calculated to capture all future revenue generated by the company.

$$Terminal\ Value = FCF_{t=5+1}\frac{(1+g_{lt})}{WACC - g_{lt}} \quad \text{Eq. 12}$$

$$PV(Terminal\ Value) = Terminal\ Value * (1+WACC)^{-5} \quad \text{Eq. 13}$$

Where $FCF_{t=5+1}$ is the free cash flow for forecast year 5+1 and g_{lt} is the long-term growth rate for the terminal value. What is important to notice is that as the WACC decreases the terminal value will increase, nothing new about that, but as will be evident from the sensitivity analysis this feature, combined with the discounting of the terminal value has an impact on the models performance. The long-term growth rate for the terminal value is for all companies assumed to be 4%.

2.2.4. Enterprise Value and Share Price

A company's value of operations is calculated as the discounted free cash flows for the forecasted five years plus the discounted terminal value. The equity value, the value of a company, is then calculated by adding excess cash and cash securities to the value of operations. To obtain an estimated share price, or take over value, from the equity value the amount of debt is added to the equity value to obtain the enterprise value, that is then divided by the number of outstanding shares.

$$Equity\ Value = Value\ of\ Operations + Value\ of\ Cash \quad \text{Eq. 14}$$

$$Enterprise\ Value = Equity\ Value - Debt \quad \text{Eq. 15}$$

$$Share\ Price = \frac{Enterprise\ Value}{Outstanding\ shares} \quad \text{Eq. 16}$$

3. Section 3 – The Shipping Market

3.1. Introduction to the shipping market

The international shipping industry can be summarized as the facilitator for connecting supply and demand of the world's products and raw materials. Everything from iron-ore, to cars and human beings is transported by sea.

As the global economy has evolved and grown over the course of the last couple of decades the seaborne trade has followed. The current world economy is more interconnected and decentralized (in some industries) than ever before. Out-sourcing of production facilities has led to an increase and shift in supply and demand volumes in both raw-materials and finished products. The industrialization of emerging markets has further increased both supply and demand in these areas while opening up now ports and trade routes. To meet this apparently ever increasing supply and demand in the world, larger and more cost efficient ship types have been developed to take advantage of the economies of scale that these vessels present; and thus lower the cost of transportation per unit.

The dry bulk shipping market

Vessel type	Ship size (dwt)	Approx. Speed (knots)
Handysize	20.000-35.000	12-16
Handymax*	35.000-45.000	12-16
Supramax	45.000-55.000	12-15
Panamax	60.000-75.000	12-15
Capesize	80.000-300.000	12-14

Table 2: Categorization of dry-bulk ships (Source: Alizadeh (p. 30))

*Handymax is included in the Handysize vessels for all companies fleet portfolios

Due to the variety and the nature of the products transported, various types of ships have been developed to handle certain types of trade. For instance a container ship cannot transport oil products very efficiently; therefore tankers have been developed instead. The shipping industry can, in broad terms, be divided into three main areas: liquid bulk (also known as wet-bulk or tankers), dry bulk and container trade (Alizadeh; p. 25). Each of these general categorizations is further sub-divided into ships of different cargo sizes and operational speed.

Whenever a shipper [3] decides to hire a vessel he or she will seek to minimize the total transportation costs of the voyage. This minimization depends on several factors, but the three most dominant are; the type of cargo to be transported, the amount that needs to be transported compared to the commodity parcel size[4] and lastly the loading and discharging facilities at the departure and arrival ports (Alizadeh; p. 28).

Obviously some commodities can take greater advantage of the economies of scale from transportation than others. For instance agricultural and other perishable products often have lesser parcel sizes than coal and iron-ore because the demand for them isn't large enough to match the supply before the products will have rotten or in other ways lost its value. Therefore there must be a connection between vessel types and sizes and commodities. Some vessels like the VLCC[5] tanker are used for the transportation of crude oil, whereas ships in the Handysize class are used for smaller and sometimes different types of cargo. These ships are often geared meaning they have the ability to load and discharge their cargo, making them less depending on port facilities and thus more flexible. Flexible vessel types will, as will be shown later, experience less

[3] A shipper is someone needing a commodity transported from port A to port B
[4] Commodity parcel size is the average shipment size of a commodity, when considering transportation and storage cost for that commodity (Alizadeh; p. 28).
[5] Very Large Crude Carrier (VLCC)

volatility in the freight rates because they do not depended on one single market but can service several different ones and is thus in itself more diversified than, for instance, the VLCC market.

3.1.1. The Indices

The Baltic Exchange, based in London, delivers daily indices on the freight rates of shipping raw-materials across the world, for various ship types. The indices are based on averages calculated from the reports of traders and members of the Baltic Exchange and quoted as US$/tonne. They publish 7 spot market indices, where 4 of them, the dry-bulk indices, are of interest to this paper. The BDI is more general and is not divided into ship types. For the wet-bulk market the IMAREX indices are used.

The four dry-bulk indices in the model are as follow:

1. Baltic Exchange Capesize Index (BCI)
2. Baltic Exchange Panamax Index (BPI)
3. Baltic Exchange Supramax Index (BSI)
4. Baltic Exchange Handysize Index (BHSI)

In reality the actual price of moving cargo from one port to another depends on a host of different variables, such as the vessels age, state of maintenance, type of vessel and the cost of loading and discharging cargo and crew sizes. The Baltic Exchange is primarily a means for derivative trading in the shipping industry, and is considered one of the most accurate and reliable sources of market data within shipping.

Notice that the freight rates produced by the model is time-charter rates, that is money per day for the use of a ship, and the Baltic Exchange indices are all money per tonne of cargo. The Baltic Indices are used as drivers for modelling the time-charter rates. In other words the characteristics of the Baltic Indices, are used to derive time charter rates, this done under the assumption that a purely time-charter based index would express a similar behaviour.

For the wet-bulk market indices on Freight Forward Agreements (FFA) from Imarex (International Maritime Exchange) is used. There are, compared to the Baltic indices, advantages and disadvantages. The advantage is that, unlike the Baltic indices, they are prices on time-charter contracts and therefore quoted in USD/day, the disadvantage is that there is no global index capturing the general movements, instead they are divided into route sections, such as routes from Europe to USA. This construction of the Imarex indices introduces a very dubious assumption to the model.

It is assumed that all

- MR vessels operate on routes between the UK/continental Europe and USA
- LR1 vessels operate on routes between North sea to Continent
- LR2 vessels operate on routes between West Africa to US Atlantic Coast
- VLCC vessels operate on routes between Arabian Gulf to Japan

This assumption is obviously a strong simplification, and a construction of a global index, based on all the Imarex indices could be attempted, but this in-turn would introduce other assumptions of which I know nothing of. Therefore I've decided I'll rather have a dubious assumption that I know of than one I know nothing of.

The exact Imarex indices used are all found using Bloomberg and are as follows:

1. MR (Bloomberg ticker: IFTC2D1M Index, front month – UK/Continent to USAC Clean)
2. LR1 (Bloomberg ticker: IFTD7D1M Index, front month - North sea to Continent)
3. LR2 (Bloomberg ticker: IFTD5D1M, front month – West Africa to US Atlantic Coast)
4. VLCC (Bloomberg ticker: IFTD3D1M, front month – Arabian Gulf to Japan)

3.1.2. Shipping Freight Contracts

In general terms a shipping company has two ways of acquiring shipping capacity, and thus generating revenue, either through operating vessels exposed to the short-term spot market, or through time-charter contracts. Time-charter contracts are in essence a leasing contract where a ship owner delivers control of the ship to a charter against an agreed upon sum of money, the time-charter rate. In reality though there exists a wide variety of different types of time-charter contracts giving either or both parties options to extend the lease or buy the vessel completely. In section 2.2 the calculation of revenue was explained, therein was the average number of voyage days, they are effectively the assumed length of the time-charter contracts.

The rates of a time-charter contract are believed to be depending on the market agents expectations to the future developments of the (short-term) spot freight-rate. According to the Expectations Hypothesis of Term Structure (Kavussanos, 2002), and assuming the markets are efficient, the charterers should be indifferent in choosing between the two contract forms. That is; the discounted present value of a series of short-term spot-rate contracts that run over the same length of time as the time-charter contract should have equal value, otherwise arbitrage would occur. Mathematically we can express this relationship as follows (Alizadeh, 2009):

$$TC_t^n = \left(\sum_{i=1}^{k} \frac{(E_t FR_{t+im}^m - E_t VC_{t+im}^m)}{(1+r)^i} \Big/ \sum_{i=1}^{k} \frac{1}{(1+r)^i} \right), \qquad k = {}^n/_m \qquad \text{Eq. 17}$$

Where TC_t^n is the time-charter rate for an *n* period contract at time *t*, r is the discount rate, $E_t FR_{t+im}^m$ is the expected spot charter rate at time t of a contract over *m* periods from *t+im* to *t+(i+1)m*. *k* is a positive integer value indicating the number of spot contracts during the length of the time-charter contract. $E_t VC_{t+im}^m$ is the voyage's expected cost. Note that unlike the spot rate, the time-charter rate is excluding voyage costs, the charter is expected to cover those costs in the spot market.

As Alizadeh points out however, it is not likely that one would observe this relationship in practice, since the time-charter contract guarantees the ship owner a fixed income for a predefined period of time; he is no longer exposed to the inherent risk of the spot freight-rates. Instead the charter is taking on that risk, among others[6], he has in other words transferred some of the business risk to the charter. In order for the charter to accept this additional risk the time-charter rates will effectively be lower than what is found in Eq. 17. Kavussanos and Alizzadeh (Kavussanos, 2002) have in their research found that this *risk-premium* is time varying, suggesting that depending on the expectations of the future spot market the charter is willing to take on more or less risk, and vice-versa for the ship owner. Eq. 17 can then be written as:

$$TC_t^n = \left(\sum_{i=1}^{k} \frac{(E_t FR_{t+im}^m - E_t VC_{t+im}^m)}{(1+r)^i} \Big/ \sum_{i=1}^{k} \frac{1}{(1+r)^i} \right) - \varphi_t, \qquad k = {}^n/_m \qquad \text{Eq. 18}$$

Where φ_t is the risk-premium at time t.

[6] Risk such as: Exposure to the more volatile spot freight-rates, the risk of unemployment, vessel relocation in order to get to a new spot-rate contract.

3.1.3. The Current State of the Shipping Industry

The unprecedented freight-rate levels leading up to the collapse of the global economy in 2008 resulted in shipping companies investing large amounts of money in new ships, resulting in record order-book levels for the shipyards. This in turn resulted in long delivery times of up to four or five years for orders placed around 2008 (Alizadeh; p. 62). The high freight rates had also ensured that the older; and more operationally expensive vessels still were profitable and thus were kept in the market.

When the credit-crisis hit most of the shipping industry went into a standstill because banks were unwilling to issue letters of credit to the buyers of the goods being transported. As a result the freight rates plummeted as freighters fought to keep their vessels employed in a market where no-one seemingly could get a letter of credit. A letter of credit is used to ensure that he seller of a product will receive money for the products he is delivering. The letter of credit is issued by the buyer's bank, guaranteeing the payment as long as the seller lives up to his obligations of delivery.

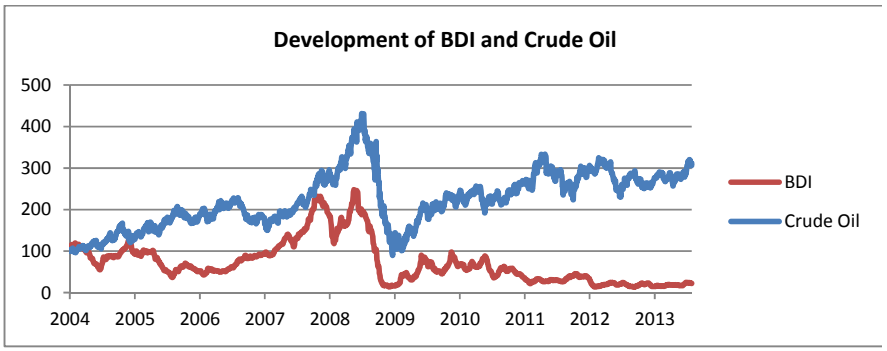

Figure 5: Development of the BDI and Crude Oil over time showing the large and very rapid drop in freight rates around 2008. Index 100 = Jan-04.

This very rapid and extremely large drop in freight rates as a result of the drop in "available demand" for transportation turned the market upside down. Now all of a sudden the industry had an excess supply of shipping services and the much lower rates made previous long-term charter contracts unprofitable.

Though the scrapping of older ships, who were no longer profitable began, the delivery of the new more efficient ships, which were ordered during the "good times", have so far exceeded the capacity of the scrapped vessels. Thus increasing the overcapacity, and keeping the freight rates from recovering to more profitable levels, even though the availability of letters of credit has increased.

The last of these new-ship orders are only now being delivered and consequently a gradual shift in the supply and demand for shipping is expected to occur during the next few years (2013 and beyond) as more capacity will be scrapped than introduced to the market.

To make matters worse the price development of crude oil[7] has comparatively increased more than the freight rates (and decreased less). This has obviously put pressure on the shipping companies' margin. Figure 5 shows the index development of both the BDI and the price of crude oil. Index 100 is set to January 2004. It is evident that not only did the price of crude oil increase more than the BDI in the period leading up to the financial crisis; it also fell less when the crisis hit and recovered faster.

[7] Crude Oil is used as a proxy for bunker oil, and though the development in crude oil prices and bunker oil isn't the same the overall development is assumed to be somewhat similar. Bunker oil is the fuel used in the shipping industry.

3.2. Porters Five Forces

To better be able to put the financial data from the five shipping companies in context Porter's Five Forces framework is used to get a feeling for the market conditions and competitiveness in the time following the credit-crisis.

3.2.1. Threat of new entrants

When assessing the threat of new entrants it is important to distinguish between new competitors and new subsidiaries of existing competitors. Some companies create a lot of minor companies that only own or operate one or two vessels, that way they can circumvent local policies and in some cases be exempt from taxes for a number of years.

The cost of starting a new company is very high, new ships are expensive, but the financing is often not that difficult because ships often have a good possibility of earning their investment back. Before the credit-crisis financing new ships wasn't considered difficult, banks and other investors were willing to invest in ships because they often were leased out on long-term time charter contracts that would ensure repayment of the loan. The low freight rates, and thus also low time-charter rates have made it harder to get new ships financed because the expected cash-flows from the time-charter contracts no longer provides a promising return. The oversupply of freight capacity has however lowered the cost of second hand ships considerably, making this a viable option for new companies that are willing to accept the higher operational costs often associated with a second hand ship against the lower price of the ship.

A new company doesn't have to buy a ship, all they have to do is enter a time-charter contract and operate in the spot market. This does however put a lot of pressure on the company to get its ship fully utilised leading us to the next issue; getting customers. This is probably the hardest part for a new business, though it must be assumed that the people starting a new shipping business have possible customers on hand, presumably from a previous job within the industry.

New competitors won't, at first, increase the capacity of the global fleet, and as such only challenge the freight rates by having a lower cost structure, accepting a lower payoff or running a deficit in order to win customers.

All things considered, the threat of new entrants in the current market is considered to be low, mainly due to the fact that the profitability and thus the appeal for entrants are very low.

3.2.1. Bargaining power of suppliers

Shipping companies have a range of different suppliers, some more important for the daily operations than others. Here some of the most important suppliers and their bargaining power will be discussed.

All modern day freighters consume bunker fuel for propulsion and as such the level of earnings in the industry is highly depended on the price of bunker fuel. Most companies are not anywhere large enough to exercise any real pressure on the suppliers of bunker fuel in order to affect the price.

As has become increasingly apparent the financial suppliers for the companies have gained a tremendous bargaining power during the credit-crisis. As the market has deteriorated and earnings have dropped the obligations on the debt are getting increasingly harder to meet. Falling interest rates might relieve some of the pressure but for many companies this is far from enough to negate the drop in earnings. To make things worse; many companies had in the years leading up to the crisis taken up large loans to finance the orders on new ships.

The maintenance and retrofitting of a company's fleet makes it dependent on suppliers of spare parts and knowledge, a dependency that haven't decreased despite of the crisis. Though knowledge of the actual market conditions for retrofitting and ship maintenance is unknown it is fair to assume that there is a certain degree of competition in the market, enabling the companies to shop around for the best possible price, giving them some bargaining power.

Looking at the supply chain of ships in a broad spectrum there are suppliers of ships, both new and old, and "suppliers" of scrapping. That is the companies that will dismantle old ships and sell the metal at scrap value. The bargaining power of the suppliers of ships; shipyards and second hand dealers, are in a market with overcapacity very low. The suppliers of scrapping on the other hand have a good deal of bargaining power as prices on scrap metal have plummeted with the increase in vessels taken out of service and sold for scrapping as they become unprofitable.

3.2.2. Bargaining power of customers

Customers have a high degree of bargaining power, primarily due to the overcapacity in the market. This enables the customers to shop around in a market where the costs of switching shipping suppliers are low and the primary product differentiating often comes down to price and the availability and reliability of the company, though various forms of financing plans and credit time could play a decisive factor as well.

This high degree of bargaining power by the customers is best witnessed by the rapid drop in freight rates; remember that even though talking about freight rates as something set externally by the market, all contracts are negotiated individually and can differ from the index freight rates.

One thing, however, that does speak against a high bargaining power of the customers are the availability of substitute products, which will be examined next.

3.2.3. Threat of substitute products

In the inter-continental and global trade for dry and wet cargo there really aren't any viable alternatives that can compete on price with shipping. Aero freight is one alternative, but the much faster delivery rarely make up for the lower parcel sizes and higher costs that is typical in this kind of transport. Most often flight transport is used for postal services and highly processed products where time is of greater importance and earnings per quantity of product higher than is the case in the dry and wet bulk market, where products usually are components that either will be refined or processed further or have a long or no decay time. On land transportation by truck and/or train is obviously also a possibility but normally these are restricted to shorter intra-continental transportation because of the higher price per unit transported.

3.2.4. Competitive rivalry within the industry

As mentioned the product differentiation is based mainly on availability, reliability and service, getting a sustainable competitive advantage is hard and even more so in a market where the switching costs for the customers are so low. While in general the competitiveness within the market must be described as being high, the Five Forces framework doesn't really account for the numerous strategic relations in the market. Using pools of ships to maximise capacity and increase the availability of transportation to customers is common. So even though the companies compete individually they also engage in mutually beneficial pooling of freight capacity. As will be shown later on there is a difference in the level of corporate taxation the five companies pay, this is not considered a sustainable competitive advantage, since all the companies in theory could obtain the same tax-rate by moving. All in all the markets are considered highly competitive and homogenous in the sense that the product or service delivered, in essence, is the same across all companies; moving goods from point A to point B.

4. Section 4 - Taking it to the data

Having described the model and its input parameters in detail this section will focus on the actual calibration and estimation of the input parameters, starting with the non-company specific data. That is all the input parameters for the Ornstein-Uhlenbeck process that is modelling the market conditions, starting with results of the stationarity tests, followed by the parameter estimations of the speed of mean reversion and long-term mean for each time-series.

4.1.1. Testing for stationarity

As stated in section 2.1.1 Testing For Stationarity it is important to ensure the time series are stationary. Remember that the ADF is tested assuming the time series represents a random walk (no drift and no trend). The first indication that this in fact is the case is found by looking at the daily return. Figure 6 shows the changes in daily return for the capsize index and it is evident that there is no apparent trend and it appears to be revolving around 0. In fact the mean return for the Capesize index over the period is 0,00%.

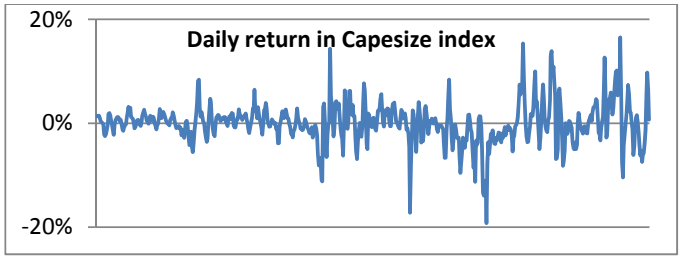

Figure 6: Daily changes in the Capesize index, revolve around 0. Source: Bloomberg

To test if the actual, or true, mean return for the indices is significantly different from zero, the 95% confidence intervals for the mean return of all the time-series has been calculated. It is clear that zero is well within the boundaries for all indices and as such it can be concluded that using the pure random walk test in the ADF is a good fit. This is also evidence of the time-series exhibiting a mean-reverting behaviour. Table 3 shows mean returns and confidence levels for all eight time-series.

In Table 4 the summary statistics of the augmented Dickey-Fuller tests is listed for each series. Detailed results from SAS Enterprise Guide can also be found in the appendices. By introducing various numbers of lags in the augmentation it is found that all eight time-series fulfil the criteria for a (weak) stationary process, and there should not be any problems with spurious behaviour in the modelling of the time-series.

	Mean	95-CI	Std.Dev.
Capesize	0.00%	[-0,30%; 0,29%]	3.8%
Panamax	-0.04%	[-0,32%; 0,25%]	3.7%
Supramax	-0.06%	[-0,24%; 0,12%]	2.3%
Handysize	-0.09%	[-0,24%; 0,05%]	1.9%
MR	-0.15%	[-0,63%; 0,32%]	8.0%
LR1	-0.24%	[-0,97%; 0,49%]	12.4%
LR2	-0.10%	[-0,54%; 0,35%]	7.5%
VLCC	-0.16%	[-0,71%; 0,40%]	9.4%

Table 3: Mean return 95% Confidence Interval and standard deviation. Source: Own making

	Dry-bulk				Wet-bulk			
	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
Model	1st Dif. (4 lags)	1st Dif. (7 lags)	1st Dif. (2 lags)	1st Dif. (3 lags)	1st Dif. (0 lags)	1st Dif. (0 lags)	1st Dif. (1 lags)	1st Dif. (1 lags)
Tau (ADF)	**-18.24**	**-13.12**	**-8.35**	**-5.25**	**-32.62**	**-32.17**	**-23.34**	**-22.14**
Pr < Tau	**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**	**<.0001**
AIC	25371	19941	8221	4183	19560	21180	21335	22409

Table 4: Testing for unit-root using the Augmented Dickey-Fuller test. Source: Own making

4.1.2. Historic freight rate correlation

How the different time-series move together obviously needs to be taken into account, and as explained in Section 2, a Gaussian Copula is used by Cholesky-decomposing the correlation matrices. But first remember that the model is assuming that:

Wet and dry-bulk indices are assumed to be uncorrelated.

This means there are two correlation matrices. Wet and dry bulk calculations will be done separately until yearly revenue is calculated, combining revenue generated from both markets. The correlation between the four time-series in each market is calculated based on their daily return and can be seen in Table 5 and Table 6. It is clear that the dry-bulk market appear to be more strongly correlated than the wet-bulk market, which should provide a possibility for a greater diversification of risk in the wet-bulk market, compared to dry-bulk. This risk reduction is however thwarted by the higher volatility in the wet-bulk market, see standard deviations in Table 3.

	MR	LR1	LR2	VLCC
MR	100.00%	19.15%	33.72%	22.96%
LR1	19.15%	100.00%	40.51%	31.66%
LR2	33.72%	40.51%	100.00%	64.10%
VLCC	22.96%	31.66%	64.10%	100.00%

Table 5: Wet-bulk historical correlations matrix. Source: Own making

	Capesize	Panamax	Supramax	Handysize
Capesize	100.00%	55.17%	39.10%	35.97%
Panamax	55.17%	100.00%	55.47%	51.41%
Supramax	39.10%	55.47%	100.00%	85.16%
Handysize	35.97%	51.41%	85.16%	100.00%

Table 6: Dry-bulk historical correlations matrix. Source: Own making

This is our estimated $\hat{\sigma}$ to be used in Eq. 2

4.1.3. Estimating parameters

To estimate the speed of mean reversal and long-term mean for each time-series an AR(1) regression like the one shown in Eq. 6 has been run on all the time-series. Table 7 shows the estimated **a** and **b** values from each regression as well as the corresponding **k** and **θ** values obtained through Eq. 7 and Eq. 8.

A recent change in the Bloomberg academic license, used by CBS[8], has disabled the access to the dry-bulk time-charter data needed to calculate the long-term mean values (marked in red in Table 7) for this market. Instead the values calculated by Rasmussen (2010) will be used (marked in orange in Table 8).

The estimates for speed of mean reversal is, for the dry-bulk market, calculated using the Baltic Exchange Indices; this too follows the approach taken by Rasmussen, and implicitly *assumes that the indices express the same mean reversion behaviour as the time-charter data would have*. This is of course a somewhat dubious assumption, especially when considering the impact small

	k	θ	a	b
Capesize	0,000700	1.794,48	1,256134	0,9993
Handysize	0,000570	1.524,62	0,869032	0,9994
Panamax	0,000840	1.255,62	1,054721	0,9992
Supramax	0,000600	2.099,15	1,259489	0,9994
VLCC	0,016811	74.712,90	1245,464	0,9833
Suezmax	0,047018	41.218,14	1893,149	0,9541
Aframax	0,022246	36.136,57	795,0046	0,9780
MR	0,034674	20.648,38	703,6968	0,9659

Table 7: Estimates of speed reversion and long-term mean. Note that the long-term mean for the dry-bulk markets are not used! Instead the long-term mean from Rasmussen (2010) is used. Source: Own making

[8] CBS is using an educational license for Bloomberg in collaboration with 3 other Danish universities. I have been told that this is in violation with Bloomberg's rules for educational licenses, though this is known by the Danish Bloomberg office it was feared that changing the access level to include the data I needed would get the attention of the International office and possibly result in a shut-down of the license for all 4 universities.

changes to these estimates have on the model. The final estimates used in the model can be seen in Table 8.

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
k	0,000700	0,000840	0,000600	0,000570	0,034674	0,022246	0,047018	0,016811
θ	73.745	33.790	34.390	10.663	20.648	36.137	41.218	74.713
Start Value	64.320	26.050	21.084	11.373	3.562	3.116	15.645	13.051

Table 8: Estimated parameters for the O-U process, the long-term mean values marked in orange are taken from Rasmussen (2010). Source: Own making

4.2. Company Introduction

In the following section a short description with key facts and figures about each of the five companies and their main areas of operations will be examined. All information is obtained from the companies' annual reports for 2008.

4.2.1. Frontline

Frontline is a Bermuda based company, it is primarily invested in the tanker market, and is considered one of the world´s leading transporters of crude oil, mainly operating LR2 and VLCC class vessels. As is evident from Table 3, the tankers market is more volatile than the dry-cargo market, and as such the expectation is that the model results should express broader confidence bands compared to the companies with less exposure to the tankers market.

Frontline facts:

- Operating revenue: 2.104 USDm in 2008.
- Employees: Approximately 48 people across offices in Bermuda, London and Oslo.
- Rely on independent ship managers to manage and operate their vessels.
- Listed on both the Oslo stock exchange and the New York Stock Exchange.

Main areas of operation:

- VLCC
  - The Middle East Gulf to the Far East
  - Northern Europe
  - The Caribbean
  - The Louisiana Offshore Oil Port
- LR2:
  - Atlantic Basin and Middle East to South East Asia.

4.2.2. NORDEN

NORDEN is a Danish company that operates in the dry-cargo and tankers (wet-bulk) markets. They considered them self one of the world's largest operators of Panamax and Handymax vessels and with significant activities in the Handysize and Capesize vessels from 2009. NORDEN is also active in the tankers market with vessels in the MR and LR1 vessel classes. The majority of the fleet portfolio is engaged in the dry-bulk market (aprox. 75%) and the exposure to the wet-bulk market stems from the comparatively less volatile MR vessel class. The exposure gained from their operations in the LR1 vessel class, the most volatile of all, will only have little influence on the final results as the expected number of vessel in that class range from 1 to 2.

NORDEN facts:

- Operating revenue: 4.246 USDm in 2008.
- Employed 672 people in 2008 with roughly one-third ashore and the rest at sea.
- Have offices in Hellerup, Shanghai, Rio de Janeiro, Mumbai, Singapore and Annapolis.
- Listed on the NASDAQ OMX Copenhagen.

Main areas of operation:

- NORDEN mentions no particular main areas of operations leading to the assumption that the fairly large fleet is engaged across all global trade routes.

4.2.1. Golden Ocean

Golden Ocean was formed in 2004 as a subsidiary of Frontline and later that same year spun-off from Frontline and is now listed on the Oslo stock exchange. The company is working in the dry-bulk market and operating 6 panamax and 4 capsize vessels. They still have close ties to Frontline whom manage certain administrative aspects of the business. The largest shareowner of both Frontline and Golden Ocean is Hemen Holding Ltd. and as such both companies share board members. Golden Ocean was first founded to handle the dry-bulk vessels originally held by Frontline but operations have later expanded to more general operations in the dry-bulk market like buying and selling vessels and speculating.

Golden Ocean facts:

- Operating revenue: 947 USDm in 2008.
- No information is given on the number of employees in the annual reports
- Office in Bermuda
- Listed on the Oslo stock exchange

Main areas of operation:

- There is no mentioning of any particular areas of operations in the annual reports.

4.2.2. OSG

OSG is primarily focused on the transportation of bulk cargo, mostly – but not restricted to, crude oil and other energy products, such as liquid gas and coal. OSG operate in both the dry-bulk and tankers market. With the largest fleet of the companies OSG has a fairly diverse portfolio split roughly 50-50 between the tankers and dry-bulk markets. The fleet within the tankers market is more diverse than the dry-bulk that is comprised mainly of handysize and panamax vessels. OSG is the only US based company and as such is subject to US statutory income taxation, but only on revenue generated where the destination or departure port was located inside the US. This is however extremely difficult to simulate so and a assumption is made stating that; for the purpose of calculating WACC the total corporate tax rate is assumed to be 0%.

The composition of OSG and NORDEN's fleet portfolios are somewhat similar in terms of diversification between the dry-bulk and tankers market, and as such the shape of the distributions of both estimated revenue and price per share is expected to be similar as well.

OSG facts:

- Operating revenue: 1.704 USDm in 2008.

- Employed 3.774 people in 2008 with 3.292 on the sea and the rest in offices around the world.
- Offices in Manila, Tampa, Philadelphia, Houston, London, New York and Singapore
- Listed on the New York Stock Exchange (NYSE)

Main areas of operation:

- OSG is operating globally and have no particular geographical area of operation.

4.2.3. TORM

TORM is, like NORDEN, a Danish company. They operate in both the wet and dry-bulk markets, though their engagement in the wet-bulk market is considerably higher than the dry-bulk market. The only vessel type they operate in the dry-bulk market is the panamax, whereas they operate MR, LR1 and LR2 tankers in the wet-bulk market. The exposure to the dry-bulk market and especially the highly volatile LR2 vessel class is expected to greatly affect the distribution of estimated share prices resulting in wide confidence intervals.

TORM facts:

- Operating revenue: 1.183 USDm in 2008.
- Employed 3.457 people in 2008 with 3.139 on the sea and the rest in offices around the world.
- Offices in Denmark, Singapore, India and USA.
- Listed on OMX the Nordic exchange in Copenhagen and NASDAQ in USA.

Main areas of operation:

- There is no mentioning of any particular areas of operations in the annual reports.

4.3. Past financial performance

Historically all the companies have experienced declining margins over the period of 2004 to 2008. In percentage points OSG and Frontline lost the most dropping 31 pp[9] and 26 pp respectively but still maintain the highest margins of the five. Looking at Figure 7 it is clear that the drop in margins must have been an

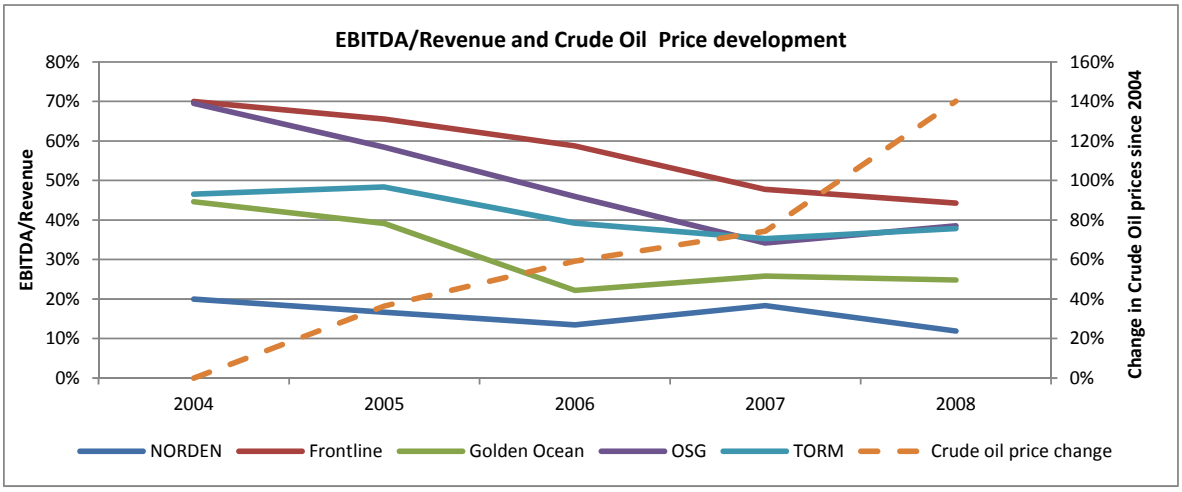

Figure 7: EBITDA/Revenue for all companies compared with the percentage change in crude oil prices (average daily price).

[9] OSG fell from 70% in 2004 to 39% in 2008 and Frontline fell from 70% to 44%.

industry wide factor, though most margins level-out or increase slightly in 2008 it would have been expected to increase more considering the extraordinarily high freight rates in that period. Most companies' even reported record breaking revenue numbers in 2008, apparently without any impact on their ability to generate profit. The main reason for this lack of profitability is most likely to be found in the development in bunker oil prices. Figure 7 also shows the percentage change in the average daily crude oil prices from 2004 to 2008. It is quite clear that this increase in fuel prices inevitably must have driven margins down. All though the decline in margins levels-out for most of the companies in 2008, it is fair to assume that the increased freight rates were offset by a similar increase in oil prices (see Figure 5).

4.4. Beta, WACC and corporate tax levels

As mentioned in section 2, the beta values are obtained through Bloomberg and calculated using different index returns as proxies for the market portfolio.

	Frontline	NORDEN	Golden Ocean	OSG	TORM
Proxy for market portfolio	SPX	KFX	OBX	SPX	SPX
Beta	1,09	1.05	1.24	1.15	1.18
Corporate tax	0.0%	25.0%	0.0%	0.0%*	25.0%
Equity weight E / (E + D)	38.1%	96.1%	18.7%	54.8%	42.7%
Net debt weight D / (E + D)	61.9%	3.9%	81.3%	45.2%	57.3%
Cost of equity R_{equity} =	10.5%	10.3%	11.3%	10.8%	11.0%
Post-tax average cost R_{debt} =	7.9%	3.0%	3.9%	5.8%	3.0%
WACC	**8.9%**	**10.0%**	**5.3%**	**8.5%**	**6.4%**

Table 9: WACC calculations and corporate tax-levels. Source: Own making
*assumed

For Frontline that is listed on both the Oslo stock exchange and the NYSE; The S&P500 (SPX) is used as it is believed to be more appropriate considering the multinational nature of the shipping business and that the SPX covers more companies than the smaller Oslo based index (OBX). Likewise the SPX is used to obtain the beta value for TORM instead of the Danish KFX-Index. Plots of the regressions from Bloomberg can be found in appendix 3 Beta values.

The cost of debt is usually stated in the annual report, but in some cases it has been calculated as the weighted average of interest rates on the company's different loans. The cost of equity is found based on the obtained beta value and the assumptions made on the risk-free rate and market risk premium. Table 9 shows the input factors and final WACC for all the companies. Not surprisingly there is quite a large difference in the WACC values, ranging from 5.3% to 10.0%. Obviously this stems from differences in beta values, the available cost of debt and the companies' equity and debt weights. In the following only referenced to as the debt-equity ratio or D/E ratio. As is evident from Table 10 there is a close relationship between the WACC

	Frontline	NORDEN	Golden Ocean	OSG	TORM
D/E-ratio	162%	4%	435%	82%	134%
WACC	8.90%	10.00%	5.30%	8.50%	6.40%

Table 10: WACC and debt-equity ratio. Source: Own making

and debt-equity ratio, which is not surprising when considering the nature of the WACC formula, but the debt-equity ratio is one of the factors that management have the most direct control of in the WACC calculations, therefore it is worth examining the impact of this ratio on the model results. (see Changes in Debt).

4.5. Financial statements and the DCF

Having estimated the model parameters for the mean reverting process that will simulate the developments in the freight rate market it is now time to look at the company specific parameters that connects the O-U process to the DCF model.

The following uses TORM as an example but the procedure is almost identical for all the companies.

4.5.1. Revenue and Fleet Portfolio

The revenue is based on the fleet portfolio and the freight rates generated by the O-U process. For TORM the revenues can be divided into two categories, fixed and exposed revenue. Fixed revenue is revenue locked in through time-charter contracts a head in time, and obtained through the annual reports. The exposed revenue is made up from the part of the fleet portfolio not used to service the time-charter contracts generating the fixed revenue.

TORM's fleet portfolio and its expected development are found in Table 11 where it is split into a fixed-revenue generating portion and an exposed portion. Table 12 contains the average daily time-charter rate which TORM has managed to secure. The product of these T/C rates and the fixed portfolio make up the fixed revenue portion of the total revenue.

Total Ship days	Panamax	MR	LR1	LR2	Total Days	Ships
2009	5.012	16.839	6.482	4.743	33.076	90,6
2010	6.196	21.479	7.770	5.474	40.919	112,1
2011	7.454	21.900	6.909	4.563	40.826	111,9
2012	7.454	21.900	6.909	4.563	40.826	111,9
2013	7.454	21.900	6.909	4.563	40.826	111,9
Fixed Ship Days	**Panamax**	**MR**	**LR1**	**LR2**	**Total Days**	**Ships**
2009	858	7.646	3.115	1.085	12.704	34,8
2010	69	4.358	1.200	524	6.151	16,9
2011	0	641	730	321	1.692	4,6
2012	0	0	0	0	0	0
2013	0	0	0	0	0	0
Exposed Ship Days	**Panamax**	**MR**	**LR1**	**LR2**	**Total Days**	**Ships**
2009	4.154	9.193	3.367	3.658	20.372	55,8
2010	6.127	17.121	6.570	4.950	34.768	95,3
2011	7.454	21.259	6.179	4.242	39.134	107,2
2012	7.454	21.900	6.909	4.563	40.826	111,9
2013	7.454	21.900	6.909	4.563	40.826	111,9

Table 11: TORM's fleet portfolio split into Fixed and Exposed revenue generation. Source: TORM annual 2008

T/C Revenue per day	Panamax	MR	LR1	LR2
2009	15.170	20.269	23.943	30.947
2010	15.211	20.672	19.981	31.905
2011	0	21.163	18.598	32.817
2012	0	0	0	0
2013	0	0	0	0

Table 12: The daily average T/C rates that TORM have managed to fix into the future. Source: TORM annual report 2008

The exposed revenue is calculated by matching the exposed portion of the fleet portfolio with the truncated, or captured, freight rate paths (see Figure 4 for an example of a truncated freight rate path). So for the first

year the sum of the first 365 days in each of the truncated freight rate indices is multiplied with the number of available ships days for the year. The income statement in Table 14 shows both the fixed revenue and one possible revenue outcome for the exposed fleet.

4.5.2. Costs, Drivers and Free Cash Flow

Just like the fixed revenue TORM also have fixed costs on the ships they themselves have charted in. Table 13 shows the number of ship days TORM have charted in and at what cost. The cost of the exposed fleet and related operational costs, such as fuel and port fees, are calculated based on averages of the operational cost divided by the revenue for the years 2004 to 2008. This way the vessel operating cost will follow the revenue and the different revenue paths created by the Monte-Carlo simulation. Administrative costs are calculated in the same manner. The DCF setup uses a set of drivers (see Table 15) to forecast items in the income statement (Table 14), balance sheet (Table 38, in appendix), cash flow statement(Table 40, in appendix) and the discounting of free cash flow (Table 45, in appendix), most of them are calculated as a percentage of revenues, allowing the DCF to adapt to the changes in revenue when running the Monte-Carlo simulation. A few items are however based solely on the average of previously reported levels, such as the exceptional items. They include the occasional sale of a vessel and other operating income, that: "*primarily comprises chartering commissions received by TORM in connection with the management of the three tanker pools*" TORM, Annual Report 2008.

T/C Costs per day	Panamax	MR	LR1	LR2
2009	16.409	18.210	20.524	25.459
2010	15.442	17.319	22.137	24.615
2011	15.514	17.177	22.620	0
2012	15.810	16.426	22.818	0
2013	16.170	16.424	23.666	0

Chartered Ship Days	Panamax	MR	LR1	LR2	Total	Ships
2009	3.541	3.419	4.177	537	11.674	32,0
2010	3.296	3.315	4.882	380	11.873	32,5
2011	3.468	3.254	4.228	0	10.950	30,0
2012	4.015	2.672	3.375	0	10.062	27,6
2013	4.213	2.657	2.433	0	9.303	25,5

Table 13: The number of days TORM have charted in vessels and their average T/C cost. Source: TORM annual report 2008

The free cash flow calculations (appendix Table 45 and Table 41) are made under the assumption that depreciations will be offset by capex investments of the same size, this implicitly assumes that there will be no expansion of assets, like purchasing new ships merely a maintenance of status quo. For the calculation of the terminal value (Table 45) a long-term growth rate of 4% is assumed.

