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Financing in the Ship-owning Industry

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<p>Abstract:</p> <p>This is a study of how ship-owning companies finance their investments. 27 ship-owning companies listed on Oslo Børs are included in the study, from both OSLO Shipping Index and OSLO Energy Index. The companies represents four segments, offshore, LNG and LPG, bulk and tank, hence the thesis also questioners if there are differences between the segments. The pecking order theory, the static trade-off theory and the Miller and Modigliani’s propositions are the three financing theories that form the basis of the theoretical framework. The results from the regression analysis are discussed relative to the three theories. The results from the industry regression analysis indicate that interest rate affects companies when considering increasing share capital. The higher interest rate the higher probability of increasing share capital. The segment regression analysis could not prove that there are differences between the segments, due to lack of statistical significance. In conclusion, Miller and Modigliani’s propositions seems best to describe financing in the ship-owning industry.</p>
<p>Keywords: Financing, ship-owning, capital structure, debt/equity ratio, offshore, LNG, LPG, bulk, tank</p>

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1 Abbreviations

AHTS	-	Anchor Handling Tug Supply Vessel
GDP	-	Gross Domestic Product
LNG	-	Liquid Natural Gas
LPG	-	Liquid Petroleum Gas
MPV	-	Multi Purpose Vessel
OSCV	-	Offshore Subsea Construction Vessel
OTC	-	Over the Counter
PSV	-	Platform Supply Vessel
R&D	-	Research and Development

2 Introduction

Shipping has existed in over 5000 years and the first sea trade network we know of was between Mesopotamia, Bahrain and Indus River. Shipping is constantly changing and shipping today is far from shipping 5000 years ago. Thanks to the discovery of the global sea routes in the late fifteenth century, the industrial revolution in the late eighteenth century and the dismantling of the colonies in the second half of the twentieth century, shipping went from slow and expensive by land to a tightly knit global business community (Stopford 2008, p. 45).

Access to capital is central in building a business community like the shipping industry. High investments cost, due to highly technological vessels, require ship-owners who know how to get funding.

“Because shipping is such an old industry, with a history of continuous change, sometimes gradual and occasionally calamitous, we have a unique opportunity to learn from the past.”
(Stopford 2008, p. 4)

Finding out how ship-owning companies finance their investments, by using historical data and learn from the past 16 years, is the objective of this study. Hopefully, the study will provide answers to financing in the ship-owning industry.

2.1 Motivation

Financing is an important stage in starting an asset-based company such as ship-owning companies. Knowledge of financing and capital can be a prerequisite for the company to create innovative products and services. The CEO of Havila Shipping said in an interview with Sysla (Aadland 2014) that it is important to maintain the maritime cluster in Norway to keep a leading position in the shipping industry. Adjacent to this he mentioned finance as an area of focus among ship-owners, yards, classification-companies, suppliers, insurance and Norwegian mariners. The interview was given when the company flagged out one of their ships to Bahamas because sailing under the Norwegian flag led to inconvenience. This is unfortunate for the maritime industry in Norway.

The maritime industry, which ship-owning companies are a part of, is a knowledge-based industry and important for the Norwegian trade. Norway is a global leader in the field and almost 90 000 people are employed by the maritime industry directly (Nærings-

ogFiskeridepartementet 2014). Flagging ships out to other nations is affecting the seafarers' rights and obligations in the economic, social and welfare issues (Solhaug 2014). Flagging out ships can potentially lead to a defection in the maritime industry and a delay in the development of the knowledge-based industry, including ship-owning companies.

The industry is important to keep Norway's gross domestic product on a high level. According to the Norwegian Ministry of Trade, Industry and Fishers, the maritime industry represents 6-9 percent of the value creation in Norway (Nærings-ogFiskeridepartementet 2014). Research and development in the financing field may help the ship-owning industry with acquiring capital and facilitate further growth. Understanding when and why one should use the different financing methods is important to make the growth that Norway has experienced sustainable.

I have a Bachelor of Science in Marine Technology from Bergen University College. When choosing a topic for my Master thesis, I wanted to apply my maritime knowledge in the study. Additionally, I find Corporate Finance in the master program very interesting and saw this as an opportunity to learn more about the topic. This way I could combine the two topics and study the industry that will be my future work environment. Within Corporate Finance, I chose to study financing. In combination with my marine background, the topic turned out as financing of ship-owning companies. If the future brings me the opportunity to start my own business within the maritime industry, I see financing as a very important part of the start-up process. Knowing how to acquire capital can be crucial for a company's future. This thesis will hopefully give me knowledge about how to prepare for when starting my own business, and maybe more important at this time, how to understand financing in my upcoming position as a project engineer in a ship-owning company.

2.2 Problem Definition

The pecking order theory, the static trade-off theory and the Miller and Modigliani's propositions are the three financing theories that form the basis of my theoretical framework. The theories have different views on capital structure and I want to find out if the ship-owning industry is basing financing decisions on one of these theories.

To get a hold of the financing theory that reflects the industry's financial behavior, I will investigate if given variables affect the companies when they decide to increase share capital. This leads me to the first research question:

1. How does ship-owners finance their investments?

The shipping cycles are known for its volatility, but the fluctuations within different shipping segments vary. For instance, the cycles in the tank-segment are more volatile than the offshore segment as a result of the high activity in the North Sea. Because of constant operations in the North Sea, the offshore-segment will be relatively stable with small fluctuations. In other words, the activity and the need of capital vary within the ship-owning industry and differences between segments can be expected. This leads me to the second research question:

2. Are there differences between companies operating the offshore, LNG and LPG, bulk and tank segment?

2.3 Scope of the Thesis

The scope of this thesis is restricted due to the limited time available. The study includes 27 Norwegian Oslo Børs listed companies picked from OSLO Shipping Index and OSLO Energy Index. This makes the term ship-owning more suitable in the context of this study, it includes companies at the Oslo Børs Shipping Index as well as ship-owners in the offshore segment listed at Oslo Børs Energy Index.

This study is carried out by analyzing financial data collected from databases. Collecting information from databases as Oslo Børs is convenient in several ways; the researcher does not need to consider when respondents are available for interviews, the data is available at any time, it strengthens the reliability of the thesis and privacy protection is not a concern. The sampling of the companies will be explained thoroughly later in the thesis.

There are no commercial restrictions for this thesis since all the information is public. Therefore, privacy protection is not a concern. Also, this enables a sooner start of data collection thus further work with the thesis. Unless a thesis has restrictive access, companies listed at Oslo Børs rarely disclose possibly sensitive information. Restricted access could have

been an alternative approach in this case, but collecting qualitative data from 27 companies is beyond the scope of this thesis.

In order to narrow down even further I chose to focus on three financing theories and analyze my results in light of those. The recognized financing theories are Miller and Modigliani propositions, the static trade-off theory, and the pecking order theory.

3 Theoretical Framework

In this chapter the ship-owning industry, its cycles, ship finance and shipping economy will shortly be presented. Further, an explanation of how to finance ship-owning companies by private funds, loan and by getting new shareholders. The chapter ends with a presentation of Miller and Modigliani's propositions, the static trade-off theory and the pecking order theory.

3.1 The Ship-owning Industry

Ships do 90 percent of the world trade today. Assumingly, the need for shipping will grow in the future. Shipping is the most efficient and environmental friendly way of trading goods, both domestically and between countries in Europe. Taking care of the environment is a highly relevant topic these days and argues to facilitate further growth in the shipping industry. Shipping is important for further growth in the world economy (Stopford 2008).

Norway is one of the largest shipping nations with an advanced maritime environment. Measured in number of listed companies, Oslo Børs is the largest shipping stock exchange in Europe and the second largest worldwide (OsloBørs 2014). Norwegian ship-owning companies represent an important role in the Norwegian trade. In 2011, the shipping industry had almost 5% of the added value in Norway and all together the maritime industry had 10% of the added value.

The ship-owning market is affected by the business cycles; the volatility creates high profit opportunities but can also lead to large losses for investors. This is why the interest of doing investments in shipping companies distinguishes from investing in other asset-based businesses. According to Norwegian Ship-owners Association, Norwegian shipping companies points out that it is hard to get access to capital to make new investments (NorgesRederiforbund 2013). Limited access to capital is a factor that can slow down further growth and innovation in the industry. It is important for the Norwegian government to facilitate growth and make the Norwegian shipping interesting and investable to keep the industry in Norway.

3.1.1 The Shipping Cycle

The shipping cycle consists of four stages; trough, recovery, peak and collapse. The repeating character of the cycle is distinctive. This is an overview of the different stages in order to explain how the shipping cycle development can affect the choice of financing.

Trough has three characteristics; ships queuing at loading-points, fall in the freight rates and financial pressure. Low freight rates can lead to negative cash flow and in extreme cycles, this can result in banks foreclosing. Ship owners might have to sell modern ships at distress prices well below their book value to increase funds. As the wave of difficult decisions passes and the market starts to correct, the crisis declines.

The next stage is *recovery*, when supply and demand move towards balance. The freight rates starts to level the operating costs and there are fewer vessels at the quay. The market sentiment is still perceived as uncertain, but gradually confidence grows.

During a *Peak/Plateau* freight rates rise, often two or three times operating costs. In extreme cases, it can actually be as much as 10 times. The duration of the peak can be a few weeks, but a peak can also last for several years. High earnings increase liquidity and the banks agree to lend against strong asset values. Modern vessels sell for more than the new building price and new building orders increase.

