

NHH



Development of Ship Financing

A study of the 2008 Financial Crisis

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Abstract

This thesis looks to examine the period before and after the financial crisis of 2008 in order to identify any potential shifts in ship financing. For our period of analysis, we defined the *pre* period from the start of 2005 until the end of August 2008, while the *post* period is defined as the period from September 2008 until the end of 2012.

In our empirical analysis we have used inferential statistics to test our predictions. The data used have been gathered from two world-renowned shipping information providers, Clarksons and Marine Money. By pooling and later segmenting the provided data, we have created our own database, tailored for our research questions.

Our analysis shows that there has indeed been a shift from the traditional financing source of bank loans towards corporate bonds. By the end of 2012, bond issuance stood for almost 45% of ship financing, up 40% from the start of the sample. Such a shift also involved a change in location of funding, with Asia and Scandinavia providing significantly greater number of debt issuances in the aftermath of the financial crisis, while North America, Europe and the Middle East experienced a deterioration of their funding proportions. In addition, the use of public equity markets as means of financing has greatly declined, resulting in a greater reliance on debt in the *post* period.

Given the increased importance of bonds, the authors have also examined this instrument in more detail. Our findings show that bondholders demand higher return and are less willing to engage in long-term commitments in the *post period*, as a result of the greater market uncertainty. Such an uncertainty has also caused banks to alter their lending practice, with a greater focus on risk mitigation.

Our takeaway from our analysis is quite extreme, with a severe change in ship financing over the last eight years. Looking into the future, we do believe that the ship financing picture has changed permanently, but in a less radical way than what we have observed in our sample. We expect bonds to take a larger part in ship financing, nevertheless, we still expect bank loans to be the primary source of capital.

Preface

This master thesis marks the end of our Master of Science degree at the Norwegian School of Economics and Business Administration (NHH). Both the authors are majoring in Financial Economics, and have throughout our specialization attained a deeper understanding in this field of study.

Our choice of topic is based on our mutual interest for corporate finance, in addition to our fascination of the volatile and unpredictable shipping industry. With little research performed on the field, we also found it rewarding to be able to contribute with further findings, shedding light on relevant topics of today. Even though there have been other papers concerning the capital structure in shipping, the authors have found none that consider the substantial change in means of financing addressing the recent financial crisis.

The independent study has been interesting while challenging, providing us with a deeper understanding of ship financing and the shipping industry as a whole. We certainly hope the reader finds it as interesting as we have.

The authors would first of all like to thank, our advisor Professor Roar Ådland for constructive insight and guidance throughout the writing process, Thomas Falck for an interesting discussion regarding our results and helpful reflections on the actual practice of the banking sector, Søren Greve for valuable insights in the shipping market and Egil Gade Greve for an interesting historical perspective of ship financing.

In addition we would also like to thank Marine Money and Clarksons for providing us access to their database, enabling us to perform our analysis.

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1. Introduction

Over the last eight years, ship financing has probably changed more than in the last couple of centuries. After years of continuance of boom and bust cycles in the start of the millennium, the shipping industry experienced one of the greatest booms of all times in the period of 2003 through 2008. With increased demand for seaborne trade fuelled by the emerging Chinese economy, freight rates skyrocketed leading to a mass expansion of the world shipping fleet. Such expansion needed funding with shipowners primarily tapping bank loans and public equity markets. By 2008, the demand for seaborne trade had reached its culmination point, and when the financial crisis hit, world trade was negatively affected resulting in a substantial overcapacity of ships. This caused the freight market to collapse. As a result of the crash in the financial market, a series of bankruptcies rippled through the market causing counterparty credit concerns. With the trust gone, short term funding costs went through the roof, causing bank liquidity to dry up. This led shipowners to turn to the bond market for financing. By the end of 2009, market sentiment had again recovered, resulting in a new round of investments. The recovery was, however, short lived, as the European Sovereign Debt Crisis emerged by the start of 2011. This second downturn hit both banks and investors hard, causing funding to almost dry up, with now bonds representing an increasingly large share of ship financing.

The purpose of this thesis is four folded. Our main research question is that we wish to examine whether there has indeed been a significant change in ship financing as a result of the recent financial crisis. Secondly, we wish to establish that this crisis has affected the instrumental variables of debt. Thirdly, given the significant change of funding, we further wish to determine whether there has been a change in location of funding. Lastly, we wish to use traditional capital structure theories to analyze to what extent these theories can explain the shift in funding, and whether such a change is permanent.

This thesis is divided up into 13 chapters. We initially introduce general shipping theory, in order for the reader to build up the necessary understanding of the industry. The following chapter presents the most relevant capital structure theories, which have been included to give the reader a better premise for understanding shipowners' choice of funding. The succeeding three chapters elaborate on the main types of funding available to shipowners. Next, three fundamental topics are included to establish key insights of the various asset

classes. Chapter 8 then describes the statistical theory behind the analysis, while chapter 9 addresses the dataset used in our analysis. In chapter 10, all of our hypothesis are put forward and justified. We then go through the general macroeconomic development of the sample period, before finally presenting our results and analyzing them.

2. Shipping

The following theory section for shipping is taken from Martin Stopford's, Maritime Economics 3rd edition (2009).

The concept of shipping has existed for thousands of years. Ever since the first transportation of cargo that dates back more than 5000 years; seaborne trade has led to exploration and discoveries that have shaped the world of today. With global development, trade has increased which has led to greater demand for transportation. Today, more than 90% of world trade is transported by the shipping industry, making it a truly global industry.

2.1 Segments

The shipping industry can be divided into three segments: bulk shipping, specialized shipping and liner shipping.

Bulk Shipping:

The bulk shipping segment carries large homogeneous parcels, such as raw material cargo and can be split further into the following sub segments:

- Liquid Bulk: Refers to the transportation of liquefied commodities including crude oil, oil products and liquid chemical.
- The five major bulks: Referring to the transportation of homogenous commodities: iron ore, grain, coal, phosphates and bauxite.
- Minor bulks: Refers to other commodities such as steel products, steel scrap, cement, etc.

Liner Shipping

The liner shipping or general cargo shipping, which it is also known as, carries parcels that are too small to justify a dedicated bulk shipping operation. The container shipping segment is part of this group. There are no fixed rules for what characterizes as general cargo, however, boxes, bales, machinery, 1000 ton steel products are typical examples of general cargo.

Specialized Shipping

Specialized shipping is specially built ships that carry non-homogeneous cargo such as motorcars, forest products, refrigerated goods, chemical and liquefied gas. It can therefore be viewed as a combination of the bulk and liner segment, as it bears characteristics of both.

2.2 The Four Shipping Markets

Global sea transport is provided by four directly related markets; freight market, the market for buying and selling of second-hand ships, the newbuilding market, and the demolition market.

2.2.1 The Freight Market

The freight market is the market where sea transport is sold and bought. Today, there is one single international freight market, however, within this market there are separate markets for each different type of segment. Although these markets are in the short term independent of each other, there exist long-term spillover effects from one segment to the next. In the freight market, the shipowner can use both the spot market and charter contracts. In the spot market, the ship is exposed to sudden changes in freight rates due to change in demand, compared to long-term contract where freights are fixed. Although the rates are higher in the spot market, there is great risk involved in being exposed to this market, as the rates are volatile and thus shipowners can easily lose money either from a sudden drop in freight rates or the vessel lying idle. However, the long-term contracts are not completely safe either, as they bear credit risk on the chartering part.

Within the freight market there are four different types of contracts:

- **Voyage Charter:** Contract that arranges for the transportation of a specific cargo from one destination to another, for a fixed price per ton.
- **Contract of affreightment:** Under this contract the shipowner agrees to transport a series of cargo parcels for a fixed price per ton. Here, the charterer leaves the details of each voyage to the shipowner. The shipowner, on his side, will look to utilize his fleet in the most efficient way, thus enabling him to switch cargo between vessels to ensure the most streamlined and profitable operation.

- **Time Charter:** A contract that provides operational control of the vessel transporting the cargo to the charterer. The shipowner retains the ownership and management of the vessel. A time charter can last for the time it takes to complete a voyage (trip charter) or over a period of several months (period charter). Under this contract the shipowner pays for the operational costs, while the charterer pays for the voyage costs.
- **Bare Boat Charter:** Provides a company with full control of the ship without owning it, typically used in leasing deals. Here the investor buys a ship and hands over control to a charterer for a certain period of time, typically 10-20 years. The charterer is thus responsible for all operating and voyaging costs of the ship.

Typically, a shipping firm keeps a part of its fleet in the spot market and a part tied up on the time charter market, in order to diversify its portfolio. Such a strategy enables it to take advantage of an upswing in the market, while at the same time secure a minimum revenue level from its fleet.

In addition, there exists a freight derivatives market. Here shipowners and freight charterers can hedge their freight risk or even make bets on the future, by engaging in forward freight agreements. These financial contracts are settled on the basis of a future value of a freight market index.

2.2.2 The Sale and Purchase Market

In this market, second-hand ships are traded between shipowners. Since second-hand ship prices are dependent on freight rates, age, inflation and expectations of future earnings, the value of ships can be volatile. The volatility in price is thus important to shipowners, as the trading of ships is a major source of revenue.

2.2.3 The Shipbuilding Market

This is the market where new ships are ordered from the shipyards. Since the ship has to be built, this adds complexity to the contract process in the form of specifications, delivery date, payments and financing of the purchase. The ship prices are related to the prices in the second-hand market, market expectations, the capacity of the shipyard and the access of affordable financing. The investment in a new ship is of considerable risk, since it takes two

to three years for it to be delivered, thus with the volatile nature of the shipping industry, the market conditions may have changed upon delivery.

2.2.4 The Demolition Market

The demolition market (often referred to as the recycling market) is the market where old or obsolete ships are dismantled and sold for scrap. The procedures are similar to the once under the sale and purchase market, but the customers here are scrap yards, rather than shipowners. The major scraping markets are today located in eastern Asia. The scrap price has historically varied substantially over time. The price is determined by the supply of ships and the demand for scrap metal, which in Asia, is usually dependent on the demand in the local steel market.

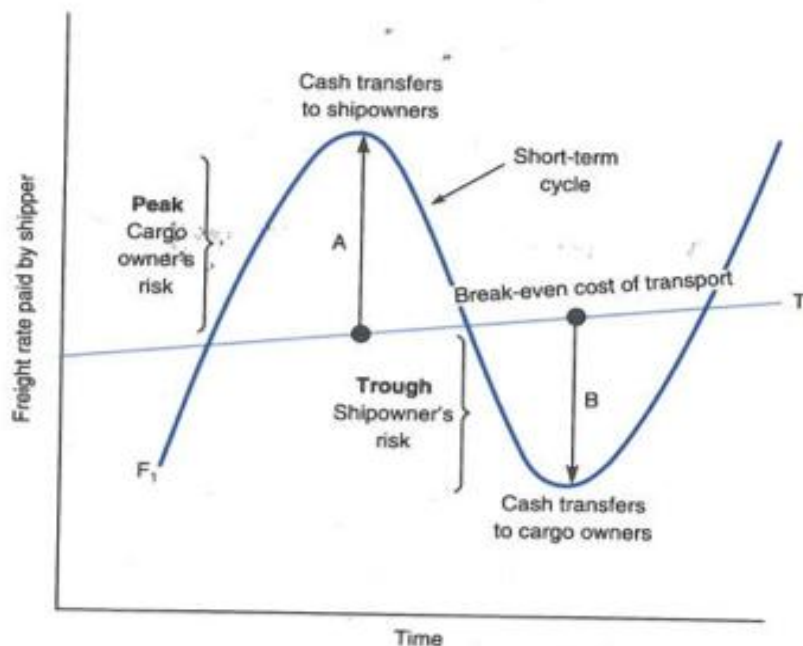
2.3 Cycles

Economic cycles can be defined as the varying pattern of economic activity over a period of time. Market cycles in the shipping industry are a prominent part of the business. Martin Stopford uses the analogy of poker to describe the behaviour of shipowners in shipping cycles. Like poker, profiting from the cycles is a combination of skills, luck and psychology for the shipowners, which is a game that has been played for centuries.

With cycles we can distinguish between three different types, in relation to how long they last.

- A long-term cycle refers to a cycle lasting for several decades that is driven by advancement in technology, change in economic conditions and regional changes. Thus, it is important for shipowners to pay attention to whether the market is in the downturn or upturn of the cycle.
- Short term cycles or business cycles typically last anywhere from 3 to 12 years. Within the short term cycles of shipping, there are four different stages which have the following characteristics:

Figure 1: Cycles in shipping



Source: Stopford (2009) p 102

- **Trough:** Characterized by surplus shipping capacity and freight rates falling to the level of operating costs for the least efficient ships. The low margins can lead banks to foreclose on firms, forcing shipping firms to sell modern ships at distress prices. The prices of old ships fall to scrap prices, leading to increased demolition activity, which again reduces the oversupply of ships.
- **Recovery:** While market sentiment is still uncertain, supply and demand start to move towards equilibrium, causing freight rates to move above the operating costs.
- **Peak/Plateau:** Supply and demand tighten, while freight rates start to rise. The freight rates typically rise 2-3 times above the operating costs. The peak can last for weeks or years, which is dependent of how the balance between supply and demand develops. As the excitement increases an almost euphoric sentiment is created in the market. High earnings and increased asset values led to; banks being more lenient with credit, talks of a new era in shipping, public offerings of shipping firms in the stock market, as well as increased ordering of newbuildings. In the second-hand market, ships are sold for more than their replacement price, while modern ships trade for more than their newbuilding prices.

- **Collapse:** In this stage, the oversupply of vessels in the market exceeds the demand, drastically driving down the freight rates. This decline can further be reinforced by economic shocks like the financial crisis. As ship prices decline, shipowners are reluctant to sell ships due to the previous prices in the peak period.

Looking at the phases of the business cycle, investors may be tempted to try to time the market cycles of shipping by counter cyclical ordering large volumes of ships. This, however, risks prolonging the downturn and halting a potential recovery that would have happened, had they not flooded the market with new tonnage.

- Seasonal cycles refer to the fluctuations in a year. In shipping, one can observe these fluctuations in the dry bulk sector, where the transportation of grain is relatively low during July and August. Another example is in the tanker segment, where one can see increased activity as the Northern Hemisphere builds up its oil stocks for the winter.

2.4 Shipping Taxation

The shipping industry generally benefits from very low effective taxes due to favourable tax regulations in most countries. Since shipping activity is not geographically bound, like other industries, this means that shipowners are free to choose what country they want to register their fleet and operate from. There is, therefore, a strong incentive for the governments to offer favourable regulations in order to attract foreign companies and avoid flagging out of domestic operators. The taxation regimes within shipping can be split into three categories.

2.4.1 Tonnage tax regimes

The tax paid under the tonnage tax regime is not based on the actual profits generated by the firm, but rather on the actual tonnage of the vessel. The tax is calculated by multiplying the tonnage of the vessel by a fixed amount that represents the estimated profit per ton. Under the tonnage tax regime, there are two prominent models, the Dutch and the Greek model.

Comparing the Dutch model with a regular taxation model, the main difference is how the profits from shipping activities are calculated and what vessels are included under the respective model. Other than this, the shipping firm and income from non-qualifying activities will be taxed under the regular taxation system. The Greek model is overall more

lenient, including all vessels and shipping activities under it. In addition, the two models also have special criteria for ownership, lock-up period, capital gains, flag requirement and the way the management is organized. However, the overall taxation will differ from country to country, even though they use the same model, as the governments will tailor it for their home country.

Geographically the Dutch model is implemented in most EU countries as well as Japan, USA, South Africa and South Korea, while the Greek model is only used in Greece, Cyprus and Malta.

2.4.2 Shipping incentives regimes (special benefits for shipping)

This refers to the tax provision provided to shipping companies operating in the respective country. There are many different incentives, however, most incentives are typically associated with very low taxation. This is either done by reducing the tax rate, narrowing the tax base or through tax redemption. These kinds of tax regimes can be observed in countries like Liberia, Malaysia, Marshall Islands, Panama, Russia and Singapore.

2.4.3 Tax efficient regimes (low effective tax rate)

Tax efficient regimes refer to countries that do not have any special tax regimes targeted towards the shipping industry, but rather treat all foreign operators on equal grounds. Despite the fact that there are no shipping specific tax regimes, it can still be attractive for shipping companies to register their vessels and operate out of countries like this. This may be due to exemption of taxation for foreign investment or accelerated amortization for the ships. Some of the countries practicing this are Antigua, Barbuda, Bermuda, Estonia and Saint Lucia (PWC, 2009).

2.5 Today's Shipping market

Looking at the market conditions in shipping today, one can see that the market is still suffering from the collapse of the world economy in 2008, following the booming years between 2003/4 and 2008. Today's market is characterized by dire market conditions, with freight rates being severally depressed due to an oversupply of tonnage relative to the demand for seaborne trade. At the moment, however, we do not have a demand side problem, with the growth of trade increasing with 3% in 2011 and 3.5% in 2012. On the

other hand, we do have a supply-side problem. This oversupply has been created by the rapid fleet expansion and ordering during the booming years, which was followed into the recent years of economic recession. As the freight rates of the recent boom reached astronomical levels, only comparable with those of the First World War, many of the operators built up substantial capital. This capital has now being put to use to build up cheap countercyclical investments. This is illustrated by a growth of 37% of the world fleet from 2008-2012.

Even though there has been a gradual reduction of new orderings from its peak of 2009 and a gradual increase in demolitions, the supply of ships still far outgrow the demand, having a growth of trade of about 3.5%, paired with a 10% increase in the world fleet last year. It is expected that by 2014, there will be a fleet surplus of about 20% leading to severe excess capacity. Such structural unbalance leads to low projected growth in the future, and with another possible round of countercyclical ordering around the corner, the trough can be further prolonged.

Going further in detail, the tanker sector is currently struggling with the structural problems mentioned, and the sector is losing growth due to the combined effect of high oil prices, and the emerging complete sources of oil; like shale oil and deep water oil from the Persian Gulf and Brazil. Bulk trade is doing a bit better, with Asia being its main driver. This demand is, however, not only created by China, but Asia as a whole, where China accounts for half of the demand. Liner trade experienced its first negative shock in 40 years in 2009, with a 6% decrease in seaborne trade. It has, however, partially recovered, but indications are now that the market is likely to be more volatile in the future (Stopford Presentation, 2013).

Looking into the future, according to Wilbur Ross, emerging markets such as China, Brazil and India are likely to carry the shipping market in the following years (qtd. LaRocco, 2013). This view is further reinforced by the recovery in world trade being led by these developing countries, having been much of the driving force behind the recent economic recovery.

The resurgence of oil and production in the US, due to technological advances in attaining the reserves in the shale rock, is also an event that could cause large changes in both seaborne trade and oil production. It is predicted that the US will become a net exporter of oil by 2030, but this development is dependent upon the oil prices remaining at fairly high level. It is expected that a drop of the oil price under \$70-95 per barrel would make it

unprofitable to extract these resources (Bartis et.al., 2005), and with it being just seven years since everybody predicted oil prices to sustain at \$20-25 per barrel until 2030, the future is clearly not set. It is, however, likely that the success factor of this extraction will be an important variable in the in the world trade for years to come. The initial effect of the shale oil can already be seen, by among other things, Saudi-Arabia decreasing its export to the US, and shifting their exports to a larger degree towards China (IEA, 2012).

3. Capital Structure

In this section, we wish to present the various capital structure theories, in order to better analyze the capital structure decisions that have taken place in the shipping industry during our sample period.

The term “capital structure” refers to how the firm is financed through equity, debt or hybrid securities (Berk, DeMarzo, 2011).

3.1 Miller and Modigliani.

In 1958, Merton Miller and Franco Modigliani (MM) published their article “Theory of investment”, stating that under perfect capital markets the total value of a firm is independent of the capital structure. Despite initial criticism, this contribution by MM has become the cornerstone of modern financial theory.

Their assumptions for **perfect capital markets** where:

- “Investors and firms can trade the same set of securities at competitive market prices equal to the present value of their future cash flows.
- There are no taxes, transaction costs, or issuance costs associated with security trading.
- A firm’s financing decisions do not change the cash flows generated by its investments, nor do they reveal new information about them” (Berk, DeMarzo 2nd edition 2011, page 455).

MM put forward two propositions:

Proposition 1: *“In a perfect capital market, the total value of a firm is equal to the market value of the total cash flows generated by its assets and is not affected by its choice of capital structure”* (Berk, DeMarzo 2nd edition 2011, page 455)

MM supported their reasoning behind Proposition 1 with the arguments from the Law of One Price and Homemade Leverage.

The Law of One Price states that under the assumption of perfect capital markets, all the cash flows generated by the firm will be equal to the cash flow paid out to all. This is

consistent with the Law of one Price, meaning that the value of the firm assets must be equal to its securities. This in turn means that as long the firms' choice of securities does not change the cash flow of the firm; the value of the firm is independent on the source of financing. If the law of one price was violated one would have an arbitrage opportunity.

Homemade Leverage

The homemade leverage argument states that if investors are unhappy with the capital structure the firm has chosen, they can simply add/subtract leverage to/from their portfolio by borrowing/lending out themselves. This is known as homemade leverage, and as long as the investor can borrow or lend at the same rate as the firm, the added/subtracted leverage will be a perfect substitute for the use of leverage by the firm.

Proposition 2: “*The cost of capital of levered equity increases with the firm's market value debt-equity ratio*” (Berk, DeMarzo 2nd edition 2011, page 461). Given an all equity financed firm, as the firm starts to lever up with cheap debt, the risk of the equityholder increases proportionally. When the debt level reaches a sufficiently high enough level, the risk of bankruptcy surfaces. Additional leverage above this level results in an increase in risk for both equity- and debtholder. As a result of the increased risk, the equity- and debtholders will demand a higher risk premium and therefore a higher expected return. The levered return of equity formula and *Figure 2* shows this relationship:

$$R_E = R_U + \frac{D}{E}(R_U - R_D)$$

Where:

R_E is the expected return on levered equity

R_U is the expected return on unlevered equity

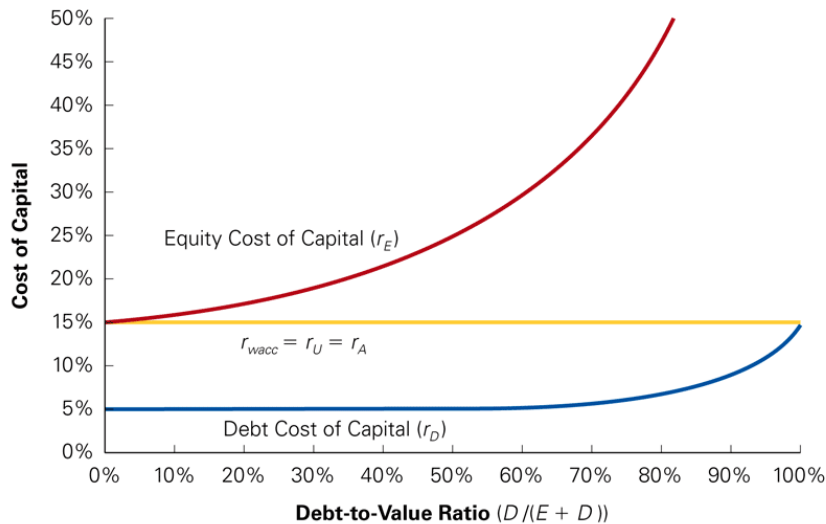
R_D is the expected return on debt

$\frac{D}{E}$ is the debt to equity ratio

The theory of M&M provides further useful intuition on the cost of capital for new investments. Using the pre-tax Weighted Average Cost of Capital (WACC), assuming perfect capital markets, one can see that the increased cost of equity is offset by the increased weight put on debt, thereby resulting in unchanged cost of capital. Consequently,

the way the firm finances its new investments does not change the value of the firm, as the NPV of the cash flows are discounted with the same WACC regardless. This causes the value of the firm to remain unchanged.

Figure 2: Cost of Capital



Source: (Berk DeMarzo p 462, 2011)

$$r_{WACC} = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D$$

$$r_{WACC} = r_U = r_A$$

Where:

r_{WACC} is the weighted average cost of capital

$\frac{E}{E+D}$ is the equity to enterprise value

r_E is the cost of equity

$\frac{D}{E+D}$ is the debt to enterprise value

r_D is the cost of debt

r_U is the cost of unlevered capital

r_A is the cost of capital for the firms' assets

3.2 Trade-off theory:

The trade-off theory rationalizes the use of a certain debt ratio. This is because the incurred interest cost from the debt is tax-deductible on the firms' taxable income. As a result, the tax paid on the firm's income is offset by the interest tax-shield created by the interest expense, leading to a lower taxable income for the firm. However, with increased debt levels the probability of financial distress increases. In this respect, the trade-off theory says that a firm will increase its leverage to the point where the marginal net present value of the interest tax shield is just offset by the increased net present value of possible costs of financial distress (Myers, 2001).

