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## CERTIFICATION OF THESIS PREPARATION

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# TABLE OF CONTENTS

<b>ABSTRACT.....</b>	<b>1</b>
<b>1. INTRODUCTION.....</b>	<b>2</b>
<b>2. LITERATURE REVIEW.....</b>	<b>5</b>
2.1 INTRODUCTION.....	5
2.2 FUNDAMENTAL ANALYSIS PROCEDURE.....	5
2.3 MULTIPLE MODELS .....	6
2.3.1 <i>Price to Earnings (P/E)</i> .....	7
2.3.2 <i>Price to Book Value of Equity (P/B)</i> .....	10
2.3 <i>Enterprise Value to Earnings Before Interest Taxes Depreciation Amortization Multiple (EV/EBITDA)</i> .....	11
2.3.4 <i>Dividend Yield (DY)</i> .....	13
2.4 DISCOUNT MODELS .....	13
2.4.1. <i>Dividend Discount Model</i> .....	14
2.4.2 <i>Discounted Cash Flow Model</i> .....	16
2.4.3 <i>Residual Income Valuation Model</i> .....	18
<b>3. DETERMINANTS OF PERFORMANCE IN MARITIME INDUSTRY .....</b>	<b>21</b>
<b>4. EMPIRICAL ANALYSIS .....</b>	<b>28</b>
4.1 INTRODUCTION.....	28
4.2 SAMPLE SELECTION.....	28
4.3 PRIMARY MODEL SELECTION METHODOLOGY.....	31
4.4 EMPIRICAL ANALYSIS .....	32
<b>5. PRACTICAL IMPLEMENTATION OF PRIMARY MODELS .....</b>	<b>41</b>
5.1 INTRODUCTION.....	41
<b>6. ANALYSTS REFERENCES ON SHIPPING SECTOR PERFORMANCE DETERMINANTS... 45</b>	
<b>7. CONCLUSIONS.....</b>	<b>50</b>
<b>REFERENCES:.....</b>	<b>52</b>



## ABSTRACT

The primary purpose of this dissertation is to cover the gap in international bibliography with the examination of equity valuation models, used in practice for the calculation of fair value of shipping stocks. The shipping industry has some specific features, which make this investigation effort of practical sell-side research analysts, really interesting.

The examination sample consists of one hundred eleven (111) equity research reports of large investment brokerage houses. The reports are referred to shipping companies, that are listed in both NASDAQ and the NYSE stock exchange and have been derived from Thompson Reuters Eikon. The examined time period of these reports is from 01 January 2018 to 31 December 2018. From the analysis of the collected reports, it is noted that the valuation models, that are mainly preferred from financial analysts to use in practice in order to support the target prices and the stock recommendations are Multiples such as: Enterprise Value to Earnings Before Interest Taxes Depreciation and Amortization (EV/EBITDA) and the Net Asset Value (NAV). The method of NAV constitutes a valuation model that is not popular in the company valuation of other industries. We consider that the increasing use of this specific method in the shipping industry is mainly due to the qualitative characteristics of this sector as well as the importance of vessel market values in the financial valuation of shipping stocks. In chapter 5 an analytical example is demonstrated that shows step by step how the analyst derive the market price using the NAV method, which is considered the most commonly applied model. Finally, analysts' quotes are presented from the reports collected, which show practical analysis of risk factors in the returns of shipping stocks.



# 1. INTRODUCTION

One of the financial issues, that has been discussed intensively from the research community, is the valuation models of stocks and the practical application of them. Specifically, in the shipping industry, which presents special characteristics, there is not any recorded study. The role of shipping industry concerning the global economy is extremely significant and the continuously increasing number of listed shipping companies in the stock exchange, indicates the necessity of research of equity valuation models, that are used for the calculation of fair value of shipping stocks.

This dissertation, aims to close the gap that exists in the international bibliography and especially at the investigation of valuation models, that are used from sell-side research analysts on the valuation of shipping stocks. Moreover, an analysis of these valuation models is attempted and an effort to record the methods practically applied from financial analysts.

In the valuation process, the financial analysis of a company includes the study and analysis of the qualitative characteristics from both the internal and external environment that the company operates. At this stage all the company's available information is examined such as: the published financial statements, the special characteristics of the industry that the company operates and the current financial situation at the global economy. This analysis concludes in the selection and use of the valuation model, that indicates better the qualitative characteristics of this company.

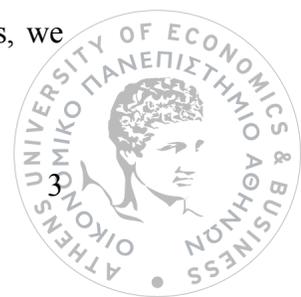
The role of the selected model is extremely important. The results derived from the valuation model and by extension the investment proposal, are expressed from the reports of investment brokerage houses. Investors will decide for the company they desire based on the above-mentioned reports. In addition, they affect immediately the assessment of investors as well as all the individuals that are involved in the operation of the capital market regarding the company's stock price and its prospects. The critical review of the most important valuation models in accordance with the international bibliography and the analysis of their specific characteristics, is one of the goals of this dissertation.



The structure, and the chapter topics of the dissertation covered are briefly discussed below. The dissertation is separated in two parts, the theoretical and empirical, consisted of 7 chapters. In this chapter, we revise the topics that this study covers. Both in the second and third chapter the theoretical topics are covered while the empirical part is presented at the fourth, fifth and sixth chapter. Lastly, the seventh chapter includes the conclusions of this dissertation.

In the theoretical part there is a review of both international bibliography and the examination of special factors that determine the financial return of companies in the shipping industry. Specifically, in chapter 2, we present the theoretical background of the most widespread valuation models, that have been extensively analyzed in financial theory, the various stages of their implementation, and the most important characteristics of them are analyzed. At the beginning, the steps referred are followed in the process of the fundamental analysis, noting the importance of using accounting and financial information in that process. In specific sections of the chapter, there is a presentation of theoretical background of the most essential multiples and discounts models that financial theory suggests. Also, it is investigated the practicality of these models, underlining their advantages and disadvantages. Finally, in chapter 3, an attempt is being made to systematically record the peculiarities of the shipping industry and the influencing performance factors of shipping companies, as the international bibliography indicates. It is worth to mention that; these factors are analyzed and are taken into consideration in the valuation company process from financial analysts.

In the empirical analysis, the results are described from the empirical examination considering the valuation models used from financial analysts. Also, it is attempted an approach of practical implementation of the most used valuation model from the empirical analysis. Especially in chapter 4, the criteria adopted in the selection process on the final sample of one hundred eleven (111) reports from financial analysts are described, concerning the stocks of shipping industry, that are listed both in NYSE and NASDAQ stock exchange. In conclusion, in a specific section are presented the most significant results of the empirical analysis, as they arise from the study and process of one hundred eleven (111) reports of our sample. In this section, through the tables, we present and interpret the results of our research.



In chapter 5, an approach is being made of the practical implementation of the most important and widespread valuation model regarding the shipping stocks. The details of the way the model is used and the factors that the analysts consider important are the main points that we emphasize in our analysis. In chapter 6, an attempt is being made to indicate the significance and the practical use of the influencing factors of shipping companies' return, through the characteristics quotes from the financial analysts reports, that refers to these factors. In chapter 7, it is concluded the conclusion of our study and further research that can be considered.



## 2. LITERATURE REVIEW

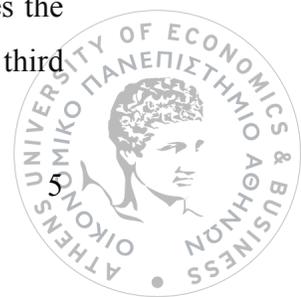
### 2.1 Introduction

The analysis to identify the practical use of alternative valuation models for stocks has evolved to a promising scientific field, abound with technical disputes and groundbreaking advancements for the scientific community in the past years. Specifically, a constant growing research interest has surged regarding the empirical investigation of the practical use of valuation methods from the financial analysts. In this chapter, a step-up systematic effort to record the basic models of valuation shares and its practical use by the industry is attempted. In section 2.2 we present an introduction to the process of shares fundamental analysis and the alternative valuation models, which financial analysts utilize towards the goal of making more reliable estimations. Section 2.3 describes the four (4) basic models of multiples accounting values: Price to earnings (P/E), Price to book (P/B), Enterprise Value to Earnings Before Interest, Taxes, Depreciation and Amortization (EV/EBITDA) and Dividend Yield. Finally, in section 2.4 the three (3) basic models of discount are presented: the Dividend Discount Model, the Discounted Cash Flow Model and the Residual Income Valuation Model.

### 2.2 Fundamental Analysis Procedure

One of the main preconditions to complete the procedure of valuation of a share is to predict the future expected cash flows. Specifically, the financial analysts are able to predict the future expected cash flows using information from the financial statements and from other sources [Penman et al. 2010, Palepu et al. 2010, Koller et al. 2010]. This procedure is a crucial part of the fundamental analysis. In practice we can say that the valuation of shares is the last stage of this process. Yet, it is an extremely important procedure which is able to affect the previous stages.

According to Penman et al. the procedure of the fundamental analysis of the shares consists of 5 stages. In the first stage, the analyst collects and evaluates the quantity information for the internal and the external environment of the company by analyzing the strategy of the organization and its ability to maintain a sustainable competitive advantage (Strategic analysis). In the second stage, the analyst collects and analyses the accounting and non-accounting information of the company. Furthermore, in the third



stage, the analyst defines, calculates and predicts the necessary accounting sizes of the company, that will be useful as an input to the practical application of the valuation mode. In the next stage (fourth), the analyst applies his predictions from the previous stage, to the most suitable, based on the personal assessment, valuation model. This stage could be described as converting forecast to valuation. Finally, in the final (fifth) stage, the analyst completes this valuation and forms the personal investment proposal for the specific stock (trading for valuation).

The variety of the valuation models provides the analyst, the freedom to choose the most appropriate model which approximates better to the quantitative characteristics of the examined company. The models that are used in practice can be complex, such as the discount models, or they can be simple, such as the multiples. By choosing one of the before mentioned accounting size multiples, the analyst assumes that the financial data of the company for the current year, are sufficient to predict in the future the value of the share. In case the analyst believes that these financial data for the current and the next year, are not sustainable and do not reflect the actual financial state of the company, then he prefers discount models. The practical use of these models requires the preparation of the expected financial statement for a period between five to ten years [Penman et al. 2010, Koller et al. 2010]. Therefore, it is important to fully understand the business strategy and the environment in which the company is operating. Also, a more thorough analysis of the financial results should be taken into consideration.