As supply overtake demand, the market moves into the *collapse* phase and freight rates fall precipitately. Spot ships built up in key ports, low freight rates and reduced operating speed for ships recognize this stage. Few companies sells their ships and the liquidity remains high (Stopford 2008).

“Ship owners and shippers are on the opposite sides of the shipping risk distribution, and when supply and demand get out of balance, one or the other loses money.”(Stopford 2008, p. 102)

Summarized, the supply-demand balance forms the cycles. There will always be losers and winners, but ship-owners and shippers will not be winners at the same time. The winner at a given point is a result of the supply-demand balance in either the market or the world. Easier access to capital seems to be whenever the ship-owner is the winner. The ship-owning industry is asset based and in times with strong asset value, the bankers are willing to lend more money. Additionally, investors show interest in the companies, especially in the stage of recovery when the stock price is still low. The need for capital is often at its highest when times are bad and increasing share capital is expensive.

3.1.2 Ship Finance and Shipping Economics

Starting a shipping company requires a lot of capital. The investment costs are often very high as shipping is an asset-based industry. Offshore and supply vessels are specked with

technological equipment and might have a \$ 100M price tag. Therefore, the company must find the best way to finance both their new builds and the company in general in order to get profitable. According to Stopford (2008) shipping is regarded as a specialist business. It differs from other asset-based businesses because of the international mobility; a ship-owner can choose the legal jurisdiction of the vessel. This means that ship-owners can choose legal jurisdiction out of economic considerations. Some countries, Bahamas for instance, will be a preferred country to register a vessel, because of advantages such as, trading mobility, reduced taxes and reduced wage costs (Bahamas registered vessels are allowed to hire crew from foreign countries).

Banks are often more interested in recessions than booms, in the ship-owning industry. Stopford (2008), explains this with their interest in getting repaid, because bankers just get paid interest. For bankers, the value of the firm is only a concern whenever the debt exceeds the value. Investors on the other hand, look at the investments potential and often consider those with high profitability, thus high risk. The lenders and shareholders payoff is comparable to selling and buying options exemplified in figure 1.



Figure 1 Payoff when selling and buying call options

The lenders payoff is comparable to selling a call option since the bank loses money first when the firm’s debt is greater than the value. Hence, lenders are concerned about recessions and not so interested in booms. Recessions can lead to losses but a lender will never take advantage of a boom because they are solely paid by interest.

Shareholders payoff can on the contrary be compared to buying a call option. Unlike the lenders, a shareholder will not get payoff as long as the company’s value and debt are equal.

If the value of the firm exceeds the firm's debt however, the shareholders will earn payoff for the excess amount. These two statements have an interesting connection to the financing theories presented later in the chapter.

3.2 Ways of Financing Ships and Ship-owning Companies

There are several ways to finance ships and ship-owning companies. In the following chapter, three financial sources for doing so are presented, starting with private funds.

Private funds are capital the company holds. For start-up companies, the initial funding often comes from heritage, investments or loans from family and friends. For existing companies, new investments can be made with capital from the already existing cash flow. If the company does not possess a sufficient amount of money, several financing methods can be combined. This leads us to the next financial source, debt financing.

In order to retrieve funds, loaning capital occurs frequently. According to Stopford (2008) bank loans are the most important source of ship finance. Loaning capital is advantageous as it leaves the company with full ownership of the business. On the other hand, interest rate is a concern when considering a bank loan as it might be very expensive for the company. Over time, the expenses in total may even exceed the losses affiliated to selling shares to increase equity. Companies issue bonds when they wish to borrow money from the public on a long-term basis. Issuing a bond is often done when the company's internal capital sources do not cover the bank's capital requirement, comparable to a top-up loan. Buying a bond from a company means that you lend the company an amount of money. The bond issuer will pay an interest, called the coupon, but none of the principal will be repaid until the end of the lending period. The cash flow from a bond is constant resulting in a fluctuating value. When interest rates in the marketplace rise, the bond is worth less and opposite when the interest rates fall (Ross, Westerfield et al. 2007).

The final method for financing is to search for funding in the equity markets. By making a public offering of shares, the company can increase equity. Searching for funds in the capital market is often a less preferred method for finding funds. The owners must give up parts of their stocks, which over time, can cause a greater loss than paying interest. The price of financial distress is on the other hand unknown and increasing share capital can be profitable

in some periods. According to Stopford (2008), large companies that is known and accepted by the financial institutions have an advantage in the capital markets. Until the 1990s, a limited group of shipping companies was accepted. During the 1990s, the shipping industry became more active on the stock exchanges around the world and developed public offering of equity as a capital source. It has remained a minor player in ship finance because most of the ship-owning companies are small and do not have the same need for raising very large sums of money (Stopford 2008).

Capital structure is a key issue in finance; it shows the company's debt willingness. Below are four tables showing the debt/equity ratio for the companies in this study, the tables are established based on numbers from the companies' 2012 annual reports and proff.no.

Company	Equity	Debt	Debt/equity ratio
Bonheur ASA	NOK 12 387 286 000.00	NOK 17 215 869 000.00	1.39
BW Offshore Limited	USD 1 127 100 000.00	USD 2 296 700 000.00	2.04
Deep Sea Supply Plc	USD 157 007 000.00	USD 608 703 000.00	3.88
DOF ASA	NOK 6 749 000 000.00	NOK 25 005 000 000.00	3.70
Eidesvik Offshore ASA	NOK 2 201 415 000.00	NOK 3 430 031 000.00	1.56
EOC Limited	NOK 157 545 000.00	NOK 475 168 000.00	3.02
Farstad Shipping ASA	NOK 6 849 488 000.00	NOK 8 788 243 000.00	1.28
GC Rieber Shipping AS	NOK 1 795 092 000.00	NOK 1 750 413 000.00	0.98
Havila Shipping ASA	NOK 2 008 164 000.00	NOK 6 677 006 000.00	3.32
Oceanteam Shipping ASA	USD 112 068 000.00	USD 189 344 000.00	1.69
Ocean Yield ASA	USD 533 000 000.00	USD 965 400 000.00	1.81
Siem Offshore AS	NOK 26 445 000.00	NOK 42 615 000.00	1.61
Solstad Offshore ASA	NOK 4 664 512 000.00	NOK 10 042 945 000.00	2.15

Table 1 Capital structure in the offshore segment.

Company	Equity	Debt	Debt/equity ratio
BW LPG	NOK -311 564 000.00	NOK 686 522 000.00	-2.20
Höegh LNG Holdings	NOK 162 819 000.00	NOK 176 443 000.00	1.08
I.M. Skaugen	USD 54 665 000.00	USD 157 763 000.00	2.89
Solvang	NOK 533 026 000.00	NOK 76 566 000.00	0.14

Table 2 Capital Structure in the LPG and LNG segment.

Company	Equity		Debt		Debt/equity ratio
Golden Ocean Group Limited	USD	538 296 000.00	USD	572 083 000.00	1.06
Jinhui Shipping and Transportation Limited	USD	853 499 000.00	USD	632 379 000.00	0.74
Odfjell SE	NOK	947 907 000.00	NOK	1 220 841 000.00	1.29
Western Bulk ASA	USD	100 882 000.00	USD	140 863 000.00	1.40

Table 3 Capital structure in the bulk segment.

Company	Equity		Debt		Debt/equity ratio
American Shipping Company ASA	USD	41 889 000.00	USD	919 300 000.00	21.95
Belships ASA	NOK	290 728 000.00	NOK	95 402 000.00	0.33
Eitzen Chemical ASA	USD	-32 144 000.00	USD	994 766 000.00	-30.95
Frontline Limited	USD	131 149 000.00	USD	1 557 072.00	0.01
Saga Tankers ASA	USD	31 572 000.00	USD	3 488 000.00	0.11
Stolt-Nielsen Limited	USD	1 486 817 000.00	USD	2 304 211 000.00	1.55

Table 4 Capital structure in the tank segment.

The average for the offshore segment is 2.1, the LNG and LPG segment 1.37, the bulk segment 1.122 and the tank segment -1.16. In comparison, the ten largest companies in Norway in 2011, ranked by revenue, had an average debt/equity-ratio of 3.07. The four segments in the ship-owning industry have all a debt/equity-ratio below the average for Norway's top ten companies. This indicates that the ship-owning industry in general is less leveraged than the largest companies in Norway are. The volatile market in the ship-owning industry may be a reason for the difference. The debt/equity ratio expresses the degree to which a business is geared to sustain losses before it affects the lenders. In a volatile market, the cash flow will have significant variations; high degree of leverage can be hard to operate in the stage of a trough.

3.3 Miller and Modigliani's Propositions.

The principal of Miller and Modigliani's two propositions is based on a world without corporate taxes. Proposition I states that it is irrelevant how a firm chooses to arrange its finances. In other words, different capital structure cannot change the value of the firm and no capital structure is any better or worse than any other capital structure for stockholders. Cost of capital is also unaffected by the firm's capital structure (Ross, Westerfield et al. 2007). Proposition II states that the cost of equity depends on the required rate of return on the firm's assets, the firm's cost of debt and the firm's debt/equity ratio (Hillier, Clacher et al. 2011).