The following formula displays the relationship:

$$V_L = V_U + PV(\text{Interest Tax Shield}) - PV(\text{Financial Distress Costs})$$

Where:

V_L is the value of the levered firm

V_U is the value of the unlevered firm

PV (Interest Tax Shield) is the present value of the tax shield created by the interest from debt

PV(Financial Distress Costs) is the present value financial distress

Source: (Berk, DeMarzo, 2011)

The net present value of financial distress can be separated into direct and indirect cost. The direct costs refer to the legal and administrative fees relating to lawyers, accountants, and other professionals involved in the bankruptcy filing (Weiss, 1989).

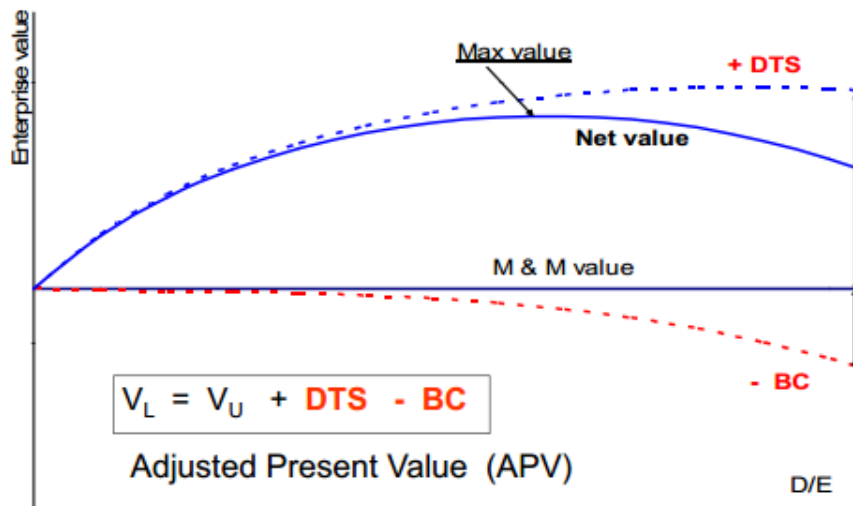
While the indirect costs consist of a variety of unobservable expenses and opportunity costs that are difficult to measure. These include loss of: customers, suppliers, employees, receivables and fire sale of assets (Berk, DeMarzo, 2011).

A study by Andrade and Kaplan (1998) shows that financial distress costs of highly leverage firms that became distressed, make up between 10-20% of the firm value.

Figure 3 shows the intuition behind the trade-off theory:

Figure 3: Trade-off Theory

Debt Tax Subsidies (DTS) vs Bankruptcy Costs (BC)



Source: (Johnsen, 2011)

The theory suggests that all firms should lever up as long as the costs of financial distress are less than the benefit from the added tax shield. Empirically this does not hold, since studies show that the most profitable firms tend to borrow the least amount. This is counterintuitive to the trade-off theory, since these firms would have large taxable incomes that would benefit from the deductible interest tax-shield, created by the added debt (Myers, 2001).

3.3 Pecking order theory:

The pecking order theory created by Myers and Majluf (1984) describes the firms' hierarchal view on use of financing options. In their analysis, they looked at a firm with asset-in-place that required further financing to realize a growth opportunity.

The theory can be summarized:

1. The firm prefers internal funds to external funds.
2. The target dividend ratio is changed accordingly with the firms' investment opportunity, as the firm tries to keep abrupt changes in dividends to a minimum.
3. As a result of dividend policy being "sticky" and the profitability and the investment opportunities varying over time, the capital expenditure sometimes exceeds the internally generated funds and vice versa. Should the funds exceed the capital expenditure; the firm

will pay down debt or invest in marketable securities. However, should we have the opposite case where the capital expenditure exceeds the internal funds, the firm would use its cash balance or sell its marketable securities to achieve balance.

4. In the case where external finance is needed, the firm will issue the safest security first; from safe to riskier debt, and finally equity as a last resort (Brealey, Myers, Allen, 2011) (Myers, 2001).

The reason firms prefer to issue debt over equity is that there exists information asymmetry between the management and the market. Assuming that the management is acting in the best interest of the existing shareholders, the management will not issue equity when they view the company as undervalued, as this would be a gift to new shareholders. If they view the firm as overvalued they will be more willing to issue equity, as this would benefit the existing shareholders. However, since the market is aware of the information asymmetry between management and shareholders, it will quickly react to the issuance of equity, and drive down the stock price, eliminating this overvaluation. Therefore, assuming both management and shareholders are rational, the management will issue debt over equity whenever this is possible.

The pecking order theory does not give a target debt ratio, since the two types of equities, internal and external, are situated on top and bottom of the pecking order list. The observed debt ratio of a firm is therefore a sign of the cumulative requirements for external finance.

Compared with the trade-off theory, the pecking order theory actually explains why the most profitable firms have the lowest debt ratio. This is because they have excess internal funds, and therefore do not require external funds to finance new projects. Less profitable firms on the other hand, need to borrow to make up for the funding gap between their capital expenditure and the internal funds available (Brealey, et al., 2011).

3.4 Market Timing Theory

The market timing theory refers to a hypothesis put forward by Baker (2002), which states that firms will choose the cheapest source of financing at point of time when the financing is needed. They will hence pay attention to the market conditions and attempt to time the market, choosing the best alternatives of financing from equity and different debt instruments.

The theory is based on behavioural finance and differs from the traditional pecking order theory and trade-off theory, as this theory does not try to choose between equity and debt. The theory rather tries to find which source of capital that benefits the firm the most. The goal is not to find the optimal capital structure, but rather to take advantage of the market conditions by regulating the firms' capital structure.

The theory further separates itself from the pecking order and trade of theory by not trying to explain why mispricing occurs or why the firm has a better ability to price the firm than the market. The theory rather assumes that mispricing does exist, implying that that the market is not perfect and that the management knows better.

The empirical evidence for this theory is, however, mixed, like many other hypotheses in behavioural finance. Baker and Wurgler (2002) claimed in their paper that an index of financing from market trough and upswings illustrated this hypothesis, while other papers, such as Altı's paper (2006), have found that this effect falls away after two years. It has furthermore been difficult to prove that certain firms are able to consequently beat the market, hence questioning the reliability of the theory.

3.5 Relating financial theory to shipping

According to Grammenos and Papapostolou (2012), the shipping industry has in the three past decades gone through a significant shift in the use of financing options. During the 80s and 90s, the **Pecking Order theory** fit the behaviour of shipping firms. Shipping firms mainly used debt, as the retained earnings was generally too small to finance a large ship investment. Stopford (2009) supports such statement by describing ship financing as dominated by bank loans, with bonds as the second choice of capital as long as the firms had the creditworthiness to issue debt.

However, according to Grammenos and Papapostolou (2012), the development during the last decade suggests a shift from the Pecking Order theory to the **Market Timing Theory**. This has been especially evident in the US shipping market during the period 2003-10, where there has been a shift from the traditional debt financing towards the more untraditional equity financing.

The main reasons for the shift towards the equity market were:

-
- The banking crisis of the 1980's that led to large losses in the financial sector.
 - The depletion of the equity base of shipping firms in the mid-80s.
 - The large scale-vessel replacement programs with increased capital requirements as well as high vessel prices in the 1999 and 2000.
 - A new generation of ship-owners and management that has a different perspective and academic background (Merikask, Gounopoulos, Nounis, 2009)(Grammenos, Papapostolou, 2012).

In addition to the increased use of the equity market, there was also an increase in the popularity of the high-yield bond market. This development suggests that shipping firms raise their external capital based on their perception of the cost of equity and debt, and in that respect what is the best for the particular firm in the current state of the economy.

Given the cyclical and volatile nature of the shipping industries, we do, however, believe the financing choices and preferences of the industry operators are likely to diverge from the norm. We, therefore, believe that we will see divergences from the general financial theory, which consequently may explain why financial theories only hold for a certain period of time for the shipping industry.

3.6 Ship financing general overview.

The shipping industry is one of the most capital intense industries in the world. Therefore is the choice of financing imperative for the success of new investments. Because of the truly mobile nature of the shipping industry, shipping firms face a less rigorous corporate and legal structure compared to other industries that are as capital intense. The volatility of the earnings and the value of the assets contribute to make it an exciting industry for shipowners, while more challenging for lenders, who seek stability and transparency.

During normal market conditions, where the shipping industry generates respectable profits, shipping firms will generally have little problem to secure financing for their new investments. In fact, some would even say that the industry has been plagued by an abundance of capital, thereby resulting in an oversupply of ships (Stopford, 2009). Bank loans have been the prominent source of capital for the industry. However, in times when the financial sector experiences deteriorating credit markets, they will cut back on loans, thereby limiting the supply of credit to the shipping firms (Stopford, 2009).

When the "cheap" bank loan source dries up, shipowners have to look for alternative financing sources. The second prominent source of capital is the public equity and debt markets. As we will later discuss, there has been an upswing in the use of equity during the last decade. In addition, the lack of bank funding led to the resurrection of the high-yield bond market from the mass defaults seen in the late 90's (Grammenos, Papapostolou, 2012).

4. Equity financing.

In a capital intense and volatile industry such as the shipping industry, with vessel values tying up the majority of capital, there is a real threat of financial distress. Therefore, the way the firm finances its vessels is a key component of the business.

For the shipping industry, the capital markets acts as a link between investors and shipowners, providing capital to fund new investments and growth. With changing market conditions, shipping companies have explored new ways to finance their investments.

Equity financing can be separated into externally and internally raised equity. Internal equity refers to the use of the owner's private equity, retained earnings from operations and the profit from selling ships (asset play) to fund investments. External equity refers to public or private equity offerings in the capital markets (Stopford, 2009) (Merikas et al., 2009) (Grammenos, Papapostolou, 2012).

4.1 Initial Public Offerings

Initial Public Offerings (IPO) refers to the process of a firm listing itself on the stock exchange, in order to raise new capital in the form of a share issue. Firms that go public, work with an **underwriter**, which is an investment bank that manages and structures the deal. For the underwriter, there are three levels of commitment:

-*Firm commitment*, where the underwriter guarantees the issue by purchasing the whole issue and then re-offers it to the public. The firm is then guaranteed that it will get the money, even though the issue should fail on the underwriters' part.

-*Best efforts agreement*. Here, the underwriter will sell the issue in the market; however, the firm has no guarantee from the underwriter that the issue will raise the intended amount of capital.

-*Book-building method*, where the underwriter collects bids from investors and sets the issue price based on demand. This is the most common method used for shipping IPOs.

The deal can either be structured as a primary or secondary offering. A **Primary offering** refers to new shares being issued to raise capital, while a **secondary offering** refers to the process where the current shareholders sell their shares to the public (Berk, DeMarzo, 2011).

4.1.1 Advantages of going public:

The major advantage of using equity financing in the form of an IPO, is the mitigation of the financial risk and obligation associated with issuing debt. Using debt, the company is obligated to make interest and principal payments to its creditors. On the other hand, the firm has no obligation to pay shareholder dividends. The reduction of financial risk is especially important in the volatile shipping industry, as a falling market may threaten the very existence of the firm.

In addition, there are a number of other advantages and disadvantages associated with going public:

- The newly raised equity will make the company more tolerant to the use of additional debt, as the gearing level of the firm has decreased (Grammenos, Papapostolou, 2012).
- The added liquidity from the listing might decrease the illiquidity premium associated with privately held firms and therefore lead to an increase in the market value of the firm (Damodaran, n.d.). This does not necessarily apply to shipping firms, as the main assets of the firm are ships. Vessels are generally a liquid asset and therefore the illiquidity premium will likely be lower compared to other firms with more specialized "hard to sell" assets.
- For family-controlled firms that go public, Brancel and Mittoo (2008) find that these families feel that IPOs give them added bargaining power with creditors without handing over control.
- The success of the IPO will improve the reputation of the firm, increasing market coverage and transfer the monitoring costs from creditors to the stock exchange authorities (Brancel, Mittoo 2008).
- Finally, the stock exchange listing leads to stricter control over the company, thereby reducing the probability of the management acting fraudulent (Grammenos, Papapostolou, 2012).

4.1.2 Disadvantages of going public:

- For the existing shareholders, the IPO might cause them to lose their controlling stake in the company.
- By diluting the current shareholders, they will in the future receive a smaller portion of the firms' profit, as they now hold a smaller proportion of the firms' stock.
- Public companies have to regularly inform the market in accordance with the regulations of the stock exchange where the company is listed. This makes the management's job more time-consuming and less flexible.
- The company's performance on the stock exchange is not only related to its own performance, but also the overall condition of the stock exchange.
- There is a considerable one-time cost that the underwriters charge when going public (Grammenos, Papapostolou, 2012).
- A majority of the listings are related to firms in the bulk segment, thus the IPO price will be set close to the market-adjusted net asset value of the firm. This pricing is only reasonable when net asset value reflects the full earnings and cash flows of the company. According to Merikas et al. (2009), this is generally not the case in shipping, as the second-hand prices of vessels do not always reflect the future cash flows of the ship. They find that the prices in the second-hand market do, however, generally reflect a high multiple of operating cash flow. This pricing will hence create problems when the shipping market is in a downturn and the earnings for the certain bulk segments are negative.
- Finally, there is the observed IPO puzzle. It states that IPOs are systematically underpriced, and that an IPO offering typically increases just after the offering given its underpricing. In general the increase last between a day and a year, before underperforming the following three to five years (Berk, DeMarzo, 2011). Merikas et al. (2009) also find support for this underpricing, when it comes to shipping IPOs.

Despite these disadvantages, Bancel and Mitto (2009) findings suggest that CFOs perceive the advantages to greatly outweigh the disadvantages associated with going public. Another study by Brau and Fawcett (2006) interviewing 348 CFOs showed that IPOs were viewed as a funding vehicle for the company's growth. They were, however, also concerned with the large fees associated with listings on the stock exchange, but most of all the loss of

confidentiality and control. It should, nevertheless, be noted that the advantages of going public are highly market value dependent, and that it is generally only when the industry experiences a boom, causing the market values to be high or at least higher than the underlying value of the firm, that management typically takes the firm public. In shipping, we have, however, recently seen that these characteristics do not always hold, with several solid shipping firms deciding to fund through IPOs, even when the freight market is down.

4.2 Follow-On Offerings (FO)

After going public, a firm will generally seek to grow and explore additional investment opportunities leading to the need for more capital. A follow-on or seasoned equity offering (SEO) is where an already public firm offers new shares for sale to the public. Within FOs there are two possibilities, cash offer or rights offer. In a cash offer, the firm offers new shares to anyone, thereby having a dilutive effect on the existing shareholders. In a rights offer, on the other hand, the firm only offers shares to the existing shareholders, thereby protecting them from dilution.

The market reaction to a FOs is generally negative. As with IPOs, the management is only willing to sell at a price that is correct or overvalues the company. This leads to the market believing that the company is overpriced, thereby resulting in a price drop. In addition, FOs have the same tendency as IPOs to underperform after issuance. Researchers have been trying to explain this phenomenon, explaining that it might be the conditions leading up to the choice of FO and not the FO itself (Berk, DeMarzo, 2011).

4.3 Public equity and its role in ship financing up until 2005

The use of more untraditional financing sources such as the public capital markets, for shipowners, started gaining popularity in the United States during the 1980s, and showed a substantial increase in the 21st century. Before to this, the knowledge of the shipping industry had been limited and deemed a niche sector.

During the 1980s, the shipping industry experienced a depression. Despite being plagued with depressed freight rates, many shipowners had obtained deep pockets during the earlier peak and were now looking to exploit the low shipyard prices. This led to a steep increase in the ordering of newbuildings. Expecting a market recovery in the mid-80s, their strategy was

flawed as many shipowners made the same strategic decision, thereby leading to vast oversupply when the newbuildings entered the market. Shipowners who had used large amounts of debt, from willing banks with large deposits of petrodollars, now faced severe financial problems (Stopford, 2009). This part of the crisis will be discussed in more detail under “Syndicate Problems”. The crisis wiped out the equity base of most shipping firms, and the banks who suffered large losses were more reluctant to make new loans for the second half of the 1980s. This contraction in the debt market, led shipping firms to start experimenting with funding through the US equity market. Furthermore, the increasing newbuilding prices during the late 80s/early 90s and the need for a large scale-vessel replacement of the fleet, also led to a further increase in demand for funding. In addition to the difficult financing conditions that the firms faced, a new generation of shipowners, with a different academic background and a more liberal view on ownership, emerged, leading to an increasing use of the equity market. By the start of the 21st century, shipping IPOs really picked it up. Once shipping IPOs caught the attention of large institutional investors and the shipowners realized that this was a way they could effortlessly raise addition capital, the use surged (Grammenos, Papapostolou, 2012).

4.4 Private Placement

Private placement is the process where a company, that is either public or private, offers securities to individuals or a small group of accredited investors. Securities offered, can either be of equity or debt, and private placement will hence also be described under our debt section. In such offerings, the investor can for example be in the form of banks, mutual funds or private equity firms. In the US, this does not qualify as a public sale of securities; therefore it does not have to be registered with the Securities and Exchange Commission (SEC) or fulfill the usual reporting requirements. Contrary to an IPO, private placement is a cost effective and less time consuming procedure for a firm to raise capital (Private Placement of Securities, n.d.).

4.4.1 Private Equity

Private equity refers to a firm that has raised equity capital in order to invest in privately held companies. Private equity is usually organized in the form of funds, which pools money from a range of investors and invest collectively into a company. The strategy of the private

equity funds differs according to the nature of their investment and their means of realizing the profits from the transaction. The profits can either come from operational income or from exit strategies such as IPOs, mergers and acquisitions, selling or leveraging of the assets (Snow, n.d.)(Imhof, n.d.).

4.4.2 Private Equity and its Role in Ship Financing

What we today refer to as private equity did not emerge as a source of capital before after the Second World War, when firms started to raise capital from sources other than wealthy families. Before World War II, venture capital investments were primarily the domain of wealthy individuals and families. Even as recent as 1970, private equity investments were mostly restricted to venture capital inputs into small firms in fast growing sectors by high net worth families. Even though venture capital has progressed since then, they comprised of less than 1/5 of all private equity deals done in 2007. The real boom in private equity happened in the 1980s and introduced a new type of private equity, namely leverage buy-outs (LBOs), which today represent the main type of private equity deals. This type of financing refers to the takeover of relatively large companies, financed to a large extent by debt (Chandrasekhar, 2007). This type of financing really became popular in the 1980s, and just between 1979 and 1989, 2000 LBOs were completed for a value of more than \$250 billion (Opler, Titman 1993). By 1992-93, the bubble burst and many of the large buyouts ended up in bankruptcy. After this, private equity again experienced two periods of considerable growth, with small periods of reduced activity. The industry grew from 1995 until 2000, before being hit by the Dotcom bubble. Hereafter, it again re-established itself and continued to grow steeply from 2003 to 2007, which is also known as the Golden Age of Private Equity (Chandrasekhar 2007).

Private equity has traditionally not been a conventional source of financing within shipping, as their term return objective has historically made shipowners reluctant to use this type of funding. Shipowners have previously found that their incentives rarely are similar to those of the private equity firms. However, given the financial condition that several shipping firms found themselves in, following the financial crisis, shipowners had to seek alternative ways of financing, with much of the bank loans issuance gone, due to the financial difficulties of the banking sector. Private equity funds saw this as an opportunity to capitalize on the tight credit market and the subsequent historical low vessel values, expecting to see a significant return, once the shipping market rebounded. Given the lack of other opportunities and the

promise of access to great funds, several shipping firms/owners accepted the offers from various private equity firms. In the years of 2010 and 2011 there was a surge of private equity firms entering the shipping industry.

The most common approach made by private equity funds, when entering into the shipping industry, is by joint ventures. This is typically done together with another investor who is either a shipowner or a manager. Since the shipping industry is very different from other industries, the private equity firm will have to rely on the expertise of its partner. This is due to the many laws that affect shipping, which can severally differ from jurisdictions. In addition, there is the conflict of interest between the shipowner/ management and the private equity fund, since private equity funds may have a different view on the objective and the strategic path to it, compared to the shipowner/manager (Imhof, n.d.).

5. Mezzaine Financing

Mezzanine finance is a collective term for hybrid forms of finance. All financing that fall between the two main types of financing, senior debt and pure equity financing, are defined as such. There are various types of mezzanine finance, each having its own unique characteristics (European Commission, n.d).

The most common form of mezzanine finance is subordinated loans. This type of financing refers to junior unsecured loans, implying a lower ranking in case of bankruptcy compared to senior debt. This type of financing is typically used to finance the expansion of existing companies, and as a result of the inferior claim on assets, it usually requires a higher interest rate compared to regular debt.

Even though this type of financing is clearly debt, it possesses equity like characteristics, since most mezzanine lenders typically receive warrants, which may be exercised to transform the debt into equity in the borrowing company. Warrants can be defined as a derivate security offered by the firm itself, which allows the warrant holder to purchase stock in the firm at a specified price for a determined time period (Gaughan, 2007).

6. Debt

In capital-intensive industries like shipping, equity financing may often fall short of the desired capital level needed to make the correct investments, and finance the best strategic actions. An alternative to equity financing is to turn to the debt market. Debt may be issued from many sources, however, we will in this paper, mainly focus on corporate debt as this is of most relevance to our topic. One can in general divide corporate debt into private and public debt. Within both these segments, debt is often classified according to whether they are secured or unsecured, have a senior or junior ranking, and whether it is syndicated or bilateral debt. In addition, there are also other types of corporate debt that display one or more of the characteristics noted above.

All corporate debt is categorized as either secured or unsecured. Related to whether the debt has specific asset pledge to its lenders in case of liquidation. Secured debtholders are, as we will discuss later in chapter 7, the first in line to get their claims covered in case of liquidation. Within these two classifications, one also separates between senior and junior debtholders. In the state of liquidation, the senior debtholder will supersede the junior debtholder's claim. A junior secured debtholder's claims will, however, supersede a senior unsecured debtholder one's. The level the loan is secured hence supersedes the ranking of the debtholder as long as the claim can be fulfilled with the sale of the secured asset (John, Lynch, Puri, 2003).

6.1 Private Debt

Having defined the different subcategories of debt, we now return to the bigger picture, and separate between private and public debt. One can separate private debt from public debt, by defining private debt as not being publically traded. The private debt market can be divided up into bank loans and private placements (Berk DeMarzo, 2011).

Bank Loans

The main type of private debt is bank loans. Within bank loans you have term loans, which are what one normally thinks about when talking about bank loans, and revolver loans, which are revolving lines of credit. Revolver loans are offered to some of the bank's large customers and refer to an open credit commitment for a specific period of time, up to a

certain predetermined credit limit. Returning to term loans, these can be divided up according to their maturity, short and long-term loans. Term loans have historically been the most important source of capital in shipping, as it offers quick and flexible access to capital, without reducing owner's control of the company.

Syndicate Loan

A bank loan can either be given out by an individual bank or syndicated by a group of banks. By syndicating the loan, the bank is able to spread the risk by sharing the loan among a number of banks. This is the usual practice for large loans, and it has often been used for ship financing, as an investment here often requires a significant amount and would hence represent a significant risk for only one bank. For the shipping banks, this practice further allows banks that do not possess relevant shipping knowledge needed to appraise shipping loans, to participate in the loans by following the risk assessment of the lead bank. Allowing the smaller non-shipping banks into the market have, however, historically had mixed results. It may be an easy way for such participants to make money in good economic times; however, they seem to often lack the required understanding of the market to do the "correct" decision when the market turns. Such behaviour was illustrated in the 1980s depression.

After a recovery of the world economy at the end of the 1970s, the world economy again, moved into a new period of low economic activity, which lasted until 1987. With tanker firms experiencing steady decline of seaborne oil trade until 1983, and the bulk sector losing pace in 1981, after having experienced years of booming. Freight rates hit new lows between 1983 and 84, with some brokers describing it as the worst ever (Stopford, 2009).

Many banks had overextended themselves during the boom, and when the market turned, many of the smaller banks without shipping knowledge did not have the industry knowledge needed to make rational judgements. Many were desperate to reduce their exposure, and either wanted to pull back their loans or waited for the lead banks to take action. This led many, both creditors and debtors, to take losses that they were not necessarily required to. One can hence say that the syndicate loans led many participants into the market where they perhaps should not have been, and in that way increased the effect of a potential crisis (Falck, 2013)(Gade Greve, 2013).

Term Loans

As we in this paper wish to look further into the capital sources available to the shipping industry, we will focus on the 3 types of term loans available to the shipowners. These are: mortgage-backed loans, corporate loans and loans provided through the governmental shipyard credit schemes.

Mortgage backed loans

Mortgage-backed loans refer to loans that take security in a ship of the lenders fleet. This is hence referred to as a secured loan. This type of financing opens up the opportunity for shipping companies to take loans that they might not otherwise be creditworthy for. The percentage of vessel market value at which the bank is willing to consider as security depends upon the age of the ship and the state of the shipping market; however, loans rarely exceed 50%. With extra security in form of time charter, mortgages on other ships or personal guarantees from the shipowners, the bank might be convinced to increase the loan ratio towards the full ship value (Stopford, 2009).