### 2.3 Multiple Models

According to Palepu et al. (2010) the procedure that is followed by analysts during the practical use of multiples models includes 3 stages. In the first stage an accounting return index or enterprise value is selected, on which a multiple of delineation is based on (price-to-earnings- ratio or price-to-earnings-ratio). Furthermore, the analysts select a sample of similar companies with comparable operating costs and economic characteristics with the company that is checked into and they calculate the mean or the average of the selected multiple. At the final stage, the analysts multiply the mean or the average of the samples with the accounting performance ratio or enterprise value so that the evaluation is complete.



According to the Damodaran (2005), the analysts should choose the multiples that best reflect the profits of the item being valued. As an example, he mentions the case where there is an intention of stock purchase, the price-to-earnings ratio is usually preferred (equity valuation). While in the case where there is an intention of purchasing a business entity, then the appraisal is usually executed by using the enterprise value to EBITDA (enterprise valuation).

The ease of the actual application, that is, in the calculation and interpretation of the stock value, as a function of the profit or the book value of the enterprise, is the greatest advantage of these valuation methods. (Stowe et al. 2002).

Despite that, the difficulties in the recognition of similar operational and economic characteristics in comparing companies, it is thought to be a big disadvantage. As an additional disadvantage we could mention the effect of temporary and not permanent events in the accounting index of return which is used as a basis for calculating the multiplier, leading to misleading conclusions about the fairness of the company's stock valuation.

### 2.3.1 Price to Earnings (P/E)

It is supposed to be one of the most important and often-used, from the analysts, model (Block 1999 and Bradshaw 2004). The connection which defines the price to earnings multiple per stock, is the following:

$$P/E = \frac{\text{MARKET VALUE PER SHARE}}{\text{EARNINGS PER SHARE}}$$

A high P/E ratio could mean that a company's stock is over-valued, or else that investors are expecting high growth rates in the future.

Companies that have no earnings or that are losing money do not have a P/E ratio since there is nothing to put in the denominator.



A permutation of this model, which is well-known in a practice and is based on the discount dividends model of Gordon, is the one which is mentioned by Stowe et al. (2002). More specifically we have:

$$P_0 = \frac{D_1}{r-g} = E_0 * (1 - b) * (1 + g) / (r - g)$$

P<sub>0</sub>=Current stock price

g=Constant growth rate expected for dividends, in perpetuity

r=Constant cost of equity capital for the company (or rate of return)

D<sub>1</sub>=Value of next year's dividends

E<sub>0</sub>=Earnings per share year 0

b=Retention Rate

From this model we can understand that the price-to-earnings is positively connected to the future increase of the business' profits and negatively with cost of common stock (see Barker). In addition, it is affected from the differences of the capital structure of the comparing companies. The price-to-earnings of the company gets lower values when the net financial leverage rises, if the following equation works: the rate of the Nopat/Enterprise Value is higher than the Wacc (Weight average cost of capital) (see Pennan 2010 and Koller et al. 2010). While approaching the issue of analysis of the price to earnings from the perspective of the example of the Discounted Abnormal Earnings Valuation Model Pennan (2010) shows the P/E actually depends on the difference between future and current Abnormal Earnings (Abnormal earnings are equal to actual earnings less the normal (or required) earnings: Net Profit – (re x BVEt-1)). If a company is expected to have higher (lower) future abnormal earnings in comparison to the current ones; as a result it will have higher (lower) P/E.

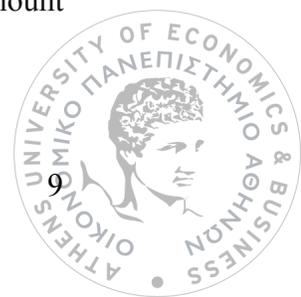


The impact of the current and future growth rate of profits in the configuration of the level of the P/E became the case study of Molodovsky (1953) and Beaver and Morse (1978).

There is an important positive (negative) relation of the P/E with the future (current) rate of increase of the business' profits (see Barker 2001). This phenomenon is called Molodovsky effect. Companies which receive a non-sustainable high growth rate of profit at the current year have temporary high profits which are not expected to be maintained in the future. In these cases, the investors are willing to pay less per dollar (euro) of profits, therefore the market provides a lower current P/E at the share of these companies. On the other hand, for companies that have temporary low profits, which are expected to increase significant in the future, the investors accept to pay more per dollar (euro) of the profits and as a result the market provides higher P/E at the shares of these companies. When the investor buys a share he actually “buys” the future profit of it.

Moreover, it is important to mention that the main way, in which the analysts use the P/E in practice, trying to discover undervalued shares, is by using as a basis of comparison the average P/E for the sector in which the examined company operates in. Two basic disadvantages of the P/E are related with the cases in which the analysts apply in order to make a valuation. More specifically, the shares of the industry in which the company operates in, are not properly evaluated from the stock market or if they are not alike (differences in the profitability, cost of equity, capital structure or the future growth rate) then it is highly likely that analysts will lead to incorrect conclusions.

Data which are being examined when comparisons are made, are the economic figures of the period and events which are temporary but affect the valuation positively or negatively. Examples of such non-functional unexpected factors are parts of the profits from sale of fixed assets which are not expected to happen in the future. Therefore, the use of P/E requires extensive investigation of the earnings, in order to isolate the impacts of the unexpected factors, which can misrepresent the outcome of the valuation. Practically, the financial analysts usually proceed in the definition of an adjusted amount



of profits or focus on the analysis of the expected P/E of the following year, which is not affected from unexpected events.

### 2.3.2 Price to Book Value of Equity (P/B)

The P/B ratio compares the market price per share with the book value per share.

Book value per share is calculated as follows: (total assets - total liabilities) / number of shares outstanding).

Market value per share is obtained by simply looking at the share price quote in the market.

$$P/B \text{ Ratio} = \text{Market Price per Share} / \text{Book Value per Share}$$

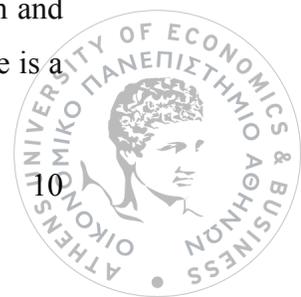
A lower P/B ratio could mean the stock is undervalued. However, it could also mean something is fundamentally wrong with the company. As with most ratios, this varies by industry.

The P/B ratio also indicates whether you're paying too much for what would remain if the company went bankrupt immediately.

The P/B has a positive connection with future efficiency of equity and negative connection with the cost of equity (see Lundholm and Sloan 2007). In other words, the P/B depends on the level of figuration of future abnormal earnings of the company (see Penman 2010). If the stock market works effectively, then a company which is expected to have positive (negative) or abnormal earnings should have a P/B of higher (lower) per 1. The normal price of the P/B is the value 1 (one). In this case the stock market is expected zero future abnormal earnings from the business.

The analysts often use a composite fraction with a numerator of the P/B and denominator the fraction of the expected efficiency of the equity (see Demirakos, Strong and Walker, 2004) when the result of this composite fraction is smaller (bigger) than 1 then that could be the result of the existence of undervalued (overvalued) shares because the difference of the market and accounting value of the shares isn't justified from the level of configuration of their future abnormal earnings.

In addition, the P/B depends on the rate of the increase of the equity (see Lundholm and Sloan, 2007). If the company has equity higher than the cost of the equity, then there is a



positive relation between the P/B and the growth rate. In another case, when the company is expected to have negative abnormal earnings, then the growth rate of equity affects negatively the P/B.

The characteristic of the P/B ratio is its high frequency preference for the valuation of companies of the banking sector and the sector of financial services (see Damodaran 2008 and Imam et.al 2008).

The main reason why they are used in these sectors, is the fact that the highest percentage of assets of these companies depicts the fair market value, so there is a powerful relation between financial market and cost of equity (see Damodaran 2005). The most important disadvantage of the model according to Vishwanath (2009), is the effect that it has to P/B, the adoption of different accounting policies and estimates according to the valuation of the tangible and basically of the intangible assets from comparing companies, and as a result to extract wrong conclusions.

### **2.3 Enterprise Value to Earnings Before Interest Taxes Depreciation Amortization Multiple (EV/ EBITDA)**

Another important ratio, as concluded from international bibliographies, is the one of the Enterprise Value of the company to the Earnings Before Interest, Taxes, Depreciation and Amortization (EV/ EBITDA). A usual type of calculation of the market value of the business is the following:

$$EV = MC + Total\ Debt - C$$

MC = Market Capitalization, equal to the current stock price multiplied by the numbers of outstanding stock shares.

Total Debt = Equal to the sum of short – term and long- term debt



C = Cash and Cash equivalents, the liquid assets of a company, but may not include marketable securities.

Also, Earnings, Before Interest, Taxes, Depreciation and Amortizations are easy to find from the financial statement or are part of the estimation in case that the analyst prefers to use expected values.

The financial analyst calculates the percentage or the average price of the specific indicator and a sample of alike companies with the comparing company. Then, it determines the fair value of the examined company as equal with the product of the earnings before the interests, taxes and depreciation of the examined company multiplied with the average (or the average price) of the EV/EBITDA of similar businesses. The fair value of the share of the examined company is resulting as equal with the fraction with the numeric difference of the fair value less its “net” total liabilities divided by its number of shares outstanding.

This ratio is considered, as Stowe et. al (2002) point out the most appropriate compared with the P/E ratio for comparison of companies with different financial leverage. The numeric EV/ EBITDA separates the effect of differences in the financial structure of comparing companies having as a numerator the enterprise value of the business and as a denominator a part of the earnings before the deduction of interests. Furthermore, it has been noticed that the specific valuation model is used especially very often in capital-intensive sectors with businesses that present high depreciations (see Damodaran, 2009). Another advantage that is indicated from the bibliography is that it can be used for the valuation of company with negative P/E, while a business might have negative P/E but positive earnings, before the deduction of interests, taxes and depreciations.

Additionally, we can point out, that the indirect method of valuation with the EV/EBITDA is considered from the analysts as the most appropriate of the valuations of companies with high levels of leverage, which differentiated in significant level among same companies. For all of the above reasons the specific ratio is used very often in cases of companies which are subjects of mergers and acquisitions or leveraged buyouts from



private equity companies (see Rosenbaum and Pearl, 2009, Arzac, 2005, and Viebig, Poddig and Varmaz, 2008).

### 2.3.4 Dividend Yield (DY)

The Dividend Yield ratio is one of the oldest indicators used. According to Vishwanoth (2009), in previous decades it was very popular as dividends was the main reason of holding shares. The ratio remains popular today in the evaluation of business with high annual dividend values.

The type of dividend yield is the following:

$$\text{Dividend Yield} = \frac{\text{Annual cash Dividends per share}}{\text{Market Value per share}}$$

Vishwanath (2009) point out that the Dividend Yield should be used carefully. The reason is because many companies with high Dividend Yield, may deal with financial problems. What is more, he points out another disadvantage of the indicator, which is the ratio not being applicable in businesses that follows a non-dividend policy, for example: Businesses of high technology.