Miller and Modigliani's propositions is often referred to as the traditional financing principle. It argues that the firm's overall cost of capital cannot be reduced as debt is substituted for equity, even though debt appears to be cheaper than equity. Why? When the firm adds debt, the remaining equity becomes risky and then when the risk rises, so will the cost of equity capital.

According to Ross, Westerfield et al. (2007), Miller and Modigliani have a convincing argument that a firm cannot change the total value of its outstanding securities by changing the proportions of its capital structure. This indicates that managers cannot change the value of a firm by repackaging the firm's securities. Though this idea was considered revolutionary when originally proposed in the late 1950s, the Miller and Modigliani approach and proof have since met wide acclaim and been challenged by other theories.

3.4 The Static Trade-off Theory

The theory of capital structure has been dominated by the search for optimal capital structure where the company is eager to reach an optimum. Optimums normally require a tradeoff, for example between the tax advantages of borrowed money and the costs of financial distress when the firm finds it has borrowed too much (Shyam-Sunder and C. Myers 1999). Optimum varies between companies and finding it involves advanced calculations and is dependent of the market cycles.

According to the trade-off model, each firm balances the benefits of debt, such as the tax shield, with the cost of debt, such as distress costs. The optimal capital structure for a company varies, however the debt/equity ratio for asset-based industries tends to be approximately two.

The optimal capital structure depends on whom it is going to benefit. Changes in capital structure benefit the stockholders if and only if the value of the firm increases. In the presence of corporate taxes having debt is positive related to the firm's value. A leveraged firm pays less in taxes than the all-equity firm does. In addition, the value of a leveraged firm is greater than

the value of an all-equity firm, because the value of the firm is the sum of debt and equity. The illustration in figure 1 conveys this example in a simple matter.

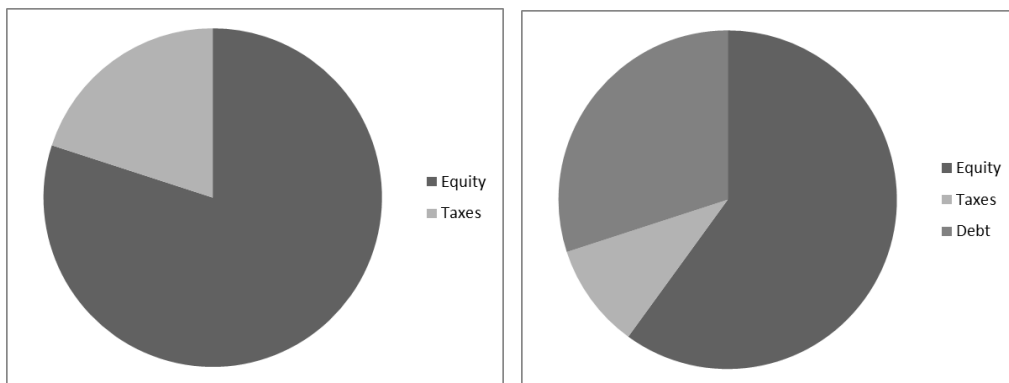


Figure 2 Value of the firm with and without debt, made by author inspired by Ross, Westerfield et al. (2007)

Tax deductions on the company's earnings, due to debt, gives the company greater profit. Why different companies choose different capital structures is often a result of the company's or the manager's attitude to debt.

3.5 The Pecking order Theory

Although the trade-off theory has dominated corporate finance circles for a long time, attention is also being paid to the pecking order theory (Ross, Westerfield et al. 2007).

According to Shyam-Sunder and C. Myers (1999), the basic pecking order model, which predicts external debt financing driven by the internal financial deficit, has much greater time-series explanatory power than a static trade-off model, which predicts that each firm adjusts gradually toward an optimal debt ratio. According to the pecking order theory, changes in debt/equity ratio are driven by the need for external funds, and not by reaching an optimal capital structure.

Ross, Westerfield et al. (2007), states that if a firm issues stock, the firm was likely overvalued beforehand. Opposite, if a firm issues debt, the stock was likely undervalued. This indicates that timing is the financial manager's only consideration in financing issues when following the terms of the pecking order theory.

The theory of the pecking order provides two rules. Rule number one; use internal financing, meaning that if the company has capital it will use this first to finance new investments. Rule number two; issue the safest securities first. Issue straight debt before issuing convertibles. In this context, safe means that the decision is not affected by revelation of a managers' inside

information. This means that a company will always use retained earnings before they issue debt and they will always issue debt before they issue stocks.

Implications to this theory are that there is no target amount of leverage; each company chooses its leverage based on financing needs. Second, profitable firms use less debt. Profitable firms are in less need for financing because they use generated cash to finance their investments. Third, companies like financial slack. The pecking order theory is based on the difficulties of obtaining financing at reasonable costs. If the company can be ahead of time and possess capital that they use to fund profitable projects in the future, this can make the company independent of the capital markets when a project comes up (Ross, Westerfield et al. 2007). When profit is transferred to equity to finance future investments, it is unlikely that these companies will pay dividend.

4 Hypothesis

4.1 Miller and Modigliani's Propositions

If Miller and Modigliani's propositions reflect the industry's pattern of financial decisions, it is expected that the dependent variables do not correlate with the independent variable. If the results of the regression analysis indicate that the correlations are not statistically significant, it is reasonable that Miller and Modigliani's propositions is the theory that best reflects the companies financing decisions. Miller and Modigliani's perception of no optimal capital structure is the basis for this statement. If a company considers an investment and needs capital, all financing methods are considered regardless of capital structure. The expected correlations for the Miller and Modigliani Theory are:

- Interest Rate Level – Do not expect statistically significant coefficients
- Global GDP Growth – Do not expect statistically significant coefficients
- Issuance of bonds – Do not expect statistically significant coefficients
- Decreased Share Capital – Do not expect statistically significant coefficients

4.2 Static Trade-off Theory

The static trade-off theory is based on an optimal capital structure; hence, the company is interested in keeping the debt/equity ratio at the point of maximal value of the company. The interest rate level is positive correlated with increasing share capital. When the interest rate rises, financial costs rise. The cost of selling shares may then be regarded as smaller than the financial costs related to loans. If the global GDP growth is low, the companies will probably have a smaller cash flow and the debt/equity ratio will increase. To avoid this, the company can increase their share capital by selling stock. In other words, with the static trade-off theory, global GDP growth is assumingly negatively correlated with increased share capital. Issuance of bonds can be interpreted as a move to adjust the capital structure. Issuance of bond could have been done to increase the debt/equity ratio because they have done or are supposed to increase share capital. Decreasing share capital might be a move to adjust the debt/equity ratio, by using equity to buy shares back to the company. Decreasing share capital is negatively correlated with increasing share capital because the actions offset each other. If the company choose to decrease share capital it is unlikely that they would increase share

capital at the same time. A company should buy own shares when the stock price is low and sell when it is high. The expected correlations for The Static trade-off theory are:

- Interest Rate Level – Positive
- Global GDP Growth – Negative
- Issuance of bonds – Positive
- Decreased Share Capital – Negative

4.3 Pecking Order Theory

According to the pecking order theory, managers that adhere to this financing theory always use internal financing first and stocks are only sold if the interest rate level makes debt unattractive. Assuming that the pecking order theory best reflects the reality, the expected result in the study, is a positive correlation between interest rate level and increased share capital and a negative correlation between the coefficient of global GDP growth. It is conceivable that growth in the Global GDP leads to increased cash flow, which in turn gives the opportunity of internal financing. Not paying dividend is an element recognized in the pecking order theory. Instead of paying dividend, the company saves the profit in good times to finance investments in bad times. The expected correlations for the pecking order theory are:

- Interest Rate Level – Positive
- Global GDP Growth – Negative
- Issuance of bonds – Negative
- Decreased Share Capital – Do not expect statistically significant coefficients

5 Methodology

The objective for this thesis is to identify if there is a pattern in ship-owning companies' financing strategies. The goal is to present a picture of the financing strategies through data collection from Oslo Børs, Proff and the companies' webpages. The choice of method, explanation of the data collection and an evaluation of the validity of the thesis are presented in the following chapter.

5.1 Multiple Case Study

Doing case study research is the preferred method, in situations when (1) the main research questions are «how» or «why» questions; (2) the researcher has little or no control over behavioral events; and (3) the focus of study is a contemporary (as opposed to entirely historical) phenomenon (Yin 2012). All of the three circumstances are present in this study; by using historical data, it is anticipated to find out *how* ship-owning companies finance their investments. Using historical data to conduct an analysis gives the researcher *no control over behavioral events*. The focus of the study is to examine how financing companies finance their investments, considered as a contemporary phenomenon.

In this thesis, several individual companies are looked into, thus each company represent an individual case study. All together, the individual case studies combined with a study of the industry as a whole makes the study a multiple-case study. In a multiple-case study each case must be carefully selected to ensure that it either (a) predicts similar results (a literal replication) or (b) predicts contrasting results but for anticipatable reasons (a theoretical replication) (Yin 2012). This case has both a literal replication and a theoretical replication. Literal because the results from the study of the industry is expected to give similar results, and theoretical because it is expected that there will be variations between the four represented ship-owning segments.

5.2 Data and sources

When the probability to be picked out is unknown, it is called non-probability sampling. This dataset is selected on discretionary basis, meaning that the researcher has picked out companies of interest. The area of interest in this thesis is ship-owning companies and the selection was based on the companies' presence at Oslo Børs. It is important to mention that this type of data sampling can lead to a less representative result. The risk is that the selected

units have a systematic deviation from the units in the universe, in this case the ship-owning industry, and the selection can be biased. The researcher might also select companies that has characteristics that agree with the preconceived ideas (Hellevik 1999).