Corporate loans

Corporate loans refer to loans given to large, well-established companies with collateral on the corporate balance. These types of loans are given at the convenience of the big companies. Such firms typically have large fleets and any change in their fleet, would involve a time-consuming loan transaction with the mortgage-backed loans option. It is hence much more convenient for them to loan on the company as a whole, receiving credit based on the company's name. The advantage of this arrangement is that it gives the company a flexible source of capital. The disadvantage, on the other hand, is that the banks loans are not secured in specific assets, as they have assumed that these companies are "too big to fail" (Stopford, 2009). This type of mentality has recently proven to be ill advised. A perfect example of this going wrong is the previous shipping giant OSG recently filing for bankruptcy (Church, Milford, Kary, 2012).

6.2 Shipyard credit scheme

Shipyard credit scheme refers to a financial aid scheme offered by various governments to shipowners, in order to add incentives to put in orders at respective domestic shipyards. These schemes are also known as government credit schemes, and were introduced in the

1930s. What we today consider shipbuilding credit schemes were, however, first introduced in the 1960s when Japanese shipyards were the first to launch an export credit scheme. Fierce credit competition from the European shipyards followed before OECD regulated the inter-country competition of shipbuilding credit offerings. This regulation is still in force, and was last updated in 2002. Most European shipyards today offer credit schemes based on OECD terms (Stopford, 2009).

There are three ways in which a government can make its shipbuilding credit more attractive than commercial bank credit to the shipowner.

- **Government guarantee:** Here the government stands as a guarantee for the shipowner's loan, hence helping the firm to borrow from a commercial bank. The value of the guarantee depends on the credit standards that the government agency applies in issuing the guarantee.

- **Interest rate subsidy:** Here the government subsidizes the interest rate that the shipowner has to pay for the debt financing.

- **Moratorium:** A moratorium refers to a period of time in which there is a suspension on interest or principal payments. This is typically agreed upon with the government in difficult times, in order to lighten the burden and give the firm time to stabilize itself. A moratorium usually does not last longer than one or two years.

Today, most financing of new acquisitions within the shipping industry is incorporated under this governmental credit scheme. The most significant shipbuilding countries all have such schemes in order to stay competitive. Examples of such institutions carrying out these schemes are the Export Credit Bank of Japan, the KEXIM bank of South Korea, the EXIM bank of China, and Eksportfinans and GIEK in Norway (Stopford, 2009).

6.3 Private placements

Private placements can, as earlier described, either be an offering of equity or debt security to individuals or a small group of accredited investors. Debt private placements refer, in more detail, to a bond issue that is not traded on the public market, but rather offered to a selected small group of investors. It can, as with bank loans, also be divided up into secured or unsecured and senior or junior placements. Like its equity equivalent, the advantage with this type of financing compared to other tradable securities, is that it does not need to be

registered with the SEC in the United States. You are hence able to secure financing much quicker than what you would be able to do with similar tradable securities. Furthermore, you do not need to conform to the same standards as of public debt. You are therefore allowed a larger degree of tailoring of products. Advantages from this tailoring include the possibility of fixed interest rate or long duration (Berk, DeMarzo, 2011).

6.4 Public Debt

Public debt is debt that is publically traded and is often referred to as bonds. A bond is a fixed-obligation debt security. The premise of such a security is that the issuer sells a certificate of debt to an investor. In return, the issuer promises to pay back the investor the whole amount (the principal) at the maturity of the bond. Between the issuing date and the maturity, the issuer is also obligated to pay, at pre-determined dates, an agreed upon interest rate on the principal. This interest rate is known as the coupon rate.

The coupon rate the issuer offers depends upon the respective interbank rate (the interest rate that banks charge each other for internal bank loans), the duration of the bond and the credit rating the borrower has. If it becomes more expensive to borrow, then this will be reflected in the interest rate. Similarly, as estimating the credit worthiness of the borrower gets harder the longer into the future one goes, longer maturity bonds usually needs a higher coupon rate than shorter ones. This phenomenon is referred to as the credit curve. Furthermore, if the credit rating is bad, this implies that there is risk of default. The lender will therefore require an interest rate above the risk free rate (what he/she could get without taking any credit risk), leading to an increasing of the coupon rate (Bodie, Kane, Marcus, 2011).

The credit rating is decided by the rating agencies. The most worldwide-recognized rating agencies are Standard & Poor (S&P), Moody's, and Fitch Rating. Between these there are two different rating systems. Moody's assigns bond credit ratings from Aaa to C, where Aaa represent the best and C the worst. They divide each letter group ex (Aa) into three, where three indicates that the company is considered to be at the lowest segment of the letter group. S&P and Fitch, rate based on a different system than Moody's, where AAA rated companies are considered to be the safest and D rated firms is the lowest rated class of companies. Each letter grouping here receives a plus, a minus or neither based on its rating within that particular rating group. Even though the rating systems differ, the systems are fairly similar, and firms are often rated in the "similar" class. The difference is illustrated in *Figure 4*. We

have here not included the segment of each letter group (1,2,3 /+,-) (Moody's, 2009)(Standard & Poor, n.d).

Figure 4: Bond Rating

Investment-grade	Moody's	S&P
Highest quality	Aaa	AAA
High	Aa	AA
Upper	A	A
Medium	Baa	BBB
'Junk'		
Somewhat speculative	Ba	BB
Low grade, speculative	B	B
Low grade, default possible	Caa	CCC
Low grade, partial recovery possible	Ca	CC
Low grade, default likely	C	C
In default	–	D

Source: (Yahoo Finance, n.d.)

An important distinction when considering bonds, is to separate between investment grade and junk bonds. All bonds rated BBB or higher are considered investment grade. Those below are called junk bonds, or high-yield bonds. The issuers of such bonds typically tend to have high leverage ratios, often as high as 90-95%, which causes them to have significantly higher probability of default (Brealey et al., 2008). It is quite normal that hedge funds and mutual funds have investment policies restricting their purchase of this type of bonds, forcing the companies to offer an even higher interest rate in order to attract sufficient capital (Illustrated by the investment policy of the world's largest mutual fund company) (Investment Policy Statement, 2009).

6.4.1 Securitization of Public Debt

One can with bonds, as with private debt, divide public debt up according to its seniority and degree of secured claims. Unsecured public debt can be divided up according to maturity into notes and debentures, while secured public debt can be separated into mortgage bonds and asset backed bonds.

A note is a written promise to pay a specific sum of money on a certain date. A note typically has maturity between 1 and 10 years, which is shorter than the maturity of a debenture. Both these are unsecured meaning that in case of bankruptcy the bondholders only have claim on the assets not already pledged as collateral for another debt (Berk, DeMarzo, 2011).

Mortgage-backed bonds and asset-backed bonds, are similar to the same type of loans discussed above, secured by specific assigned collateral. Mortgage bonds are secured in real property, while asset backed bonds are secured in any kind of asset (Berk, DeMarzo, 2011).

6.4.2 Bonds Repayment provisions

Typically a bond is repaid, by the issuer making its coupon payments during the duration of the bond, and finally the principal at the end of maturity. There are, however, other ways for the issuer to repay the bond. The issuer can for instance repurchase a portion of the outstanding bonds in the market, or make a tender offer for the entire issue (A public takeover bid to buy all bonds outstanding at a specified price during a specified time, subject to the tendering of a minimum and maximum number of shares).

Another way for the issuer to repay bonds is to exercise a call provision, which allows the issuer to repurchase the bonds at a predetermined price, given that such a provision is implemented in the bond. This type of bond is referred to as a callable bond. A different version of a callable bond is a convertible bond, where the holder of the bond has a warrant on the bond, meaning an option to convert the bond into common stock in the issuing company or cash of equivalent value, at a predetermined price (Berk, DeMarzo, 2011).

This type of bond is often issued by shipping companies. Convertible bonds carry a lower coupon rate than a similar bond without the warrant option, and are often subordinate to other debt. The lower coupon rate can be explained by the imbedded warrant option, which makes the bond more attractive, and hence require a lower coupon rate in order to attract investors (Brennan, Schwartz 1980).

In the shipping industry, bonds are often unsecured (78 % of all bonds issued in 2012 were senior unsecured bonds (Weltman, 2013), and most bonds also have relatively short tenors, with the most regular being a five-year maturity (Lian, Liu, Lin, Yeh 2006). This implies

that notes are the most used type of corporate bonds in this industry. Furthermore, the shipping industry's risk profile can be rated as BB (Kindahl, 2008), given the high volatility in the freight market, the high leverage ratio and competitive factors within the shipping industry. The most relevant bond market to consider, as a way of financing for the shipping industry, is hence the high-yield market.

6.4.3 Bonds as means of financing for shipping

In order to examine the suitability of bonds as a mean of financing for the shipping industry, one needs to consider the underlying characteristics of the shipping industry. The industry is highly cyclical and volatile both in terms of freight rates and asset values. Most firms are heavily geared, as it is a capital-intensive industry, and the asset life expectancy is quite long; with the expectancy depending on the particular shipping segment. Such characteristics may suggest that it might be hard for shipping companies to stay within covenants or make coupons if the market is in a trough.

6.4.4 High-Yield bonds and its role in ship financing up until 2005

We will in this section briefly go through the history of high-yield bonds in relation to shipping, and discuss its suitability as a source of capital in the shipping industry.

The history of the high-yield bond market is a fairly short one. The market arose in the US, in the 1980s, when investment bankers realized that investors were willing to invest in former investment grade companies that had been downgraded. Even though the market had been around for decades, the activity in the market had been close to nothing. In the 1980s, the investments bankers, led by Drexel Burnham Lambert and Michael Milken, found these so called "fallen angels" to be systematically undervalued, and hence started offering bond issues to finance small and medium sized companies that were unable to achieve an investment grade rating. In the 1980s, this market was further fuelled by the growing use of leveraged finance acquisitions, which used high-yield bonds as the main source of capital (Taggart, 1987). As the bottom fell out of the market in the early 1990s, the default rates rose for high-yield bonds, and the market encountered its first down cycle (Grammenos, Papapostolou, 2012). Drexel Burnham Lambert went bankrupt, while several major investors were barred from buying new high-yield bonds and were forced to liquidate their high-yield bond positions (Altman, 2012). By the end of the 1990s, default rates peaked at 11 percent

(Helwe, Kleinman 1996). Since then, the market has strengthened and continued to grow as a source of financing in the international capital market area.

As a mean of ship financing, the first bond offer by a shipping company took place in 1992, when Sea Containers Ltd. issued \$125 million of subordinated debentures. Since then many issues have taken place. By June 2011, \$16,6 billion of fresh capital has been raised, and 83 issues had taken place (Grammenos, Papapostolou, 2012). After the initial offering in 1992, annual shipping bond offerings stabilized before slowly growing until its first peak in 1997-98 (Marine Money Offshore, n.d). During this period, many shipping firms took advantage of the booming market conditions, and between June 1996 and December 1997, \$6 billion worth of high-yield bonds were issued to shipping companies in the US (Lloyd's List, 2010). When the shipping market dropped again in mid-98 and 99, caused by the Asian and Russian financial crisis, many of these issues defaulted. In 1999, shipping public debt default rate reached alarmingly 38% in the US, compared to the overall public debt default rate of 1.28% (Grammenos, Papapostolou, 2012). This occurrence hit the investors hard, and smeared the shipping industry's reputation as a bond issuer for years to come. Regardless of this, the shipping high-yield market again re-emerged in 2003, as China moved into a period of serious infrastructure development. The following years will be covered in our analysis, and we will hence not discuss it here in order to avoid redundancy.

6.4.5 Advantages of using bonds

When considering bonds as means of financing there are several aspects to consider. Starting with the advantages, the bond market firstly offers shipowners a massive pool of alternative capital to exploit, this market being especially relevant when the capital market condition tightens. Secondly, by including bonds in your financing portfolio you further diversify you capital source, as it is likely to already be overweighed towards bank loans (Falck, 2013)(Gilson, Warner, 1998). Third, given that a bond does not require an amortization of the principal, financing through bonds may also raise the cash flow breakeven, and through that enable the firm to take greater advantage of its interest tax shield. This advantage is of course given that the firm is situated in a country that taxes the shipping industry (Falck, 2013).

Considering financial flexibility, junk bonds can provide a higher degree of flexibility compared to bank loans. Firstly, the covenant restriction that follows with a bond is minimal

compared to what is required for a syndicate loan (Hale, Santos, 2006) (Albertijn, Toepfer, Besler, Drobetz, 2011). Such restrictions can lead to lost opportunities if they prevent the firm from investing in positive net present value projects (Smith, Warner, 1979). Secondly, as bonds generally are more often unsecured compared with bank loans, this allows the issuer greater flexibility in managing its assets (Gilson, Warner, 1997). Thirdly, as the principal only has to be repaid at maturity and the bond only requires the borrower to pay coupons during the lending period, the issuer increases its financial flexibility. This allows the shipowner to either invest the freed up capital in projects, expand their fleet or take on more bank loans by using the available capital to repay other debt obligation already outstanding (Grammenos, Papapostolou, 2012)(Falck, 2013).

An alternative to bond financing is of course to raise equity through issuance of new shares, but by doing so shareholders share may get diluted (Berk DeMarzo, 2011). Secondly, the bond process offers a larger degree of certainty of execution and is considerably less time consuming than what an IPO offering would have been. Thirdly, by issuing a bond you are also required to do considerably fewer disclosures than what an IPO offering entails (Grammenos, Papapostolou, 2012).

Lastly, for firms that do not have had much exposure to the financial market, a bond issuance provides valuable experience for firms that in the long run plan to make an IPO offering. If the firm also has not previously been exposed to the public market, an issuance of a bond would require a greater discipline from the management, as the investor now will monitor them. Such supervision can help reduce typical agency costs such as empire building and suboptimal capital structure (Kaplan, Atkinson, 1998). Through a bond issuance, a firm can also improve its credibility and publicity in the public market, which may improve its standing with its current debt provider (Hale, Santos, 2006).

6.4.6 Disadvantages of using bonds

Considering the negative aspects of a bond issuance, it is an expensive source of capital. Bonds are expensive both in terms of the initial outlay needed to complete the issue, as well as the high interest payments that follows the bond during its duration (Hale, Santos, 2006). Furthermore, as the interest payments also are so significant, it becomes very expensive to hold the capital without investing it, and such financing hence normally requires a speedy

investment. This leaves little time for consideration after receiving the capital (Grammenos, Papapostolou, 2012).

The repayment structure of a bond normally entails a large sum due at maturity. This lump sum represents a refinancing risk. Most issuers tend to deal with this issue by rolling over the bullet payment into a new bond, and hence funding the principal with the new bond (Falck, 2013). Such strategy does, however, rely heavily on a well-functioning liquid market, and could force many companies into financial distress if for instance the market dried up like it did during the financial crisis (Dick-Nielsen, Feldhütter, Lando, 2010). At today's market, however, as long as the debt has been serviced during its contractual period and the borrower is in solid financial shape, refinancing should not be a big issue. The refinancing risk may also be reduced by buying back part of the issue at a discount during its duration, if the market conditions allow it. Such repurchase is usually possible after the first few years, in which there usually is a "no call" provision (Berk, DeMarzo, 2011).

We earlier talked about financial flexibility, comparing bonds and bank loans, and gave several reasons why a bond would be more flexible. We do, however, not believe that junk bond dominate bank loans on this matter. As presented earlier, bank loans also come as revolving line of credit. Such an option can give great flexibility, enabling growing firm quick access to capital.

Relying on bonds oppose to bank loan financing can also be a risky in case of financial distress, with risk of breaching covenants or inability to cover interest payments. With bonds, you namely lose the aspect of personal interface you get with a bank loan. Where you with a bank loan can relate to one specific banker, with whom you have a personal relationship and perhaps a history of financial involvements (Petersen, Rajan, 1994), you will with a bond need to deal with a representative for all of the bondholders, in Norway called "Norsk Tillitsmann", described in section 7.3. This is a representative, which whom you are unlikely to have neither a personal relationship with nor any past or future business with. He/she will hence have little incentive to compromise/ be flexible in a situation of financial distress and will only have his/her bondholder's interest in focus, even though this might not be the best solution in the long run (Falck, 2013).

Another aspect to consider in this regard is the lack of transparency. By this, we refer to the fact that with a bond the bond buyers are not obligated to reveal their identity. In such a system, one/several investors may buy a large portion of the bond with intentions of bankrupting/ taking over the company in the case of a breach of covenant or lack of interest payments. The owners of a bond have in other words a big influence on the company. Michael Milken, one of the pioneers of high-yield bond market, underlined this treat by declaring: “if you miss one payment, we will take the company away” (Milken, n.d). By financing with bonds, you hence lose the flexibility a bank with a long-term relationship offers you, and you risk meeting less understanding lender in the case of financial distress (Falck, 2013).

Incorporated with a bond issue there are several regulatory requirements. First of all, prior to the issue, the company is obligated to hire an accounting firm in order to get its books audited. This will entail an increased annual accounting expense (Falck, 2013). Going public also entails that the firm will be under close surveillance by the respective governmental body overseeing the relevant securities exchange, in the United States this body is called the Securities and Exchange Commission (SEC) (Falck, 2013). From firms issuing bonds, SEC requires quarterly and annual reports that comply with the Sarbanes Oxley act. If the firm already has already gone public, it already has to comply with such regulations and the issuance of a bond will provide very little extra work. If, however, it is a private company, then such an issue will require considerably more effort, and can present concerns about privacy and use of management’s time (Grammenos, Papapostolou, 2012). Gao (2011) finds that foreign firms that are not already listed on the US stock exchange, comply with IFRS standards, or issue large bonds, are less likely to use the US bond market after the Sarbanes Oxley act.

For a private company, deciding to go public also results in a greater sensitivity to its public rating. It now needs to consider the effects the firm’s actions will have on its public rating, and how the public rating might affect the business (Falck, 2013).

7. Key Fundamental Insight

In this section we will discuss three key topics related to the different asset classes of funding.

7.1 Basel

The Basel requirements, also known as the Basel Accord, are a set of minimum capital requirements for the banking industry, agreed upon by the G-10¹ central banks, through the Basel Committee on Banking Supervision (BCBS). The BCBS is a committee established by the central bank governors of the G-10 countries in 1974 as a response to the troubled liquidation of Hersatt Bank (BIS, n.d).

The initial accord was established by the Bank of International Settlements (BIS) in 1988, and is referred to as Basel I. This accord was voluntarily enforced by law in the G-10 countries in 1992. Since then, the requirements have been updated and developed, and several other countries have enforced the requirements. A new set of rules were introduced, that went by the name of Basel II, and a following update, known as Basel III, was agreed upon in 2010-2011. The accord will gradually be introduced, before being put in to full effect by 2019.

The Basel I Accord sets forth a framework for measuring capital adequacy and proposes a minimum standard of capital to be demanded for international banks in adopting countries. In Basel I, BCBS divided up the banks' assets into five categories according to how much credit risk each category possessed. Each category was given a certain degree of risk percentage in the range of (0-100). Stated simply, all banks with international presence were required to have at least 8 percent of the value of its risk-weighted assets as buffer capital. By risk-weighted assets, they refer to assets weighted according to the level of perceived risk that each asset category represents, and how each off-balance-sheet exposure is converted and weighted accordingly to its equivalent amount of assets (Basel, 1988).

¹ G-10 countries (Belgium, Canada, France, Italy, Japan, The Netherlands, The United Kingdom, The United States, Germany, and Sweden)

In Basel II, further efforts were made to significantly mitigate the credit risk of banks. This was done by strengthening the regulatory capital framework for large banks with international exposure. This was accomplished through minimum capital requirements that were more sensitive to the institutions' risk profile and also provided strengthened incentives for stronger risk management. In Basel II, the committee introduced three different pillars on which the requirements were built on (Federal Reserve, n.d).

Pillar 1 requires banks to hold a minimum total capital level of 8% as a function of their risk level, similar to what was proposed in Basel I. What has changed from the initial Basel accord is the definition of risk-weighted assets and the division of capital. The hallmark of Basel II is the alteration in the treatment of risk, as well as the explicit incorporation of operational risk in risk-weighted assets. The bank capital has been divided up into two tiers: Tier I and Tier II capital. A requirement for the degree of Tier I capital has also been set. After Basel II, each bank is required to have 4% of Tier I capital, and common equity of 2%, known as core Tier I capital.

In Pillar 2, the administration will evaluate the activities and risk profiles of each individual bank in order to decide whether the organization needs to adjust and consequently hold more capital than the minimum requirements of Pillar 1. The concept is hence that well-managed banks should seek to go beyond simple compliance with the minimum capital requirements, and perform a comprehensive assessment of whether they have sufficient capital to support their own individual risk profile. These assessments are known as Internal Capital Adequacy Process (ICAAP) (BIS, 2009).

In Pillar 3, the Basel accord seeks to complement the framework set forward in Pillar 1 and 2, by improving transparency of the banking sector. Pillar 3 aims to do this by requiring the banks to publish details on the scope of their operations, capital, risk exposure, risk assessment processes, and capital adequacy. These disclosures are required to be made at least twice a year, except for the qualitative disclosures, which are only needed annually and provide a summary of the general risk management objectives and policies. This pillar allows the public to evaluate the individual bank's risk profile, level of capitalization and whether the information presented by the company actually correlates with how the management assesses and manages the institution's risks. It is seen as a particularly important pillar, since Basel II allows some banks to rely more heavily on internal risk assessment methods. This gives them greater power in determining their own capital needs.

The latest update of the Basel accord is Basel III. It was developed as a response to the financial regulatory gaps that came into light after the recent financial crisis. The accord introduces stricter capital requirements and new regulatory requirements on bank liquidity and bank leverage (BIS, 2009).

Basel III requires banks to hold 4.5% of common equity (up from 2% in Basel II) and 6% of Tier I capital (up from 4% in Basel II) of risk-weighted assets (RWA).

Basel III also introduces: additional capital buffers, a minimum leverage ratio, and two liquidity ratios.

(i) Capital conservation buffer

- a. The banks are expected to hold a core capital degree of 2.5% in addition to the minimum capital requirement.

(ii) Countercyclical buffer

- a. In order to protect the banks against obligations of strong credit growth, the national regulators are allowed to require up to another 2.5% of capital of counter cyclical buffer, during periods of high credit growth.

(iii) Minimum leverage ratio above 3%

- a. In order to prevent firms of leveraging up too much, hence exposing themselves to high credit risk, a minimum leverage ratio of 3% has been put in place. The ratio is calculated by dividing Tier 1 capital by the bank's average total consolidated assets.

(iv) Liquidity ratios.

a) **The Liquidity Coverage Ratio (LCR)**

The LCR is implemented to promote the short-term resilience of a banks' liquidity risk profile. It achieves this by requiring that a bank holds an adequate stock of high-quality liquid assets that can be converted into cash immediately in private markets, in order to meet its liquidity needs for a 30 calendar day liquidity stress scenario. This requirement will strengthen the banking sector's ability to absorb shocks arising from financial and economic stress, thus reducing the risk of spillover from the financial sector to the real economy.

b) **The Net stable funding ratio (NSFR)**

This ratio aims to ensure banks are able to survive an extended closure

of wholesale funding markets. The Net stable funding ratio establishes a minimum acceptable amount of stable funding to exceed the required amount of stable funding over a one-year period of extended stress. The ratio comes as a response to severe shortage of funding many banks experienced in the recent crisis, caused by their significant reliance of short term funding through the interbank market.

7.1.1 Critics

Even though it is clear that a further tightening of the financial regulatory system was needed, critics of the accord have claimed that the greater regulation is responsible for the slow recovery of the world economy. Tighter Basel III requirements may further negatively affect the stability of the financial system, by increasing the incentives of banks to game the regulatory framework (Taylor, 2012)(Suttle, 2011).

7.1.2 The Basel Accord's effect on the Banking industry

Following the latest change in the Basel Accord; many banks have been struggling to fulfill the requirements set forward. As we have discussed, the required quality of the minimum capital has increased and several additional capital buffers have been required. This has forced the banks to readjust their balance in order to optimize the use of equity.

With the new set of rules, the required equity has increased for previous similar risk. This forces the banks to either raise more equity or reduce the risk associated with their portfolio. The later option is related to the fact that the capital requirements are relative to the banks' assets. This is being implemented through risk weighted assets (RWA), where the equity requirements are dependent upon the riskiness of the assets (Accenture, 2011).

Looking into the first option of raising equity, banks can either; issue shares, sell assets or increase retained earnings by increasing their revenues or reducing costs. As the banking deposit market is close to perfectly competitive, charging interest rates above the average market rates is not sustainable in the long run. In addition, this would be a strategy of high risk, as deposits often represent 30-40% of the bank's funding (Gade Greve, 2013). Banks hence rarely turn to this option in order to increase revenues. Following the fall of the market, several banks have downsized, and made cuts in less crucial areas. This has happened either by selling out some of the assets or reducing staff. Unfortunately, however,

given the current market state, these sales often happen at prices under book value, leading to a reduction in equity. Furthermore, the revenue of the banks has also fallen, causing the efforts of cost reduction to be insufficient in order to reach the required equity levels of the Basel Accord (Accenture, 2011).