TORM A/S USD '000	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (Exposed Fleet)				441.168	857.699	846.396	1.093.022	1.129.150
Revenues (Fixed Fleet)				276.149	131.834	37.676	0	0
Total revenues	**603.717**	**818.773**	**1.183.594**	**717.317**	**989.533**	**884.073**	**1.093.022**	**1.129.150**
growth	*2,9%*	*35,6%*	*44,6%*	*(39,4%)*	*37,9%*	*(10,7%)*	*23,6%*	*3,3%*
Vessel operating costs	(332.276)	(461.155)	(645.798)	(588.236)	(734.043)	(659.467)	(745.845)	(749.367)
Gross margin	271.441	357.618	537.796	129.081	255.490	224.606	347.177	379.783
margin	*45,0%*	*43,7%*	*45,4%*	*18,0%*	*25,8%*	*25,4%*	*31,8%*	*33,6%*
Administrative operating costs	(34.594)	(68.743)	(89.906)	(51.575)	(71.147)	(63.565)	(78.588)	(81.186)
as % of revenues	*(5,7%)*	*(8,4%)*	*(7,6%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*
EBITDA	**236.847**	**288.875**	**447.890**	**77.506**	**184.343**	**161.041**	**268.589**	**298.598**
margin	*39%*	*35%*	*38%*	*11%*	*19%*	*18%*	*25%*	*26%*
Depreciation	(58.915)	(98.681)	(126.068)	(69.925)	(96.461)	(86.181)	(106.549)	(110.071)
Amortisation of other intangible assets	0	0	0	0	0	0	0	0
EBIT before goodwill amortisation	**177.932**	**190.194**	**321.822**	**7.581**	**87.882**	**74.861**	**162.040**	**188.527**
margin	*29,5%*	*23,2%*	*27,2%*	*1,1%*	*8,9%*	*8,5%*	*14,8%*	*16,7%*
Goodwill amortisation (non tax deductible)	0	0	0	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0
EBIT	**177.932**	**190.194**	**321.822**	**7.581**	**87.882**	**74.861**	**162.040**	**188.527**
margin	*29,5%*	*23,2%*	*27,2%*	*1,1%*	*8,9%*	*8,5%*	*14,8%*	*16,7%*
Exceptional items	64.201	14.787	97.306	60.899	60.899	60.899	60.899	60.899
Income from associates (before tax)	0	0	27.122	0	0	0	0	0
Net interest	(1.047)	599.241	(86.179)	10	10	10	10	10
EBITDA cover	*226*	*nm*	*5*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**241.086**	**804.222**	**360.071**	**68.490**	**148.791**	**135.770**	**222.949**	**249.435**
Tax	(6.574)	(12.545)	(1.279)	(1.885)	(4.094)	(3.736)	(6.135)	(6.863)
Tax rate	*2,7%*	*1,6%*	*0,4%*	*2,8%*	*2,8%*	*2,8%*	*2,8%*	*2,8%*
Income from associates (after tax)	0	0	0	0	0	0	0	0
Earnings from ordinary activities	234.512	791.677	358.792	66.605	144.697	132.034	216.814	242.572
Minority interest	0	0	0	0	0	0	0	0
Net earnings from ordinary activities	**234.512**	**791.677**	**358.792**	**66.605**	**144.697**	**132.034**	**216.814**	**242.572**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0
Net earnings	234.512	791.677	358.792	66.605	144.697	132.034	216.814	242.572
Preferred dividend	0	0	0	0	0	0	0	0
Net attributable profit	234512	791677	358792	66605	144697	132034	216814	242572
Common dividend	(73.939)	(64.548)	(55.100)	(20.351)	(44.211)	(40.342)	(66.247)	(74.117)
Retained earnings	**160.573**	**727.129**	**303.692**	**46.254**	**100.485**	**91.691**	**150.568**	**168.455**
# common shares at end of year	*36.400*	*72.800*	*72.800*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*
EPS	*6,7*	*11,4*	*5,2*	*1*	*2*	*2*	*3*	*3*
Common dividend per share	*2,1*	*0,9*	*0,8*	*0,3*	*0,6*	*0,6*	*0,9*	*1,0*

Table 14: TORM income statement. The years 2004 and 2005 have been removed to fit the page, see Table 39 in the appendix for a full version. Source: TORM annual reports.

TORM A/S USD '000		2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers									
Revenue growth		2,9%	35,6%	44,6%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	45,0%	43,7%	45,4%	48,6%	48,6%	48,6%	48,6%	48,6%
Total operating costs	*(% of revenues)*	(5,7%)	(8,4%)	(7,6%)	(7,2%)	(7,2%)	(7,2%)	(7,2%)	(7,2%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Sustaining investment in tangible assets	*(% of revenues)*	9,8%	12,1%	10,7%	9,7%	9,7%	9,7%	9,7%	9,7%
Sustaining investment in intangible assets	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash operating profit	*(% of revenues)*	**40,9%**	**40,0%**	**42,4%**	**46,1%**	**46,1%**	**46,1%**	**46,1%**	**46,1%**
Marginal tax rate		0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash tax rate		(0,9%)	10,4%	0,5%	4,5%	4,5%	4,5%	4,5%	4,5%
Tax rate for financial statements		2,7%	1,6%	0,4%	2,8%	2,8%	2,8%	2,8%	2,8%
Common dividend pay-out ratio	*(% of net earnings)*	31,5%	8,2%	15,4%	30,6%	30,6%	30,6%	30,6%	30,6%
Interest on debt					4,00%	4,00%	4,00%	4,00%	4,00%
Interest on excess cash					1,50%	1,50%	1,50%	1,50%	1,50%
Balance sheet drivers AVERAGE									
Average inventory days	*(days of total revenue)*	7,3	8,8	5,6	6,7	6,7	6,7	6,7	6,7
Average accounts receivable days	*(days of total revenue)*	30,0	40,2	37,1	34,2	34,2	34,2	34,2	34,2
Average other current assets	*(% of total revenues)*	3,6%	3,6%	7,0%	4,2%	4,2%	4,2%	4,2%	4,2%
Operating cash	*(% of total revenues)*	6,2%	15,0%	15,5%	18,4%	18,4%	18,4%	18,4%	18,4%
Accounts payable days	*(days of total revenue)*	11,3	19,8	15,1	14,7	14,7	14,7	14,7	14,7
Other current liabilities	*(% of total revenues)*	4,3%	9,8%	16,1%	7,9%	7,9%	7,9%	7,9%	7,9%
Long-term debt - Current portion	*(% of total revenues)*	9,3%	94,0%	17,9%	29,2%	29,2%	29,2%	29,2%	29,2%
Total average operating working capital	*(% of total revenues)*	12,6%	16,8%	13,9%	21,9%	21,9%	21,9%	21,9%	21,9%
Cash flow drivers									
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	(351,9%)	(45,9%)	(34,6%)	(115,9%)	(115,9%)	(115,9%)	(115,9%)	(115,9%)
Incremental intangible assets	*(% of incremental revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Depreciation	*(% of total revenues)*	(9,8%)	(12,1%)	(10,7%)	(9,7%)	(9,7%)	(9,7%)	(9,7%)	(9,7%)

Table 15: TORM financial drivers, most of which are based on the revenue in the year 2004 to 2008 and forecasting is then the average of those years.

5. Section 5 - Model Performance

5.1. Index Simulation

	Capesize	MR
k (reversal speed)	0,00070	0,03467
θ (long-term mean)	73.745	20.648
Start value	64.320	3.562
Start bias	- 9.425	- 17.086

Table 16: Estimated parameter values for the Capesize and MR indices. Source: Own making

Figure 8 and Figure 9 shows the mean of the modelled Capesize and MR indices and their 95-confidence bands with the frequency distribution of the index values overlain. Both distributions are skewed to the right; this can be attributed to two factors in the mean-reversion model. First the difference, or distance, between the starting value and the long-term mean shows how far, up or down, the index will travel, on average. Secondly the speed of mean reversion determines how fast it will get there, hence the name. This is clear when comparing the Capesize and MR indices. They have two distinctly different shapes, where the Capesize index increase in, what looks like a steady linear fashion the MR index starts out with a steep increase and then levels out around the long-term mean. The reason is of course the very large start bias that the MR index has compared to the Capesize index and the fact that the speed of mean reversal for the MR index is more than 49 times higher than that of the Capesize.

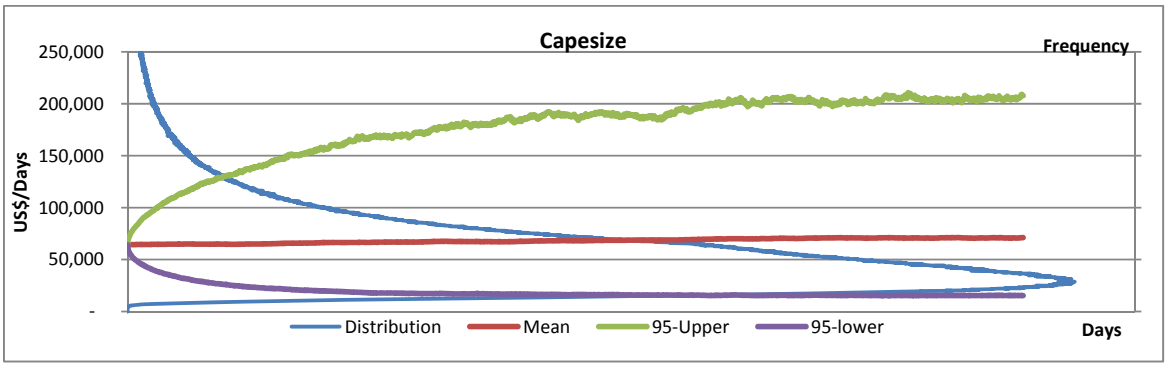

Figure 8: The estimated mean development in the Capesize Index with upper and lower 95% confidence bands and the frequency distribution. Source: Own making

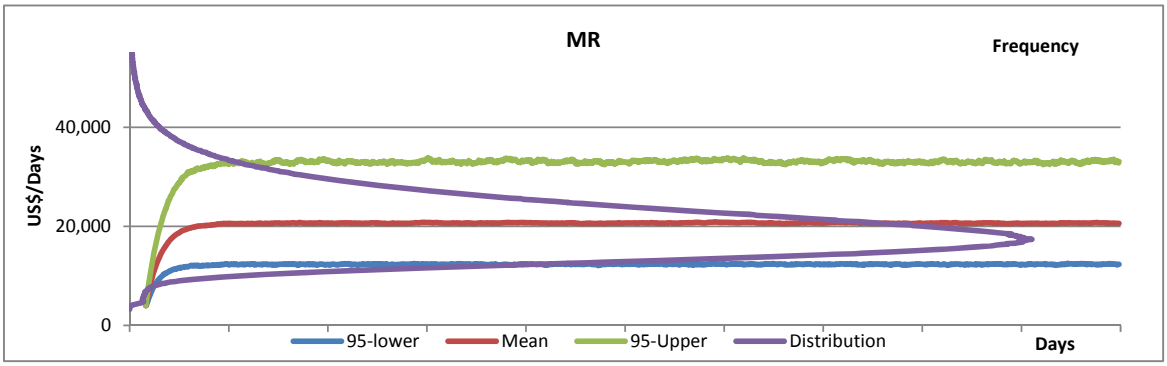

Figure 9: The estimated mean development in the MR-Index with upper and lower 95% confidence bands and the frequency distribution. The combination of a higher mean-reversal speed and greater distant is evident in the early steep increase. Source: Own making

By comparing the estimated development in the MR index and the actual development (Figure 10) it is clear that the model greatly overestimates the index. There are several reason for this; first of all the long-term mean is estimated using an 8 year period, including, if not the biggest then one of the biggest freight rate bubbles in history. This will naturally draw the mean upwards; secondly the freight rate market is very different from what has been seen earlier, the massive introduction of new freight capacity has kept the rates low. It could be argued that the historical long-term mean isn't a good fit for future freight rates under the current market conditions, at least not unconditionally.

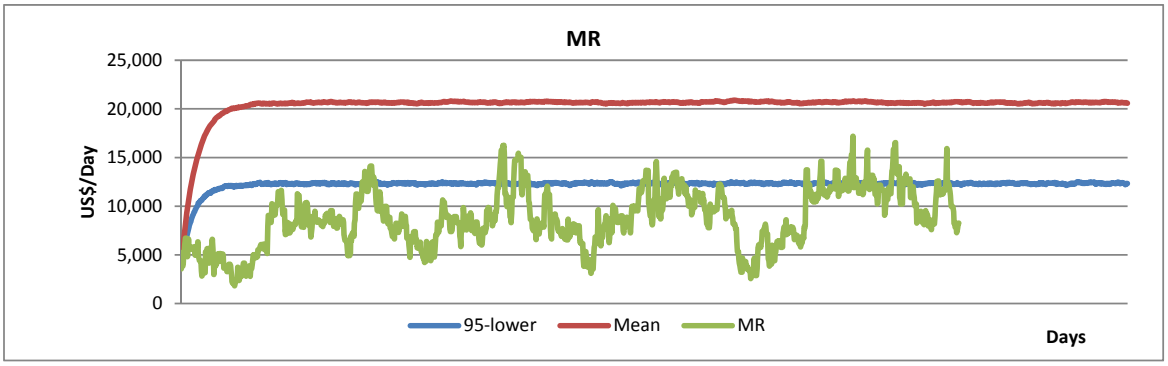

Figure 10: Actual development in the MR index vs. the model estimate. Source: Bloomberg (MR), Mean and 95-lower own calculations

5.2. Revenue

As explained in section 1.1.1 Assessing performance, the terms precision and accuracy will be used to assess the performance of the model. Precision will be measured as the relative standard deviation and accuracy using the coefficient of determination R^2. Both measurements will be evaluated subjectively, and the use of relative standard deviation will mainly be used on the share price, that is the primary determining factor for the final assessment of model performance.

For the purpose of assessing the models ability to accurately estimate revenues the estimated revenues from all companies will be compared to the actual revenues reported for the given years. If the revenues are within, or close to, the confidence borders, the outer values in the confidence interval, a subjective evaluation will be made of whether or not the results can be considered accurate. The results will then be examined with the purpose of explaining why they look the way they do.

5.2.1. The Distributions of Estimated Revenue – Model Precision

The first thing that stands out when looking at the distributions of the generated revenues is that 2009 (see Figure 11 to Figure 15 on page 35) is, misshaped compared to the rest of the years. It's "centre of gravity" appears to be either placed further to the left or to the right than the distributions of the other years. It also appears steeper, higher and narrower than the rest indicating a lower standard deviation.

	Group 1			Group 2	
	Frontline	**OSG**	**TORM**	**NORDEN**	**Golden Ocean**
Dry-Bulk	10%	53%	15%	74%	100%
Wet-Bulk	90%	47%	85%	26%	0%

Table 17: The companies' allocation of their fleet in either the wet-bulk market or dry-bulk market. Source: Own making

The companies can at first glance be divided into two groups. Group 1 is those with the first year revenue (2009) furthest to the left, and group 2 those with the first year revenue furthest to the right. Group1 consists of TORM, Frontline and OSG while group 2 is made up of Golden Ocean and NORDEN.

To explain this displacement of the 2009 revenue between the two groups a closer examination of differences and similarities in the revenue generation of the two groups is necessary. The main driver for generating revenue for all the companies is of course their fleet portfolio, its size and composition. Looking at the composition of the fleets in terms percentage of total portfolio in either the wet or the dry-bulk market (see Table 17), it is clear that, with the exception of OSG, group 1 is primarily engaged in the wet-bulk market and group 2 mostly engaged in the dry-bulk market.

As explained, the model only generates changes to the spot rate and therefore needs a starting point. This starting point is fixed (and can be seen in Table 8) but the starting points for the wet-bulk indices are very low compared to their estimated long-term means (see Table 8), and the model will attempt to pull them upwards, resulting in higher (more to the right) revenue distributions for the years 2010-2013 compared to 2009. This starting point bias towards lowering the 2009 revenue also exists in the dry-bulk indices but is not nearly as powerful; in that the actual difference between the starting point and the long-term mean is less than in the wet-bulk market.

Relative Std. Dev (Std. Dev/Mean) of revenue					
	2009	2010	2011	2012	2013
TORM	8%	15%	21%	24%	27%
OSG	10%	14%	21%	29%	42%
Frontline	20%	23%	24%	27%	29%
Golden Ocean	30%	64%	82%	95%	122%
NORDEN	3%	16%	35%	40%	50%

Table 18: Relative standard deviations of revenue over time. Source: Own making

The lower observed standard deviation in the 2009 revenue distributions is partly a result of the model construction. The starting point doesn't only create a revenue bias it also effectively lowers the standard deviation of the first year. This is however a desired effect that illustrates the fact that the further into the future the estimations go the more uncertainty is associated with them. It is therefore not unsurprising to discover that the precision of the modelled revenues does in fact decrease with time. This is however hard to observe in the distribution figures due to limitations imposed on the maximum and minimum values of the x-axis to get a better image of the shift between the distributions, but is clearly visible from Table 18.

Another reason for the lower relative standard deviations in 2009 is found in the "fixed" or known revenues found in the annual reports. Rasmussen (2010) found in his sensitivity analysis that increasing the company's exposure to the modelled freight rates resulted in a wider distribution of the share price. Though his analysis only looked at the share price the principles are the same when looking at the revenue distributions. The higher the exposure to the modelled freight rates the wider (higher standard deviation) is to be expected. In Table 19 it is seen that TORM and NORDEN are the only two companies that have provided information on their future fixed revenue, or coverage. It is likewise those two that show the narrowest 2009 revenue distributions, compared to the other years for the same company, confirming the finding from Rasmussen (2010). Comparing NORDEN's relative standard deviation in Table 18 with their exposure to the spot market in Table 19 it is clear how much of an impact "fixing" future revenue will have on the models precision, it is also visible from the flatter but wider distributions found in Figure 15. The fixing of revenues might also be the reason why the expectation of somewhat similar revenue distributions for NORDEN and OSG (made in section 4.2.2) didn't hold.

	2009	2010	2011	2012	2013
TORM	64%	88%	96%	100%	100%
OSG	100%	100%	100%	100%	100%
Frontline	100%	100%	100%	100%	100%
Golden Ocean	100%	100%	100%	100%	100%
NORDEN	22%	57%	79%	80%	80%

Table 19: Revenue generated from exposure to the modelled spot rates. Source: Own making.

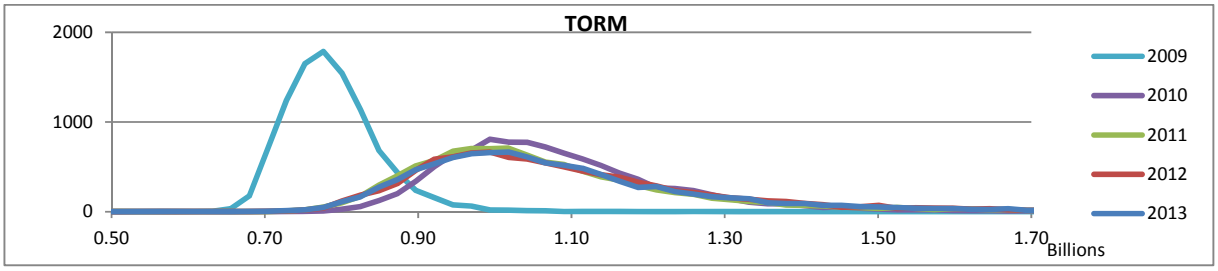

Figure 11: Frequency distribution of future revenue for TORM. Source: Own making

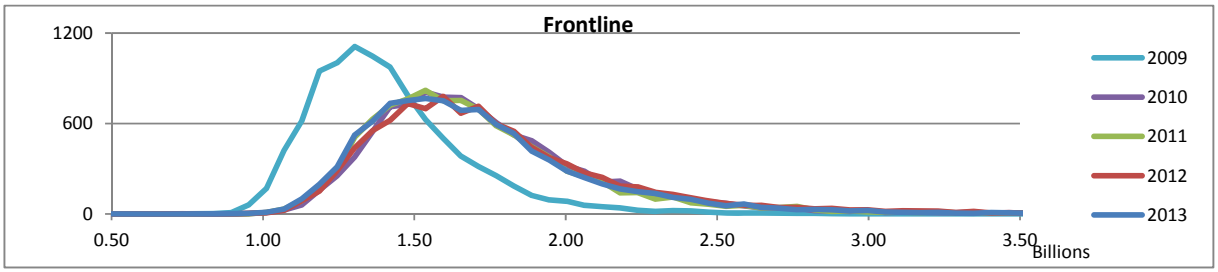

Figure 12: Frequency distribution of future revenue for Frontline. Source: Own making

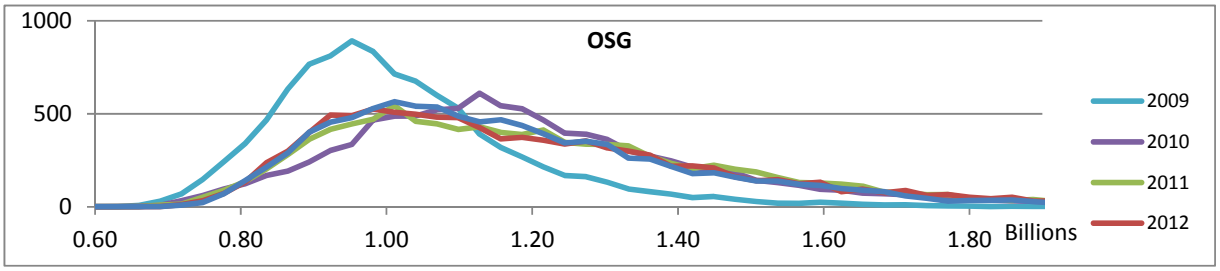

Figure 13: Frequency distribution of future revenue for OSG. Source: Own making

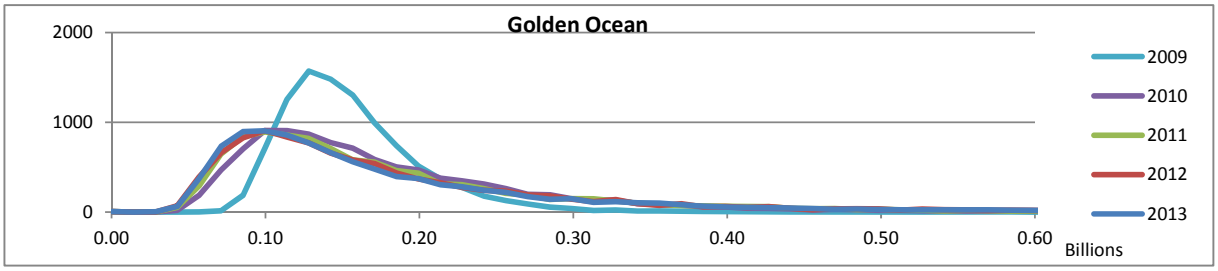

Figure 14: Frequency distribution of future revenue for Golden Ocean. Source: Own making

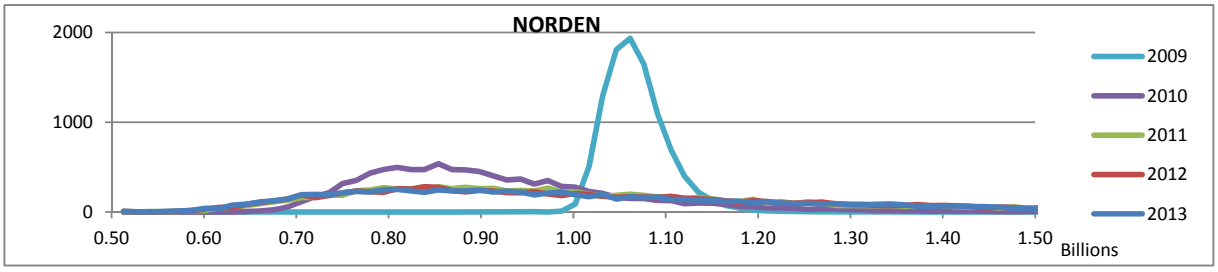

Figure 15: Frequency distribution of future revenue for NORDEN. Source: Own making

5.2.2. Estimated Revenue vs. Actual Revenue – Model Accuracy

In the following the estimated and actual revenues from all five companies will be examined and possible explanations as to why actual and estimated revenue differ will be put forward.

Looking at the charts in Figure 16 to Figure 20 several commonalities can be seen. First the smaller standard deviation in 2009 described in the previous section is again evident, here through the smaller confidence bands in 2009. Secondly the estimated revenue (mean) seems to be increasing steadily year over year, often with a kink in 2010 following a larger increase. Thirdly it is clear that when comparing the estimated revenues to the actual revenues the accuracy of the model results vary a lot! Some estimates are well below the actual revenue, others above. One seems to fits fairly accurately and some have years that are within the confidence bands while others are not. Lastly it is worth noting that the reported revenues appear to be a lot more volatile compared to the modelled revenues, with the exception of OSG; which, perhaps incidentally, is the company with the most accurate revenue estimations.

Looking into why the model under- or overestimates the revenues the development of the fleet portfolio is the most obvious place to start. The development of the fleet portfolio is the one model factor that is subject to the most guesstimation from the analyst. There is no standard in the way fleet development is expressed in the annual reports, some companies don't mention it at all, some only give information on the amount of money allocated or invested in the development and maintenance of the fleet, while others again give detailed descriptions on how many operating days and ships they expect to own and operate and how much of that fleet is already covered through time-charter contracts. This difference in information obviously creates some uncertainties for the analyst when trying to assess the composition and size of the company's future fleet portfolio, and the extent to which future revenue have already been fixed. As was evident in the previous section and from Rasmussen (2010) information on fixed future revenue will help the analyst increase the performance of the model by lowering the standard deviation on the estimated revenues.

If the actual development of the fleets compared to the estimated developments can help explain the large differences in actual versus estimated revenue and thus the differences in over/underestimation of revenue will be examined in this section.

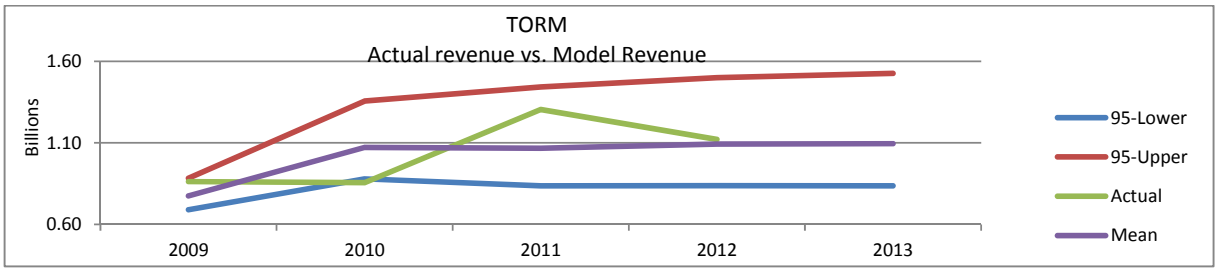

Figure 16: Mean of model estimated revenue and 95-Confidence intervals vs. realised revenue for TORM. Source: Own making and annual reports 2009-2012

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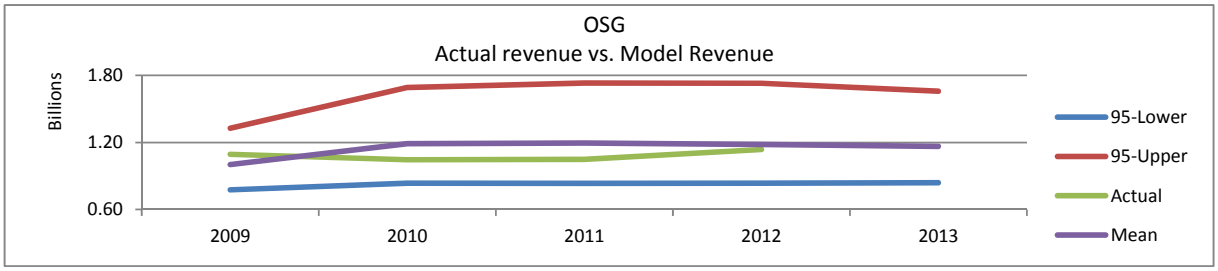

Figure 17 Mean of model estimated revenue and 95-Confidence intervals vs. realised revenue for OSG. Source: Own making and annual reports 2009-2012

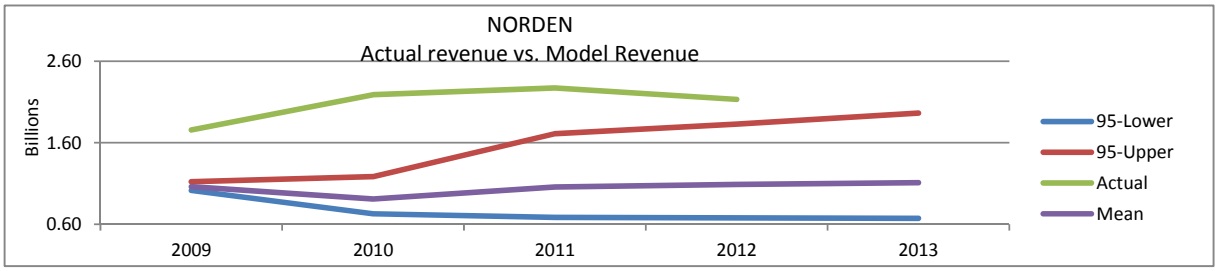

Figure 18 Mean of model estimated revenue and 95-Confidence intervals vs. realised revenue for NORDEN. Source: Own making and annual reports 2009-2012

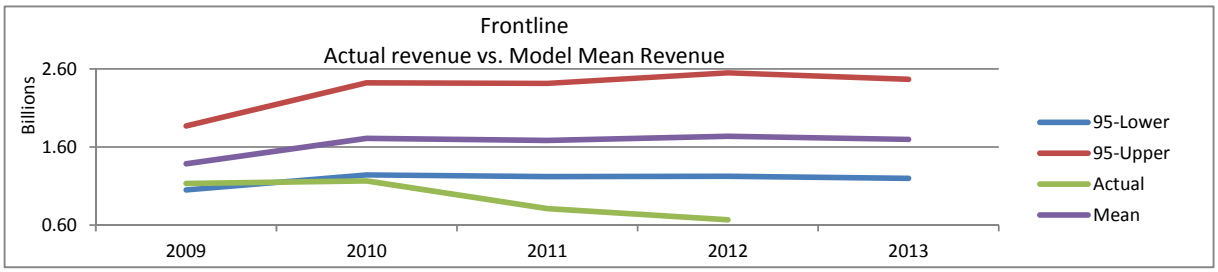

Figure 19 Mean of model estimated revenue and 95-Confidence intervals vs. realised revenue for Frontline. Source: Own making and annual reports 2009-2012

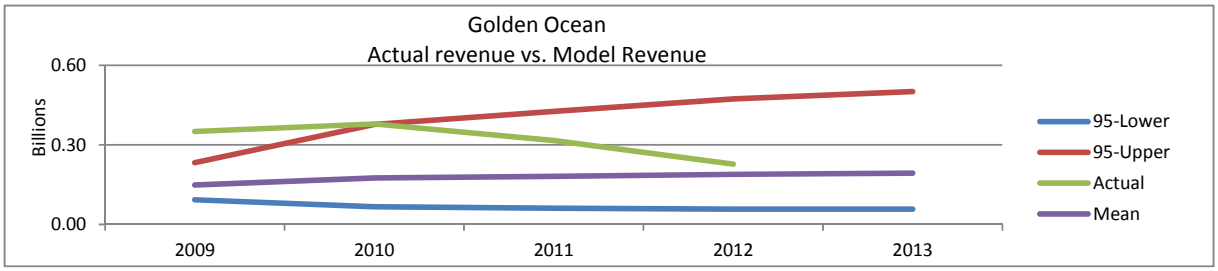

Figure 20 Mean of model estimated revenue and 95-Confidence intervals vs. realised revenue for Golden Ocean. Source: Own making and annual reports 2009-2012

TORM

Expected Fleet Development

Year	Panamax	Handy-size	MR	LR1	LR2	Total
2009	14	0	46	18	13	91
2010	17	0	59	21	15	112
2011	20	0	60	19	13	112
2012	20	0	60	19	13	112
2013	20	0	60	19	13	112

Actual Fleet Development

Year	Panamax	Handy-size	MR	LR1	LR2	Total
2009	15	0	51	20	13	99
2010	12	0	54	21	13	101
2011	25	12	59	23	12	131
2012	17	7	58	19	10	111
2013						

TORM is one of the companies for which the model produces reasonably accurate results, that is the revenue for 2009 is just inside the upper confidence band and for 2010 it is just outside the lower confidence band, it appears to be fluctuating around the estimated mean. The R^2 for TORM is 0,2781, not an incredibly good result but not too bad either.

When comparing TORM's estimated revenue from Figure 16 and the expected fleet development found in Table 20 it is, not surprisingly, easy to see that the kink in revenue from 2010 is followed by an expected increase in the overall fleet. Also it is interesting that for 2009 when the model underestimated the revenue (although still inside the 95-confidence band) the expected size of fleet portfolio was lower than the actual fleet, and in 2010 when then model overestimated the revenue the expected size of the fleet was larger than the actual fleet and in 2011 when the expected fleet again were lower than the actual then so was the revenue estimation. This shows that there is an apparent relationship between the accuracy of the estimated revenue and the accuracy of the estimated fleet portfolio.

OSG

Expected Fleet Development

Year	Panamax	Handysize	MR	LR1	LR2	VLCC	Total
2009	12.0	51.0	7.0	11.0	20.5	19.5	121.0
2010	12.0	51.0	7.0	11.0	20.5	19.5	121.0
2011	12.0	51.0	7.0	11.0	20.5	19.5	121.0
2012	12.0	51.0	7.0	11.0	20.5	19.5	121.0
2013	12.0	51.0	7.0	11.0	20.5	19.5	121.0

Actual Fleet Development

Year	Panamax	Handysize	MR	LR1	LR2	VLCC	Total
2009	9.0	12.0	26.0	4.0	15.4	14.0	80.4
2010	9.0	13.0	32.0	4.0	14.5	15.0	87.5
2011	9.0	12.0	35.0	6.0	11.0	13.5	86.5
2012	9.0	14.0	34.0	6.0	8.9	11.0	82.9
2013							

Table 21: OSG expected vs. actual fleet development. Source: Own making

Looking at Figure 17 it is would appear that the estimations for OSG are the most accurate. The estimated revenues for 2009-2012 are fairly close to the actual revenue. When calculating the R^2 however the results are not at all accurate, with a value of 0,0589 the accuracy should be considered poor. This is in sharp contrast to what is visibly observed in Figure 17 and the reason is found in the construction of R^2 and the data points used to calculate it. In Figure 21 the estimated revenue and actual revenue for OSG and Frontline is plotted against each other (actual revenue as a function of estimated revenue). The data points for OSG are

all fairly close together compared to the Frontline data points, this combined with the low number of data points makes the R^2 calculations unreliable as a tool for assessing accuracy for OSG.

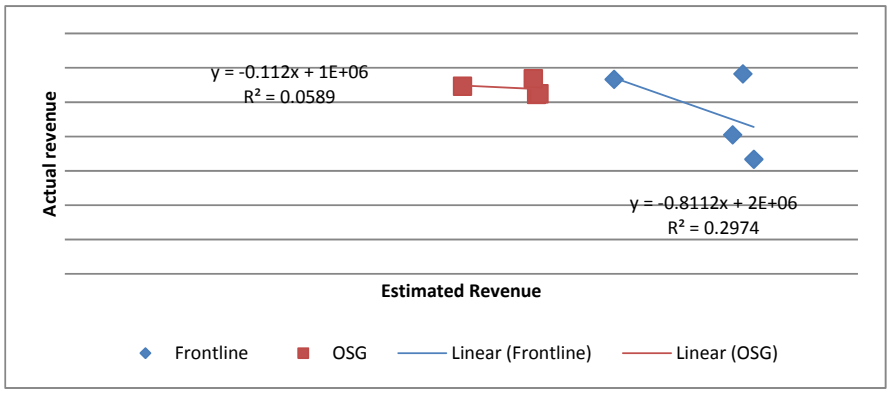

Figure 21: Scatter plot of the estimated vs. actual revenue for OSG and Frontline. Source: Own making and annual reports from 2009 to 2012 for Frontline and OSG. Source: Own making

Unlike the actual revenue witnessed in TORM, OSG's actual revenue is somewhat stable, making it easier to model accurately. These results would indicate a good fit between the expected and actual fleet development for OSG, but as is apparent from Table 21 this is not the case. In fact the expectation was for OSG to maintain its fleet size and composition, since the annual reports provided no useful information on the long-term development of the fleet. The actual fleet turned out to be a lot smaller than the expected and with a larger exposure to the wet-bulk market. Though the fleet wasn't constant in size as expected the fluctuations was however small keeping the revenues on fairly stable levels as well. The apparent relationship between the accuracy of modelled revenues and the accuracy of the estimated fleet development found in TORM is not to the same extend evident in the OSG data.

All in all the size and composition of expected fleet development was overestimated compared to the actual fleet, but unlike what could be expected the difference in the estimated and actual fleet did not negatively affect the model accuracy. In fact OSG is able to generate larger revenues per ship than the modelled spot rate revenues. Reasons for this could be due to favourable long-term charter contracts that effectively have kept their average T/C rate above market, but it is more likely the fact that OSG have revenue generating activities other than the "standard" shipping activities modelled that are included in their reported revenues.

NORDEN

Expected Fleet Development

Year	Capesize	Panamax	Supramax	Handysize	MR	LR1	Total
2009	4	21	26	12	20	2	85
2010	9	14	34	20	25	1	103
2011	14	14	36	27	23	1	115
2012	14	14	36	27	23	1	115
2013	14	14	36	27	23	1	115

Actual Fleet Development

Year	Capesize	Panamax	Supramax	Handysize	MR	LR1	Total
2009	5	13	14	4	14	0	50
2010	8	13	18	7	24	0	70
2011	11	15	22	19	27	0	94
2012	12	15	23	21	26	0	97
2013							

Table 22: The expected and actual development in NORDEN's fleet portfolio. Source: Own making

For NORDEN the model greatly underestimates the revenues every year even though the expected development in the fleet portfolio is greater than the actual development. The reason is found in NORDEN's strategic approach to its fleet; that apart from the owned and time-charter operated fleet consists of a flexible fleet that are charted in for short periods of time, often only one trip-charters. The expectation for the fleet development is not taken this flexible one trip-charter fleet into account and as such the total revenues end up being underestimated.

> *"The number of these vessels fluctuated over the year between 65 and 90. The degree of flexibility is enhanced by the fact that close to 30% of the shortterm chartered fleet consists of vessels chartered for a single voyage. When the voyage is completed, the vessel is returned, and NORDEN is not exposed to the risk of having to continue the journey in a possibly declining market"* – NORDEN Annual report 2009

This is an obvious short coming in the model, but accurately estimating the number and type of one-trip charters unrelated to the existing fleet is practically impossible. The best way of accounting for this kind of strategic behaviour in the model is by introducing additional ships to the expected portfolio. The R^2 (0,0752) for NORDEN is, like OSG, very poor but this time this was to be expected. NORDEN is the only company for which the model estimates a decrease in revenue, in 2010, this can be attributed to NORDEN's increased exposure to the spot market in 2010 compared to 2009. It also indicates that the T/C rates obtained by NORDEN in 2009 is outperforming the market spot rates.

Frontline

From Table 23 it is evident that the expected development in the fleet portfolio is far from the actual development, while the expectation for Frontline was to maintain a fairly stable fleet the reality is that their fleet have shrunk from a total 76 ships in 2009 to 39 in 2012, a decrease of nearly 50%. This obviously is expected to have a profoundly negative impact on the accuracy of the models revenue results, and as is evident from Figure 19 only the 2009 (actual) revenue is within the estimated 95% confidence band, for the rest of the forecast period the model overestimates the revenues. The R^2 for Frontline is however found to be quite high at 0,2974.

Expected Fleet Development

Year	Capesize	LR2	VLCC
2009	8	33	42
2010	8	35	42.5
2011	8	37	40
2012	8	36	42
2013	8	36	41

Actual Fleet Development

Year	Capesize	LR2	VLCC
2009	8	27	41
2010	8	21	44
2011	5	12	31
2012	1	11	27
2013			

Table 23: Golden Ocean expected vs. actual fleet development. Source: Own making

Golden Ocean

Figure 20 shows the models estimated revenue for Golden Ocean. Clearly the model underestimates the revenues in 2009. In 2010 the actual revenue is on the upper border of the confidence band, and then declining in both 2011 and 2012 to end up fairly close to the models expected revenue for 2012. For Golden Ocean the R^2 is the highest among the five companies at 0,3667. Golden Ocean did not in their annual report for 2008 state any expectations for the development of their fleet. All entries on future vessels were reported in dollars invested or owed, not very useful for estimating the development in the number and type of ships in fleet. This has lead to the assumption that the fleet only

Expected Fleet Development

Year	Capesize	Panamax
2009	4	6
2010	4	8
2011	4	8
2012	4	8
2013	4	8

Actual Fleet Development

Year	Capesize	Panamax
2009	4	8
2010	5	11
2011	6	14
2012	6	15
2013		

Table 24: Golden Ocean expected vs. actual fleet development.

grew by two panama vessels in 2010 and from there on remained constant, in both size and composition. This wasn't the case as can be seen from Table 24. In fact the fleet grew a lot, and especially the number of Panamax vessels. What is unexpected though is the decline in reported revenues (see Figure 20). When the fleet increases an increase in revenue is to be expected. The model is not capable of imitating such behaviour; remember that one assumption is full utilization of vessels; Gold Ocean actually generates less revenue per vessel year over year.

Sub Conclusion

Using R^2 as a measurement for model accuracy proved to be inadequate as the low number of data points didn't seem to provide enough data for the measurement to reliable. Further it cannot be concluded that the model accurately estimates revenues on a consistent basis across companies. However the section clearly shows the models inherent reliability on the analyst's expectations to the development of the company's fleet portfolio. Though this obviously can be hard to estimate it is however easier to get good information from the company's annual reports or the company managers themselves on their expectations for their fleet development compared to the development in total revenues. In other words obtaining accurate and reliable data on the development on the fleet portfolios is easier and presumably more accurate than estimating revenue growth rates. Just how the relationship between the estimated fleets and the estimated revenues interact will be explored further in Section 6 – Sensitivity Analysis. It is worth noting that no fleet portfolio was expected to decrease, though this indeed was the case in some years, this can perhaps be attributed to the lack of information on the fleet developments and only helps to emphasise the importance of acquiring this information. Since all calculations have been done retrospectively, asking companies of their expectations to fleet developments in the past was somewhat difficult.

		Revenue					R^2
		2009	2010	2011	2012	2013	
Frontline	Estimate	1.384.944	1.709.715	1.683.757	1.737.307	1.696.421	**0,2974**
	Actual	1.133.286	1.165.215	810.102	668.107		
NORDEN	Estimate	1.060.401	909.176	1.055.645	1.087.462	1.109.446	**0,0752**
	Actual	1.756.000	.189.600	.272.800	2.131.400		
Golden Ocean	Estimate	148.580	175.121	181.326	188.486	193.398	**0,3667**
	Actual	350.235	378.629	316.294	227.137		
OSG	Estimate	1.002.592	1.189.399	1.195.520	1.181.207	1.165.083	**0,0589**
	Actual	1.093.618	1.045.610	1.049.531	1.137.130		
TORM	Estimate	774.530	1.071.845	1.067.440	1.092.872	1.095.643	**0,2781**
	Actual	862.251	856.075	1.305.208	.121.215		

Table 25: Model revenue accuracy measured as R^2. Source: Own making and company annual reports. Source: Own making

The models inability to account for trip-charter capacity was also revealed, and formed the basis of the inaccuracy in the revenue estimations for NORDEN. Assumptions regarding fleet development could however be made to account for this strategic behaviour, if the extend of it is known at the time of the analysis.

Lastly an example of the effect of greatly violating the assumption of full utilization was evident from the results obtained for Golden Ocean, though it is possible to adjust the model to assume less than full utilization of the fleet it is rarely something that would be expected to occur as this greatly reduces the vessels profitability, and a company would usually get rid of the vessel in such a situation.

5.3. Share Price

The revenues are after all only intermediate results in the model, the true purpose of the model is to obtain a company value either as an enterprise value or – more often as a price-per-share, for comparison with the market value. The problem when assessing the performance of the model is that the price-per-share measure can't be tested against a known fixed price-per-share like the revenue could and therefore assessing the models accuracy and robustness against the price-per-share is inadequate. It is however worth looking at the type of share price distributions the model returns for the different companies in order to assess the precision of the estimates.

5.3.1. The Distributions of Estimated Share Price – Model Precision

Figure 29 to Figure 33 (on page 46) shows the frequency distributions of the share prices for the companies. As would be expected the share price distributions are skewed to the right to just like the revenue distributions. It is nonetheless difficult, from those figures, to say anything thing about the precision of the model results. It is clear that there are differences in width, height and skew of the distributions but that is all that really can be said from visual observation. To better compare the characteristics of distributions and assess the precision of the model Table 26 shows the share price estimations, the upper and lower confidence interval, the confidence interval, both the standard deviation and the relative standard deviation as well as the distributions skew and kurtosis.