5.2.1 The Selection of Companies

The selection of companies was made on the basis of OSLO Shipping Index and OSLO Energy Index. The term shipping is conservative and it would not be sufficient to include OSLO Shipping Index only. The requirement to get included in the thesis was that ship-owning is the company’s main activity, hence several companies in the OSLO Energy Index was excluded because the revenue stream came mainly from other activities. Ship-owners in the offshore segment falls into the Oslo Energy Index but are substantial in the ship-owning industry and it was a natural choice to include this group.

	Oslo Shipping Index	Oslo Energy Index
Oslo Børs	American Shipping Company	AGR Group (Offshore Services)
	Avance Gas Holding (Noted 15.04.2014)	Aker Solutions (Offshores Services)
	Belships	Aqualis (Offshore Services)
	BW LPG	Archer (Offshore Services)
	Eitzen Chemical	Atlantic Petroleum (E&P)
	Frontline	Bergen Group (Offshore Services)
	Golden Ocean Group	Bonheur
	Höegh LNG	BW Offshore
	Hurtigruten (Tourism)	Deep Sea Supply
	I.M. Skaugen	Det norske oljeselskap (E&P)
	Jinhui Shipping and Transportation	DNO International (operator)
	Odfjell	DOF
	Royal Caribbean Cruises (Tourism)	Dolphin Group (Geophysical Services)
	Stolt-Nielsen	Eidesvik Offshore
	Solvang	Electromagnetic Geoservices
	Siem Shipping	(Geophysical Services)
	Tanker Investments (Noted 25.03.2014)	EOC
	Western Bulk	Farstad Shipping
	Wilh. Wilhelmsen (Rolling Cargo Segment)	Fred. Olsen Energy (Offshore Services)
		Ganger Rolf (Tourism)
	Havila Shipping	
	Hafslund (Energy)	
	InterOil Exploration and Production (E&P)	

		<p>Kværner (Offshore Services)</p> <p>Northern Offshore (Drilling)</p> <p>Norwegian Energy Company (E&P)</p> <p>Ocean Yield</p> <p>Odfjell drilling (Drilling)</p> <p>Oceanteam Shipping</p> <p>Petrolia (E&P)</p> <p>Panoro Energy (E&P)</p> <p>Petroleum Geo-Services (Geophysical Services)</p> <p>Polarcus (Geophysical Services)</p> <p>Prosafe (Rig)</p> <p>Questerre Energy Corporation (Shale Services)</p> <p>Reach Subsea (Offshore Services)</p> <p>REC Silicon (Supplier)</p> <p>REC Solar (Energy Services)</p> <p>Rocksource (E&P)</p> <p>GC Rieber Shipping</p> <p>SeaBird Exploration (Geophysical Services)</p> <p>Seadrill (Drilling)</p> <p>Sevan Marine (Ship-building)</p> <p>Sevan Drilling (Drilling)</p> <p>Siem Offshore</p> <p>Solstad Offshore</p> <p>Songa Offshore (Drilling)</p> <p>Spectrum (Geophysical Services)</p> <p>Statoil (Energy)</p> <p>Subsea-7 (Offshore Services)</p> <p>TGS-NOPEC Geophysical Company (Geophysical Services)</p> <p>Wentworth Resources (E&P)</p>
Oslo Axess	<p>Aker Philadelphia Shipyards</p> <p>Awilco LNG</p>	<p>Awilco Drilling</p> <p>Badger Explorer</p> <p>Cecon</p> <p>EAM Solar</p> <p>FLEX LNG</p>

		MultiClient Geophysical North Energy Prospect Offshore Drilling REM Offshore S.D. Standard Drilling Transeuro Energy Corp.
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Table 5 An overview of all companies listed on Oslo Børs and Oslo Axess in the shipping and energy index. The brackets explain the reason for exclusion.

Oslo Børs recommend Oslo Axess for companies that have less than three years history and companies in a pre-commercial phase as these are not allowed access at Oslo Børs (OsloBørs 2014). This study uses data from 16 years back and has an objective of revealing financing trends, hence it would be disadvantageous to include companies from Oslo Axess that have a short history. Because of different requirements and short company history, the 14 companies from the indices listed on Oslo Axess were excluded.

To narrow down even further the companies' main activity were examined. Table 5 illustrates the selection process where the reasons for exclusion are written in brackets. The remaining companies were divided into four segments and the respective segments are offshore, LPG and LNG, bulk and tank.

5.2.1.1 Offshore

The offshore segment consists of companies that operate an offshore fleet. Typical vessels for this segment are ATHS, PSV, MPV and OSCV. These vessels are used to supply platforms, anchor handling operations, assist in operations, construct and maintain offshore constructions.

Company	Established	Fleet	Ticket	Year	Value(MNOK)
Bonheur ASA	1897		BON	1920	4894,72
BW Offshore Limited	1982	16	BWO	2006	5051,37
Deep Sea Supply Plc	2005	32	DESSC	2006	1361,01
DOF ASA	1981	77	DOF	2000	3287,12
Eidesvik Offshore ASA	1992	28	EIOF	2005	982,89
EOC Limited	2007	4	EOC	2007	565,87
Farstad Shipping ASA	1956	58	FAR	1985	4992,00
GC Rieber Shipping AS	1930	15	RISH	2005	2292,26
Havila Shipping ASA	2003	27	HAVI	2005	1017,05

Oceanteam Shipping ASA		6	OTS	2007	111,86
Ocean Yield ASA	2012	6	OCY	2013	4990,34
Siem Offshore AS	2005	46	SIOFF	2005	3577,47
Solstad Offshore ASA	1964	50	SOFF	1997	4332,75

Table 6 Company overview for the offshore segment, numbers from Oslo Børs 04.03.2014

5.2.1.2 LNG and LPG

Companies in the Liquefied Natural Gas and Liquefied Petroleum Gas segment is transporting gas. LNG and LPG vessels have the ability to reduce the volume of the gas by cooling it down. A LNG or LPG vessel is expensive to build, due to highly advanced tank system.

Company	Established	Fleet	Ticket	Year	Value(MNOK)
BW LPG AS	1935	42	BWLPG	2013	8960
Höegh LNG AS	1927	6	HLNG	2011	3406,59
I.M. Skaugen SE	1916	15	IMSK	1997	281,72
Solvang ASA	1936	18	SOLV	1938	549,05

Table 7 Company overview for the LNG and LPG segment, numbers from Oslo Børs 04.03.2014

5.2.1.3 Bulk

Vessels in the bulk segment are shipping dry cargo. The cargo is transported unpackaged in large quantities. Coffee, coal and shingle are examples of products that are normally shipped in bulk. The vessels are built for simplicity where the design focus is on cubic capacity, access to holds and loading equipment (DanishShipFinance 2014).

Company	Established	Fleet	Ticket	Year	Value(MNOK)
Golden Ocean Group Limited	2004	45	GOGL	2004	5979,89
Jinhui Shipping and Transportation Limited	1994	38	JIN	1994	2252,42
Odfjell SE	1914	90	ODF ODFB	1986 1989	3028,22
Western Bulk ASA	1982	9	WBULK	2013	2038,19

Table 8 Company overview for the bulk segment, numbers from Oslo Børs 04.03.2014

5.2.1.4 Tank

Tankers transport liquids in bulk with cargo space consisting of several tanks (Stopford 2008). The typical cargo is crude oil, gasoline and diesel. Tankers are often built for a specific cargo and specific routes.

Company	Established	Fleet	Ticket	Year	Value(MNOK)
American Shipping Company ASA	2005	5	AMSC	2005	2479,22
Belships ASA	1918	34	BEL	1939	283,16
Eitzen Chemical ASA	2001	50	ECHEM	2006	83,40
Frontline Limited	1985	48	FRO	1998	2431,19
Saga Tankers ASA	2010		SAGA	2010	214,34
Stolt-Nielsen Limited	1959	151	SNI	2001	10457,12

Table 9 Company overview for the tank segment, numbers from Oslo Børs 04.03.2014

Note that the book value of a firm's equity does not always equal the market value. For example, the book value of a vessel can be 200M USD but the actual value of the vessel will constantly change in accordance to supply and demand in the market.

5.2.2 Collecting Quantitative Data

As mentioned, the data used for the thesis is collected from Oslo Børs, the companies' webpages and Proff. Oslo Børs is a database for company data and gives access to annual financial reports, issued bonds and exchange messages concerning companies listed on Oslo Børs. Proff is a database that presents financial numbers of all Norwegian corporations, the numbers are provided by Brønnøysundregisteret; a register that secures order and clarity of the economic responsibilities in Norway.(Brønnøysundregisteret 2014)

5.2.2.1 Capital Structure

The companies' annual financial reports have been used to get an overview of the capital structure in the companies. Debt/equity ratio is calculated by dividing debt by equity, the number is found in the balance sheet of the annual report. The debt/equity ratios are based on numbers from the 2012 annual reports. The debt/equity ratio for each company is found in chapter 3.2.

