



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

A Theoretical and Empirical Study of how Capital Structure influences the Performance and Enterprise Value

- A study of the Norwegian shipping industry

**FEG313 Bachelor Thesis, Business Administration, Accounting and
Finance**

A quantitative/descriptive study

Spring 2013

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Gothenburg School of Business, Economics and Law

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Abstract

This paper ought to give an introduction on the subject of capital structure and further ascertain how well Miller and Modigliani's theorems, the tradeoff theory and the owner structure can explain the performance for the 21 listed Norwegian shipping companies. Our empirical findings suggest that our selection of companies show tendencies of following the tradeoff theory and that there is a preferred capital structure. We further observed that the capital structure have minor influence on the performance at moderate level of debt. Additionally, it was concluded that companies tend to adapt their solvency ratio depending on their earnings volatility (EBIT).

Keywords; *Capital Structure, Performance, Norwegian Shipping Industry, Modigliani Miller, Tradeoff theory, Principal agency theory*

TABLE OF CONTENT

1	INTRODUCTION.....	1
1.1	BACKGROUND	1
1.2	PURPOSE AND PROBLEM STATEMENT	2
1.2.1	<i>Main Problem</i>	2
1.2.2	<i>Sub Problems</i>	2
1.3	DELIMITATIONS.....	2
2	THEORETICAL FRAMEWORK.....	3
2.1	MODIGLIANI AND MILLER	3
2.1.1	<i>Proposition I</i>	3
2.1.2	<i>Proposition II</i>	4
2.1.3	<i>The Pizza Analogy</i>	4
2.2	THE TRADEOFF THEORY	5
2.3	OTHER RELEVANT THEORIES	6
2.3.1	<i>The Pecking Order Theories</i>	6
2.3.2	<i>Principal Agent Theory and Owner Structure</i>	6
3	METHODOLOGY	8
3.1	TYPE OF RESEARCH DESIGN	8
3.2	DEFINITION OF ACCOUNTING MEASURES	9
3.2.1	<i>Capital Structure Measure</i>	9
3.2.2	<i>Performance Measures</i>	9
3.3	RESEARCH DESIGN	9
3.3.1	<i>Testing how Solvency effects Enterprise Value</i>	10
3.3.2	<i>Hypothesis</i>	11
3.3.3	<i>Testing Solvency against Earnings Volatility</i>	11
3.3.4	<i>Proposition II and the Tradeoff Theory</i>	12
3.3.5	<i>Top-5 performing companies</i>	13
3.3.6	<i>Additional Research Errors</i>	13
4	EMPIRICAL FINDINGS AND ANALYSIS	15
4.1	ENTERPRISE VALUE, EBIT AND SOLVENCY – MILLER AND MODIGLIANI PROPOSITION I.....	15
4.1.1	<i>Testing how Solvency effects Enterprise Value</i>	15
4.1.2	<i>Testing how Earnings Volatility effects Solvency</i>	16
4.2	RETURN ON EQUITY AGAINST EQUITY-TO-ASSETS	16

4.2.1	Year 2005	16
4.2.2	Year 2006	17
4.2.3	Year 2007	17
4.2.4	Year 2008	18
4.2.5	Year 2009	18
4.2.6	Year 2010	19
4.2.7	Year 2011	20
4.2.8	Further Analysis.....	20
4.3	THE TOP PERFORMING COMPANIES	23
4.3.1	Ownership Structure	24
5	SUMMARY AND CONCLUSION.....	26
6	IMPLICATIONS FOR FUTURE RESEARCH	27
6.1	ACCOUNTING PRINCIPLES	27
6.2	OPERATIVE QUESTIONS	28
6.3	ACCESS TO FINANCIAL MARKETS	29
6.4	EXTEND THE SAMPLE	29
6.5	SINGLE CASE STUDY.....	30
7	REFERENCES.....	31
7.1	BOOKS	33
APPENDIX.....		A1
	EXCHANGE RATES NOK/USD	A1
	WEIGHTED AVERAGES	A1
	ALL COMPANIES	A2

1 Introduction

1.1 Background

JP Morgan, McKinsey, McDonalds and Statoil they all have completely different business models, but with one strong denominator, they all have assets in their balance sheet. A company generally has two ways of financing their assets; either with Stockholders' equity or/and with debt (Myers, 2001). The combination of debt and equity a company chooses to finance its assets with is referred to as *the capital structure*.

The choice of capital structure has interested a number of researchers over the years and it has been one of the most broadly researched areas within corporate finance.¹ Yet, there is no clear consensus among the researchers regarding the existence of an optimal capital structure or how it affects the company in terms of performance and enterprise value [(Harris and Raviv, 1991) (Titman et al, 2001)].

Gronhaug and Dreyer (2004) published a paper where they examined different strategic aspects to see how they affected the performance of Norwegian fish processing plants. The strategic aspects were defined as factors of uncertainty² as well as types of flexibility³. The study concluded that financial flexibility was the most important factor when explaining the performance of the plants, where a higher degree of financial flexibility⁴ resulted in better performance. Additionally, Gamba and Traintis (2008) suggests that companies with high levels of financial flexibility should be traded with a premium compared to their less flexible peers. Moreover, a study performed by Hagberg (2010) examined the correlation between financial flexibility and performance in the Swedish shipping industry and concluded that performance decreases as leverage increases.



Figure 1. The bar chart shows the equity-to-assets ratio for all the listed Norwegian shipping companies, for year 2005. Blue denotes equity.

Furthermore, we were presented an abstract of the capital structure among the listed European shipping companies. The abstract made it clear that an extensive variation in capital structure existed among the companies, which are shown in the bar chart to the left. This seems to some extent be consistent with the findings made by Miller and Modigliani (1958). Their first paper concluded that if there is a perfect market the company's value should be independent of the capital structure. An interpretation of their theorem is that no specific capital structure should be favored, and the debt-equity ratio should therefore, as the diagram illustrates, vary substantially.

Moreover, according to a paper by KPMG (2012) the shipping industry is one of the most capital-intensive sectors as well as it is sensitive to the state of the economy. The shipping industry is also characterized by a low

¹ The search word "capital structure" returned a number of articles on google scholar and the three most popular ones was cited roughly 9000 times.

² Raw materials, product volume, product mix, gross margins and profitability.

³ Volume, labour, product and financial flexibility

⁴ "Financial flexibility represents the ability of a firm to access and restructure its financing at a low cost" (Gamba & Traintis, 2008:2263)

transparency, which in combination with the highly cyclical nature of the industry is a bad combination for attracting capital. Hence, the capital structure and supply of financing is a crucial subject for the majority of the shipping companies. Stopford⁵ further concludes:

“Shipping is one of the world’s most capital intensive industries... Capital payments dominate shipping companies’ cash flow and decision about financial strategy are among the most important that their executives have to make.” (Stopford, 1997 s 194)

It is widely known that Modigliani and Miller’s theory rests upon several strong assumptions and should only be looked at as a benchmark. For instance, Jensen and Meckling (1976) problematize the relationship between the ownership and control and its impact on company performance and capital structure. In addition, Taro Lennerfors (2009) has mapped the Swedish shipping industry between 1980 and 2000 and came to the conclusion that the only two companies still in business were family owned. Thus, looking at internal factors such as ownership structure has also been done to give a broader understanding of what constitutes a good performing company within the Norwegian shipping industry.

1.2 Purpose and Problem Statement

The purpose of this thesis is to give a descriptive overview on how the capital structure looks within the Norwegian shipping industry between 2005 and 2011 and if it has an explanatory power on the companies’ performance. It further seeks to give an overview of the main theories of the capital structure and how well they are applicable on the listed Norwegian shipping companies.

1.2.1 Main Problem

Can the existing capital structure theories help to explain the performance of the examined companies?

1.2.2 Sub Problems

Can the performance and capital structure of the listed Norwegian shipping companies be explained by:

- The Miller and Modigliani theorems
- The Tradeoff theory
- The Principal agent theory

1.3 Delimitations

In this thesis we have chosen to only examine the listed Norwegian shipping companies between 2005 and 2011. A further limitation is the use of financial figures where we have decided to only look upon the following five figures: *Net income, EBIT*, Equity, Total Assets and Enterprise value*. The theoretical framework has been limited to four of the most accepted theories within the area of capital structure. Performance has been defined as Enterprise Value and Return on Equity. It was also decided not to distinguish the market and book value of debt and equity.

⁵ . Martin Stopford is the author of Maritime Economics and is according to Lloyds list one of the most influential people within the shipping industry

2 Theoretical Framework

In this section we will present a thorough background for the chosen capital structure principles our thesis is based upon. Our theoretical framework consists of the *Modigliani and Miller theorems*, the *tradeoff theory*, *pecking order theory* and the *principal agent theory*.

2.1 Modigliani and Miller

The *Irrelevance theorem* (M. Miller and F. Modigliani, 1958) has come to be one of the most cited papers within the area of capital structure.⁶ Their findings have constituted a reference point from which most researchers within the area start from when making new studies. Their main findings concern how the capital structure is influencing the company's performance.⁷ If the crucial conditions of a perfect capital market is fulfilled Modigliani and Miller (1958) argue that the capital structure is irrelevant both for the value of the firm (proposition I) and for the weighted average cost of capital (proposition II). They later published a new revised version of their irrelevance theorem called "*A Correction*" (1963) which incorporates taxes. Moreover, in 1966 they managed to find empirical support for their theory by examining the electrical utility sector.

2.1.1 Proposition I

The first proposition of Modigliani and Miller's study is as follows:

"...the average cost of capital to any firm is completely independent of its capital structure and equal to the capitalization rate of the pure equity stream of its class" (Modigliani & Miller, 1958, p. 268-268)

Proposition I rests upon the assumption that a *perfect capital market* exists which implies that no taxes, transactions or issuance costs are present and that investors and firms can trade under the same conditions (Siegel et. al. 2000:326). When the condition of a perfect capital market is fulfilled Modigliani and Miller claims that the capital structure has no explanatory power when it comes to the enterprise value. The logic behind their conclusion is mainly to be found in the law of one price, which states that two similar assets must be traded at the same price in a perfect market. Looking at two similar companies with same prospects but different leverage, one might intuitively think that the levered company would gain a higher enterprise value, as a consequence of the higher return on equity. This assumption would be correct if investors were not allowed to replicate the leverage on their own with a so-called *homemade leverage*.⁸ Under perfect market conditions the intelligent investor would detect the arbitrage opportunity and exploit the price differential between the levered and unlevered firm. For instance, suppose there are two theoretically identical⁹ firms but with a different capital structure. It is known that according to Modigliani and Miller (1958) both firms, if they were unlevered, would have had exactly the same return on equity. Increasing one firm's leverage would thus give that firm a higher return on equity due to the leverage effect.¹⁰ Let us

⁶http://scholar.google.se/scholar?q=miller+modigliani+1958&hl=sv&as_sdt=0&as_vis=1&oi=scholart&sa=X&ei=N4qTUYy9Osjtgbvi4CoDQ&ved=0CCoQgQMwAA cited 11405

⁷ Performance is defined as enterprise value

⁸ Assumes that the interest rate on debt is the same for investors and companies, which implies that the investor can replicate the leverage of another company.