Furthermore, most banks are reluctant to issue shares, mainly due to the fear of diluting shareholders and putting negative pressure on the stock price. Increasing equity levels have therefore proven to be a difficult task in the current state of the market. Most banks have consequently seen the need to trim their portfolios' of the most risky loans, and thus reducing their risk-weighted assets. This have led several banks to turn to their big customers, which are exposed to high volatility, and make large cuts in funding in sectors such as industry and shipping. (KPMG, 2011).

7.2 Liquidation of a firm

When a firm cannot meet its debt obligations the firm is in default. The creditors can then take legal action against the firm to collect the outstanding payments by taking control over the firm's assets. Hence the control of the firm is transferred from the equityholders to the debtholders. Since a firm generally has several creditors there exist bankruptcy codes to ensure fairness and coordination between the creditors. These codes differ from country to country and so does also the friendliness towards the creditors and debtors. US and French courts for example, are known to be friendlier towards the debtors than the creditors by favouring the current management and the continuance of the firm as a going concern. This thereby creates an incentive for firms to seek bankruptcy protection in US courts, as for example the LPG tanker firm Navigator Gas did, instead of in the Isle of Man (De Lacy, Michael Fay, 2012).

Since firms generally have multiple creditors there exists a hierarchy that states the priority of claims for the different debtholders. This hierarchy is known as the "Absolute Priority Rule" (APR) and can be seen in *Figure 5*. The rule states that in the case of liquidation, secured debtholders are paid first. This refers to debtholders that given the large risk of default have required their loans/bond to be securitized against the assets of the firm. When the firm goes into default, the bank or bondholder will then try to recover the outstanding debt by taking control of the collateral that secured the loan. Their claims are hence a priority as long as the secured assets cover their outstanding debt. Senior unsecured creditors

will have second priority, while subordinate debtholders have the lowest seniority of the creditors. Banks are the predominant users of securitized debt, while bondholders will seek compensation in form of higher expected yield due to the increased ratio of loss given default. The loss given default depends on the characteristics of the borrowing company, the asset value under liquidation and the economic condition.

Equityholders have the lowest priority and will only receive value when creditors have been paid. This is not always the case, as there exists deviations to the APR (Eberhart, Weiss 1998). This can be due to the individual circumstances of the firm and the country the bankruptcy is being processed in.

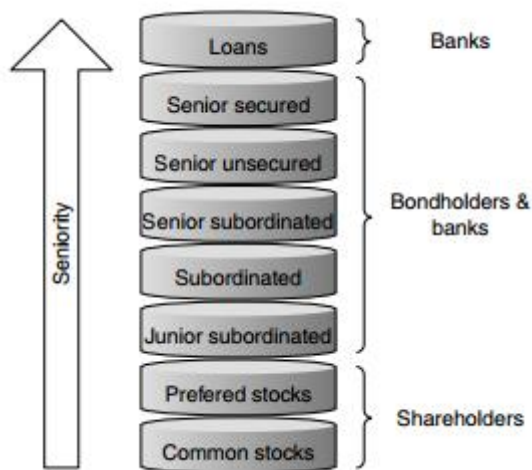


Figure 5: Seniority Hierarchy

Source: (Gestel, Baesnes, 2009)

The rating agency Moody's has compiled a database of the recovery rates for debtholders holding different priorities in non-financial US corporations. The database dates back from 1987 and consists of over 3500 loans and bonds taken from 720 non-financial corporations. Figure 6 shows the recovery rate for the different seniorities. The higher the seniority, the more the creditor will on average recover.

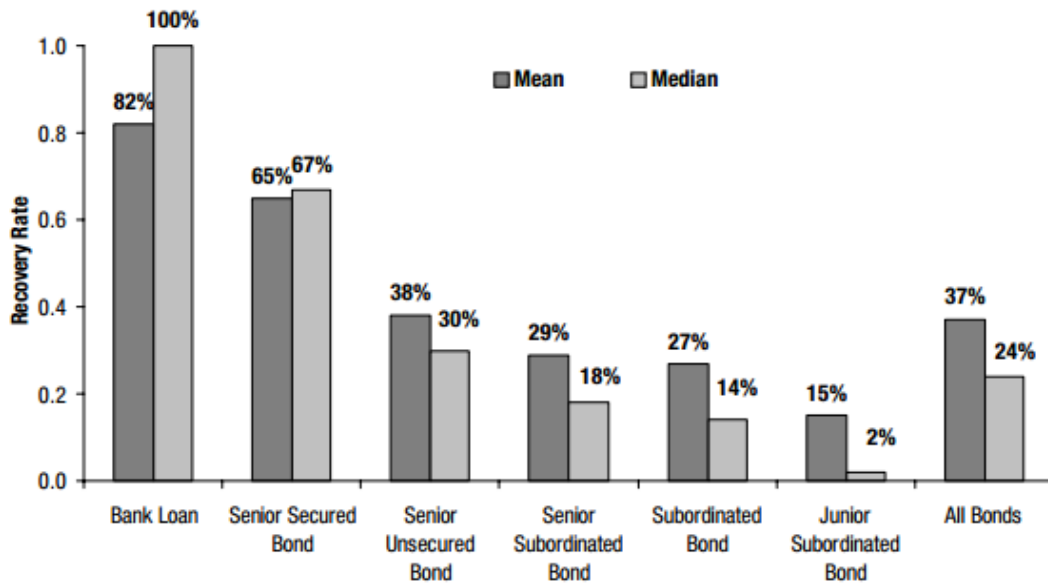


Figure 6: Recovery Rate

Source: (Moody's Ultimate Recovery Database, n.d.)

7.3 Norsk Tillitsmann/ Norwegian Trustee

The Norwegian Trustee is an independent bond trustee that acts as the link between bondholders and the issuing firm. In Norway, 95% of the bonds have a trustee arrangement. During the past five years, the trustee has seen an increase in high-yield bonds from the oil, offshore and shipping sector.

The main roles of the trustee are related to documentation, monitoring and crisis management. The documentation responsibility includes preparation of loan agreements and security documents with respective parties. The monitoring responsibility consists of making sure the firm is meeting the obligations to the bondholders. The most important responsibility is the crisis management role, where the trustee handles the restructuring process and protects the rights of the creditors.

Benefits of using a trustee from the issuers' perspective

By using a trustee, the issuer will only have one single point of contact when addressing the bondholders. Should there be need to make minor changes to the loan agreement, the trustee has the authority to act on behalf of the bondholders. In addition, the trustee may act as a sparring partner for the issuer.

The fact that the trustee is the single point of contact between the issuer and the creditors protects the issuer from dealing with single bondholders during distress. The creditors themselves cannot go directly to the issuing firm and demand a settlement, but have to go through the trustee. The trustee agreement typically requires $2/3$ majority to perform any actions towards the issuing firm.

Benefits from the bondholders' perspective

Since one of the main tasks of the trustee is to monitor and take action should the loan agreement be broken, this greatly reduces the monitoring costs of each bondholder. As mentioned earlier, decisions require $2/3$ majority by the bondholders, this thereby limits the power of bondholders with special interest, and for the most part secures equal treatment for all bondholders (Norwegian Trustee, n.d).

8. Method

In this chapter we will describe the inferential statistics we have used for our analysis.

8.1 T-Test

The t-test is a statistical test that can be used to determine whether there is a statistical significant difference between two populations' means. For our analysis, we will use the one-tailed t-test to determine if there has been a decrease or increase of the respective variable from the *pre* to the *post* financial crisis data.

To perform the one-tailed t-test, we have to create two hypotheses:

H_0 : There is no difference between the two populations means, $\mu_1 = \mu_2$.

H_1 : The mean of the first group is greater than the second. $\mu_1 > \mu_2$.

H_1 : The mean of the first group is less than the second group. $\mu_1 < \mu_2$.

Using a significance level of 5%, an observed t-value equal to or greater than 1.645($\mu_1 > \mu_2$) and equal to or less than -1.645($\mu_1 < \mu_2$), will create a significant result leading us to reject the null hypothesis. This range of numbers is known as the *rejection* region, and tells us to reject the null hypothesis should the test statistics be within these values.

8.2 P-Value

The use of the rejection region method has a number of disadvantages. The most prominent drawback is the yes or no answer the method provides. To better understand the reasoning for rejecting the null-hypothesis, one can use the p-value.

The p-value is defined as “the probability of observing a test statistic at least as extreme as the one computed given that the null hypothesis is true” (Keller, 2008). In other words, the p- value measures the statistical support for the H_1 hypothesis.

$$P - value = \left(P(X > X') = P = \frac{X - \mu}{\frac{\sigma}{\sqrt{n}}} \right)$$

The null hypothesis states that the means of the two group are equal, thus the closer the means are to each other, the larger the p-value will be and vice versa. The smaller the p-value is, the more significant the result, hence leading us to reject the null-hypothesis.

The degree of statistical significance for p-values:

P < 0.01 Highly Significant

0.01 < P < 0.05 Significant

P > 0.05 Not Significant

If the p-value exceeds 0.1, the alternative hypothesis is not true and therefore the null-hypothesis will be kept.

For the analysis of our shipping data, we will use the p-value instead of the rejection range method to determine if to keep or reject the null-hypothesis.

8.3 Wilcoxon Ranked Sum/Mann Whitney U Test

When the data points are not normally distributed, one can theoretical not use the t-test. In this case, one will have to use a non-parametric hypothesis test, like the Wilcoxon Ranked Sum/Mann Whitney-U test to compare populations that are non-normally distributed. However, in this test you are not actually comparing means, but the median of the two populations (Lowry, n.d).

To determine if the dataset is normally distributed, we have utilized the Shapiro-Wilk test for data samples of less than 2000. The test tests the hypothesis that the sample is normally distributed, in other words, if the result is significant and we reject the null hypothesis, then the data is not normally distributed (Shapiro, Wilk, 1965).

8.4 Two sample proportion test

The sampling test can be used to test if two proportion of a population are statistically different.

Proportion is defined as: $\hat{p} = \frac{x}{n}$, where x is the number of observations and n is the sample size.

- \hat{p}_1 represents the proportion of sample 1.
- \hat{p}_2 represents the proportion of sample 2.
- \hat{p} represents the pooled proportions of sample 1 and 2.

$$z = \frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\hat{p}((1 - \hat{p}))\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

To perform the test, we will have to create a hypothesis test.

H_0 : There is no statistical difference between the two populations proportions, $\hat{p}_1 = \hat{p}_2$.

H_1 : The proportion of population 1 is greater than the proportion of population 2, $\hat{p}_1 > \hat{p}_2$.

H_1 : The proportion of population 1 is less than the proportion of population 2, $\hat{p}_1 < \hat{p}_2$.

Using a significance level of 5%, the null hypothesis will be rejected when z is greater than 1.645 ($\hat{p}_1 > \hat{p}_2$) and less than -1.645 ($\hat{p}_1 < \hat{p}_2$.) However, for our analysis we will use the p-value to determine when to keep and when to reject the null hypothesis (Keller, 2008).

9. Data Sample

The financial data collected is the cornerstone of our analysis and we have therefore dedicated a section to briefly explain how we found the data and how we segmented it for analysis.

The data used in this analysis has been collected from Marine Money's deal database and Clarksons' transaction database. The Marine Money and Clarksons database contains deals recorded by them, while Dealogic has provided the bank loan data. A brief introduction to the various contributors: Marine Money is a world-renowned financial publication within the maritime industry, Clarksons is the world-leading provider of integrated shipping services, whereas Dealogic is a global provider of real-time financial services information, much like Bloomberg and Thomson Reuters.

The database consists of numerous type of deals executed within the maritime industry ranging from 2000 to 2013. Since the Marine Money database is a live-database where new deals are constantly being added, we decided to extract all information used from this database at one point of time in order to avoid the risk of conflicting samples. The data used in this thesis was collected on the 11th of April. To better assess the change in financial structure within the shipping industry, we have segmented the maritime companies into 10 different categories:

- **Shipping:** Consists of companies that transport commodities and merchandise goods by sea.
- **Offshore:** Consists of companies that are directly related to development of oil and gas fields.
- **Terminals:** Companies operating terminals or ports.
- **Containers:** Companies that build and lease containers to the shipping segment.
- **Barge:** Companies using barges to transport goods in rivers or canals.
- **Cruise Lines:** Includes companies operating ferries and cruises.
- **Maritime Services:** Companies that perform services for companies operating in the maritime sector.
- **Dredging/Tugging:** Consists of companies performing dredging and tugger activities.
- **Financial Providers:** Includes companies that provide financial services.

Furthermore, we have also segmented the financial institutions involved in the transactions after nationality in order to assess where there has been the most activity, and whether there have been shift between various regions. We have therefore divided the financial institutions up into five subcategorizes:

-Asia

-Europe

-Middle East

-North America

-Scandinavia

We have decided to separate Scandinavia from the rest of Europe, as much of the world's ship financing comes from this region, and we furthermore expect there to be a significant increase of bond issuance from this area.

By segmenting the companies, as well as the financial institutions, into different categories we have created a flexible dataset, where we have had the possibility to add and extract data throughout the process of writing this thesis. With guidance from our advisor, we have decided that we, in the end, wish to focus on merely the shipping segment of our maritime data. We have done this in order to narrow our thesis and hopefully improve the validity of our work.

9.1 Timeframe

For our analysis we have chosen to split the dataset into two time periods, *Pre* and *Post*, to better assess the changes before and after the recent financial crisis. The *Pre* period consists of data ranging from 01.01.2005 until 31.08.2008, while the *Post* period ranges from 01.09.2008 till 31.12.2012. The reason we have chosen to split the dataset at the turn of the month of august 2008 is because we wanted to capture the whole effect leading up to the events that unfolded in the middle of September. The bankruptcy of the investment bank, Lehman Brothers, on September 15th 2008, created a cataclysmic ripple effect that threw the global financial markets into turmoil.

Almost immediately after the investment bank filed for chapter 11, the money market, which acts as a key source of credit for banks, dried up due to the vast amount of money being withdrawn from the market. The TED spread, indicating the risk of interbank lending, surged after the Lehman collapse, making it hard and expensive to attain credit. The subsequent credit freeze paralyzed the global financial markets, almost bringing the markets down (Klovland, 2011). One can argue that the financial crisis already began in 2007, and therefore the dataset should be split at an earlier point, however, it was not before September 2008 that the market collapsed, leading to the greatest economic crisis since the Great Depression.

It should also be noted that we have decided to exclude the entries prior to 2005 as well as those of 2013. The reason behind deciding to exclude the dataset prior to 2005 is that the number of transactions gathered per year were so few for 2003-04 that it made the authors question the credibility of the sample. Regarding our reason not to include the data from 2013, we concluded that as we will not be able to receive data for the whole year prior to submitting our thesis. Including these transactions could give a false impression of the current financial situation, and will hence not be considered.

9.2 Merging the Marine Money and Clarkson database

After first focusing purely on the entries provided from Marine Money, we decided, after discussing the validity of the sample with our advisor, to merge the entries concerning Convertible Bonds, Certified Bonds, IPOs and FOs provided by Marine Money with the dataset provided by Clarksons from their Shipping Intelligence Network database. The reasons for this were two-fold. For one, the Clarksons database possessed more detail information concerning bonds, allowing us to better analyze both the interest rates and tenor of our bonds transactions. Secondly, we noticed that there were some discrepancies between the two databases. The data for bank loans were collected by Dealogic on an aggregate level, through close collaboration with the banking industry, while the information for Bonds, IPOs and FOs were collected by Marine Money as an outside operator, which relies on them being on top of the market at all times. We thus felt the accuracy of the bank loan data was likely to be greater, even though we are aware that Dealogic do not receive transaction information from all bank issuing loans. Since it is virtually impossible to include all deals

made on a worldwide basis, we hence decided to include the data collected by Clarksons on these areas of financing, in order to improve the validity of our results.

9.3 Shipping Database Description

The newly created Shipping database have been forged by the authors segmenting the different companies into the above described categories through researching each individual company online. The overall data collected consists of 3140 different deals conducted from the period 01.01.2003 to 13.03.2013. In our analysis, we have used data ranging from 01.01.2005 to 31.12.2012, which accounts for 1991 deals when only focusing on the shipping segment.

As we have converted a maritime database into a pure shipping database, certain selection decisions can be useful to be informed of. For one, as we are looking on a dataset comprising of data from 8 years of transactions, including both peaks and troughs, several of the included companies have either merged or been acquired since the start of the period. We have hence decided to pool all merged/acquired firms into the new parent company, even though some of the transactions have been done prior to the completion of the deal. We have done this in order to keep the consistency of the data, and also enabling us to better judge the trend of the market. Secondly, several of the firms included in the sample are large global operators with different divisions. In order to better follow the activity of the company as a whole, as well as more easily read financing trends, we have decided to consolidate the data for such companies and hence merge all entries coming from different subsections of the same firm/group under one. Such global operators nationality have also been based on their location of headquarter. This may cause some discrepancies compared to where the actual deal has been made.

9.4 Assumptions

Since the data is collected from three well-renowned firms in the capital markets of the maritime industry, we consider the data used in our analysis to be close to accurate. We have furthermore assumed that all deals not included in the Clarkson/Marine money dataset, but that exists in the other, have not been detected and should hence be included in our data.

9.5 Bond Interest Rate

As parts of the data provided on the bonds coupon rates were given in floating rate (3 month interbank rate + credit spread), while others were provided at fixed rate, we have adjusted the three-month floating interbank rate to a fixed rate. This has been done in order to better compare the coupon rates from the *pre* and *post* period. Such conversion was done by looking up the fixing rate for, both LIBOR and NIBOR, of each individual issuance, on the respective issuing date using Teletrader (2013).

9.6 Total Financing Need

To better understand how the underlying financing need in shipping has developed during our period of analysis, we have created a proxy. Together with our advisor and an industry professional (Greve, 2013), we have determined that the Panamax bulk carrier class is a representative average for the industry. The Panamax class is a ship class that is within the limits and size of the requirements to travel through the Panama Canal in South-America.

To calculate the proxy we have collected the following monthly data from the Clarksons' database:

- Newbuilding prices for the Panamax bulk carrier class
- Second-hand prices for 5 year old Panamax 76K bulk carriers
- Number of deliveries for Panamax bulk carrier newbuildings
- Number of Panamax bulk carrier sales in the second-hand market.

Assumptions

Since the life expectancy of a ship is generally between 20-25 years, one can argue that the second-hand prices for 10 year old ships would be most representative for our proxy. However, the fleet modernization we have seen in the past decade, partially driven by the increasing focus on fuel efficiency, creates a skew towards the use of 5 year old second-hand prices. Thus, we have decided to use the 5 year old second-hand prices for our analysis.

When considering the number of deliveries against the newbuilding prices, it is important to be aware that it typically takes between 2-3 years, from a ship is ordered, until it is delivered. This time lag thus creates a skew when calculating the monthly financing need for newbuildings. Arguably this could be corrected for by adjusting the newbuilding prices for

the time lag; however, since our period of analysis goes from 2005-2012, we do not have the complete data for deliveries 2-3 years into the future.

Calculation

To create the proxy for total financing needs, we first calculated the financing needs for the newbuilding and second-hand market. For the newbuilding market, this was done by multiplying the newbuilding prices by the number of deliveries in the respective month. Similarly, the financing needs for the second-hand market, was calculated by multiplying the number of second-hand ships sold by the second-hand prices. Adding these two together, we get a total proxy of the total monthly financing demand for the Panamax class.

From this proxy, we were able to create a combined estimate of the average ship prices for the newbuilding and second-market. This was done by dividing the total financing proxy by the total number of ships delivered and sold. The result can be seen later, in the results section in *Figure 8*.

9.7 Criticism of the dataset

In order of keeping our integrity and avoid any misguidance, we wish to point out some weaknesses in our data.

9.7.1 Credibility of our data providers

Public Capital Markets

First of all, as we have already touched upon, the data collected on Bonds, IPOs and FOs has been gathered by outside operators (Marine Money, Clarksons). The validity of the data is, hence, based on the collectors being on top of the market at all-time, detecting all deals going through. There are, in other words, room for human errors, and as the different collectors may have used different sources of information, exchange rates, etc., discrepancies are likely to occur. When merging the databases, we hence noticed, to some extent, discrepancies between the databases in terms of deal entries, date of issuance and amount. We further noticed that the discrepancies become larger the further back in the data set one goes, and one hence needs to keep this in mind when assessing the data.

Private Capital Market

As for the private capital markets, we have, as mentioned, used data collected by Dealogic for analyzing the development in bank lending. Dealogic is, arguably, considered to hold the best database for bank loan transactions within shipping. We are, however, aware that several significant operators in the ship financing industry do not disclose their lending volumes to the database (Falck, 2013), resulting in the accuracy of the database to decline. It does, however, give a good indication of the movement in the funding market and it is, in the authors' opinion, the best source available to perform these analyses. As for private placements, Marine Money has as mentioned, collected our data. Given the private nature of these transactions, it is, however, unlikely that the collected data represent total volumes of deals performed. This is especially true for the shipping industry, where we know private equity firms have made significant investments in the years following the crisis (Falck, 2013).

The fact that it is likely that transactions both for equity and debt are missing, furthermore, leads us to expect that the total financing level observed in our sample is below the actual industry level.

9.7.2 Conversion from Marine Money's Maritime database into a shipping database

As we have in this paper forged our own shipping database, by manually excluding non-shipping firms, there is a chance that some firms may have been wrongly included/excluded from the dataset. Furthermore, since some of the deals conducted have been made by large conglomerate firms with limited description of their transactions; we have used our best judgment when assessing the categorization of these companies. The deals conducted by these firms are typically quite large and it has therefore also been hard to determine whether the money raised will be used for investment in ships or other non-shipping activities. It is therefore important to keep this in mind as such mistakes could skew the results. However, it should also be stated that these firms make up a small percentage of total firms.

9.7.3 Nationality of the Financial Institutions

When categorizing the different financial transactions after nationality, the nationality has been based on the headquarters of the institutions. This could cause some discrepancies as

these firms may have offices in different parts of the world, and the deal may hence not have been executed from the headquarters.

9.7.4 Statistical Concerns

In examining the statistical test, our biggest concern is the skewed number of observations. We have cut our start of data sample from 2003 to 2005, given the questionable validity of the data prior to 2005. This has caused the period prior to the crisis to be shorter (3.5 years) than the period after the start of the crisis (4.5 years). As the more recent data furthermore seems to be more accurate, and the numbers *post-crisis* usually heavily outweighs the number of entries *pre*, this may affect the validity of some of our statistical tests.

10. Hypotheses

When deciding on a topic for our thesis, we decided to combine our interest for shipping and finance. Our final choice of topic was sparked by the many news articles and constant complaining in the media of the challenging capital conditions shipowners faced in the aftermath of the Lehman Brother crash. We hence wish to put these claims to the test and examine the change in the financial environment shipping firms have faced the last 8 years. We have therefore come up with several hypotheses, which we wish to look further into.

We have in this paper divided the different types of funding up into: M&A, Bank Loans, Bonds (Certified Bonds +Convertible Bonds), Public Equity Offerings (IPOs+ FOs) and Private Placements.

10.1 Amount per issue/ number of deals

For each asset class defined we have tested whether there has been a substantial change from the *pre-crisis* period to *post-crisis* period on the:

- The amount raised per issue
- The number of issues raised

Our premise for testing these variables is that the product of multiplying the two variables gives us the total volume of that asset class. We can by examining the different variables multiplying up to the product, hence define the cause of any potential changes.

Our hypotheses are that we believe both the amount raised per issue and the number of deals have on average decreased *post* the crisis for bank loans, private placements and public equity offerings, while we expect to see an increase in number of bond deals. The development of bonds and M&A deal sizes, in addition to that of M&A activity are, however, more unsure variables. Our predications landed on a decline in deal size and number for M&A deals, while we expect an increase in bond deal sizes.

Our basis for such hypotheses is that after the financial turmoil caused by the crash of 2008, the financial picture changed. With most banks severely affected by the crisis, and some having already gone through restructuring, it is likely that the number of bank loans issued

and the average deal size have decreased. Such predictions are based on the fact that banks are clearly more risk averse after the crisis (Von Hagen, Schuknecht, Wolswijk, 2011). They are less willing to take on additional risk and interested in reducing their risk per loan issued. This view is also in line with DNB's future projections for the banking sector (DNB, 2012).

As for public equity offerings, they are, as described earlier, more common in booming periods than troughs. This is the case as management only wishes to sell shares when the price reflects or overvalues the underlying assets. Given the booming *pre* period, a fall in both amount and numbers of issues were hence expected in the *post* period.

Private placements are likely to behave in a similar manner as public equity offerings. After a *pre* period of highly cooperative investors, private placement have likely struggled to convince its investors to invest in the *post* period with investors being more risk averse and more vary of their investments. As private equity (PE) does, however, go under this category, and there has been a significant increase in PE investment in shipping, this could pull up our results. Given the private nature of these transactions, we do, nevertheless, not expect to see a drastic increase in PP activity.