### 2.4 Discount Models

The final part of a time consuming and complicated process is the application of a discount model. A fundamental analysis as is noted in the international bibliography, is an extensive process of collection and analysis of financial and non-financial information relevant to a business. The use of all of these information results to the prediction of future financial values which are used as inputs in a discount model.

According to international bibliography, 3 are the most important discount models:

a) Dividend Discount Model



- b) Discounted cash Flow Model
- c) Residual Income Valuation Model

### 2.4.1. Dividend Discount Model

The dividend discount model is part of a typical application of an immediate way of valuation, because it expresses a fair value of equity of the business as equal with the current value of all the future cash flows that are expected to be collected from the shareholder of the business, that is the dividends discounted with the company's cost of equity. A version of the dividend discount Model was suggested from Williams (1938).

The main relation on which the Dividend Discount Models are based on, is:

$$V_0 = \frac{div_1}{1+re} + \frac{div_2}{(1+re)^2} + \frac{div_3}{(1+re)^3} + \dots$$

$V_0$  = Current stock price

Div = the estimated value of dividends in time t

Re = Discount rate (cost of equity)

In the practical application of the model, it is required an estimation of expected dividends for a time period from 5 to 10 years. Afterwards by doing some simplistic assumptions, the future dividend behavior is estimated further than the finite horizon. For the determination of this value which can be created after the finite horizon, the term of continuing or terminal value is used. This term, depending on the expectations of the analysts for the dividend's direction after the setting of the time-horizon forecast, is a stable or growing perpetuity.

The constant perpetuity is determined by the relation:

$$V_0 = \frac{div_1}{1+re} + \frac{div_2}{(1+re)^2} + \frac{div_3}{(1+re)^3} + \dots + \frac{div_n}{(1+re)^n} + \frac{div_{n+1}/re}{(1+re)^n}$$

While the growing perpetuity is derived from the following relation:

$$V_0 = \frac{div_1}{1+re} + \frac{div_2}{(1+re)^2} + \frac{div_3}{(1+re)^3} + \dots + \frac{div_n}{(1+re)^n} + \frac{div_{n+1}/(re-g)}{(1+re)^n}$$

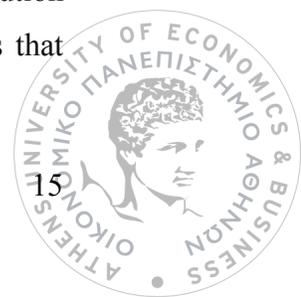
Where  $g$ =the constant growth rate for dividends in perpetuity.

Another version of dividend discount model is the one that presented by Gordon (1962). This assumes a more stable future dividend growth and the relation is expressed as the dividend of the following period through the difference between the cost of equity and the increasing rate of dividends (as long as the cost of equity is higher than the increasing rate of dividends). This relation is the following:

$$V_0 = \frac{div_1}{re - g}$$

In summary, we could mention that an advantage of the application of the Dividend Discount Model is the fact that all of the shareholders and the investors are familiar with the size and the concept of the Dividends. Furthermore, the ease of the forecasts of the dividends, due to the stability even in a short-term basis, is another advantage of the use of this model. (see Penman)

The main disadvantage of this model is that the dividends are part of the distribution process of wealth and not of its creation. According to this statement, companies that



create value (return on equity > cost of equity) can choose not to distribute dividends. While other companies that “destroy” the value of the shares (return on equity < cost of equity) are expected to distribute dividends. This phenomenon can lead the analyst to use especially large horizon forming detailed forecasts, making the practical application of the dividend discount model problematic (see Palepu et. Al.2010 and Penman 2010).

The dividend discount model is used intensively, according to Iman, Baker and Clubb (2008) for valuations of the financial services sector. The model is applied mainly for the valuation of businesses which pay as a dividend a fixed rate of profits yearly. In this last case for the application of the model, is needed only the estimation of the future earnings of the company.

#### **2.4.2 Discounted Cash Flow Model**

The Discounted Cash Flow Model uses as basis the net cash flows which do not depend on the accounting practices applied in a company.

The Discounted Cash Flows are not presented directly in a financial statement of the company but should be calculated from the data of its financial statement. Usually in practice the financial analysts when referred to the Discounted Cash Flow Model they indicate the Free cash flow to equity and debt holders (see Lundholm and Sloan 2007). According to this version, the Discounted Cash Flow Model calculates the fair value of the whole company (enterprise value, entity value) from which the net debts are deducted, resulting in the fair value of the equity.

The size of the net debt arises easily from the company’s balance sheet, equals to the total debt (liabilities) of the company minus the available cash and cash equivalents. The Fair Value of the company is equal with the present value of all the cash flows expected to be collected from both the shareholders and the debtholders, discounted with the Weighted Average Cost of Capital. The net cash flow are available to everyone who offers equity to the company as long as they have previously paid all of the operating expenses (including taxes) and the necessary investments on the required working capital and the non-current assets. In practice, the financial analysts use the following formula of calculation of the

net cash flow to all the shareholders and bondholders of the company. (see Rosenbaum and Pearl 2009)

$$\text{Free Cash Flow} = \text{EBIT} - \text{TAXES} + \text{Depreciation \& Amortization} - \text{Capital Expenditures} \\ - \text{Increase in Net Working Capital}$$

The formula reflects the available cash flow that are created from the operation of the company, to the shareholders and bondholders discounted with the opportunity cost.

This cost is the Weighted Average Cost of Capital which is calculated weighting the cost of debt and equity cost according to the estimated market values.

$$WACC = \frac{v_d}{v_d + v_e} R_d (1 - T) + \frac{v_e}{v_d + v_e} R_e$$

Where,

$V_d$  = Market value of the firm's debt

$V_e$  = Market value of the firm's equity

$R_e$  = Cost of equity

$R_d$  = Cost of debt

$T$  = Corporate tax rate

To sum up, the model results in the fair value of equity using one of the following formulas, depending on the assumptions that will be made regarding the direction of the cash flow after setting a forecast horizon. Following there are shown the formulas of stable and growing perpetuity.



The stable perpetuity:

$$V_0^e = \sum_{t=1}^1 \frac{FCF_t}{(1+WACC)^t} + \frac{FCF_{t+1}}{(1+WACC)^t * WACC} - V_0^D$$

While the growing perpetuity:

$$V_0^e = \sum_{t=1}^1 \frac{FCF_t}{(1+WACC)^t} + \frac{FCF_{t+1}}{(1+WACC)^t * (WACC-g)} - V_0^D$$

Where:

$V_0^D$  = Value of the firm's debt at time 0

$g$  = Constant growth rate expected for free cash flow after the time T

To conclude we can indicate that the Discounted Cash Flow Model even though it is widely preferred from financial analysts, it is more appropriate in the cases that a company creates continuous positive cash flows. According to Pennan (2010) the most important disadvantages of the specific model are the following:

1. The net cash flow is not the best indicator, that add value to the company at least in short-term period.
2. The investments in non-current assets are dealt as reduce of the company's value, resulting a company can increase its net cash flow by reducing its investments.
3. The practical application of the model demands the use of large horizon to form detailed forecasts
4. The financial analysts predict profits of a company and not net cash flow.

### 2.4.3 Residual Income Valuation Model

A third important discount model is that of abnormal earnings, which for the past years has become well-known among the analysts. The discount method of abnormal earnings



calculates the fair values of company's equity as equal with the current book value of equity plus the present value of future abnormal earnings (equity approach):

$$Vo^e = BVo^e + \frac{ri1^e}{1+re} + \frac{ri2^e}{(1+re)^2} + \frac{ri3^e}{(1+re)^3} + \dots$$

$Vo^e = \text{Fair value of equity}$

$BVo^e = \text{Current book value of equity}$

$rit^e = \text{abnormal earnings at period } t$

The amount of abnormal earnings is equal with the profit after taxes less the product of the cost of equity multiplied with the book value of equity at the beginning of the year (abnormal earnings for shareholders). Besides from the amount of the abnormal earnings for the shareholders, there is the amount of abnormal earnings for all the investors (shareholders and debtholders) which is equal with the net operating profit after taxes less the product of the weight average cost of capital multiplied with the net assets at the beginning of the year. The calculation of abnormal earnings for the investors precedes the preparation of reformulated financial statements separating the operating and financial data in the income statement and the balance sheet of the business. The abnormal earnings for all the investors are used with an alteration of the discount model, which is shown below (entity approach):

$$Vo^e = BVo^e + \frac{ri1^{op}}{1+WACC} + \frac{ri2^{op}}{(1+WACC)^2} + \frac{ri3^{op}}{(1+WACC)^3} + \dots$$

Where,

$ri_i^{op} = \text{abnormal earnings for all the investors (shareholders and debtholders) at time } T.$



As in the case of the discount model of the cash flow, the actual application of this model requires defining the horizontal detailed formation forecast and simplified assumptions for the calculation of the continuous or final value.

A main advantage of the discount model of abnormal earnings as Koller et al. (2010) indicated, is the use of the amount of abnormal earnings which focuses on measuring value creation. Moreover, another important advantage of this method is that one of the parameters used, can be found in the financial statement of the company (book value of equity) and as a result the analysts do not need to proceed to its forecast. Nevertheless, assuming that the fair value of the equity equals to the present value of future profits, then in the context of the model of abnormal earnings, the book value of equity basically reflects the present value of future 'normal profits' of the company. (Kothari 2001). This result in, the present value representing a smaller part of the fair value of equity at the abnormal earnings discount model, compared to the equivalent of cash flow (Penman 2010). Finally, it is noteworthy that if the discount model of dividend, cash flow and abnormal earnings are applied properly using the same forecasts, they conclude with the same valuation result (see Lundholm and O'Keefe 2001). However, the financial analysts practically continue to prefer the valuation of discounted cash flow model (see Demirakos et al. 2004 and Iman et al.2008)

### 3. DETERMINANTS OF PERFORMANCE IN MARITIME INDUSTRY

The shipping industry is the link between the countries and the continents. It is the backbone of globalization. The international shipping industry is both large and highly important to the global economy as it carries over 80% of global trade in volume terms according to the World Trade Organization (2010). The global financial environment is changing continually due to ever-increasing competition and as a result in an era that everything is uncertain, the shipping industry cannot be the exception.

Based on Panayides & Wiedmer et al., (2011) state that, the global economic activities are changing and shipping industry is facing some structural changes. There is a dramatic shift in the world manufacturing and trading. The market and marketplaces are now global, and production is located everywhere. China is the world manufacturer; India and other Asian countries are following the same economic model.