⁹ Firms that have the same expected cash flows as well as the same level of total assets.

¹⁰ Presumes that the company makes profit and a cost of debt is lower than the return.

hypothetically assume a violation of the law of one price so that the unlevered company trades at a value below the levered company. The smart investor will shortly realize this mispricing and buy the unlevered firm and borrow in his own account in order to replicate the leverage of the levered company. Other investors will keep doing so until this arbitrage is exploited and the value of the two firms equals each other's.

2.1.2 Proposition II

Modigliani and Miller (1958) outline in their second proposition that the weighted average cost of capital (WACC) should be constant and remain independent of the capital structure. Modigliani and Miller argue that the WACC therefore always should equal the required return on equity of the unlevered firm. As the debt holders have a prior claim in its assets and earnings in a company, it is implied that the cost of debt always has to be lower than the cost of equity (Myers, 2001). The lower cost of debt relative to equity is a central condition when explaining the WACC and its independence of capital structure. When a firm starts issuing debt, a larger proportion of its total assets compose of the cheaper debt and the WACC should therefore get lower. However, the larger amount of debt increases the risk of the firm causing investors to raise their required rate of return. The increase in cost of equity as an effect of the higher risk precisely neutralizes the lower cost of debt. The following equations explain this relation:

$$(1) R_E = R_{WACC} + (R_{WACC} - R_D) \frac{D}{E} \qquad (2) R_{WACC} = R_D \frac{D}{D+E} + R_E \frac{E}{D+E}$$

Equation (1) states that without leverage R_E should equal R_{WACC} . An increased debt-to-equity ratio, all else equal, results in a higher required rate of return on equity as the investor faces higher risk. The price of equity will, according to Modigliani and Miller (1958) equation (2), rise at the same level as the firm issues debt, holding the WACC constant as illustrated in the example below:

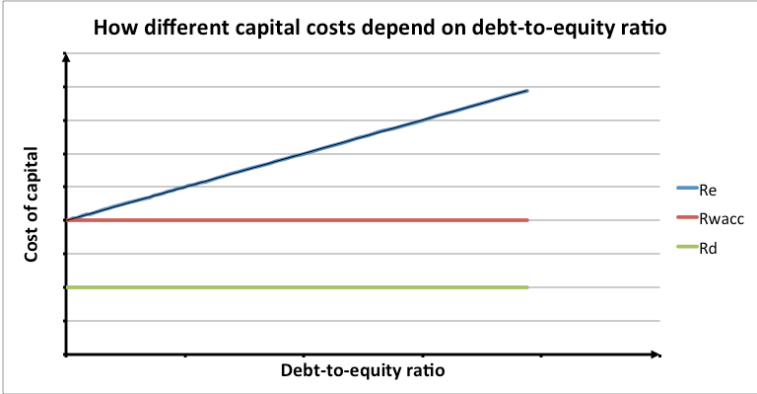


Figure 2. Graphic illustration of equation 2.

2.1.3 The Pizza Analogy

To sum up the Modigliani and Miller theorems, a pizza analogy could be useful to explain and simplify their irrelevance theory. Most people would agree that the value of a pizza should be independent of whether it is sliced or not. People who wanted to buy less than a whole pizza could go together and buy a whole pizza if it was more expensive than buying it slice by slice. This is the essence of the irrelevance theorem, which outlines that the value of a firm should be independent of its mix of debt and equity. The statement holds true if there is a perfect market (ibid). In reality

though, people could be willing to pay a higher price for slices than an equivalent whole, as it could be problematical and time consuming to find other people who wants to split a pizza (R. Coase, 1960). This implicates that there could be imperfections in the market that Modigliani and Miller theorems fail to account for in their framework implying that financing in fact do matter. This assumption has constituted the framework in the development of *The Tradeoff Theory and The Pecking Order theory*.

2.2 The Tradeoff Theory

Modigliani and Miller (1963) describe the relation between financial leverage and the value of the firm and concluded that under taxes higher leverage will generate a higher enterprise value due to the tax shield.¹¹ The value of the firm increases linearly as the debt to equity ratio increases which is an effect of the deductible interest payments (Modigliani and Miller, 1958). This is shown in by the following equation: $V_L = V_U + PV(\tau, r, D)$ ¹². The presented statement outlines that the more debt the company issues the higher the value of the firm, insinuating that all firms should maximize their use of debt. It is well known though, that the theorems of Modigliani and Miller have a number of simplifications and shortcomings. Not accounting for bankruptcy costs as made above is one of them (Ibid).

The tradeoff theory starts up with the assumptions of the Modigliani and Miller theorem with taxes but do incorporate the cost of financial distress and bankruptcy. When a firm starts taking on more debt its tax shield increases but it also gain a higher risk of bankruptcy as the firm becomes more sensitive to losses. The tradeoff theory predicts that the bankruptcy costs pushes firm to use less leverage whereas agency costs¹³ of free cash flows and tax advantages encourage firms to use more (Fama and French, 2000). The theory further states that firms with lower and more volatile earnings have higher expected bankruptcy costs and less use of a tax shield, which pushes firms with lower profitability to use a higher degree of equity (Myers, 1977, Leary and Roberts, 2005). Myers (1984) also claims that firms with tangible assets tend to take on more debt than firms with intangible assets. Corporate and personal taxes are also influencing the optimal capital structure of a firm. The deductibility of corporate interest payments favors the use of leverage while higher personal tax rates on debt, relative to equity, makes firms use less (Miller, 1977).

Additionally, the tradeoff theory also predicts that the value of a levered firm should equal the value of an unlevered firm plus the net costs and profits of the leverage (Howe and Jain, 2010). This rules out the essence of the tradeoff theory; that firms maximize their enterprise value when the marginal value of the tax shield is equal to the marginal cost of the financial distress (Myers, 1984). The tradeoff theory is, in contrast to Modigliani and Miller's irrelevance theorem (1958), said to advocate the belief of an optimal capital structure, which are showed in figure 2 and 3.

¹¹ The deductions that result in a reduction of income tax payments. The tax shield is calculated by multiplying the deduction by the tax rate itself (Siegel et al. p.438)

¹² The present value (PV) of the interest payments is a function of the value of debt, the interest rate and marginal tax rate.

¹³ Managers tend to allocate the excessive cash to less useful activities.

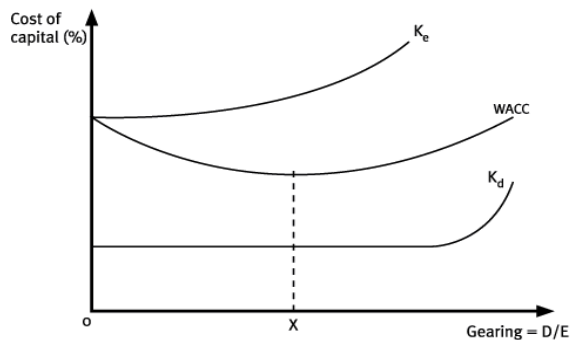


Figure 3. The chart plots the relationship between the WACC, cost of equity (K_e) and cost of debt (K_d). (Watson and Head, 2013 p. 298)

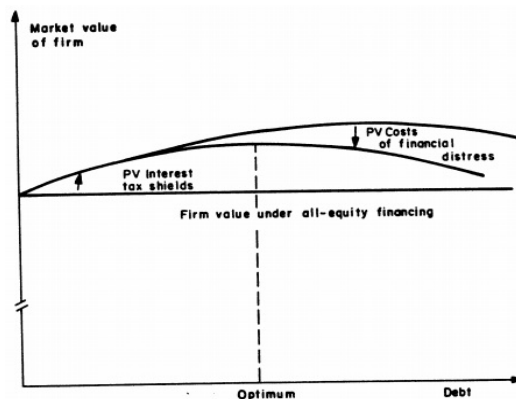


Figure 4. It shows how debt influences the market value. (Myers, 1984)

The charts above show that it exists a point (X) where the WACC is minimized. According to the tradeoff theory this point denotes the optimal capital structure, hence the value of the firm will be maximized at this particular debt-to-equity level. The cost of debt is initially flat because the debt holders ultimately care about the bankruptcy risk. Only when the debt reaches substantial levels the risk of bankruptcy becomes evident. Thus, debt holders will only then require a higher interest rate as a compensation for the higher risk they are facing (Myers, 2001). Shareholders' on the other hand have a residual claim of the earnings and as a consequence the cost of equity will therefore rise as soon as the firm takes on debt (ibid). In short, the tradeoff theory stipulates that it is possible to maximize the value of the firm by changing its capital structure so that the WACC is minimized.

In addition, the tradeoff could be divided into two different sub-theories; static and dynamic theory. The dynamic tradeoff theory predicts that firms actively will make changes to maintain a debt-to-equity ratio close to the target (Hovakimian and Titman, S 2002) whereas the static tradeoff theory states that firms sets a debt-to-equity target and passively will be moving towards it (Myers, 1984).

2.3 Other relevant Theories

2.3.1 The Pecking Order Theories

The pecking-order theory tries to explain, from an information asymmetry perspective, why corporate management chooses to finance their assets with one source of finance above another. The different sources are; *retained earnings*, *dividends*, *debt* and *equity*. The latter two are external¹⁴ sources while the others are internal¹⁵. The theory further states that the corporate management prefers to fund their investments with internally generated funds instead of externally generated. The essence of the pecking order theory outlines that, in contrast to the tradeoff theory, that profitable companies should have a high solvency whereas less profitable firms should have lower (Myers, 1984).

2.3.2 Principal Agent Theory and Owner Structure

The basics of the principal agent theory can be described by reducing the organization to two people, the principal and the agent. The role of the principal is simply to supply the agent with capital, bear

¹⁴ External sources refer to the actions when corporate management have to go out to the financial market.

¹⁵ The cash flow generated from the companies operations.

risk and create incentives (A. Lambert, 2001). Since it can be assumed that both the principal and the agent are seeking to maximize their utility and their interests diverge, a conflict is unavoidable (Jensen and Meckling, 1976). For instance, Meckling (1986) outlines that managers have strong incentives to grow their firms above their optimum sizes as a larger company implicates more managerial power. To prevent such actions the principal (shareholders) are likely to implement monitoring systems or create incentive programs, which incorporates additional costs – *agency costs*. Further, Jensen and Meckling (1976:308) emphasize that the agency costs are composed of three different costs; *monitoring expenditures by the principal*¹⁶, *Bonding expenditures by the agent*¹⁷ and *residual losses*¹⁸ which all tend to increase as the manager's ownership falls (ibid).