With a decline in both equity offerings and bank lending, shipowners need to finance through alternative sources. We believe bonds have overtaken the majority of the financing gap. The reasoning behind this conclusion is that investors have historically turned to the bond market in times when the capital market has contracted, and the shipowners have in the recent crisis had few other options to turn to. Such a switch in financing would hence involve an increase in number of bonds issued. When it comes to our projections of bond deal sizes, there are factors dragging in different directions. At one side, if bonds are going to replace the funding gap left by loans and equity, one would expect an increase in bond sizes, as the funding gap likely is quite severe. On the other side, with freight rates declining steeply in the later years, one would expect the fleet market value to have declined, hence lightening the financing needed to undertake new investments. The macroeconomic events leading to these conclusions are discussed in more detail under the "Macroeconomic Events" section for bonds.

Given the discussed fall of shipping market values, a decrease of amount per M&A deal are also to be expected. In regards to numbers of deals, there are also here forces dragging in different directions. At one side, consolidation is fairly normal in poor economic times given

the companies' wish to maximize economy of scale. Low market values could also lead to an increase in acquisitions, as increasing ones market share could be done a low cost. On the other side, it is hard to finance such deals in the current situation of the capital market. With many operators struggling enough as it is with their own operation; they are unlikely to take on more capital draining fleet capacity.

10.2 Size of consortium

Given the banks seeking to mitigate risk in the *post* period, we further wish to examine the change of consortium sizes from the two periods. Our hypothesis is that we have seen a significant increase in the syndicate sizes. In this test we only consider bank loans, as consortium sizes for equity and public debt offerings are of little relevance in terms of risk of the issuer.

We chose to include this hypothesis after reading DNB's presentation "Navigating through turbulent times" (DNB, 2012). In this presentation, DNB predicted a decline in syndicate sizes. Their reasoning was that banks would seek a more simplistic lending relationship, trending towards a larger degree of bilateral deals. There are, however, counterarguments of a risk and capital exposure reduction following an increase of consortium members, we wish to put this argument to the test.

10.3 Proportions

Given the reasoning of section 10.1, with a booming *pre* period, indicating an increase in bank loans and equity, and a trough of a *post* period, indicating a fall in bank loans and equity, with bonds filling much of this gap, our hypothesis for the sample is that there has been a change of proportions. We expect to see a similar change in proportions as with issuing activity, hence a significant shift from bank loans and equity towards bond financing.

10.4 Bond interest rate and tenor

Given the newfound importance of bonds, we wish to further examine this asset class in more detail. Our hypotheses are that there has been a significant increase in bond interest rate and a similar significant decline of the average tenor of bonds. This view is based on the

theory that as the market steps into a time of greater uncertainty where the solvency of the borrowers is questioned; the interest rate demanded is likely to increase. In such markets, lenders are also typically reluctant to offer lending too far into the future in fear of bankruptcy risk. From the borrower's perspective, one wishes, at one hand, to have a longer tenor in order to reduce refinancing risk, and secure liquidity for the future. On the other hand, one should, however, be careful not to be bound for too long at unfavourable market conditions (Bodie, Kane, Marcus, 2011). As these are times where the lenders have much power, but also hold much risk, we expected that we would experience an increase in interest rate and a drop of the average tenor.

10.5 Location of debt funding

With the funding sources changing drastically from the *pre to post* period, we believe given the shift in market proportions that the origin of the capital also has changed. We wish to focus this test on the debt market, as this is the key source of ship funding. Our predictions are that Asian and Scandinavian financial institutions have increased their market share of loans issued in the second period, whereas the North American, European and Middle Eastern financial institutions have accounted for a smaller portion of bank loans issuances in the *post period*.

Like in section 10.1, it is harder to predict shifts of corporate bonds issuances than that of bank loans. This being the case as the reasoning behind the frequency of an institution's bond issuances is more complex than just examining the financial situation of this institution. Corporate bond issuing activity is rather to a large extent based upon the demand for capital by shipping companies and investors' willingness to invest. Our predictions for the time period are a significant increase in the Scandinavian and Asian activity, a significant decrease in the North American activity, while we saw little reason for any change in European issuances. For total debt issuances, we believe there has been less equity financing in the aftermath of the crisis. Our hypothesis is hence that we expect to see an increase in debt levels for all regions.

Our basis for doing this test has been that we believe there have been shifts in sources of financing on the global scale. Since 2005, Asia has experienced an almost continuous growth, whereas the Euro-zone and the United States has been hit by one of the worst economic crisis of all times. Based on this information, one would expect Asian financial

institutions to be in a better financial state in the *post* period, compared to institutions from troubled areas such as North America and Europe. One could hence assume that Asian financial institutions have issued more loans than those of North America and Europe in aftermath of the Lehman Brother crash. Markets located in areas that have been fairly untouched by the surrounding issues, such as Scandinavia and in particular Norway, a large global ship financier, would also be likely to carry a larger share of ship financing in the *post* period.

For bonds, we have in our macroeconomic section, discussed the key economic events causing us to predict that there will be a proportional increase in bond issuance. Separating the issuance activity for the various regions, we have based our hypotheses on our perception on the differences of the demand and supply side of corporate bonds, and to some extent media coverage that has indicated a particular trend, which we then have wished to examine the validity of.

Our hypothesis for Scandinavia is based on the increasing media coverage concerning the numerous maritime bond issuances performed here. The recent upswing in the Norwegian bond market has also been one of the major areas of interest for the authors, hence something we wish to put to the test. Our prediction of an increase in the Asian market is based on the growth that Asia has experienced. Even though the corporate bond and stock markets in Asia differ widely in size and level of development, they have been growing at a significant pace the later years, increasing their activity (Gyntelberg, Ma, Remolona 2005). Furthermore on the supply side, with Asia starting to take an increasing larger part in shipping, especially within shipbuilding, many of these operators are likely to turn to the corporate bond market for funding. While on the demand side, enormous cash reserves have been building up during the boom, and with investors seeking investments to place their money; corporate bonds should be an attractive investment in the search for yield (Frangos, 2013).

Considering the movement in North America, we expect a decrease in the North American proportion of bond activity. We believe this is the case based on the fact that United States is the origin of high-yield bond (Grammenos, Papapostolou, 2012), and also the key area of issuance in the *pre* period (Lloyd's List, 2010). With a significant increase in issuances from Scandinavia, parts of this market share is likely to have come from the United States, especially given the low market confidence present in the American market in the *post*

period. Furthermore, given the findings of Von Hagen, Schuknecht, and Wolswijk (2011) that investors penalize structural imbalance more *post* the Lehman crash. One could claim that such change in behaviour could cause investors' willingness to invest in North America to decrease in the start of the financial crisis, as the structural imbalance was quite severe at this point of time and comparatively larger than in other markets.

Other factors to consider could also be that institutional investors in America have to a large extent been sitting on the fence with large cash reserves after the crisis hit (Moody's, 2013). They have had little confidence in the market and the governing body, a notion being enforced even more with the recent indecisiveness in regards to the failure of dealing with the mounting American debt. Such extraction could cause the demand for bonds to shrink considerably, taking away much buying power.

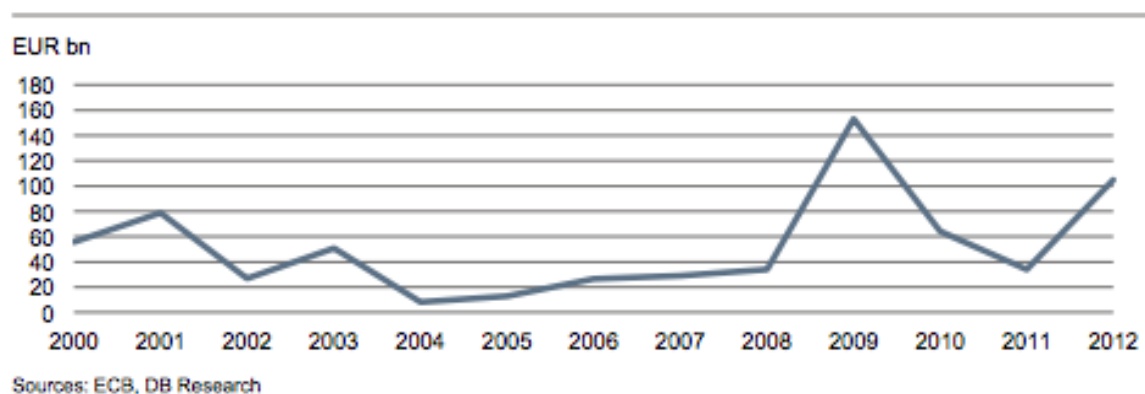


Figure 7: Net issuance of long-term non-financial corporate debt securities in Europe

In terms of Europe, we see no reason for any significant change in the activity level. Our hypothesis is to a large extent based on Deutsche Bank's research paper on the overall European corporate bond movement (Deutsche Bank, 2013). Looking at *Figure 7*, we see that by comparing the peaks and troughs, the market more or less equals out in the *post* period, with perhaps a small overall increase. The fundamental drivers behind these swings have mostly been the macroeconomic factors already discussed. However, the main driver for the high issuance volumes seems to be investors' search for yield in a low interest rate environment. As sovereign bonds are offering historically low yields, corporate bonds have become increasingly interesting investment (Deutsche Bank 2013). We see little reason why shipping bonds issuances should separate itself substantially from the overall movement, and hence expect to see a small but insignificant increase.

Lastly for total debt issuances, we believe there has been less equity financing in the aftermath of the crisis. Our reasoning for such hypothesis is the same as in section 1.1, namely that it is not common to issue equity in a period of low market values. Both Pecking and market timing theory further support such statement. Furthermore, we also believe the magnitude of bank loans will supersede the potential negative effect of bonds, leading to an increase in debt in Asia and Scandinavia and a decrease of debt in Europe and North America.

11. Macroeconomic Development

In this section we will discuss the main macroeconomic events that led up to and occurred during the sample period. We have separated this section from the rest of the analysis, as many of these happenings have to a large extent dictated the development of the asset classes examined. The analysis would hence be very repetitive if these events were discussed in detail under each subsection.

In the start of the 21st century, world trade experienced typically boom and bust cycles. The world economy experienced a financial crisis in 1997-99, both in Asia and Russia. The trade then surprisingly recovered and boomed again by the spring of 2000, before the collapse of internet stocks in early 2001 triggered a deep recession in the Atlantic and Asian economies, also known as the Dotcom crisis (Stopford 2009). As shipping freights are strongly correlated with global trade activity, freight rates varied greatly in the start of the millennium before crashing in 2002. By the end of 2003, freight rates had, however, yet again started to pick up speed (ClarkSea Index) and the shipyards' orderbook had already started to build up because of the emerging Chinese economy. Their industry was mostly export oriented, and the country now entered into a period of considerable infrastructure development. This development was dependent upon the import of enormous quantities of raw materials, such as coal and iron. A booming China, in other words, meant a steep increase in demand for the seaborne trade, creating an acute shortage of ships, resulting in dry bulk and tanker rates propelling to new heights (Stopford, 2009). As the freight rates increased, a huge demand for financing followed. The banks were, however, reluctant to overextend their lending prior to reassuring themselves that the market was going to recover fully. As the sustainability of the growth became increasingly clear by the end of 2003/start of 2004, shipping loans issuances surged by 2005.

Between 2003/4 and 2008, the shipping market actually experienced one of the largest booms of all times, having freight rates reaching astronomically high levels, only comparable to the rates reached during World War I (Stopford, 2013). This led shipping firms to continue to look for ways to expand their fleet in these prospering market conditions, this happening either through newbuildings or expensive acquisitions of second-hand ships. Such investments required additional funding, leading to a rise not only in bank loans, but in both equity and debt issuance. As the peak grew bigger, so did the demand for

capital, finally resulting in the supply of ships far outweigh the demand when seaborne trade started to decline.

Considering the second part of our sample period, the world economy gradually went into a deep recession, with the crisis arguably hitting its peak with the crash of Lehmann Brothers in mid-September 2008. We will not discuss the crisis or its underlying factors in detail, as our main focus here is the effect the collapse had on the shipping industry and world trade in general. A bankruptcy of such a large operator like Lehman Brothers did, however, cause turmoil in the financial market, awakening counterparty credit concerns, as well as heavily affecting other financial operators. With the bailout of AIG following the next day, counterparty credit concerns increased even more (Baba, Packer, 2009). These were just some of the more renowned firms that were struggling, and with most of these operators previously being top ranked by the credit rating companies. The trust/credibility in the market disappeared causing short-term funding costs to spike. Solvency now became the area of focus. Without knowing whom to trust, the liquidity of the debt market quickly dried up (Cornett, McNutt, Strahan, Tehranian, 2011). With many banks relying heavily on short term funding in the interbank market (Ivashina, Scharfstein 2010), the effect of the spike in short-term funding costs was further strengthened causing many banks to struggle to roll over their short term debt, leading much of lending to dry up by 2009. The decline in loan issuances was, however, not as steep as that of publicly traded securities. The much steeper decline in traded commercial paper may reflect an overall lack of trust in securitized debt after the financial market crashed, regardless of the fact that a commercial paper is a direct obligation of the borrower (Asmundson, Dorsey, Khachatryan, Niculcea, Saito 2011).

In terms of shipping, freight rates plunged by late 2008 as the global trade experiencing a sharp drop. The drop in global trade can, however, not completely be credited to the crash in the financial market, as, among other things, a sharp increase in food and fuel prices had unsettled world trade the previous year (Asmundson, Dorsey, Khachatryan, Niculcea, Saito 2011). With the freights rate at a low, many shipping firms were losing money, with operating costs exceeding freight rates, even with slow steaming. Worst positioned were the shipowners who had overextended themselves and were expecting delivery of newbuilding vessels, but had not yet secure financing. As the crisis prolonged, the need for capital became greater. Shipowners now had to meet their financing needs at a higher cost of capital. Most exposed were those who were highly geared and had gambled by operating

larger parts of their fleet in the spot market and therefore were not able to maintain the high interest rate repayments.

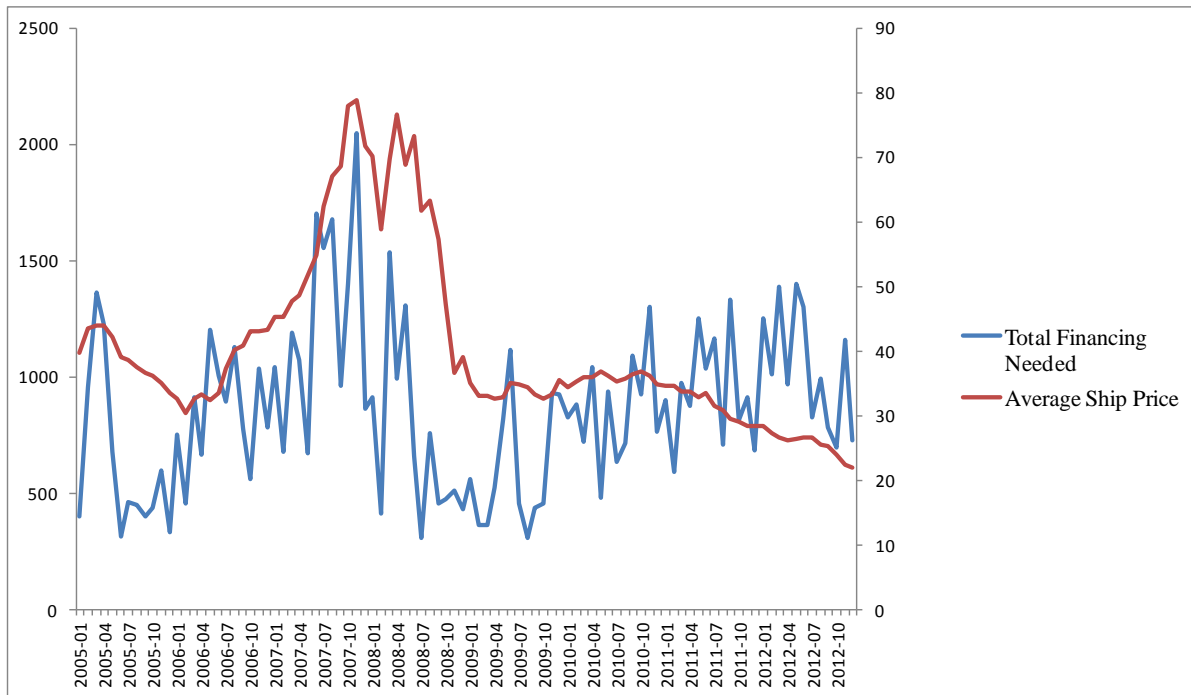


Figure 8: Panamax Total Financing Need

Source: Clarksons

As the freight rates came out of the worst trough by the end of 2009 (Clarksea Index), optimism was again to be found in the market. Many expected the market to fully recover and a new round of ordering started. This optimism is illustrated in *Figure 8* showing Panamax contracting numbers, with the total financing needed on the left vertical axis, and average vessel price in millions US dollars on the right vertical axis. Strong countercyclical macroeconomic policies in most developed and emerging-market economies helped the global economy turn the corner in mid-2009. Robust demand for commodities from the rapidly growing emerging-market economies, and a stronger recovery than expected in domestic demand in the US indications of better times to come (Trade and Development Report, 2010). This growth followed into 2010 with a worldwide GDP growth of 3.9pp, much of this fueled by the leading developing countries (China, India, Brazil)(Trade and Development Report, 2011). This improved the financial market conditions in the first half of 2010, and many decided to access the debt and to some extent equity market in order to refinance/restructure/invest. Such optimism can again be spotted in *Figure 8*, with Panamax contracting numbers peaking in mid-2010.

As the effect of the stimulus packages started to diminish, with governments introducing a shift towards fiscal consolidation, growth slowed down in the second half of 2010, a trend that followed into 2011 where the global economy lost steam (Trade and Development Report, 2012). By this time, the magnitude of the European sovereign debt crisis was becoming increasingly clear and can to some extent explain the decline of growth. The stimulus packages, on top of already significant debt levels, had led many countries in the Euro-zone to build up unsustainable levels of debt in the years following the market crash of 2008. This rise in debt levels had caused a wave of downgrades of government debt, which resulted in several countries' solvency being questioned. The countries worst affected were Greece, Portugal, Italy, and Spain, often referred to as the PIGS countries. With the numerous downgrades and the uncertainty gradually increasing from the end of 2009, the term spread of the respective governments bonds rose steeply, making refinancing of current debt close to impossible in the long run. In order to avoid a collapse of these countries and ultimately the Euro-zone, the European Central Bank (ECB) followed through on a series of measurements, among other things a bond purchase plan in order to secure sustainable short term financing. Regardless of ECB's actions, uncertainty in the market remained high, causing the market confidence to tumble and ultimately dragged parts of the world economy back into a recession again (Lane, 2012).

In addition to the emergence of the European sovereign debt crisis, with Greece and Portugal's term spread spiking from the second half of 2010 to the start of 2012, global financial risks, as well as, political and social unrest in North Africa and Western Asia have also affected world trade negatively in 2010/11(Trade and Development Report, 2012). As the market turned, investors realized that much of the growth in the previous years had been brought forward by the stimulus packages, while little had been done to fix the underlying problems. This caused the optimism to fall and liquidity in the capital market disappeared again. By introducing the stimulus packages, the governments had in fact enforced the already emerging sovereign debt crisis, bringing the Euro-zone even deeper into troubled waters.

With market confidence again at a low, the banks' patience had now been strained, suggesting a change in the financial market, where the usual flexibility of the banks now was gone. After years of being understanding, accepting heavy short-term losses, many banks

can no longer wait for their customers to recover, causing them to pull the plug on some of the worst affected firms. Notorious private equity legend Wilburn Ross phrases this change of attitude pretty clearly. “What’s happening this time is the lending banks are really starting to pull triggers. Whereas in older times, they would try to play along with the owners, now they’re being much more prompt and saying “Enough is enough, we need to pull out”” (LaRocco, 2012).

12. Results

In this chapter we will discuss and analyze the results from our hypothesis testing.

12.1 Capital Structure Theory

We will in this section relate the financing theories discussed in chapter 3, to the data we have collected, in order to see if there is evidence to support these theories.

12.1.1 Trade-off theory

We find little support for the trade-off theory in the shipping industry as a whole, as this theory suggest that firms should be financed with enough debt to capture the debt tax shield (DTS) so that the benefit of the DTS is only marginally higher than the associated costs of financial distress that arise with high debt ratios. The taxation of shipping firms is especially lenient as previously discussed in section 2.4, thereby eliminating the lucrative DTS created by the use of debt. According to the theory, this should leave the shipping firms with only the costs of financial distress, thereby discouraging them from using debt. Despite this, our data shows that debt has made up approximately 70- 80% of the total financing for the period analyzed. We therefore conclude that the trade-off theory is not applicable to explain the pattern of financing for the shipping industry.

12.1.2 Pecking Order theory and Market Timing Theory

The pecking order theory, describes the preferred order of how a firm finances its new investments. If we look at the ClarkSea Index in *Figure 9*, which shows the weekly earnings for main commercial vessel types, weighted according to the number of vessels in each fleet sector, we see that earnings drastically improved during the shipping boom from 2003-2008. This boom made it easy for shipping firms to attain credit from banks for new investments.

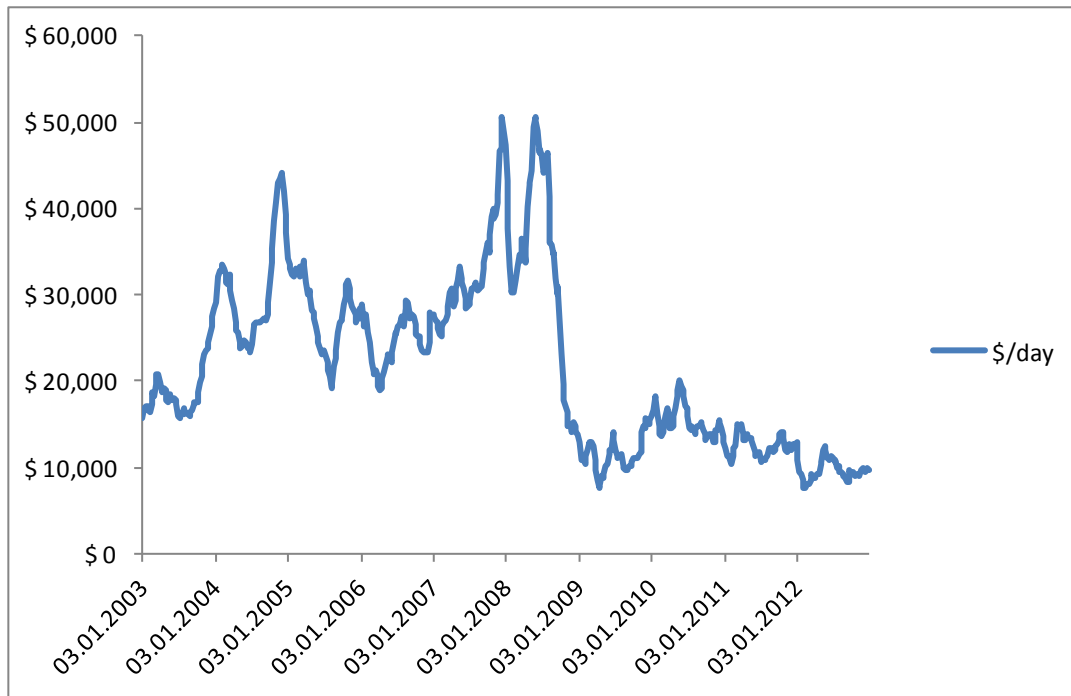


Figure 9: ClarkSea Index

Source: Clarksons

Our numbers show that the use of equity both in the form of public equity and private placements in the *pre-crisis* period, made up an average of 26.3%, while only 14.7% in the *post-crisis* period. This implies a rise in the use of debt after the financial crisis, which is contrary to the pecking order theory. According to the theory, equity will be issued last, when all other options have been exhausted. One would therefore expect that shipping firms would have utilized more debt relative to equity during the *pre*-period, as credit was easily attainable. In the *post* period, we know banks cut back on credit, leading to increased use of the bond market for financing. The use of FOs peaked in the crisis year of 2009, possibly suggesting that firms who could not attain financing from banks or the bond market were forced to use equity instead, which is also the last resort according to the pecking order theory. Despite this, the evidence is too weak to suggest that the pecking order theory can explain the financing choices of the shipping firms due to considerable use of equity in the *pre* period.

The market timing theory seems to be the theory that best fits the observed behaviour of shipping firms. To quickly recap, the market timing theory implies that the firm does not choose between equity or debt, but rather tries to find the source of capital that is most beneficial to the firm. It is, however, important to remember that the financial crisis created

havoc, thus limiting the supply of financing sources available. This could therefore affect the choice of funding and give a bias towards debt financing, as we will discuss further in the debt section.