According to Stopford et al. (2009) claimed that managing the shipping industry itself is volatile. The volatility in the shipping industry is driven by the freight rates, which is determined by the demand and supply in the shipping market. Furthermore, the freight rates are the income of the shipping companies, i.e. they generate the revenue to shipping companies and thereby influence the stock price of the shipping companies. So, if the freight rate goes up then the stock price to the shipping companies also goes up and vice versa if the freight rates goes down.

Also, after the outbreak of the financial crisis (2008-2009) the financial structure of the shipping companies alters radically. The shipping companies must enhance their competitiveness, adjust to new world regulations (IMO 2020 etc.) and to new operating rules in order to ensure low break-even and maintain their competitive advantage.

It is important to analyze now the importance of maritime industry. The following message from UN Secretary-General Ban Ki-moon's on World Maritime Day aligns with our personal view in this issue:

*“Everybody in the world benefits from shipping, yet few people realize it. We ship food, technology, medicines, and memories. As the world's population continues to grow, particularly in developing countries, low-cost and efficient maritime transport has an essential role to play in growth and sustainable development.”*



Shipping helps ensure that the benefits of trade and commerce are more evenly spread. No country is entirely self-sufficient, and every country relies on maritime trade to sell what it has and buy what it needs. Much of what we use and consume in our everyday lives either has been or will be transported by sea, in the form of raw materials, components or finished articles.

Maritime transport is the backbone of global trade and the global economy.

The jobs and livelihoods of billions of people in the developing world, and standards of living in the industrialized and developed world, depend on ships and shipping. The shipping industry has played an important part in the dramatic improvements in global living standards that have taken millions of people out of acute poverty in recent years.

(<https://www.un.org/press/en/2016/sgsm18129.doc.htm>)

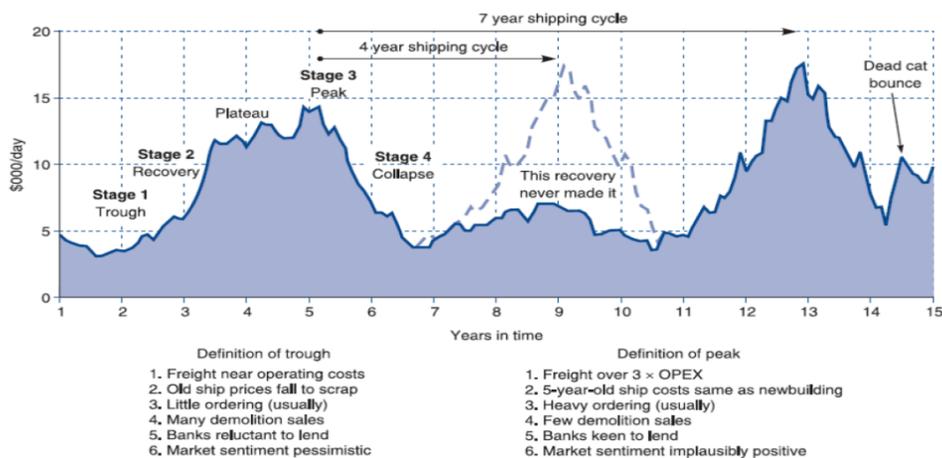
Two major characteristics of maritime industry are cyclicality and seasonality. Shipping cycles are like waves sometimes it takes a long time for a shipping cycle to finish and sometimes a cycle lasts for a short period. There are 4 main stages of shipping cycle, according to Stopford:

- Stage 1- Market trough
  - Signs of surplus in shipping capacity, ships queuing at loading points and sea slow-steaming to save fuel.
  - Freight rates fall to operating cost of the least efficient ships, which move into lay-up.
  - Negative cash flows, declining ship prices up to scrap value, increasing financial pressure and distress and active demolition market.
- Stage 2 - Recovery
  - Surplus and demand move towards balance.
  - Freight rates edge above operating costs and lay-up tonnage falls.
  - Market sentiment remains uncertain, but gradually confidence grows, ship prices increase.
- Stage 3- Market peak
  - As the surplus is absorbed supply and demand tighten.



- Freight rate rise often twice or three times the operating costs. Thus, the only untradeable ships are laid-up and the whole fleet operates at full speed.
- Earnings generate excitement, easier to finance new investments, overtrading of ships in the second-hand market and increasing newbuilding orders.
- Stage 4 – Collapse
  - As supply overtakes demand the market moves into a collapse.
  - Freight rates fall, ships reduce speed, least efficient ships wait for cargo.
  - Market sentiment is confused, changing with each rally in rates and reluctant to accept that the peak is over.
  - The average length fell from 12.5 years in 1743 to 7 years in 2003. But each cycle is different, no cycle lasted as long as the average cycle because there were different causes of the cycles (economic conditions, trade growth, ordering and scrapping of ships etc.).

Figure 1: Characteristics of Shipping Cycle



Source: Martin Stopford 2009

Also, we have seasonal cycles that are depicted in regular fluctuations in freight rates within a year such as: the timing of harvest: typically, there is a sharp increase in grain movements during late September and October as the North American harvest reaches

the sea for shipment and increased demand for Oil and oil products during Winter in the Northern Hemisphere (stock building).

As a result, it is essential to mention that maritime industry is characterized from high cyclicalities according to Drobetz et al., Schilling et al. and Tegtmeier et al. (2009).

More specifically, due to volatile characteristics of income of shipping companies, usually after periods of consecutive years with high profit margins it is following periods with low profit margin or even with losses. The cyclicalities and seasonality of one industry has strong impacts and repercussions in the role of a financial analyst because it is required special attention in the formulation and implementation of the required forecasts that they use in the practical judgments in developing and using valuations methods (Koller et al. 2010).

The specific features of maritime business and the determinants factors of the financial performance of shipping companies have been the subject of further investigation from the research community.

In this section, the factors that affect the shipping industry in accordance with the analysis of Kavousanos et al. and Visvikis et al. 2006 are recorded. Kavousanos and Visvikis distinguished the following crucial risks in the industry: a) business risk for example supply and demand in the industry, factors that affect the freight rate and the oil prices etc, b) liquidity risk, c) default risk, d) financial risk, e) credit risk, f) market risk g) political risk, e) technical and physical risk.

Below are mentioned some factors that affect the financial performance of shipping companies and are considered important in accordance with the international bibliography:

- The international financial activity and the changes in the global trade (for example trade war USA-China), as referred by Drobetz, Schilling and Tegtmeier (2010), are considered important factors in the financial analysis and valuation of shipping stocks.

The demand for the transportation service through sea is derived, i.e. demand is primarily for the transported cargo (commodity) and not for the shipping transportation. (Marshall's rule 4)

So, crucial variables are: the changes in the industrial production of countries members of G-7 and the changes in the industrial production of China. Nowadays, it is known, as determined from the reports of analysts, that China leads the world demand at least whatever is related with iron, coal and iron ore. In addition, significant variable which analysts take into consideration and underline in the reports is the changes in the global GDP.

- The current freight rates for the services and the forecasts for the future are also parameters that the analysts consider important for the valuation of shipping stocks. The global freight market is enough liquid and is related with the global supply and demand, but also with the conditions that occur in the global economy. The factors that affect the demand was analyzed in the previous paragraph. Concerning of the variable of supply, this variable has 3 critical factors. The first one that is deemed of high importance is the fleet of every examined company because this affects the quality of the services and also determines the freight rates that the company receives now and will receive in the future. More specifically, the average lifespan and the deadweight in tons of the feet are taking into account at the valuation of the shipping stocks (Grammenos et al. and Marcoulis et al. 1996). The second factor is the competitive rivalry between the shipping companies. It is examined the total global deadweight in tons. This is determined from the fleet of every company and the orderbook. Last factor but not least, is the time lag in new ships construction (18-36 months). This makes the supply of new vessels (increase of the fleet) to be sticky in the short run, i.e. supply cannot adjust to meet increased demand-thus in this case freight rates may increase rapidly.

An exemption to this is that the supply of shipping service may increase in the short run if the ship-owners:

- use the ships which have been “frozen” in lay-up or

- increase the speed of sailing for the existing vessels (consumption increases rapidly).

However, if the demand is too strong, then the supply cannot adjust fully in the short run and freight rates will skyrocket (this was the case during 2003-2007). All these factors play an important role in the determination of freight rates.

- Another factor that analysts are considered important is the exchange rate risk, as referred by Cullinane (1995). The income of the shipping companies is mainly in dollars, but some operating costs can be in euro, yuen or any other local currency. Thus, the variation of the exchange rates can provoke extremely high increases or decreases in the financial operating results of the companies.
- The cost of lending is another important parameter. Precisely, Drobetz W., Schilling D. and Tegtmeier L., (2010) mentioned that the interest rates of loans are determined from a) short-term interest rates, b) long-term interest rates, c) TED spreads. The TED spread is the difference between the 3-month LIBOR and the 3-month Treasury bill rate. The TED spread is commonly used as a measure of credit risk and it often enlarges in periods of economic crisis. The TED spread is an indicator of the solvency of financial institutions, monetary liquidity, and perceived risk of the financial system and it is affected by the global politics stability, the balance trade and the financial policy of USA. Last but not least, the interest rates of loans are affected direct from the inflation in a global scale.
- The financial leverage in shipping industry is another critical variable that is addressed from the analysts in the valuation of shipping stocks (Grammenos et al. and Marcoulis et al. 1996). For shipowners, borrowing monies from shipping banks has been the most prominent way of financial leverage in the shipping industry. The capital markets have been also a source of borrowing for larger, more sophisticated shipowners for several decades now, and it is expected that access to these markets will become even more crucial in the future (Karatzas et al., chapter 6, The international Handbook of Shipping Finance, 2016). In a high-capital intensive industry such as shipping, that high levels of debt can create damages on a company's credit ranking, analysts must know a company's debt

level. The financial leverage of every company reflects the strategy and the management decisions related to the sources of financing their investments. Both debt-to-equity and debt-to-assets ratios are deemed significant from the analysts. It is worth to mention, that nowadays there is a trend from the listed shipping companies and not only, to reduce their debts (with leasing mainly) in order to become more attractive to investors, without to ignore that this is happened for other various reason too.

- Another important factor that affects the valuation of stocks of shipping companies is the variation of the oil prices like this happened in the Brent Crude Oil. At their research, Drobetz W., Schilling D. and Tegtmeier L., (2010), determine the two dimensions, that justify the importance of this factor. The first dimension is related with the fact that the oil is necessary for the transportation of ships, in other words it is essential in order to provide the shipping transportation services .The second dimension refers to the existence of a one-big segment in shipping that is tankers, which have as main service, the carry of oil. So, the demand for the maritime services are in immediate function with the demand of oil globally.
- Last but not least, as shipping constitutes a "ripe" industry, both investors and analysts pay close attention at the dividend yield of companies. Analysts are attracted more from companies with high or stable dividend yield.