Share price statistics	NORDEN	Frontline	OSG	TORM	Golden Ocean
95-Upper [US$]	72,56	112,24	131,5	23,83	2,62
Mean Estimate[US$]	**61,12**	**75,47**	**86,14**	**8,35**	**0,79**
95-Lower [US$]	55,21	51,52	54,24	-1,72	-0,33
CI-Range [US$]	17,35	60,71	77,27	25,55	2,95
Standard Deviation [US$]	7,57	23,19	24,30	10,35	1,34
Relative Std. Dev.	12,4%	30,7%	28,2%	124,0%	168,3%
Skewness	13,67	9,92	1,07	6,36	15,86
Kurtosis	503,13	327,43	2,25	102,49	594,65

Table 26: Mean estimates, levels for 95% confidence bands, standard deviation and relative standard deviation for all five companies. Source: Own making

Golden Ocean and NORDEN distinguish themselves in Table 26, by having the highest (positive) skews and highest kurtosis values (both above 500) of all. They also have the two lowest standard deviations, but there is a huge difference in their relative standard deviation, 168,3% for Golden Ocean vs. 12,4% for NORDEN. Though Golden Ocean has the lowest standard deviation of all five companies, and as such could be mistaken for being a precise result, the reality is that the model has produced the least precise results of all five companies for Golden Ocean. This is evident in both Table 26 and in Figure 22 where the confidence bands are plotted as percentages of the models share price estimates.

Looking at the estimates and their confidence bands for all the companies, it is clear that the width of these confidence bands differ greatly, not only in absolute monetary values, but also when measured as percentages from the mean estimate. Figure 22 shows the upper and lower levels of the 95% confidence band for all the five companies, ranging from the highest precision to the lowest precision (measured in RSD). The estimated value is the baseline (0%) as the calculation is done as confidence band level divided by mean estimate minus 1. So the 95-Upper value for NORDEN is calculated as $\frac{72,56}{61,12} - 1 = 0,187$.

Figure 22 allows a better comparison of the upper and lower levels of the confidence interval, though the absolute monetary values of the confidence intervals can be found in Table 26 a low value here isn't telling

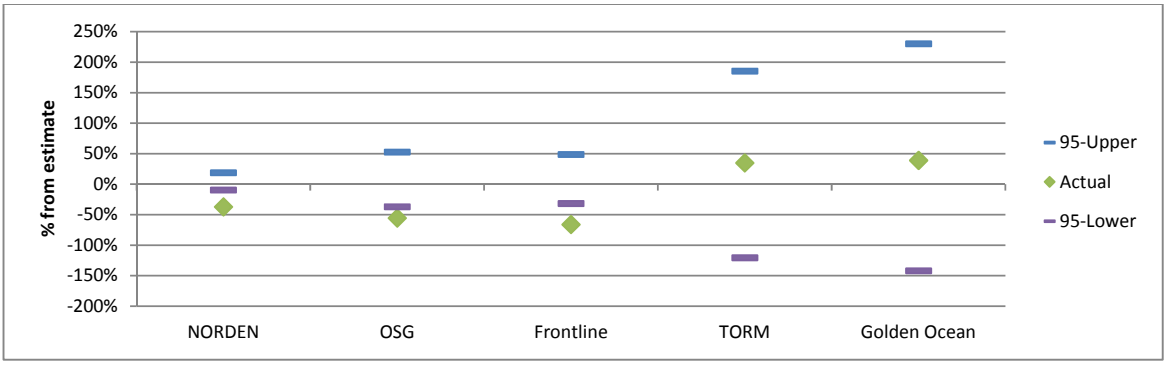

Figure 22: The models share price upper and lower confidence bands for each company, expressed as percentages from the mean estimate (estimate = 0%). i.e. the 95-upper confidence limit for Frontline is roughly 50% larger than the mean estimate. Source: Own making

the whole story as is again evident from Golden Ocean where the distance between the upper and lower boarder only is 2,95 US$ and for NORDEN the distance is 17,35 US$, but seen as percentage from the estimate there are huge differences.

Clearly the model produces the most precise estimates for NORDEN followed by OSG and Frontline, evident from their fairly low relative standard deviations and Figure 22. After Frontline there is somewhat of a "jump" up(or down) to TORM and Golden Ocean, that both have RSD's above 100% (standard deviation greater than absolute value of the model estimate).

When assessing the model performance on revenue, only the size and composition of the fleet portfolio and the amount of fixed revenue were factors that the companies had control over. This is not the case with the share price, since it is based on the enterprise value obtained from calculating the free cash flows. Had the precision of the estimated share prices matched what was found in the revenue no further studies would be necessary but the vast differences in share price precision cannot be attributed to portfolio composition and fixation of revenue alone.

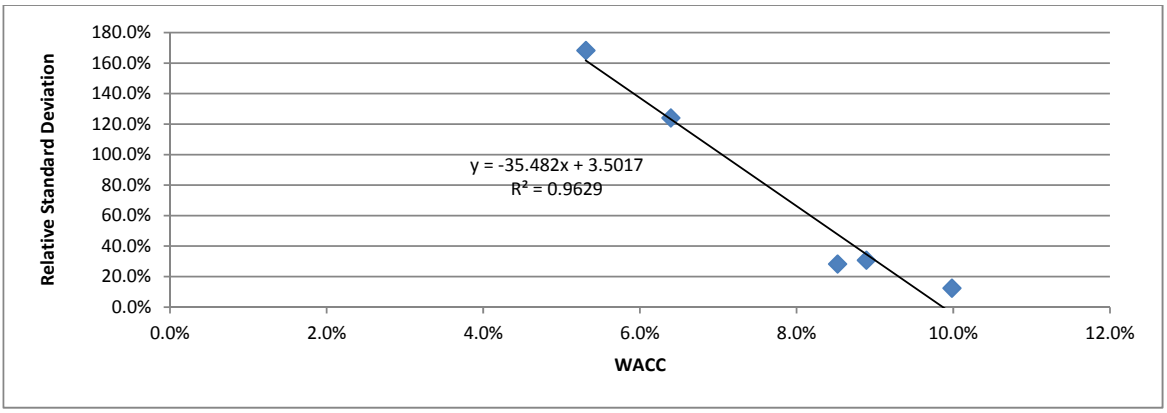

Figure 23: WACC as a function of relative standard deviation. Source: Own making

One of the main financial differences between the companies is their debt-equity ratio and consequently their WACC. Plotting the companies' relative standard deviation as a function of their WACC there appears to be a linear relationship, indicating that the model for a company with a 1% larger WACC than another company

will result in a lower RSD of about 35%. Put another way; a company with a high WACC will seemingly increase the models ability generate precise results.

5.3.1. Estimated Share Price vs. Actual Share Price

Figure 22 also show the actual share price for each company at the valuation date (16-06-2009) as a percentage from the estimate. It might just be coincidental that the three companies with the lowest relative standard deviations all are undervalued according to the model and the two other companies both overvalued. Inspired by Rasmussen (2010) it is interesting to see how the actual share price have developed over time compared to the model estimation. Figure 24 shows the development for Frontline's share price

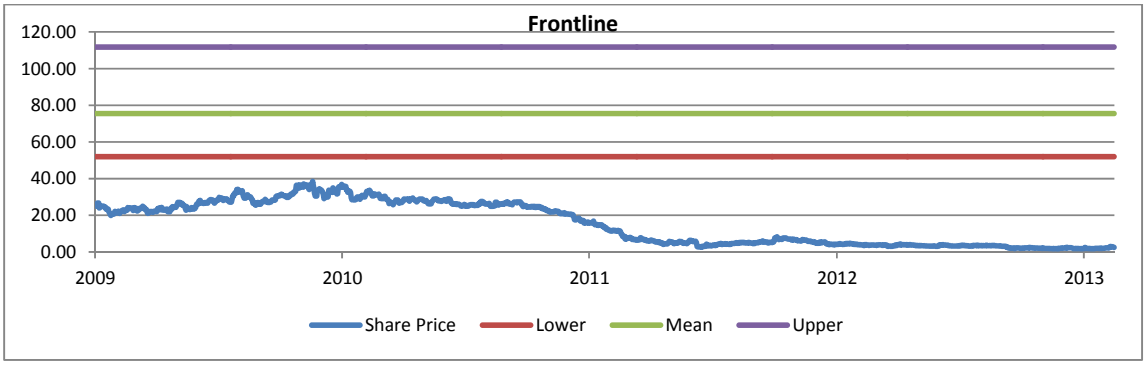

Figure 24: Estimated share price and the 95-confidence bands vs. the actual share price development for Frontline. Source: Own making+Bloomberg

from 16-06-2009 to 31-07-2013. All though four years is a long time to compare a single valuation against it is interesting to see how the Frontline share price never even gets close to the lower boundary of the confidence interval, and declines rather drastically at the end of 2010, remember Frontline was considered overvalued by the model. The share price development, model estimates and confidence bands for the rest of the companies can be seen in Figure 25 to Figure 28 on page 45. It is interesting to see that the actual share price of neither one of the three most precise estimates, NORDEN, OSG and Frontline, ever gets inside their confidence intervals, while both TORM and Golden Ocean's share prices stays inside the confidence interval and often close to the estimated share price. That the actual share price of TORM and Golden Ocean is inside their confidence intervals isn't that surprising considering the width of them.

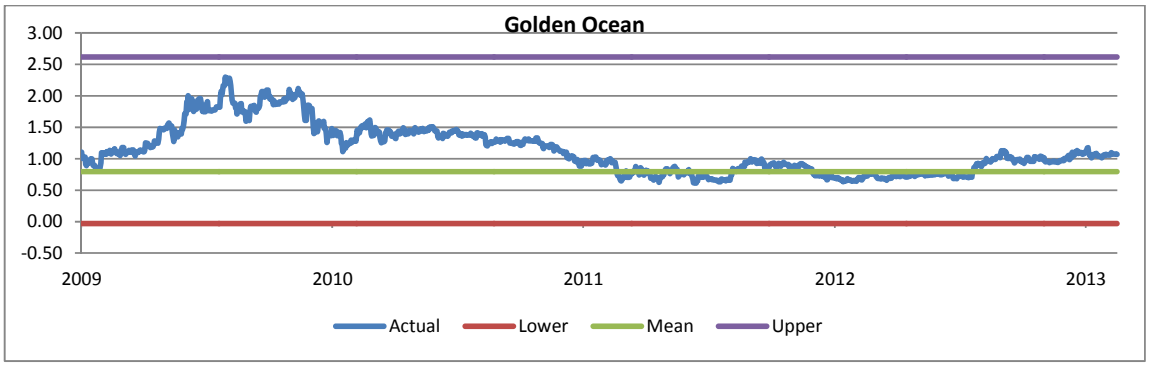

Figure 25: Golden Ocean estimated share price with confidence intervals vs. actual share price. Source: Own making+Bloomberg

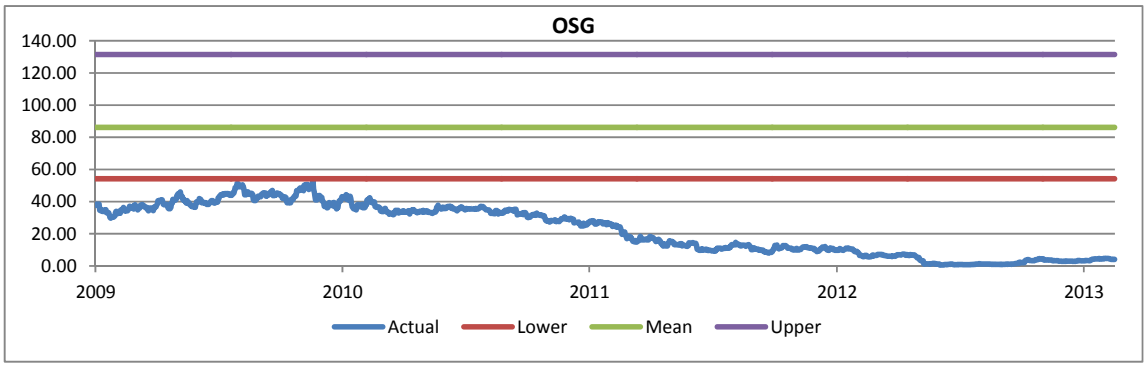

Figure 26: OSG estimated share price with confidence intervals vs. actual share price. Source: Own making+Bloomberg

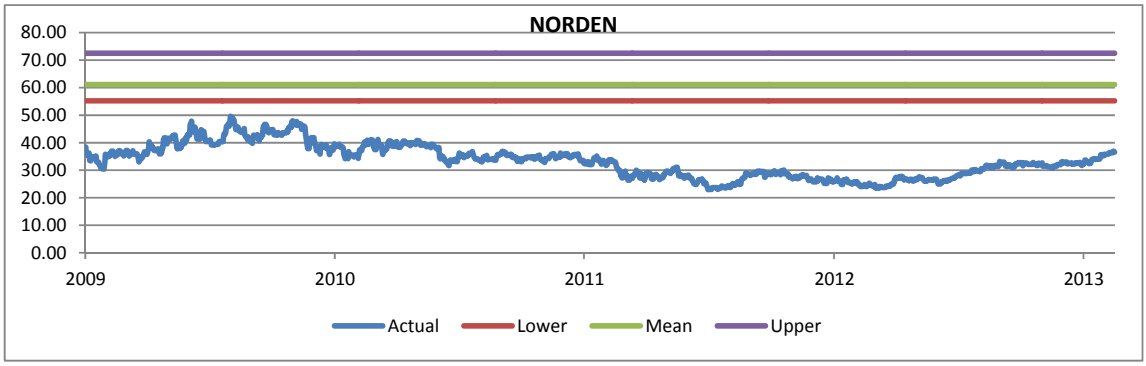

Figure 27: NORDEN estimated share price with confidence intervals vs. actual share price. Source: Own making+Bloomberg

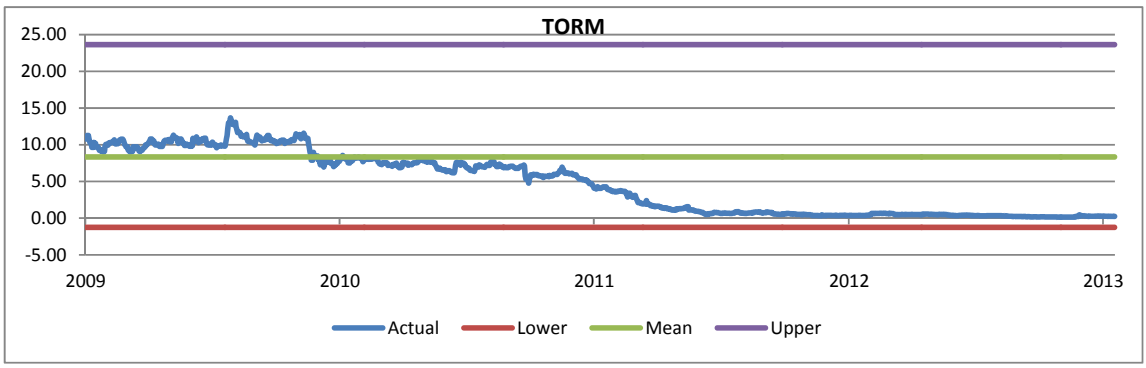

Figure 28: TORM estimated share price with confidence intervals vs. actual share price. Source: Own making+Bloomberg

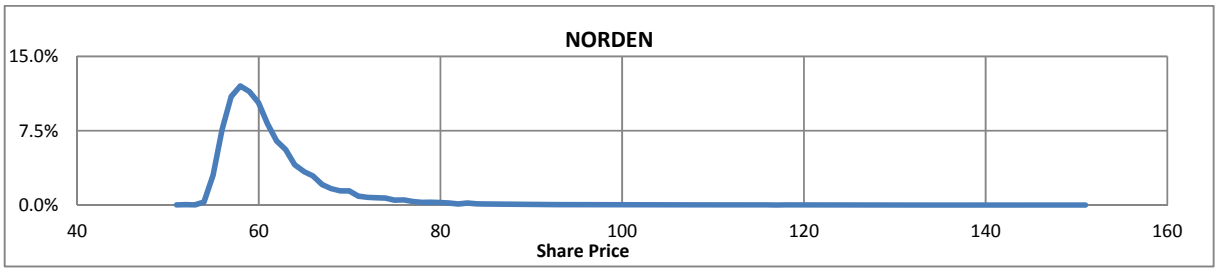

Figure 29: NORDEN's frequency distribution of the modelled share price. Source: Own making

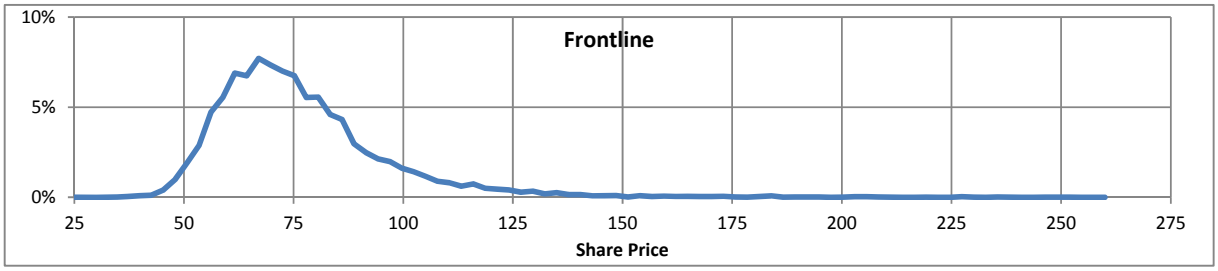

Figure 30: Frontline's frequency distribution of the modelled share price. Source: Own making

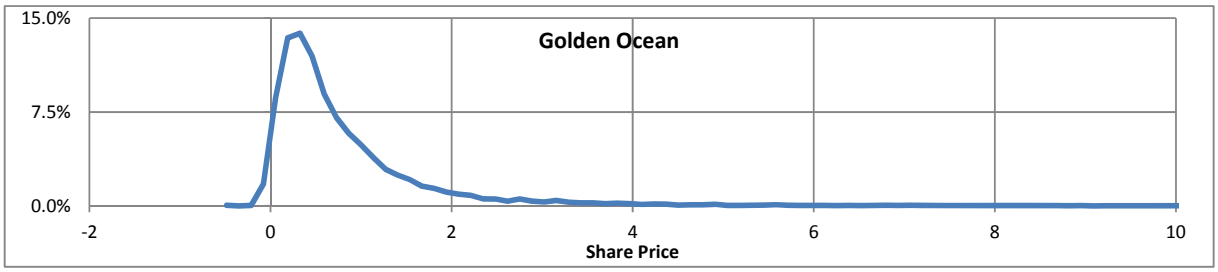

Figure 31: Golden Ocean's frequency distribution of the modelled share price. Source: Own making

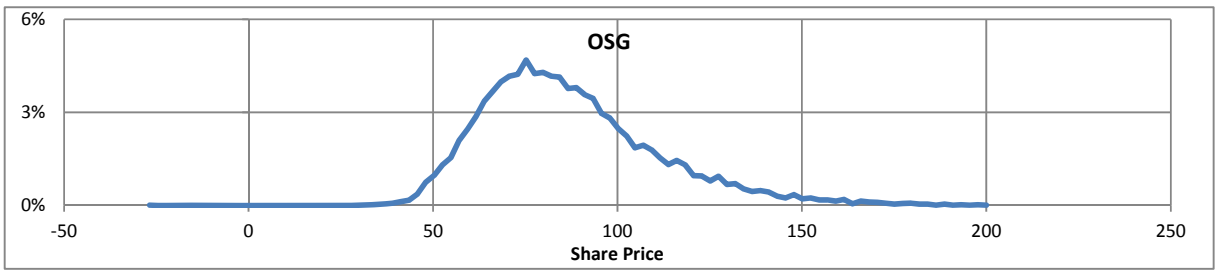

Figure 32: OSG's frequency distribution of the modelled share price. Source: Own making

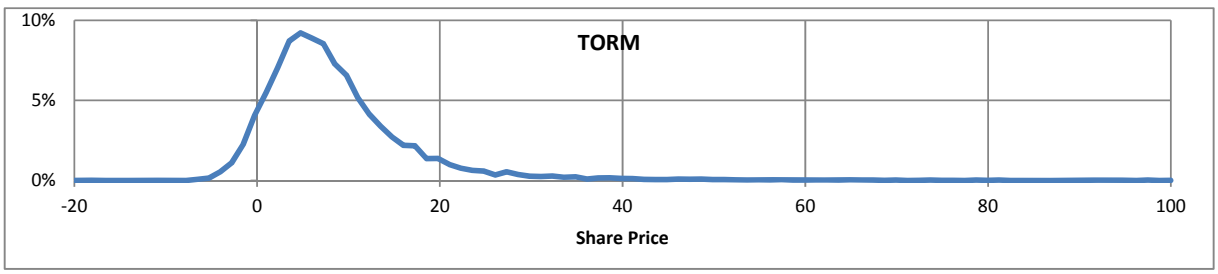

Figure 33: TORM's frequency distribution of the modelled share price. Source: Own making

5.4. Sub-Conclusion

It was found that the models simulation of the freight rate indices are highly dependent on the index start bias (the difference between start value and long-term mean) and speed of mean reversal. Furthermore it was found that the fairly high, compared to current levels, long-term means resulted in indices being overestimated. This raises the question of how the long-term mean should be defined, or if using a short(er)-term mean instead would yield better results. The idea is that a short-term mean might capture more of the current market characteristics than a long-term mean does.

The accuracy of the size of fleet portfolio was, unsurprisingly, found to have an effect on the accuracy of the revenue estimations. The model might not rely on guesstimated revenue growth rates, like the classic DCF but it has merely moved the uncertainty from estimating changes in revenue to estimating changes in the fleet portfolio. This is however an improvement as this type of information is often readily available through the annual reports and/or through the managers at the company. The down side is that there is a lot more data for the analyst to handle and process, the complexity of the model has increased tremendously from the classic DCF.

R^2 was found to be a poor measure for the models revenue accuracy as the low number of data points made it highly unreliable.

All things considered it cannot be concluded that the model performs with sufficient precision and accuracy in estimating revenues to deem its performance as anything other than dubious – at best.

It was however evident that there are large differences in how precise the models share price results are for each of the companies, with NORDEN as the best case. Where the model actually ended up with a fairly precise share price estimate with an RSD of 12,4%.

The very large differences in the precision of the model across companies could not be attributed to the differences in fleet portfolio and the characteristics of the freight rate exposure alone. The capital structure of the individual company appears to influence the models ability to generate results with high precision. This was most evident when plotting the relative standard deviation as a function of the all the companies WACC's. This revealed an apparent linear relationship between the two. Most notably was the large negative slope of the regression line suggesting a decrease in relative standard deviation of 35% for every 1% increase in WACC. Assuming the linear relationship holds of course and that the observed relationship actually exists.

It would appear that NORDEN is a special case for which the model is able to obtain a higher degree of precision, compared to the other companies. A 95% confidence interval ranging from +19% to -10% of the estimate is a result that is precise enough for an analyst to use, but even the comparatively high precision obtained for OSG and Frontline results in a too wide confidence interval to be really useful for an analyst. See Table 26 for estimates and confidence intervals. It would appear that the model is unable to provide precise results for companies with no or little information on fixed revenues.

The estimates indicate that the market greatly undervalues NORDEN, OSG and Frontline, the three companies with the highest precision but the development in share price over a four year period doesn't seem to support this. In fact Frontlines share price drops rather quickly at the end of 2010 and OSG filed for bankruptcy protection at the end of 2012 (law360.com).

6. Section 6 – Sensitivity Analysis

6.1. Previous sensitivity analysis results

Rasmussen (2010) did a series of sensitivity analysis on the model in which he came forth with 4 prepositions. His focus in all of them was on determining the impact, changes in different key input parameters in the model would have on the distribution of share prices. This section will recap his findings as they form the foundation of the following sensitivity analysis.

Freight rate volatility versus share price

In preposition 1 Rasmussen examined the relationship between the freight rate volatility and the distribution of the share price.

> Preposition 1: "*Increasing the volatility of the underlying freight rate, should cause the valuation distribution to widen due to the increase revenue uncertainty*" Rasmussen (2010).

He found that increasing the freight rate volatilities resulted in a share price distribution with a lower kurtosis and higher mean values. This will affect the revenue distribution in the same way. The volatility of the freight rate indices are thus a factor in determining the position (left/right) and height/width of both the revenue (Figure 11 to Figure 15) and share price distributions(Figure 29 to Figure 33). Though it is not within the company's control to change these factors; knowing how they affect the results are paramount to the analyst when estimating them based on historic data.

Freight rate correlation versus share price

Preposition 2 is looking at the correlation between the freight rates and the impact on the share price distribution.

> Preposition 2: "*Increasing the freight rate correlation, should cause the valuation distribution to widen due decreased vessel diversification*" Rasmussen (2010).

Again he finds that the share price distribution widens, more specifically he finds that "*… increasing the correlation between the freight rates causes more revenue uncertainty and thus more uncertainty towards the valuation of the company*" Rasmussen (2010).

The reasoning for this is that by increasing the correlation the fleet portfolios offer less diversification. In other words; a drop in one index is less likely to be offset by an increase in another, thus making the total fleet portfolio more volatile.

Speed of mean-reversion coefficient versus share price

Preposition 3 is looking at changes in the speed of mean reversal in the Stochastic Differential Equation and the share price.

> Preposition 3: "*Increasing the speed of mean-reversion coefficient, should cause the valuation distribution to narrow since the simulated freight rates return faster to their historical mean level*" Rasmussen (2010).

Not surprisingly Rasmussen finds that this is indeed the case, confirming the point made in section 2.1.3 Parameter Estimation that accurate estimations of the speed of mean reversal is paramount to the simulation of the indices.

Net exposure versus Enterprise Value

Rasmussen's final sensitivity analysis looks at NORDEN's exposure to the modelled freight rates and the impact on the share price.

> Preposition 4: "*Increasing the net exposure, should cause the valuation distribution to widen since D/S Norden becomes increasingly exposed to volatile freight rates*" Rasmussen (2010).

This comes as no surprise; the more fixed revenue the company has the less exposure to the volatility of the freight rates and thus a less volatile share price. This is exactly what was evident from the comparison of the companies 2009 estimated revenues

Critique and takeaways

While Rasmussen's results do provide valuable information on how some of the input factors of the model affect the precision they are only based on 500 Monte-Carlo iterations and can as such not be considered very reliable. They will however be accepted as they make intuitive sense and some have been confirmed from results in this project as well.

The most important takeaway from Rasmussen's sensitivity analysis is that the factors enabling the model to simulate market conditions; freight rate volatility, correlation and "size" of speed of mean reversion all affect the *precision* (width of confidence interval and mean estimate) of the model. Though nothing can be said of the models accuracy from Rasmussen's analysis, it is fair to conclude; based on Rasmussen findings in preposition 4 and the results on revenue distribution and company exposure to the volatile freight rates, that decreasing net exposure will increase the models accuracy on revenue generation, and its precision when estimating share price.

While Rasmussen focused on testing model parameters that pertain to the simulation of the market development through the O-U process, the following analysis will focus on how changes in the companies' financial structure and fleet portfolio will affect the performance of the model.

6.2. Changes in fleet size

As the results in section 5.2.2 Estimated Revenue vs. Actual Revenue showed, there appear to be a connection between the size of the estimated fleet portfolio, the actual fleet portfolio and the accuracy with which the model is able to estimate revenues. In this section the relationship between the size of the fleet portfolio and the estimated revenue will be examined further. In order to do this a series of models have been run where the only difference is the total size of the fleet portfolio, so the composition of the portfolio is kept constant. Using Frontline as a case company the "base" case is considered to be the expected portfolio that has generated all previous results. This time 10 new models have been developed with just a change in the size of the fleet. The change in fleet size range from -75% to +75% compared to the base case, with increments of 15%.

The results can be seen in Figure 35 where the changes in estimated year 1 revenue and changes in the share price are plotted against changes in the fleet size. As expected from section 5.2.2 Estimated Revenue vs. Actual Revenue there is a clear 1-to-1 relationship between fleet size and estimated revenue; that is a 1%

change in fleet size will result in a 1% change in estimated revenue. The perfect linear relationship between fleet size and estimated share price is actually a little more interesting. Figure 35 suggest that a 1% increase in Frontline's fleet would result in a 1,24% increase in share price. Table 27 shows the slope of all the regressions, interestingly enough NORDEN would only see an increase in share price of 0,57% by increasing the fleet by 1%. This is due to the amount of fixed revenue they have. Especially the amount of fixed revenue in year 5 seems to have a negative influence as the rates for the fixed revenue is well below most of the indices long-term means (See appendix 7 Fixed T/C Rates).

	Slope
TORM	1,13
Golden Ocean	1,61
NORDEN	0,57
OSG	2,47
Frontline	1,25

Table 27: The slope of the share price regressed against change in fleet size.

Though these regressions are interesting as they suggests that increasing the fleet will yield greater return for the investors, the results are however based on a percentage increase in fleet size without regard to how acquiring such a fleet would affect the financial gearing of the company and possible interests on loans obtained to increase the fleet are not included. Furthermore the analysis assumes that the companies will be able to sell this extra added freight capacity.

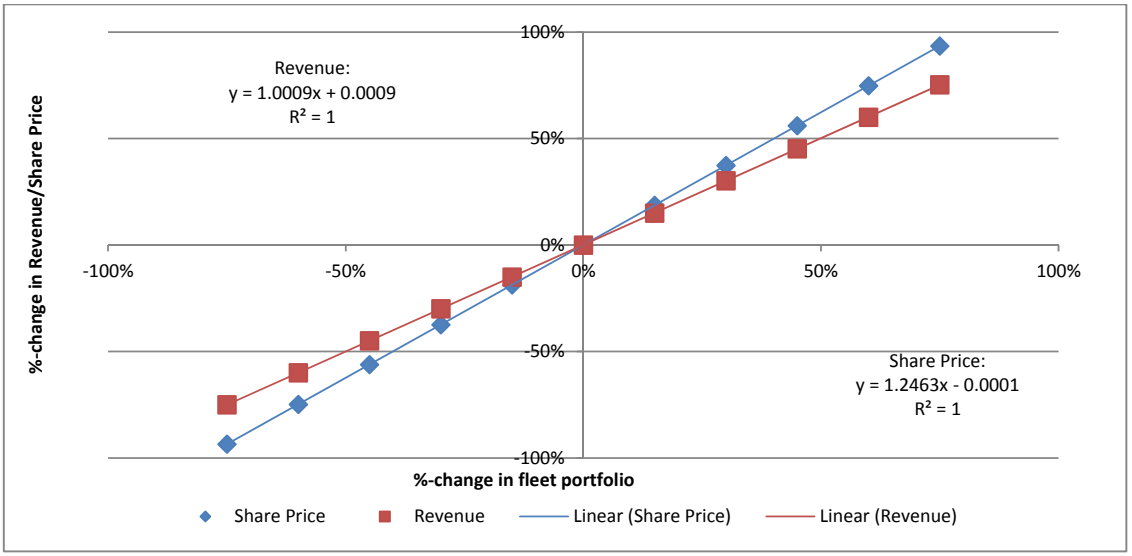

Figure 35: The relationship between changes in fleet size and changes in estimated revenue (year 1), and the relationship between fleet size and estimated share price. Based on Frontline data.

Another interesting aspect is found in Figure 34 where the share price distribution for each of the 11 models is shown. Again the relationship between size and estimated share price can be seen, this time as the "mass"

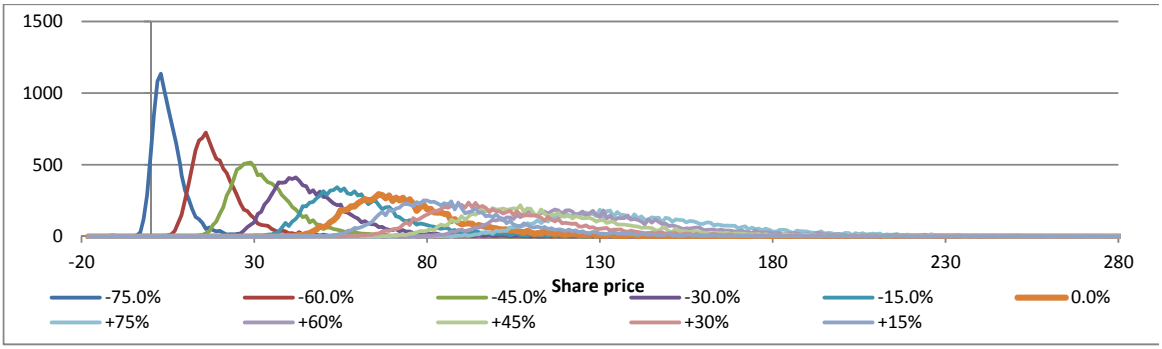

Figure 34: The relationship between changes in fleet size and changes in estimated share price. Notice how the width of the distributions increases with fleet size. Based on Frontline data.

of the distributions move to the right as the fleet size increase.

The key take away from this figure however is the width of the distributions; that increase with the size of the fleet. The logic behind this is the same as for Rasmussen's preposition 4, when the fleet size increases so does the relative exposure to the volatile freight rates making the possible outcome of the model greater. This could be interpreted as the model precision will decrease with the size of the fleet portfolio and as such making it more suitable for valuating small fleet companies, but what is less obvious from Figure 34 is that the mean value of share price increase faster than the standard deviation (the width) resulting in the exact opposite conclusion, that model precision increases with fleet size (see Figure 36), though the greatest change in relative standard deviation happens when the fleet size get so small that the estimated share price approaches 0, making the RSD explode towards infinity.

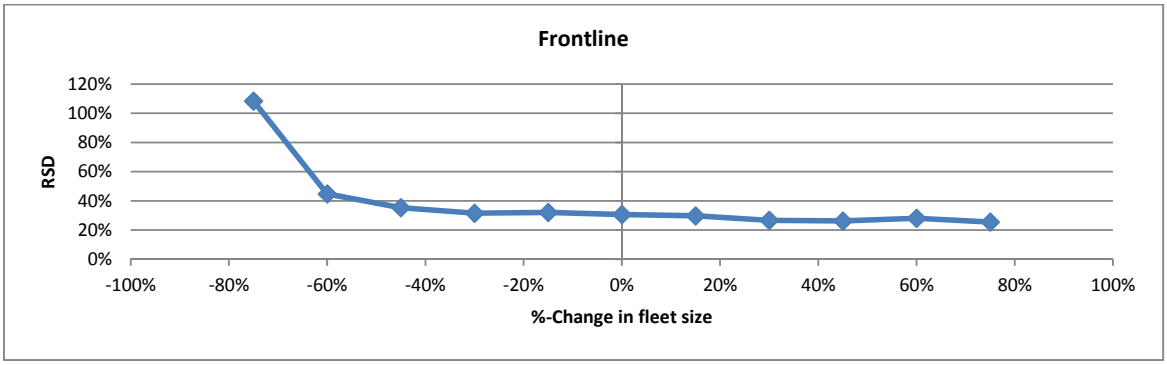

Figure 36: Relative standard deviation as a function of the percentage change in fleet size. All else equal. Source: Own making

All else equal; changes in the size of the fleet portfolio will have a 1-to-1 influence on the estimated revenue, and based on the company's amount of fixed revenue and financial structure have an impact on the estimated share price. Generally it was found that, all else equal, decreasing the fleet size would have a profound negative effect on the model precision if the decrease would result in share price estimations close to 0, if not the effect is miniscule.

6.3. Changes in Debt and WACC

From Figure 23 it was evident that there is a relationship between the company WACC and the models precision. Increasing the company debt will of course increase the debt-equity ratio as well and thus change the WACC. The impact on the WACC by changing the debt is illustrated in Figure 37, clearly increasing the

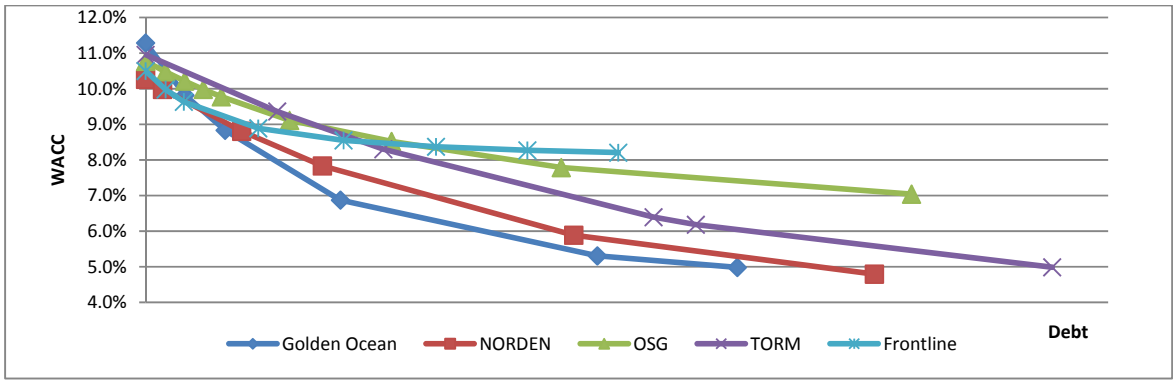

Figure 37: WACC as a function of debt. Source: Own making

debt will have a negative effect on the WACC, but the effect is waning. Increasing the company debt while, allowing it to change the WACC is problematic when trying to assess the components of the models effect on precision individually.

This section will analyse the effects of changing the financial structure in the companies by first changing their amount of debt while keeping everything else equal. Then the effects of changing the WACC will be examined and finally the combination of changing the debt including its effects on the WACC will be investigated.

6.3.1. Change in debt – all else equal

By changing the amount of the debt that enters into the calculation of the enterprise value, the effects on RSD as the enterprise value approaches 0 is clearly visible in Figure 38. As expected the RSD will approach infinity as the debt-to-equity value[10] ratio approaches 100%. The reason for this is evident from Figure 39, where the share price and standard deviation is plotted as well.

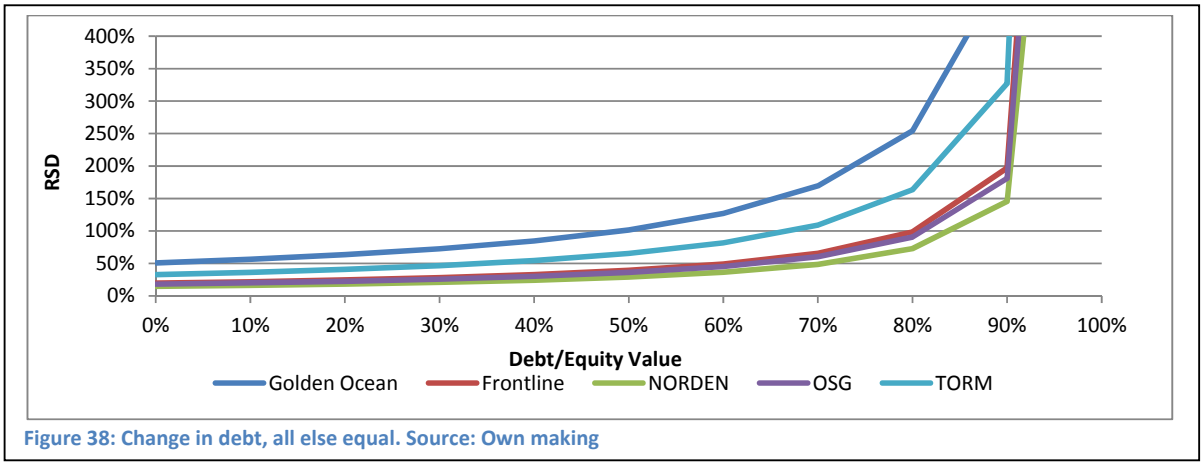

Figure 38: Change in debt, all else equal. Source: Own making

The debt in the calculation of enterprise value will only affect the share price estimate, not the standard deviation. The share price estimate will increase/decrease linearly with the amount of debt added/subtracted due to the relationship in Eq. 15. This decrease in the mean estimate results in higher relative standard deviations and thus decreases precision. The combination of a decline in estimated share price as debt increases (relative to equity value) and a constant standard deviation greatly impacts the precision of the model.

There are several important observations in Figure 38. First, when the debt/equity ratio is 0 there is still a rather large difference in RSD across the companies, indicating and inherent uncertainty in the model. This is due to differences in composition of fleet portfolios and freight rate exposure. Another important observation is the fact that none of the curves ever cross one another. Showing that while the debt/enterprise ratio does have an impact on the models precision it cannot change the underlying uncertainties of the fleet portfolio, it merely amplifies it to a greater or lesser extent.

Though not very clear from Figure 38; the percentage increase in RSD as a result of an increase in the debt/equity ratio is the same for all companies. That is; going from a debt/equity ratio of 0% to 50% will, regardless of the company result in a 100% increase of RSD. This relationship can be expressed

[10] The equity-value refers to the equity value found from Eq. 14

mathematically, and enables us to determine the RSD at any given debt-equity value (Eq. 19), when one point on the curve is known.

$$RSD_0 = RSD_j * \left(1 - \frac{Debt}{Equity\ Value_j}\right) \quad \text{Eq. 19}$$

Her RSD_0 is the relative standard deviation when the debt-equity is 0, and RSD_j denotes the relative standard deviation for the debt-equity ratio j.

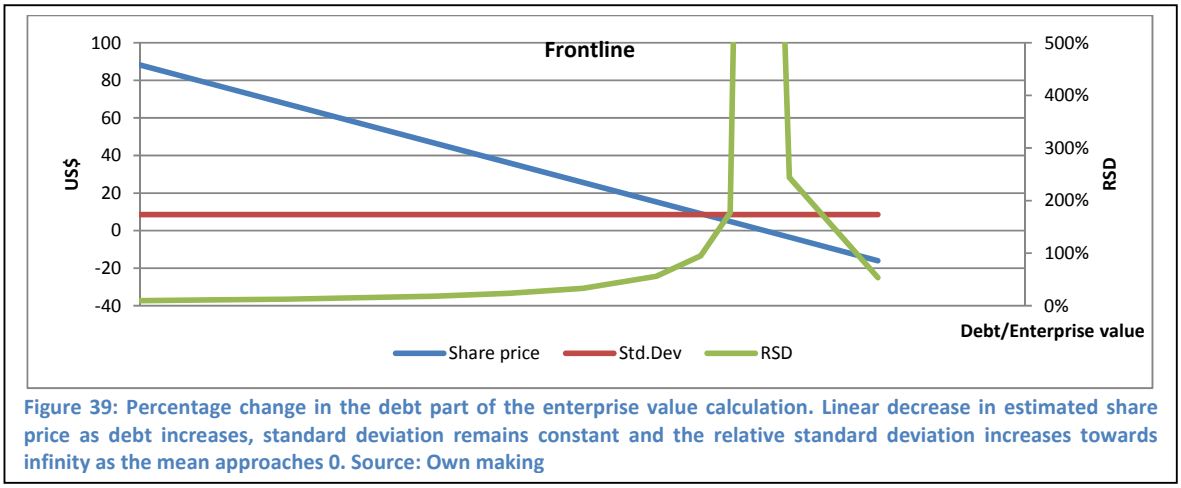

Figure 39: Percentage change in the debt part of the enterprise value calculation. Linear decrease in estimated share price as debt increases, standard deviation remains constant and the relative standard deviation increases towards infinity as the mean approaches 0. Source: Own making

6.3.1. Change in WACC – all else equal

By adjusting the WACC independently from the rest of the model it becomes clear that the linear relationship witnessed in Figure 23 is somewhat misleading. First of all, the conclusion that a lower WACC would lead to a lower RSD clearly doesn't hold. As a matter of fact, it is a bit of both. A high WACC will decrease the model precision. But as is evident from Figure 40 there are large differences in the extent to which the model precision is affected by a change in WACC, for NORDEN and OSG the WACC curve is

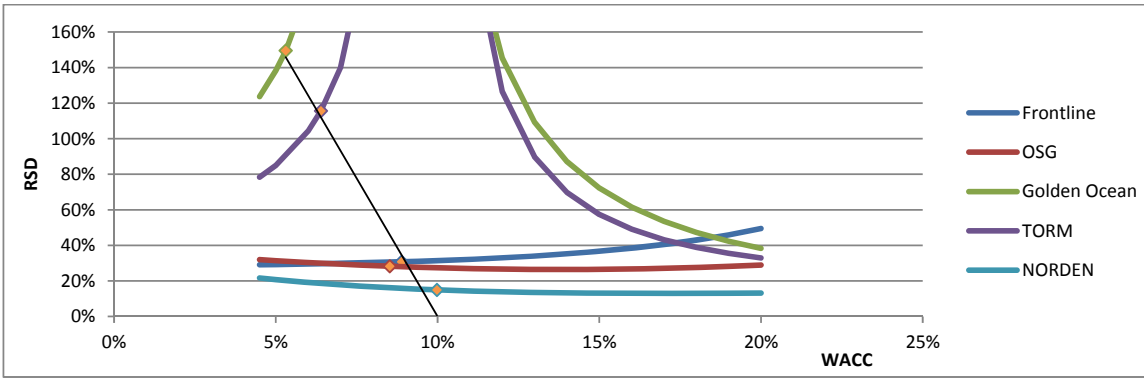

Figure 40: RSD as function of WACC alone for each company. Orange dots mark the values from the base models. Source: Own making.

even slightly decreasing at first. The strong decline in the curves for TORM and Golden Ocean occur as a result of negative estimated share prices, and does as such not provide any useful information to an analyst.