5.2.2.2 Financial Activity

The company time-line sheet was made to give an orderly overview of the financial activities the companies have performed in their presence on Oslo Børs. Information when the financial

activities took place were found at Oslo Børs NewsWeb in the category of *Share Capital Changes/Dividend Information* (NewsWeb 2014). The timeline contains the following activities:

- Increased share capital
- Start point of bonds
- Decreased share capital
- Dividend payment

Several companies offered shares to employees during the 17 years of question. When this occurs the share capital will increase with a smaller amount of money. This kind of share capital adjustment is not interesting for the study and to avoid that these adjustments influenced the results, the lower limit of increased share capital to be registered was set to 10 MNOK.

The timeline for each segment is found in appendix 1 and gives an orderly overview of what have been explained in this chapter.

5.2.2.3 Interest Rate and Global GDP Growth

Information about of the interest rate in Norway from 1982-2013 is gathered from NorgesBank (2014). The global GDP growth for 2012 was collected from the InternationalMonetaryFund (2013). Interest rate level and global GDP growth are two of six independent variables in the regression analysis.

5.3 Regression Analysis

A regression analysis is a statistic method used to study the correlation between several variables. In many cases, it is used to figure out if a variable is changing as a function of other variables (StoreNorskeLeksikon 2013). The method has dominated the social science in the last decade because of its advantage in multivariate analysis where several independent variables are included.

At the center of regressions are the relations between two or more variables, called the dependent variables and independent variables. The dependent variable, called Y, is on the left side. The right side consists of independent variables and their corresponding coefficients. In this study, the dependent variable Y is increased share capital. On the right hand side, there

are six independent variables; starting with the interest rate in Norway, then the Global GDP growth, further it is four dichotomous variables related to bond issuance and decreasing share capital or paying dividend.

Logistic regression is used when the objective is to determine if given factors increase or decrease the probability of an outcome. Logistic regression is the preferred method when the dependent variable is dichotomous. In this thesis, the dependent variable has two outcomes; did or did not increase share capital, hence logistic regression is the preferred method. The dependent variable is a dummy variable indicated by, Y=0 or Y=1.

The goal of logistic regression is a bit different because the goal is to predict the likelihood that Y is equal to 1 (rather than 0), given certain values of X. If X and Y have a positive linear relationship, the probability that a company will have a score of Y=1 (did increase share capital), will increase as values of X increase. For example, as the interest rate increases, the probability that Y will be equal to 1 will tend to increase (Tuftte 2000).

The mathematical explanation of the applied regression model is presented below. The following model is the result of using logit:

$$P(Y = 1 | Z = z) = \frac{e^z}{1 + e^z}$$

The odds of the outcome Y=1 versus Y=0 is

$$\frac{P(Y = 1 | Z = z)}{P(Y = 0 | Z = z)} = e^z = e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_r X_r}$$

This results in the following model

$$\ln \left[\frac{P(Y = 1 | Z = z)}{P(Y = 0 | Z = z)} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_r X_r$$

The respective variables for this study are:

- Y= increased share capital
- X₁= interest rate level
- X₂= global GDP growth
- X₃= issued bond current quarter

- X_4 = issued bond previous quarter
- X_5 = increased share capital/paid dividend current quarter
- X_6 = increased share capital/paid dividend previous quarter

The coefficients β_j has interpretation as the change in log-odds if one unit changes X_j . In this thesis, it is sufficient to just look at the coefficient, if it is negative or positive and if it is statistically significant. To convert the Log odds to numbers that are intelligible is comprehensive and considered not to be necessary when the objective is to look for negative or positive correlation. Equations are taken from lectures at The Norwegian School of Economics by Møen (2010), on the topic applied methods.

Statistical significance is a measure used to evaluate the validity of the results. The limit for statistical significance is set to 0.05 in this thesis and all coefficients with a $\text{prob} > \text{Chi}$ greater than 0.05 are not considered statistical significant. Statistical significance is marked with this symbol: *.

Several data programs are used to conduct a regression analysis, JMP is one. JMP is a user-friendly program and sheets from excel are easily imported. Table 10 illustrates how the variables were organized in excel sheets before imported to JMP.

Increased Share Capital	Interest Rate Level	Global GDP Growth	Issued Bond Current Quarter	Issued Bond Previous Quarter	Paid Dividend Current Quarter	Paid Dividend Previous Quarter
0	2.5	3.59	0	0	0	0
0	2.5	2.871	0	0	0	0
0	2.5	2.871	0	0	0	0
0	2.5	2.871	0	1	0	0
0	2.5	2.871	1	0	0	0
0	2.55	3.177	0	0	0	0
0	2.55	3.177	0	0	0	0
0	2.55	3.177	0	1	0	0
0	2.55	3.177	1	0	0	0
0	3.14	3.905	0	0	0	0
0	3.14	3.905	0	0	0	0

Table 10 This is a section of the input data that was imported form excel to JMP

5.4 Credibility of the Study

To judge the quality of the research design it is important to pay attention to validity and reliability. Construct validity is the accuracy with which a case study's measures reflect the concepts being studied (Yin 2012).

5.4.1 Internal Validity

According to (Yin 2012) internal validity is determined by showing the absence of spurious relationships and the rejection of rival hypothesis. A regression with spurious relationships will incorrectly give answers that are statistically significant and a high R-squared. One possible reason for this is that the variables are dependent of the same underlying variable. Goodness of fit is a measure of the validity of the model. R^2 measures goodness of fit, referred to as the explanatory power of the model. R^2 ranges from zero for no fit and 1 for perfect fit (JMP 2014). The result of the goodness of fit test is presented later and the internal validity is decided based on the results.

5.4.2 External Validity

A common concern in case study research is an apparent inability to generalize from case study findings (Yin 2012). The external validity is the extent to which the findings can be analytically generalized to other populations or universe. It is likely to think that the results of this case study can be generalized to the worldwide ship-owning industry because the industry is affected by the same market. At the same time, the interest rate level and access to capital will vary in different parts of the world and generalizing cannot be done with certainty.

5.4.3 Reliability

It is important to present the premises for the conclusion to ensure that the thesis has reliability. It is achievable to replicate this study and have the same results because it has been a high level of transparency during the data collection. All data sampled is presented clear and orderly in excel sheets that can be found in the tables, figures and appendices. All the data included in the regression analysis is systematically presented in the timeline, Interest Rate Level sheet and Global GDP Growth Sheet. The data is public numbers from Annual Reports and announcements from Oslo Børs and is available for everyone interested.

6 Empirical Findings

This chapter includes a presentation and discussion of the results, as well as a presentation of the outcome. Firstly, the results from the data collection will be presented. Secondly, the results from the regression analysis will be presented in two levels; a presentation of the ship-owning industry as a whole and the results from the four segments. Finally, the results will be summarized and compared with the hypothesis.

6.1 Results

In the following chapter, the variables included in the research will be presented. Further, there will be a presentation of results from the regression analysis and a discussion of the findings.

6.1.1 The Dependent Variable

Increasing share capital is the dependent variable in the regression analysis. When and under which condition a company increases share capital is a financial move that can indicate a distinction between the three financing theories. Having increased share capital as a dependent variable makes it possible to test the hypothesis to a certain extent. 70% of the companies increased their share capital during the 16 years. In three of the segments 70% of the companies increased share capital, excluding the Offshore segment where only 53,8% of the companies have increased share capital in the 16 years of question.

6.1.2 The Independent Variables

Issuance of bonds is included as a variable in the regression analysis because it is an alternative to increase the share capital by selling stocks. Issuance of bonds can indicate that the company prefers not to increase equity. The variable is an element in the analysis that contributes in test of the hypotheses. Bonds are secured or unsecured debt where the

	Increased Share Capital	Issued Bonds	Paid Dividend	Decreased Share Capital
BON		Blue	Yellow	Orange
BWO	Green	Blue	Yellow	
DESSC			Yellow	Orange
DOF	Green	Blue		Orange
EIOFF		Blue		
EOC			Yellow	
FAR		Blue		
RISH				
HAVI	Green	Blue	Yellow	Orange
OTS	Green	Blue		
OCY	Green	Blue		
SIOFF	Green	Blue		
SOFF	Green	Blue	Yellow	
BWLPG				
HLNG	Green	Blue		
IMSK	Green	Blue	Yellow	Orange
SOLV	Green		Yellow	
GOGL	Green		Yellow	
JIN				Orange
ODF	Green	Blue		Orange
WBULK	Green	Blue		
AMSC	Green			
BEL	Green			
ECHEM	Green			
FRO	Green		Yellow	
SAGA	Green			
SNI	Green	Blue	Yellow	

Figure 3 The financial activity in the companies

issuer pays the buyer interest, called the coupon. The coupon reflects the interest rate level at the time of issuance. The value of a bond is fluctuating and it is assumed that this can influence the decision whether the company should or should not increase share capital. Issuance of bonds is represented in two of the independent variables; if the company issued bonds in the current quarter and previous quarter. It is conceivable that issuance of bonds can influence financing decisions in the following quarter, this is why issuance of bonds is included in two variables. Fifty six percent of the companies have issued bonds in total, 76,9% have issued bonds in the offshore segment. In the three other segments have less than 50% of the companies issued bonds. Twenty six % of the bonds are secured either by negative pledges, pledge or solidary debtors.