## 4. EMPIRICAL ANALYSIS

### 4.1 Introduction

The empirical investigation of valuation models that in practice are widely used by financial analysts, has engaged the research community and has been the subject of numerous studies e.g.: Barber (1999a, 1999b), Bradshaw (2002), Demirakos, Strong and Walker (2004), Imam-Barker-Clubb (2008). Section 4.2 describes the individual criteria used in the selection process of the final sample of one hundred eleven (111) financial reports for maritime transportation stocks listed in NASDAQ and NYSE stock exchanges. Section 4.3 describes the procedure for selecting the primary valuation model in cases where the financial analyst applies more than one valuation method in its report. Finally, section 4.4 presents the main results and conclusions of empirical analysis as they accrue from the in-depth processing and research of one hundred eleven (111) sample reports.

### 4.2 Sample Selection

The sample selection contains all the maritime transportation companies listed in NASDAQ and NYSE stock exchanges. These two stock exchanges account for the trading of a major portion of equities worldwide. Our selection of reports based on one of the world's largest providers of financial markets data and infrastructure, Thompsons Reuters Eikon DataStream. More specifically, in this platform there are available financial reports of all listed companies that provide services in maritime transportation. Before analyzing both, the procedure we followed and the criteria we set to conclude at the final sample, we would like to mention briefly some characteristic of Thompson Reuters Eikon platform. This set of software provided by Refinitiv is a financial data platform which includes data from financial markets, companies' (especially listed companies') financial information, financial news etc. The platform is supported by Thompson Reuters and the key goal is to help customers reach out to the global investing community and the media using the benefits of today's technology. The competition and market conditions make this kind of service extremely important in need for communication, innovation and economic growth for the promotion of interests of any listed company.

All data were extracted from Thomson Reuters Eikon during the period from 1st of January 2018 up to 31 of December 2018 and include all the financial reports of analysts presented in our sample for that period. The final number of reports that will be examined is one hundred eleven (111). In order to conduct to this number, we set some criteria so that the reports are as informative as possible and the results of the research be robust and representative of the methods the analysts apply.

The first criterion we set was all the reports to exceed 10 pages so that there is an adequate analysis of the models used by the analysts to evaluate each maritime company. The second criterion was that in case a maritime company has more than one report from the same contributor (analyst), we take into consideration only the one that has the highest number of pages. Finally, the last criterion we considered it would be essential for our research was that all reports would give a target price and the methods used for the evaluation would be mentioned comprehensively. It should be noted here, that some reports contain analysis of several companies and for this purpose the same report was included more than once in our sample.

<b>Table 4.1 : Distribution of Sample Reports</b>						
Distribution of Sample Reports from Companies Related in Maritime Transport						
Maritime Companies	Contributors	Date	Pg.	Proposal	Valuation Methods	
					Primary	Others
ARDMORE SHIPPING CORP	Jefferies Group	26/1/2018	31	BUY	NAV	-
	JPMorgan	23/3/2018	76	BUY	NAV	EV/EBITDA
	Morgan Stanley	05/02/2018	21	HOLD	NAV	-
	Pareto Securities	26/2/2018	12	BUY	NAV	-
SAFE BULKERS INC	Maxim Group	15/2/2018	11	BUY	NAV	-
	Morgan Stanley	15/2/2018	19	HOLD	NAV	-
	Sadif Analytics Prime	26/11/2018	12	BUY	SMW (synthetic multiples)	-
GASLOG LTD	Deutsche Bank	10/10/2018	20	BUY	EV/EBITDA	-
	JPMorgan	29/1/2018	25	HOLD	NAV	DCF
	Morgan Stanley	09/09/2018	27	BUY	DDM	NAV
GENCO SHIPPING & TRADING LIMITED	Artic Securities	08/07/2018	17	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	Deutsche Bank	15/4/2018	24	BUY	NAV	-
	Noble Financial Capital Markets	31/5/2018	13	BUY	EV/EBITDA	NAV
	Morgan Stanley	05/09/2018	18	HOLD	NAV	-
MATSON INC	Wells Fargo Securities	11/08/2018	16	HOLD	EPS	-
SEASpan CORPORATION	Deutsche Bank	19/4/2018	24	BUY	NAV	DCF
	Janney Montgomery Scott	01/04/2018	12	HOLD	EV/EBITDA	-
	JPMorgan	28/2/2018	16	HOLD	EV/EBITDA	NAV
	Morgan Stanley	04/03/2018	25	SELL	DCF	EV/EBITDA, NAV
	Sadif Analytics Prime	22/10/2018	12	HOLD	SMW(synthetic multiples)	-
SHIP FINANCE INTERNATIONAL LTD	BTIG	15/8/2018	18	BUY	Dividend Yield	-
	Morgan Stanley	28/2/2018	19	HOLD	Dividend Yield	NAV, DCF
	Pareto Securities	27/2/2018	10	HOLD	NAV	DCF, EV/EBITDA, P/E
	sadif Analytics Prime	22/10/2018	12	HOLD	SMW(synthetic multiples)	-
CAPITAL PRODUCT PARTNERS L.P	Minkabu The Infonoid	23/10/2018	18	HOLD	P/B	P/S
	Wells Fargo Securities	30/7/2018	16	BUY	NAV	-
COSTAMARE INCORPORATED	Barcleys	22/1/2018	20	HOLD	DCF	P/E
	Berenberg	05/05/2018	19	BUY	Dividend Yield	NAV
	JPMorgan	23/3/2018	76	BUY	EV/EBITDA	-
	Morgan Stanley	20/10/2018	23	BUY	DCF	NAV, EV/EBITDA
DANAOS CORPORATION	Minkabu The Infonoid	20/8/2018	11	BUY	P/B	P/S, P/E
	Sadif Analytics Prime	22/1/2018	12	SELL	SMW(synthetic multiples)	-
DHT HOLDINGS INC	JPMorgan	23/3/2018	76	BUY	NAV	DCF
	Morgan Stanley	02/06/2018	20	HOLD	NAV	Divident Yield

<b>Table 4.1 : Distribution of Sample Reports ( Cont' )</b>						
Distribution of Sample Reports from Companies Related in Maritime Transport						
Maritime Companies	Contributors	Date	Pg.	Proposal	Valuation Methods	
					Primary	Others
DIANA SHIPPING INC	Barcleys	22/1/2018	20	SELL	DCF	EV/EBITDA
	Deutsche Bank	22/5/2018	10	HOLD	NAV	Hist. Average Yield
	JPMorgan	17/10/2018	32	HOLD	NAV	DCF
	Morgan Stanley	27/7/2018	18	HOLD	NAV	-
DORIAN LPG LTD	JPMorgan	31/10/2018	15	BUY	NAV	DCF
DRYSHIPS INC	Pareto Securities	07/04/2018	12	BUY	NAV	DCF, EV/EBITDA, P/E
	Sadif Analytics Prime	20/7/2018	12	HOLD	SMW(synthetic multiples)	-
DYNAGAS LNG PARTNERS LP	Berenberg	09/06/2018	43	HOLD	NAV	DCF, Dividend Yield, EV/EBITDA
	Maxim Group	20/2/2018	14	BUY	NAV	-
	Morgan Stanley	27/7/2018	18	HOLD	DDM	NAV,
EAGLE BULK	Artic Securities	24/10/2018	16	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	Morgan Stanley	18/6/2018	33	HOLD	NAV	-
EURODRY LTD	Maxim Group	15/6/2018	16	BUY	EV/EBITDA	DCF, NAV
EUROSEAS LTD	Sadif Analytics Prime	18/7/2018	12	BUY	SMW(synthetic multiples)	-
GASLOG PARTNERS LP	Deutsche Bank	10/10/2018	20	BUY	Dividend Yield	-
	JPMorgan	29/1/2018	25	HOLD	NAV	-
	Morgan Stanley	08/09/2018	27	BUY	NAV	DCF, DDM
	Artic Securities	20/8/2018	20	BUY	NAV	DCF , EV/EBITDA, P/E, P/B
GOLDEN OCEAN GROUP LTD	JPMorgan	18/4/2018	31	BUY	NAV	DCF
	Morgan Stanley	31/5/2018	21	HOLD	NAV	-
	Sadif Analytics Prime	10/01/2018	12	BUY	SMW(synthetic multiples)	-
	Sadif Analytics Prime	13/12/2018	12	HOLD	SMW(synthetic multiples)	-
HERMITAGE OFFSHORE SERVICES LTD	Barcleys	23/8/2018	10	BUY	Dividend Yield	-
HOEGH LNG PARTNERS LP	Morgan Stanley	29/11/2018	16	BUY	NAV	DCF, DDM
INTERNATIONAL SEAWAYS INC	Artic Securities	24/10/2018	16	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	JPMorgan	11/07/2018	15	BUY	NAV	DCF
KNOT OFFSHORE PARTNERS LP	Barcleys	27/11/2018	10	HOLD	Dividend Yield	-
	Minkabu The Infonoid	20/8/2018	11	SELL	P/B	P/S,P/E
NAVIGATOR HOLDINGS LTD	Berenberg	04/03/2018	24	BUY	NAV	DCF
	Morgan Stanley	14/11/2018	23	HOLD	NAV	DCF
NAVIOS MARITIME ACQUISITION CORPORATION	Deutsche Bank	22/5/2018	10	HOLD	NAV	Hist. Average Yield
	JPMorgan	05/10/2018	14	SELL	NAV	DCF
	Sadif Analytics Prime	29/10/2018	12	HOLD	SMW(synthetic multiples)	-
NAVIOS MARITIME HOLDINGS INC	JPMorgan	20/11/2018	11	SELL	NAV	DCF
	Minkabu The Infonoid	20/8/2018	11	SELL	P/B	P/S,P/E
	Sadif Analytics Prime	11/09/2018	12	HOLD	SMW(synthetic multiples)	-
NAVIOS MARITIME PARTNERS LP	JPMorgan	13/11/2018	12	BUY	NAV	DCF
	Wells Fargo Securities	08/07/2018	15	BUY	NAV	-
NORDIC AMERICAN TANKER LIMITED	Artic Securities	24/10/2018	24	BUY	NAV	DCF , EV/EBITDA, P/E, P/B
	Morgan Stanley	14/8/2018	17	HOLD	NAV	-
	Sadif Analytics Prime	30/10/2018	12	SELL	SMW(synthetic multiples)	-
	Wells Fargo Securities	14/11/2018	10	BUY	NAV	-
OVERSEAS SHIPPING GROUP INC	Sadif Analytics Prime	27/12/2018	12	BUY	SMW(synthetic multiples)	-
PANGAEA LOGISTICS SOLUTIONS LTD	Noble Financial Capital Markets	09/04/2018	17	BUY	NAV	EBITDA, DCF
	Sadif Analytics Prime	12/10/2018	12	BUY	SMW(synthetic multiples)	-