In our dataset, we see an increased number of IPOs leading up to the crisis, suggesting that shipping firms used the financing option that was most beneficial for the firm. The *pre* period was characterized by high earnings and great market sentiment both in shipping and the rest of the financial markets. This upswing created a viable market for IPOs, which the PWC's Global IPO Report (2012) confirms. The *post* period was characterized by bleak market sentiment, forcing shipping firms to utilize the bond market, private equity and FOs as the credit from banks dried up. Grammenos and Papapostolou (2012) also find support for this in their paper, describing the shift from pecking order theory for the period of 80s and 90s, towards the market timing theory for the last decade.

12.2 Merger and Acquisitions (M&A)

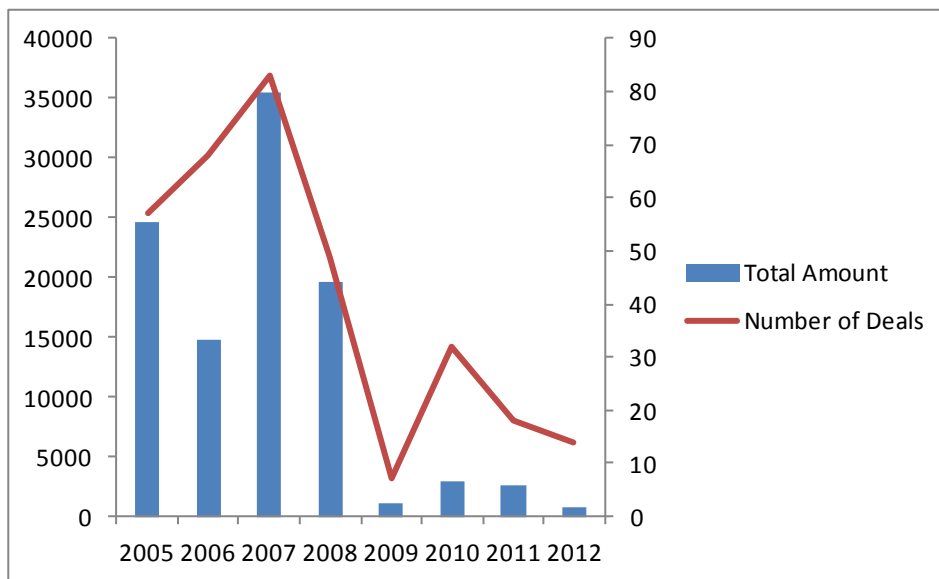


Figure 10: M&A Trend

When studying the development of M&A transactions in *Figure 10*, it is important to have in mind that the number of deals in the chart contains all the deals executed in the period, even those listed with zero value in the database. The reason for zero values could be that details of the deal have not been made public, thereby listing it as zero. The total amount is

therefore not as interesting as before. Thus one cannot look at the graph and say that the average M&A deal has decline in the *post* period.

In our test we have excluded the zero values for comparing the average amount; however, on the overall number of M&A deals we have included the deals with zero value.

Table 1: M&A Results

M&A		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	465.802	329.359
Observations	184	49
T-value	1.005	
Critical T-value	1.666	
P-value	0.159	
Number of deals t-test		
Mean number of deals	61.75	16.20
Observations	247	81
T-value	28.434	
Critical Value	1.657	
P-value	5.73E-57	

*Deals with 0 value are not included

Results

From the results, we can see that there has been a significant drop in the number of deals executed in the *post* period. Declining from an average of 61.75 in the *pre* period to only 16.2 in the *post* period. This is in line with our hypothesis, as well as, with the DVB report (2012), where they find that M&A activity has significantly dropped in the aftermath of the crisis. The results furthermore showed no significant drop in average deal size between the two periods. This is opposite to our initial hypothesis, and hence needs further analyzing. Looking at the average deal size, we see that the drop is quite severe, decreasing from \$465.8 to \$329 million. One would hence think that this would be statistical significant. Due to the many outliers of the sample, we, however, suspect that these outliers might affect the result. We hence believe that the deal size has gone significantly down. We are, nevertheless, unable to prove this statistically. Such decrease would also be in line with the drop in vessel

value. Thus, the fall in the deal size could partly be accredited to the lower implied valuation of ships and shipping firms.

Another important point, and probably the most prominent reason, is the contraction of the funding market. In addition to this, in these harsh market conditions, most shipping firms will have enough with just staying "afloat" themselves, thus having no desire to expose themselves towards the extra risk. The DVB Bank report (2012) predicts the shipping M&A activity in 2013 and onwards will be driven by the aim to reduce costs, maintain market positions and negotiation powers. They also note that the volatility of the equity and debt markets will continue to make it hard to secure funding for deals. However, there is a large amount of money on the sideline, waiting to be placed by both strategic and financial investors. Globally, general M&A activity has been suppressed by the slow recovery of the world economy. The 2012 global M&A activity represents a 41 % fall from the *pre-crisis* level according to Clifford Chance (2013).

12.3 Equity

The premise for the increase of IPOs and FOs came mainly after the down turn of the Dotcom crisis from the good investment sentiment from the period between 2004 and 2007. In addition, the shipping market was experiencing a boom, needing to fund the expansion of the fleet as the growth of the Chinese economy drove the demand for seaborne trade (Grammenos, Papostolou, 2012) (Merikas et al. (2009).

12.3.1 Public Equity Market Offerings

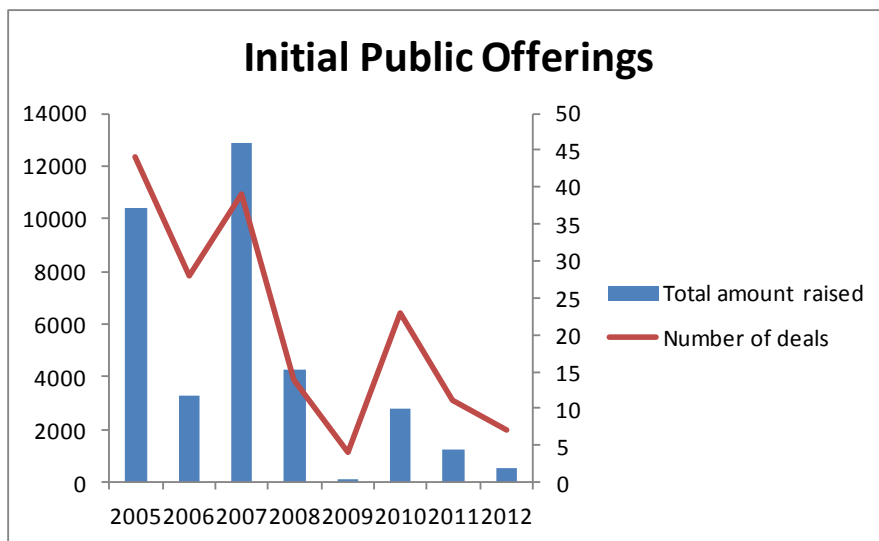


Figure 11: Initial Public Offerings Trend

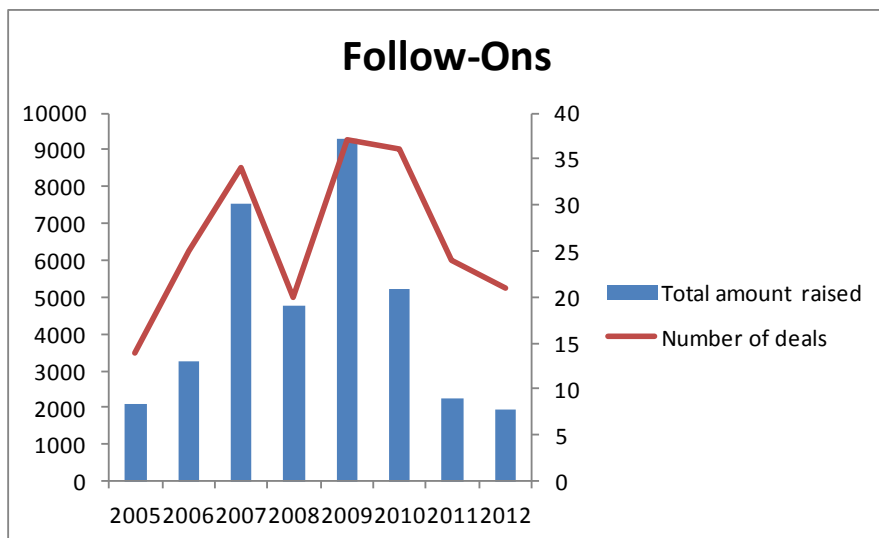


Figure 12: Follow-On Offerings Trend

Figure 11 and *12* illustrate the use of IPOs and FOs for our period of analysis. The left axis shows the total amount raised, while the right axis shows the number of deals.

Together with an upbeat stock market and tremendously high freight rates, equity as a financing source peaked in 2007 with \$20.429 billion raised, making up an astonishing 38% of the total financing that year. Looking at IPO activity alone, we see that it peaked in 2005 and 2007, while seeing a dip in 2006. Interestingly, number of transactions actually increased from 2005 to 2006, possibly suggesting the listing of smaller firms. With the increasing IPO activity, FO activity also flourished, having an almost linear growth from 2005 until 2009, with the only exception coming in 2008, where there was a drop in both amount and numbers of deals.

As the financial crisis hit in the fall of 2008, and both the stock market and freight rates collapsed, there was a major dip in the use of equity. With the stock market bottoming out and starting its slow recovery in early 2009, the usage of FOs peaked the same year. However, after the peak in 2009, we see a steady decline in FOs. The number of deals has though remained surprisingly high. IPOs have, on the contrary, seen a steady decrease in the *post* period, only seeing a spike in activity in 2009, before continuing to fall the following years.

Results

After having initially described the trend picture in public equity financing, we will now use the statistical tests described in chapter 8 to test our hypotheses. The standard deviations for the two periods, for both IPOs and FOs, are larger than their averages, thus implying that there is a large spread in the deal sizes. Thus, we have also conducted a Wilcoxon/Mann Whitney U test on our amount samples. However, due to the nature of the test and the results it provided, we find its usage questionable. We have therefore chosen to omit it from the following analysis section and provided the output in appendix 8 for reference purpose.

IPOs

Beginning with IPOs, the average amount raised for the *pre* period was \$299 million, while in the *post period*; the average amount had declined to \$148 million. This is a staggering drop of 50.5% in average deal size. Looking at the issuance activity, we see a decrease in IPOs, from an average of 31.25 in the *pre* period to only 9 in the *post* period. In line with these drops, the proportion of IPOs relative to total financing, dropped from an average of

15.3% in the *pre* period, to only 2.53% in the *post* period. All the results can be found in *Table 2* and are statistically strongly significant, due to their p-value being less than 0.05.

Table 2: IPO Results

IPO		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	299.010	148.048
Observations	103	32
T-value	3.6126	
Critical T-value	1.6565	
P-value	0.0002	
Number of deals t-test		
Mean number of deals	31.250	9.000
Observations	125	45
T-value	12.561	
Critical Value	1.670	
P-value	0.000	
Proportion z-test		
\hat{p} (proportion)	0.153	0.025
Total observed deals	660	641
Z-value	7.978	
Critical Z-value	1.645	
P-value	0.00E+00	

**Deals with 0 value are not included*

Further exploring our data, looking at annual figures, we see that the largest listings came in 2007 and 2008, with an average issuance size of \$379 and \$471 million, respectively. As one might expect, all the issues of 2008, came prior to the fall of Lehman Brothers in September. The year 2009, was an extreme year with only two issues, amounting to an average of \$67.1 million. Number of issues and average deal size again picked up in 2010, reaching 17 issues and \$166 million, respectively. Despite this initial recovery, the average deal size has fallen to just \$102 million with only 5 issues in 2012. This analysis backs up the statistical results we previously mentioned.

FOs

For FOs, the average amount raised per deal dropped by 17.2%, from \$195.5 to \$161.9 million in the *post* period. To our surprise, the average number of deals actually increased in the *post* period, from 23 to 23.8. FOs as a proportion of total financing, also surprised us,

actually increased from 8.7 % to 10% in the *post* period. The test results are presented in *Table 3*.

Table 3: FO Results

Follow-Ons		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	195.515	161.88
Observations	90	116
T-value	0.856	
Critical T-value	1.654	
P-value	0.197	
Number of deals t-test		
Mean number of deals	23.000	23.800
Observations	92	119
T-value	-0.497	
Critical Value	1.659	
P-value	0.310	
Proportion z-test		
\hat{p} (proportion)	0.087	0.100
Total observed deals	660	641
Z-value	-0.808	
Critical Z-value	-1.645	
P-value	0.210	

**Deals with 0 value are not included*

While the decrease in amount was expected, we were a bit puzzled by the actual increase in number of deals and the increase in proportion of total financing. However, looking at the p-values, we see that they are not even significant at a confidence level of 90%. Thus, from a statistical standpoint, it suggests that the usage of FOs has not significantly changed, rather remained stable and served as a funding source for shipping firms, despite the financial turmoil.

Analyzing the average yearly deal sizes, we see a slightly different pattern, than for IPOs. For FOs the peaks came in 2008 and 2009, with on average \$239 and \$249 million raised respectively. After this, the average FO dropped drastically in size, falling to \$98 and \$93 million in 2011-2012 period. Looking at the yearly proportions, we see that FOs peak as a means of financing in 2009, making up 27.2%. This makes it the second largest source of

capital that year, only beaten by bank loans, which made up 56.7%. Despite the peak in 2009, the importance of FOs drastically fell the following years, only making up between 7-8% of total financing.

Looking at the overall equity results from our analysis, we find that they are partially in line with our hypothesis. As equity markets bottomed out in early 2009, and started their slow recovery, the shipping market, as previously mentioned, kept struggling. With no immediate relief in sight and shipping firms striving to survive, one would not expect investors to be very willing to sink their funds into an industry in turmoil. This is evident from the results we found in IPOs, where the issuance, deal size and volume have drastically dropped in the *post* period. With low freight rates and vessel prices, as discussed earlier, an IPO would likely drastically undervalue the shipping firm. Other types of financing, like bonds would therefore be more beneficial. In addition, the IPO market in general has been struggling to recover from its fall in 2008/2009, suggesting that the low issuance of IPOs in the shipping segment is also related to the general market turmoil created by the European sovereign debt crisis and weak economic outlooks for the world (Ernst & Young, 2012).

When we look at FOs we see a different pattern than what we hypothesized. Our results suggest that once a company has been listed, it is willing to tap the equity markets for additional funds, despite financial turmoil. The willingness of investors also seems to be there despite the collapse of the financial markets. According to Grammenos and Papapostolou (2012), the primary use of FOs in the US market, during 2008/09, were to repay existing debt. In regards to our results for FOs, it is important to remember that the financial crisis has severally limited the lending and risk appetite of banks, which has been the traditional source of finance, thereby forcing companies either to utilize the public markets, either in form of bonds or equity. Possibly, companies that could not obtain bonds due to their financial situation would be forced to utilize FOs as a last resort. Investors having a substantial share in shipping firms, possibly facing bankruptcy, would hence have to "bail out" their own company opposed to possibly losing everything in a bankruptcy, and thus possibly risk missing out, once the shipping market rebounds.

After having reviewed our results for the two individual funding sources that make up the public equity issuance, we observe that both IPOs and FOs grew steeply during the booming years, causing total public equity issuance to surge. After the crisis, IPO volumes, deal size and activity have plunged, while FO activity initially grew before slightly declining. The

surprisingly high issuance level of FOs do, however, not make up for the significant decrease of IPOs. On average, equity made up 26% of the total financing from the period of 2005-2009, before drastically falling to an average of only 12% from 2010-2012.

12.3.2 Private Placement

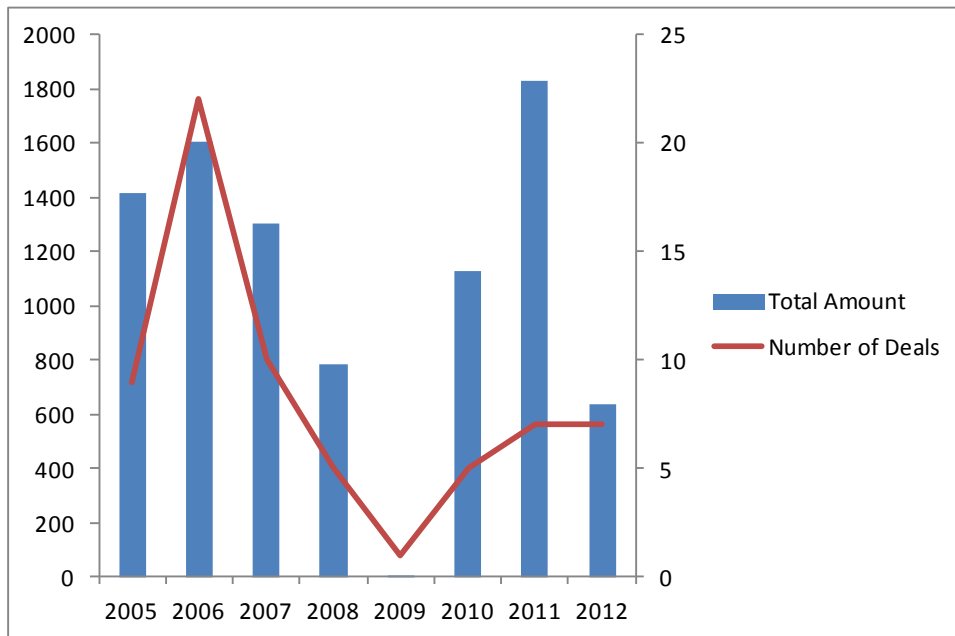


Figure 13: Private Placement Trend

Private placement makes up a very small percentage of the total financing in our sample, only amounting for about 2.6 % of the total capital raised. If we look at the equity portion only, PP makes up on average 13.84 % for the entire period of analysis. On average \$1.175 billion was raised per year in the *pre* period, while only \$1 billion in the *post* period. The above graph shows the development of the private placements through the period we have analyzed. As one can see from the graph the total amount in the *pre* period remained stable, peaking in 2006 with \$1.6038 billion raised in 22 deals. In the post period where the financial crisis wrecked havoc, we see a large dip in 2009 with only \$6 million raised in 1 deal, before PP again picked up.

In our hypothesis, we stated that we believed that private placements would behave the same way as the public equity markets and decline when the financial crisis hit. However, looking at the results we see a slightly different picture.

Table 4: Private Placement Results

Private Placement		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	111.985	190.341
Observations	42	21
T-value	-1.546	
Critical T-value	1.711	
P-value	0.068	
Number of deals t-test		
Mean number of deals	11.00	4.40
Observations	44	22
T-value	4.928	
Critical Value	1.690	
P-value	9.98E-06	
Proportion z-test		
\hat{p} (proportion)	0.023	0.021
Total observed deals	660	641
Z-value	0.241	
Critical Z-value	1.645	
P-value	0.595	

*Deals with 0 value are not included

For average amount raised, we predicted that there would be a decline in the *post* period; however, it has actually increased from \$111.9 million to \$190.3 million, which is an increase of 70%. Statistically, this results is not significant at a 95% confidence level, however, if we lower the requirement to only 90%, we see that the results is well within this range, with a p-value of 0.0676.

Further analyzing the data, we see that there has been a significant drop in the average number of deals, falling 60%, from an average of 11 to only 4.4 in the *post* period. This result is highly significant at a confidence level of 99%, with a p-value less than 0.01. Looking at this result in relation to the average amount raised, it suggests that there has been made fewer, but larger PP in the *post* period. If we look at the proportion statistic, we see that there has not been a statistical significant change in the proportion of PPs, falling

slightly in the *post* period from 2.3% to 2.1%. Thus, it seems that the use of PP has remained stable in the *post* period.

Comparing the results with our initial hypothesis, we can see that private placements have behaved differently from what we first thought. While the number of private placements fell, the average deal sizes actually rose, at the same time as the portion remained close to *pre* levels. This implies that the usage of PP has remained stable despite the financial crisis.

On the other hand, given the private nature of PPs, our sample may, as mentioned, lack a number of entries that have not been made public. This could give a skewed picture in either direction. However, the most likely scenario is that we are missing transactions, thus one should be aware of this when interpreting the results.

Private equity funds, which may take part in private placements, given that the firm is not publicly traded, have increased their investments in shipping significantly post 2009 (DVB Bank, 2012). The private equity funds speculate in making large profits once the shipping market rebounds. Given the low number of transactions observed in our data, we do hence assume that a large part of these deals have been held outside the public market, and hence not included in our sample.

12.4 Debt

In this paper we have defined debt as bank loans and bonds combined. Given that bank loans have historically been the most important source of capital for shipping firms, we will first consider how this asset class has developed the last years.

12.4.1 Bank Loans

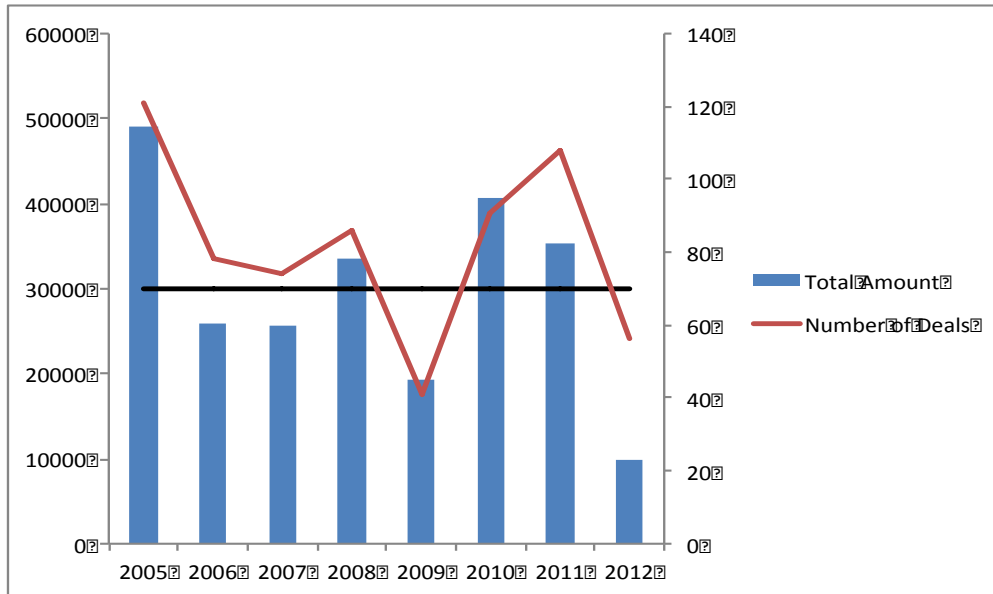


Figure 14: Bank Loan Trends

The figure above illustrates the issuance of bank loans to the shipping industry over the last 8 years. The left vertical axis represents the total amount issued annually and the right vertical axis, the number of transactions performed during the time period. From the transaction information we have attained, we see that loans volumes peaked in 2005 and have dropped ever since. The loan issuance has, however, not really been declining since 2005, but rather stabilizing after an unusual year. Looking in more detail, we observe that bank loan volumes and issuances have fallen from a total volume of \$49 billion and 121 issuances, representing almost 74% of all ship financing in 2005 to a loan volume of only \$19.4 billion divided upon 41 issuances in 2009, with volumes representing just over 56.7% of total financing at this point. The market then made a recovery in 2010-11, reaching a volume high of \$40.5 billion in 2010 and an issuance and proportion high in 2011 of 108 and 65.9% respectively. Realizing that the recovery was premature, the banks then contracted, causing the loan

volume to plunge again, ending up at a period low of \$9.9 billion or 41.7% in 2012. The number of issuance also declined, but at much slower rate, ending up at 56 loans issuances in 2012.

Results

Considering *Figure 14* and the data presented in the previous paragraph, one can hence see that loan volumes have varied substantially during the period we have monitored ship financing. Given the information provided, it is, however, difficult to make any concrete conclusions on the movements of the different variables. We have therefore gone deeper into the data, where we have, through statistical tests, compared the *pre* and *post* period of the recent financial crisis. Our analysis has proven a significant decrease in both the proportion of bank loans and number of bank loans issued for the shipping industry, while no significant change was found for the amount raised per bank loan. The results can be found in *Table 5*.

Bank Loans		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	377.405	372.551
Observations	341	297
T-value	0.079	
Critical T-value	1.648	
P-value	0.468	
Number of deals t-test		
Mean number of deals	85.75	62.40
Observations	343	312
T-value	9.464	
Critical Value	1.650	
P-value	0.000	
Proportion z-test		
\hat{p} (proportion)	0.639	0.592
Total observed deals	660	641
Z-value	1.751	
Critical Z-value	1.645	
P-value	0.040	

*Deals with 0 value are not included

Table 5: Bank Loan Results

Starting our analysis on the proportional finding, the test found a significant change in proportions even though the average decreased just less than 5 pp from the *pre* to *post* period. Examining the data further, we believe the reason that such a small change turned significant is because of the magnitude of the number of observations and the amounts that are in motion here. The result also has a fairly high p-value, making it significant, but only with a 95% confidence level. The result does, however, confirm our hypothesis, and one can conclude that the bank loans have decreased significantly in importance in the *post* period.