One way of decreasing share capital is by buying back shares or pay dividend. Paying dividend is interpreted as decreased share capital because the company pays dividend instead of transferring profit to equity. It is not expected that any company increases and decreases share capital during the same period. For example, a company would normally not pay dividend if the share capital was increased in the previous quarter. Decreasing share capital is relevant when testing the hypotheses and is for this reason included in the regression analysis. Fifty-one of the companies either paid dividend or increased share capital during the period. The bulk segment stands out, 75% of the companies have done one or both moves. The tank segment however, is found at the other end of the scale with only 28,6%

Interest rate is crucial for companies when issuing debt or bonds. High interest rates result in expensive loans and it is assumed that companies will consider increasing the share capital when the interest rate exceeds a certain level. Hence, the interest rate level is taken into consideration to check if it is statistically significant correlated to the activity of increasing share capital.

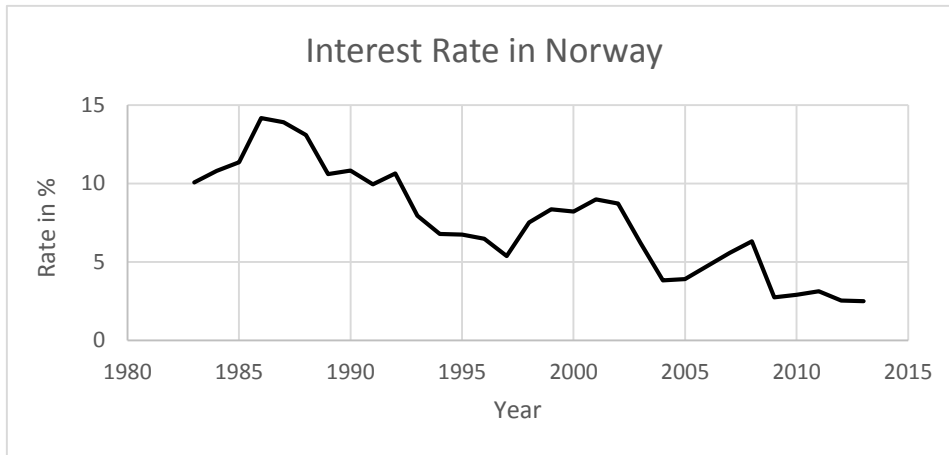


Figure 4 The interest rate level in Norway from 1980 to 2014 in a graph

If the interest rate coefficient correlates with the dependent variable and is statistically significant, there are two alternative outcomes:

- Positive correlation – As the interest rate rises, the probability of increased share capital will rise
- Negative correlation – The probability of increased share capital lowers with decreasing interest rate.

The global gross domestic product is measuring the growth the world is experiencing every year. Global GDP growth is considered in the thesis because it is reasonable to think that growth in the world will influence the companies' cash flow, including ship-owning companies, which is the case in this study. In times with increasing global GDP growth, it is likely that a company's cash flow rises. If a company's cash flow is rising, the company will have the opportunity to finance investments by using internal funds. Opposite, if the world is experiencing negative or low GDP Growth, this might influence the cash flow negatively. The growth in the ship-owning industry is assumed to be proportionally to the global GDP growth.

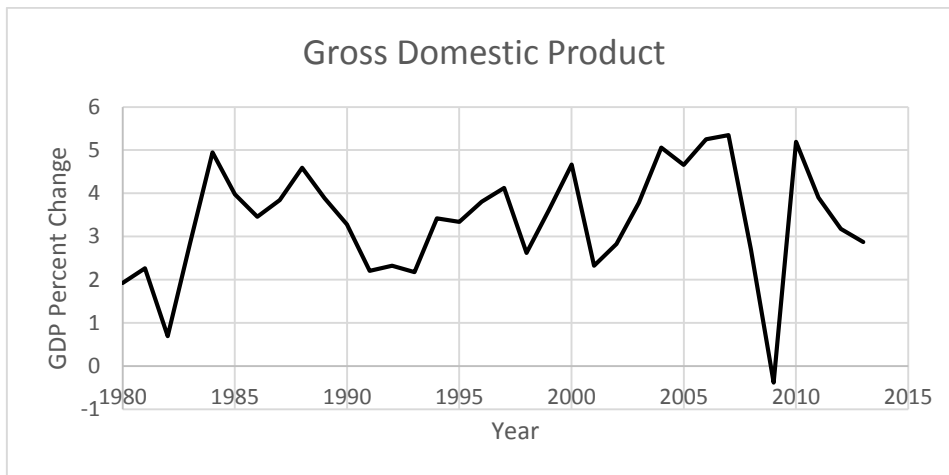


Figure 5 The Global Gross Domestic Product Growth from 1980 to 2014 in a graph

As for the Interest Rate Level, there are two alternative outcomes for the global GDP growth coefficient, either positive or negative. The following is expected:

- Positive correlation; the probability of increased share capital rises with Global GDP Growth
- Negative correlation; the probability of increased share capital lowers when Global GDP Growth rises. When there is a negative growth, the probability of increased share capital increases.

6.1.3 Regression Analysis

The variables have been explained and justified and the time has come to present and discuss the results from the regression analysis. A regression analysis investigates if there are any correlations between the dependent and the independent variables as explained in chapter 5.3. The next chapter includes a presentation of the results, first the results from the industry and then from the four segments.

6.1.3.1 The Industry

The Parameter Estimates is a table of the coefficients, their standard error and if the coefficient is statistical significant. The results from the regression analysis of the industry are presented below in table 11. Note that the red numbers are considered unstable; an explanation of the instability will be discussed later.

Parameter Estimate

Term	Estimate	Std Error	Prob>ChiSq
Intercept	3,40615075	0,5788335	<,0001*
Interest Rate Level	0,1541851	0,0755596	0,0413*
Global GDP Growth	-0,1380707	0,1102292	0,2104
Issued Bonds Current Quarter	-0,6084377	0,7733591	0,4314
Issued Bonds Previous Quarter	-0,6478574	0,773633	0,4024
Paid Dividend or Decreased Share Capital Current Quarter	15,4431497	1800,8811	0,9932
Paid Dividend or Decreased Share Capital Previous Quarter	-0,5152767	0,741889	0,4873

Table 11 Parameter Estimates for the industry, numbers from JMP

The interest rate level coefficient is statistically significant and indicates that the probability of increased share capital increases with the interest rate level. Interest rate is an important factor when considering bank loan or bonds; if the interest rate is high, the company might see financial stress as a higher price to pay than losing ownership of the company. Loans turn out to be a less attractive financing method when the interest rate is on a high level and the companies can more easily consider financing investments with share capital.

The independent variable Global GDP Growth seems to be negatively correlated with the dependent variable. This is not statistically significant but it is still of interest to comment the observation. A negative correlation tells us that as the global GDP growth decreases, the probability of increased share capital rise. Lower GDP growth can lead to reduced cash flow. Lower cash flow in a company can lead to less private equity in the company and internal financing is no longer an option for the company.

Issuance of bonds are negatively correlated to increased share capital but not statistically significant.

The regression analysis points out that both the pecking order theory and the Miller and Modigliani's propositions can illustrate the financial strategies in the ship-owning industry. The pecking order theory hypothesis seems to fit the actual results at several points. Also, it

is important to mention that only the correlation between Y and X_1 (Interest Rate Level) is statistically significant. However, the results give interesting numbers pointing at the pecking order theory.

The interest rate level has a positive correlation to increased share capital. This means that as the interest rate level rises, the companies will consider acquiring capital from the capital markets rather than obtaining debt. The cost of selling shares seems to be regarded as cheaper than the cost of financial distress when the interest rate level rises.

The other variables do not seem to have an impact on whether the company will or will not increase share capital.

Summarized, the interest rate level is positive correlated to increased share capital. Global GDP Growth, issuance of bonds in both current and previous quarter and decreased share capital in previous quarter are all negative correlated. The last variable, decreasing share capital in current quarter is unstable and considered zero. If the results were statistically significant, the results from the regression analysis would have indicated that the pecking order theory best reflected how ship-owning companies acts in financing decisions. In fact, the results are not statistically significant and to conclude based on the coefficients alone is not sufficient. This underpins Miller and Modigliani's propositions; capital structure makes no difference in the valuation of a firm. The results may signalize that companies in the ship-owning industry pick the financing source they consider cheapest at the time, regardless of capital structure.

The explanatory power of the model is expressed by R^2 . The value indicates if the variables fit the regression model. R^2 is a number between one and zero and a R^2 of 1 means that the model perfectly explains the reality. R^2 for the regression analysis of the industry is 0,0280 and is considered insufficient. R^2 is very small in this study, indicating that the variables included in the analysis do not fit the model. Lack of fit can also signalize that the companies, supporting Miller and Modigliani's propositions once again, the companies equally rate all of the financing alternatives.

6.1.3.2 The Segments

As mentioned in chapter 3, the cycles in the tank-segment are more volatile than the offshore segment as a result of high activity in the North Sea. Several companies in the offshore segment operate in the North Sea. Because of constant operations, the offshore-segment will be perceived as relatively stable with small fluctuations while the three freight segments might experience larger fluctuations because of variation in supply and demand. Different financing may be expected because of varying fluctuations between the segments.

The results from the regression analysis were not statistically significant still, it is interesting to check if the coefficients are positive or negative. The lack of statistical significance may be due to fewer observations in the segments than in the industry; in addition, few observations occur at the same time as the event of increased share capital. Table 12 was created on the basis on parameter estimates tables from the segments regression analyses, yet the numbers were excluded because of the lack of statistical significance.