<b>Table 4.1 : Distribution of Sample Reports ( Cont' )</b>						
Distribution of Sample Reports from Companies Related in Maritime Transport						
Maritime Companies	Contributors	Date	Pg.	Proposal	Valuation Methods	
					Primary	Others
PYXIS TANKERS INC	Noble Financial Capital Markets	23/4/2018	24	BUY	EV/EBITDA	NAV
	Sadif Analytics Prime	27/12/2018	12	HOLD	SMW(synthetic multiples)	-
SCORPIO BULKERS INC	JPMorgan	22/10/2018	13	HOLD	NAV	DCF
	Morgan Stanley	24/4/2018	20	HOLD	NAV	-
	Sadif Analytics Prime	28/11/2018	12	HOLD	SMW(synthetic multiples)	-
SCORPIO TANKERS INCORPORATION	Artic Securities	08/01/2018	16	BUY	NAV	DCF , EV/EBITDA, P/E, P/B
	JPMorgan	31/10/2018	14	BUY	NAV	DCF
	Morgan Stanley	31/7/2018	23	BUY	NAV	-
	Pareto Securities	12/11/2018	15	BUY	NAV	DCF, EV/EBITDA, P/E
SEANERGY MARITIME HOLDINGS CORP	Maxim Group	03/07/2018	11	BUY	NAV	DCF
	Minkabu The Infonoid	20/8/2018	11	BUY	P/B	P/S, P/E
	Noble Financial Capital Markets	18/12/2018	26	BUY	EV/EBITDA	NAV
SINO-GLOBAL SHIPPING AMERICA,LIMITED	Maxim Group	17/9/2018	20	BUY	DCF	P/E
	Minkabu The Infonoid	27/11/2018	20	SELL	P/B	P/S, P/E
	Sadif Analytics Prime	26/10/2018	12	BUY	SMW(synthetic multiples)	-
STAR BULK CARRIERS CORPORATION	JPMorgan	21/11/2018	11	BUY	NAV	DCF
	Morgan Stanley	28/2/2018	19	BUY	NAV	-
	Pareto Securities	22/11/2018	10	BUY	NAV	DCF EV/EBITDA, P/E
	Sadif Analytics Prime	20/9/2018	12	BUY	SMW(synthetic multiples)	-
TEEKAY CORPORATION	Minkabu The Infonoid	20/8/2018	12	BUY	P/B	P/S, P/E
	Morgan Stanley	02/12/2018	76	HOLD	NAV	DDM
	Sadif Analytics Prime	24/10/2018	12	BUY	SMW(synthetic multiples)	-
TEEKAY OFFSHORE PARTNERS L.P	Morgan Stanley	13/6/2018	61	HOLD	NAV	DDM
	Wells Fargo Securities	11/08/2018	16	BUY	NAV	-
TSAKOS ENERGY NAVIGATION LIMITED	JPMorgan	03/12/2018	12	BUY	NAV	DCF
	Morgan Stanley	09/09/2018	16	BUY	NAV	-
	Sadif Analytics Prime	15/10/2018	12	SELL	SMW(synthetic multiples)	-
	Wells Fargo Securities	09/07/2018	23	HOLD	NAV	-
FLEX LNG LIMITED	Artic Securities	23/10/2018	17	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	Kepler Cheuvreux	29/8/2018	16	BUY	NAV	DDM, EV/EBITDA, P/E , DCF
	Pareto Securities	28/11/2018	12	BUY	NAV	DCF, EV/EBITDA, P/E
	SEB Equities	27/2/2018	15	BUY	NAV	EV/EBITDA

### 4.3 Primary Model Selection Methodology

In this section we describe the criteria we used in our research of financial reports issued by analysts, in order to isolate the primary model used to support the target price and the investment proposal. Each criterion described is followed by a typical example.

Specifically, in case there is only one valuation model described in the report we consider it as primary. For example, the financial report of Morgan Stanley for the maritime company Golden Ocean Group. On page 3 the analyst refers only the NAV model as a method for estimating the target price for each of the three scenarios that were examined (base, bullish, bearish). No other reference is mentioned throughout the report. Therefore, we can safely assume that the specific analyst uses only the Net Asset Value for the evaluation of the particular company.

In addition, in each report that are presented more than one valuation methods, for the selection of the primary model we check the executive summary and the valuation section where the analyst states the valuation models he uses. In case no valuation summary is written, we concentrate on the analysis section, where the model is presented and explained. A specific example for this criterion is the report of Maxim Group for Eurodry ltd. company. The valuation policy of the Maxim Group contributor is to apply NAV as their primary benchmark in evaluating shipping companies. However, for Eurodry ltd., it is clearly stated in the summary of the report (page 1) and on the valuation methods (page 14) that the target price was based on an EV/EBITDA analysis. Therefore, in this case we consider EV/EBITDA the primary valuation model for the specific company.

Finally, in the scenario where the analyst applies more than one model and there is not clear statement in which one the target price is based on, we examine each model and its results, and we choose the one that has the least deviation from the analyst's target price. For instance, Morgan Stanley apply both Net Asset Value (NAV) and Discounted Cash Flow (DCF) in their report on Seaspan Corporation. However, the DCF model is the one that gives the target price which is the estimation of the analysts. Specifically, pages 9-10 of the analyst's report provide two tables where the analyst presents in detail the valuation process of each method used. The NAV analysis provide a target price of 4.2\$ per share while DCF a 5.50\$ dollars per share which is the final estimation of the analyst for the

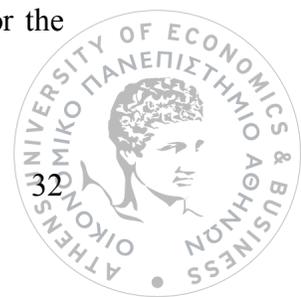
specific company. In some reports such as Morgan Stanley's for the Gaslog ltd where there are multiple models giving target prices for different scenarios, we consider the primary model the one that describes the base scenario.

#### 4.4 Empirical analysis

As we have already mentioned, the number of reports included in the sample is one hundred eleven. Specifically, the reports include the following segments: dry freight transport companies, freight tankers and liquid gas companies and containership companies. The overall picture of the results for the fourteen (14) dry bulk companies is presented on the table 4.2a, while for the twenty-two (22) wet bulk and liquid gas companies on the table 4.2b. Finally, on table 4.2c we included the five (5) companies which operate in the containership sector (totally or partially). We should mention here, that some companies include in their fleet more than one category of vessels. The segregation above based on the majority of vessels the companies own in each category.

<b>Table 4.2a : Distribution of Sample Reports.</b>						
Distribution of Sample Reports from Dry Bulk Companies						
Maritime Companies	Contributors	Date	Pg. Proposal	Valuation Methods		
				Primary	Others	
SAFE BULKERS INC	Maxim Group	15/2/2018	11 BUY	NAV	-	
	Morgan Stanley	15/2/2018	19 HOLD	NAV	-	
	Sadif Analytics Prime	26/11/2018	12 BUY	SMW(synthetic multiples)	-	
GENCO SHIPPING & TRADING LIMITED	Artic Securities	08/07/2018	17 BUY	NAV	DCF, EV/EBITDA, P/E, P/B	
	Deutsche Bank	15/4/2018	24 BUY	NAV	-	
	Noble Financial Capital Markets	31/5/2018	13 BUY	EV/EBITDA	NAV	
	Morgan Stanley	05/09/2018	18 HOLD	NAV	-	
DIANA SHIPPING INC	Barcleys	22/1/2018	20 SELL	DCF	EV/EBITDA	
	Deutsche Bank	22/5/2018	10 HOLD	NAV	Hist. Average Yield	
	JPMorgan	17/10/2018	32 HOLD	NAV	DCF	
	Morgan Stanley	27/7/2018	18 HOLD	NAV	-	
DRYSHIPS INC	Sadif Analytics Prime	20/7/2018	12 HOLD	SMW(synthetic multiples)	-	
EAGLE BULK	Artic Securities	24/10/2018	16 BUY	NAV	DCF, EV/EBITDA, P/E, P/B	
	Morgan Stanley	18/6/2018	33 HOLD	NAV	-	
EURODRY LTD	Maxim Group	15/6/2018	16 BUY	EV/EBITDA	DCF, NAV	
GOLDEN OCEAN GROUP LTD	Artic Securities	20/8/2018	20 BUY	NAV	DCF, EV/EBITDA, P/E, P/B	
	JPMorgan	18/4/2018	31 BUY	NAV	DCF	
	Morgan Stanley	31/5/2018	21 HOLD	NAV	-	
	Sadif Analytics Prime	10/01/2018	12 BUY	SMW(synthetic multiples)	-	
NAVIOS MARITIME HOLDINGS INC	JPMorgan	20/11/2018	11 SELL	NAV	DCF	
	Minkabu The Infonoid	20/8/2018	11 SELL	P/B	P/S, P/E	
NAVIOS MARITIME PARTNERS LP	Sadif Analytics Prime	11/09/2018	12 HOLD	SMW(synthetic multiples)	-	
	JPMorgan	13/11/2018	12 BUY	NAV	DCF	
PANGAEA LOGISTICS SOLUTIONS LTD	Wells Fargo Securities	08/07/2018	15 BUY	NAV	-	
	Noble Financial Capital Markets	09/04/2018	17 BUY	NAV	EBITDA, DCF	
SCORPIO BULKERS INC	Sadif Analytics Prime	12/10/2018	12 BUY	SMW(synthetic multiples)	-	
	JPMorgan	22/10/2018	13 HOLD	NAV	DCF	
	Morgan Stanley	24/4/2018	20 HOLD	NAV	-	
SEANERGY MARITIME HOLDINGS CORP	Sadif Analytics Prime	28/11/2018	12 HOLD	SMW(synthetic multiples)	-	
	Maxim Group	03/07/2018	11 BUY	NAV	DCF	
	Minkabu The Infonoid	20/8/2018	11 BUY	P/B	P/S, P/E	
SINO-GLOBAL SHIPPING AMERICA,LIMITED	Noble Financial Capital Markets	18/12/2018	26 BUY	EV/EBITDA	NAV	
	Maxim Group	17/9/2018	20 BUY	DCF	P/E	
	Minkabu The Infonoid	27/11/2018	20 SELL	P/B	P/S, P/E	
	Sadif Analytics Prime	26/10/2018	12 BUY	SMW(synthetic multiples)	-	
STAR BULK CARRIERS CORPORATION	JPMorgan	21/11/2018	11 BUY	NAV	DCF	
	Morgan Stanley	28/2/2018	19 BUY	NAV	-	
	Pareto Securities	22/11/2018	10 BUY	NAV	DCF, EV/EBITDA, P/E	
	Sadif Analytics Prime	20/9/2018	12 BUY	SMW(synthetic multiples)	-	

Table 4.2a presents all the information derived from the research of our sample for the dry freight transport companies.