This is of course closely related to the debt/enterprise ratio, when the WACC increases the equity value drops, and consequently the debt will account for a larger portion effectively lowering the enterprise value.

The orange points in the figure represent the base case[11] and a similar regression line as the one found in Figure 23 is added.

The vastly different slopes on the curves can be attributed to the different levels of debt the companies hold. Figure 41 shows the effect of increasing the debt for OSG, independently of the WACC. The result is a

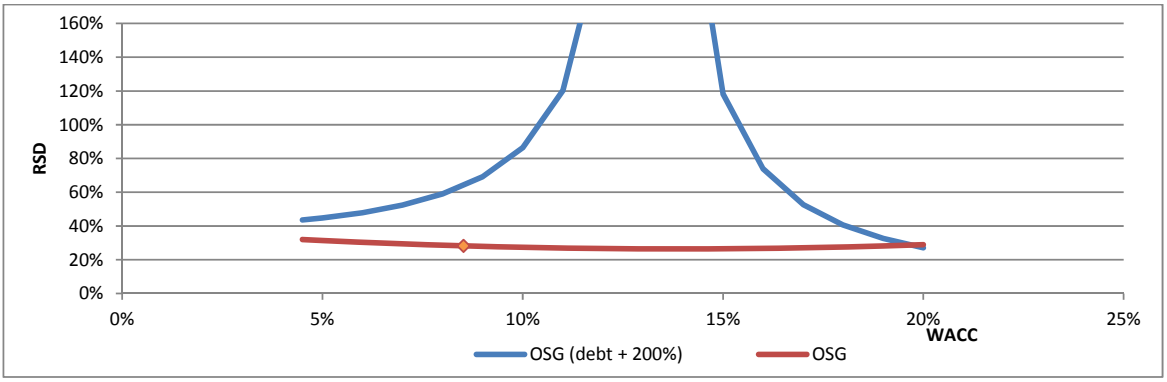

Figure 41: Increasing the debt independently of the WACC, will shift the RSD-WACC curve right. Source: Own making

"shift" in the RSD-WACC curve. The required WACC to obtain an enterprise value of 0 is now much lower, again illustrating the models inability to generate precise results for low value companies.

6.3.1. Change in WACC as result of change in debt– all else equal

Both changes in the debt and WACC will affect the precision of the model, when they were the only factors changing. In this section a combination of the two will be examined as changes in debt will be allowed to generate changes in the WACC.

Figure 42 shows the relative standard deviation as a function of NORDEN's WACC. It is important to remember that the decline in RSD as the WACC increases primarily is due to the increase in debt as the change in RSD generated by the WACC for NORDEN was negative (increasing precision).

Figure 43 shows the relationship between the amount of debt and the RSD for NORDEN when changes in debt alone were made compared to changes in debt and WACC. Clearly the difference between the curves is increasing as the debt/equity ratio increases. So this tells us that the WACC will affect the RSD as debt increases and consequently WACC decreases; which is what Figure 40 showed us.

[11] Note the relative standard deviations don't necessarily match the previously reported values since the analysis is based on different simulation runs.

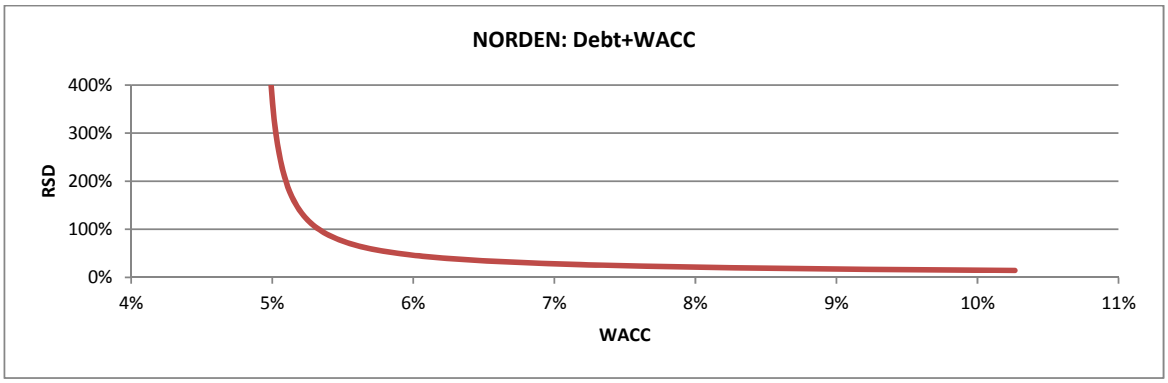

Figure 42: Relative Standard Deviation as a function of WACC. Source: Own making

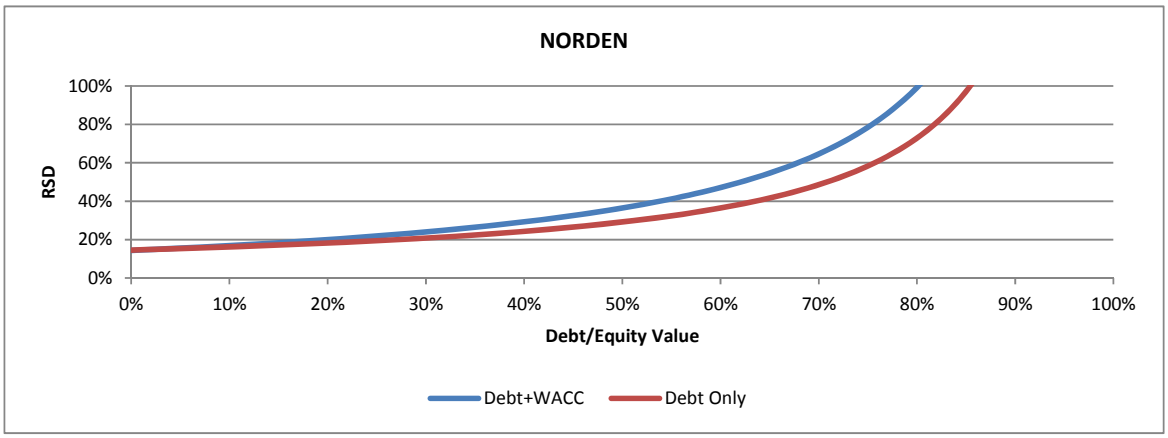

Figure 43: The relative standard deviation as a function of Debt/Equity Value for changes in debt+wacc and debt only. Source: Own making

Increasing the debt will decrease the WACC that in turn will increase the terminal value (see Eq. 12) and the subsequent free cash flow and equity value. But as shown the debt is also an integrated part of the enterprise value calculation and increasing debt will decrease the enterprise value. So the two mechanisms counteract each other, but do not offset each other. The increase in debt is not offset by the increase in equity value caused by the WACC. Furthermore while the increase in debt always led to an increase RSD, increasing the WACC could, depending on the company, either increase or decrease the RSD depending on the amount of debt carried.

The financial structure does have an impact on how well the model will perform, but what is most apparent is that the model performance clearly isn't good when applied to a low-value company or a company in distress. By adjusting the amount of debt in each company both the WACC and enterprise value calculations were affected, both of which have a direct influence on the model precision. The WACC will affect both the standard deviation and the share price estimate whereas the debt only will affect the share price estimate.

7. Section 7 – Conclusion and Further Studies

7.1. Conclusion

Based on the one-factor stochastic DCF model developed by Rasmussen in his thesis, the model was tested on five different shipping companies in order to determine how it would perform when subjected to different kinds of company structures.

The models ability to simulate the development in the freight rate indices were examined and it was found that the difference between start value and long-term mean (start bias) combined with the speed of mean reversal had a profound impact on the shape of the index mean path, and ultimately resulting in higher simulated freight rates and thus revenues in the later years of the forecast period. Comparing the actual development in the MR index to the mean path of the simulated MR index it was clear that a long-term meant might not be the best option for a forecast period of only 5 years, in a market profoundly different from the one the long-term mean is based upon.

The performance of the model was assessed partly on its revenue accuracy but predominantly on its ability to generate precise results. For measuring the accuracy of the revenue estimations the coefficient of determination, R^2, was sought to be used but this proved to be inadequate as the low number of data points for each company made the results unreliable. Instead subjective assessments, based on visual inspection of the estimated vs. actual revenue charts were made. The precision of the share price estimate was measured as the relative standard deviation. This made it possible to compare model results across companies.

The accuracy of the forecasted revenues was then tested by comparing them to the actual reported revenues by the companies in the period from 2009 to 2012. The large variation in accuracy, "measured" as a subjective evaluation further leads to the conclusion that *the model cannot be relied upon to accurately estimate revenues on a consistent basis*.

The revenue accuracy test did however reveal the models reliance on the analysts' estimation of the development in the fleet portfolio. In the sensitivity analysis it was discovered that there is a 1-to-1 relationship between the size of the fleet portfolio and the estimated revenues, and as such the accuracy. Furthermore an increase in the size of the fleet portfolio was found to have a slight impact on the models precision for the estimated share price, though only once the enterprise value was well above 0. In conclusion the size of a company's fleet portfolio only affects the models performance when it is too small to sustain the business operations and the enterprise value as a result approaches 0, in which case the relative standard deviation will approach infinity.

The precision, measured as the relative standard deviation, and confidence intervals of the share price estimates for each company were very different. Ranging from the most precise at 12,4%, obtained for NORDEN, to the least precise, obtained for Golden Ocean, at 168,3%. Since all companies used the same parameter estimates for the O-U process it can be concluded that: *The model performance to a large extend is affected by company specific factors*. The fairly precise results obtained by Rasmussen had apparently as much to do with the nature of the company as the stochastic forecasting of freight rates.

In the sensitivity analysis it was examined what impact the amount of debt carried by the companies would have on the share price precision. This was done by changing the level of debt in the company. This in turn affected the WACC for the company. The debt is also a key component in the calculation of the enterprise

value of a company and it was found that the model precision fell as the debt increased and enterprise value approached 0.

While the model has shown to be readily applicable to all five companies the precision and confidence interval of the share price estimates were for the most part so poor that they would add no further value or information to an analyst compared to a classic DCF.

The model results do however provide valuable insights to the factors that affect risk in the shipping industry. This enables the analyst to further investigate these and to better understand the mechanics and interactions between the inherent market risk, obtained through the fleet portfolio, and the amplification of this risk by the company's financial structure. Table 28 shows the different company specific factors examined either by Rasmussen (2010) or in this project and their degree of influence on the model performance.

Company Factors	Revenue Estimate	Share Price Estimate	Model Precision
Net exposure(fixed revenue)	High	High	High
Fleet size	High	Medium	Low
Debt/Equity*	No influence	High	High
WACC	No influence	Medium	Medium/Low

Table 28: The influence of company specific factors on model performance. Source: Own making.
*Here Equity is the equity value of the company after calculating free cash flows

Though the model isn't well suited for valuating shipping companies in general the share price distributions could be useful for an analyst trying to make tail risk assessments, as they clearly show the possible outcome for the share price is not normally distributed as is otherwise often assumed in finance. This however is outside the scope of this project.

7.2. Further Studies and Applications

There is a number of areas that would be interesting for further studies of the model, perhaps most notably in the area of improving the precision of the estimates. Several different approaches to this would be interesting to examine. The DCF's heavy reliance on the terminal value might be a contributing factor to the poor results generally achieved; using another valuation framework, like the residual income model that puts less emphasis on the terminal value could potentially increase the models precision. Another approach could be to apply advanced variance reduction techniques like importance sampling and stratified sampling, techniques known to greatly reduce the variance of the Monte-Carlo simulation, and thus improve the precision of the model.

As was shown the shipping companies' margin is extremely reliant on the price of bunker oil using a one factor model to just simulate the revenue might not be enough. Therefore expanding to a two factor model incorporating changes in bunker fuel might produce more accurate results, though quite possibly at the cost of model precision, making such a study more suitable for risk management than valuation.

Most long term time charter contracts have purchase options build into them, allowing the company that's chartering the vessel to buy it after a number of years. Since the model was so reliant on the expectations of the fleet portfolio incorporating a real-options approach that depending on the path created by the O-U process would determine whether to exercise the option or not could provide insights to the value and risks associated with these contracts.

Comparing alternative forecasting models to see which ones, if any, is best suited for adaptation in a valuation framework is another interesting field of study. One possibility would be to adapt and build upon the work of Li and Parsons (1997) that in their paper is testing neural networks forecasting capabilities of tanker freight rates against an ARMA model.

For simulating the freight rates in wet-bulk market an assumption was made that the route specific indices used would be representative for the vessel types in general. This most likely isn't the case, and future analysts and/or researchers should attempt to obtain data that better describes the development of the market on a globe scale. This can be done either by constructing index averages or finding and applying an industry accepted index. Another approach would be to construct company specific indices based on the company's customers. For companies that derive most of their revenue from specific routes, perhaps due to one or two large customers, this approach might be more suitable.

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Appendix

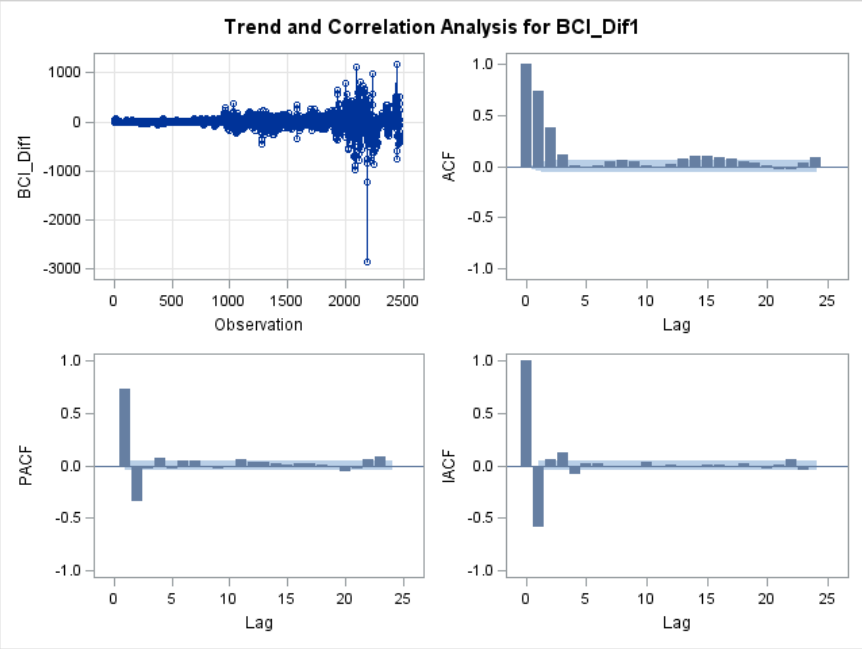
List of appendices:

1. Testing for Stationarity

1.1. Index: Capesize (Baltic Capesize Index)

From: 01/02-2000 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \Delta Y_{t-2} + \Delta Y_{t-3} + \Delta Y_{t-4} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests

Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	F	Pr > F
Zero Mean	0	-630.536	0.0001	-19.33	<.0001		
	1	-1168.75	0.0001	-24.56	<.0001		
	2	-1287.76	0.0001	-22.56	<.0001		
	3	-1004.96	0.0001	-18.54	<.0001		
	4	-1075.00	0.0001	-18.24	<.0001		

Ordinary Least Squares Estimates

SSE	24536322.7	DFE	2070
MSE	11853	Root MSE	108.87284
SBC	25404.8832	AIC	25371.0541
MAE	46.6088702	AICC	25371.0947
MAPE	109.165486	HQC	25383.452
Durbin-Watson	2.0009	Regress R-Square	0.5660
		Total R-Square	0.5660

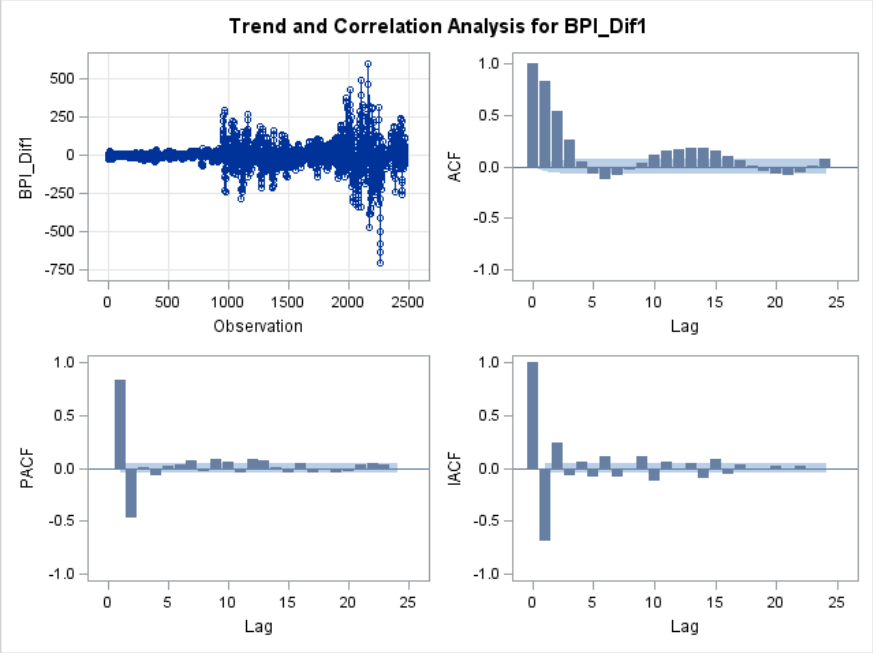
Godfrey's Serial Correlation Test

Alternative	LM	Pr > LM
AR(1)	0.1033	0.7480
AR(2)	39.2064	<.0001
AR(3)	54.2574	<.0001
AR(4)	58.2364	<.0001

1.2. Index: Panamax (Baltic Panamax Index)

From: 01/02-2000 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \Delta Y_{t-2} + \Delta Y_{t-3} + \Delta Y_{t-4} + \Delta Y_{t-5} + \Delta Y_{t-6} + \Delta Y_{t-7} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests

Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	F	Pr > F
Zero Mean	0	-394.858	0.0001	-14.62	<.0001		
	1	-1032.92	0.0001	-22.54	<.0001		
	2	-1064.89	0.0001	-20.39	<.0001		
	3	-1291.85	0.0001	-19.70	<.0001		
	4	-1107.76	0.0001	-17.50	<.0001		
	5	-945.643	0.0001	-16.09	<.0001		
	6	-768.428	0.0001	-14.80	<.0001		
	7	-692.428	0.0001	-13.12	<.0001		

Ordinary Least Squares Estimates

SSE	3405818.11	**DFE**	1923
MSE	1771	**Root MSE**	42.08439
SBC	19991.9662	**AIC**	19941.8694
MAE	23.0644596	**AICC**	19941.963
MAPE	100.088475	**HQC**	19960.2961
Durbin-Watson	1.9780	**Regress R-Square**	0.7550
		Total R-Square	0.7550

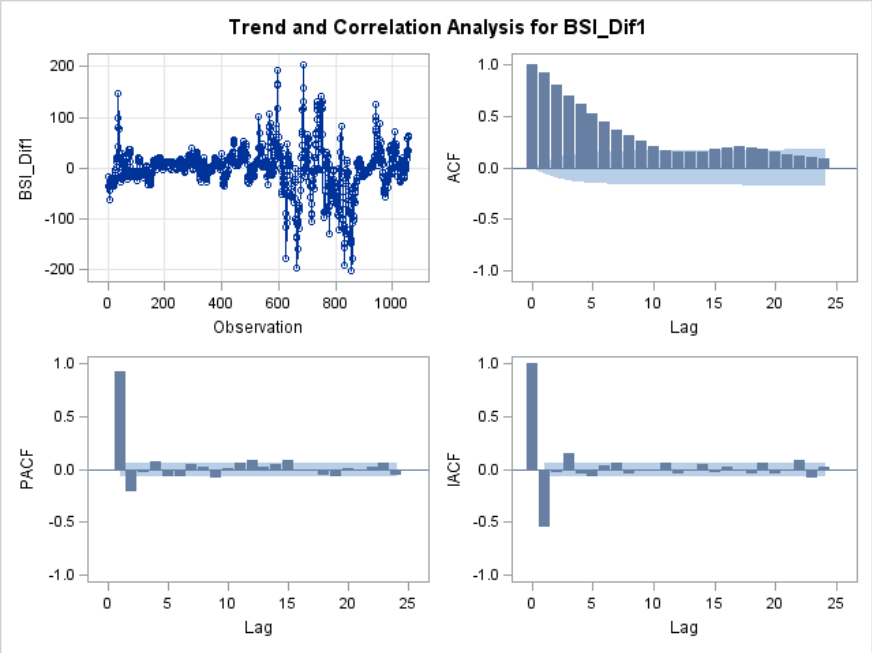
Godfrey's Serial Correlation Test

Alternative	LM	Pr > LM
AR(1)	3.6447	0.0562
AR(2)	4.5139	0.1047
AR(3)	4.6285	0.2011
AR(4)	6.3200	0.1765

1.3. Index: Supramax (Baltic Supramax Index)

From: 01/07-2005 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \Delta Y_{t-2} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests

Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	F	Pr > F
Zero Mean	0	-95.3047	<.0001	-7.41	<.0001		
	1	-133.360	0.0001	-8.63	<.0001		
	2	-131.830	0.0001	-8.35	<.0001		

Ordinary Least Squares Estimates

SSE	318851.605	DFE	945
MSE	337.40911	Root MSE	18.36870
SBC	8240.96857	AIC	8221.54694
MAE	10.9459221	AICC	8221.58931
MAPE	79.1987252	HQC	8228.94724
Durbin-Watson	2.0097	Regress R-Square	0.8307
		Total R-Square	0.8307

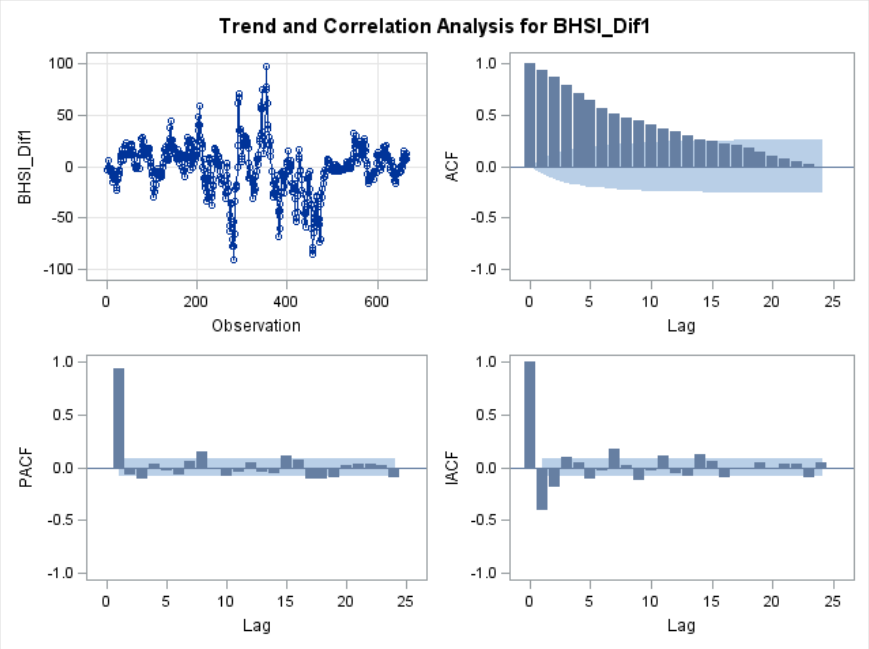
Godfrey's Serial Correlation Test

Alternative	LM	Pr > LM
AR(1)	0.9299	0.3349
AR(2)	0.9674	0.6165
AR(3)	5.9452	0.1143
AR(4)	5.9510	0.2028

1.4. Index: Handysize (Baltic Handysize Index)

From: 02/01-2007 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \Delta Y_{t-2} + \Delta Y_{t-3} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests

Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	F	Pr > F
Zero Mean	0	-50.1001	<.0001	-5.51	<.0001		
	1	-55.4282	<.0001	-5.83	<.0001		
	2	-64.1534	<.0001	-5.83	<.0001		
	3	-54.8077	<.0001	-5.25	<.0001		

Ordinary Least Squares Estimates

SSE	44347.064	DFE	577
MSE	76.85800	Root MSE	8.76687
SBC	4205.47564	AIC	4183.64329
MAE	6.00075928	AICC	4183.74746
MAPE	62.0543646	HQC	4192.15374
Durbin-Watson	2.0048	Regress R-Square	0.8637
		Total R-Square	0.8637

Godfrey's Serial Correlation Test

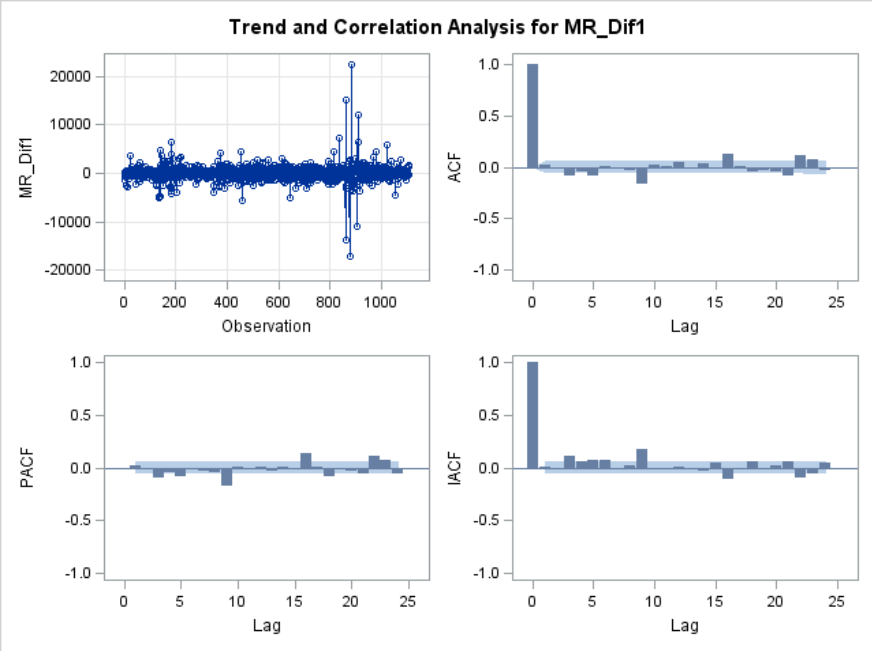
Alternative	LM	Pr > LM
AR(1)	0.0962	0.7565
AR(2)	0.0990	0.9517
AR(3)	3.6972	0.2961
AR(4)	4.1334	0.3883

1.5. Index: MR (IMAREX)

Bloomberg ticker: IFTC2D1M

From: 15/2-2005 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests							
Type	**Lags**	**Rho**	**Pr < Rho**	**Tau**	**Pr < Tau**	**F**	**Pr > F**
Zero Mean	0	-1084.75	0.0001	-32.62	<.0001		

Ordinary Least Squares Estimates			
SSE	3100946377	DFE	1105
MSE	2806286	Root MSE	1675
SBC	19565.8942	AIC	19560.8856
MAE	893.407343	AICC	19560.8893
MAPE	100.486288	HQC	19562.7799
Durbin-Watson	1.9633	Regress R-Square	0.0000
		Total R-Square	0.0000

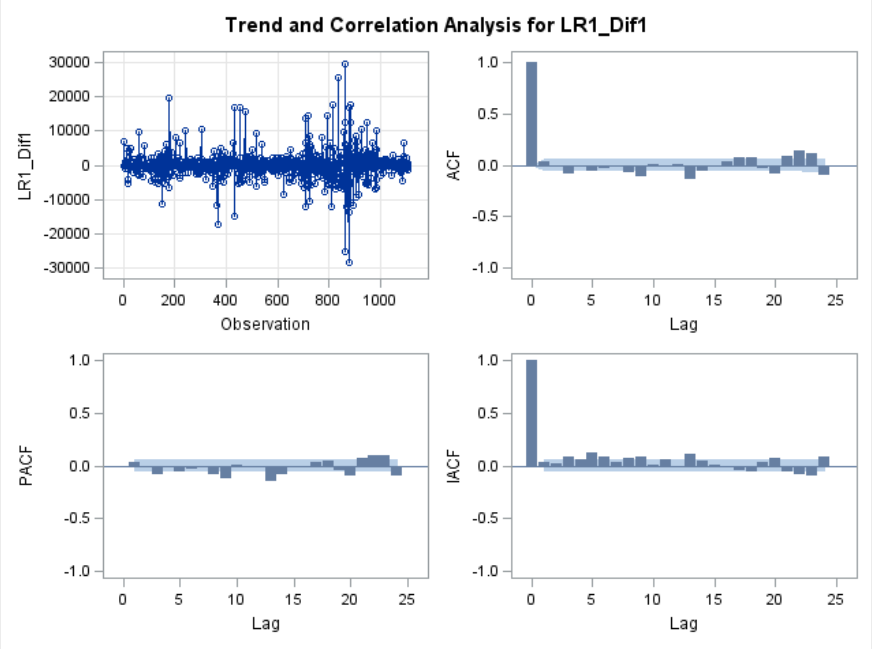
Godfrey's Serial Correlation Test		
Alternative	**LM**	**Pr > LM**
AR(1)	0.3685	0.5438
AR(2)	0.3693	0.8314
AR(3)	9.5457	0.0228
AR(4)	12.0381	0.0171

1.6. Index: LR1 -Aframax (IMAREX)

Bloomberg ticker: IFTD7D1M

From: 15/2-2005 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests							
Type	**Lags**	**Rho**	**Pr < Rho**	**Tau**	**Pr < Tau**	**F**	**Pr > F**
Zero Mean	0	-1067.29	0.0001	-32.17	<.0001		

Ordinary Least Squares Estimates			
SSE	1.3407E10	DFE	1105
MSE	12133036	Root MSE	3483
SBC	21185.1556	AIC	21180.1471
MAE	1724.43284	AICC	21180.1507
MAPE	101.163005	HQC	21182.0413
Durbin-Watson	1.9284	Regress R-Square	0.0000
		Total R-Square	0.0000

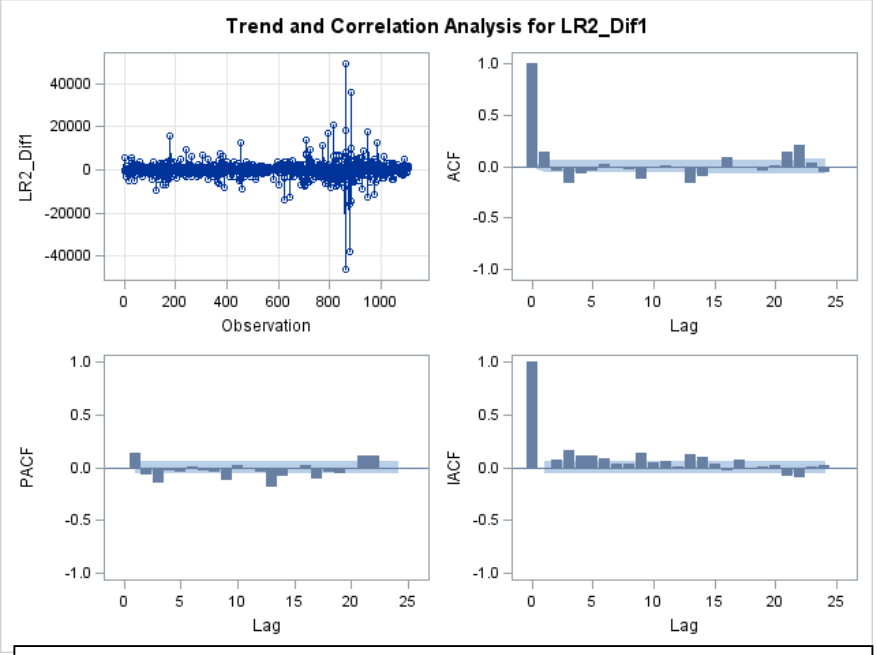
Godfrey's Serial Correlation Test		
Alternative	**LM**	**Pr > LM**
AR(1)	1.2808	0.2578
AR(2)	1.3586	0.5070
AR(3)	9.2343	0.0263
AR(4)	9.2450	0.0553

1.7. Index: LR2 – Supramax (IMAREX)

Bloomberg ticker: IFTD5D1M

From: 15/2-2005 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests							
Type	**Lags**	**Rho**	**Pr < Rho**	**Tau**	**Pr < Tau**	**F**	**Pr > F**
Zero Mean	0	-957.209	0.0001	-29.07	<.0001		
	1	-1091.26	0.0001	-23.34	<.0001		

Ordinary Least Squares Estimates			
SSE	1.56334E10	DFE	1102
MSE	14186403	Root MSE	3766
SBC	21350.7858	AIC	21335.763
MAE	1861.51796	AICC	21335.7848
MAPE	195.794987	HQC	21341.445
Durbin-Watson	1.9866	Regress R-Square	0.0511
		Total R-Square	0.0511

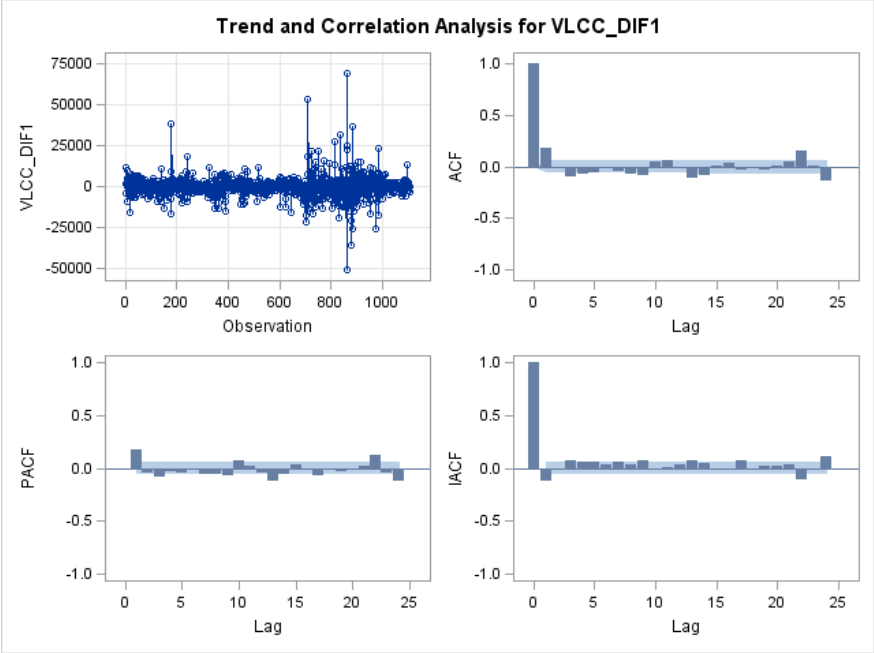
Godfrey's Serial Correlation Test		
Alternative	**LM**	**Pr > LM**
AR(1)	0.0362	0.8490
AR(2)	0.2111	0.8998
AR(3)	15.4670	0.0015
AR(4)	15.5551	0.0037

1.8. Index: VLCC (IMAREX)

Bloomberg ticker: IFTD3D1M

From: 15/2-2005 to 17-07-2009 (both included)

Regression: $\Delta Y_t = \delta Y_{t-1} + \Delta Y_{t-1} + \varepsilon_t$



Augmented Dickey-Fuller Unit Root Tests							
Type	**Lags**	**Rho**	**Pr < Rho**	**Tau**	**Pr < Tau**	**F**	**Pr > F**
Zero Mean	0	-911.087	0.0001	-27.87	<.0001		
	1	-981.275	0.0001	-22.14	<.0001		

Ordinary Least Squares Estimates			
SSE	4.13054E10	DFE	1102
MSE	37482220	Root MSE	6122
SBC	22424.3847	AIC	22409.3619
MAE	3489.95849	AICC	22409.3837
MAPE	150.941777	HQC	22415.0439
Durbin-Watson	1.9885	Regress R-Square	0.0496
		Total R-Square	0.0496

Godfrey's Serial Correlation Test		
Alternative	**LM**	**Pr > LM**
AR(1)	0.0169	0.8965
AR(2)	0.0548	0.9730
AR(3)	4.9519	0.1754
AR(4)	5.5258	0.2375

2. Parameter Estimation

2.1. Index: Capesize (Baltic Capesize Index)

Conditional Least Squares Estimation (BCI Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	1788	160,48145	11,14	<.0001	0
AR1,1	0,9993	0,0006278	1591,81	<.0001	1
Constant Estimate	1,256134				
Variance Estimate	25777,08				
Std Error Estimate	160,5524				
AIC	30930,38				
SBC	30941,93				
Number of Residuals	2380				

2.2. Index: Handysize (Baltic Handysize Index)

Conditional Least Squares Estimation (BHSI Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	1537,4	24,08143	63,84	<.0001	0
AR1,1	0,99943	0,0008448	1183,01	<.0001	1
Constant Estimate	0,869032				
Variance Estimate	580,0502				
Std Error Estimate	24,08423				
AIC	5863,029				
SBC	5871,942				
Number of Residuals	637				

2.3. Index: Panamax (Baltic Panamax Index)

Conditional Least Squares Estimation (BPI Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	1250,5	83,55029	14,97	<.0001	0
AR1,1	0,99916	0,0004896	2040,85	<.0001	1
Constant Estimate	1,054721				
Variance Estimate	6989,223				
Std Error Estimate	83,60157				
AIC	27847,58				
SBC	27859,13				
Number of Residuals	2382				

2.4. Index: Supramax (Baltic Supramax Index)

Conditional Least Squares Estimation (BSI Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	2087	44,5522	46,84	<.0001	0
AR1,1	0,9994	0,0006264	1595,5	<.0001	1
Constant Estimate	1,259489				
Variance Estimate	1985,609				
Std Error Estimate	44,56017				
AIC	10548,3				
SBC	10558,14				
Number of Residuals	1011				

2.5. Index: VLCC (IMAREX)

Conditional Least Squares Estimation (VLCC Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	74700,3	5654,1	13,21	<.0001	0
AR1,1	0,98333	0,0059261	165,93	<.0001	1
Constant Estimate	1245,464				
Variance Estimate	39075969				
Std Error Estimate	6251,077				
AIC	22535,65				
SBC	22545,68				
Number of Residuals	1109				

2.6. Index: LR2 – Suezmax (IMAREX)

Conditional Least Squares Estimation (Suezmax Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	41215,3	2092,1	19,7	<.0001	0
AR1,1	0,95407	0,009213	103,56	<.0001	1
Constant Estimate	1893,149				
Variance Estimate	14572420				
Std Error Estimate	3817,384				
AIC	21441,76				
SBC	21451,78				
Number of Residuals	1109				

2.7. Index: LR 1 – Aframax (IMAREX)

Conditional Least Squares Estimation (Aframax Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	36129,6	2827,6	12,78	<.0001	0
AR1,1	0,978	0,006621	147,71	<.0001	1
Constant Estimate	795,0046				
Variance Estimate	12040521				
Std Error Estimate	3469,945				
AIC	21230,11				
SBC	21240,13				
Number of Residuals	1109				

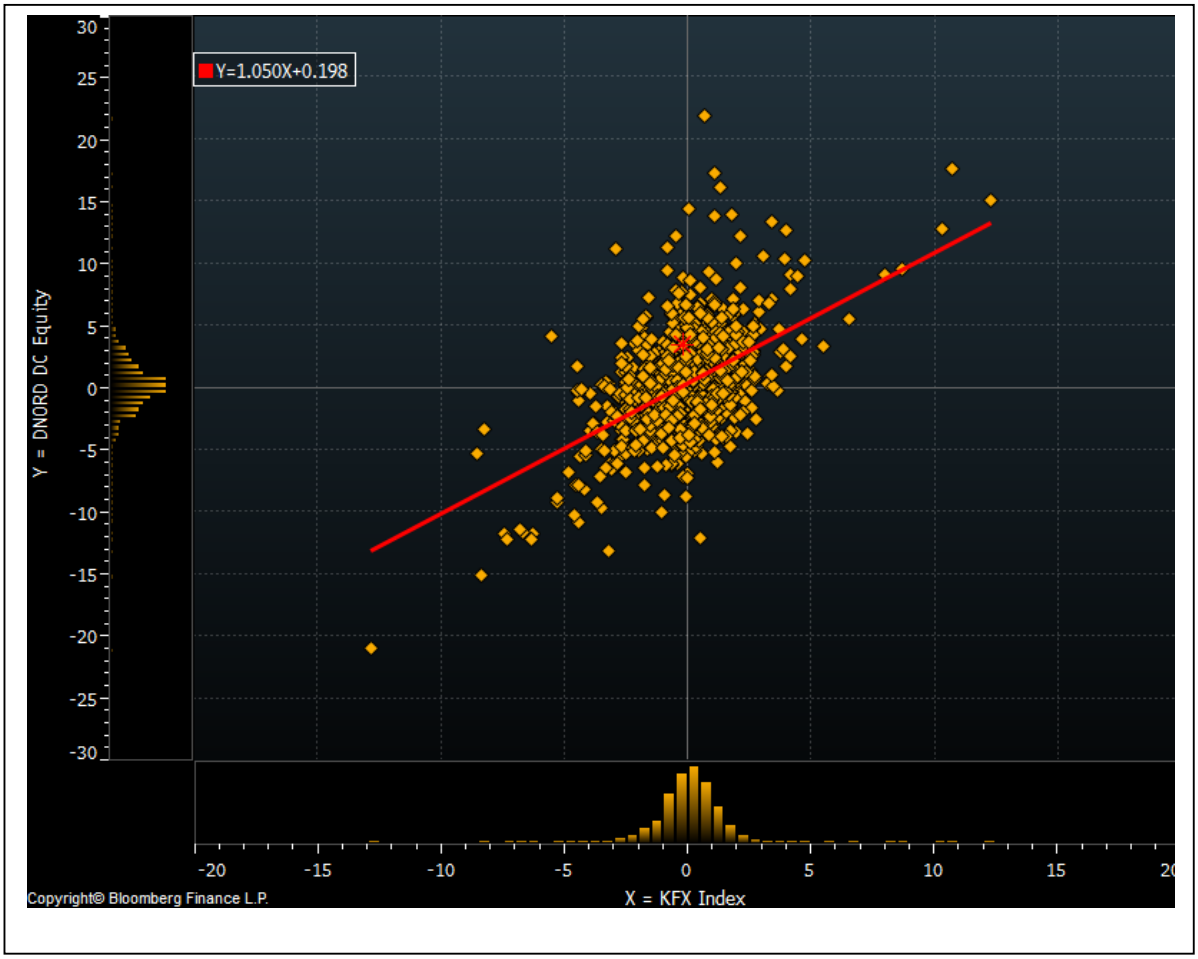
2.8. Index: MR (IMAREX)

Conditional Least Squares Estimation (MR Start -> 16/07-09)					
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag
MU	20650	1099,5	18,78	<.0001	0
AR1,1	0,96592	0,0081812	118,07	<.0001	1
Constant Estimate	703,6968				
Variance Estimate	2759261				
Std Error Estimate	1661,102				
AIC	19596,2				
SBC	19606,22				
Number of Residuals	1109				

3. Beta values

Source: Bloomberg

3.1. Beta: NORDEN

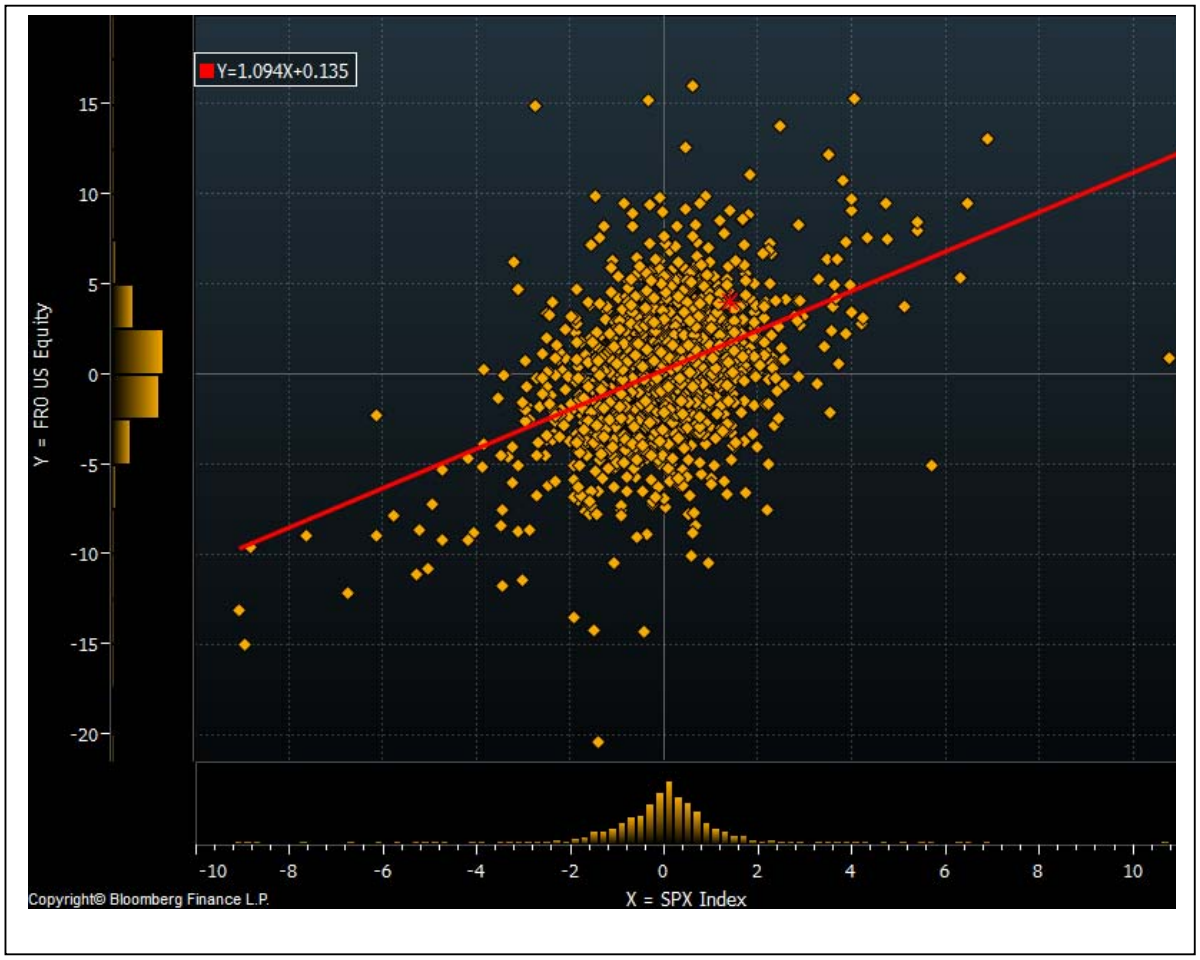


Beta calculation from Bloomberg, NORDEN stock return regressed against the KFX return on a daily basis.