Correspondingly, Tsionas et al. (2011) found a strong positive relation between concentrated ownership and return on equity within internationally listed shipping firms. Later Kachaner et al (2012) conducted a study of 149 publicly traded family controlled businesses. One of their key findings were that family businesses underperformed slightly during flourishing years but performed markedly better than their peers with other owner structures during economic downturns. Further they argued that family businesses are, among other factors, more careful with the company's funds, less likely to take on debt and pursue overspending. Their empirical findings concerning the behavior and subsequently the performance of family firms correspond well with what Jensen and Meckling claim regarding the relation of ownership and control.

¹⁶ Costs incurred when the principal attempts to monitor the agent's behavior.

¹⁷ Costs borne by the agent against abuse of power, contractual limitations and so forth.

¹⁸ Costs incurred despite the use of bonding and monitoring

3 Methodology

This section ought to describe the type of research that was employed in the study. Moreover, the accounting measures used in this study is described and how they were combined to examine the questions from the problem statement will be presented.

3.1 Type of Research Design

A combination of a descriptive and quantitative approach was chosen to answer the research problems stated in the introduction of this thesis: *“Can the existing capital structure theories help to explain the performance of the examined companies?”* The study was accomplished by collecting data from 21 listed Norwegian shipping companies¹⁹ between the years 2005 and 2011. Ideal would have been to look at a longer period of time, but due to the availability of the firms’ financial figures the time period had to be limited to seven years. Another advantage with the chosen time period was that all the companies used the IASB’s standard IFRS during the whole period making a comparison easier. All listed companies in Europe are supposed to use IFRS but Pettersson (2011) found differences in how the companies applied the accounting principles to the valuation of the companies’ fleet, which impacts their results. Thus, we chose to examine one country to minimize this kind of error. A further advantage was that Norway has a long tradition of shipping and has of today one of the world’s largest fleet (KPMG, 2012)²⁰. This combined with the large number of listed companies contributed to our decision to investigate the Norwegian shipping industry.

The shipping companies chosen for this paper are operating in the bulk, offshore, Ro-Ro, tanker or passenger segment. Information regarding in which segment the companies are operating in have been extracted from Pettersson’s licentiate thesis (2011). However, a slight adjustment of her segmentation has been made where Bonheur was moved from the passenger to the offshore segment, as the largest part of its income was attributable to the offshore division (Annual report, Bonheur, 2011).

The financial figures used in this thesis were conducted from their respective annual reports at a consolidated level and manually added into an Excel-sheet for further preparation. The consolidated level was chosen in order to make our analysis more reliable. According to R. Lönnqvist (2012:217-19) looking at the parent company or at specific companies within a group would undermine the comparison between companies; hence a consolidated level is preferable. Some of the companies presented their financial figures in NOK whereas others used USD. To make it possible to compare different companies’ absolute numbers and size a conversion from NOK to USD was made. Norwegian crowns were converted to dollars by dividing all the financial figures in Norwegian crowns with the average yearly exchange rate (NOK/USD) for each year Research Design, see appendix Exchange Rates. The average yearly exchange rate was gathered from the Norwegian Central bank (Norges Bank).²¹

¹⁹ All the listed Norwegian shipping companies with ships in their balance sheet, see Appendix Norwegian Shipping companies.

²⁰ KPMG concludes that Norway is the seventh largest shipping nation in terms of tonnage dead weight in year 2011.

²¹ <http://www.norges-bank.no/no/prisstabilitet/valutakurser/>

3.2 Definition of Accounting Measures

The type of accounting measures used in this study could be divided in capital structure and performance measures. All measures except from enterprise value are book values.

3.2.1 Capital Structure Measure

The solvency ratio is used to denote the capital structure measure, which explains the company's financial stability. It states the owners' part of the company's total assets.

$$\text{Equity-to-assets: } \frac{\text{Shareholders' equity}}{\text{Total assets}}$$

Shareholders' equity has been defined as the book value of total shareholders' equity including both minority and majority shareholders, which is congruent with the *entity perspective*. Total assets are the book value of the firm's assets, which could be found in the annual reports. Equity-to-assets was calculated by dividing shareholders' equity with total assets.

3.2.2 Performance Measures

We have decided to use two different profitability measures and enterprise value to define performance. The different profitability measures that were used are return on equity and EBIT*. Return on equity states how the companies results has affected book value of equity while EBIT* denotes the company's profit attributable to the shareholders', creditors' and to the state in form of tax payments. The enterprise value states the theoretical takeover price an acquirer is willing to pay for the company (Berk and DeMarzo, 2011:27).

$$\text{Return on Equity (ROE): } \frac{\text{Net Income}}{\text{Shareholders' equity}}$$

$$\text{EBIT*}: \text{Earnings before taxes} + \text{Interest expenses}$$

$$\text{Enterprise Value: } \text{Market value of equity} + \text{Interest bearing debt} - \text{Cash}$$

Net income has been defined as net result before other comprehensive incomes such as hedges and exchange rate differences. The return on equity was calculated by dividing net income_t with shareholders' equity_t²².

EBIT* consists of earnings before taxes plus interest expenses and enterprise value has been calculated by adding the company's interest bearing debt with market capitalization of equity and then subtracting the companies holdings of cash and cash equivalent assets.

3.3 Research Design

Our research consists of four parts where we seek to analyze how solvency affects enterprise value, earnings volatility and return on equity as well as a brief part to investigate the top-5 performing companies to examine if they have a common denominator. The latter two parts will be examined from a descriptive point of the view while the rest will be analyzed from a quantitative perspective. We will thereafter try to align our findings with our used theoretical framework to determine to which extent the theory is able to explain this thesis findings.

²² The net income for the end of the year divided by the same year shareholders' equity at the end of the year.

3.3.1 Testing how Solvency effects Enterprise Value

Enterprise value is a central part of our chosen theories and it denotes the value of the underlying business, which according to Modigliani and Miller (1958) should not be altered by the chosen capital structure. The tradeoff theory instead implies that there is an optimal level of debt. Thus, we decided to perform a test to examine our theories degree of explanatory power on the chosen sample of companies.

Our first thought was to create a regression analysis for the correlation between enterprise value and solvency. Shortly, we realized that making this type of comparison would be pointless as the enterprise value is an absolute variable while solvency is a relative measure. This implies that the size of the companies could bias our result and would not help us answer our problem statement. Our second approach to answer the problem statement was to make regressions between EV and Debt and EV and Equity. Later, we realized that this would simply be to compare the company's relative sizes of Debt and Equity compared to enterprise value for the companies.

We thereafter came to the conclusion that we should try to scale EV with a denominator to get this as a relative number (multiplier) as well, which would make the correlation possible. Goedhart, Koller and Wessels (2010:313) concluded that the first thing you do when you aspire to make a valuation of a company is to use what they call a triangular method. This means using multipliers to appreciate an interval that the company's enterprise value should be within. They recommended using EBITA²³ as denominator for enterprise value and their reasoning to this were that it generally is the best measure to use if you want to compare different firms. Thus the multiplier would look like

$$\text{Multiplier} = \frac{\text{Enterprise Value}}{\text{EBITA}}$$

Moreover Damodaran (2002:704) recommends using EBITDA as denominator when calculating the multiplier and further states that security analysts use other denominators as well (Damodaran 2002:712). Some other denominators are EBIT and EBIT* and it thus seems that researchers and practitioners disagree what constitutes best practice. The difference between these measures is what they include in the results. EBIT* differs from EBITA as it includes depreciation and interest incomes and the difference between EBITDA and EBITA is that EBITA includes depreciation costs.

The volatile nature of the shipping industry causes large shifts in the companies' earnings with high results in some years and low negative results in other years, making a year-to-year comparison volatile. Further, Damodaran (2002:704) stated that the usefulness of comparing different companies earnings diminishes, as company's results are too low and even negative.

A further obstacle to bear in mind is the different accounting principles being used. Pettersson (2011) concluded that all of the investigated European shipping companies administer the acquisition method for valuation of their fleet. The companies therefore need to depreciate the ships over a specific period of time. Pettersson further stated that companies in different segments as well as within a segment depreciate their asset over different time horizons. EBITDA would in this aspect be preferred as it excludes depreciation expenses, which thus makes a comparison between companies more suitable as they do not let accounting choice affect the comparison between companies. Despite this we argue that measures including depreciation expenses could be used, as the yearly differences should be eliminated over the measured time period. We further argue that the chosen depreciation period could be part of the company's strategy. This implies that different companies

²³ EBITA, earnings before interest taxes and appreciation

are expected to use their ships for different period of times and that the accounting choice therefore gives the best estimation of the true yearly costs for the fleet, thus showing a fair and true view.

Analyzing all these aspects together we decided to use mean EBIT* for the period 2005 to 2011 as denominator. We argue that it is the best predictor of showing long-term sustainable result, as it shows the earning residuals left for stockholders, creditors and the tax authorities, which makes this measure resistant to differences in capital structure. A simple arithmetic mean value was used to calculate the earnings to avoid the extreme values caused by the volatile earnings.

The difficulty with using the mean value is instead that we fail to see trends in company's results and distinguish growth companies from mature companies. This is also signaled by the equation below, which used by Goedhart, Koller and Wessels (2010:316) to create a discounting cash flow model. The essence of their model is that the companies expected growth rate, g , need to be taken into account.

$$\frac{Value}{EBITA} = \frac{(1 - T)(1 - \frac{g}{ROIC})}{WACC - g}$$

In the test of the multiplier against the solvency ratio have a regression line been made with the multiple as the dependent variable and the solvency ratio as the independent variable.

$$Multiple = \frac{Enterprise\ Value_{2011}}{mean(EBIT^*_{2005-2011})}$$

3.3.2 Hypothesis

For the hypothesis stated below it is important to recall that the WACC could be calculated by inverting the enterprise value multiplier.

Hypothesis 1) The trend line's slope is close to zero would support Modigliani Miller.

Hypothesis 2) The trend line is upward or downward sloping would disagree with Modigliani Miller.

Hypothesis 3) The second-degree polynomial correlation is convex and has a higher correlation than the linear regression line, thus it would look like figure 4 in the theoretical frameworks section.

Hypothesis 4) A concave second-degree polynomial correlation exists would disagree with the theories.

The EBIT* measure was gathered from annual reports while the enterprise value for the different firms were found for all firms at Orbis except from Rem Offshore and Dockwise LTD. The values for the exceptions were instead calculated manually by looking at their annual reports and taking the stock price from Yahoo finance and Oslo Börs. The value of interest-bearing debt was taken from the balance sheets in the annual report as well as cash. Cash were defined as Cash and cash equivalents while the interest-bearing debt included but were not limited to bonds and bank borrowing.

3.3.3 Testing Solvency against Earnings Volatility

The pecking order and tradeoff theory states that companies with higher earnings volatility are supposed to have lower leverage (Fama and French, 2002). This is a function of the decreased use of the interest rate tax shield and the increased risk of bankruptcy. We therefore seek to explain if there is a correlation between the company's solvency and its earnings volatility.