<b>Table 4.2b : Distribution of Sample Reports</b>						
Distribution of Sample Reports from Wet Bulk and Liquid Gas Companies						
Maritime Companies	Contributors	Date	Pg.	Proposal	Valuation Methods	
					Primary	Others
ARDMORE SHIPPING CORP	Jefferies Group	26/1/2018	31	BUY	NAV	-
	JPMorgan	23/3/2018	76	BUY	NAV	EV/EBITDA
	Morgan Stanley	05/02/2018	21	HOLD	NAV	-
	Pareto Securities	26/2/2018	12	BUY	NAV	-
GASLOG LTD	Deutsche Bank	10/10/2018	20	BUY	EV/EBITDA	-
	JPMorgan	29/1/2018	25	HOLD	NAV	DCF
	Morgan Stanley	09/09/2018	27	BUY	DDM	NAV
SHIP FINANCE INTERNATIONAL LTD	BTIG	15/8/2018	18	BUY	Dividend Yield	-
	Morgan Stanley	28/2/2018	19	HOLD	Dividend Yield	NAV, DCF
	Pareto Securities	27/2/2018	10	HOLD	NAV	DCF, EV/EBITDA, P/E
	sadif Analytics Prime	22/10/2018	12	HOLD	SMW(synthetic multiples)	-
CAPITAL PRODUCT PARTNERS L.P	Minkabu The Infonoid	23/10/2018	18	HOLD	P/B	P/S
	Wells Fargo Securities	30/7/2018	16	BUY	NAV	-
DHT HOLDINGS INC	JPMorgan	23/3/2018	76	BUY	NAV	DCF
	Morgan Stanley	02/06/2018	20	HOLD	NAV	Divident Yield
DORIAN LPG LTD	JPMorgan	31/10/2018	15	BUY	NAV	DCF,
	Pareto Securities	07/04/2018	12	BUY	NAV	DCF, EV/EBITDA, P/E
DYNAGAS LNG PARTNERS LP	Berenberg	09/06/2018	43	HOLD	NAV	DCF, Divident Yield, EV/EBITDA
	Maxim Group	20/2/2018	14	BUY	NAV	-
	Morgan Stanley	27/7/2018	18	HOLD	DDM	NAV
GASLOG PARTNERS LP	Deutsche Bank	10/10/2018	20	BUY	Divident Yield	-
	JPMorgan	29/1/2018	25	HOLD	NAV	-
	Morgan Stanley	08/09/2018	27	BUY	NAV	DCF, DDM
HERMITAGE OFFSHORE SERVICES LTD	Sadif Analytics Prime	13/12/2018	12	HOLD	SMW(synthetic multiples)	-
HOEGH LNG PARTNERS LP	Barcleys	23/8/2018	10	BUY	Divident Yield	-
	Morgan Stanley	29/11/2018	16	BUY	NAV	DCF, DDM
INTERNATIONAL SEAWAYS INC	Artic Securities	24/10/2018	16	BUY	NAV	DCF , EV/EBITDA, P/E, P/B
	JPMorgan	11/07/2018	15	BUY	NAV	DCF
KNOT OFFSHORE PARTNERS LP	Barcleys	27/11/2018	10	HOLD	Divident Yield	-
NAVIGATOR HOLDINGS LTD	Minkabu The Infonoid	20/8/2018	11	SELL	P/B	P/S, P/E
	Berenberg	04/03/2018	24	BUY	NAV	DCF
	Morgan Stanley	14/11/2018	23	HOLD	NAV	DCF
NAVIOS MARITIME ACQUISITION CORPORATION	Deutsche Bank	22/5/2018	10	HOLD	NAV	Hist. Average Yield
	JPMorgan	05/10/2018	14	SELL	NAV	DCF
	Sadif Analytics Prime	29/10/2018	12	HOLD	SMW(synthetic multiples)	-
NORDIC AMERICAN TANKER LIMITED	Artic Securities	24/10/2018	24	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	Morgan Stanley	14/8/2018	17	HOLD	NAV	-
	Sadif Analytics Prime	30/10/2018	12	SELL	SMW(synthetic multiples)	-
	Wells Fargo Securities	14/11/2018	10	BUY	NAV	-
OVERSEAS SHIPPING GROUP INC	Sadif Analytics Prime	27/12/2018	12	BUY	SMW(synthetic multiples)	-
PYXIS TANKERS INC	Noble Financial Capital Markets	23/4/2018	24	BUY	EV/EBITDA	NAV
	Sadif Analytics Prime	27/12/2018	12	HOLD	SMW(synthetic multiples)	-
SCORPIO TANKERS INCORPORATION	Artic Securities	08/01/2018	16	BUY	NAV	DCF , EV/EBITDA, P/E, P/B
	JPMorgan	31/10/2018	14	BUY	NAV	DCF
	Morgan Stanley	31/7/2018	23	BUY	NAV	-
	Pareto Securities	12/11/2018	15	BUY	NAV	DCF, EV/EBITDA, P/E
TEEKAY CORPORATION	Minkabu The Infonoid	20/8/2018	12	BUY	P/B	P/S, P/E
	Morgan Stanley	02/12/2018	76	HOLD	NAV	DDM
	Sadif Analytics Prime	24/10/2018	12	BUY	SMW(synthetic multiples)	-
TEEKAY OFFSHORE PARTNERS L.P	Morgan Stanley	13/6/2018	61	HOLD	NAV	DDM
TSAKOS ENERGY NAVIGATION LIMITED	Wells Fargo Securities	11/08/2018	16	BUY	NAV	-
	JPMorgan	03/12/2018	12	BUY	NAV	DCF
	Morgan Stanley	09/09/2018	16	BUY	NAV	-
	Sadif Analytics Prime	15/10/2018	12	SELL	SMW(synthetic multiples)	-
FLEX LNG LIMITED	Wells Fargo Securities	09/07/2018	23	HOLD	NAV	-
	Artic Securities	23/10/2018	17	BUY	NAV	DCF, EV/EBITDA, P/E, P/B
	Kepler Cheuvreux	29/8/2018	16	BUY	NAV	DDM, EV/EBITDA, P/E ,DCF
	Pareto Securities	28/11/2018	12	BUY	NAV	DCF, EV/EBITDA, P/E
	SEB Equities	27/2/2018	15	BUY	NAV	EV/EBITDA

<b>Table 4.2c : Distribution of Sample Reports</b>						
Distribution of Sample Reports from Containership Companies						
Maritime Companies	Contributors	Date	Pg.	Proposal	Valuation Methods	
					Primary	Others
MATSON INC	Wells Fargo Securities	11/08/2018	16	HOLD	EPS	-
SEASPAN CORPORATION	Deutsche Bank	19/4/2018	24	BUY	NAV	DCF
	Janney Montgomery Scott	01/04/2018	12	HOLD	EV/EBITDA	-
	JPMorgan	28/2/2018	16	HOLD	EV/EBITDA	NAV
	Morgan Stanley	04/03/2018	25	SELL	DCF	EV/EBITDA, NAV
	Sadif Analytics Prime	22/10/2018	12	HOLD	SMW(synthetic multiples)	-
COSTAMARE INCORPORATED	Barcleys	22/1/2018	20	HOLD	DCF	P/E
	Berenberg	05/05/2018	19	BUY	Dividend Yield	NAV
	JPMorgan	23/3/2018	76	BUY	EV/EBITDA	-
	Morgan Stanley	20/10/2018	23	BUY	DCF	NAV, EV/EBITDA
DANAOS CORPORATION	Minkabu The Infonoid	20/8/2018	11	BUY	P/B	P/S, P/E
	Sadif Analytics Prime	22/1/2018	12	SELL	SMW(synthetic multiples)	-
EUROSEAS LTD	Sadif Analytics Prime	18/7/2018	12	BUY	SMW(synthetic multiples)	-

In particular, the information mentioned in the table, are the examined maritime companies, the contributors of the financial reports which are investment brokerage houses , dates of issuance of sample reports, total number of their pages, the recommendation type of each proposal as well as the primary and other valuation models that have been used by the analysts.

An important element of the analysis worth noting, is the number of investment brokerage houses that have issued the examined reports. As shown in table 4.3 the financial analysts who issued the reports of the sample are working in seventeen (17) different investment brokerage houses. Some of them are concentrated only in one specific maritime sector (e.g. tanker segment). Therefore, we made a distinction of the reports in three maritime segments which can lead us to derive better and more reliable results from our sample.

<b>Table 4.3 : Distribution of Sample Reports</b>						
Distribution of Sample Reports by Investment House and Sector						
Investment Houses	Total	Dry Bulk Companies		Wet Bulk and Liquid Gas Companies		Containership Companies
1 Morgan Stanley	22 19,82%	7	17,9%	13	22,0%	2 15,38%
2 Sadif Analytics Prime	19 17,12%	8	20,5%	8	13,6%	3 23,08%
3 JPMorgan	17 15,32%	6	15,4%	9	15,3%	2 15,38%
4 Artic Securities	7 6,31%	3	7,7%	4	6,8%	0 0,00%
5 Minkabu The Infonoid	7 6,31%	3	7,7%	3	5,1%	1 7,69%
6 Deutsche Bank	6 5,41%	2	5,1%	3	5,1%	1 7,69%
7 Pareto Securities	6 5,41%	1	2,6%	5	8,5%	0 0,00%
8 Wells Fargo Securities	6 5,41%	1	2,6%	4	6,8%	1 7,69%
9 Maxim Group	5 4,50%	4	10,3%	1	1,7%	0 0,00%
10 Barcleys	4 3,60%	1	2,6%	2	3,4%	1 7,69%
11 Noble Financial Capital Markets	4 3,60%	3	7,7%	1	1,7%	0 0,00%
12 Berenberg	3 2,70%	0	0,0%	2	3,4%	1 7,69%
13 BTIG	1 0,90%	0	0,0%	1	1,7%	0 0,00%
14 Janney Montgomery Scott	1 0,90%	0	0,0%	0	0,0%	1 7,69%
15 Jefferies Group	1 0,90%	0	0,0%	1	1,7%	0 0,00%
16 Kepler Cheuvreux	1 0,90%	0	0,0%	1	1,7%	0 0,00%
17 SEB Equities	1 0,90%	0	0,0%	1	1,7%	0 0,00%

Below, we present table 4.4 which includes a brief description of the valuation models used in the financial reports.