Data period:01-04-2001 to 30-12-2008

Estimated beta: 1,050

3.2. Beta: Frontline

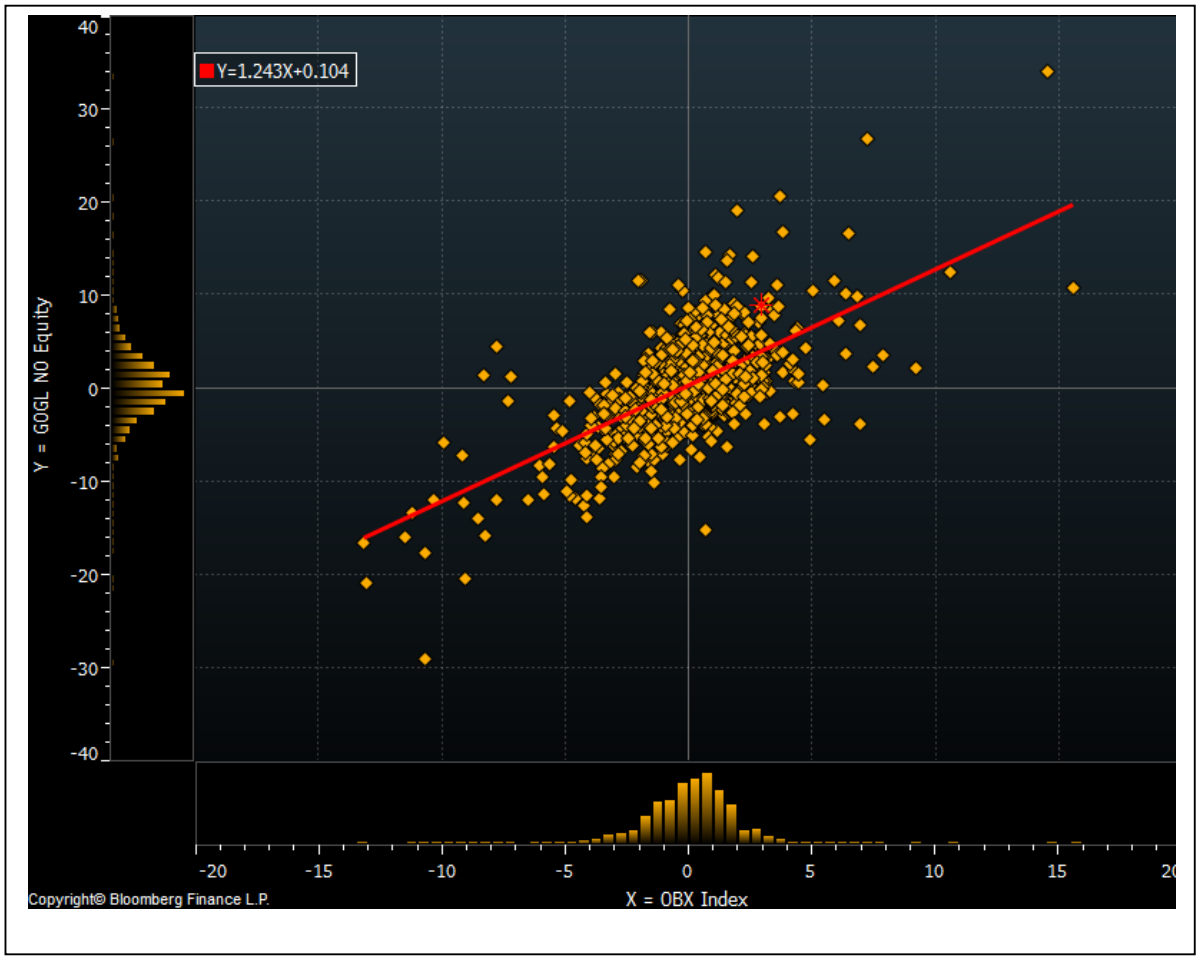


Beta calculation from Bloomberg, Frontline stock return regressed against the S&P-500 return on a daily basis.

Data period:22-02-2001 to 31-12-2008

Estimated beta: 1,094

3.3. Beta: Golden Ocean

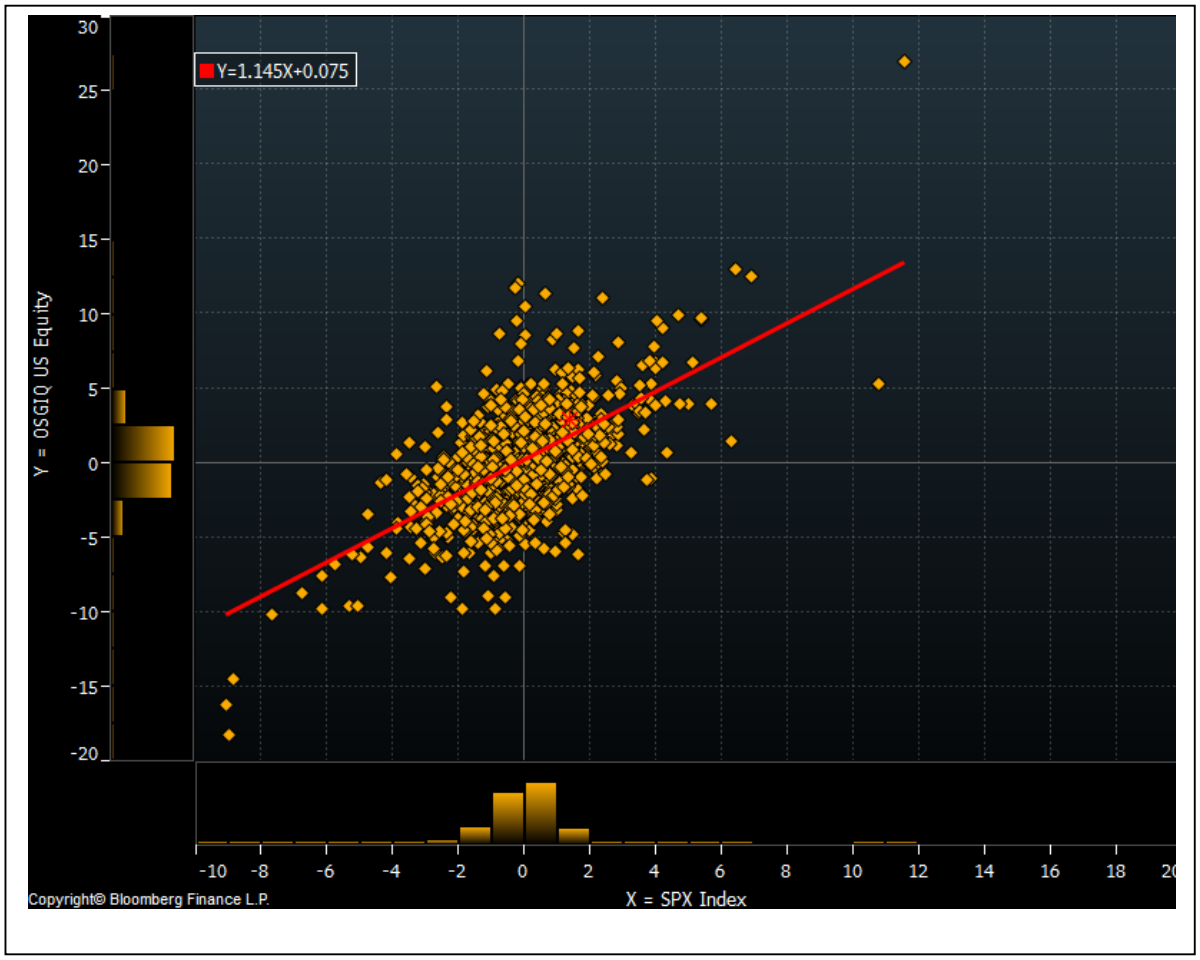


Beta calculation from Bloomberg, Golden Ocean stock return regressed against the OBX return on a daily basis.

Data period: 15-12-2004 to 30-12-2008

Estimated beta: 1,243

3.4. Beta: OSG

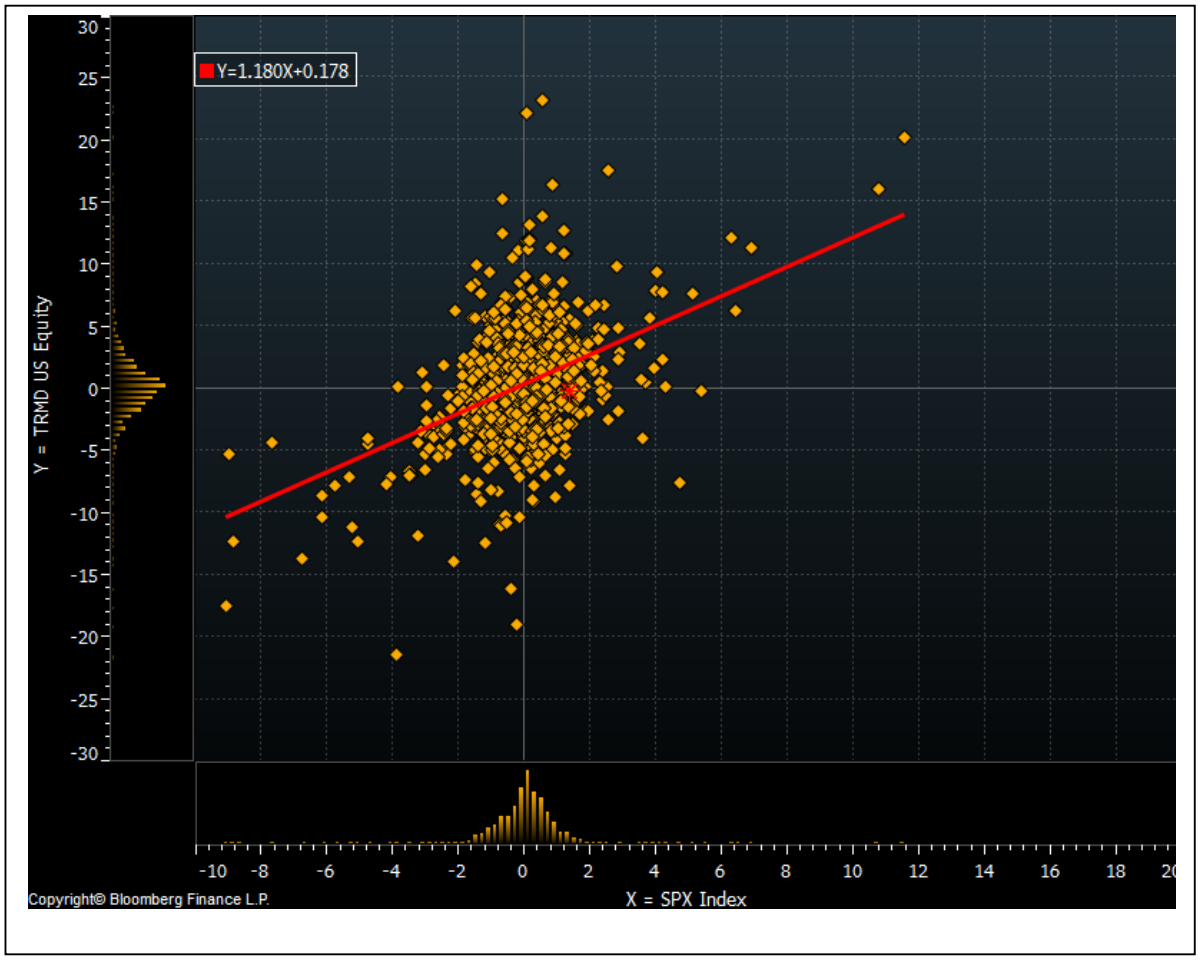


Beta calculation from Bloomberg, OSG stock return regressed against the SPX return on a daily basis.

Data period: 01-02-2001 to 31-12-2008

Estimated beta: 1,145

3.5. Beta: TORM



Beta calculation from Bloomberg, TORM stock return regressed against the SPX return on a daily basis.

Data period: 26-04-2002 to 31-12-2008

Estimated beta: 1,180

4. Financial Data

4.1. Frontline: Balance Sheet

Frontline Ltd USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tangible fixed assets	2.997.434	3.273.382	3.239.503	2.693.603	2.993.105	2.389.687	1.996.398	1.608.691	1.260.234	857.281
Goodwill	0	0	0	0	0	0	0	0	0	0
Other intangible fixed assets	41.313	27.412	27.519	69	24.121	24.121	24.121	24.121	24.121	24.121
Fixed financial assets	130.619	35.346	210.773	348.956	189.140	189.140	189.140	189.140	189.140	189.140
Total fixed assets	3.169.366	3.336.140	3.477.795	3.042.628	3.206.366	2.602.948	2.209.659	1.821.952	1.473.495	1.070.542
Inventories	32.017	44.984	43.791	55.435	42.223	42.243	41.326	39.774	43.765	43.817
Accounts receivable	169.279	84.894	98.167	67.947	71.119	90.836	88.865	85.527	94.109	94.221
Other current assets	784.069	751.861	771.534	411.965	457.063	597.031	584.077	562.137	618.543	619.279
Cash and marketable securities	184.029	236.938	198.650	184.116	250.957	197.518	193.233	185.975	204.636	204.879
Total current assets	1.169.394	1.118.677	1.112.142	719.463	821.362	927.627	907.501	873.413	961.052	962.196
Accounts payable	(8.268)	(9.382)	(17.573)	(16.043)	(27.034)	(14.431)	(14.118)	(13.587)	(14.951)	(14.968)
Other current liabilities	(160.101)	(168.917)	(100.294)	(284.426)	(131.002)	(166.784)	(163.165)	(157.036)	(172.794)	(172.999)
Long+Short-term debt - Current portion	(173.112)	(253.277)	(310.266)	(276.415)	(536.764)	(284.235)	(278.068)	(267.623)	(294.476)	(294.827)
Defered Income	(4.382)	(7.071)	(15.783)	(13.342)	(16.130)	0	0	0	0	0
Corporate Tax	0	0	0	0	0	(830.417)	(814.971)	(788.646)	(855.973)	(856.849)
Current Liabilities	(345.863)	(438.647)	(443.916)	(590.226)	(710.930)	(1.011.632)	(992.254)	(959.270)	(1.043.717)	(1.044.817)
Net deferred tax balance	0	0	0	0	0	0	0	0	0	0
Provision for pensions	0	0	0	0	0	0	0	0	0	0
Other provisions and long-term liabilities	(756.068)	(729.193)	(754.454)	(2.349.173)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)
Total provisions	(756.068)	(729.193)	(754.454)	(2.349.173)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)	(1.993.268)
Interest-bearing short and long-term debt (Frontline: Incl. Capital leases)	(1.990.131)	(2.101.061)	(2.181.885)	(376.723)	(614.676)	142.967	504.055	860.980	1.171.637	1.539.902
Net assets	1.246.698	1.185.916	1.209.682	445.969	708.854	668.642	635.692	603.807	569.199	534.556
Common share capital	(187.063)	(187.063)	(187.063)	(187.063)	(194.646)	(194.646)	(194.646)	(194.646)	(194.646)	(194.646)
Other equity reserves	(570.544)	(528.103)	(481.497)	(258.906)	(462.169)	(462.169)	(462.169)	(462.169)	(462.169)	(462.169)
Retained earnings	(160.361)	0	0	0	(45.402)	(11.827)	21.123	53.008	87.616	122.259
Common shareholders' funds	(917.968)	(715.166)	(668.560)	(445.969)	(702.217)	(668.642)	(635.692)	(603.807)	(569.199)	(534.556)
Minority interests	(328.730)	(470.750)	(541.122)	0	(6.637)					
Preferred share capital	0	0	0	0	0					
Total shareholders' funds	(1.246.698)	(1.185.916)	(1.209.682)	(445.969)	(708.854)	(668.642)	(635.692)	(603.807)	(569.199)	(534.556)

Table 29: Frontline Balance Sheet

4.2. Frontline: Income statement

Frontline Ltd USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (T/C Fleet)						997,527	1,209,194	1,337,526	1,440,286	1,558,535
Total revenues	**1,855,666**	**1,504,516**	**1,583,863**	**1,299,927**	**2,104,018**	**997,527**	**1,209,194**	**1,337,526**	**1,440,286**	**1,558,535**
growth	*na*	*(18.9%)*	*5.3%*	*(17.9%)*	*61.9%*	*(52.6%)*	*21.2%*	*10.6%*	*7.7%*	*8.2%*
Vessel operating costs ()	(531,306)	(497,634)	(620,876)	(642,856)	(1,137,086)	(407,409)	(493,909)	(546,475)	(588,560)	(636,904)
Gross margin	1,324,360	1,006,882	962,987	657,071	966,932	590,117	715,285	791,051	851,726	921,631
margin	*71.4%*	*66.9%*	*60.8%*	*50.5%*	*46.0%*	*59.2%*	*59.2%*	*59.1%*	*59.1%*	*59.1%*
Total operating costs (Frontline: Aministrative expenses)	(25,754)	(21,061)	(32,214)	(36,410)	(35,226)	(18,548)	(22,483)	(24,869)	(26,780)	(28,979)
as % of revenues	*(1.4%)*	*(1.4%)*	*(2.0%)*	*(2.8%)*	*(1.7%)*	*(1.9%)*	*(1.9%)*	*(1.9%)*	*(1.9%)*	*(1.9%)*
EBITDA	**1,298,606**	**985,821**	**930,773**	**620,661**	**931,706**	**571,570**	**692,802**	**766,182**	**824,946**	**892,652**
margin	*70%*	*66%*	*59%*	*48%*	*44%*	*57%*	*57%*	*57%*	*57%*	*57%*
Depreciation(Frontline: Incl. Amortisation)	(181,274)	(198,359)	(203,849)	(219,638)	(223,519)	(126,372)	(153,188)	(169,446)	(182,464)	(197,444)
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
EBIT before goodwill amortisation	**1,117,332**	**787,462**	**726,924**	**401,023**	**708,187**	**445,197**	**539,615**	**596,736**	**642,482**	**695,208**
Margin	*60.2%*	*52.3%*	*45.9%*	*30.8%*	*33.7%*	*44.6%*	*44.6%*	*44.6%*	*44.6%*	*44.6%*
Goodwill amortisation (non tax deductible)	0	0	0	0	0	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0	0	0
EBIT	**1,117,332**	**787,462**	**726,924**	**401,023**	**708,187**	**445,197**	**539,615**	**596,736**	**642,482**	**695,208**
Margin	*60.2%*	*52.3%*	*45.9%*	*30.8%*	*33.7%*	*44.6%*	*44.6%*	*44.6%*	*44.6%*	*44.6%*
Exceptional items	136,528	85,971	95,655	123,610	142,293	111,882	111,882	111,882	111,882	111,882
Income from associates (before tax)	10,553	4,919	1,118	1,106	651	0	0	0	0	0
Net interest	(175,858)	(102,073)	(148,853)	(16,306)	(149,867)	10	10	10	10	10
EBITDA cover	*7*	*10*	*6*	*38*	*6*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**1,088,555**	**776,279**	**674,844**	**509,433**	**701,264**	**557,089**	**651,507**	**708,628**	**754,375**	**807,100**
Tax	(178)	19	(162)	(419)	(310)	(232)	(272)	(296)	(315)	(337)
Tax rate	*0.0%*	*nm*	*0.0%*	*0.1%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Income from associates (after tax)	0	0	0	83,566	0	0	0	0	0	0
Earnings from ordinary activities	1,088,377	776,298	674,682	592,580	700,954	556,857	651,235	708,333	754,060	806,764
Minority interest	(64,995)	(169,459)	(158,682)	(22,162)	(2,184)	0	0	0	0	0
Net earnings from ordinary activities	**1,023,382**	**606,839**	**516,000**	**570,418**	**698,770**	**556,857**	**651,235**	**708,333**	**754,060**	**806,764**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0	0	0
Net earnings	1,023,382	606,839	516,000	570,418	698,770	556,857	651,235	708,333	754,060	806,764
Preferred dividend	0	0	0	0	0	0	0	0	0	0
Net attributable profit	1,023,382	606,839	516,000	570,418	698,770	556857	651235	708333	754060	806764
Common dividend	(1,040,093)	(764,203)	(516,000)	(570,418)	(653,368)	(580,320)	(678,675)	(738,178)	(785,832)	(840,756)
Retained earnings	**(16,711)**	**(157,364)**	**0**	**0**	**45,402**	**(23,463)**	**(27,439)**	**(29,845)**	**(31,772)**	**(33,993)**
# common shares at end of year	*74,825.2*	*74,825.2*	*74,825.2*	*74,825.2*	77,858.5	*77,858.5*	*77,858.5*	*77,858.5*	*77,858.5*	*77,858.5*
Average common shares in issue	*74,236.5*	*74,825.2*	*74,825.2*	*74,867.0*	76,341.8	*77,858.5*	*77,858.5*	*77,858.5*	*77,858.5*	*77,858.5*
EPS excl. extra-ordinary results after GW amortisation	*13.79*	*8.11*	*6.9*	*7.62*	*9.15*	*7*	*8*	*9*	*10*	*10*
EPS excl. extra-ordinary results before GW amortisation	*13.79*	*8.11*	*6.9*	*7.62*	*9.15*	*7*	*8*	*9*	*10*	*10*
Common dividend per share	*14.0*	*10.2*	*6.9*	*7.6*	*8.6*	*7.5*	*8.7*	*9.5*	*10.1*	*10.8*
Common dividend pay-out ratio after GW amortisation	*1.0*	*1.3*	*1.0*	*1.0*	*0.9*	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*

Table 30: Frontline Income statement

4.3. Frontline: Cash flow statement

Frontline Ltd USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EBIT	1,117,332	787,462	726,924	401,023	708,187	544,271	748,322	610,628	628,650	1,046,887
Depreciation and (goodwill) amortisation	181,274	198,359	203,849	219,638	223,519	154,520	212,482	173,392	178,534	297,358
Change in net deferred tax balance	[no]	0	0	0	0	0	0	0	0	0
Change provision for pensions	[no]	0	0	0	0	0	0	0	0	0
Change in other provisions and long-term liabilities	[no]	(26,875)	25,261	1,594,719	(355,905)	0	0	0	0	0
Change in net working capital	[no]	60,647	(53,897)	575,281	(244,332)	70,591	(222,343)	149,949	(19,723)	(455,806)
Exceptional items & extraordinary results	136,528	85,971	95,655	123,610	142,293	111,882	111,882	111,882	111,882	111,882
Income from associates	10,553	4,919	1,118	84,672	651	0	0	0	0	0
Minority interest	(64,995)	(169,459)	(158,682)	(22,162)	(2,184)	0	0	0	0	0
Tax	(178)	19	(162)	(419)	(310)	(274)	(359)	(301)	(309)	(483)
Cash flow from operating activities	**na**	**941,043**	**840,066**	**2,976,362**	**471,919**	**880,991**	**849,984**	**1,045,550**	**899,035**	**999,838**
Movement in fixed assets	[no]	(474,307)	(169,970)	326,262	(523,021)	488,043	39,922	289,768	163,227	(56,394)
Movement in other intangible assets	[no]	13,901	(107)	27,450	(24,052)	0	0	0	0	0
Goodwill incurred	[no]	0	0	0	0	0	0	0	0	0
Investments in fixed financial assets	[no]	95,273	(175,427)	(138,183)	159,816	0	0	0	0	0
Cash flow from investment activities	**na**	**(365,133)**	**(345,504)**	**215,529**	**(387,257)**	**488,043**	**39,922**	**289,768**	**163,227**	**(56,394)**
Net interest	(175,858)	(102,073)	(148,853)	(16,306)	(149,867)	10	10	10	10	10
Dividends declared	(1,040,093)	(764,203)	(516,000)	(570,418)	(653,368)	(683,526)	(896,085)	(752,650)	(771,423)	(1,207,100)
Change in dividends payable	[no]	2,689	8,712	(2,441)	2,788	667,396	212,559	(143,435)	18,774	435,677
Change in preferred share capital	[no]	0	0	0	0	0	0	0	0	0
Change in common share capital	[no]	0	0	0	7,583	0	0	0	0	0
Change in other equity reserves	[no]	(42,441)	(46,606)	(222,591)	203,263	0	0	0	0	0
Change in minority interests	[no]	142,020	70,372	(541,122)	6,637	(6,637)	0	0	0	0
Cash flow from financing activities	**na**	**(764,008)**	**(632,375)**	**(1,352,878)**	**(582,964)**	**(22,757)**	**(683,516)**	**(896,075)**	**(752,640)**	**(771,413)**
Change in interest-bearing debt	**na**	**188,098**	**137,813**	**(1,839,013)**	**498,302**	**(1,346,277)**	**(206,391)**	**(439,243)**	**(309,622)**	**(172,031)**

Table 31: Frontline Cash flow statement

4.4. Frontline: Analysis of income statement

Analysis of income statement USD '000	2004	2005	2006	2007	2008
Total revenues	1,855,666.0	1,504,516.0	1,583,863.0	1,299,927.0	2,104,018.0
growth	*na*	*-18.9%*	*5.3%*	*-17.9%*	*61.9%*
COGS	(531,306.0)	(497,634.0)	(620,876.0)	(642,856.0)	(1,137,086.0)
Gross margin	**1,324,360.0**	**1,006,882.0**	**962,987.0**	**657,071.0**	**966,932.0**
Total operating costs	(25,754.0)	(21,061.0)	(32,214.0)	(36,410.0)	(35,226.0)
EBITDA	**1,298,606.0**	**985,821.0**	**930,773.0**	**620,661.0**	**931,706.0**
EBITDA (% of revenues)	***-70.0%***	***-65.5%***	***-58.8%***	***-47.7%***	***-44.3%***
Depreciation and (goodwill) amortisation	(181,274.0)	(198,359.0)	(203,849.0)	(219,638.0)	(223,519.0)
EBIT	**1,117,332.0**	**787,462.0**	**726,924.0**	**401,023.0**	**708,187.0**
EBIT (% of revenues)	***60.2%***	***52.3%***	***45.9%***	***30.8%***	***33.7%***
Add back depreciation and (goodwill) amortisation	181,274.0	198,359.0	203,849.0	219,638.0	223,519.0
Exceptional items	136,528.0	85,971.0	95,655.0	123,610.0	142,293.0
Adjustments	(136,528.0)	(85,971.0)	(95,655.0)	(123,610.0)	(142,293.0)
Adjusted exceptional items	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Extra-ordinary results after tax	0.0	0.0	0.0	0.0	0.0
Other adjustments	0.0	0.0	0.0	0.0	0.0
Adjusted extra-ordinary results after tax	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Adjusted change in other provisions and LT liabilities (see below)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Sustaining investments in tangible and intangible fixed assets (see below)	**(181,274.0)**	**(198,359.0)**	**(203,849.0)**	**(219,638.0)**	**(223,519.0)**
Cash operating profit	**1,117,332.0**	**787,462.0**	**726,924.0**	**401,023.0**	**708,187.0**
Cash operating profit margin (% revenues)	**60.2%**	**52.3%**	**45.9%**	**30.8%**	**33.7%**

Table 32: Frontline analysis of income statement

4.5. Frontline: Analysis of balance sheet

Analysis of balance sheet (page 1) USD '000	2004	2005	2006	2007	2008
Movement in tangible fixed assets	[no]	(474,307.0)	(169,970.0)	326,262.0	(523,021.0)
Movement in intangible fixed assets	[no]	13,901.0	(107.0)	27,450.0	(24,052.0)
Goodwill incurred	[no]	0.0	0.0	0.0	0.0
Total movement in operational fixed assets	**na**	**(460,406.0)**	**(170,077.0)**	**353,712.0**	**(547,073.0)**
PM: Depreciation of tangible fixed assets	*(181,274.0)*	*(198,359.0)*	*(203,849.0)*	*(219,638.0)*	*(223,519.0)*
Sustaining investments in tangible fixed assets	**(181,274.0)**	**(198,359.0)**	**(203,849.0)**	**(219,638.0)**	**(223,519.0)**
Implicit expansion investments in tangible fixed assets	**181,274.0**	**198,359.0**	**203,849.0**	**219,638.0**	**223,519.0**
Incremental tangible fixed assets / incremental sales	***na***	***56.5%***	***-256.9%***	***77.4%***	***-27.8%***
PM: Amortisation of intangible fixed assets	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Sustaining investments in intangible fixed assets	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Implicit expansion investments in intangible fixed assets	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Incremental intangible fixed assets / incremental sales	***na***	***0.0%***	***0.0%***	***0.0%***	***0.0%***
Total expansion investments in fixed assets (incl. acquisitions)	**181,274**	**198,359**	**203,849**	**219,638**	**223,519**
Incremental fixed assets / incremental sales	**na**	**56.5%**	**-256.9%**	**77.4%**	**-27.8%**
Analysis of balance sheet (page 2) USD '000	**2004**	**2005**	**2006**	**2007**	**2008**
Inventories	32,017.0	44,984.0	43,791.0	55,435.0	42,223.0
Accounts receivable	169,279.0	84,894.0	98,167.0	67,947.0	71,119.0
Other current assets	784,069.0	751,861.0	771,534.0	411,965.0	457,063.0
Cash and marketable securities	184,029.0	236,938.0	198,650.0	184,116.0	250,957.0
Accounts payable	(8,268.0)	(9,382.0)	(17,573.0)	(16,043.0)	(27,034.0)
Other current liabilities	(160,101.0)	(168,917.0)	(100,294.0)	(284,426.0)	(131,002.0)
Net working capital as in financial statements	**1,001,025.0**	**940,378.0**	**994,275.0**	**418,994.0**	**663,326.0**
Remove financing portion of cash and marketable securities	0.0	0.0	0.0	0.0	0.0
Other adjustments	0	0	0	0	0
Total adjustment to change in working capital	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Adjusted net working capital	**1,001,025.0**	**940,378.0**	**994,275.0**	**418,994.0**	**663,326.0**
Total adjusted cash change in net working capital	**na**	**60,647.0**	**(53,897.0)**	**575,281.0**	**(244,332.0)**
Incremental net working capital / incremental sales	**na**	**17.3%**	**67.9%**	**202.6%**	**30.4%**
Non-cash adjustments to operating profit (as reported in cash flow statement)	0	0	0	0	0
Other adjustments	0	0	0	0	0
Total adjustment to operating profit due to provisions	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
PM: Change in other provisions and LT liabilities (as in financial statements)	*na*	*(26,875.0)*	*25,261.0*	*1,594,719.0*	*(355,905.0)*

Table 33: Frontline analysis of balance sheet

4.6. Frontline: Analysis of taxes

Analysis of taxes USD '000	2004	2005	2006	2007	2008
Marginal tax rate	0.0%	0.0%	0.0%	0.0%	0.0%
Effective tax rate for financial statements					
Profit before tax (according to financial statements)	1,088,555.0	776,279.0	674,844.0	509,433.0	701,264.0
Add back non tax deductible goodwill amortisation	0.0	0.0	0.0	0.0	0.0
Add back net interest (according to financial statements)	175,858.0	102,073.0	148,853.0	16,306.0	149,867.0
Total taxable income before net interest	**1,264,413.0**	**878,352.0**	**823,697.0**	**525,739.0**	**851,131.0**
Total Net interest (according to financial statements)	(175,858.0)	(102,073.0)	(148,853.0)	(16,306.0)	(149,867.0)
Taxes according financial statements	(178.0)	19.0	(162.0)	(419.0)	(310.0)
Tax shield on net interest expense (at marginal tax rate)	0.0	0.0	0.0	0.0	0.0
Effective taxes on taxable income before net interest	(178.0)	19.0	(162.0)	(419.0)	(310.0)
Effective tax rate on taxable income before net interest	0.0%	0.0%	0.0%	0.1%	0.0%
Cash tax rate calculation					
Total net interest	(175,858.0)	(102,073.0)	(148,853.0)	(16,306.0)	(149,867.0)
Income from associates (before tax)	10,553.0	4,919.0	1,118.0	1,106.0	651.0
Taxes according financial statements	(178.0)	19.0	(162.0)	(419.0)	(310.0)
Reverse tax shield on net interest expense (at marginal tax rate)	0.0	0.0	0.0	0.0	0.0
Reverse tax on income from associates (at effective tax rate)	1.5	(0.1)	0.2	0.9	0.2
Increase (decrease) in deferred tax liabilities	na	0.0	0.0	0.0	0.0
Other adjustments	0	0	0	0	0
Cash taxes	na	18.9	(161.8)	(418.1)	(309.8)
PM: Cash operating profit	1,117,332.0	787,462.0	726,924.0	401,023.0	708,187.0
Cash tax rate (% cash operating profit)	**na**	**0.0%**	**0.0%**	**0.1%**	**0.0%**

Table 34: Frontline analysis of taxes

4.7. Frontline: Financial drivers

Frontline Ltd USD '000		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers											
Revenue growth		na	(18.9%)	5.3%	(17.9%)	61.9%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	71.4%	66.9%	60.8%	50.5%	46.0%	59.1%	59.1%	59.1%	59.1%	59.1%
Total operating costs	*(% of revenues)*	(1.4%)	(1.4%)	(2.0%)	(2.8%)	(1.7%)	(1.9%)	(1.9%)	(1.9%)	(1.9%)	(1.9%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sustaining investment in tangible assets	*(% of revenues)*	9.8%	13.2%	12.9%	16.9%	10.6%	12.7%	12.7%	12.7%	12.7%	12.7%
Sustaining investment in intangible assets	*(% of revenues)*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash operating profit	*(% of revenues)*	**63.0%**	**55.1%**	**50.0%**	**36.5%**	**37.0%**	**48.3%**	**48.3%**	**48.3%**	**48.3%**	**48.3%**
Marginal tax rate		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cash tax rate		na	(0.0%)	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tax rate for financial statements		0.0%	nm	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Common dividend pay-out ratio	*(% of net earnings from ordinary activities)*	101.6%	125.9%	100.0%	100.0%	93.5%	104.2%	104.2%	104.2%	104.2%	104.2%
Interest on debt							7.90%	7.90%	7.90%	7.90%	7.90%
Interest on excess cash							1.50%	1.50%	1.50%	1.50%	1.50%
P&L ratios											
Gross margin	*(% of revenues)*	71%	67%	61%	51%	46%	59%	59%	59%	59%	59%
EBITDA margin	*(% of revenues)*	70%	66%	59%	48%	44%	57%	57%	57%	57%	57%
EBIT margin	*(% of revenues)*	60%	52%	46%	31%	34%	45%	45%	45%	45%	45%
Net earnings margin before XO	*(% of revenues)*	55%	40%	33%	44%	33%	52%	53%	54%	53%	53%
Net earnings margin	*(% of revenues)*	55%	40%	33%	44%	33%	52%	53%	54%	53%	53%
Balance sheet drivers AVERAGE (INPUT)											
Average inventory days	*(days of total revenue)*	6.3	10.9	10.1	15.6	7.3	10.0	10.0	10.0	10.0	10.0
Average accounts receivable days	*(days of total revenue)*	33.3	20.6	22.6	19.1	12.3	21.6	21.6	21.6	21.6	21.6
Average other current assets	*(% of total revenues)*	42.3%	50.0%	48.7%	31.7%	21.7%	38.9%	38.9%	38.9%	38.9%	38.9%
Operating cash	*(% of total revenues)*	9.9%	15.7%	12.5%	14.2%	11.9%	12.9%	12.9%	12.9%	12.9%	12.9%
Accounts payable days	*(days of total revenue)*	1.6	2.3	4.0	4.5	4.7	3.4	3.4	3.4	3.4	3.4
Other current liabilities	*(% of total revenues)*	8.6%	11.2%	6.3%	21.9%	6.2%	10.9%	10.9%	10.9%	10.9%	10.9%
Long-term debt - Current portion	*(% of total revenues)*	9.3%	16.8%	19.6%	21.3%	25.5%	18.5%	18.5%	18.5%	18.5%	18.5%
Total average operating working capital	*(% of total revenues)*	53.9%	62.5%	62.8%	32.2%	31.5%	48.6%	48.6%	48.6%	48.6%	48.6%
Cash flow drivers											
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	na	56.5%	(256.9%)	77.4%	(27.8%)	(37.7%)	(37.7%)	(37.7%)	(37.7%)	(37.7%)
Incremental intangible assets	*(% of incremental revenues)*	na	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Depreciation	*(% of total revenues)*	(9.8%)	(13.2%)	(12.9%)	(16.9%)	(10.6%)	(12.7%)	(12.7%)	(12.7%)	(12.7%)	(12.7%)

Table 35: Frontline financial drivers

4.8. Frontline: Discounting Free Cash Flows

Frontline Ltd USD '000	2005	2006	2007	2008	2009	2010	2011	2012	2013	Terminal
Revenues	1,504,516	1,583,863	1,299,927	2,104,018	1,497,442	1,289,720	1,230,874	1,333,410	1,409,856	1,423,011
EBIT	787,462	726,924	401,023	708,187	668,116	575,522	549,179	594,825	628,910	634,779
Goodwill amortisation	0	0	0	0	0	0	0	0	0	0
Depreciation	198,359	203,849	219,638	223,519	189,705	163,389	155,934	168,924	178,609	180,275
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
Sustaining investments in tangible assets	(198,359)	(203,849)	(219,638)	(223,519)	(189,705)	(163,389)	(155,934)	(168,924)	(178,609)	(180,275)
Sustaining investments in intangible fixed assets	0	0	0	0	0	0	0	0	0	0
Exceptional items & extra-ordinary results after-tax (operating)	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in other provisions & long-term liabilities	0	0	0	0	0	0	0	0	0	0
Cash operating profit (CBIT)	**787,462**	**726,924**	**401,023**	**708,187**	**668,116**	**575,522**	**549,179**	**594,825**	**628,910**	**634,779**
Cash taxes	19	(162)	(418)	(310)	(280)	(242)	(230)	(250)	(264)	0
Cash flow before new investment (CBNI)	**787,481**	**726,762**	**400,605**	**707,877**	**667,835**	**575,280**	**548,948**	**594,575**	**628,646**	**634,779**
Expansion capex (including acquisitions and divestments)	198,359	203,849	219,638	223,519	228,774	78,344	22,194	(38,672)	(28,832)	(124,804)
Expansion investments other intangible assets	0	0	0	0	0	0	0	0	0	0
Working capital investment	60,647	(53,897)	575,281	(244,332)	(64,377)	100,946	28,597	(49,829)	(37,150)	(160,809)
Total new investments	**259,006**	**149,952**	**794,919**	**(20,813)**	**164,397**	**179,290**	**50,791**	**(88,501)**	**(65,983)**	**(285,614)**
Free cash flow	**1,046,487**	**876,714**	**1,195,524**	**687,064**	**832,232**	**754,570**	**599,739**	**506,075**	**562,664**	**349,165**
Date of relevant cash flow					2009	2010	2011	2012	2013	Terminal
FCF subject to discounting					832,232	754,570	599,739	506,075	562,664	7,140,345
Cost of capital (WACC)					8.9%	8.9%	8.9%	8.9%	8.9%	8.9%
Discount factor					0.95	0.88	0.81	0.74	0.68	0.68
PV of FCF					794,657	661,678	482,972	374,270	382,148	4,849,556