We therefore needed to decide a measure to denote earnings volatility. To avoid any bias to the companies chosen capital structure was volatility denoted by the standard deviation of EBIT*. Recall that EBIT* is the residual earnings left for stockholders', investors and tax authorities.

Moreover, we decided to scale the standard deviation of EBIT* with the companies mean EBIT* to avoid bias of the company's size. We chose to use a simple arithmetic mean value which were calculated by summarizing one companies EBIT* for each year and then subtracting them by seven.

Thus, the test were performed by plotting the observed solvency as the dependent variable and the independent variable $\frac{\text{standard deviation (EBIT*)}}{\text{mean(EBIT)*}}$ and making a regression line from it.

Our hypotheses from the above-mentioned test is:

Hypothesis 1) Companies with higher EBIT* volatility have higher solvency, which would be supported if the curve had a positive slope.

Hypothesis 2) Companies with lower EBIT* volatility have higher solvency, which would be supported if the curve had a negative slope.

3.3.4 Proposition II and the Tradeoff Theory

We have looked at the change in ROE and equity-to-assets ratio on a year-to-year basis. This was done to make a comparison through time possible and to see how both measures have changed over the years. The relationship between capital structure and ROE will be presented in a diagram with the equity-to-assets ratio as an independent variable and the ROE as the dependent. In addition, a trend line was plotted in each diagram to give an indication of if there is an underlying trend. The trend line's goodness of fit (R^2) could lie between 0 and 1 where a value closer to one denotes a higher explanatory power for the regression (N. Gujarati and C. Porter, 2009:493). By plotting the observations we can examine how well they are following Modigliani and Miller's proposition II equation (1), which states that higher leverage (lower solvency) would create higher returns during an economic upswing whereas the opposite is to be expected during bad years. It is also reasonable to expect companies with a lower equity-to-assets ratio to have a more volatile ROE as the Modigliani and Miller's proposition II works in both directions. Deviations from this prediction would suggest differences in the operating performance. A positive slope of the regression during flourishing years would for instance contradict the equation and indicate that high-levered companies are more likely to underperform.

The tradeoff theory on the other hand would suggest a slightly steeper slope on the trend line compared to Modigliani-Miller's model, as tax advantages are included. We should also observe a threshold where the slope of the trend line falls as the increased leverage increases the risk of bankruptcy. Thus, we should observe that companies with high and low solvency would have lower return on equity than the others' if the tradeoff theory is applicable. A further support for the tradeoff theory would be if companies prefer a specific debt-to-equity ratio. To test this we will create a histogram in MATLAB of the number of observations at each level of solvency to see if it shows any sign of being normally distributed which would suggest that there is a preferred capital structure.

In addition, histograms of the change in equity-to-assets ratio have been created to give a better overview of the change in ratio from one year to another for the examined companies. Finally, mean values for equity-to-assets and return on equity, both weighted and un-weighted, were calculated for

each year as well to give an indication of the accumulated performance each year. A brief overview of the return on equity and equity-to-assets ratio will also be given for the respective segment to create a broader understanding of segment specific differences.

3.3.5 Top-5 performing companies

To make a further analysis of the given area possible, we decided to look at the best performing companies in order to determine if they have a common denominator. To distinguish the outperformers from the underperformers a ranking of the companies was accomplished. The ranking was based upon the accumulated ROE for each company over the chosen period of time. There are generally two ways of calculating accumulative historical returns for time series, realized and average returns. Realized return was chosen in this study since we are interested in knowing the shareholders realized return over the given time period. The calculation was made as follows:

$$((1+ROE_{2005}) * (1+ROE_{2006}) * (1+ROE_{2007}) * (1+ROE_{2008}) * (1+ROE_{2009}) * (1+ROE_{2010}) * (1+ROE_{2011})) - 1$$

The results from running the equation above for each company were listed on a descending scale and the five companies with the highest accumulated ROE were selected for further analysis, see appendix. We also decided to take a closer look at ownership structure where information regarding the CEO, Chairman of the board, the largest shareholder and their relation to the company were conducted. With background from our theoretical framework and previous studies we expect the top five performing companies to have a close connection between ownership and control. The above information was gathered from the annual reports (2011-2012) as well as from Orbis.

3.3.6 Additional Research Errors

Transferring data manually from the annual reports to Excel is a plausible source of error and several inspections have therefore been made trying to minimize this evident risk of error. Furthermore, an additional check was performed to compare our values to the ones given by the database Orbis.²⁴ The reason annual reports were used as the primary source²⁵, despite the previous mentioned disadvantage, was to lower the risk of second-hand errors that otherwise could occur when using databases. Unfortunately some financial figures²⁶ could not be found in the annual reports and they had to be complemented with figures from Orbis. The figures found in the annual reports were mostly in line with the ones presented by Orbis. However, a slight difference was found concerning the stockholders' equity where the values given by Orbis were somewhat lower than the values found in the annual reports. The discrepancy could be explained by the fact that Orbis following the *owner perspective*, meaning that they don't take the minority interests into account (Balans nr 2, 2007 s. 40-42). On the contrary, the figures used in this study, is from an *entity perspective* taking the equity from both minority and majority holders into consideration. Additionally, according to R. Lönnqvist (2012:221) the entity perspective is strongly recommended when analyzing the profitability of companies at a consolidated level as performed in our study.

Further, using ROE²⁷ as a measure of performance has a few shortcomings, it does not take the dividend payouts, stock repurchase or new issuances into account. If a company does a dividend payout or a stock repurchasing the ROE increases as a result of the decrease in equity.

²⁴ <https://orbis-bvdinfo-com.ezproxy.ub.gu.se/version-2013430/Home.serv?product=orbisneo&loginfromcontext=ipaddress>

²⁵ Annual reports are according to Artsberg (2005) a primary source.

²⁶ Enterprise value could not be found in the annual reports.

²⁷ Measured as net income for year (t) and equity (t)

Correspondingly, new issuances will increase equity that lowers the ROE. One should therefore bear this in mind when interpreting our results since companies with high dividend payouts will gain a higher ROE for a specific year. A further disadvantage with comparing a specific year's net income with the same year's equity is the high volatility of the industry companies, which causes the nominal value of equity to fluctuate year to year. This causes large variations in the measure return on equity and it would therefore have been more suitable to use weighted averages of equity between the points in time t and $t - 1$.

In addition, extra ordinary items occasionally constitute a large post in the companies' income statements as a consequence of profits or losses made on sold ships. Thus, the ROE and EBIT* can fluctuate considerably even though the underlying performance of the company is constant. This may help to explain the extreme values seen in our empirical findings section. This evident problem with extra ordinary items was also acknowledged Tsionas et. al (2011) when they looked at the ROE within the shipping industry.

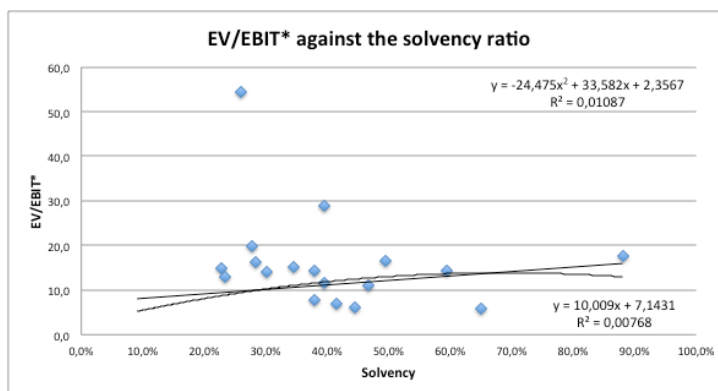
4 Empirical Findings and Analysis

The empirical findings and an analysis of these will be presented in this section. These regard the correlation between ROE, EV/EBIT* and earnings volatility to the equity to assets ratio for the entire sample of the listed Norwegian shipping companies. Further, findings from the investigation of the top-5 performing companies will be presented and analyzed.

4.1 Enterprise Value, EBIT and solvency – Miller and Modigliani Proposition I

4.1.1 Testing how Solvency affects Enterprise Value

The test of the EV/EBIT*-multiplier resulted in the graph below. The slope of the trend line is slightly positive indicating that the multiplier in general is higher for companies with higher solvency. We can further see that the second-degree polynomial has a slightly higher goodness of fit than the linear regression. This supports our hypothesis number 3 as we stated that the polynomial correlation should be convex and have a higher degree of explanatory power on our sample. This would suggest



that the tradeoff theory is more valid, for our sample, in explaining the capital structure's influence on enterprise value.

We could further observe that a couple of companies with negative multiplier's indicating that these firms had positive enterprise values despite the fact that they had negative earnings. We can further conclude

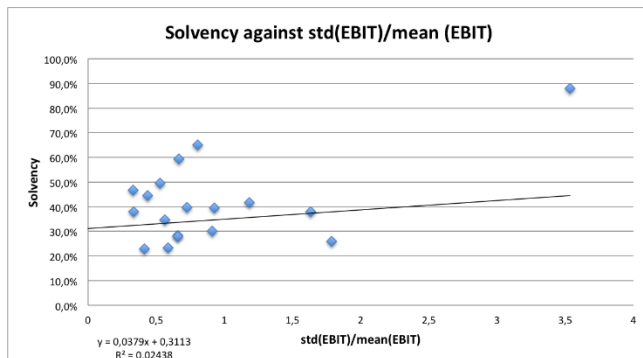
that the median company had a EV/EBIT* multiplier around 14 indicating that investors and creditors combined are willing to pay 14 times that company's earnings which would suggest a weighted average cost of capital amounting to 7,1 percent. It is, however, important to observe the low goodness of fit of the line and to note that several companies are above or below the trend line. Remember though that stockholders' are interested in the future cash flows and not past earnings. Thus, a possible explanation to the large differences in the multiplier is because stockholders' see other potential in the stocks than our given model does. Hence, future expectations could be one explanation to why all the firms do not have the same multiplier. This is a consequence of the discrepancy between our model and the stockholder's estimation of the future earnings. The companies with a multiplier higher than 14 indicates that investors believe in higher earnings in the future while the opposite is true if the multiplier is lower than 14.

We argue that the low goodness of fit does not impair our ability to draw any conclusions from the test as Modigliani Miller's theorem relies on the assumption of the law of one price. Further, if the companies had been identical²⁸ a stronger goodness of fit would have been expected. It is more

²⁸ Identical but with different capital structures.

important to observe differences in the slope of the trend line as well as differences in how a second-degree polynomial curve and the linear curve are shaped.