Another interesting notion to include here is that even though loan volume peaked at \$40.5 billion in the 2010-11 recovery, the proportions did not peak before 2011. Such discrepancy indicates that in 2010 other asset classes made up a larger market share than earlier, causing the bank loan proportion to increase less proportionally than earlier. Examining the data, we find that in 2010 bonds indeed made a jump, increasing their funding share with 12.2pp to 27.9%, while FOs still represented 7.7% of total funding after its peak in 2009, hence leading bank loan proportions not to reach its peak of the *post* period in 2010.

Moving on in our analysis, we see that our hypothesis regarding a fall in the number of bank loans issued in the *post* period is confirmed, with a drop of average number of loans issuance per year from 85.75 to 62.4. The result also has a very low p-value, making it highly significant with a 99% confidence level. Looking further into the annual data, we see that the result remains significant even though we see a strong increase in number of deals made in 2010-2011 (highest during the sample). This increase could potentially have lifted the average enough to alter the statistical result, but the low number of deals made in 2009 and 2012, however, outweighed the number of issuance made during the recovery.

Considering the statistical findings on the change of average deal size, the test found no significant change. This is not in line with our initial hypothesis and hence needs to be examined further. At first glance, this result seems natural, as the averages for the two periods are very close. Examining the data closer we, however, find that the trend of total volume and number of issuances diverge between 2010-12, where the number of issuances is at all times higher than that of loan volumes. Such discrepancy indicates that there was a significant decrease of deal size between 2010 and 2012. Analyzing the data, we find that the average amount per loan indeed plunged from 2010 to 2012, declining 24.8% from 2010 to 2011 and another 45.9% from 2011 to 2012. So why has this decline not caused a

significant outcome in the t-test? Examining amount per deal between 2008 and 2010 gives us the answer. Here we see an increase in the amount per deal far beyond previous deal sizes, dragging up average deal size in the *post* period. As the larger part of 2008 is included in the *pre* period, this increases its mean, but at a much smaller scale. One can hence conclude that the test does not find a significant decrease in amount per deal, as the time period examined is inappropriate for the sample. The test should have been done comparing the time periods *pre* and *post* 2010. By doing so, one will see a highly significant decrease, with a drop of average deal size of 59% between 2010 and 2012. It is hence correct that the banks recently have reduced deal size as a risk mitigation tool, but such reduction did not happen before in 2011.

Following the banking industry's trend of risk mitigation, another hypothesis of ours was that we also expected to see an increase in consortium sizes. Our statistical t-test confirmed this hypothesis, with the average consortium size increasing from 2 to 3 per deal. The results can be found in *Table 6*. Looking at the p-values, we see that the result is highly significant, with a confidence level of 99%. Such result indicates that the number of club deals has increased. The result, furthermore, partially rejects DNB's prediction of a decline in consortium sizes, but as some of the transactions had very large syndicates, these outliers are likely to pull the average significantly up. It is hence hard to reject DNB's argument. However, looking closer at the data, we observe that very few syndicate loans are being made in the *post* period. One can hence conclude that it is likely that banks have wished to diversify their lending portfolio by increasing the consortium sizes. An increase of club deals can, however, also be attributed to the lack of liquidity in the capital market, leading banks to come together to fulfill customer's capital demands. Such trends have led the number of club deals to increase.

Consortium Size		
t-test: Two-Sample Assuming Unequal Variances		
	<i>Pre</i>	<i>Post</i>
Mean	2.079	3.084
Observations	331	296
T-value	-5.377	
Critical T-value	1.648	
P-value	6.23E-08	

Table 6: Consortium Size

Trying to explain the bank lending trend, one should have in mind that the world economy had started to recover from the Dotcom crisis before 2005, and by the time we start our sample, shipping loans reached its peak. Starting our sample at this point of time hence gives an indication of a fall in financing in the following years, whereas the truth is that it was actually fairly easy for shipping firms to attain financing from 2005-2008.

Explanatory variables

Having described the key macroeconomic event behind the development of bank loans in our macroeconomic section, we now wish to point on a couple of key contributing factors leading to the drop of bank loans in the *post* period.

A key factor attributing to the drop has been the pending implementation of Basel III and the stricter capital requirements it will impose on banks. As mentioned in our theory section, with Basel III the required equity of banks have increased proportionally given the same amount of risk. This forces the banks to either raise more equity or reduce the risk associated with its lending portfolio. The later option is because the capital requirements are relative to the bank's assets through the implementation of risk weighted assets (RWA). Equity requirement hence depends upon the assets riskiness. As banks are, for various reasons, reluctant to raise equity in the market, most banks have turned to their risky portfolio in order to reach the Basel III requirements. By removing/significantly reducing the lending to these groups, they can reduce required equity holdings. As shipping is a highly volatile industry, such efforts have particularly affected the industry. As a result, bank loans as means of financing have been available to fewer shipowners since the peak of 2008 and this is unlikely to change anytime soon. Several banks have, with the recent crash in freight rates in mind, severely cut their funding to the industry, with even some of the previous biggest lenders such as Commerzbank AG, Germany's second largest lender, completely discontinuing their lending to the industry (Commerzbank, 2012).

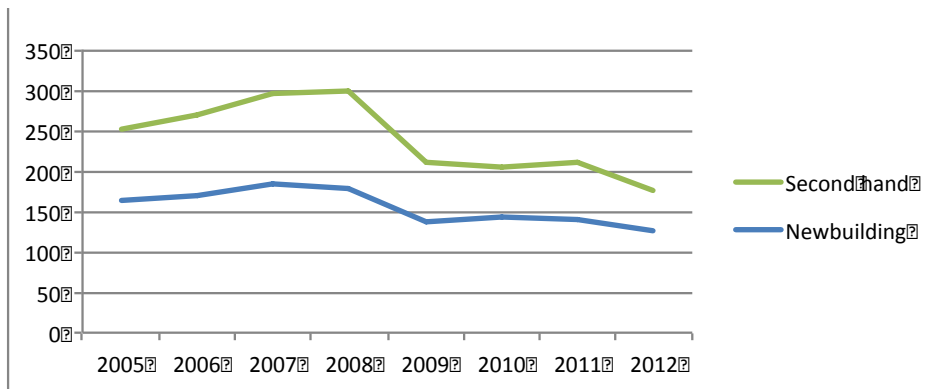


Figure 15: Price Index

Source: Clarksons

However, the decline can also be partially explained by the fall of the vessel values, in addition to the numerous restructurings of both shipping companies and banks. The fluctuation of vessel values within shipping is often characterized as quite extreme. From having astronomically high price tags in times of excess demand, vessel values quickly depreciate when the market collapses. The reason for this is that these values are based on projected future earnings. Market values are hence strongly correlated with the movement of the freight rates, which is known to be very volatile. Banks are therefore, as mentioned, normally very reluctant to extend secured loans, with security in vessels, above 50% of current market values. This is especially the case in booming periods where these values typically are inflated.

With the recent decline in freight rates, the market value of the world fleet has as expected decreased severely. *Figure 15* illustrates the development in the second-hand and newbuilding price indexes the later years. As we can see, both have experienced a quite significant drop since 2008/ 2007, down 41pp and almost 32pp respectively from their peaks. Such decline in market value has hence caused the needed financing for new investments to drop dramatically. This decrease is further illustrated in *Figure 8*, showing an approximate of the movement in the need of financing. We see that as vessel values decline, so has the total funding needed. Part of the decline in bank loans can hence partially be explained by lower vessel prices, leading us to conclude that the excess demand for bank loans may not be as severe as many industry professionals have expressed.

Lastly, with both the shipping industry and the banking sector predominantly experiencing rough waters since the crash of the capital markets in 2008, many of both kinds have gone

through heavy restructuring and refinancing. Hence, with credit committees in place, bank lending might be further limited, especially to industries perceived risky or where most operators are struggling financially. One would hence expect that shipping would be allocated less capital.

Summarizing up, bank loans have experienced a significant drop in the aftermath of the financial crisis, which can to a large degree be explained by the pending implementation of Basel III, lower financing need given the lower market values of vessels and stricter lending policies.

12.4.2 Bonds

When we are referring to bonds in this section, we consider both certified bonds, as well as convertible bonds. We decided to pool these in order to examine the total availability of capital from the shipping bond market. It should, however, be noted that convertible bonds represent a small part of the total bonds volume, and that removing convertibles would not change the trend pattern drastically.

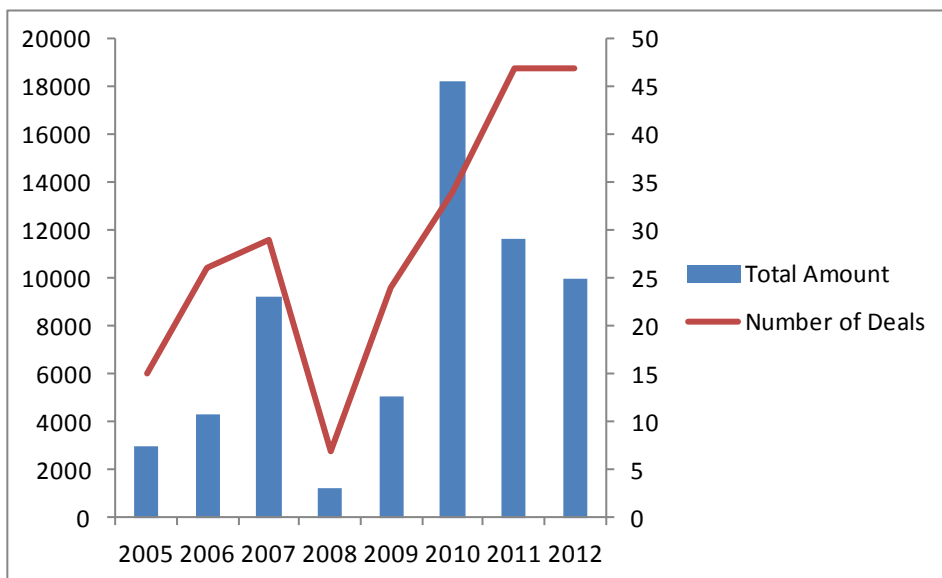


Figure 16: Bonds Trend

Examining the importance of bonds as means of ship financing, we see that its share has increased from a volume of \$3.4 billion out of 19 issues in 2005, accounting for 5.1% of all ship financing to a share of 17.8% in 2007, accounting for just less than \$10.3 billion raised from 35 issues. This is also the peak of the *pre* period both in terms of numbers of deals, volume and proportions. In the following year, the market collapsed with bond volumes

falling 87.8% from the year before. This is also a sample low for proportions, representing 2.8% of ship financing, with financial institutions only issuing 7 shipping bonds, amounting to just over \$1.25 billion. The market then slowly built itself up in 2009, before really booming the subsequent year. By 2010, bonds represented 27.9% of vessel financing and ended up at an annual shipping bond volume of \$19.2 billion, which is a sample high. This increase between 2009 and 2010 is characteristic both for number of deals performed per year as well as annual bond volume. From 2009 to 2010, volumes increased with astonishingly 260%, before dropping and stabilizing at just above *pre-crisis* levels the next two years. Number of deals has had the same noteworthy increase following the crisis, but did not peak before 2011 and then stabilizing at that level the following year. From 2008 to 2011, number of bond deals went up with remarkably 571%, reaching a period of 53 deals that year. Even though total volumes decreased from 2010-2012, the proportional use of bond as means of ship financing in our sample actually peaked in 2012 at 45.8 %.

Results

Considering the information presented in the previous paragraph, it seems quite likely that at least two of our earlier presented hypotheses are confirmed. Namely that the proportion of bonds and the number of bond issues has increased substantially in the aftermath of the recent financial crisis. We will, however, check these hypotheses statistically, in addition to the others we have put forward.

Looking at the most obvious results first, our analysis has proven that there has indeed been a substantial increase both in the proportion of bond financing, as well as the number of bonds issued *post* the financial crisis. The average of bond proportion has experienced a growth of around 16pp from the *pre* to *post* period, whereas the average number of deals per year has increased with just less than seven issues per year. We furthermore see that both results have very low p-values, making them highly significant (with a 99% confidence level).

Bonds (CB+Conv)		
Amount per deal t-test		
	<i>Pre</i>	<i>Post</i>
Mean deal size*	234.421	279.402
Observations	84	175
T-value	-0.972	
Critical T-value	1.651	
P-value	0.166	
Number of deals t-test		
Mean number of deals	10.75	17.50
Observations	86	175
T-value	-3.603	
Critical Value	-1.658	
P-value	2.29E-04	
Proportion z-test		
\hat{p} (proportion)	0.098	0.261
Total observed deals	660	641
Z-value	-7.741	
Critical Z-value	-1.645	
P-value	4.94E-15	

**Deals with 0 value are not included*

Table 7: Bond Results

Looking further into the data provided for each individual year, we see that both the number of issues and bond proportion of financing have actually experienced an almost continuous growth between 2005 and 2012. From having 19 issues and representing only 5.1% of financing in 2005, the asset class has gradually grown in importance the next 8 years, having 52 issues and representing 45.3% in 2012. This is a quite remarkable growth, and one can clearly say that the total financing picture has drastically changed.

Considering the changing financial picture, it is, however, also important to consider the scale difference of total financing of the *pre* and *post* period. Looking at the data, bond volumes reached its peak in 2010, at \$18.2 billion, while bank loan volumes reached its peak in 2005 at an annual total of \$49 billion. The peak of the bank loans is hence more than twice the size of the equivalent bond peak. Looking at the results, we see that bonds represented just over 45.3% of total ship financing in 2012. This is, however, of a total of \$24.5 billion, which is significantly lower than the total financing peak of \$93 billion from 2007. Such

findings further confirm our earlier conclusion, namely that the total availability/need for funding has decreased significantly *post* the crisis. Putting it in terms of macroeconomics, the equilibrium point for supply and demand of shipping financing has moved down to a lower intersection point.

Looking further into bond instrumental variables, our test found no substantial change in the bonds deal size. Considering the p-value, we see that the result is not even significant within a 90% confidence level, leading us to reject it. Looking at *Figure 16*, we, however, notice that the graph behaves much alike that of bank loans (total volume peaking in 2010, while number of deals peaking in 2011). One can hence draw the same conclusion as that of bank loans, namely that bond deal size did in fact increase quite steeply (133%) from 2009 to 2010. It has, however, dropped since then, but down to a level just above that of 2005-06. Given that the new level is still below that of 2007-08, the average of the two periods will be quite similar. There have hence been no significant change in bond sizes comparing the *pre* and *post* period, and our initial hypothesis was rejected. Nevertheless, if one had examined the periods of 2009-10 and 2010-12, we would first have seen a significant growth in deal sizes, before the amount fell steeply down again to *pre* boom levels.

Further analyzing the bonds' transactions tenor and interest rate, our statistical test found significant changes in both interest rates and tenors *post* 01.09.2013. These results can be found in *Table 8*. The interest rate increased from an average of 4.9 to 6 %, whereas bonds' tenor dropped from an average of just over 8 years to 4.9 years. These results confirm our hypotheses that the lenders requiring higher risk premiums in times of greater uncertainty, and are less willing to issue bonds of long duration in times where solvency might be questioned. Looking at the p-value of the results, we see that the later result is highly significant (with a 99% confidence level), whereas the increase in risk premium is only valid at a 95% confidence level, making it only significant.

Considering these results, it is, however, important to take into consideration that we have not had access to rating information on the various companies examined. We have hence not considered how rating changes have affected the interest rate in the sample period.

Bonds Tenor			Bonds Interest Rate		
t-test: Two-Sample Assuming Unequal Variances			t-test: Two-Sample Assuming Unequal Variances		
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
Mean maturity in years	8.110	4.912	Mean	4.932	6.028
Observations	45	200	Observations	37	187
T-value	3.604		T-value	-2.030	
Critical T-value	1.677		Critical T-value	-1.674	
P-value	3.66E-04		P-value	0.024	

Table 8: Tenor and Interest Rate

It is furthermore interesting to observe that while the bottom fell out of all the publicly trade market (Bonds, IPOs and FOs) in 2008, bank loan volumes experienced a boost in volumes the same year. This is interesting, as regardless of the sharp decline in the public trade market, bank still issued loans, making it a typically example of banks' liberal lending during booms. We will go in more detail of why the bottom fell out of the publicly traded market in our "Macroeconomic event" section.

Explanatory variables

In this section, we wish to briefly touch upon the bond's role as an alternative source of capital in order to build up the reader's understanding of the key fundamentals behind the movements in the bond market, before moving on to the macroeconomic events section.

Bonds' role as a financial instrument

Bonds are often considered as an alternative source of financing, typically used when investors are unable to attain desired amount of capital from bank loans. This can either be the case of a tightening capital market in a down cycle, the beginning of an upswing in the market or the firm is in an economic position/rating, which limits its possibility of obtaining bank loans at a sustainable yield. The reason for its recognition as an alternative source of capital is two-folded. For one, bond financing is an expensive type of financing, where the lenders requires yield above what banks charge in order to be properly compensated for their comparatively larger degree of bankruptcy risk. Bondholders are in the case of bankruptcy, as described in our theory section, much less likely to get their claims fulfilled, than a bank in the similar situation. This disadvantage leads the bondholders to charge a higher interest rate. Secondly, governments and banks do not always have the same interest, causing the effect of government incentives to not always turn out as planned. In poor economic times, the government will push down the interest rate in order to encourage people to spend

money. A decline in the central bank interest rate will encourage lending, given the cheaper loan arrangements, while on the other hand discourage bank saving, given the lower rate of return. The government and the banks do, however, not always want the same thing. Typically when the government reduces the interest rate, the banks' profit margin decreases depending on how the decline affects the interbank rate. Furthermore, governments typically reduce interest rates in times where lender's solvency may become an issue. Banks would then usually be more reluctant to overextend lending. Such conflicting issues hence cause governmental measures to not always have the attended effect. For such reasons, bonds then become an alternative type of financing in times of low interest rates. As bond's interest rate is based upon the 3-month interbank rate of the issuing country, bonds only charge a yield spread (risk premium) above this lending rate. This makes bond a fairly cheap way of financing in times when the banks contract. As the market recovers, however, interest rates again rise, as the government wishes to control the inflation pressure building up. This causes bonds to become an increasingly more expensive way of financing as the economy picks up speed.

Macroeconomic events

We have decided to include a separate section describing the key macroeconomic events for bonds. The reasoning for including such a section is that even though we have already described the main events that have occurred, these events effect on bank loans and equity are, to some extent, clearer than that of bonds. We also find that there are in addition to the general events, other happenings affecting the development in bonds. An inclusion of these, in the earlier section, could have made it less intuitive for the reader, leading us to discuss these separately. In order to minimize redundancy, we have also tried to only briefly touch upon the key events necessary to explain the activity in the bond market.

The shipping market experienced one of the century's largest booms in freight rates between 2003/4 and 2008. For many shipowners, the identification of a boom entails a hunt for capital in order to make investments early on in the cycle. As there is a lag between ordering and receiving ships, being able to recognize a boom early is of immense importance in this industry. Bank loans are, as mentioned, historically the first source of capital the shipowners seek, and with the freight rates picking up speed in 2003/04, bank loans issuance skyrocketed by 2005. Not all shipowners were, however, able to attain desired level of capital through bank loans, for various reasons, and as the growth continued, shipowners gradually started to exhaust their available bank loan capital, leading to a steady increase of

alternative financing such as bonds, IPOs and FOs. This can explain the gradual growth in bond issuance observed. However, as a boom grows, banks typically become more lenient on the loan requirements (Lee, Haque 2011). This leads the availability of bank loans to increase, explaining the relative lower comparative growth of bonds to bank loans up until freight rates peaked. Bank loans will hence stand for most financing during booms, but firms will also make use alternative sources of capital, if they are unable to attain the desired amount of capital from banks. It is likely that this explains parts of the gradual rise of bonds issuances up until 2007.

Interestingly, all publicly traded securities considered in this sample (Bonds, IPOs and FOs) experienced a steep decline in issuances in 2008. Such a decline must hence have started prior to the crash of the markets, with Lehman Brothers going bankrupt in mid-September that year. Such a drop in volumes can be explained with rising uncertainties in the market, with the American housing bubble starting to burst in 2006/2007. According to Duca, Muellbauer and Murphy (2010), the bubble gripped the financial markets already from August 2007. This uncertainty caused a bearish sentiment, which also can be observed from the gradual decline of the stock market from the end of 2007 (Dow Jones Index, 2013). When the banks liquidity dried up in the end of 2008, many turned to bonds as means of financing. After the Lehman Brothers crash, investors risk aversion also increased significantly (Von Hagen, Schuknecht, Wolswijk, 2011), leading the term spread to rise proportionally with the increase in demand. With the optimism in the world economy again emerging by the middle of 2009, demand for bonds further rose the next year. Other contributing factors to the boom in shipping bonds were, among other things, the investment banks receiving large fees for completing high-yield bond deals, and the lenders being tempted by the high coupons that the shipping high-yield bonds offered (Grammenos, Papapostolou, 2012).

In the second half of 2010, the world economy and with it the shipping market went again into a period of negative market sentiment. This downturn in global trade led investments to decrease and hence caused the demand of financing to fall as well. Bad times also led many investors to invest in sovereign instead of corporate bonds, as many of these had historically been seen upon as safe havens. This downturn in the global corporate bond market lasted until early 2011, when the solvency of Greece, and later the rest of the PIGS countries were put to question. With the solvency of these previously safe havens put to question, investors' demand for corporate bonds again increased (Deutsche Bank 2013). With no longer any risk-

free investments, and the sovereign funds now still considered reasonably safe, offering even lower returns, investors saw corporate bonds as an increasingly attractive investment in search of yield. Such trend can be found by looking at the proportional financing development of our data. We believe the correlation between the global economy and ship financing is better displayed by looking at the proportional financing than that of total volumes after 2009. Our reasoning for such a conclusion is that as the financing need together with bond deal sizes decreased from 2010-2012, the total bond volume development (declining) does hence not reflect the increase in number of bond issuances caused by the shift away from sovereign bonds.

12.4.3 Country of issuance

Given the changing financing picture in today's market we have put forward several hypotheses of shifts we expect to see within the worldwide ship financing, these hypotheses being partially based on theory and partly based on comments by industry professionals.

Considering the historically most important source of ship financing first, our statistical test of bank loans found indeed a significant change in all regions covered. The results can be found in *Tables: 9-13*. Asia increased its proportion of the number of worldwide bank loans issuances with 20pp, from 19% to 39%, whereas Scandinavia experienced an increase of just under 8pp, from 6.7 to 14.6 %. On the declining side, North America, Europe and Middle East all had a substantial drops, with both Europe and the Middle East falling approximately 8pp, from 43 to 35% and 11 to 2.8% respectively. North America experienced a decline of almost 12pp, from 18.3 to 6.4%. This test hence confirmed all hypotheses put forward for bank loans. All results also show very low p-values, indicating that they are highly significant (with a 99% confidence level).

Examining the source of debt with most growth in this period first, our statistical test only found a significant change in the proportions of bonds activity in Scandinavia, coming from a significant increase in the issuance of bonds. The results can be found in *Tables 9-13*. Only two of our hypotheses were hence confirmed. (Middle East did not have a significant amount of bond deals and was hence not tested.) The p-values were non-significant for all, except for Scandinavia, showing a significant change within a 95% confidence level.

Examining these results more in detail, we see that Scandinavia in the *post* period contributes to almost 28.5% of the total number of world shipping bond issuance, an

increase from 19.5% in the *pre* period. Except from that, we can observe that both Asia and Europe strengthen their proportions of number of deals made as predicted, while the North American markets issued a proportionally lower number of deals in the *post* period. None of these changes were, however, substantial, causing two of our hypotheses not to be fulfilled. Considering Julian Macqueen's article in Lloyd's List, where he, in the first half of 2010, stated that there were only two fixed-income markets that shipping firms should consider if deciding to issue bonds, the United States and Norway (Lloyd's List, 2010). We find that there have indeed been some changes in the market picture since this article was written. As things stand now, Scandinavia has accounted for the greatest activity of shipping bonds in the *post* period, closely followed by Asia, whereas North America, on the other hand, has actually issued fewest shipping bond (18%) since 01.09.2008.

It is, however, important to point out that we have in our tests considered the activity of the various financial institutions, not the total debt volumes issued. We are hence comparing apples and pears, and our results may very well separate from those found if considering total bond volumes. This would be the case if the amount raised per deal differs between the regions.

Lastly, looking at the combined shifts of the two debt sources discussed above, our test found again significant results for all the regions tested. The results can be found in *Table 14*. Asia strengthened its position considerably from a 20% proportion of number of shipping debt issuances in the *pre* period to a total of 35.5% in the *post* period. Scandinavia followed with a 10pp increase, in the proportion of total number of issuance, from 9 to 19%. While Europe and North America experienced a drop of respectively 8 and 10pp, leaving the two with 32% and 10% respectively of total number of shipping debt issuance. All results gave a very low p-value, making all results highly significant (with a 99% confidence level). Going back to our hypotheses, we see that all proposed hypotheses for total debt level were confirmed.