Table 36: Frontline discounting free cash flow

4.9. Frontline: Calculating share price

Shareholder value (in USD '000 except per share items)	
Value of operations	7,545,281
Market value of excess cash & securities	250,957
Market value of financial fixed assets	189,140
Corporate value	7,985,378
Market value of interest-bearing debt	(3,144,708)
Market value unfunded pension and other liabilities	(131,002)
Market value of minority interest	(6,637)
Market value of preferred equity	0
Common shareholder value (Entreprise value)	4,703,031
Shares outstanding	77,859
Common shareholder value per share	60.405

Table 37: Frontline calculation of estimated share price

4.10. TORM: Balance Sheet

TORM A/S USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tangible fixed assets	687.950	1.167.093	1.323.705	2.553.438	2.611.521	1.928.360	2.032.833	1.776.742	1.796.308	1.857.251
Goodwill	0	0	0	87.663	89.184	89.184	89.184	89.184	89.184	89.184
Other intangible fixed assets	0	0	0	7.481	2.451	2.451	2.451	2.451	2.451	2.451
Fixed financial assets	368.492	360.993	644.409	55.629	210.015	210.015	210.015	210.015	210.015	210.015
Total fixed assets	1.056.442	1.528.086	1.968.114	2.704.211	2.913.171	2.230.010	2.334.483	2.078.392	2.097.958	2.158.901
Inventories	5.824	10.869	12.134	19.823	18.302	13.103	17.742	16.456	20.157	25.395
Accounts receivable	36.027	53.890	49.690	90.265	120.166	66.997	90.717	84.143	103.067	129.848
Other current assets+accruals	17.677	16.986	21.500	29.533	82.713	30.182	40.868	37.906	46.432	58.496
Cash and marketable securities	123.592	156.969	37.581	122.730	183.001	131.328	177.825	164.938	202.035	254.530
Total current assets	183.120	238.714	120.905	262.351	404.182	241.609	327.152	303.443	371.692	468.269
Accounts payable	(15.668)	(22.918)	(18.760)	(44.310)	(48.960)	(28.820)	(39.023)	(36.195)	(44.336)	(55.856)
Other current liabilities	(23.060)	(23.592)	(26.004)	(80.282)	(190.973)	(56.549)	(76.570)	(71.021)	(86.994)	(109.598)
Long-term debt - Current portion	(62.141)	(59.926)	(55.902)	(769.943)	(212.368)	(208.246)	(281.976)	(261.541)	(320.365)	(403.606)
Defered Income	(7.384)	(6.022)	(1.080)	(7.975)	(944)	0	0	0	0	0
Corporate Tax	(9.357)	(9.381)	(4.575)	(14.437)	(9.709)	(17.545)	(36.823)	(36.353)	(58.419)	(85.845)
Current Liabilities	(117.610)	(121.839)	(106.321)	(916.947)	(462.954)	(102.913)	(152.416)	(143.569)	(189.749)	(251.299)
Net deferred tax balance	(73.261)	(54.560)	(62.787)	(55.588)	(55.117)	(60.263)	(60.263)	(60.263)	(60.263)	(60.263)
Provision for pensions	0	0	0	0	0	0	0	0	0	0
Other provisions and long-term liabilities	0	0	0	(28.218)	(14.536)	(14.536)	(14.536)	(14.536)	(14.536)	(14.536)
Total provisions	(73.261)	(54.560)	(62.787)	(83.806)	(69.653)	(74.799)	(74.799)	(74.799)	(74.799)	(74.799)
Interest-bearing short and long-term debt	(333.284)	(729.088)	(639.065)	(884.579)	(1.505.797)	(969.370)	(1.014.205)	(648.797)	(538.642)	(411.563)
Net assets	715.407	861.313	1.280.846	1.081.230	1.278.949	1.324.537	1.420.215	1.514.670	1.666.460	1.889.510
Common share capital	(53.350)	(53.390)	(42.980)	(42.980)	(42.980)	(42.980)	(42.980)	(42.980)	(42.980)	(42.980)
Other equity reserves	(423.618)	(435.955)	(663.373)	(84.594)	(26.429)	(26.429)	(26.429)	(26.429)	(26.429)	(26.429)
Retained earnings	(238.439)	(415.306)	(574.493)	(953.656)	(1.209.540)	(1.255.128)	(1.350.806)	(1.445.261)	(1.597.051)	(1.820.101)
Common shareholders' funds	(715.407)	(904.651)	(1.280.846)	(1.081.230)	(1.278.949)	(1.324.537)	(1.420.215)	(1.514.670)	(1.666.460)	(1.889.510)
Minority interests	0	0	0	0	0	0	0	0	0	0
Preferred share capital	0	0	0	0	0	0	0	0	0	0
Total shareholders' funds	(715.407)	(904.651)	(1.280.846)	(1.081.230)	(1.278.949)	(1.324.537)	(1.420.215)	(1.514.670)	(1.666.460)	(1.889.510)

Table 38: TORM balance sheet

4.11. TORM: Income statement

TORM A/S USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (T/C Fleet)						487.473	885.338	881.157	1.075.003	992.649
Revenues (Owned Fleet)						276.149	131.834	37.676	0	0
Total revenues	**433.320**	**586.975**	**603.717**	**818.773**	**1.183.594**	**763.622**	**1.017.172**	**918.834**	**1.075.003**	**992.649**
growth	*na*	*35,5%*	*2,9%*	*35,6%*	*44,6%*	*(35,5%)*	*33,2%*	*(9,7%)*	*17,0%*	*(7,7%)*
Vessel operating costs	(193.152)	(272.021)	(332.276)	(461.155)	(645.798)	(612.022)	(748.240)	(677.323)	(736.589)	(679.249)
Gross margin	240.168	314.954	271.441	357.618	537.796	151.600	268.931	241.511	338.415	313.400
margin	*55,4%*	*53,7%*	*45,0%*	*43,7%*	*45,4%*	*19,9%*	*26,4%*	*26,3%*	*31,5%*	*31,6%*
Total operating costs (Administrative Expenses)	(38.637)	(31.176)	(34.594)	(68.743)	(89.906)	(54.904)	(73.134)	(66.064)	(77.292)	(71.371)
as % of revenues	*(8,9%)*	*(5,3%)*	*(5,7%)*	*(8,4%)*	*(7,6%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*	*(7,2%)*
EBITDA	**201.531**	**283.778**	**236.847**	**288.875**	**447.890**	**96.696**	**195.797**	**175.447**	**261.122**	**242.029**
margin	*47%*	*48%*	*39%*	*35%*	*38%*	*13%*	*19%*	*19%*	*24%*	*24%*
Depreciation	(35.181)	(47.894)	(58.915)	(98.681)	(126.068)	(74.439)	(99.155)	(89.569)	(104.793)	(96.765)
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
EBIT before goodwill amortisation	**166.350**	**235.884**	**177.932**	**190.194**	**321.822**	**22.257**	**96.642**	**85.878**	**156.329**	**145.264**
margin	*38,4%*	*40,2%*	*29,5%*	*23,2%*	*27,2%*	*2,9%*	*9,5%*	*9,3%*	*14,5%*	*14,6%*
Goodwill amortisation (non tax deductible)	0	0	0	0	0	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0	0	0
EBIT	**166.350**	**235.884**	**177.932**	**190.194**	**321.822**	**22.257**	**96.642**	**85.878**	**156.329**	**145.264**
margin	*38,4%*	*40,2%*	*29,5%*	*23,2%*	*27,2%*	*2,9%*	*9,5%*	*9,3%*	*14,5%*	*14,6%*
Exceptional items (TORM: Sale of vessel+Ohter Operating income)	13.139	67.301	64.201	14.787	97.306	60.899	60.899	60.899	60.899	60.899
Income from associates (before tax)	0	0	0	0	27.122	0	0	0	0	0
Net interest (TORM: Financial Items)	25.839	(3.818)	(1.047)	599.241	(86.179)	10	10	10	10	10
EBITDA cover	*nm*	*74*	*226*	*nm*	*5*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**205.328**	**299.367**	**241.086**	**804.222**	**360.071**	**83.165**	**157.551**	**146.787**	**217.238**	**206.173**
Tax	(18.715)	(4)	(6.574)	(12.545)	(1.279)	(2.288)	(4.335)	(4.039)	(5.978)	(5.673)
Tax rate	*9,1%*	*0,0%*	*2,7%*	*1,6%*	*0,4%*	*2,8%*	*2,8%*	*2,8%*	*2,8%*	*2,8%*
Income from associates (after tax)	0	0	0	0	0	0	0	0	0	0
Earnings from ordinary activities	186.613	299.363	234.512	791.677	358.792	80.877	153.215	142.748	211.261	200.500
Minority interest	0	0	0	0	0	0	0	0	0	0
Net earnings from ordinary activities	**186.613**	**299.363**	**234.512**	**791.677**	**358.792**	**80.877**	**153.215**	**142.748**	**211.261**	**200.500**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0	0	0
Net earnings	186.613	299.363	234.512	791.677	358.792	80.877	153.215	142.748	211.261	200.500
Preferred dividend	0	0	0	0	0	0	0	0	0	0
Net attributable profit	186.613	299363	234512	791677	358792	80877	153215	142748	211261	200500
Common dividend	(99.861)	(132.382)	(73.939)	(64.548)	(55.100)	(24.712)	(46.814)	(43.616)	(64.550)	(61.262)
Retained earnings	**86.752**	**166.981**	**160.573**	**727.129**	**303.692**	**56.165**	**106.401**	**99.132**	**146.711**	**139.238**
# common shares at end of year	*36.400,0*	*36.400,0*	*36.400*	*72.800*	*72.800*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*
Average common shares in issue	*34.800,0*	*34.800,0*	*34.800,0*	*69.600*	*69.600,0*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*	*72.800,0*
EPS excl. extra-ordinary results after GW amortisation	*5,36*	*8,60*	*6,7*	*11,4*	*5,2*	*1*	*2*	*2*	*3*	*3*
EPS excl. extra-ordinary results before GW amortisation	*5,36*	*8,60*	*6,7*	*11,4*	*5,2*	*1*	*2*	*2*	*3*	*3*
Common dividend per share	*2,9*	*3,8*	*2,1*	*0,9*	*0,8*	*0,3*	*0,6*	*0,6*	*0,9*	*0,8*
Common dividend pay-out ratio after GW amortisation	*0,5*	*0,4*	*0,3*	*0,1*	*0,2*	*0,3*	*0,3*	*0,3*	*0,3*	*0,3*

Table 39: TORM income statement

4.12. TORM: Cash flow statement

TORM A/S USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EBIT	166.350	235.884	177.932	190.194	321.822	22.257	96.642	85.878	156.329	145.264
Depreciation and (goodwill) amortisation	35.181	47.894	58.915	98.681	126.068	74.439	99.155	89.569	104.793	96.765
Change in net deferred tax balance	[no]	(18.701)	8.227	(7.199)	(471)	5.146	0	0	0	0
Change provision for pensions	[no]	0	0	0	0	0	0	0	0	0
Change in other provisions and long-term liabilities	[no]	0	0	28.218	(13.682)	0	0	0	0	0
Change in net working capital	[no]	(47.812)	116.063	(61.618)	(26.490)	(2.803)	(55.467)	21.513	(34.164)	18.016
Exceptional items & extraordinary results	13.139	67.301	64.201	14.787	97.306	60.899	60.899	60.899	60.899	60.899
Income from associates	0	0	0	0	27.122	0	0	0	0	0
Minority interest	0	0	0	0	0	0	0	0	0	0
Tax	(18.715)	(4)	(6.574)	(12.545)	(1.279)	(2.288)	(4.335)	(4.039)	(5.978)	(5.673)
Cash flow from operating activities	**na**	**284.562**	**418.764**	**250.518**	**530.396**	**157.649**	**196.894**	**253.820**	**281.879**	**315.271**
Movement in fixed assets	[no]	(527.037)	(215.527)	(1.328.414)	(184.151)	561.093	(194.652)	203.521	(76.173)	192.195
Movement in other intangible assets	[no]	0	0	(7.481)	5.030	0	0	0	0	0
Goodwill incurred	[no]	0	0	(87.663)	(1.521)	0	0	0	0	0
Investments in fixed financial assets	[no]	7.499	(283.416)	588.780	(154.386)	0	0	0	0	0
Cash flow from investment activities	**na**	**(519.538)**	**(498.943)**	**(834.778)**	**(335.028)**	**561.093**	**(194.652)**	**203.521**	**(76.173)**	**192.195**
Net interest	25.839	(3.818)	(1.047)	599.241	(86.179)	10	10	10	10	10
Dividends declared	(99.861)	(132.382)	(73.939)	(64.548)	(55.100)	(24.712)	(46.814)	(43.616)	(64.550)	(61.262)
Change in dividends payable	[no]	(1.338)	(9.748)	16.757	(11.759)	10.963	19.334	(2.798)	18.312	(2.876)
Change in preferred share capital	[no]	0	0	0	0	0	0	0	0	0
Change in common share capital	[no]	40	(10.410)	0	0	0	0	0	0	0
Change in other equity reserves	[no]	12.337	227.418	(578.779)	(58.165)	0	0	0	0	0
Change in minority interests	[no]	0	0	0	0	0	0	0	0	0
Cash flow from financing activities	**na**	**(125.161)**	**132.274**	**(27.329)**	**(211.203)**	**(13.738)**	**(27.470)**	**(46.404)**	**(46.228)**	**(64.128)**
Change in interest-bearing debt	**na**	**360.137**	**(52.095)**	**611.589**	**15.835**	**(705.003)**	**25.229**	**(410.937)**	**(159.478)**	**(443.338)**

Table 40: TORM Cash flow statement

4.13. TORM: Analysis of income statement

Analysis of income statement USD '000	2004	2005	2006	2007	2008
Total revenues	433.320	586.975	603.717	818.773	1.183.594
growth	*na*	*35,5%*	*2,9%*	*35,6%*	*44,6%*
COGS	(193.152)	(272.021)	(332.276)	(461.155)	(645.798,0)
Gross margin	**240.168**	**314.954**	**271.441**	**357.618**	**537.796**
Total operating costs	(38.637)	(31.176)	(34.594)	(68.743)	(89.906)
EBITDA	**201.531**	**283.778**	**236.847**	**288.875**	**447.890,0**
EBITDA(%ofrevenues)	***-46,5%***	***-48,3%***	***-39,2%***	***-35,3%***	***-37,8%***
Depreciation and (goodwill) amortisation	(35.181)	(47.894)	(58.915)	(98.681)	(126.068)
EBIT	**166.350**	**235.884**	**177.932**	**190.194**	**321.822,0**
EBIT(%ofrevenues)	***38,4%***	***40,2%***	***29,5%***	***23,2%***	***27,2%***
Add back depreciation and (goodwill) amortisation	35.181	47.894	58.915	98.681	126.068
Exceptional items	13.139	67.301	64.201	14.787	97.306
Adjustments	(13.139)	(67.301)	(64.201)	(14.787)	(97.306)
Adjusted exceptional items	**0**	**0**	**0**	**0**	**0**
Extra-ordinary results after tax	0	0	0	0	0
Other adjustments	0	0	0	0	0
Adjusted extra-ordinary results after tax	**0**	**0**	**0**	**0**	**0**
Adjusted change in other provisions and LT liabilities	**0**	**0**	**0**	**0**	**0**
Sustaining investments in tangible and intangible fixed assets	**(35.181)**	**(47.894)**	**(58.915)**	**(98.681)**	**(126.068)**
Cash operating profit	**166.350**	**235.884**	**177.932**	**190.194**	**321.822**
Cash operating profit margin (% revenues)	**38,4%**	**40,2%**	**29,5%**	**23,2%**	**27,2%**

Table 41: Calculation of the cash operating profit for TORM. Source: Annual report 2008

4.14. TORM: Analysis of balance sheet

Analysis of balance sheet (page 1) USD '000	2004	2005	2006	2007	2008
Movement in tangible fixed assets	[no]	(527.037,0)	(215.527,0)	(1.328.414,0)	(184.151,0)
Movement in intangible fixed assets	[no]	0,0	0,0	(7.481,0)	5.030,0
Goodwill incurred	[no]	0,0	0,0	(87.663,0)	(1.521,0)
Total movement in operational fixed assets	**na**	**(527.037,0)**	**(215.527,0)**	**(1.423.558,0)**	**(180.642,0)**
PM: Depreciation of tangible fixed assets	*(35.181,0)*	*(47.894,0)*	*(58.915,0)*	*(98.681,0)*	*(126.068,0)*
Sustaining investments in tangible fixed assets	**(35.181,0)**	**(47.894,0)**	**(58.915,0)**	**(98.681,0)**	**(126.068,0)**
Implicit expansion investments in tangible fixed assets	**35.181,0**	**47.894,0**	**58.915,0**	**98.681,0**	**126.068,0**
Incremental tangible fixed assets / incremental sales	***na***	***-31,2%***	***-351,9%***	***-45,9%***	***-34,6%***
PM: Amortisation of intangible fixed assets	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Sustaining investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Implicit expansion investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Incremental intangible fixed assets / incremental sales	***na***	***0,0%***	***0,0%***	***0,0%***	***0,0%***
Total expansion investments in fixed assets (incl. acquisitions)	**35.181**	**47.894**	**58.915**	**98.681**	**126.068**
Incremental fixed assets / incremental sales	**na**	**-31,2%**	**-351,9%**	**-45,9%**	**-34,6%**

Analysis of balance sheet (page 2) USD '000	2004	2005	2006	2007	2008
Inventories	5.824,0	10.869,0	12.134,0	19.823,0	18.302,0
Accounts receivable	36.027,0	53.890,0	49.690,0	90.265,0	120.166,0
Other current assets	17.677,0	16.986,0	21.500,0	29.533,0	82.713,0
Cash and marketable securities	123.592,0	156.969,0	37.581,0	122.730,0	183.001,0
Accounts payable	(15.668,0)	(22.918,0)	(18.760,0)	(44.310,0)	(48.960,0)
Other current liabilities	(23.060,0)	(23.592,0)	(26.004,0)	(80.282,0)	(190.973,0)
Net working capital as in financial statements	**144.392,0**	**192.204,0**	**76.141,0**	**137.759,0**	**164.249,0**
Remove financing portion of cash and marketable securities	0,0	0,0	0,0	0,0	0,0
Other adjustments	0	0	0	0	0
Total adjustment to change in working capital	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted net working capital	**144.392,0**	**192.204,0**	**76.141,0**	**137.759,0**	**164.249,0**
Total adjusted cash change in net working capital	**na**	**(47.812,0)**	**116.063,0**	**(61.618,0)**	**(26.490,0)**
Incremental net working capital / incremental sales	**na**	**31,1%**	**-693,2%**	**28,7%**	**7,3%**

Table 42: TORM analysis of balance sheet

4.15. TORM: Analysis of taxes

Analysis of taxes USD '000	2004	2005	2006	2007	2008
Marginal tax rate	0,0%	0,0%	0,0%	0,0%	0,0%
Effective tax rate for financial statements					
Profit before tax (according to financial statements)	205.328,0	299.367,0	241.086,0	804.222,0	360.071,0
Add back non tax deductible goodwill amortisation	0,0	0,0	0,0	0,0	0,0
Add back net interest (according to financial statements)	(25.839,0)	3.818,0	1.047,0	(599.241,0)	86.179,0
Total taxable income before net interest	**179.489,0**	**303.185,0**	**242.133,0**	**204.981,0**	**446.250,0**
Total Net interest (according to financial statements)	25.839,0	(3.818,0)	(1.047,0)	599.241,0	(86.179,0)
Taxes according financial statements	(18.715,0)	(4,0)	(6.574,0)	(12.545,0)	(1.279,0)
Tax shield on net interest expense (at marginal tax rate)	0,0	0,0	0,0	0,0	0,0
Effective taxes on taxable income before net interest	(18.715,0)	(4,0)	(6.574,0)	(12.545,0)	(1.279,0)
Effective tax rate on taxable income before net interest	10,4%	0,0%	2,7%	6,1%	0,3%
Cash tax rate calculation					
Total net interest	25.839,0	(3.818,0)	(1.047,0)	599.241,0	(86.179,0)
Income from associates (before tax)	0,0	0,0	0,0	0,0	27.122,0
Taxes according financial statements	(18.715,0)	(4,0)	(6.574,0)	(12.545,0)	(1.279,0)
Reverse tax shield on net interest expense (at marginal tax rate)	0,0	0,0	0,0	0,0	0,0
Reverse tax on income from associates (at effective tax rate)	0,0	0,0	0,0	0,0	77,7
Increase (decrease) in deferred tax liabilities	na	(18.701,0)	8.227,0	(7.199,0)	(471,0)
Other adjustments	0	0	0	0	0
Cash taxes	na	(18.705,0)	1.653,0	(19.744,0)	(1.672,3)
PM: Cash operating profit	166.350,0	235.884,0	177.932,0	190.194,0	321.822,0
Cash tax rate (% cash operating profit)	**na**	**7,9%**	**-0,9%**	**10,4%**	**0,5%**

Table 43: TORM Analysis of taxes

4.16. TORM: Financial drivers

TORM A/S USD '000		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers											
Revenue growth		na	35,5%	2,9%	35,6%	44,6%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	55,4%	53,7%	45,0%	43,7%	45,4%	48,6%	48,6%	48,6%	48,6%	48,6%
Total operating costs	*(% of revenues)*	(8,9%)	(5,3%)	(5,7%)	(8,4%)	(7,6%)	(7,2%)	(7,2%)	(7,2%)	(7,2%)	(7,2%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Sustaining investment in tangible assets	*(% of revenues)*	8,1%	8,2%	9,8%	12,1%	10,7%	9,7%	9,7%	9,7%	9,7%	9,7%
Sustaining investment in intangible assets	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash operating profit	*(% of revenues)*	**56,2%**	**50,8%**	**40,9%**	**40,0%**	**42,4%**	**46,1%**	**46,1%**	**46,1%**	**46,1%**	**46,1%**
Marginal tax rate		0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash tax rate		na	7,9%	(0,9%)	10,4%	0,5%	4,5%	4,5%	4,5%	4,5%	4,5%
Tax rate for financial statements		9,1%	0,0%	2,7%	1,6%	0,4%	2,8%	2,8%	2,8%	2,8%	2,8%
Preferred dividends	*(% of preferred share capital outstanding)*	0	0	0	0	0	0	0	0	0	0
Preferred interim dividends	*(% of preferred dividends declared)*	0	0	0	0	0	0	0	0	0	0
Common dividend pay-out ratio	*(% of net earnings from ordinary activities)*	53,5%	44,2%	31,5%	8,2%	15,4%	30,6%	30,6%	30,6%	30,6%	30,6%
Common interim dividends	*(% of common dividends declared)*	0,91	0,93	0,94	0,78	0,82	0,87	0,87	0,87	0,87	0,87
Interest on debt							4,00%	4,00%	4,00%	4,00%	4,00%
Interest on excess cash							1,50%	1,50%	1,50%	1,50%	1,50%
P&L ratios											
Gross margin	*(% of revenues)*	55%	54%	45%	44%	45%	20%	26%	26%	31%	32%
EBITDA margin	*(% of revenues)*	47%	48%	39%	35%	38%	13%	19%	19%	24%	24%
EBIT margin	*(% of revenues)*	38%	40%	29%	23%	27%	3%	10%	9%	15%	15%
Net earnings margin before XO	*(% of revenues)*	43%	51%	39%	97%	30%	11%	15%	16%	20%	20%
Net earnings margin	*(% of revenues)*	43%	51%	39%	97%	30%	11%	15%	16%	20%	20%
Balance sheet drivers AVERAGE (INPUT)											
Average inventory days	*(days of total revenue)*	4,9	6,8	7,3	8,8	5,6	6,7	6,7	6,7	6,7	6,7
Average accounts receivable days	*(days of total revenue)*	30,3	33,5	30,0	40,2	37,1	34,2	34,2	34,2	34,2	34,2
Average other current assets	*(% of total revenues)*	4,1%	2,9%	3,6%	3,6%	7,0%	4,2%	4,2%	4,2%	4,2%	4,2%
Operating cash	*(% of total revenues)*	28,5%	26,7%	6,2%	15,0%	15,5%	18,4%	18,4%	18,4%	18,4%	18,4%
Accounts payable days	*(days of total revenue)*	13,2	14,3	11,3	19,8	15,1	14,7	14,7	14,7	14,7	14,7
Other current liabilities	*(% of total revenues)*	5,3%	4,0%	4,3%	9,8%	16,1%	7,9%	7,9%	7,9%	7,9%	7,9%
Long-term debt - Current portion	*(% of total revenues)*	14,3%	10,2%	9,3%	94,0%	17,9%	29,2%	29,2%	29,2%	29,2%	29,2%
Total average operating working capital	*(% of total revenues)*	33,3%	32,7%	12,6%	16,8%	13,9%	21,9%	21,9%	21,9%	21,9%	21,9%
Cash flow drivers											
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	na	(31,2%)	(351,9%)	(45,9%)	(34,6%)	(115,9%)	(115,9%)	(115,9%)	(115,9%)	(115,9%)
Incremental intangible assets	*(% of incremental revenues)*	na	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Depreciation	*(% of total revenues)*	(8,1%)	(8,2%)	(9,8%)	(12,1%)	(10,7%)	(9,7%)	(9,7%)	(9,7%)	(9,7%)	(9,7%)

Table 44: TORM Financial drivers

4.17. TORM: Discounting Free Cash Flows:

TORM A/S USD '000	2005	2006	2007	2008	2009	2010	2011	2012	2013	Terminal
Revenues	586.975	603.717	818.773	1.183.594	763.622	1.017.172	918.834	1.075.003	992.649	940.758
EBIT	235.884	177.932	190.194	321.822	22.257	96.642	85.878	156.329	145.264	137.671
Goodwill amortisation	0	0	0	0	0	0	0	0	0	0
Depreciation	47.894	58.915	98.681	126.068	74.439	99.155	89.569	104.793	96.765	91.706
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
Sustaining investments in tangible assets	(47.894)	(58.915)	(98.681)	(126.068)	(74.439)	(99.155)	(89.569)	(104.793)	(96.765)	(91.706)
Sustaining investments in intangible fixed assets	0	0	0	0	0	0	0	0	0	0
Exceptional items & extra-ordinary results after-tax (operating)	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in other provisions & long-term liabilities	0	0	0	0	0	0	0	0	0	0
Cash operating profit (CBIT)	**235.884**	**177.932**	**190.194**	**321.822**	**22.257**	**96.642**	**85.878**	**156.329**	**145.264**	**137.671**
Cash taxes	(18.705)	1.653	(19.744)	(1.672)	(996)	(4.325)	(3.843)	(6.996)	(6.501)	(34.418)
Cash flow before new investment (CBNI)	**217.179**	**179.585**	**170.450**	**320.150**	**21.261**	**92.317**	**82.035**	**149.333**	**138.763**	**103.253**
Expansion capex (including acquisitions and divestments)	47.894	58.915	98.681	126.068	486.654	(293.808)	113.952	(180.966)	95.430	(54.334)
Expansion investments other intangible assets	0	0	0	0	0	0	0	0	0	0
Working capital investment	(47.812)	116.063	(61.618)	(26.490)	(2.803)	(55.467)	21.513	(34.164)	18.016	(10.258)
Total new investments	**82**	**174.978**	**37.063**	**99.578**	**483.851**	**(349.275)**	**135.465**	**(215.130)**	**113.446**	**(64.592)**
Free cash flow	**217.261**	**354.563**	**207.513**	**419.728**	**505.112**	**(256.958)**	**217.499**	**(65.797)**	**252.210**	**38.661**
Date of relevant cash flow					2009	2010	2011	2012	2013	Terminal
FCF subject to discounting					505.112	(256.958)	217.499	(65.797)	252.210	1.614.794
Cost of capital (WACC)					6,4%	6,4%	6,4%	6,4%	6,4%	6,4%
Discount factor					0,97	0,91	0,85	0,80	0,75	0,75
PV of FCF					488.411	(233.530)	185.789	(52.826)	190.322	1.218.551

Table 45 TORM discounting free cash flow

4.18. TORM: Calculating share price

Shareholder value (in USD '000 except per share items)	
Value of operations	1.796.716
Market value of excess cash & securities	0
Market value of financial fixed assets	210.015
Corporate value	2.006.731
Market value of interest-bearing debt	(1.718.165)
Market value unfunded pension and other liabilities	0
Market value of minority interest	0
Market value of preferred equity	0
Common shareholder value (Entreprise value)	288.566
Shares outstanding	72.800
Common shareholder value per share	3,964

Table 46: TORM calculation of estimated share price

4.19. OSG: Balance Sheet

Overseas Shipholding Group, Inc (OSG) USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tangible fixed assets	1.489.512	2.344.553	2.583.370	2.797.023	2.818.060	1.439.674	800.599	856.151	867.985	577.113
Goodwill	0	0	64.293	72.463	9.589	9.589	9.589	9.589	9.589	9.589
Other intangible fixed assets	317.968	349.583	462.286	352.773	285.503	285.503	285.503	285.503	285.503	285.503
Fixed financial assets	227.701	269.657	275.199	131.905	98.620	98.620	98.620	98.620	98.620	98.620
Total fixed assets	**2.035.181**	**2.963.793**	**3.385.148**	**3.354.164**	**3.211.772**	**1.833.386**	**1.194.311**	**1.249.863**	**1.261.697**	**970.825**
Inventories	1.132	1.855	7.002	9.195	6.627	4.478	3.290	4.154	5.052	5.134
Accounts receivable	144.237	157.334	136.043	180.406	219.500	153.627	112.868	142.505	173.308	176.130
Other current assets+accruals	21.067	37.110	95.718	112.732	108.553	64.823	47.625	60.130	73.127	74.318
Cash and marketable securities	479.181	188.588	606.758	502.420	343.609	408.802	300.344	379.207	461.174	468.683
Total current assets	**645.617**	**384.887**	**845.521**	**804.753**	**678.289**	**631.729**	**464.127**	**585.996**	**712.661**	**724.264**
Accounts payable	(80.047)	(105.173)	(192.500)	(178.837)	(167.615)	(131.357)	(96.507)	(121.848)	(148.186)	(150.599)
Other current liabilities	(4.729)	(6.968)	(7.650)	(8.406)	(1.092)	(5.746)	(4.222)	(5.330)	(6.482)	(6.588)
Long-term debt - Current portion	(25.024)	(20.066)	(27.426)	(26.058)	(26.231)	(23.560)	(17.310)	(21.855)	(26.579)	(27.011)
Defered Income	(3.573)	(233.456)	(218.759)	(182.076)	(143.948)	0	0	0	0	0
Corporate Tax	(90.943)	0				10.645	4.035	11.118	21.161	25.189
Current Liabilities	**(204.316)**	**(365.663)**	**(446.335)**	**(395.377)**	**(338.886)**	**(126.459)**	**(96.694)**	**(116.060)**	**(133.507)**	**(131.997)**
Net deferred tax balance	(143.927)	(141.334)	(270.076)	(281.711)	(330.407)	(233.491)	(233.491)	(233.491)	(233.491)	(233.491)
Provision for pensions	0	0	0	(132.470)	(101.766)	(46.847)	(46.847)	(46.847)	(46.847)	(46.847)
Other provisions and long-term liabilities	(42.717)	(42.043)	(33.894)	(24.938)	0	0	0	0	0	0
Total provisions	**(186.644)**	**(183.377)**	**(303.970)**	**(439.119)**	**(432.173)**	**(280.338)**	**(280.338)**	**(280.338)**	**(280.338)**	**(280.338)**
Interest-bearing short and long-term debt	(863.466)	(923.612)	(1.273.053)	(1.506.396)	(1.396.135)	(201.186)	626.614	608.790	754.644	1.350.116
Net assets	**1.426.372**	**1.876.028**	**2.207.311**	**1.818.025**	**1.722.867**	**1.857.132**	**1.908.020**	**2.048.252**	**2.315.157**	**2.632.869**
Common share capital	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)	(40.791)
Other equity reserves	(182.053)	(194.495)	(169.694)	392.864	760.831	760.831	760.831	760.831	760.831	760.831
Retained earnings	(1.203.528)	(1.640.742)	(1.996.826)	(2.170.098)	(2.442.907)	(2.577.172)	(2.628.060)	(2.768.292)	(3.035.197)	(3.352.909)
Common shareholders' funds	**(1.426.372)**	**(1.876.028)**	**(2.207.311)**	**(1.818.025)**	**(1.722.867)**	**(1.857.132)**	**(1.908.020)**	**(2.048.252)**	**(2.315.157)**	**(2.632.869)**
Minority interests	0	0	0	0	0					
Preferred share capital	0	0	0	0	0					
Total shareholders' funds	**(1.426.372)**	**(1.876.028)**	**(2.207.311)**	**(1.818.025)**	**(1.722.867)**	**(1.857.132)**	**(1.908.020)**	**(2.048.252)**	**(2.315.157)**	**(2.632.869)**

Table 47: OSG Balance sheet. Source: OSG Annual reports

4.20. OSG: Income statement

Overseas Shipholding Group, Inc (OSG) USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (Exposed Fleet)						924.296	1.257.858	1.123.427	1.094.635	1.257.676
Revenues (Fixed Fleet)						0	0	0	0	0
Total revenues	**810.835**	**1.000.303**	**1.047.403**	**1.129.305**	**1.704.697**	**924.296**	**1.257.858**	**1.123.427**	**1.094.635**	**1.257.676**
growth	*na*	*23,4%*	*4,7%*	*7,8%*	*51,0%*	*(45,8%)*	*36,1%*	*(10,7%)*	*(2,6%)*	*14,9%*
Vessel operating costs	(194.974)	(336.291)	(466.401)	(616.157)	(903.673)	(641.163)	(685.538)	(644.722)	(588.143)	(575.807)
Gross margin	615.861	664.012	581.002	513.148	801.024	283.133	572.320	478.704	506.491	681.869
margin	*76,0%*	*66,4%*	*55,5%*	*45,4%*	*47,0%*	*30,6%*	*45,5%*	*42,6%*	*46,3%*	*54,2%*
Total operating costs (OSG: General and Administrative Expenses)	(51.993)	(79.667)	(99.525)	(127.211)	(144.063)	(80.588)	(109.670)	(97.950)	(95.439)	(109.655)
as % of revenues	*(6,4%)*	*(8,0%)*	*(9,5%)*	*(11,3%)*	*(8,5%)*	*(8,7%)*	*(8,7%)*	*(8,7%)*	*(8,7%)*	*(8,7%)*
EBITDA	**563.868**	**584.345**	**481.477**	**385.937**	**656.961**	**202.545**	**462.650**	**380.755**	**411.052**	**572.214**
margin	*70%*	*58%*	*46%*	*34%*	*39%*	*22%*	*37%*	*34%*	*38%*	*45%*
Depreciation(OSG: Incl. Amortization)	(100.088)	(152.311)	(141.940)	(185.499)	(189.163)	(126.896)	(172.690)	(154.234)	(150.281)	(172.665)
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
EBIT before goodwill amortisation	**463.780**	**432.034**	**339.537**	**200.438**	**467.798**	**75.650**	**289.960**	**226.521**	**260.771**	**399.549**
margin	*57,2%*	*43,2%*	*32,4%*	*17,7%*	*27,4%*	*8,2%*	*23,1%*	*20,2%*	*23,8%*	*31,8%*
Goodwill amortisation (non tax deductible)	0	0	0	0	(62.874)	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0	0	0
EBIT	**463.780**	**432.034**	**339.537**	**200.438**	**404.924**	**75.650**	**289.960**	**226.521**	**260.771**	**399.549**
margin	*57,2%*	*43,2%*	*32,4%*	*17,7%*	*23,8%*	*8,2%*	*23,1%*	*20,2%*	*23,8%*	*31,8%*
Exceptional items (OSG: Other income+vessel sale)	45.781	77.367	91.114	82.568	(88.585)	40.616	40.616	40.616	40.616	40.616
Income from associates (before tax)	45.599	43.807	22.484	8.876	12.292	0	0	0	0	0
Net interest (TORM: Financial Items)	(74.146)	(89.489)	(68.652)	(74.696)	(57.449)	10	10	10	10	10
EBITDA cover	*8*	*7*	*7*	*5*	*11*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**481.014**	**463.719**	**384.483**	**217.186**	**271.182**	**116.276**	**330.586**	**267.147**	**301.397**	**440.175**
Tax	(79.778)	1.110	8.187	(4.827)	34.004	(10.935)	(31.088)	(25.122)	(28.343)	(41.394)
Tax rate	*16,6%*	*nm*	*nm*	*2,2%*	*nm*	*9,4%*	*9,4%*	*9,4%*	*9,4%*	*9,4%*
Income from associates (after tax)	0	0	0	0	0	0	0	0	0	0
Earnings from ordinary activities	401.236	464.829	392.670	212.359	305.186	105.341	299.498	242.024	273.054	398.781
Minority interest	0	0	0	(1.049)	12.479	0	0	0	0	0
Net earnings from ordinary activities	**401.236**	**464.829**	**392.670**	**211.310**	**317.665**	**105.341**	**299.498**	**242.024**	**273.054**	**398.781**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0	0	0
Net earnings	401.236	464.829	392.670	211.310	317.665	105.341	299.498	242.024	273.054	398.781
Preferred dividend	0	0	0	0	0	0	0	0	0	0
Net attributable profit	401.236	464829	392670	211310	317665	105341	299498	242024	273054	398781
Common dividend	(27.532)	(27.615)	(36.576)	(38.038)	(44.856)	(11.427)	(32.489)	(26.254)	(29.620)	(43.259)
Retained earnings	**373.704**	**437.214**	**356.094**	**173.272**	**272.809**	**93.914**	**267.009**	**215.770**	**243.434**	**355.522**
# common shares at end of year	*39.113,0*	*39.444,0*	*39.515,3*	*34.135,7*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*
Average common shares in issue	*39.113,0*	*39.444,0*	*39.515,3*	*34.135,7*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*	*29.648,2*
EPS excl. extra-ordinary results after GW amortisation	*10,26*	*11,78*	*9,9*	*6,2*	*10,7*	*4*	*10*	*8*	*9*	*13*
EPS excl. extra-ordinary results before GW amortisation	*10,26*	*11,78*	*9,9*	*6,2*	*12,8*	*4*	*10*	*8*	*9*	*13*
Common dividend per share	*0,7*	*0,7*	*0,9*	*1,1*	*1,5*	*0,4*	*1,1*	*0,9*	*1,0*	*1,5*
Common dividend pay-out ratio after GW amortisation	*0,1*	*0,1*	*0,1*	*0,2*	*0,1*	*0,1*	*0,1*	*0,1*	*0,1*	*0,1*

Table 48: OSG Income statement. Source: OSG annual reports

4.21. OSG: Cash flow statement

Overseas Shipholding Group, Inc (OSG) USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EBIT	463.780	432.034	339.537	200.438	404.924	75.650	289.960	226.521	260.771	399.549
Depreciation and (goodwill) amortisation	100.088	152.311	141.940	185.499	252.037	126.896	172.690	154.234	150.281	172.665
Change in net deferred tax balance	[no]	(2.593)	128.742	11.635	48.696	(96.916)	0	0	0	0
Change provision for pensions	[no]	0	0	132.470	(30.704)	(54.919)	0	0	0	0
Change in other provisions and long-term liabilities	[no]	(674)	(8.149)	(8.956)	(24.938)	0	0	0	0	0
Change in net working capital	[no]	288.095	(372.625)	27.861	107.928	61.068	(161.860)	65.233	13.971	(79.116)
Exceptional items & extraordinary results	45.781	77.367	91.114	82.568	(88.585)	40.616	40.616	40.616	40.616	40.616
Income from associates	45.599	43.807	22.484	8.876	12.292	0	0	0	0	0
Minority interest	0	0	0	(1.049)	12.479	0	0	0	0	0
Tax	(79.778)	1.110	8.187	(4.827)	34.004	(10.935)	(31.088)	(25.122)	(28.343)	(41.394)
Cash flow from operating activities	**na**	**991.457**	**351.230**	**634.515**	**728.133**	**141.460**	**310.317**	**461.481**	**437.296**	**492.321**
Movement in fixed assets	[no]	(1.007.352)	(380.757)	(399.152)	(210.200)	1.377.706	(361.936)	369.698	196.428	(88.655)
Movement in other intangible assets	[no]	(31.615)	(112.703)	109.513	67.270	0	0	0	0	0
Goodwill incurred	[no]	0	(64.293)	(8.170)	0	0	0	0	0	0
Investments in fixed financial assets	[no]	(41.956)	(5.542)	143.294	33.285	0	0	0	0	0
Cash flow from investment activities	**na**	**(1.080.923)**	**(563.295)**	**(154.515)**	**(109.645)**	**1.377.706**	**(361.936)**	**369.698**	**196.428**	**(88.655)**
Net interest	(74.146)	(89.489)	(68.652)	(74.696)	(57.449)	10	10	10	10	10
Dividends declared	(27.532)	(27.615)	(36.576)	(38.038)	(44.856)	(11.427)	(32.489)	(26.254)	(29.620)	(43.259)
Change in dividends payable	[no]	138.940	(14.697)	(36.683)	(38.128)	(151.394)	(13.724)	4.062	(2.193)	(8.887)
Change in preferred share capital	[no]	0	0	0	0	0	0	0	0	0
Change in common share capital	[no]	0	0	0	0	0	0	0	0	0
Change in other equity reserves	[no]	12.442	(24.801)	(562.558)	(367.967)	0	0	0	0	0
Change in minority interests	[no]	0	0	0	0	0	0	0	0	0
Cash flow from financing activities	**na**	**34.278**	**(144.726)**	**(711.975)**	**(508.400)**	**(162.811)**	**(46.202)**	**(22.182)**	**(31.804)**	**(52.136)**
Change in interest-bearing debt	**na**	**55.188**	**356.791**	**231.975**	**(110.088)**	**(1.356.356)**	**97.821**	**(808.998)**	**(601.921)**	**(351.530)**

Table 49: OSG Cash flow statement. Source: OSG annual report

4.22. OSG: Analysis of income statement

Analysis of income statement USD '000	2004	2005	2006	2007	2008
Total revenues	810.835,0	1.000.303,0	1.047.403,0	1.129.305,0	1.704.697,0
growth	*na*	*23,4%*	*4,7%*	*7,8%*	*51,0%*
COGS	(194.974,0)	(336.291,0)	(466.401,0)	(616.157,0)	(903.673,0)
Gross margin	**615.861,0**	**664.012,0**	**581.002,0**	**513.148,0**	**801.024,0**
Total operating costs	(51.993,0)	(79.667,0)	(99.525,0)	(127.211,0)	(144.063,0)
EBITDA	**563.868,0**	**584.345,0**	**481.477,0**	**385.937,0**	**656.961,0**
EBITDA (% of revenues)	***-69,5%***	***-58,4%***	***-46,0%***	***-34,2%***	***-38,5%***
Depreciation and (goodwill) amortisation	(100.088,0)	(152.311,0)	(141.940,0)	(185.499,0)	(252.037,0)
EBIT	**463.780,0**	**432.034,0**	**339.537,0**	**200.438,0**	**404.924,0**
EBIT (% of revenues)	***57,2%***	***43,2%***	***32,4%***	***17,7%***	***23,8%***
Add back depreciation and (goodwill) amortisation	100.088,0	152.311,0	141.940,0	185.499,0	252.037,0
Exceptional items	45.781,0	77.367,0	91.114,0	82.568,0	(88.585,0)
Adjustments	(45.781,0)	(77.367,0)	(91.114,0)	(82.568,0)	88.585,0
Adjusted exceptional items	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Extra-ordinary results after tax	0,0	0,0	0,0	0,0	0,0
Other adjustments	0,0	0,0	0,0	0,0	0,0
Adjusted extra-ordinary results after tax	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted change in other provisions and LT liabilities (see below)	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Sustaining investments in tangible and intangible fixed assets (see below)	**(100.088,0)**	**(152.311,0)**	**(141.940,0)**	**(185.499,0)**	**(189.163,0)**
Cash operating profit	**463.780,0**	**432.034,0**	**339.537,0**	**200.438,0**	**467.798,0**
Cash operating profit margin (% revenues)	**57,2%**	**43,2%**	**32,4%**	**17,7%**	**27,4%**

Table 50: OSG Analysis of income statement. Source: OSG annual report.