4.1.2 Testing how Earnings Volatility affects Solvency



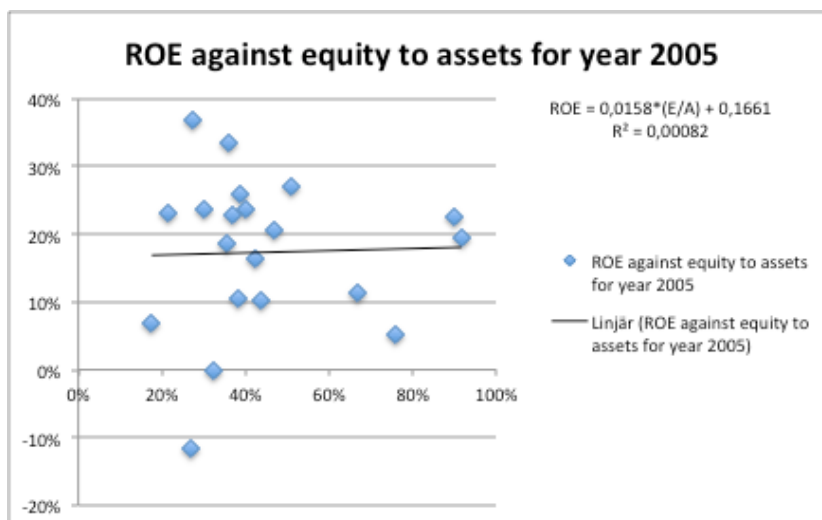
Further, Leary and Roberts (2005) and Myers (1977) concluded that companies should adjust their capital structure for volatility in earnings. They concluded that the higher the volatility is the higher degree of equity financing. We have therefore performed a test to see if their conclusion is applicable on the Norwegian shipping industry. The result from our test is that the degree of equity

financing increases as the $\frac{std(EBIT^*)}{mean(EBIT^*)}$ -ratio increases indicating that firms with higher volatility in their earnings finance their assets with a higher degree of equity. This supports our hypothesis 1 that indicates that firms with higher volatility are more likely to have high solvency. This is in line with what Leary and Roberts (2005) and Myers (1977) expected.

It is important though to observe that we cannot determine the causality in the correlation between the variables and it could thus be that companies with lower solvency have higher volatility. This would be in line with the leverage formula $R_E = R_T + (R_T - R_S) \frac{S}{E}$, which is divided in operational and financial risk. It would implicate that companies with less operational flexibility chose to have less leverage to limit their financial risk.

4.2 Return on Equity against Equity-to-Assets

4.2.1 Year 2005

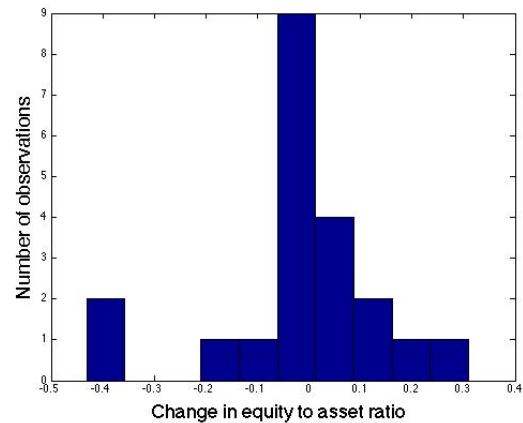
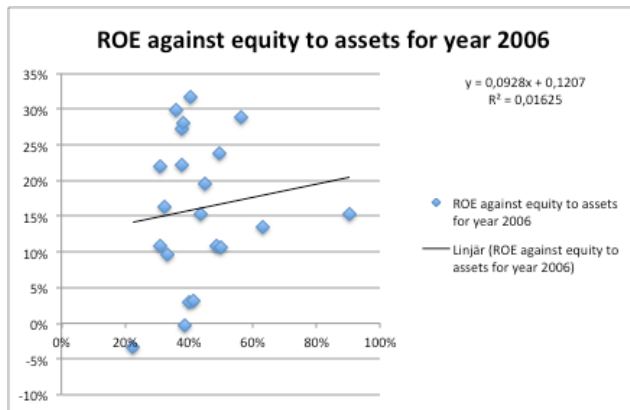


The graph shows the first year during the observed time period. From looking at the graph it could be concluded that the majority of the observations have solvency ratios between 20-50 percent²⁹, but there are also several companies that have significantly higher solvency. Year 2005 was a good year

²⁹ Thirteen out of the twenty one companies

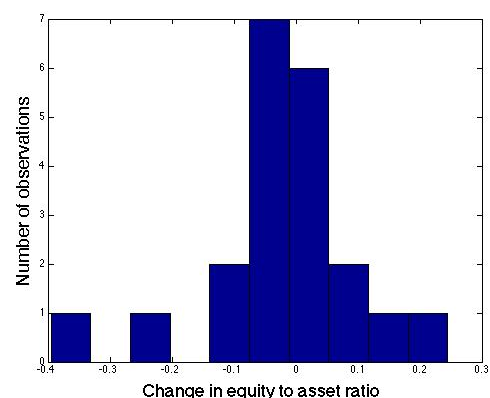
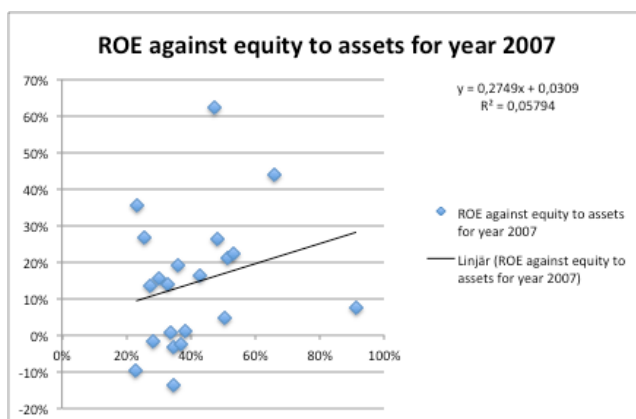
with a weighted average³⁰ ROE of 18.54 percent and all companies except two had a positive ROE. The trend line plotted in the diagram indicates that there is an extremely weak positive correlation between the ROE and the equity-to-assets ratio. This is evident both from the slope of the line and the fact that the correlation coefficient (R^2) is close to zero.

4.2.2 Year 2006



For year 2006 the companies' equity-to-assets ratio has somewhat converged towards 40 percent. The ROE has fallen slightly compared to 2005, which is proven as the weighted mean value has decreased from 18.54 percent to 14.54 percent. The slope of the trend line has increased as well as the correlation. Even though the correlation has increased it is still too weak to state that equity-to-assets ratio should influence the ROE in a specific direction. Furthermore, in 2005 four of the investigated companies had an equity-to-assets ratio of above 60 percent. As of year 2006 two of them decreased their ratio significantly. This is confirmed by the histogram and since all companies except one experienced a positive ROE the decreased equity-to-assets ratio could therefore not be a consequence of losses. Hence, a plausible explanation for the decrease might be that they made new investments, acquired a company or recapitalized.

4.2.3 Year 2007

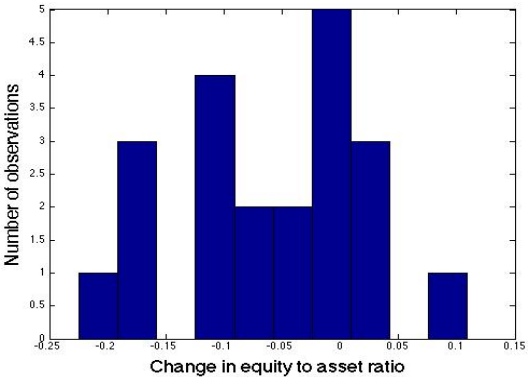
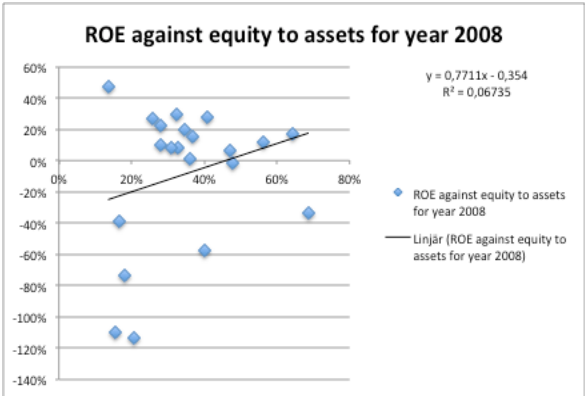


In 2007 a significant number of the companies showed red numbers, simultaneously the best performing companies managed to further improve their results. The effect of these two events

³⁰ For weighted and un-weighted averages for all years see appendix Weighted Averages

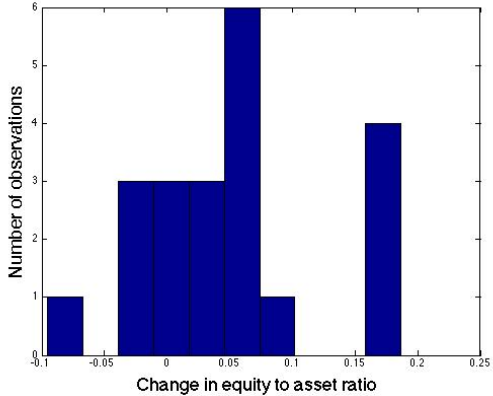
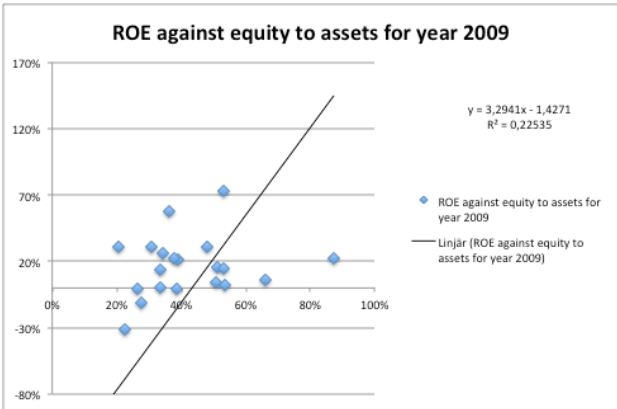
contributed to a decreased weighted average on ROE. Further, the differences between the under- and outperforming companies have increased substantially compared to year 2006. The equity-to-assets ratio has to some extent diverged even though the range between the lowest and highest has been held constant. The slope of the trend line has become somewhat steeper and the correlation a little bit stronger. The histogram shows that more companies have decreased than improved their equity-to-assets ratio and that the lion part of the companies experienced a minor change in the equity-to-assets ratio.

4.2.4 Year 2008



The equity-to-assets interval decreased in 2008 as a consequence of an extensive drop in solvency for the company with the highest ratio. On contrary, the equity-to-assets ratio within the sample diverged even more compared to the previous year. In addition, various companies seem to have rearranged their capital structure so that they have place themselves at an equity-to-assets ratio at around 20 percent. The most apparent thing during the year of 2008 was the highly negative ROE that could be found on a several companies. A total of six companies delivered a return of lower than -25 percent and the two worst performing companies had a negative ROE of nearly 120 percent. Moreover, the slope of the trend line and the correlation increased further. The histogram shows that more companies decreased than increased their solvency and that the changes were smaller this year than previous years, even though some firms had negative return on equity.