Looking at all countries of issuance results combined, we see that most of our initial predictions were confirmed. There have indeed been shifts in the capital market activity away from North America, Europe and Middle East towards Asia and Scandinavia. These effects are, however, not as strong for bonds as for bank loans. This was, to some extent, predictable, as the most important finding for bonds was the recent shift towards the Scandinavia fixed-income market.

Asia**Bonds****Bank Loans**

	ASIA			ASIA	
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.241	0.273	\hat{p} (proportion)	0.193	0.397
Total observations	112	355	Total observations	683	926
Critical Z-value	-1.645		Critical Z-value	-1.645	
Z-value	-0.672		Z-value	-8.745	
P-value	0.251		P-value	1.111E-18	

Table 9: Asia: Country of Issuance

Scandinavia**Bonds****Bank Loans**

	SCANDINAVIA			SCANDINAVIA	
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.196	0.285	\hat{p} (proportion)	0.067	0.147
Total observations	112	355	Total observations	683	926
Critical Z-value	-1.645		Critical Z-value	-1.645	
Z-value	-1.845		Z-value	-4.978	
P-value	3.25E-02		P-value	3.22013E-07	

Table 10: Scandinavia: Country of Issuance

North America**Bonds****Bank Loans**

	NORTH AMERICA			NORTH AMERICA	
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.232	0.180	\hat{p} (proportion)	0.183	0.065
Total observations	112	355	Total observations	683	926
Critical Z-value	-1.645		Critical Z-value	1.645	
Z-value	1.213		Z-value	7.348	
P-value	0.113		P-value	1.01E-13	

Table 11: North America Country of Issuance

Europe**Bonds****Bank Loans**

	EUROPE			EUROPE	
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.205	0.228	\hat{p} (proportion)	0.435	0.350
Total observations	112	355	Total observations	683	926
Critical Z-value	-1.645		Critical Z-value	1.645	
Z-value	-0.506		Z-value	3.460	
P-value	0.306		P-value	2.70E-04	

*Table 12: Europe: Country of Issuance***Middle East****Bank Loans**

	MIDDLE EAST	
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.117	0.028
Total observations	683	926
Critical value	1.645	
Z-value	7.117	
P-value	5.508E-13	

Table 13: Middle-East: Country of Issuance

*Combined:***Pooled (Bank loans + CB)**

ASIA			SCANDINAVIA		
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.200	0.365	\hat{p} (proj)	0.086	0.191
Total observations	795	1281	Total c	795	1281
Critical Z-value	-1.645		Critica	-1.645	
Z-value	-7.942		Z-valu	-6.544	
P-value	9.959E-16		P-valu	2.996E-11	

NORTH AMERICA			EUROPE		
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.204	0.100	\hat{p} (proj)	0.403	0.322
Total observations	795	1281	Total c	795	1281
Critical Z-value	1.645		Critica	1.645	
Z-value	6.635		Z-valu	3.750	
P-value	1.622E-11		P-valu	8.845E-05	

Table 14: *Combined: Country of Issuance*

13. Conclusion

The purpose of this thesis has been to determine the key changes in ship financing caused by the recent financial crisis. After the shipping market experienced years of continuous upswing fuelled by the Chinese economy in the start of the millennium, the world economy and with it the shipping industry went into a deep trough, with the financial turmoil reaching its peak in mid-September 2008. As the financial market collapsed, so did the access to capital. In the following years, shipowners have experienced a different funding environment. Through examining our tailored database, we found that there indeed been a significant change in financing in the aftermath of the 2008 financial crisis. Our statistical evidence show that both equity and bank loans have contributed with a significantly smaller proportion of ship financing in this *post* period.

The decrease in lending volumes can, considering the whole *post* period, mainly be attributed to the decrease in number of deals, as deal sizes have not changed significantly between 2008 and 2012. However, if one examines the two last years separately, one observes a severe drop in loan deal sizes. A drop coming as a result of a combination of factors, among other things; decreasing vessel values and risk mitigation efforts from the banks side. One can hence conclude that the reason for the drop in volume is two folded, with the second factor only contributing in the second part of the period. Examining the underlying factors for the decrease in lending, we see that the pending Basel III regulations; causing many banks to drop risky portfolios like shipping, the drop in vessel values; leading to lower financing need and the stricter lending policies, are the key reasons for the reduction in lending liquidity.

The decrease in equity seems to a large degree to be caused by the severe drop in IPOs. Looking at the results, the key findings are a significant decrease in both the IPO and Private Placement (PP) activity, coupled with a severe drop in IPO deal size. On the contrary, average private placement deal size nearly doubled in the *post* period. A likely reason for this is the surge of private equity deals in 2010/11. However, given the limited number of deals, the total effect of this surge was not of significance. It is, however, hard to tell whether all private placement transactions were caught by the information gatherers, given the private nature of these deals. In addition to private placements, FO activity did actually increase in the beginning of the *post* period, before slowly decreasing. One can hence say it

remained fairly stable, as investors have turned to it, in some instances, as an alternative source of funding. The total effects of PP and FOs were, however, not enough to alter the general negative trend of equity issuance, as both IPO activity and deal size fell drastically from a high in 2007. The key reasons for such a decline seems again to be a drop in market values of the shipping firms, leading to lower deal sizes and a general aversion from turning to the equity market in times when the management knows that the firm value is not reflected in what they can raise in the public market.

With a drop in bank loans and equity issuance, we find that the funding gap left by these have to a large degree been filled by bond issuances; with our test finding a significant increase in number of bond deals. However, this gap may be smaller than what many think, as the substantial drop in market value significantly reduces the funding needed. The drop in financing need has, however, likely not been as steep as that of market values, as many of the deals needing financing in the *post* period, have already been ordered in the *pre* period at considerable contract fees.

Regardless of the significant decrease in lending volumes, our results show that bank loans still represent the largest portion of vessel financing. With bank loans and equity issuance contracting, shipowners have been left with severely limited options, leading them to turn to bonds and, to some extent, private equity and FOs, as alternative capital sources. It is, however, only a minority of shipping firms that are involved in the bond market (Falck, 2013), and one should hence not overemphasize this shift. What we rather see as an explanatory factor for the increasing funding share of alternative capital, is a significant drop in overall shipping funding. Bond volumes have really not increased that much, but this source of capital has rather experienced an increase in proportion as a result of the other asset classes declining volumes. In addition to our findings, we would also like to mention as a side note, that we in reality expected private equity to stand for a larger degree of ship financing than what we have found in our analysis. We believe, given the private nature of these deals, that it is likely that not all transactions of this kind are included in our sample.

Furthermore, considering how the different debt variables have been affected by the financial crisis, our test found that bonds have experienced an increase in interest rates and a drop in tenor. Such behavior seems natural given the large degree of uncertainty in the market, causing investor to demand larger returns, and shorter commitments. As a risk

mitigation tool, we also observe that bank consortium sizes have increased in the *post* period, as firms wish to diversify their lending portfolio and reduce exposure per deal.

Examining the global movement of capital, we find empirical evidence that as bonds increase in importance and the proportional funding of bank loans deteriorate, the origin of capital shifts from North America, Europe and the Middle East, to Scandinavia and Asia. It is, however, questionable whether the change of origin can be fully credited to the overall shift in funding, or whether there are other factors behind the shift.

Our statistical test found that Asia increased its funding proportion both in terms of bank loans and bonds, although bank loans were the only statistical significant figure. Considering the overall growth in the Asian economy over the period, we see that such a growth have led banks to be in better financial shape, caused Asia to take an increasingly larger part in the shipping industry and made Chinese business flourish, causing cash reserves to mount up and hence investors to search for yield. Such growth seems therefore to be the most significant factor behind the increased funding from this region, attributing little importance to the shift from bank loans to bonds.

Scandinavia has, however, had a tremendous increase in bonds, far larger than its increase in bank lending. One can hence assume that at least a larger part of its change can be credited to the shift of funding. Furthermore, with the financial crisis leaving Scandinavia fairly untouched, it is likely that the solid financial position these institutions find themselves in; in combination with the tightening global lending market, have led the Scandinavia lending volumes to rise. One can hence give this shift in funding a great explanatory degree.

Our test found that North America experienced a drop in both bond and lending issuances, with only the later being significant. Such declines can to a large degree be explained by the worsening financial situation for banks and the investors losing trust in the market. The later leading substantial amounts of capital to be extracted from the market (Moody's, 2013) and investors requiring higher return as they penalize structural imbalance stronger in the *post* period (Von Hagen, Schuknecht, Wolswijk, 2011). Interpreting this, we find that the shift in funding can to a large degree explain the decline in bank loans, but given the strong US bond market in the *pre* period, one would perhaps expect a movement from loans to bonds for shipping companies. However, given the limitations of the US corporate bond market, with little shipping knowledge and firms needing to be of a significant size to be

recognized (Falck, 2013), such factors may lead the US bond market only to be suitable for a limited number of shipping firms. When there, in addition, have been large amounts of capital held out of the market, resulting in a severe decline in demand, these forces combined could lead to a decline in the North American shipping corporate bond market.

Lastly, our test found that Europe experienced a significant drop in lending and a small shift towards bond issuance in the *post* period, with the later being insignificant. Such a trend hence follows the overall trend of world ship financing and leaves the shift with a great explanatory degree. It should, however, be noted that while the shift away from bank loans seems to have come as a direct effect of the financial crisis, the growth in the corporate bonds did, however, not recover before after the European sovereign debt crisis. This led investors away from sovereign debt, making corporate bonds increasingly appealing in the search of yield (Deutsche Bank, 2013). This event should hence be put some emphasis on, as it is a significant explanatory factor for the increase in European corporate bond issuance activity.

Summarizing up, we see that the shift has had a different degree of effect on the various regions, with the Scandinavian capital market being affected the most, while Asia having other factors driving its primary growth. There, furthermore, seems to be a direct link between both the European and North American decline in shipping lending and the shift of capital, while the movement of corporate bonds in these two regions seems to be led by other factors.

Analyzing the change in financing according to traditional capital structure theory, we firstly conclude that the trade-off theory is not well suited for the shipping industry and secondly that the financial behavior of shipowners today is more complex than assumed by the pecking order theory. We see that the recent shift of financing could be explained by the market timing theory, findings supported by Grammenos, and Papapostolou (2012). However, crediting the overall funding movement to this theory could be to exaggerate its effect. The lack of financing options during the tight capital markets seems to be an equally valid explanation, hence partially rejecting this theory. One could, however, claim that the market timing theory has a significantly higher explanatory degree in the *pre* period, where financing options were numerous and the majority of shipowners chose the cheapest source of financing, hence supporting the theory.

Given the volatile nature of the shipping industry and its impact on the financing sources available to shipowners, we do not believe that the shift we have seen in our analysis is of a permanent nature. Bank loans will always play an instrumental role in shipping financing. They provide the cheapest source of capital, and even though many banks have pulled out of the industry at present time, they will be tempted to return as the market recovers. This can, however, take some time. Furthermore, bonds are and always will be an alternative source of financing. This given its nature of being expensive, something that is further enhanced as the economy recovers. We do, nevertheless, believe that bonds will play a greater role in ship financing in the future. Bonds do, however, not fit for all shipping operators, as the industry operators still are to a large degree privatized, fragmented and on average small (Falck, 2013). Looking to the future, we do, however, expect bonds to take some of banks' funding share; as such inclusion is beneficial for all parts of the industry (banks, shipowner, underwriters and lenders).

14. Appendix

Appendix 1: Amount per deal t-test

Bank Loans		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	377.405	372.551
Variance	354663.309	806911.264
Standard deviation	595.536	898.282
Observations	341	297
Degrees of Freedom	502	
t Stat	0.0792	
P(T<=t) one-tail	0.4685	
t Critical one-tail	1.6479	
P(T<=t) two-tail	0.9369	
t Critical two-tail	1.9647	

IPO		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	299.010	148.048
Variance	143346.710	11343.261
Standard deviation	378.612	106.505
Observations	103	32
Degrees of Freedom	132	
T-value	3.612596223	
P(T<=t) one-tail	0.000214828	
t Critical one-tail	1.65647927	
P(T<=t) two-tail	0.000429655	
t Critical two-tail	1.978098814	

Bonds (CE+Conv)		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	234.42	279.40
Variance	48736.50	273491.45
Standard deviation	220.76	522.96
Observations	84.00	175.00
Degrees of Freedom	254	
t Stat	-0.9717	
P(T<=t) one-tail	0.1661	
t Critical one-tail	1.6509	
P(T<=t) two-tail	0.3321	
t Critical two-tail	1.9693	

FO		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	195.5154659	161.8782314
Variance	91050.83159	61766.50883
Standard deviation	301.7463034	248.5286881
Observations	90	116
Degrees of Freedom	171	
t Stat	0.856004662	
P(T<=t) one-tail	0.196596543	
t Critical one-tail	1.653813324	
P(T<=t) two-tail	0.393193087	
t Critical two-tail	1.973933915	

M&A		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	465.8019565	329.3589796
Variance	669174.461	724728.8214
Standard deviation	818.0308436	851.3100619
Observations	184	49
Degrees of Freedom	73	
t Stat	1.005128275	
P(T<=t) one-tail	0.159077618	
t Critical one-tail	1.665996224	
P(T<=t) two-tail	0.318155235	
t Critical two-tail	1.992997097	

PP		
t-Test: Two-Sample Assuming Unequal Variances		
Deals with 0 value are not included		
	<i>Pre</i>	<i>Post</i>
Mean	111.9854762	190.3414286
Variance	9651.959981	49149.06687
Standard deviation	98.24438906	221.6958883
Observations	42	21
Degrees of Freedom	24	
t Stat	-1.545557358	
P(T<=t) one-tail	0.067648477	
t Critical one-tail	1.710882067	
P(T<=t) two-tail	0.135296954	
t Critical two-tail	2.063898547	

Appendix 2: Number of deals t-test

Bank Loans		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	85.75	62.4
Variance	562.9166667	1387.3
Standard Deviation	23.72586493	37.24647634
Observations	343	312
STD(Pre-Post)	2.467312469	
Degrees of freedom	318.7900827	
T-value	9.463738497	
Alpha	0.05	
Critical T-value	1.649659429	
P-value	3.45744E-19	

IPO		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	31.25	9
Variance	176.9166667	77.5
Standard Deviation	13.30100247	8.803408431
Observations	125	45
STD(Pre-Post)	1.77131464	
Degrees of freedom	62.06173846	
T-value	12.56129176	
Alpha	0.05	
Critical T-value	1.669804163	
P-value	5.42549E-19	

Bonds (CB+Conv)		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	10.75	17.5
Variance	126.7857143	356.0555556
Standard Deviation	11.25991626	18.86943443
Observations	86	175
STD(Pre-Post)	1.873193975	
Degrees of freedom	120.8397287	
T-value	-3.603470912	
Alpha	0.05	
Critical T-value	-1.6576509	
P-value	0.0002291	

FO		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	23	23.8
Variance	74	212.7
Standard Deviation	8.602325267	14.58423807
Observations	92	119
STD(Pre-Post)	1.60988906	
Degrees of freedom	108.0505023	
T-value	-0.496928652	
Alpha	0.05	
Critical T-value	1.659085144	
P-value	0.310124714	

M&A		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	61.75	16.2
Variance	343.5833333	95.2
Standard Deviation	18.53600101	9.757048734
Observations	247	81
STD(Pre-Post)	1.60197824	
Degrees of freedom	126.1349962	
T-value	28.43359469	
Alpha	0.05	
Critical T-value	1.657036982	
P-value	5.735E-57	

PP		
	<i>Pre</i>	<i>Post</i>
Mean number of deals	11	4.4
Variance	63.33333333	7.8
Standard Deviation	7.958224258	2.792848009
Observations	44	22
STD(Pre-Post)	1.339380228	
Degrees of freedom	35.62415034	
T-value	4.927652256	
Alpha	0.05	
Critical T-value	1.68957244	
P-value	9.9788E-06	

Appendix 3: Proportion z-test

Bank Loans		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.638735214	0.591522487
Total observed deals	660	641
p	0.616005486	
q=(1-p)	0.383994514	
Alpha	0.05	
Critical Z-value	1.644853627	
Z-value	1.750518141	
P-value	0.040014473	

Bonds (CB+Conv)		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.097731449	0.261394962
Total observed deals	660	641
p	0.176524338	
q=(1-p)	0.823475662	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-7.740812061	
P-value	4.93919E-15	

IPO		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.152855694	0.025326965
Total observed deals	660	641
p	0.091459254	
q=(1-p)	0.908540746	
Alpha	0.05	
Critical Z-value	1.644853627	
Z-value	7.977821827	
P-value	0.0000	

FO		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.087333912	0.10038668
Total observed deals	660	641
p	0.093617935	
q=(1-p)	0.906382065	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-0.808034296	
P-value	0.20953542	

PP		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.023343731	0.021368905
Total observed deals	660	641
p	0.022392986	
q=(1-p)	0.977607014	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	0.240687234	
P-value	0.595101233	

Appendix 4: Debt Instruments Variables

Bonds Tenor

t-test: Two-Sample Assuming Unequal Variances

	<i>Pre</i>	<i>Post</i>
Mean maturity in years	8.109954338	4.912383562
Variance	33.52652471	8.411576664
Standard deviation	5.790209384	2.900271826
Observations	45	200
Degrees of Freedom	49	
T-value	3.604188375	
Critical T-value	1.676550893	
P-value	0.000365652	

Interest Rate

t-test: Two-Sample Assuming Unequal Variances

	<i>Pre</i>	<i>Post</i>
Mean	4.93227027	6.028048128
Variance	8.803779092	10.01408608
Standard deviation	2.967116292	3.164504081
Observations	37	187
Degrees of Freedom	54	
T-value	-2.029596794	
Critical T-value	-1.673564907	
P-value	0.023668798	

Size of Consortium

t-test: Two-Sample Assuming Unequal Variances

	<i>Pre</i>	<i>Post</i>
Mean	2.078549849	3.084459459
Variance	2.242296073	8.355554283
Standard deviation	1.497429822	2.890597565
Observations	331	296
Degrees of Freedom	431	
T-value	-5.376618535	
Critical T-value	1.648396712	
P-value	6.23233E-08	

Appendix 5: Country of Issuance Bank Loans

Banks

ASIA		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.193265007	0.397408207
Total observations	683	926
p	0.31075202	
$q=(1-p)$	0.68924798	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-8.745366412	
P-value	1.11147E-18	

SCANDINAVIA		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.067349927	0.146868251
Total observations	683	926
p	0.113113735	
$q=(1-p)$	0.886886265	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-4.977524464	
P-value	3.22013E-07	

EUROPE		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.434846266	0.349892009
Total observations	683	926
p	0.385954009	
$q=(1-p)$	0.614045991	
Alpha	0.05	
Critical Z-value	1.644853627	
Z-value	3.45982988	
P-value	0.000270258	

MIDDLE EAST		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.117130307	0.028077754
Total observations	683	926
p	0.065879428	
$q=(1-p)$	0.934120572	
Alpha	0.05	
critical value	1.644853627	
z	7.117177911	
p-value	5.50782E-13	

NORTH AMERICA		
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.183016105	0.064794816
Total observations	683	926
p	0.114978247	
$q=(1-p)$	0.885021753	
Alpha	0.05	
Critical Z-value	1.644853627	
Z-value	7.347654024	
P-value	1.00808E-13	

Appendix 6: Country of Issuance Bonds

Bonds

	ASIA	
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.241071429	0.273239437
Total observations	112	355
p	0.265524625	
q =(1-p)	0.734475375	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-0.672121665	
P-value	0.250753123	

	EUROPE	
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.205357143	0.228169014
Total observations	112	355
p	0.222698073	
q =(1-p)	0.777301927	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-0.505909177	
P-value	0.306460205	

	NORTH AMERICA	
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.232142857	0.18028169
Total observations	112	355
p	0.192719486	
q =(1-p)	0.807280514	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	1.213198832	
P-value	0.112526905	

	SCANDINAVIA	
	<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.196428571	0.284507
Total observations	112	355
p	0.263383298	
q =(1-p)	0.736616702	
Alpha	0.05	
Critical Z-value	-1.644853627	
Z-value	-1.845098761	
P-value	0.032511587	

Appendix 7: Country of Issuance Combined

Pooled (Bank loans + CB)

ASIA			EUROPE			NORTH AMERICA		
	<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>		<i>Pre</i>	<i>Post</i>
\hat{p} (proportion)	0.2	0.364558938	\hat{p} (proportion)	0.402515723	0.321623731	\hat{p} (proportion)	0.203773585	0.099921936
Total observations	795	1281	Total observations	795	1281	Total observations	795	1281
p	0.301541426		p	0.352601156		p	0.139691715	
q =(1-p)	0.698458574		q =(1-p)	0.647398844		q =(1-p)	0.860308285	
Alpha	0.05		Alpha	0.05		Alpha	0.05	
Critical Z-value	-1.644853627		Critical Z-value	1.644853627		Critical Z-value	1.644853627	
Z-value	-7.941857913		Z-value	3.749921342		Z-value	6.635069466	
P-value	9.95875E-16		P-value	8.8445E-05		P-value	1.62175E-11	
SCANDINAVIA								
	<i>Pre</i>	<i>Post</i>						
\hat{p} (proportion)	0.085534591	0.191257						
Total observations	795	1281						
p	0.150770713							
q =(1-p)	0.849229287							
Alpha	0.05							
Critical Z-value	-1.644853627							
Z-value	-6.543947894							
P-value	2.99578E-11							

Appendix 8: Mann Whitney-U, SPSS output

Bank Loans

		Ranks		
	GroupBL	N	Mean Rank	Sum of Ranks
	1.00	341	342.32	116731.50
Bank Loans	2.00	297	293.30	87109.50
	Total	638		

Test Statistics	
	Bank Loans
Mann-Whitney U	42856.500
Wilcoxon W	87109.500
Z	-3.351
Asymp. Sig. (2-tailed)	.001

a. Grouping Variable: GroupBL

Bonds (CB+Conv)

		Ranks		
	GroupBonds	N	Mean Rank	Sum of Ranks
	1.00	84	130.82	10989.00
Bonds	2.00	175	129.61	22681.00
	Total	259		

Test Statistics	
	Bonds
Mann-Whitney U	7281.000
Wilcoxon W	22681.000
Z	-.122
Asymp. Sig. (2-tailed)	.903
Exact Sig. (2-tailed)	.903
Exact Sig. (1-tailed)	.452
Point Probability	.000

a. Grouping Variable: GroupBonds

Test Statistics

IPO**Ranks**

	GroupIPO	N	Mean Rank	Sum of Ranks
	1.00	103	72.20	7437.00
IPO	2.00	32	54.47	1743.00
	Total	135		

	IPO
Mann-Whitney U	1215.000
Wilcoxon W	1743.000
Z	-2.241
Asymp. Sig. (2-tailed)	.025
Exact Sig. (2-tailed)	.025
Exact Sig. (1-tailed)	.012
Point Probability	.000

a. Grouping Variable: GroupIPO

Follow-Ons**Ranks**

	GroupFO	N	Mean Rank	Sum of Ranks
	1.00	90	110.55	9949.50
FO	2.00	116	98.03	11371.50
	Total	206		

Test Statistics

	FO
Mann-Whitney U	4585.500
Wilcoxon W	11371.500
Z	-1.495
Asymp. Sig. (2-tailed)	.135
Exact Sig. (2-tailed)	.135
Exact Sig. (1-tailed)	.068
Point Probability	.000

a. Grouping Variable: GroupFO

Private Placement

Ranks				
	GroupPP	N	Mean Rank	Sum of Ranks
	1.00	42	30.95	1300.00
PP	2.00	21	34.10	716.00
	Total	63		

Test Statistics	
	PP
Mann-Whitney U	397.000
Wilcoxon W	1300.000
Z	-.642
Asymp. Sig. (2-tailed)	.521
Exact Sig. (2-tailed)	.526
Exact Sig. (1-tailed)	.263
Point Probability	.002

a. Grouping Variable: GroupPP

M&A

Ranks				
	GroupMA	N	Mean Rank	Sum of Ranks
	1.00	184	121.73	22397.50
MA	2.00	49	99.26	4863.50
	Total	233		

Test Statistics	
	MA
Mann-Whitney U	3638.500
Wilcoxon W	4863.500
Z	-2.074
Asymp. Sig. (2-tailed)	.038
Exact Sig. (2-tailed)	.038
Exact Sig. (1-tailed)	.019
Point Probability	.000

a. Grouping Variable: GroupMA

Appendix 9: Normality Test

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Bank Loans	.311	638	.000	.397	638	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Bonds	.279	259	.000	.419	259	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
IPO	.260	135	.000	.610	135	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
FO	.265	206	.000	.532	206	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PP	.191	63	.000	.765	63	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MA	.299	233	.000	.489	233	.000

a. Lilliefors Significance Correction

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