4.23. OSG: Analysis of balance sheet

Analysis of balance sheet (page 1)USD '000	2004	2005	2006	2007	2008
Movement in tangible fixed assets	[no]	(1.007.352,0)	(380.757,0)	(399.152,0)	(210.200,0)
Movement in intangible fixed assets	[no]	(31.615,0)	(112.703,0)	109.513,0	67.270,0
Goodwill incurred	[no]	0,0	(64.293,0)	(8.170,0)	0,0
Total movement in operational fixed assets	**na**	**(1.038.967,0)**	**(557.753,0)**	**(297.809,0)**	**(142.930,0)**
PM: Depreciation of tangible fixed assets	*(100.088,0)*	*(152.311,0)*	*(141.940,0)*	*(185.499,0)*	*(189.163,0)*
Sustaining investments in tangible fixed assets	**(100.088,0)**	**(152.311,0)**	**(141.940,0)**	**(185.499,0)**	**(189.163,0)**
Implicit expansion investments in tangible fixed assets	**100.088,0**	**152.311,0**	**141.940,0**	**185.499,0**	**189.163,0**
Incremental tangible fixed assets / incremental sales	***na***	***-80,4%***	***-301,4%***	***-226,5%***	***-32,9%***
PM: Amortisation of intangible fixed assets	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Sustaining investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Implicit expansion investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Incremental intangible fixed assets / incremental sales	***na***	***0,0%***	***0,0%***	***0,0%***	***0,0%***
Total expansion investments in fixed assets (incl. acquisitions)	**100.088**	**152.311**	**141.940**	**185.499**	**189.163**
Incremental fixed assets / incremental sales	**na**	**-80,4%**	**-301,4%**	**-226,5%**	**-32,9%**

Analysis of balance sheet (page 2) USD '000	2004	2005	2006	2007	2008
Inventories	1.132,0	1.855,0	7.002,0	9.195,0	6.627,0
Accounts receivable	144.237,0	157.334,0	136.043,0	180.406,0	219.500,0
Other current assets	21.067,0	37.110,0	95.718,0	112.732,0	108.553,0
Cash and marketable securities	479.181,0	188.588,0	606.758,0	502.420,0	343.609,0
Accounts payable	(80.047,0)	(105.173,0)	(192.500,0)	(178.837,0)	(167.615,0)
Other current liabilities	(4.729,0)	(6.968,0)	(7.650,0)	(8.406,0)	(1.092,0)
Net working capital as in financial statements	**560.841,0**	**272.746,0**	**645.371,0**	**617.510,0**	**509.582,0**
Remove financing portion of cash and marketable securities	0,0	0,0	0,0	0,0	0,0
Other adjustments	0	0	0	0	0
Total adjustment to change in working capital	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted net working capital	**560.841,0**	**272.746,0**	**645.371,0**	**617.510,0**	**509.582,0**
Total adjusted cash change in net working capital	**na**	**288.095,0**	**(372.625,0)**	**27.861,0**	**107.928,0**
Incremental net working capital / incremental sales	**na**	**-152,1%**	**791,1%**	**-34,0%**	**-18,8%**

Table 51: OSG Analysis of balance sheet.

4.24. OSG: Analysis of taxes

Analysis of taxes USD '000	2004	2005	2006	2007	2008
Marginal tax rate	25,0%	25,0%	25,0%	25,0%	25,0%
Effective tax rate for financial statements					
Profit before tax (according to financial statements)	481.014,0	463.719,0	384.483,0	217.186,0	271.182,0
Add back non tax deductible goodwill amortisation	0,0	0,0	0,0	0,0	62.874,0
Add back net interest (according to financial statements)	74.146,0	89.489,0	68.652,0	74.696,0	57.449,0
Total taxable income before net interest	**555.160,0**	**553.208,0**	**453.135,0**	**291.882,0**	**391.505,0**
Total Net interest (according to financial statements)	(74.146,0)	(89.489,0)	(68.652,0)	(74.696,0)	(57.449,0)
Taxes according financial statements	(79.778,0)	1.110,0	8.187,0	(4.827,0)	34.004,0
Tax shield on net interest expense (at marginal tax rate)	(18.536,5)	(22.372,3)	(17.163,0)	(18.674,0)	(14.362,3)
Effective taxes on taxable income before net interest	(98.314,5)	(21.262,3)	(8.976,0)	(23.501,0)	19.641,8
Effective tax rate on taxable income before net interest	17,7%	3,8%	2,0%	8,1%	-5,0%
Cash tax rate calculation					
Total net interest	(74.146,0)	(89.489,0)	(68.652,0)	(74.696,0)	(57.449,0)
Income from associates (before tax)	45.599,0	43.807,0	22.484,0	8.876,0	12.292,0
Taxes according financial statements	(79.778,0)	1.110,0	8.187,0	(4.827,0)	34.004,0
Reverse tax shield on net interest expense (at marginal tax rate)	(18.536,5)	(22.372,3)	(17.163,0)	(18.674,0)	(14.362,3)
Reverse tax on income from associates (at effective tax rate)	8.075,2	1.683,7	445,4	714,7	(616,7)
Increase (decrease) in deferred tax liabilities	na	(2.593,0)	128.742,0	11.635,0	48.696,0
Other adjustments	0	0	0	0	0
Cash taxes	na	(22.171,6)	120.211,4	(11.151,3)	67.721,1
PM: Cash operating profit	463.780,0	432.034,0	339.537,0	200.438,0	467.798,0
Cash tax rate (% cash operating profit)	**na**	**5,1%**	**-35,4%**	**5,6%**	**-14,5%**

Table 52: OSG Analysis of taxes

4.25. OSG: Financial drivers

Overseas Shipholding Group, Inc (OSG) USD '000		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers											
Revenue growth		na	23,4%	4,7%	7,8%	51,0%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	76,0%	66,4%	55,5%	45,4%	47,0%	58,0%	58,0%	58,0%	58,0%	58,0%
Total operating costs	*(% of revenues)*	(6,4%)	(8,0%)	(9,5%)	(11,3%)	(8,5%)	(8,7%)	(8,7%)	(8,7%)	(8,7%)	(8,7%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Sustaining investment in tangible assets	*(% of revenues)*	12,3%	15,2%	13,6%	16,4%	11,1%	13,7%	13,7%	13,7%	13,7%	13,7%
Sustaining investment in intangible assets	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash operating profit	*(% of revenues)*	**70,0%**	**59,1%**	**51,4%**	**40,3%**	**44,3%**	**53,0%**	**53,0%**	**53,0%**	**53,0%**	**53,0%**
Marginal tax rate		25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%
Cash tax rate		na	5,1%	(35,4%)	5,6%	(14,5%)	(9,8%)	(9,8%)	(9,8%)	(9,8%)	(9,8%)
Tax rate for financial statements		16,6%	nm	nm	2,2%	nm	9,4%	9,4%	9,4%	9,4%	9,4%
Preferred dividends	*(% of preferred share capital outstanding)*	0	0	0	0	0	0	0	0	0	0
Preferred interim dividends	*(% of preferred dividends declared)*	0	0	0	0	0	0	0	0	0	0
Common dividend pay-out ratio	*(% of net earnings from ordinary activities)*	6,9%	5,9%	9,3%	18,0%	14,1%	10,8%	10,8%	10,8%	10,8%	10,8%
Common interim dividends	*(% of common dividends declared)*	-2,30	1,00	na	na	na	- 0,65	-0,65	-0,65	-0,65	-0,65
Interest on debt							5,80%	5,80%	5,80%	5,80%	5,80%
Interest on excess cash							1,50%	1,50%	1,50%	1,50%	1,50%
P&L ratios											
Gross margin	*(% of revenues)*	76%	66%	55%	45%	47%	31%	45%	43%	46%	54%
EBITDA margin	*(% of revenues)*	70%	58%	46%	34%	39%	22%	37%	34%	38%	45%
EBIT margin	*(% of revenues)*	57%	43%	32%	18%	24%	8%	23%	20%	24%	32%
Net earnings margin before XO	*(% of revenues)*	49%	46%	37%	19%	19%	11%	24%	22%	25%	32%
Net earnings margin	*(% of revenues)*	49%	46%	37%	19%	19%	11%	24%	22%	25%	32%
Balance sheet drivers AVERAGE (INPUT)											
Average inventory days	*(days of total revenue)*	0,5	0,7	2,4	3,0	1,4	1,6	1,6	1,6	1,6	1,6
Average accounts receivable days	*(days of total revenue)*	64,9	57,4	47,4	58,3	47,0	55,0	55,0	55,0	55,0	55,0
Average other current assets	*(% of total revenues)*	2,6%	3,7%	9,1%	10,0%	6,4%	6,4%	6,4%	6,4%	6,4%	6,4%
Operating cash	*(% of total revenues)*	59,1%	18,9%	57,9%	44,5%	20,2%	40,1%	40,1%	40,1%	40,1%	40,1%
Accounts payable days	*(days of total revenue)*	36,0	38,4	67,1	57,8	35,9	47,0	47,0	47,0	47,0	47,0
Other current liabilities	*(% of total revenues)*	0,6%	0,7%	0,7%	0,7%	0,1%	0,6%	0,6%	0,6%	0,6%	0,6%
Long-term debt - Current portion	*(% of total revenues)*	3,1%	2,0%	2,6%	2,3%	1,5%	2,3%	2,3%	2,3%	2,3%	2,3%
Total average operating working capital	*(% of total revenues)*	69,2%	27,3%	61,6%	54,7%	29,9%	48,5%	48,5%	48,5%	48,5%	48,5%
Cash flow drivers											
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	na	(80,4%)	(301,4%)	(226,5%)	(32,9%)	(160,3%)	(160,3%)	(160,3%)	(160,3%)	(160,3%)
Incremental intangible assets	*(% of incremental revenues)*	na	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Depreciation	*(% of total revenues)*	(12,3%)	(15,2%)	(13,6%)	(16,4%)	(11,1%)	(13,7%)	(13,7%)	(13,7%)	(13,7%)	(13,7%)

Table 53: OSG Financial drivers

4.26. OSG: Discounting Free Cash Flows

Overseas Shipholding Group, Inc (OSG) USD '000	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Terminal
Revenues	810.835	1.000.303	1.047.403	1.129.305	1.704.697	924.296	1.257.858	1.123.427	1.094.635	1.257.676	1.340.846
EBIT	463.780	432.034	339.537	200.438	467.798	75.650	289.960	226.521	260.771	399.549	425.971
Goodwill amortisation	0	0	0	0	62.874	0	0	0	0	0	0
Depreciation	100.088	152.311	141.940	185.499	189.163	126.896	172.690	154.234	150.281	172.665	184.083
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0	0
Sustaining investments in tangible assets	(100.088)	(152.311)	(141.940)	(185.499)	(189.163)	(126.896)	(172.690)	(154.234)	(150.281)	(172.665)	(184.083)
Sustaining investments in intangible fixed assets	0	0	0	0	0	0	0	0	0	0	0
Exceptional items & extra-ordinary results after-tax (operating)	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in other provisions & long-term liabilities	0	0	0	0	0	0	0	0	0	0	0
Cash operating profit (CBIT)	**463.780**	**432.034**	**339.537**	**200.438**	**530.672**	**75.650**	**289.960**	**226.521**	**260.771**	**399.549**	**425.971**
Cash taxes	na	(22.172)	120.211	(11.151)	67.721	7.411	28.406	22.191	25.546	39.142	(106.493)
Cash flow before new investment (CBNI)	**na**	**409.862**	**459.748**	**189.287**	**598.393**	**83.061**	**318.366**	**248.712**	**286.317**	**438.691**	**319.479**
Expansion capex (including acquisitions and divestments)	100.088	152.311	141.940	185.499	189.163	1.250.811	(534.626)	215.464	46.147	(261.320)	(115.111)
Expansion investments other intangible assets	0	0	0	0	0	0	0	0	0	0	0
Working capital investment	na	288.095	(372.625)	27.861	107.928	61.068	(161.860)	65.233	13.971	(79.116)	(34.850)
Total new investments	**na**	**440.406**	**(230.685)**	**213.360**	**297.091**	**1.311.879**	**(696.486)**	**280.697**	**60.118**	**(340.436)**	**(149.962)**
Free cash flow	**na**	**850.268**	**229.063**	**402.647**	**895.484**	**1.394.940**	**(378.121)**	**529.409**	**346.435**	**98.255**	**169.517**

Date of relevant cash flow	2009	2010	2011	2012	2013	Terminal
FCF subject to discounting	1.394.940	(378.121)	529.409	346.435	98.255	3.749.045
Cost of capital (WACC)	8,5%	8,5%	8,5%	8,5%	8,5%	8,5%
Discount factor	0,92	0,85	0,78	0,72	0,66	0,66
	1,085					
PV of FCF	1.285.691	(321.141)	414.324	249.836	65.294	2.491.363

Table 54: OSG Discounting free cash flow

4.27. OSG: Calculating share price

Shareholder value (in USD '000 except per share items)	
Value of operations	4.185.367
Market value of excess cash & securities	0
Market value of financial fixed assets	98.620
Corporate value	4.283.987
Market value of interest-bearing debt	(1.422.366)
Market value unfunded pension and other liabilities	(1.092)
Market value of minority interest	0
Market value of preferred equity	0
Common shareholder value (Entreprise value)	2.860.529
Shares outstanding	29.648
Common shareholder value per share	96,482

Table 55: OSG calculating share price

4.28. NORDEN: Balance Sheet

D/S Norden USDm	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tangible fixed assets	264	358	479	645	939	1.236	1.220	1.140	1.132	1.122
Goodwill	0	0	0	0	0	0	0	0	0	0
Other intangible fixed assets	0	0	0	0	0	0	0	0	0	0
Fixed financial assets	10	18	18	21	31	31	31	31	31	31
Total fixed assets	**274**	**376**	**497**	**666**	**969**	**1.267**	**1.251**	**1.171**	**1.163**	**1.153**
Inventories	15	22	26	45	23	15	14	21	19	17
Accounts receivable	44	93	115	224	227	70	67	99	87	77
Other current assets	52	18	8	55	16	18	17	26	23	20
Cash and marketable securities	135	312	315	619	807	735,87	700	1.041,31	912	811
Total current assets	**246**	**445**	**464**	**944**	**1.072**	**839**	**798**	**1.188**	**1.040**	**924**
Accounts payable	(25)	(40)	(40)	(85)	(91)	(28)	(27)	(40)	(35)	(31)
Other current liabilities	(38)	(49)	(42)	(76)	(115)	(33)	(31)	(47)	(41)	(36)
Preferred dividends payable	0	0	0	0	0	0	0	0	0	0
Common dividends payable	0	0	0	0	0	0	0	0	0	0
Current Liabilities	**(63)**	**(88)**	**(82)**	**(161)**	**(206)**	**(61)**	**(58)**	**(87)**	**(76)**	**(68)**
Net deferred tax balance	(0)	0	0	0	(4)	0	0	0	0	0
Provision for pensions	0	0	0	0	0	0	0	0	0	0
Other provisions and long-term liabilities	(52)	(57)	(47)	(64)	(62)	(62)	(62)	(62)	(62)	(62)
Total provisions	**(53)**	**(57)**	**(47)**	**(64)**	**(66)**	**(62)**	**(62)**	**(62)**	**(62)**	**(62)**
Interest-bearing short and long-term debt	(66)	(65)	(118)	(74)	(68,80)	(71)	196	140	495	809
Net assets	**338**	**611**	**714**	**1.311**	**1.700**	**1.912**	**2.125**	**2.349**	**2.559**	**2.756**
Common share capital	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
Other equity reserves	0	2	(2)	(4)	(13)	(13)	(13)	(13)	(13)	(13)
Retained earnings	(329)	(603)	(702)	(1.300)	(1.681)	(1.892)	(2.105)	(2.330)	(2.539)	(2.737)
Common shareholders' funds	**(336)**	**(609)**	**(711)**	**(1.311)**	**(1.700)**	**(1.912)**	**(2.125)**	**(2.349)**	**(2.559)**	**(2.756)**
Minority interests	(2)	(2)	(2)	(0)	(0)	0	0	0	0	0
Preferred share capital	0	0	0	0	0	0	0	0	0	0
Total shareholders' funds	**(338)**	**(611)**	**(714)**	**(1.311)**	**(1.700)**	**(1.912)**	**(2.125)**	**(2.349)**	**(2.559)**	**(2.756)**

Table 56: NORDEN balance sheet

4.29. NORDEN: Income statement

D/S Norden USDm	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (exposed)						220	610	1.270	1.085	940
Revenues (fixed)	18,8%	15,4%	11,8%	17,7%	11,2%	831	389	218	218	218
Total revenues	**1.167**	**1.296**	**1.234**	**2.933**	**4.247**	**1.051**	**999**	**1.488**	**1.302**	**1.158**
growth	*na*	*11,1%*	*(4,8%)*	*137,7%*	*44,8%*	*(75,2%)*	*(4,9%)*	*48,8%*	*(12,5%)*	*(11,1%)*
Vessel operating costs	(897)	(1.044)	(1.026)	(2.334)	(3.645)	(731)	(679)	(1.127)	(977)	(860)
Gross margin	270	252	208	600	602	320	320	360	325	298
margin	*23,1%*	*19,5%*	*16,9%*	*20,4%*	*14,2%*	*30,4%*	*32,0%*	*24,2%*	*25,0%*	*25,8%*
Total operating costs	(37)	(36)	(42)	(62)	(96)	(29)	(27)	(41)	(36)	(32)
as % of revenues	*(3,2%)*	*(2,8%)*	*(3,4%)*	*(2,1%)*	*(2,3%)*	*(2,7%)*	*(2,7%)*	*(2,7%)*	*(2,7%)*	*(2,7%)*
EBITDA	**233**	**216**	**166**	**537**	**506**	**291**	**293**	**319**	**290**	**266**
margin	*20%*	*17%*	*13%*	*18%*	*12%*	*28%*	*29%*	*21%*	*22%*	*23%*
Depreciation	(13)	(16)	(20)	(20)	(32)	(11)	(11)	(16)	(14)	(13)
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0
EBIT before goodwill amortisation	**220**	**200**	**146**	**518**	**474**	**280**	**282**	**303**	**275**	**254**
margin	*18,8%*	*15,4%*	*11,8%*	*17,7%*	*11,2%*	*26,6%*	*28,2%*	*20,4%*	*21,1%*	*21,9%*
Goodwill amortisation (non tax deductible)	0	0	0	0	0	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0	0	0
EBIT	**220**	**200**	**146**	**518**	**474**	**280**	**282**	**303**	**275**	**254**
margin	*18,8%*	*15,4%*	*11,8%*	*17,7%*	*11,2%*	*26,6%*	*28,2%*	*20,4%*	*21,1%*	*21,9%*
Exceptional items	52	139	35	191	224	100	100	100	100	100
Income from associates (before tax)	(0)	8	1	2	9	0	0	0	0	0
Net interest	(5)	(1)	6	15	14	10	10	10	10	10
EBITDA cover	*46*	*243*	*nm*	*nm*	*nm*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**267**	**346**	**188**	**725**	**721**	**390**	**392**	**413**	**385**	**364**
Tax	(3)	(10)	(11)	(22)	(13)	(12)	(12)	(12)	(11)	(11)
Tax rate	*1,1%*	*2,8%*	*6,1%*	*3,0%*	*1,8%*	*3,0%*	*3,0%*	*3,0%*	*3,0%*	*3,0%*
Income from associates (after tax)	0	0	0	0	0	0	0	0	0	0
Earnings from ordinary activities	264	336	177	703	708	378	380	401	374	353
Minority interest	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Net earnings from ordinary activities	**263**	**336**	**176**	**703**	**708**	**378**	**380**	**401**	**374**	**353**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0	0	0
Net earnings	263	336	176	703	708	378	380	401	374	353
Preferred dividend	0	0	0	0	0	0	0	0	0	0
Net attributable profit	263	336	176	703	708	378	380	401	374	353
Common dividend	(105)	(74)	(41)	(309)	(103)	(166)	(167)	(176)	(165)	(155)
Retained earnings	**158**	**262**	**136**	**394**	**605**	**212**	**213**	**225**	**209**	**198**
# common shares at end of year	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*
Average common shares in issue	*44,0*	*43,5*	*43,4*	*42,7*	*42,4*	*44,6*	*44,6*	*44,6*	*44,6*	*44,6*
EPS excl. extra-ordinary results after GW amortisation	*6*	*8*	*4*	*16*	*17*	*8*	*9*	*9*	*8*	*8*
EPS excl. extra-ordinary results before GW amortisation	*6*	*8*	*4*	*16*	*17*	*8*	*9*	*9*	*8*	*8*
Common dividend per share	*2,4*	*1,7*	*0,9*	*7,2*	*2,4*	*3,7*	*3,8*	*4,0*	*3,7*	*3,5*
Common dividend pay-out ratio after GW amortisation	*0,4*	*0,2*	*0,2*	*0,4*	*0,1*	*0,4*	*0,4*	*0,4*	*0,4*	*0,4*

Table 57: NORDEN Income statement

4.30. NORDEN: Cash flow statement

D/S Norden USDm	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EBIT	220	200	146	518	474	280	282	303	275	254
Depreciation and (goodwill) amortisation	13	16	20	20	32	11	11	16	14	13
Change in net deferred tax balance	[no]	(0)	0	0	4	(4)	0	0	0	0
Change provision for pensions	[no]	0	0	0	0	0	0	0	0	0
Change in other provisions and long-term liabilities	[no]	4	(10)	17	(1)	0	0	0	0	0
Change in net working capital	[no]	(174)	(25)	(401)	(83)	88	38	(361)	137	107
Exceptional items & extraordinary results	52	139	35	191	224	100	100	100	100	100
Income from associates	(0)	8	1	2	9	0	0	0	0	0
Minority interest	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Tax	(3)	(10)	(11)	(22)	(13)	(12)	(12)	(12)	(11)	(11)
Cash flow from operating activities	**na**	**183**	**156**	**323**	**645**	**464**	**419**	**46**	**515**	**462**
Movement in fixed assets	[no]	(110)	(142)	(185)	(325)	(309)	5	64	(6)	(3)
Movement in other intangible assets	[no]	0	0	0	0	0	0	0	0	0
Goodwill incurred	[no]	0	0	0	0	0	0	0	0	0
Investments in fixed financial assets	[no]	(8)	1	(3)	(10)	0	0	0	0	0
Cash flow from investment activities	**na**	**(118)**	**(141)**	**(189)**	**(335)**	**(309)**	**5**	**64**	**(6)**	**(3)**
Net interest	(5)	(1)	6	15	14	10	10	10	10	10
Dividends declared	(105)	(74)	(41)	(309)	(103)	(166)	(167)	(176)	(165)	(155)
Change in dividends payable	[no]	0	0	0	0	0	0	0	0	0
Change in preferred share capital	[no]	0	0	0	0	0	0	0	0	0
Change in common share capital	[no]	0	0	0	0	0	0	0	0	0
Change in other equity reserves	[no]	2	(3)	(2)	(9)	0	0	0	0	0
Change in minority interests	[no]	(0)	(0)	2	0	0	0	0	0	0
Cash flow from financing activities	**na**	**(73)**	**(38)**	**(294)**	**(98)**	**(156)**	**(157)**	**(166)**	**(155)**	**(145)**
Change in interest-bearing debt	**na**	**9**	**22**	**160**	**(212)**	**2**	**(267)**	**57**	**(355)**	**(314)**

Table 58:NORDEN cash flow statement

4.31. NORDEN: Analysis of income statement

Analysis of income statement USDm	2004	2005	2006	2007	2008
Total revenues	1.166,6	1.296,5	1.234,2	2.933,1	4.246,8
growth	*na*	*11,1%*	*-4,8%*	*137,7%*	*44,8%*
COGS	(896,8)	(1.044,3)	(1.026,1)	(2.333,6)	(3.645,1)
Gross margin	**269,8**	**252,2**	**208,1**	**599,6**	**601,7**
Total operating costs	(36,8)	(36,3)	(42,0)	(62,1)	(96,0)
EBITDA	**232,9**	**215,9**	**166,1**	**537,5**	**505,7**
EBITDA (% of revenues)	***-20,0%***	***-16,7%***	***-13,5%***	***-18,3%***	***-11,9%***
Depreciation and (goodwill) amortisation	(13,3)	(16,3)	(20,3)	(19,6)	(31,6)
EBIT	**219,6**	**199,6**	**145,7**	**517,9**	**474,0**
EBIT (% of revenues)	***18,8%***	***15,4%***	***11,8%***	***17,7%***	***11,2%***
Add back depreciation and (goodwill) amortisation	13,3	16,3	20,3	19,6	31,6
Exceptional items	52,3	138,9	34,7	191,0	223,7
Adjustments	(52,3)	(138,9)	(34,7)	(191,0)	(223,7)
Adjusted exceptional items	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Extra-ordinary results after tax	0,0	0,0	0,0	0,0	0,0
Other adjustments	0,0	0,0	0,0	0,0	0,0
Adjusted extra-ordinary results after tax	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted change in other provisions and LT liabilities (see below)	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Sustaining investments in tangible and intangible fixed assets (see below)	**(13,3)**	**(16,3)**	**(20,3)**	**(19,6)**	**(31,6)**
Cash operating profit	**219,6**	**199,6**	**145,7**	**517,9**	**474,0**
Cash operating profit margin (% revenues)	**18,8%**	**15,4%**	**11,8%**	**17,7%**	**11,2%**

Table 59: NORDEN analysis of income statement

4.32. NORDEN: Analysis of balance sheet

Analysis of balance sheet (page 1) USDm	2004	2005	2006	2007	2008
Movement in tangible fixed assets	[no]	(109,9)	(141,8)	(185,4)	(325,1)
Movement in intangible fixed assets	[no]	0,0	0,0	0,0	0,0
Goodwill incurred	[no]	0,0	0,0	0,0	0,0
Total movement in operational fixed assets	**na**	**(109,9)**	**(141,8)**	**(185,4)**	**(325,1)**
PM: Depreciation of tangible fixed assets	*(13,3)*	*(16,3)*	*(20,3)*	*(19,6)*	*(31,6)*
Sustaining investments in tangible fixed assets	**(13,3)**	**(16,3)**	**(20,3)**	**(19,6)**	**(31,6)**
Implicit expansion investments in tangible fixed assets	**13,3**	**16,3**	**20,3**	**19,6**	**31,6**
Incremental tangible fixed assets / incremental sales	***na***	***-12,5%***	***32,6%***	***-1,2%***	***-2,4%***
PM: Amortisation of intangible fixed assets	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Sustaining investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Implicit expansion investments in intangible fixed assets	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Incremental intangible fixed assets / incremental sales	***na***	***0,0%***	***0,0%***	***0,0%***	***0,0%***
Total expansion investments in fixed assets (incl. acquisitions)	**13**	**16**	**20**	**20**	**32**
Incremental fixed assets / incremental sales	**na**	**-12,5%**	**32,6%**	**-1,2%**	**-2,4%**

Analysis of balance sheet (page 2) USDm	2004	2005	2006	2007	2008
Inventories	14,9	21,8	26,1	45,0	23,2
Accounts receivable	43,9	93,4	115,1	224,0	226,8
Other current assets	52,3	17,7	7,7	55,2	15,6
Cash and marketable securities	135,0	312,4	314,9	619,4	806,7
Accounts payable	(25,0)	(39,9)	(40,2)	(84,5)	(91,2)
Other current liabilities	(38,4)	(48,5)	(41,9)	(76,2)	(114,9)
Net working capital as in financial statements	**182,7**	**357,0**	**381,6**	**782,9**	**866,1**
Remove financing portion of cash and marketable securities	0	0	0	0	0
Other adjustments	0	0	0	0	0
Total adjustment to change in working capital	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted net working capital	**182,7**	**357,0**	**381,6**	**782,9**	**866,1**
Total adjusted cash change in net working capital	**na**	**(174,2)**	**(24,7)**	**(401,2)**	**(83,3)**
Incremental net working capital / incremental sales	**na**	**134,2%**	**-39,6%**	**23,6%**	**6,3%**

Table 60: NORDEN analysis of balance sheet

4.33. NORDEN: Analysis of taxes

Analysis of taxes USDm	2004	2005	2006	2007	2008
Marginal tax rate	25,0%	25,0%	25,0%	25,0%	25,0%
Effective tax rate for financial statements					
Profit before tax (according to financial statements)	266,7	345,9	188,0	725,3	720,5
Add back non tax deductible goodwill amortisation	0,0	0,0	0,0	0,0	0,0
Add back net interest (according to financial statements)	5,1	0,9	(6,2)	(14,8)	(14,2)
Total taxable income before net interest	**271,7**	**346,8**	**181,8**	**710,5**	**706,3**
Total Net interest (according to financial statements)	(5,1)	(0,9)	6,2	14,8	14,2
Taxes according financial statements	(3,0)	(9,6)	(11,5)	(22,0)	(12,7)
Tax shield on net interest expense (at marginal tax rate)	(1,3)	(0,2)	1,5	3,7	3,6
Effective taxes on taxable income before net interest	(4,2)	(9,8)	(9,9)	(18,3)	(9,1)
Effective tax rate on taxable income before net interest	1,6%	2,8%	5,5%	2,6%	1,3%
Cash tax rate calculation					
Total net interest	(5,1)	(0,9)	6,2	14,8	14,2
Income from associates (before tax)	(0,2)	8,3	1,4	1,6	8,6
Taxes according financial statements	(3,0)	(9,6)	(11,5)	(22,0)	(12,7)
Reverse tax shield on net interest expense (at marginal tax rate)	(1,3)	(0,2)	1,5	3,7	3,6
Reverse tax on income from associates (at effective tax rate)	(0,0)	0,2	0,1	0,0	0,1
Increase (decrease) in deferred tax liabilities	na	(0,4)	0,0	0,0	4,2
Other adjustments	0	0	0	0	0
Cash taxes	na	(10,0)	(9,8)	(18,2)	(4,9)
PM: Cash operating profit	219,6	199,6	145,7	517,9	474,0
Cash tax rate (% cash operating profit)	**na**	**5,0%**	**6,8%**	**3,5%**	**1,0%**

Table 61: NORDEN analysis of taxes

4.34. NORDEN: Financial drivers

D/S Norden USDm		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers											
Revenue growth		na	11,1%	(4,8%)	137,7%	44,8%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	23,1%	19,5%	16,9%	20,4%	14,2%	18,8%	18,8%	18,8%	18,8%	18,8%
Total operating costs	*(% of revenues)*	(3,2%)	(2,8%)	(3,4%)	(2,1%)	(2,3%)	(2,7%)	(2,7%)	(2,7%)	(2,7%)	(2,7%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Sustaining investment in tangible assets	*(% of revenues)*	1,1%	1,3%	1,6%	0,7%	0,7%	1,0%	1,0%	1,0%	1,0%	1,0%
Sustaining investment in intangible assets	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash operating profit	*(% of revenues)*	**25,1%**	**21,0%**	**18,6%**	**21,9%**	**15,7%**	**20,6%**	**20,6%**	**20,6%**	**20,6%**	**20,6%**
Marginal tax rate		25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%	25,0%
Cash tax rate		na	5,0%	6,8%	3,5%	1,0%	4,1%	4,1%	4,1%	4,1%	4,1%
Tax rate for financial statements		1,1%	2,8%	6,1%	3,0%	1,8%	3,0%	3,0%	3,0%	3,0%	3,0%
Preferred dividends	*(% of preferred share capital outstanding)*	0	0	0	0	0	0	0	0	0	0
Preferred interim dividends	*(% of preferred dividends declared)*	0	0	0	0	0	0	0	0	0	0
Common dividend pay-out ratio	*(% of net earnings from ordinary activities)*	40,0%	22,0%	23,0%	44,0%	14,5%	44,0%	44,0%	44,0%	44,0%	44,0%
Common interim dividends	*(% of common dividends declared)*	1,00	1,00	1,00	1,00	1,00	0,00	0,00	0,00	0,00	0,00
Interest on debt							3,96%	3,96%	3,96%	3,96%	3,96%
Interest on excess cash							3%	3%	3%	3%	3%
P&L ratios											
Gross margin	*(% of revenues)*	23%	19%	17%	20%	14%	30%	32%	24%	25%	26%
EBITDA margin	*(% of revenues)*	20%	17%	13%	18%	12%	28%	29%	21%	22%	23%
EBIT margin	*(% of revenues)*	19%	15%	12%	18%	11%	27%	28%	20%	21%	22%
Net earnings margin before XO	*(% of revenues)*	23%	26%	14%	24%	17%	36%	38%	27%	29%	30%
Net earnings margin	*(% of revenues)*	23%	26%	14%	24%	17%	36%	38%	27%	29%	30%
Balance sheet drivers AVERAGE (INPUT)											
Average inventory days	*(days of total revenue)*	4,7	6,2	7,7	5,6	2,0	5,2	5,2	5,2	5,2	5,2
Average accounts receivable days	*(days of total revenue)*	13,7	26,3	34,0	27,9	19,5	24,3	24,3	24,3	24,3	24,3
Average other current assets	*(% of total revenues)*	4,5%	1,4%	0,6%	1,9%	0,4%	1,7%	1,7%	1,7%	1,7%	1,7%
Operating cash	*(% of total revenues)*	11,6%	24,1%	25,5%	21,1%	19,0%	70,0%	70,0%	70,0%	70,0%	70,0%
Accounts payable days	*(days of total revenue)*	7,8	11,2	11,9	10,5	7,8	9,9	9,9	9,9	9,9	9,9
Other current liabilities	*(% of total revenues)*	3,3%	3,7%	3,4%	2,6%	2,7%	3,1%	3,1%	3,1%	3,1%	3,1%
Total average operating working capital	*(% of total revenues)*	15,7%	27,5%	30,9%	26,7%	20,4%	24,2%	24,2%	24,2%	24,2%	24,2%
Cash flow drivers											
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	na	(12,5%)	32,6%	(1,2%)	(2,4%)	10,0%	10,0%	10,0%	10,0%	10,0%
Incremental intangible assets	*(% of incremental revenues)*	na	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Depreciation	*(% of total revenues)*	(1,1%)	(1,3%)	(1,6%)	(0,7%)	(0,7%)	(1,1%)	(1,1%)	(1,1%)	(1,1%)	(1,1%)

Table 62: NORDEN financial drivers

4.35. NORDEN: Discounting Free Cash Flows

D/S Norden USDm	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Terminal
Revenues	1.167	1.296	1.234	2.933	4.247	1.051	999	1.488	1.302	1.158	1.114
EBIT	220	200	146	518	474	280	282	303	275	254	244
Goodwill amortisation	0	0	0	0	0	0	0	0	0	0	0
Depreciation	13	16	20	20	32	11	11	16	14	13	12
Amortisation of other intangible assets	0	0	0	0	0	0	0	0	0	0	0
Sustaining investments in tangible assets	(13)	(16)	(20)	(20)	(32)	(11)	(10)	(15)	(13)	(12)	(11)
Sustaining investments in intangible fixed assets	0	0	0	0	0	0	0	0	0	0	0
Exceptional items & extra-ordinary results after-tax (operating)	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in other provisions & long-term liabilities	0	0	0	0	0	0	0	0	0	0	0
Cash operating profit (CBIT)	**220**	**200**	**146**	**518**	**474**	**280**	**283**	**305**	**277**	**255**	**245**
Cash taxes	na	(10)	(10)	(18)	(5)	(11)	(12)	(12)	(11)	(10)	(61)
Cash flow before new investment (CBNI)	**na**	**190**	**136**	**500**	**469**	**269**	**271**	**292**	**265**	**245**	**184**
Expansion capex (including acquisitions and divestments)	13	16	20	20	32	(320)	(5)	49	(19)	(14)	12
Expansion investments other intangible assets	0	0	0	0	0	0	0	0	0	0	0
Working capital investment	na	(174)	(25)	(401)	(83)	88	38	(361)	137	107	(85)
Total new investments	**na**	**(158)**	**(4)**	**(382)**	**(52)**	**(231)**	**33**	**(312)**	**119**	**92**	**(74)**
Free cash flow	**na**	**32**	**132**	**118**	**418**	**38**	**304**	**(20)**	**384**	**337**	**110**
Date of relevant cash flow						2009	2010	2011	2012	2013	Terminal
FCF subject to discounting						38	304	(20)	384	337	1.843
Cost of capital (WACC)						10,0%	10,0%	10,0%	10,0%	10,0%	10,0%
Discount factor						0,95	0,86	0,79	0,71	0,65	0,65
PV of FCF						36	263	(16)	274	219	1.196

Table 63: NORDEN discounting free cash flow

4.36. NORDEN: Calculating share price

Shareholder value (in USDm except per share items)	
Value of operations	1.972
Market value of excess cash & securities	807
Market value of financial fixed assets	30,86
Corporate value	2.809
Market value of interest-bearing debt	(69)
Market value unfunded pension and other liabilities	0
Market value of minority interest	(0)
Market value of preferred equity	0
Common shareholder value (Entreprise value)	2.741
Shares outstanding	45
Common shareholder value per share	61

Table 64: NORDEN calculating share price

4.37. Golden Ocean: Balance Sheet

Golden Ocean Grup Ltd USDt	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Tangible fixed assets	48.926	290.883	393.795	672.509	798.207	754.327	749.484	744.211	742.038	738.842
Goodwill	0	0	0	0	0	0	0	0	0	0
Other intangible fixed assets	0	0	0	0	0	35.895	35.851	38.560	37.460	36.240
Fixed financial assets	0	74.357	82.188	74.908	22.587	22.587	22.587	22.587	22.587	22.587
Total fixed assets	**48.926**	**365.240**	**475.983**	**747.417**	**820.794**	**812.809**	**807.922**	**805.358**	**802.085**	**797.669**
Inventories	126	370	6.530	10.260	3.482	1.367	1.378	656	950	1.275
Accounts receivable	5.362	10.867	28.931	72.459	74.761	11.888	11.990	5.706	8.258	11.088
Other current assets	78	0	0	47.375	40.084	3.232	3.260	1.551	2.245	3.015
Cash and marketable securities	19.939	16.484	40.771	306.309	67.537	24.469	24.677	11.745	16.998	22.822
Total current assets	**25.505**	**27.721**	**76.232**	**436.403**	**185.864**	**40.957**	**41.305**	**19.659**	**28.451**	**38.200**
Accounts payable	(631)	(8.616)	(31.001)	(72.127)	(35.524)	(10.180)	(10.267)	(4.886)	(7.072)	(9.495)
Other current liabilities	(558)	(7.327)	(43.693)	(78.955)	(35.857)	(11.467)	(11.565)	(5.504)	(7.966)	(10.695)
Long-term debt - Current portion	(4.200)	(60.154)	(50.473)	(227.137)	(592.501)	(52.109)	(52.553)	(25.012)	(36.198)	(48.602)
Preferred dividends payable	0	0	0	0	0	0	0	0	0	0
Common dividends payable	0	0	0	0	0	0	0	0	0	0
Current Liabilities	**(5.389)**	**(76.097)**	**(125.167)**	**(378.219)**	**(663.882)**	**(21.647)**	**(21.832)**	**(10.390)**	**(15.038)**	**(20.190)**
Net deferred tax balance	0	0	0	0	0	0	0	0	0	0
Provision for pensions	0	0	0	0	0	0	0	0	0	0
Other provisions and long-term liabilities	0	0	0	0	0	0	0	0	0	0
Total provisions	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Interest-bearing short and long-term debt	(44.750)	(237.130)	(289.922)	(624.071)	(167.533)	(553.813)	(437.571)	(326.232)	(223.275)	(113.793)
Net assets	**24.292**	**79.734**	**137.126**	**181.530**	**175.243**	**278.306**	**389.825**	**488.394**	**592.224**	**701.885**
Common share capital	(22.448)	(24.668)	(27.138)	(27.177)	(27.699)	(27.699)	(27.699)	(27.699)	(27.699)	(27.699)
Other equity reserves	(14)	(12.271)	(31.561)	(48.366)	(10.918)	(10.918)	(10.918)	(10.918)	(10.918)	(10.918)
Retained earnings	(1.830)	(42.775)	(78.427)	(105.987)	(136.626)	(239.689)	(351.208)	(449.777)	(553.607)	(663.268)
Common shareholders' funds	**(24.292)**	**(79.714)**	**(137.126)**	**(181.530)**	**(175.243)**	**(278.306)**	**(389.825)**	**(488.394)**	**(592.224)**	**(701.885)**
Minority interests (Norden p. 55)	0	0	0	0	0	0	0	0	0	0
Preferred share capital	0	0	0	0	0	0	0	0	0	0
Total shareholders' funds	**(24.292)**	**(79.714)**	**(137.126)**	**(181.530)**	**(175.243)**	**(278.306)**	**(389.825)**	**(488.394)**	**(592.224)**	**(701.885)**