4.2.5 Year 2009

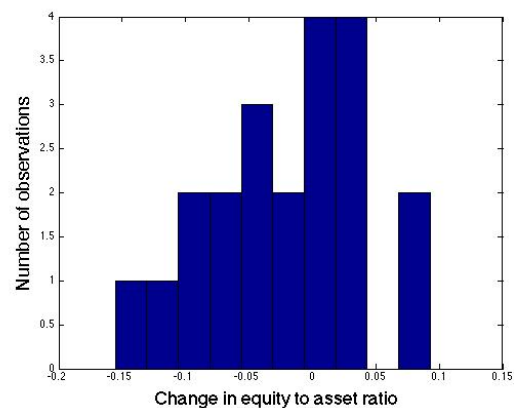
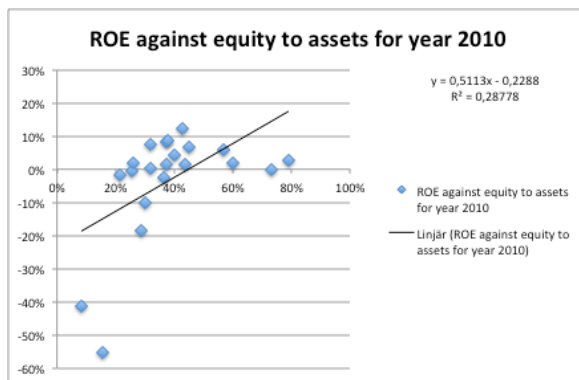


We decided to not show one company in this diagram as it had a return on equity amounting to -530 percent, which would clearly make it harder to read and compare the diagram above with the other ones. The extreme value was calculated and used in all calculations and the only difference is that it

cannot be seen in this diagram. During 2009 there was a major rebound in terms of ROE compared to previous year. This was also justified by comparing the weighted mean of the two years (15.03 against -3.70 percent). In contrast, the un-weighted mean was strongly negative, which was mainly a consequence of the -530 percent observations. The correlation coefficient has gotten stronger and the slope has gotten steeper which again would imply that companies with higher equity-to-assets ratio would have a superior return on equity.

4.2.6 Year 2010

The histogram shows that the majority of the firms' equity-to-assets ratio decreased even though

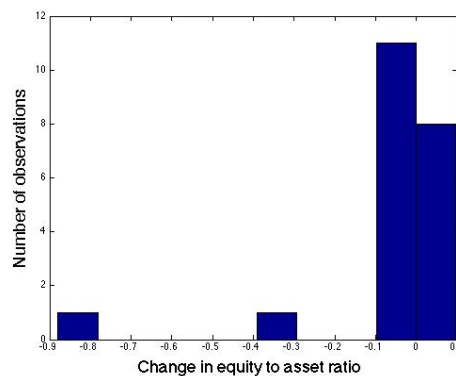
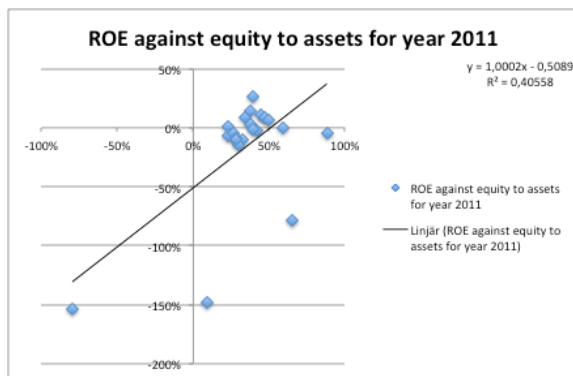


most of the firms stayed in a range of +/- 10 percentage points. The return on equity between the companies is evenly distributed this year even though four companies experienced substantial losses contributing to the negative slope. The correlation coefficient has once again risen but it is still too low to explain the major part of the correlation between equity-to-assets ratio and return on equity.

Further, the slope has decreased which partly could be explained by an improvement of the average ROE.³¹ Additionally, the ROE was quite similar among the companies with few exceptions on the negative side.

³¹ A higher average ROE suggest that the industry performed better resulting in relatively higher degree of improvement on ROE for highly levered companies according to MM's proposition II.

4.2.7 Year 2011



An interesting thing to notate from year 2011 is that one company had a negative equity-to-assets ratio due to high losses. This means that their debt is valued higher than their assets. The returns of the year 2011 vary more between the different companies than previous year. This is supported by the substantial difference in the weighted and un-weighted average ROE amounting to 2.12 and -17.35 percent. Furthermore, as indicated by the histogram all companies except two have kept their equity-to-assets ratio fairly constant between the years despite the fact that three of the companies experienced losses above 50 percent. This would suggest that there could be an equity-to-assets threshold that the companies do not want to fall below.

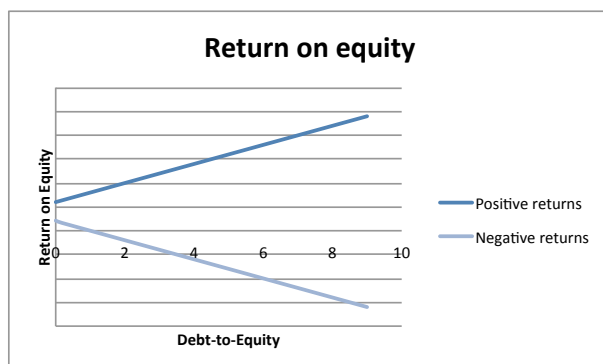
4.2.8 Further Analysis

In general, over the given time period it could be concluded that the slope of the trend line is increasing for all years when the un-weighted average ROE is decreasing. In addition, companies with lower leverage tend to have a higher return on equity. By observing all curves one could see that it is a common trend that companies with the lowest and highest leverage also tend to be below the curve. Firms with leverage within the other intervals generally experience higher return on equity than to be expected from the regression line.

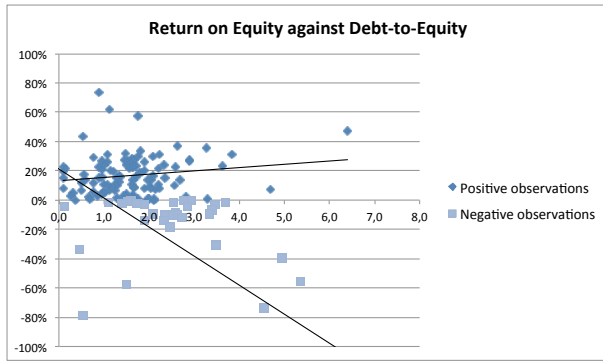
4.2.8.1 Modigliani and Miller Proposition II

An implication of the theory is that two firms with equal return on total assets and average interest rate should have the same return on equity unless their debt to equity ratio differs (Modigliani and

Miller, 1958). $R_E = R_T + (R_T - R_D) \frac{D}{E}$ The previous stated assumption suggests that an increased debt-to-equity ratio should result in an increased return on equity if the return on total assets is



larger than the average interest rates. A smaller return on total assets than the average interest rate would instead cause the return on equity to decrease as the debt to equity ratio increases, which is showed in the graph below. Suppose Modigliani and Miller were correct with their assumptions for the model and that all firms had the same cash flows. That would indicate that all companies should follow the curve.



Our empirical findings did not follow these expected curves, which instead state that the firms result differs from the plotted line. It could be argued that the results may vary between years as it could be caused by the state of the world economy, fluctuations in foreign exchange rates, vessel charts and oil prices.³² Hence, it would be natural to expect deviations from the curve from one year to another. Another reason

behind the variations could be firm specific factors influencing the company's operating performance such as how the company is managed. This type of questions includes the agent-principal problem and that some firms would have better know-how or higher flexibility (Dreyer and Gronhaug, 2004). As previously concluded, the slope increased each year when the weighted average return on equity fell. This can be explained by the year-to-year graphs in our empirical findings section, which implies that a higher degree of leverage generates lower returns on equity when the earnings from the operative business do not cover the interest expenses. This indicates that the opposite should be true if the income from the operating business is larger than the interest payments. That is, companies with high leverage would generate higher returns than their more solid peers. Our empirical results do not support this argument for companies with a high degree of leverage. On the contrary, our findings insinuate that companies with low solvency ratio are not only riskier but also that the risk is unevenly distributed to the negative side. Which is evident from the graph above as the trend line slope coefficient of the negative observations has a higher absolute number than the coefficient of the positive line.

4.2.8.2 The Tradeoff Theory

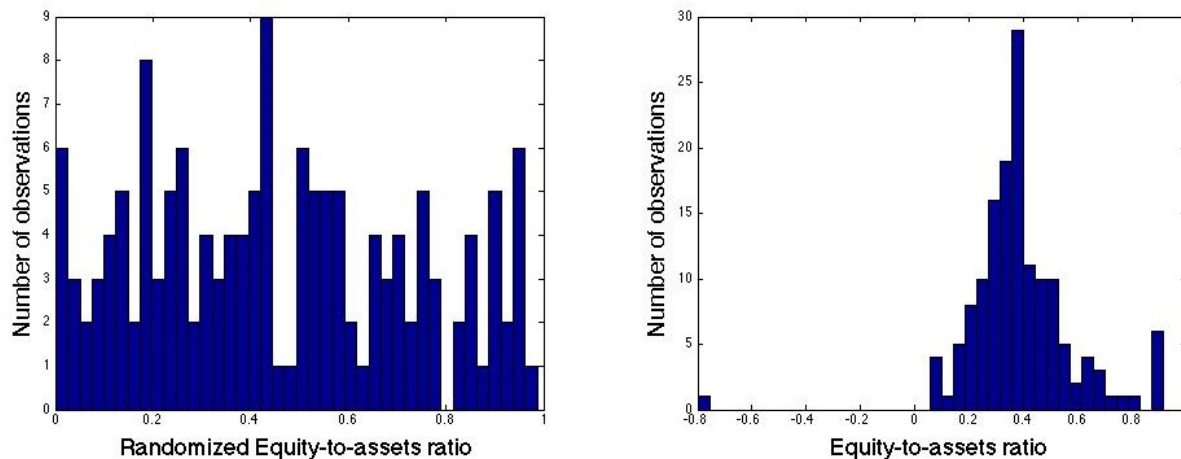


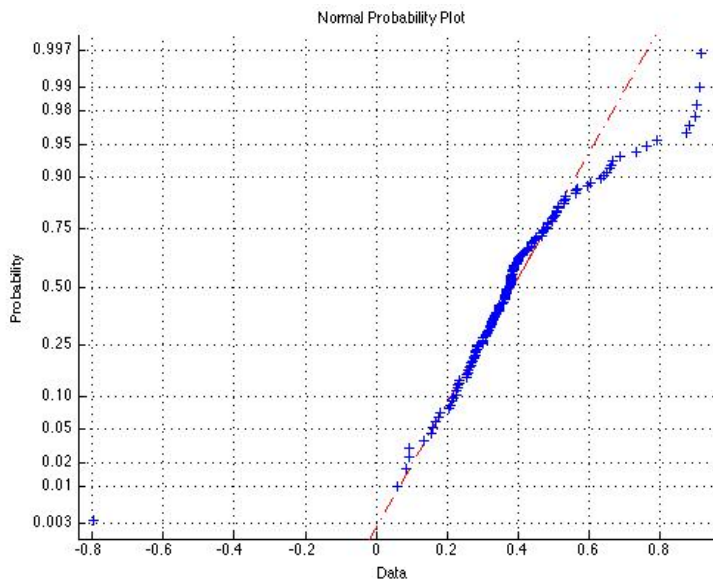
Figure 3. The picture to the left as well as the one to the right consists of 146 observations. The one to the left shows the randomized equity-to-assets ratio for 146 observations while the graph to the right shows the actual equity-to-asset ratio for all observed companies.