Term	Offshore	LNG and LPG	Bulk	Tank
Interest Rate Level	+	+	-	+
Global GDP Growth	-	-	-	-
Issued Bonds Current Quarter	-	~	~	~
Issued Bonds Previous Quarter	-	~	~	~
Paid Dividend or Decreased Share Capital Current Quarter	~	~	~	~
Paid Dividend or Decreased Share Capital Previous Quarter	~	-	~	+
R ²	0,0532	0,1014	0,0568	0,0258

Table 12 Correlation overview of the segments, the basis for the discussion.

The explanatory power, R², for the segments is considered insufficient, comments to this follow in chapter 6.2.7.

In the offshore segment, the variables concerning dividend and decreased share capital are unstable. This can be interpreted as no impact on the dependent variable. The four remaining

coefficients are negative and positive as in the results for the industry. For the offshore segment, the coefficients seem to fit the hypothesis of the pecking order theory. Lack of statistical significance leads us to the same outcome as for the industry; the offshore segment seems to adhere to Miller and Modigliani's propositions. The offshore segment has experienced huge growth since the technological development has moved towards subsea construction, where high-tech vessels play a key role in the performance of the work. It is reasonable to think that companies will rather use profit to finance new investments than paying dividends to shareholders.

Further, the LNG and LPG segment starts off similar to the offshore segment with respectively positive and negative value on the first and the second variable. The following three variables turned out to be unstable while the last one is negative correlated. Compared to the hypothesis, the results from the LNG and LPG segment seem to be close to the static trade-off theory where the goal is to reach an optimal capital structure. Still, the coefficients are not statistically significant and as for the offshore segment, the results indicate that Miller and Modigliani's propositions are applicable here as well.

For the bulk segment, the coefficients of the first two variables are negative while the four remaining are unstable. According to the hypothesis, this cannot be related to the static trade-off theory or the pecking order theory. As for the previous segments, Miller and Modigliani's propositions seem best to illustrate the financing methods in the bulk segment.

The immediate thought when looking at the coefficients in the tank segment is that it does not meet the expectations from the hypothesis of the pecking order or the static trade-off. The results are not statistical significant and it is reasonable to say that the tank market has a financing strategy that is best explained by Miller and Modigliani's propositions.

When observing the coefficients isolated, one can see a difference when comparing the results from the industry and from the four segments. The LNG and LPG segment differs from the other segments, due to the interest rate level coefficient. The coefficient is negatively correlated to increased share capital, which is opposite of both the industry and the other segments. The difference in the bond coefficients appear in the offshore segment, where issuance of bonds, in both current and previous quarter, are negatively correlated to increased share capital, indicating. Decreasing share capital in previous quarter is the coefficient that

varies the most within the segments, LNG and LPG segment is negatively correlated and tank segment is positively correlated to increased share capital.

Eventually, the final answer seems to be that there is no correlation between the dependent and the independent variables, due to lack of statistical significance. No correlation signals that the six independent variables do not have an impact on whether the company increases share capital or not. Hence, it is likely to think that the companies' valuation of the firm is independent from the choice of financing method.

Summarized, as long as the coefficients are not statistically significant it is not possible to conclude based on the coefficients. The results can either be explained by no correlation between the variables, or that there is a lack of consistency in the dataset so that any true correlation is hidden. As for the industry, Miller and Modigliani's Propositions seems best to reflect the companies financing decisions in the four segments.

6.1.3.3 Explanation of Unstable Variables in JMP

JMP identified the dichotomous independent variables as unstable in parts of the regression analysis. According to JPM user service (JMP 2014) this is a common problem, it can possibly be a result of sparse data. In this setting sparse means that there are few or no repeats of each setting of the covariates. It is possible that the regression analysis for the segment where n was smaller than in the regression analysis for the industry, has too few observations. This can explain why the dichotomous independent variables are unstable. If there are no observations, they will turn out as zero. In table 9, the unstable variables are marked with red. In table 10, the unstable and zeroed variables are replaced with the symbol \sim .

6.2 Alternative Reasons and Weaknesses

The results presented above contribute to the final conclusion. Still it is important to consider other possible factors that may have had an impact on the analysis. Alternative reasons and weaknesses are the topic of this chapter.

6.2.1 Including Numbers in the Analysis

The study determines *if* there were any financial activities in the companies. *How much* increase or decrease of share capital and the actual size of the issued bond on the other hand, were not questioned. The result could possibly turn out different if the numbers were taken

into account. Including these numbers however, would probably not lead to major changes, but instead expand the scope of the study and increase the workload.

6.2.2 Individual Benefits

Companies have individual benefits in the market such as banking relations, trustworthiness in the capital markets and ownership structure. Such benefits are not quantifiable and are probably important factors when companies acquire capital for investments. It is a weakness that these factors are not considered in the study.

6.2.3 Capital Requirements

It has been a higher frequency in issuance of bonds since 2008 (Appendix I). It is likely to think that the recession resulted in stricter capital requirements for companies issuing debt. If the company does not have required capital to issue debt, can bonds be an option to cover the equity requirement. Higher capital requirements may have decreased the number of loans issued, thus more companies search for funding in the capital markets.

6.2.4 Bonds

The recession in 2008 introduced high equity requirements from lenders. This might have affected the companies in how to acquire capital. It is visual that there was obtained more bonds after the recession in 2009 in the timeline in appendix 1. One reason may be that the bankers increased their capital requirements. One way to fulfill the requirements is to issue a bond and use the money to cover the capital requirements.

It is important to mention that expired bonds are not taken into account in this thesis. This is because Oslo Børs only has a register for current bonds, which leaves expired bonds out of the scope. Additionally, Ross, Westerfield et al. (2007) states that most trading in bonds takes place over the counter, trades on the OTC-markets are not registered at Oslo Børs. This makes the bond market less transparent, often not possible to observe. The thesis is based on data from Oslo Børs and does not include bonds traded on the OTC-market; this fact may have a weakening impact on the results from the regression analysis.

The Secured bonds generally provide lower returns than unsecured bonds. Securing the bond is often done to lower interest payments. The bond can be secured by the pledge of a special asset or a revenue stream. Seventy four percent of the bonds issued by the companies in this study are unsecured. This may indicate that the companies do not have any assets or revenue

stream to secure. Assets used as security cannot be sold in the securitization period, which reduces the flexibility of the company. Flexibility is a positive trait in a volatile market where companies need to be dynamic; this may be the reason for the high percentage of unsecured bonds. The cost related to contracts may exceed the benefits of securing a bond. The amount of money the company saves by securing the bond and losing flexibility, may not compensate for the cost related to the contract. In this study, it has not been taken into account if the bonds are secured or not, hence, this is considered as a source of error.

6.2.5 Changes in the Markets

Times are constantly changing the markets and the ship-owning industry has probably gone through a change as well. Changes in the ship-owning market may have resulted in an analysis that does not perceive consistency between the variables. The analysis might have given other results with more consistency if it covered a shorter time period.

6.2.6 Dynamic Market

The study do consider some of the dynamics that exists in the financial markets by including financial activities in previous quarter as variables. Still, financial activities are most likely influencing financing decisions in a longer period than one quarter ahead. Including more variables in the regression analysis to cover such dynamic effects could have improved the study.

6.2.7 Goodness of Fit

The R^2 of the model resulted in a very low number, which means that the explanatory power of the regression model is not satisfying. R^2 close to zero signalize that other variables might explain better if a company increases share capital or not. One way to improve the models goodness of fit is to replace the variables with other variables by a trial and error session. This is beyond the scope of the thesis. An R^2 closer to one could improve the internal validity of the thesis.

6.2.8 Taxes and Distress Costs

Miller and Modigliani's propositions are based on a world without taxes and distress costs. The companies operate in a world where taxes and distress costs is a concern; these factors might affect ship-owners in a greater extent than any of the selected variables. The fact that the study do not examine the impact from taxes and distress costs is considered a weakness.

7 Conclusion and Further Work

The objective of the thesis was to find out if any of the three defined financing theories are recognized in ship-owning companies' financing strategies. A multiple-case study of 27 ship-owning companies listed on Oslo Børs has been conducted and the financing theories have been the foundation to discuss the empirical findings in light of the research questions.

7.1 Answer to the questions of research

An evaluation of the results from the regression analysis formed the basis needed to answer the questions of research to an extent.

Starting with answering the first question, *how does ship-owners finance their investments?*

The average debt/equity ratio in the industry can explain how the companies finance their investments. The debt/equity ratio in the ship-owning industry is below the average for the ten largest companies in Norway, signaling that there are less debt willingness in this industry. In addition, a low debt/equity ratio indicates that the companies are holding capital, for companies operating in volatile markets, such as ship-owning companies, this may be the key to survive a trough.

The results from the regression analysis indicate that ship-owning companies do not consider financing methods in the perspective of reaching an optimal capital structure. The theory that best seems to explain the financing activities however, is Miller and Modigliani's propositions; the value of the firm is unaffected by capital structure.

On the other hand, the fact that there is a positive correlation between interest rate level and increased share capital indicates that the companies choose the less expensive financing method. Increasing interest makes debt more expensive and the cost of selling shares may be considered the best alternative.