Table 65: Golden Ocean balance sheet

4.38. Golden Ocean: Income statement

Golden Ocean Grup Ltd USDt	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenues (exposed)	45%	39%	22%	26%	25%	156.323	134.619	55.571	81.223	124.706
Revenues (fixed)	47%	43%	25%	27%	26%	0	0	0	0	0
Total revenues	**4.853**	**95.811**	**270.327**	**708.035**	**947.503**	**156.323**	**134.619**	**55.571**	**81.223**	**124.706**
growth	*na*	*1874,3%*	*182,1%*	*161,9%*	*33,8%*	*(83,5%)*	*(13,9%)*	*(58,7%)*	*46,2%*	*53,5%*
Vessel operating costs	(2.572)	(54.781)	(203.101)	(515.780)	(697.658)	(98.765)	(74.480)	(16.087)	(35.037)	(67.157)
Gross margin	2.281	41.030	67.226	192.255	249.845	57.557	60.139	39.484	46.187	57.549
margin	*47,0%*	*42,8%*	*24,9%*	*27,2%*	*26,4%*	*36,8%*	*44,7%*	*71,1%*	*56,9%*	*46,1%*
Total operating costs (p. 52: 5+7+8)	(115)	(3.535)	(7.259)	(9.420)	(14.662)	(3.634)	(3.129)	(1.292)	(1.888)	(2.899)
as % of revenues	*(2,4%)*	*(3,7%)*	*(2,7%)*	*(1,3%)*	*(1,5%)*	*(2,3%)*	*(2,3%)*	*(2,3%)*	*(2,3%)*	*(2,3%)*
EBITDA	**2.166**	**37.495**	**59.967**	**182.835**	**235.183**	**53.924**	**57.010**	**38.192**	**44.299**	**54.650**
margin	*45%*	*39%*	*22%*	*26%*	*25%*	*34%*	*42%*	*69%*	*55%*	*44%*
Depreciation	(212)	(5.022)	(10.145)	(15.468)	(11.435)	(4.840)	(4.168)	(1.721)	(2.515)	(3.861)
Amortisation of other intangible assets	(3)	(12.311)	(14.467)	(7.570)	(7.109)	0	0	0	0	0
EBIT before goodwill amortisation	**1.951**	**20.162**	**35.355**	**159.797**	**216.639**	**49.083**	**52.842**	**36.471**	**41.784**	**50.789**
margin	*40,2%*	*21,0%*	*13,1%*	*22,6%*	*22,9%*	*31,4%*	*39,3%*	*65,6%*	*51,4%*	*40,7%*
Goodwill amortisation (non tax deductible)	0	0	0	0	0	0	0	0	0	0
Goodwill amortisation (tax deductible)	0	0	0	0	0	0	0	0	0	0
EBIT	**1.951**	**20.162**	**35.355**	**159.797**	**216.639**	**49.083**	**52.842**	**36.471**	**41.784**	**50.789**
margin	*40,2%*	*21,0%*	*13,1%*	*22,6%*	*22,9%*	*31,4%*	*39,3%*	*65,6%*	*51,4%*	*40,7%*
Exceptional items (Golden: Impairment loss+Sale of subsidiaries)	0	(1.802)	(5.875)	74.639	180.592	61.889	61.889	61.889	61.889	61.889
Income from associates (before tax)	0	0	0	0	0	0	0	0	0	0
Net interest	(124)	10.274	(8.146)	(40.944)	(24.138)	10	10	10	10	10
EBITDA cover	*17*	*nm*	*7*	*4*	*10*	*nm*	*nm*	*nm*	*nm*	*nm*
Profit before tax	**1.827**	**28.634**	**21.334**	**193.492**	**373.093**	**110.982**	**114.740**	**98.370**	**103.682**	**112.687**
Tax	0	0	(51)	(92)	(59)	(67)	(69)	(59)	(63)	(68)
Tax rate	*0,0%*	*0,0%*	*0,2%*	*0,0%*	*0,0%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*
Income from associates (after tax)	0	0	0	0	0	0	0	0	0	0
Earnings from ordinary activities	1.827	28.634	21.283	193.400	373.034	110.915	114.671	98.310	103.619	112.619
Minority interest	0	0	0	0	0	0	0	0	0	0
Net earnings from ordinary activities	**1.827**	**28.634**	**21.283**	**193.400**	**373.034**	**110.915**	**114.671**	**98.310**	**103.619**	**112.619**
Extra-ordinary result after tax	0	0	0	0	0	0	0	0	0	0
Net earnings	1.827	28.634	21.283	193.400	373.034	110.915	114.671	98.310	103.619	112.619
Preferred dividend	0	0	0	0	0	0	0	0	0	0
Net attributable profit	1827	28634	21283	193400	373034	110915	114671	98310	103619	112619
Common dividend	0	0	0	0	0	0	0	0	0	0
Retained earnings	**1.827**	**28.634**	**21.283**	**193.400**	**373.034**	**110.915**	**114.671**	**98.310**	**103.619**	**112.619**
# common shares at end of year	*500.000,0*	*500.000*	*500.000*	*500.000*	*500.000*	*500.000,0*	*500.000,0*	*500.000,0*	*500.000,0*	*500.000,0*
Average common shares in issue	*224.477,6*	*246.877,8*	*271.377,6*	*271.765,1*	*276.990,1*	*500.000,0*	*500.000,0*	*500.000,0*	*500.000,0*	*500.000,0*
EPS excl. extra-ordinary results after GW amortisation	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*
EPS excl. extra-ordinary results before GW amortisation	*0*	*0*	*0*	*1*	*1*	*0*	*0*	*0*	*0*	*0*
Common dividend per share	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*
Common dividend pay-out ratio after GW amortisation	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*	*0,0*

Table 66: Golden Ocean income statement

4.39. Golden Ocean: Cash flow statement

Golden Ocean Grup Ltd USDt	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
EBIT	1.951	20.162	35.355	159.797	216.639	49.083	52.842	36.471	41.784	50.789
Depreciation and (goodwill) amortisation	215	17.333	24.612	23.038	18.544	4.840	4.168	1.721	2.515	3.861
Change in net deferred tax balance	[no]	0	0	0	0	0	0	0	0	0
Change provision for pensions	[no]	0	0	0	0	0	0	0	0	0
Change in other provisions and long-term liabilities	[no]	0	0	0	0	0	0	0	0	0
Change in net working capital	[no]	12.538	10.240	(283.783)	170.838	88.986	3.540	12.893	(4.184)	(7.092)
Exceptional items & extraordinary results	0	(1.802)	(5.875)	74.639	180.592	61.889	61.889	61.889	61.889	61.889
Income from associates	0	0	0	0	0	0	0	0	0	0
Minority interest	0	0	0	0	0	0	0	0	0	0
Tax	0	0	(51)	(92)	(59)	(67)	(69)	(59)	(63)	(68)
Cash flow from operating activities	**na**	**48.231**	**64.281**	**(26.401)**	**586.554**	**204.731**	**122.369**	**112.914**	**101.941**	**109.378**
Movement in fixed assets	[no]	(246.979)	(113.057)	(294.182)	(137.133)	38.807	2.368	4.277	(395)	(800)
Movement in other intangible assets	[no]	(12.311)	(14.467)	(7.570)	(7.109)	(34.253)	(940)	(3.422)	1.111	1.882
Goodwill incurred	[no]	0	0	0	0	0	0	0	0	0
Investments in fixed financial assets	[no]	(74.357)	(7.831)	7.280	52.321	0	0	0	0	0
Cash flow from investment activities	**na**	**(333.647)**	**(135.355)**	**(294.472)**	**(91.921)**	**4.555**	**1.428**	**855**	**715**	**1.083**
Net interest	(124)	10.274	(8.146)	(40.944)	(24.138)	10	10	10	10	10
Dividends declared	0	0	0	0	0	0	0	0	0	0
Change in dividends payable	[no]	0	0	0	0	0	0	0	0	0
Change in preferred share capital	[no]	0	0	0	0	0	0	0	0	0
Change in common share capital	[no]	2.220	2.470	39	522	0	0	0	0	0
Change in other equity reserves	[no]	12.257	19.290	16.805	(37.448)	0	0	0	0	0
Change in minority interests	[no]	0	0	0	0	0	0	0	0	0
Cash flow from financing activities	**na**	**24.751**	**13.614**	**(24.100)**	**(61.064)**	**10**	**10**	**10**	**10**	**10**
Change in interest-bearing debt	**na**	**260.665**	**57.460**	**344.973**	**(433.569)**	**(209.296)**	**(123.807)**	**(113.779)**	**(102.666)**	**(110.471)**

Table 67: Golden Ocean cash flow statement

4.40. Golden Ocean: Analysis of income statement

Analysis of income statement USDt	2004	2005	2006	2007	2008
Total revenues	4.853,0	95.811,0	270.327,0	708.035,0	947.503,0
growth	*na*	*1874,3%*	*182,1%*	*161,9%*	*33,8%*
COGS	(2.572,0)	(54.781,0)	(203.101,0)	(515.780,0)	(697.658,0)
Gross margin	**2.281,0**	**41.030,0**	**67.226,0**	**192.255,0**	**249.845,0**
Total operating costs	(115,0)	(3.535,0)	(7.259,0)	(9.420,0)	(14.662,0)
EBITDA	**2.166,0**	**37.495,0**	**59.967,0**	**182.835,0**	**235.183,0**
EBITDA (% of revenues)	***-44,6%***	***-39,1%***	***-22,2%***	***-25,8%***	***-24,8%***
Depreciation and (goodwill) amortisation	(215,0)	(17.333,0)	(24.612,0)	(23.038,0)	(18.544,0)
EBIT	**1.951,0**	**20.162,0**	**35.355,0**	**159.797,0**	**216.639,0**
EBIT (% of revenues)	***40,2%***	***21,0%***	***13,1%***	***22,6%***	***22,9%***
Add back depreciation and (goodwill) amortisation	215,0	17.333,0	24.612,0	23.038,0	18.544,0
Exceptional items	0,0	(1.802,0)	(5.875,0)	74.639,0	180.592,0
Adjustments	0,0	1.802,0	5.875,0	(74.639,0)	(180.592,0)
Adjusted exceptional items	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Extra-ordinary results after tax	0,0	0,0	0,0	0,0	0,0
Other adjustments	0,0	0,0	0,0	0,0	0,0
Adjusted extra-ordinary results after tax	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted change in other provisions and LT liabilities (see below)	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Sustaining investments in tangible and intangible fixed assets (see below)	**(215,0)**	**(17.333,0)**	**(24.612,0)**	**(23.038,0)**	**(18.544,0)**
Cash operating profit	**1.951,0**	**20.162,0**	**35.355,0**	**159.797,0**	**216.639,0**
Cash operating profit margin (% revenues)	**40,2%**	**21,0%**	**13,1%**	**22,6%**	**22,9%**

Table 68: Golden Ocean analysis of income statement

4.41. Golden Ocean: Analysis of balance sheet

Analysis of balance sheet (page 1)USDt	2004	2005	2006	2007	2008
Movement in tangible fixed assets	[no]	(246.979,0)	(113.057,0)	(294.182,0)	(137.133,0)
Movement in intangible fixed assets	[no]	(12.311,0)	(14.467,0)	(7.570,0)	(7.109,0)
Goodwill incurred	[no]	0,0	0,0	0,0	0,0
Total movement in operational fixed assets	**na**	**(259.290,0)**	**(127.524,0)**	**(301.752,0)**	**(144.242,0)**
PM: Depreciation of tangible fixed assets	*(212,0)*	*(5.022,0)*	*(10.145,0)*	*(15.468,0)*	*(11.435,0)*
Sustaining investments in tangible fixed assets	**(212,0)**	**(5.022,0)**	**(10.145,0)**	**(15.468,0)**	**(11.435,0)**
Implicit expansion investments in tangible fixed assets	**212,0**	**5.022,0**	**10.145,0**	**15.468,0**	**11.435,0**
Incremental tangible fixed assets / incremental sales	***na***	***-5,5%***	***-5,8%***	***-3,5%***	***-4,8%***
PM: Amortisation of intangible fixed assets	*(3,0)*	*(12.311,0)*	*(14.467,0)*	*(7.570,0)*	*(7.109,0)*
Sustaining investments in intangible fixed assets	**(3,0)**	**(12.311,0)**	**(14.467,0)**	**(7.570,0)**	**(7.109,0)**
Implicit expansion investments in intangible fixed assets	**3,0**	**12.311,0**	**14.467,0**	**7.570,0**	**7.109,0**
Incremental intangible fixed assets / incremental sales	***na***	***-13,5%***	***-8,3%***	***-1,7%***	***-3,0%***
Analysis of balance sheet (page 2) USDt	**2004**	**2005**	**2006**	**2007**	**2008**
Inventories	126,0	370,0	6.530,0	10.260,0	3.482,0
Accounts receivable	5.362,0	10.867,0	28.931,0	72.459,0	74.761,0
Other current assets	78,0	0,0	0,0	47.375,0	40.084,0
Cash and marketable securities	19.939,0	16.484,0	40.771,0	306.309,0	67.537,0
Accounts payable	(631,0)	(8.616,0)	(31.001,0)	(72.127,0)	(35.524,0)
Other current liabilities	(558,0)	(7.327,0)	(43.693,0)	(78.955,0)	(35.857,0)
Net working capital as in financial statements	**24.316,0**	**11.778,0**	**1.538,0**	**285.321,0**	**114.483,0**
Remove financing portion of cash and marketable securities	0,0	0,0	0,0	0,0	0,0
Other adjustments	0	0	0	0	0
Total adjustment to change in working capital	**0,0**	**0,0**	**0,0**	**0,0**	**0,0**
Adjusted net working capital	**24.316,0**	**11.778,0**	**1.538,0**	**285.321,0**	**114.483,0**
Total adjusted cash change in net working capital	**na**	**12.538,0**	**10.240,0**	**(283.783,0)**	**170.838,0**
Incremental net working capital / incremental sales	**na**	**-13,8%**	**-5,9%**	**64,8%**	**-71,3%**

Table 69: Golden Ocean analysis of balance sheet

4.42. Golden Ocean: Analysis of taxes

Analysis of taxes USDt	2004	2005	2006	2007	2008
Marginal tax rate	0,0%	0,0%	0,0%	0,0%	0,0%
Effective tax rate for financial statements					
Profit before tax (according to financial statements)	1.827,0	28.634,0	21.334,0	193.492,0	373.093,0
Add back non tax deductible goodwill amortisation	0,0	0,0	0,0	0,0	0,0
Add back net interest (according to financial statements)	124,0	(10.274,0)	8.146,0	40.944,0	24.138,0
	1.951,				
Total taxable income before net interest	**0**	**18.360,0**	**29.480,0**	**234.436,0**	**397.231,0**
Total Net interest (according to financial statements)	(124,0)	10.274,0	(8.146,0)	(40.944,0)	(24.138,0)
Taxes according financial statements	0,0	0,0	(51,0)	(92,0)	(59,0)
Tax shield on net interest expense (at marginal tax rate)	0,0	0,0	0,0	0,0	0,0
Effective taxes on taxable income before net interest	0,0	0,0	(51,0)	(92,0)	(59,0)
Effective tax rate on taxable income before net interest	0,0%	0,0%	0,2%	0,0%	0,0%
Cash tax rate calculation					
Total net interest	(124,0)	10.274,0	(8.146,0)	(40.944,0)	(24.138,0)
Income from associates (before tax)	0,0	0,0	0,0	0,0	0,0
Taxes according financial statements	0,0	0,0	(51,0)	(92,0)	(59,0)
Reverse tax shield on net interest expense (at marginal tax rate)	0,0	0,0	0,0	0,0	0,0
Reverse tax on income from associates (at effective tax rate)	0,0	0,0	0,0	0,0	0,0
Increase (decrease) in deferred tax liabilities	na	0,0	0,0	0,0	0,0
Other adjustments	0	0	0	0	0
Cash taxes	na	0,0	(51,0)	(92,0)	(59,0)
PM: Cash operating profit	1.951,0	20.162,0	35.355,0	159.797,0	216.639,0
Cash tax rate (% cash operating profit)	**na**	**0,0%**	**0,1%**	**0,1%**	**0,0%**

Table 70: Golden Ocean analysis of taxes

4.43. Golden Ocean: Financial drivers

Golden Ocean Grup Ltd USDt		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
P&L drivers											
Revenue growth		na	1874,3%	182,1%	161,9%	33,8%	Model	Model	Model	Model	Model
Gross margin	*(% of revenues)*	47,0%	42,8%	24,9%	27,2%	26,4%	26,1%	26,1%	26,1%	26,1%	26,1%
Total operating costs	*(% of revenues)*	(2,4%)	(3,7%)	(2,7%)	(1,3%)	(1,5%)	(2,3%)	(2,3%)	(2,3%)	(2,3%)	(2,3%)
Exceptional and extraordinary items (operational)	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in other provisions and long-term liabilities	*(% of revenues)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Sustaining investment in tangible assets	*(% of revenues)*	4,4%	5,2%	3,8%	2,2%	1,2%	1,0%	1,0%	1,0%	1,0%	1,0%
Sustaining investment in intangible assets	*(% of revenues)*	0,1%	12,8%	5,4%	1,1%	0,8%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash operating profit	*(% of revenues)*	**44,9%**	**28,4%**	**18,4%**	**25,2%**	**26,0%**	**27,5%**	**27,5%**	**27,5%**	**27,5%**	**27,5%**
Marginal tax rate		0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash tax rate		na	0,0%	0,1%	0,1%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%
Tax rate for financial statements		0,0%	0,0%	0,2%	0,0%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%
Preferred dividends	*(% of preferred share capital outstanding)*	0	0	0	0	0	0	0	0	0	0
Preferred interim dividends	*(% of preferred dividends declared)*	0	0	0	0	0	0	0	0	0	0
Common dividend pay-out ratio	*(% of net earnings from ordinary activities)*	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Common interim dividends	*(% of common dividends declared)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Interest on debt							3,93%	3,93%	3,93%	3,93%	3,93%
Interest on excess cash							1,50%	1,50%	1,50%	1,50%	1,50%
P&L ratios											
Gross margin	*(% of revenues)*	47%	43%	25%	27%	26%	37%	45%	71%	57%	46%
EBITDA margin	*(% of revenues)*	45%	39%	22%	26%	25%	34%	42%	69%	55%	44%
EBIT margin	*(% of revenues)*	40%	21%	13%	23%	23%	31%	39%	66%	51%	41%
Net earnings margin before XO	*(% of revenues)*	38%	30%	8%	27%	39%	71%	85%	177%	128%	90%
Net earnings margin	*(% of revenues)*	38%	30%	8%	27%	39%	71%	85%	177%	128%	90%
Balance sheet drivers AVERAGE (INPUT)											
Average inventory days	*(days of total revenue)*	9,5	1,4	8,8	5,3	1,3	4,2	4,2	4,2	4,2	4,2
Average accounts receivable days	*(days of total revenue)*	403,3	41,4	39,1	37,4	28,8	36,7	36,7	36,7	36,7	36,7
Average other current assets	*(% of total revenues)*	1,6%	0,0%	0,0%	6,7%	4,2%	2,7%	2,7%	2,7%	2,7%	2,7%
Operating cash	*(% of total revenues)*	410,9%	17,2%	15,1%	43,3%	7,1%	20,7%	20,7%	20,7%	20,7%	20,7%
Accounts payable days	*(days of total revenue)*	47,5	32,8	41,9	37,2	13,7	31,4	31,4	31,4	31,4	31,4
Other current liabilities	*(% of total revenues)*	11,5%	7,6%	16,2%	11,2%	3,8%	9,7%	9,7%	9,7%	9,7%	9,7%
Long-term debt - Current portion	*(% of total revenues)*	86,5%	62,8%	18,7%	32,1%	62,5%	44,0%	44,0%	44,0%	44,0%	44,0%
Total average operating working capital	*(% of total revenues)*	501,1%	12,3%	0,6%	40,3%	12,1%	16,3%	16,3%	16,3%	16,3%	16,3%
Cash flow drivers											
Expansion capex (excluding acquisition goodwill)	*(% of incremental revenues)*	na	(5,5%)	(5,8%)	(3,5%)	(4,8%)	(4,7%)	(4,7%)	(4,7%)	(4,7%)	(4,7%)
Incremental intangible assets	*(% of incremental revenues)*	na	(13,5%)	(8,3%)	(1,7%)	(3,0%)	(4,3%)	(4,3%)	(4,3%)	(4,3%)	(4,3%)
Depreciation	*(% of total revenues)*	(4,4%)	(5,2%)	(3,8%)	(2,2%)	(1,2%)	(3,1%)	(3,1%)	(3,1%)	(3,1%)	(3,1%)

Table 71: Golden Ocean financial drivers

4.44. Golden Ocean: Discounting Free Cash Flows

Golden Ocean Grup Ltd USDt	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Terminal
Revenues	4.853	95.811	270.327	708.035	947.503	156.323	134.619	55.571	81.223	124.706	125.606
EBIT	1.951	20.162	35.355	159.797	216.639	49.083	52.842	36.471	41.784	50.789	51.155
Goodwill amortisation	0	0	0	0	0	0	0	0	0	0	0
Depreciation	212	5.022	10.145	15.468	11.435	4.840	4.168	1.721	2.515	3.861	3.889
Amortisation of other intangible assets	3	12.311	14.467	7.570	7.109	0	0	0	0	0	0
Sustaining investments in tangible assets	(212)	(5.022)	(10.145)	(15.468)	(11.435)	(1.563)	(1.346)	(556)	(812)	(1.247)	(1.256)
Sustaining investments in intangible fixed assets	(3)	(12.311)	(14.467)	(7.570)	(7.109)	0	0	0	0	0	0
Exceptional items & extra-ordinary results after-tax (operating)	0	0	0	0	0	0	0	0	0	0	0
Increase (decrease) in other provisions & long-term liabilities	0	0	0	0	0	0	0	0	0	0	0
Cash operating profit (CBIT)	**1.951**	**20.162**	**35.355**	**159.797**	**216.639**	**52.360**	**55.664**	**37.636**	**43.487**	**53.403**	**53.789**
Cash taxes	na	0	(51)	(92)	(59)	(30)	(32)	(22)	(25)	(31)	(13.447)
Cash flow before new investment (CBNI)	**na**	**20.162**	**35.304**	**159.705**	**216.580**	**52.330**	**55.632**	**37.615**	**43.462**	**53.372**	**40.341**
Expansion capex (including acquisitions and divestments)	212	5.022	10.145	15.468	11.435	37.244	1.022	3.721	(1.208)	(2.047)	(8.574)
Expansion investments other intangible assets	3	12.311	14.467	7.570	7.109	(34.253)	(940)	(3.422)	1.111	1.882	7.885
Working capital investment	na	12.538	10.240	(283.783)	170.838	88.986	3.540	12.893	(4.184)	(7.092)	(29.708)
Total new investments	**na**	**29.871**	**34.852**	**(260.745)**	**189.382**	**91.978**	**3.622**	**13.192**	**(4.281)**	**(7.257)**	**(30.397)**
Free cash flow	**na**	**50.033**	**70.156**	**(101.040)**	**405.962**	**144.308**	**59.254**	**50.807**	**39.181**	**46.116**	**9.945**
Date of relevant cash flow						2009	2010	2011	2012	2013	Terminal
FCF subject to discounting						144.308	59.254	50.807	39.181	46.116	759.918
Cost of capital (WACC)						5,3%	5,3%	5,3%	5,3%	5,3%	5,3%
Discount factor						0,97	0,92	0,88	0,83	0,79	0,79
PV of FCF						140.315	54.710	44.546	32.621	36.459	600.792

Table 72: Golden Ocean discounting free cash flow

4.45. Golden Ocean: Calculating share price

Shareholder value (in USDt except per share items)	
Value of operations	909.443
Market value of excess cash & securities	0
Market value of financial fixed assets	22.587
Corporate value	932.030
Market value of interest-bearing debt	(760.034)
Market value unfunded pension and other liabilities	0
Market value of minority interest	0
Market value of preferred equity	0
Common shareholder value (Entreprise value)	171.996
Shares outstanding	500.000
Common shareholder value per share	0,34

Table 73: Golden Ocean calculating share price

5. Mean Path of Index Simulations

5.1. Index: Capesize

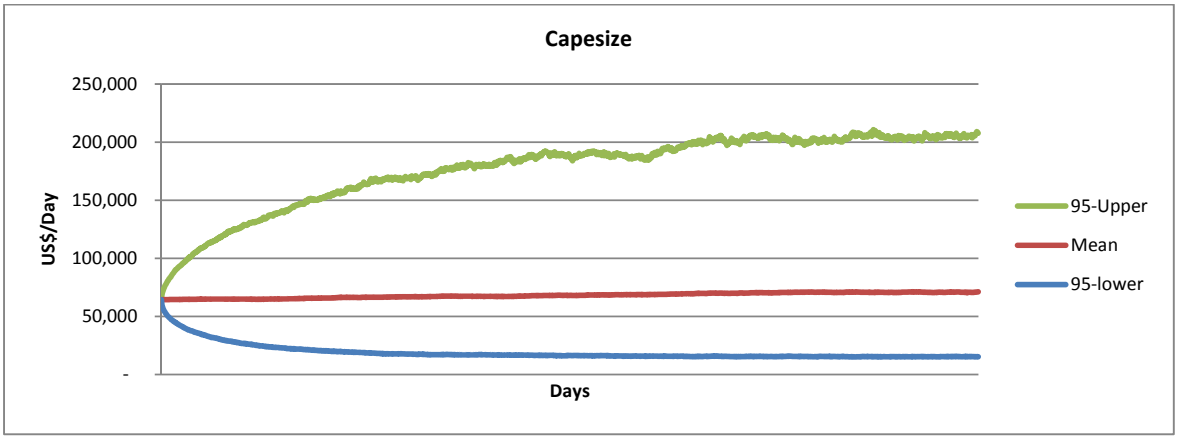


Figure 44 Capesize mean path with 95 upper/lower boundaries

	Capesize
k (speed of mean reversion)	0,00070
θ (long-term mean)	73.745
Start value	64.320

Table 74: Capesize O-U parameters

5.2. Index: Handysize

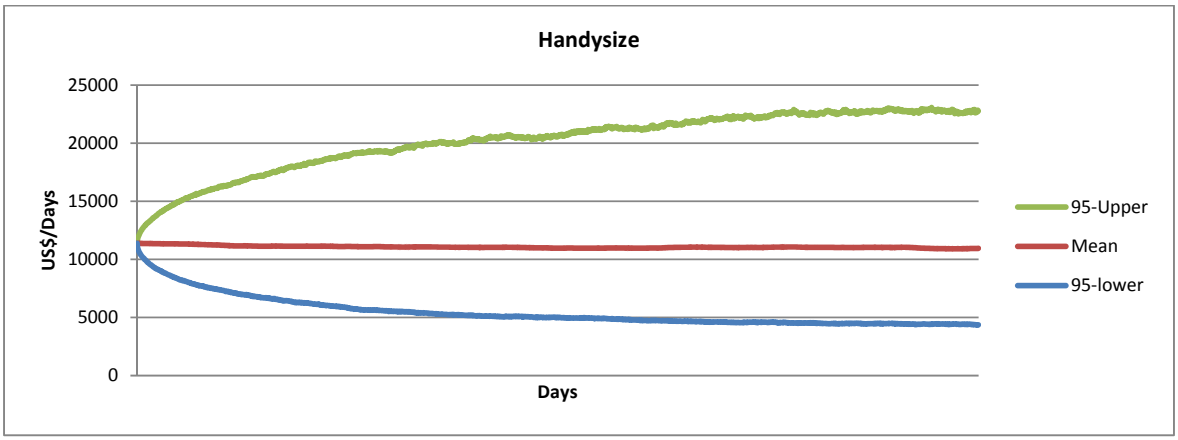


Figure 45 Handysize mean path with 95 upper/lower boundaries

	Handysize
k (speed of mean reversion)	0,00057
θ (long-term mean)	10662,6
Start value	11373

Table 75: Handysize O-U parameters

5.3. Index: LR1

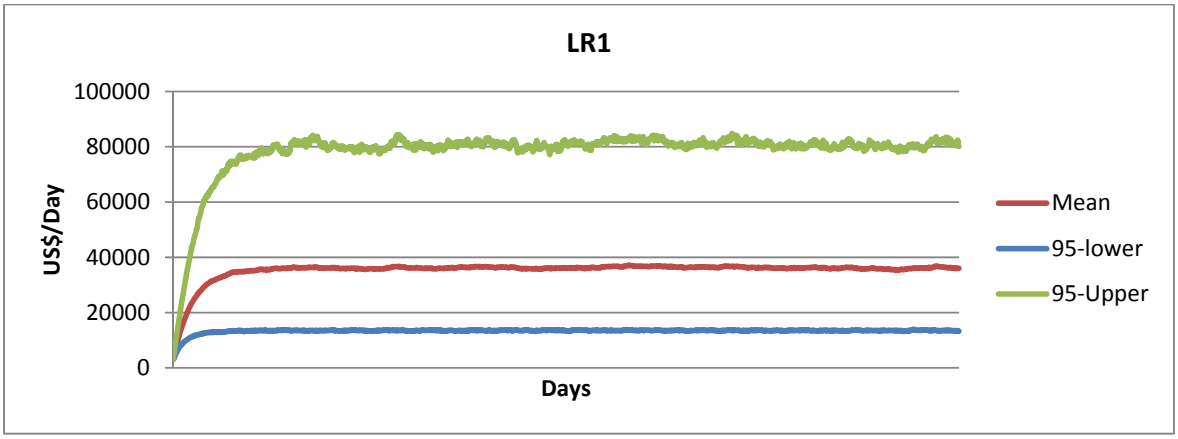


Figure 46 LR1 mean path with 95 upper/lower boundaries

	LR1
k (speed of mean reversal)	0,022246
θ (long-term mean)	36136,57
Start value	3116,24

Table 76: LR1 O-U parameters

5.4. Index: LR2

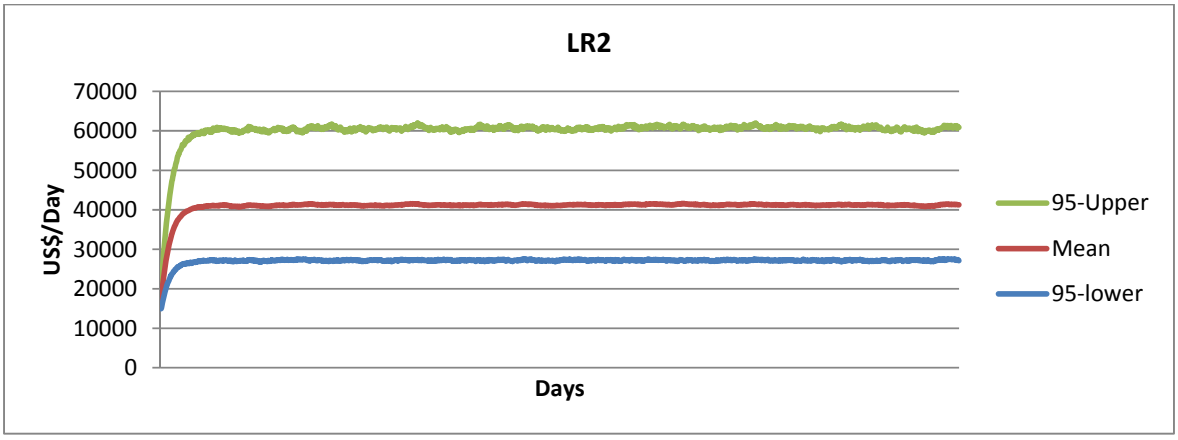


Figure 47 LR2 mean path with 95 upper/lower boundaries

	LR2
k (speed of mean reversion)	0,047018
θ (long-term mean)	41218,14
Start value	15645,01

Table 77: LR2 O-U parameters

5.5. Index: MR

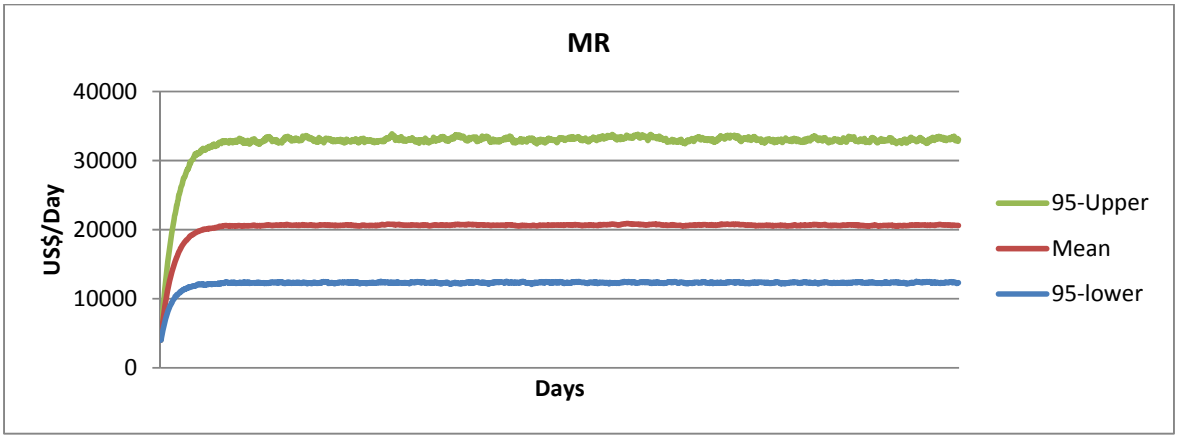


Figure 48 MR mean path with 95 upper/lower boundaries

	MR
k (speed of mean reversion)	0,034674
θ (long-term mean)	20648,38
Start value	3562,24

Table 78: MR O-U parameters

5.6. Index: Panamax

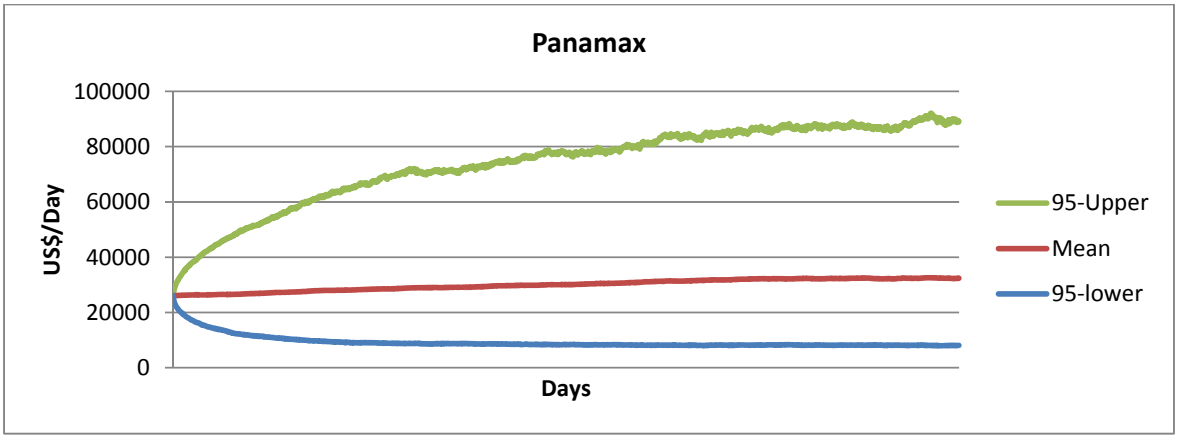


Figure 49 Panamax mean path with 95 upper/lower boundaries

	Panamax
k (speed of mean reversion)	0,00084
θ (long-term mean)	33790,14
Start value	26050

Table 79: Panamax O-U parameters

5.7. Index: Supramax

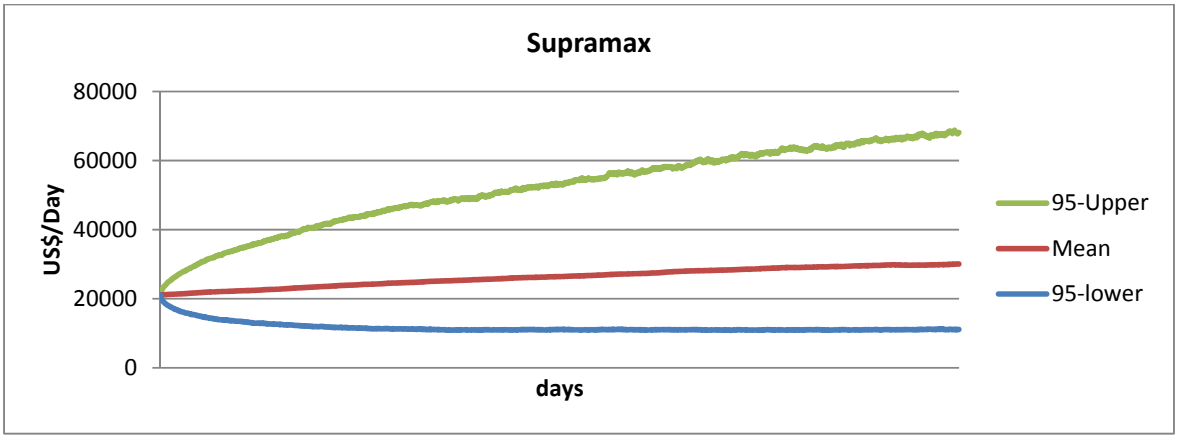


Figure 50 Supramax mean path with 95 upper/lower boundaries

	Supramax
k (speed of mean reversion)	0,0006
θ (long-term mean)	34390,19
Start value	21084

Table 80: Supramax O-U parameters

5.8. Index: VLCC

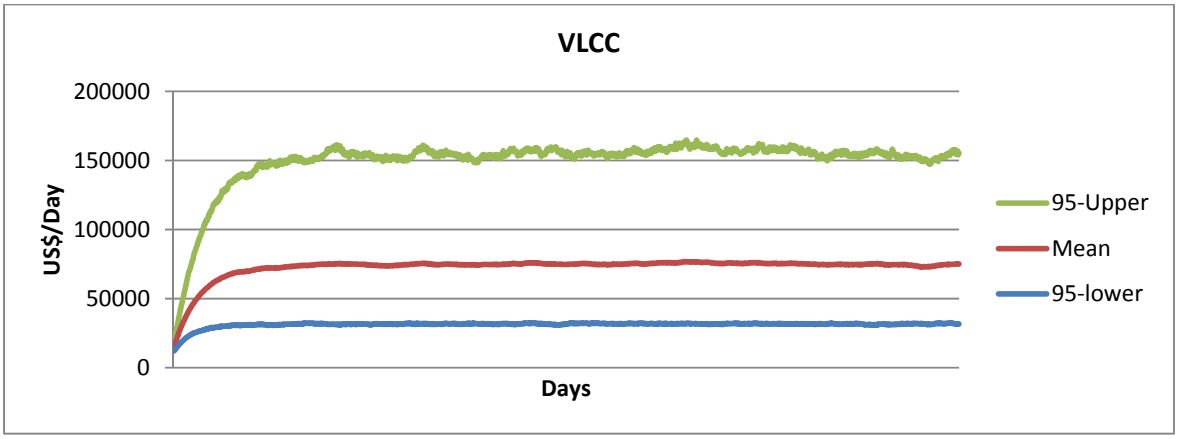


Figure 51 VLCC mean path with 95 upper/lower boundaries

	VLCC
k (speed of mean reversion)	0,016811
θ (long-term mean)	74712,9
Start value	13050,55

Table 81: VLCC O-U parameters

6. Fleet Portfolios. Fixed vs. Exposed

6.1. NORDEN

Total Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	4,2	35,7	30,1	12,0	20,2	2,3	0,0	0,0
2010	8,7	14,4	34,3	20,1	25,2	1,0	0,0	0,0
2011	14,0	14,2	35,9	27,2	23,3	1,0	0,0	0,0
2012	14,0	14,2	35,9	27,2	23,3	1,0	0,0	0,0
2013	14,0	14,2	35,9	27,2	23,3	1,0	0,0	0,0

Exposed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,5	7,2	2,0	7,8	12,4	2,3	0,0	0,0
2010	3,1	1,5	24,1	18,8	18,6	1,0	0,0	0,0
2011	8,0	8,5	31,0	26,2	20,4	1,0	0,0	0,0
2012	8,0	8,5	31,0	26,2	20,4	1,0	0,0	0,0
2013	8,0	8,5	31,0	26,2	20,4	1,0	0,0	0,0

Fixed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	3,7	28,6	28,0	4,2	7,8	0,0	0,0	0,0
2010	5,6	12,9	10,2	1,3	6,6	0,0	0,0	0,0
2011	6,0	5,7	4,9	1,0	2,9	0,0	0,0	0,0
2012	6,0	5,7	4,9	1,0	2,9	0,0	0,0	0,0
2013	6,0	5,7	4,9	1,0	2,9	0,0	0,0	0,0

Table 82: NORDEN fleet portfolio composition. Source: NORDEN annual report 2008 and own making

6.2. Frontline

Total Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	8,0	0,0	0,0	0,0	0,0	0,0	33,0	42,0
2010	8,0	0,0	0,0	0,0	0,0	0,0	35,0	42,5
2011	8,0	0,0	0,0	0,0	0,0	0,0	37,0	40,0
2012	8,0	0,0	0,0	0,0	0,0	0,0	36,0	42,0
2013	8,0	0,0	0,0	0,0	0,0	0,0	36,0	41,0

Exposed Fleet

	Capesize*	Panamax	Supramax	Handysize	MR**	LR1	LR2	VLCC
2009	8,0	0,0	0,0	0,0	0,0	0,0	33,0	42,0
2010	8,0	0,0	0,0	0,0	0,0	0,0	35,0	42,5
2011	8,0	0,0	0,0	0,0	0,0	0,0	37,0	40,0
2012	8,0	0,0	0,0	0,0	0,0	0,0	36,0	42,0
2013	8,0	0,0	0,0	0,0	0,0	0,0	36,0	41,0

Fixed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2010	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2012	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Table 83: Frontline fleet portfolio composition. Source: Frontline annual report 2008 and own making

6.3. Golden Ocean

Total Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	4,0	6,0	0,0	0,0	0,0	0,0	0,0	0,0
2010	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2012	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0

Exposed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	4,0	6,0	0,0	0,0	0,0	0,0	0,0	0,0
2010	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2012	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	4,0	8,0	0,0	0,0	0,0	0,0	0,0	0,0

Fixed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2010	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2012	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Table 84: Golden Ocean fleet portfolio composition. Source: Golden Ocean annual report 2008 and own making

6.4. OSG

Total Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2010	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2011	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2012	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2013	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5

Exposed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2010	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2011	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2012	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5
2013	0,0	12,0	0,0	51,0	7,0	11,0	20,5	19,5

Fixed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2010	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2011	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2012	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Table 85: OSG fleet portfolio composition. Source: OSG annual report 2008 and own making

6.5. TORM

Total Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	13,7	0,0	0,0	46,1	17,8	13,0	0,0
2010	0,0	17,0	0,0	0,0	58,8	21,3	15,0	0,0
2011	0,0	20,4	0,0	0,0	60,0	18,9	12,5	0,0
2012	0,0	20,4	0,0	0,0	60,0	18,9	12,5	0,0
2013	0,0	20,4	0,0	0,0	60,0	18,9	12,5	0,0

Exposed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,00	11,38	0,00	0,00	25,19	9,22	10,02	0,00
2010	0,00	16,79	0,00	0,00	46,91	18,00	13,56	0,00
2011	0,00	20,42	0,00	0,00	58,24	16,93	11,62	0,00
2012	0,00	20,42	0,00	0,00	60,00	18,93	12,50	0,00
2013	0,00	20,42	0,00	0,00	60,00	18,93	12,50	0,00

Fixed Fleet

	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0,0	2,4	0,0	0,0	20,9	8,5	3,0	0,0
2010	0,0	0,2	0,0	0,0	11,9	3,3	1,4	0,0
2011	0,0	0,0	0,0	0,0	1,8	2,0	0,9	0,0
2012	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2013	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Table 86: TORM fleet portfolio composition. Source: TORM annual report 2008 and own making

7. Fixed T/C Rates

7.1. NORDEN

NORDEN Fixed T/C Rates

Revenue per day	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	52.673	39.785	25.483	17.730	19.500	7.711	0	0
2010	37.288	29.340	31.641	20.098	19.500	0	0	0
2011	36.184	28.925	28.177	20.739	19.500	0	0	0
2012	36.184	28.925	28.177	20.739	19.500	0	0	0
2013	36.184	28.925	28.177	20.739	19.500	0	0	0
Long Term Mean	73.745	33.790	34.390	10.663	20.648	36.137	41.218	74.713

Table 87: NORDEN fixed T/C rates. Source: NORDEN annual report 2008

7.2. TORM

TORM Fixed T/C Rates

Revenue per day	Capesize	Panamax	Supramax	Handysize	MR	LR1	LR2	VLCC
2009	0	15.170	0	0	20.269	23.943	30.947	0
2010	0	15.211	0	0	20.672	19.981	31.905	0
2011	0	0	0	0	21.163	18.598	32.817	0
2012	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0
Long Term Mean	73.745	33.790	34.390	10.663	20.648	36.137	41.218	74.713

Table 88: TORM fixed T/C rates. Source: TORM annual report 2008