The histogram above illustrates all the measured observations regarding the equity-to-assets ratios between 2005 and 2011. The majority of the observations are within the range of 30-50 percent whereas the rest is spread out. Remember that Modigliani-Miller (1958) state that chosen capital structure is irrelevant for enterprise value. This would imply that no capital structure should be

³² Information were gathered from various annual report for example Odfjell, Deep Sea Supply, Havila.

avored and that the observations thus should be evenly distributed as our randomized sample suggests. The graph to the left shows one example of how a randomized equity-to-asset ratio could look if numbers between 0 and 1 were randomly selected. The differences between the two samples are evident, as the randomized sample is close of being evenly distributed while the actual sample seems to follow a normal distribution curve.

A graphical comparison was therefore performed to see if it is in line with a normal distribution curve. The graph illustrates all the observations during our measured time period where the red line denotes a perfect normal distribution curve. The results indicate that the equity-to-assets ratio for



the entire time period is surprisingly congruent with a normal distribution. It shows that companies having ratios above 60 percent is more frequently observed than normal distribution curve would suggest. However, the curve gives a good explanation when the solvency ratio is between 0 and 60 percent. The close relation with the normal distribution curve further implicates that there is a preferred capital structure within the Norwegian shipping companies.

The empirical findings showed that the solvency ratio was close to normally distributed with a median around 35 percent. The lion part of the observations had a ratio between 20 and 50 percent, which would suggest that the firms' decision makers try to keep their solvency within that range. Another trend that could be distinguished is that companies appeared to act in order to prevent their solvency ratio from dropping below 20 percent as only a few observations could be found below. One explanation may be the increased risk of bankruptcy associated with the higher leverage, which could generate higher interest rate expenses.

A further explanation might be that the creditors' lending terms prevent companies from having a too low solvency and thus forces the company to issue equity instead. It was also shown that these companies generally had realized huge negative returns, which implicates that these companies were forced to have low solvency. Additionally, companies with a low solvency ratio generally had larger fluctuations on return on equity just as Modigliani and Miller's proposition II suggests. However, the fluctuation effect was, as we concluded in the Proposition II part, mainly negative as these firms tended to have lower returns during bad years while they were not fully compensated with larger returns during the good years. The fact that companies with really high solvency also tended to perform less well than the companies with medium-high solvency ratios gives some additional support for the tradeoff theory.

The tradeoff theory's main conclusion is that companies take advantage of interest tax shields up to a specific ratio where the increased bankruptcy costs is met by the interest tax shield effect (Myers, 1984). This implies that there is an optimal degree of leverage and that this theory seems to be applicable on the Norwegian shipping industry, which is evident, as they tend to have a preferred

level of solvency. A further support for the existence of a preferred capital structure could be found in the annual reports for several of the companies in our selection³³:

“The Group’s objective concerning asset management is to ensure business as usual in order to secure earnings for the owners and other interested parties and maintain an optimal capital structure in order to reduce capital costs and make possible the payment of dividends to the shareholders.”

(Rem Offshore, Annual report, 2009:33)

“The Group manages the capital structure and makes adjustments to it to maintain an optimal structure adapted to current economic conditions.... The Group’s policy is to maintain an equity ratio between 30% and 35% and available liquidity of USD 150–200 million.”

(Odfjell, Annual report, 2011:34)

Combining our quantitative findings with what is stated in the annual reports gives rather strong support for the tradeoff theory, and in particular the dynamic tradeoff theory, which argues that firms actively will make changes in their capital structure in order to stay close to their target ratio (Hovakimian and Titman, S 2002).

4.3 The Top Performing Companies

This part contains a very brief overview of the ownership structure and solvency ratios of the five best performing companies in terms of accumulated return on equity. This was done to see if there are any similarities between these companies. The top five performing companies were; Rem Offshore, Havila, Belships, Deep Sea Supply and Bonheur.

Company	Standard deviation	Mean	Median	Max	Min
Belships	20,9%	18,4%	15,7%	62,2%	-2,3%
Bonheur	5,5%	16,8%	15,6%	26,2%	10,9%
Deep	18,5%	18,1%	13,5%	47,6%	-1,6%
Havila	13,8%	17,8%	24,9%	31,3%	-7,0%
Rem	21,6%	21,1%	11,4%	73,1%	8,2%
Total	17,3%	18,6%	15,7%	73,1%	-7,0%

Despite the fact that this group of companies is highly homogeny in terms of accumulated return on equity we can conclude that the solvency ratio for these five companies differs substantially. During the first year the solvency were in a range of 92 and 22 percent, including almost all companies in our entire sample. Thus, it is difficult to say that a specific solvency ratio would be a common denominator for our top five performing. Interestingly two companies, Bonheur ASA and Rem Offshore experienced, despite their profits, a significant decrease in their solvency and made a total change in solvency ratio of -47³⁴ respectively -32 percentage points.

Recall, that the pecking order theory states that well performing companies should have high solvency, as companies should prefer to finance their investments with retained earnings. This would suggest that all of our top-5 companies would have a similar and high solvency. This is obviously not the case and we can further conclude that these companies do not have higher solvency in general than their less profitable peers. This suggests that other factors are influencing the capital structure

³³ All our top performing companies showed similar statements regarding the capital structure.

³⁴ The change was caused by an increased ownership in the subsidiary Ganger Rolf from 49.67 to 51.28 percent, which made it fully consolidated into Bonheur’s balance sheet (Bonheur, annual report, 2006).

decisions as well. Fama and French (2002) outline that the age and size of the company could be factors influencing the capital structure.

4.3.1 Ownership Structure

All the top performing companies except from Belships (bulk) belong to the offshore segment. Another similarity is that all of the companies apart from Deep Sea Supply have a single family as their majority owner. Deep Sea Supply is also the only company where the largest shareholder does not take the place as the CEO or chairman of the board. Belships largest shareholder is Sonata AS, which according to Orbis, is completely owned by the Tidemand-family. Prior to May 2011 Sverre also served as the CEO of Belships and as of today he is chairman of the board for both Belships and Sonata AS. Belships’s new CEO, however, seems to be independent of the company’s largest owner and owns no shares. Anette S. Olsen owns Bonheur through her ownership in the three companies as shown in the table below. She is the CEO of Bonheur and her father Fredrik is chairman of the board. Havila Shipping’s majority owner is Havila Holding AS, which is owned by the Sævik-family. The four owners of Havila Holding AS all holds the last name Sævik and the four of them are; Njål, Hege, Vegard and Per. Per is chairman of the board while Njål is CEO of Havila Shipping. Rem Offshore is controlled by Åge Remøy through his investment companies³⁵ and he is also the majority owner and CEO of Rem Offshore. Peter Knudsen is independent of the largest owner and the chairman of the board. Deep Sea Supply’s largest shareholder is Hemen Holding AS, which is controlled by John Fredriksen. John is neither CEO nor chairman and the chosen persons to these positions do not have a significant connection to Deep Sea Supply in terms of ownership.³⁶

Company	Segment	Largest owner	Stake	Person with largest stake	Chairman of the board	CEO
Rem Offshore	Offshore	Åge Remøy	71 %	Åge Remøy	Peder Knudsen	Åge Remøy
Havila Shipping	Offshore	Havila Holding AS	51 %	Njål, Raben and Vegard Sævik	Per Sævik	Njål Sævik
Belships	Bulk	Sonata AS	51 %	Sverre Tidemand	Sverre Tidemand	Ulrich Müller
Deep Sea Supply	Offshore	Hemen Holding	35 %	John Fredriksen	Fredrik Halvorsen	Finn A. Norbye
Bonheur ASA	Offshore	Invento, Quatro, Ganger Rolf	71 %	Anette S. Olsen	Fredrik Olsen	Anette S. Olsen

Figure 4. Source: Annual reports 2011-2012 and Orbis

In four out of the five companies it was confirmed that the majority owner was either CEO or chairman of the board. According to Jensen and Meckling (1976) one can expect companies with a low degree of separation between ownership and control to perform better due to the decreased agency costs. Applying their theory on our top five performing companies would suggest that operative decisions will, to a broader extent, be taken in order to maximize the shareholder value than for companies where the connection between ownership and control is lower which would imply a higher return on equity. Further evidence supporting the importance of owner structure could be found in an article by Kachaner et al (2012). They state that family firms, which according to them are known for having a close connection between ownership and control, tend to outperform companies with other owner structures. The similar nature of owner structure within our top five performing companies suggest that the reduced agency costs associated with a close connection between ownership and control could be one explaining factor to why these companies performed

³⁵ Remy AS, Rem Invest AS, Barentz AS

³⁶ Finn Amund Norbye owns 117,478 shares (ca 10 NOK) and Fredrik Halvorsen none (annual report, 2011)

well. This is also in line with the findings made by Tsionas et al. (2011) regarding the correlation of ROE and concentration of ownership within the international shipping industry. However, since we have solely looked upon the owner structure within the top performing companies it may be plausible that some companies at the other end of the performance scale shows similar owner structures. What can be concluded though, is that within our selection a common denominator for the best performers is the close connection between ownership and control.

Additionally, the owner structure for our examined companies is often highly complex with cross ownership and holding companies with poor transparency. Hence, it is possible for companies to transfer stocks from one company to another and thereby change a number of key ratios with a simple transaction. This clearly makes comparisons with companies a bit problematic. An example of similar transaction is the one made by Bonheur in 2006 as they acquired control right in Gagner Rolf.

5 Summary and Conclusion

This paper has presented an overview of the main theories on capital structure and their applicability on the Norwegian shipping industry. It was further investigated whether the capital structure had an explanatory power on the companies' performance in terms of return on equity and enterprise value.

To test the correlation between enterprise value and solvency was a multiple of the enterprise value divided by EBIT plotted against the solvency. We found a weak positive, close to a no-correlation, which gives some support for their theory that the enterprise value is independent of how the company chooses to finance its assets. We further found that the second-degree polynomial correlation to have a higher explanatory power, suggesting that the tradeoff theory should be superior in describing how capital structure choices affects the enterprise value. We could further conclude that the company's degree of equity financing increases as the volatility in their earnings before interest and tax expenses increases. This is in line with Leary and Roberts (2005) and an implication of this is thus that companies tend to adjust their leverage and limit their financial risk after their operational risk.