The next question of research; *are there differences between companies operating in the offshore, LNG and LPG, bulk and tank segment?*

From the timelines in appendix 1 show that financial activity within the segments vary, but the regression analysis revealed that increased share capital do not correlate with any of the independent variables. This indicates, as for the industry, that the financing theory that best reflects the reality of financing in the four segments is Miller and Modigliani's propositions.

There are probably differences between the segments, but the analysis does not cover the variables that indicate the differences. It is reasonable to think that companies that operate in segments where the market volatility varies will prioritize differently. Companies in a highly volatile market should take advantage of peaks and gear towards a trough, while companies that experience smaller fluctuations in the market can stick to an overall strategy that takes smaller peaks and troughs into account. Despite the fact that the coefficients are not statistically significant, the variable decreased share capital or paid dividend current quarter are unstable for the four segments. This may indicate that the segments do not pay dividend to gear the company to survive a trough.

7.2 Adding to the Theoretical Discussion and Further Research

The perception of which capital structure that maximizes a firm's value is fundamental when discussing financing strategy. The results from this thesis indicated that the theory that best reflected the reality was Miller and Modigliani's propositions; it is not an optimal capital structure.

7.2.1 Expand and Improve the Quantitative Study

This is a quantitative study and determines *if* there were any financial activities in the companies, thus the financial activities were represented in the regression analysis by dichotomous variables. An in depth study with the size of the issued bonds and the magnitude of the change in share capital, expressed in continuous variables, could have resulted in a different outcome.

Including a larger number of independent variables in the study could identify other factors that affect financing decisions. The goodness of fit could have been improved if the unstable variables were replaced by stable variables. Such improvements may give other and more accurate results; still it is time consuming and increases the scope of work substantially.

This study include companies listed on Oslo Børs, expanding the dataset by including companies from several stock exchanges could have improved the results from the regression analysis. This would also strengthen the external validity.

7.2.2 Execute a Qualitative Study

There are several topics to include if executing this study as a qualitative case study some are presented below.

The positive correlation between the interest rate level and increased share capital indicates that if a company needs capital, and the interest rate is relatively high, the company would, with higher probability, search for funding in the equity market. This research indicates that the interest rate *do* influence companies financing strategies. For further research of the topic, it could have been interesting to examine *how* interest rates influences the companies financing decisions in detail.

Having a good relationship to lenders can be crucial when acquiring capital, companies that have credibility in markets often have easier access to capital. Banks are willing to lend money to a lower interest and investors pay more for shares, due to a smaller risk. These individual benefits could be interesting to examine in a qualitative case study.

To expand the study further, interviews with lenders and investors could have been conducted. Doing a qualitative research with in-depth interviews with financing managers, lenders and investors could have identified how they act in different market situations, and which factors they consider critical. Several viewpoints might nuance the results and increase the internal validity.

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Appendix 1 – Timeline

The timeline visualize the financial activity in the companies from 2007 until 2014.

Blue – Issued Bond Green – Increased Share Capital Red – Decreased Share Capital

Yellow – Paid Dividend

Year	Company	BON	BWO	DESC	DOF	EIOF	EOC	FAR	RISH	HAVI	HAVI	OTS	OCY	SIOFF	SOFF
2014	Q4														
2014	Q3														
2014	Q2														
2014	Q1														
2013	Q4														
2013	Q3														
2013	Q2														
2013	Q1														
2012	Q4														
2012	Q3														
2012	Q2														
2012	Q1														
2011	Q4														
2011	Q3														
2011	Q2														
2011	Q1														
2010	Q4														
2010	Q3														
2010	Q2														
2010	Q1														
2009	Q4														
2009	Q3														
2009	Q2														
2009	Q1														
2008	Q4														
2008	Q3														
2008	Q2														
2008	Q1														
2007	Q4														
2007	Q3														
2007	Q2														
2007	Q1														
2006	Q4														
2006	Q3														
2006	Q2														
2006	Q1														
2005	Q4														
2005	Q3														
2005	Q2														
2005	Q1														
2004	Q4														
2004	Q3														
2004	Q2														
2004	Q1														
2003	Q4														
2003	Q3														
2003	Q2														
2003	Q1														
2002	Q4														
2002	Q3														
2002	Q2														
2002	Q1														
2001	Q4														
2001	Q3														
2001	Q2														
2001	Q1														
2000	Q4														
2000	Q3														
2000	Q2														
2000	Q1														
1999	Q4														
1999	Q3														
1999	Q2														
1999	Q1														
1998	Q4														
1998	Q3														
1998	Q2														
1998	Q1														
1997	Q4														
1997	Q3														
1997	Q2														
1997	Q1														

Timeline 1 Offshore Segment

Year	Company	BWLPFG	HUNG	IMSK	SOLV
2014	Q4				
	Q3				
	Q2				
	Q1				
2013	Q4				
	Q3				
	Q2				
	Q1				
2012	Q4		1		
	Q3			13	
	Q2			12	
	Q1		2		
2011	Q4				
	Q3				
	Q2				
	Q1				
2010	Q4				
	Q3				
	Q2				
	Q1				
2009	Q4				
	Q3				
	Q2				
	Q1				
2008	Q4				
	Q3				
	Q2				
	Q1				
2007	Q4				
	Q3				
	Q2				
	Q1				
2006	Q4				
	Q3				
	Q2				
	Q1			14 500 000	
2005	Q4			Proposal	
	Q3				
	Q2			12 500 000	
	Q1				
2004	Q4				
	Q3				
	Q2			23 000 000	
	Q1				
2003	Q4				
	Q3			5 000 000	
	Q2				
	Q1				
2002	Q4				
	Q3				
	Q2			15 000 000	
	Q1				
2001	Q4			3 000 000	
	Q3			8 000 000	
	Q2				
	Q1				
2000	Q4				
	Q3				
	Q2			37 000 000	
	Q1				
1999	Q4				
	Q3				
	Q2				
	Q1				
1998	Q4			700 000	
	Q3				
	Q2				
	Q1				
1997	Q4				
	Q3				
	Q2				
	Q1				

Timeline 2 LPG and LNG Segment

Year	Company	GOGL	JIN	OD Ser. A	WBULK
2014	Q4				
	Q3				
	Q2				
	Q1				
2013	Q4				
	Q3				
	Q2				1 PRO
	Q1				
2012	Q4			5, 6	
	Q3				
	Q2			4	
	Q1				
2011	Q4				
	Q3				
	Q2				
	Q1				
2010	Q4				
	Q3				
	Q2				
	Q1				
2009	Q4				
	Q3				
	Q2				
	Q1				
2008	Q4				
	Q3				
	Q2				
	Q1				
2007	Q4				
	Q3				
	Q2				
	Q1				
2006	Q4				
	Q3	128 mill			
	Q2				
	Q1				
2005	Q4				
	Q3	95 mill			
	Q2				
	Q1				
2004	Q4				
	Q3				
	Q2				
	Q1				
2003	Q4				
	Q3				
	Q2				
	Q1				
2002	Q4				
	Q3				
	Q2				
	Q1				
2001	Q4				
	Q3				
	Q2				
	Q1				
2000	Q4				
	Q3				
	Q2				
	Q1				
1999	Q4				
	Q3				
	Q2				
	Q1				
1998	Q4				
	Q3				
	Q2				
	Q1				
1997	Q4				
	Q3				
	Q2				
	Q1				

Timeline 3 Bulk Segment

Year	Company	AMSC	BEL	ECHEM	FRO	SAGA	SIN
2014	Q4						
	Q3						
	Q2						
	Q1	2					
2013	Q4						Interim
	Q3						
	Q2						
	Q1						
2012	Q4						
	Q3						
	Q2						4
	Q1						2,3
2011	Q4						
	Q3						
	Q2			2			1
	Q1						
2010	Q4						
	Q3						
	Q2						
	Q1						
2009	Q4						
	Q3						
	Q2						
	Q1						
2008	Q4						Interim
	Q3						
	Q2						
	Q1						
2007	Q4				Interim		Interim
	Q3						
	Q2						
	Q1						
2006	Q4			Listed on OB			Interim
	Q3						
	Q2						
	Q1						
2005	Q4						Interim
	Q3						
	Q2						
	Q1						
2004	Q4						
	Q3						
	Q2						
	Q1						
2003	Q4						
	Q3						
	Q2						
	Q1						
2002	Q4						Interim
	Q3						
	Q2						
	Q1						
2001	Q4						
	Q3						
	Q2						
	Q1				Warranty		
2000	Q4						Interim
	Q3						
	Q2				2		
	Q1						
1999	Q4				3		
	Q3						
	Q2						
	Q1						
1998	Q4						interim
	Q3						
	Q2						dividend
	Q1						
1997	Q4						
	Q3						
	Q2						
	Q1						

Timeline 4 Tank Segment

Appendix 2 – Top 10 Companies in Norway

Top 10 Companies in Norway 2011

	Debt	Equity	Ratio
Statoil ASA	314654000	244189000	1.28856746
Telenor ASA	113920000	29666000	3.84008629
Norsk Hydro ASA	36737000	59274000	0.6197827
Yara International ASA	35135000	7920000	4.43623737
Orkla ASA	27554000	27370000	1.00672269
Norgesgruppen ASA	11550415	3095052	3.73189691
Total E&P Norge AS	55725000	6698000	8.31964766
Esso Norge AS	8097000	1511000	5.35870285
Reitangruppen AS	17798000	9208000	1.93288445
DNB ASA	13740000	56239000	0.24431444
Average			3.07788428