By plotting return on equity against the solvency ratio for all our examined companies we found that companies with either a very low or high solvency ratio tend to have a lower return on equity than their peers with a more moderate level of debt. Our findings are aligned with the tradeoff theory, which states that there is an optimal capital structure and companies. However, within a more normal interval of solvency our findings suggest that the capital structure has a limited explanatory power on the performance.

Moreover, by examining the number of observations at each solvency ratio and contrast them with what we could expect from a random and normal distribution we were able to conclude that there is a favored solvency ratio in our sample of Norwegian shipping companies. This result insinuates that the capital structure is not irrelevant and that companies try to stay within a specific interval of solvency, which gives further support for the tradeoff theory and that an optimal capital structure exists for the listed Norwegian shipping companies.

Regarding our top performing companies we can conclude that one of the common denominators were that they operated in the offshore segment and had a single family as the majority owner and moreover a close connection between the ownership and control. However, we were not able to draw a conclusion concerning the solvency ratio.

6 Implications for Future Research

We would like to conclude the process of writing this thesis with one word; perspective. We consider that it is worth mention this word even though you certainly are aware of it and its implications. It was our tutor Thomas Polesie who brought this word to our attention at a meeting and it affected our way of thinking as it increased our awareness of the wide range of possible perspectives there are to analyze a subject from when writing a thesis. Different individuals will probably look at one company differently if you are for say an engineer, economist or human resource person and it is thus important to decide what you are to write about and what you want to analyze. We would say that it is extra important today as a lot of information is available and it is easy to analyze the data. It is therefore from a strategic point of view important to decide what you want to measure and to assure yourself that what you have measured is what you intended to measure.

Our thesis has taken a capital structure approach in analyzing the profitability and enterprise value of different Norwegian listed shipping companies between 2005 and 2011. Further, there are a lot of different assumptions made in these theories and we chose to take a macro perspective look, which relies on the assumption that there is an efficient market. Different economists would certainly have taken different perspectives in this case of study but we thought that it was interesting to analyze the chosen methods applicability on the shipping industry. We run into various interesting areas as the writing of this thesis and we would like to present some of these ideas below. We have assumed in the writing of these suggestions that you are about to write your bachelor thesis in the subject of accounting and that you therefore have acquired the necessary skills for doing that.

6.1 Accounting Principles

Taking it to the extreme there are two different kinds of companies; capital intensive and labor intensive. Capital-intensive companies have low capital turnover rate but higher profit margins. Labor-intensive companies on the other hand have smaller balance sheets compared to their turnover and thus lower profit margin given that the companies had the same profitability. The shipping companies are a highly capital intensive industry and the accounting principles used to value the assets are hence of high importance. Investors as well as creditors need to understand which accounting principles that are used and how they affect the company's results. Pettersson (2011) concluded that the majority of the shipping companies in Europe are using the acquisition method as accounting principle for valuing their fleet which implies that they need to depreciate their fleets over a given period of time. The depreciation expenses will impact the company's future results and it is thus important that the used depreciation time period³⁷ is in line with the real lifetime of the asset. Thus, a fair and true view of the company's results shall be shown. This is important as we argue that a fair and true view enhances the comparison between companies as well as over years.

A further research area would therefore be to find out how different companies within an industry make different accounting choices and compare the choices. It would be interesting to contrast the choices between companies as well as over time³⁸ and combine this to see how it affects discounting

³⁷ Remember from the accounting class that the depreciation just moves the result from one period to another.

³⁸ We could observe that companies increased their depreciation periods during a year where the companies also experienced lower results.

cash-flows models.³⁹ Thus, it would be interesting to see how practitioners⁴⁰ adjust their cash flows models because of accounting choices and to make a model by one self to value the difference.

6.2 Operative Questions

Dreyer and Gronhaug (2004) investigated different types of flexibility and their impact on performance and concluded that financial flexibility had the highest influence as well as a positive effect. Further, Hagberg (2010) analyzed the Swedish shipping industry from a financial flexibility perspective and concluded that performance decreases as leverage increases while performance increases with increased cash holdings. Our own study concludes that higher volatility in EBIT* increases the company's solvency and it also showed support for the trade off theory implying that there is an optimal degree of leverage.

Thus, it would be interesting to take a wider perspective on flexibility and to study the effect operational flexibility has on performance. We observed three interesting aspects in how the companies can operate.

1. The first is how the companies choose to finance their fleet. That is to which extent leasing, debt, equity and other industry specific financing solutions are used and how does the chosen financing method influence performance.
2. The second is how the companies are managed and how they operate their ships. We found that companies used bareboat – and / or time charter to manage their fleet but it could be more ways to manage the fleet as well.
3. It would further be interesting to compare the profitability within or between segments to see how they differ and to examine if there are companies listed within a country that are more profitable than companies listed in other countries.

Leasing consists as of this date of operational and financial leasing. A simplified distinction is that operational leasing is used short-term and therefore not included on the balance sheet while financial leasing could be seen as long-term investment and is therefore part of the balance sheet. We argue that this implies that companies using short-term leasing make it to adjust for a temporary higher demand, which would implicate that they have a higher level of flexibility alternatively that they take a lower level of risk. This further suggests that companies using financial leasing might use leasing for other reasons⁴¹. That could for example be that they have problems to finance their fleet in the usual way with debt or equity, which therefore suggests that these companies generally perform less well.

This is only how we argue and it would therefore be interesting to analyze the shipping industry from the above-mentioned aspects and to examine if it affects performance in any specific direction.

This kind of question could be investigated from a quantitative or qualitative perspective and we recommend reading a method book or discussing it with your tutor before you decide which approach you shall apply.

³⁹ Different depreciation horizons solely leads to that the depreciation expenses are moved over different accounting periods and the nominal expense is thus the same. However, money has time value, which therefore makes money today more valuable than money tomorrow.

⁴⁰ For example investment analysts at banks and mutual funds and how much extra work it creates.

⁴¹ In an efficient market leasing should be equally expensive as lending from a bank. In reality, leasing generally causes higher interest rates than lending and it implies that lending from this perspective should be preferred. Leasing on the other contributes to increased flexibility.

We will from our own experiences and perspective present some possible disadvantages with using a quantitative approach:

1. This might very well be a dead end in this research with no real conclusion.
2. There will be a lot of statistical testing.
3. The accounting principles regarding leasing are about to change
4. It might be difficult to differentiate financial leasing from operational leasing as firms prefer to keep all their leasing as operational to avoid to have to put it as an asset which decreases their solvency.

6.3 Access to Financial Markets

We have put little effort in contrasting the demand and supply on securities⁴². It could be seen as a trivial view but we believe that taking this perspective would contribute to a deeper understanding of finance and to be useful when analyzing the different theories and to not make logical fallacies⁴³.

A company's performance can be seen as the supply side while the investor's and creditor's required rate of return can be seen as the demand side. This would implicate that a company can increase their value by improving its performance or if the investors lowers their required return. The highly capital intensive nature of the shipping industry creates a large demand for funds and these companies could therefore increase its enterprise value if they could convince the banks to decrease the interest rate. Akerlof (1970) examines the information asymmetry between companies and concludes that the parties involved in a transaction discount their price when information asymmetry exists, as they are afraid of "buying the lemon". This implies that an increased transparency could be one way to go to decrease the creditor's required return, thus increasing the enterprise value, as the risk of "buying the lemon" is reduced. This question would be interesting to investigate as the Norwegian shipping industry tends to be dominated of cross holding structures, which reduces the transparency. KPMG (2012) stated the same and added that the earnings in the shipping tends to be volatile as well. It would further be interesting to compare listed companies with un-listed to observe if their performance differs. Numerous researchers have argued that firms with better access to capital markets, older companies, firms with bond ratings and larger companies have better performance. It would thus be interesting to examine these imperfections closer to try to explain why these differences exist.

6.4 Extend the Sample

Another research question would be to do a similar study as our but to extend the used sample to the entire Europe. This would give a broader base to analyze and it would also make it possible to make a better differentiation between segments as well as a comparison between countries. It could thus explain, to a larger extent, which segments that tend to perform better / worse and if there are any country specific differences. One might expect that the best performing companies tend to come from the same region, as they would benefit from the formed clusters. This could further contribute to an analysis of the relative performance of different segments.

⁴² As for example bonds and stocks.

⁴³ The equation states that Enterprise Value = Market cap.+Debt-Cash but if fails to discuss the interaction between the market participants. A buyer need a seller to be able to buy the item as well as a seller needs a buyer to get rid of his asset.

6.5 Single Case Study

Our results implicated that capital structure cannot explain the entire story of how the company performs. Hence, it would be interesting to get a single case study of a specific company where a deeper analysis of this company is possible. We would suggest that a fundamental analysis is made consisting of relevant ratios as well as a thorough background of the company and the industry. This would for example include the previous mentioned operational questions as well as interviewing a shipping company to gain a deeper understanding of the industry before the ratio analysis is made.

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Appendix

Exchange Rates NOK/USD

Year	NOK/USD
2011	5,6074
2010	6,0453
2009	6,2816
2008	5,6361
2007	5,86
2006	6,418
2005	6,445

Source: Norges Riksbank

Weighted Averages

Years	Un-weighted	Weighted	Difference
2005	17,30%	18,54%	-1,24%
2006	16,08%	14,54%	1,54%
2007	14,26%	10,44%	3,82%
2008	-8,41%	-3,70%	-4,71%
2009	-9,47%	15,03%	-24,50%
2010	-3,19%	2,71%	-5,90%
2011	-17,35%	2,12%	-19,47%

All Companies

Företag	Segment	ROE	Mean solvency	Solvency 2005	Solvency 2011
Rem	Offshore	249%	46%	67%	35%
Havila	Offshore	213%	27%	22%	23%
Belship	Bulk	195%	44%	40%	42%
Deep sea supply	Offshore	194%	28%	32%	23%
Bonheur ASA	Offshore	194%	50%	92%	44%
Wilh wilhemsen	Ro-ro	161%	35%	37%	38%
Farstad	Offshore	152%	43%	42%	47%
Wilson	Bulk	136%	32%	36%	28%
GC Rieber Shipping	Offshore	130%	53%	47%	50%
Odfjell	Tanker	115%	32%	35%	40%
Siem	Offshore	107%	50%	76%	39%
Solstad	Offshore	89%	35%	38%	28%
Dockwise	Offshore	62%	49%	51%	59%
Solvang	Tanker	21%	85%	90%	88%
Im skaugen	Tanker	4%	30%	30%	30%
Eidesvik	Offshore	-47%	36%	44%	38%
Star reefers	Bulk	-49%	59%	39%	65%
Hurtigruten	Passagerare	-55%	24%	27%	26%
BW offshore	Offshore	-56%	37%	18%	32%
Eitzen Chemical	Tanker	-98%	23%	0%	9%
Jason shipping	Tanker	-124%	6%	28%	-80%