<b>Table 4.4 : Brief Description of Models Applied</b>	
<b>Models</b>	<b>Description</b>
1 NAV	Net Asset Value
2 SMW(Synthetic multiples)	StockMarks Investors Sentiment
3 EV/EBITDA	Enterprise Value to Earnings Before
4 P/B	Price to Book Multiple
5 Dividend Yield	Dividend Yield Model
6 DCF	Discounted Cash Flow Model
7 DDM	Discounted Dividend Model
8 EPS	Earnings Per Share Multiple

The dominant methods used by the analysts in the sample are eight (8). Among these, are methods that have been extensively analyzed in the theoretical part of the research and they are considered very important such as the method of Enterprise Value to Earnings Before Interest, Taxes, Depreciation and Amortization (EV/EBITDA) and the method of Discounted Cash Flow (DCF). Another one that is not commonly used in other industrial sectors although it is significantly important in maritime sector is the method of Net Asset Value (NAV). On the table 4.5 we present the frequency distribution of all the evaluation models which appear as primary in the analysts' reports.

As it have shown above, the methods which are most preferred from the analysts are: The Net Asset Value (NAV) ,a synthetic algorithm (SMW) of multiples called StockMarks, the Enterprise Value to Earnings Before Interest, Taxes, Depreciation and Amortization (EV/EBITDA) and Price to Book multiple (P/B) . In one hundred eleven (111) reports, the method of NAV applied in sixty three (63), the synthetic multiple algorithm nineteen times (19), while EV/EBTIDA eight (8) times and P/B seven (7) times each which corresponds to a percentage of 56,76% , 17,12% , 7.21% and 6,31% respectively. The rest of the methods used constitute the 12,61% of our remaining sample. In table 4.5 we made a segregation of the methods used in the three different maritime segments. More specifically, NAV method is leading the preferences of the analysts in dry bulk and wet bulk transportation sectors at 59% and 66,1% corresponding while the other three multiple methods (Synthetic multiple algorithm, EV/EBITDA and P/B) account for 35.9% and 22% respectively in total for these two segments. However, in container sector we notice that analysts lean towards multiples instead of NAV.

Although the sample with container companies is relatively small, the fact that most used model is applied only one time is something we ought to point out. JPMorgan which is a well known and established brokerage investment house give their reason why they prefer multiples instead of NAV in the following report for Costamare, a container based company. According to this report: *"While typically our primary benchmark in evaluating shipping company valuations is Net Asset Value (NAV), because of the long-term nature of the container industry, the relative illiquidity in the sales and purchase of ships, and the large amount of value tied up in long-term charters (relative to steel), we believe it's more appropriate to use an EV/EBITDA multiple to value container shipping companies."*

**Table 4.5: Frequency Distribution of Sample Reports**  
Frequency Distribution of Sample Reports by Valuation Method and Sector

Models	Total	Dry Bulk Companies		Wet Bulk and Liquid Gas Companies		Containership Companies	
1 NAV	63 56,76%	23	58,97%	39	66,1%	1	7,69%
2 SMW(Synthetic multiples)	19 17,12%	8	20,51%	8	13,6%	3	23,08%
3 EV/EBITDA	8 7,21%	3	7,69%	2	3,4%	3	23,08%
4 P/B	7 6,31%	3	7,69%	3	5,1%	1	7,69%
5 Dividend Yield	6 5,41%	0	0,00%	5	8,5%	1	7,69%
6 DCF	5 4,50%	2	5,13%	0	0,0%	3	23,08%
7 DDM	2 1,80%	0	0,00%	2	3,4%	0	0,00%
8 EPS	1 0,90%	0	0,00%	0	0,0%	1	7,69%

The data presented in the foregoing tables are important indications of analysts' preferences regarding their valuation methods they use for the valuation of shipping companies. In chapter 5, we provide detailed examples of the application of the most common valuation models of shipping companies. NAV and EV/EBITDA. At this point we would like to make some observations on the data in our sample. Firstly, as shown from the tables, the NAV model overwhelms the other methods so we thought that it would be more appropriate to make the comparison more general including that way, all the multiple models mentioned before as a multiple's category. This could provide us possibly a better overview of all the methods preferred by the analysts.

Regarding the synthetic multiple algorithm which is the second most used model of valuation we will not proceed with a practical example for a very specific reason. The synthetic multiple algorithm is based on the ratings for its current price multiples, outperformance likelihood and price attractiveness. The outperformance rating and the price attractiveness follow an index and rating system created from Sadif Prime Analytics

company in which we do not have any data access in order to see analytically how their target price is derived. It is also not clear, how they weight each model in their algorithm.

In the remaining part of this section we examine the use of the valuation models regarding report with different investment proposal, companies with profits or losses and last but not least, reports with high expected increase or decrease in share price.

Table 4.6 presents the frequency distribution of the methods based on the type of investment proposal expressed in the analysts' reports. The purpose of this table is to examine the degree to which analysts prefer different valuation methods to support different investment proposals. It is also important to mention that we considered the proposals expressed as Buy, Market Outperform and Overweight, positive. Neutral were considered those expressed as Hold, Market Perform, Equal weight and Neutral. Finally, we concluded negative, all those expressed as Sell, Market Underperform, Underweight and Reduce.

	<b>Models</b>	<b>Total</b>	<b>Positive</b>	<b>Neutral</b>	<b>Negative</b>
1	NAV	63	40	21	2
2	SMW(Synthetic multiples)	19	8	8	3
3	EV/EBITDA	8	6	2	0
4	P/B	7	3	1	3
5	Dividend Yield	6	4	2	0
6	DCF	5	2	1	2
7	DDM	2	1	1	0
8	EPS	1	0	1	0

This table provide us with some interesting results regarding the NAV model and the multiples. As shown, out of 64 reports that indicate a positive investment proposal, 40 times the model NAV is used (63%) while the three other multiple models combined 17 times (26%) (Synthetic Multiple 8, EV/EBITDA 5, P/B 3) . The remaining methods correspond to a 11% of the sample with positive reports. Alternatively, out of 47 reports characterized either neutral or negative analysts prefer NAV in 23 reports (48.9%) while the multiples model in 17 reports (36.1%). It is quite interesting, out of 63 reports that use as primary model the NAV, only 2 of these give a negative investment proposal.

In table 4.7 we present the frequency distribution of the methods based on the financial results of the maritime companies of our sample (for the year 2018). Based on the results of the table, we notice that in absolute numbers NAV is preferred more in both profit and loss scenarios. For this particular table, we test if there is a differentiation in the choice of valuation method regarding the financial results of the maritime companies between non earnings related models such as NAV and P/B and earnings related models which are all the rest. The result of the *chi-square test* (*The chi-square statistic is 14.4015. The p-value is .000148. This result is significant at  $p < .05$ .*) proves that there is a statistically significant difference in the use of valuation models among the two categories. In other words, analysts seem to differentiate the chosen valuation method according to the financial results of the maritime companies.

What is interesting in this table is that from all the multiple models, EV/EBITDA seems to be preferred in companies with profits while P/B is used mainly on loss companies. In particular P/B model has been used only in one profitable company.

	<b>Methods</b>	<b>Profit</b>	<b>Loss</b>	<b>total</b>
1	NAV	26	37	63
2	SMW(Synthetic multiples)	8	11	19
3	EV/EBITDA	5	3	8
4	P/B	1	6	7
5	Dividend Yield	6	0	6
6	DCF	4	1	5
7	DDM	2	0	2
8	EPS	1	0	1

In Table 4.8 we present the frequency distribution of the primary valuation methods based on the expected increase in the share price index, which is equal to the fraction of the difference between the target price and the current stock price versus the current stock price. For the construction of this table, we calculated the aforementioned ratio for all the reports in our sample. Subsequently, we charted for the twenty two (22) reports with the highest index (top 20% of our sample) and for the twenty two (22) with the lowest index (bottom 20% of our sample) the valuation methods applied. The results show that NAV model tends to add more value to the maritime stock price giving a higher expected target price. Specifically, we can observe that NAV model occupies 18 out of 22 reports with

the highest index, while only three reports suggest such a high increase in the target price based on multiples model. In this particular case only EV/EBITDA model provide such expectations. On the other hand, the highest decrease in target price is observed from multiples model. Out of 22 reports with the highest decrease price of the index, only two use NAV as their primary model. The other are either multiples, dividend yield or DCF models. Especially the synthetic multiples algorithm seems to be the most pessimistic regarding the future of the maritime stocks in most cases. Based on the results of the table, we observe that there is a statistically significant difference in the preferences of the financial analysts depending on the degree of optimism or pessimism they have regarding the future prospects of the shareholder. For the chi-square test we compared NAV to all other models in both categories. (The chi-square statistic is 14.4015. The  $p$ -value is .000148. This result is significant at  $p < .05$ .)

**Table 4.8: Frequency Distribution of Sample Reports**  
Frequency Distribution of Primary Valuation Methods based on the Expected Increase in the Share Price Index

	Methods	Top 22	Bottom 22
1	NAV	18	5
2	SMW(Synthetic multiples)	0	11
3	EV/EBITDA	3	0
4	P/B	0	2
5	Dividend Yield	0	1
6	DCF	1	2
7	DDM	0	0
8	EPS	0	1

Taking into consideration all the above tables and results we conclude that NAV is favoring the maritime companies in comparison with the multiples models. Analysts prefer NAV in cases where the current market values of assets and liabilities differ significantly from the book value. Consequently, current values are considered for NAV. When the future cash flow streams are negative or non-existent, analysts often use NAV to value companies whose major value lies in the physically held assets. Especially, in the bulk sector the vessels prices deteriorating day by day .This have led to a significant divergence between book values and market values of the vessels. Therefore, it is important to get a current valuation of the worth of assets and liabilities. For this specific reason we conclude that the Net Asset Value model is more preferred from analysts. We have to point out here that the Synthetic multiples algorithm model created by Sadif

Prime Analytics does not take consideration the market overview. According to their report: "We do not take a view on the market direction. Investors expecting the market to rise (or fall) significantly should increase (decrease) the price target accordingly."



## 5. PRACTICAL IMPLEMENTATION OF PRIMARY MODELS

### 5.1 Introduction

In this chapter we will take a closer look at the practical application of the most used model for valuation of maritime listed companies. The details of how it is used and the issues that financial analysts are focusing on are the points on which we will emphasize on our analysis. As we mentioned in a previous section after collecting, studying and examining the sample the methods that dominate the preferences are : a) the method of Net Asset Value (NAV) b)the method of Enterprise Value to Earnings Before Interest, Taxes Depreciation and Amortization (EV/EBITDA). From the analysis result we come to the conclusion that NAV is the model that have been used the most in the valuation of shipping companies and by far exceeds the second one. In this section we include an in-depth analysis of the specific method as well as an analytical example in which we demonstrate how the analyst arrives at his target price.

The NAV method substantially estimates the market value of the established business and compares it with other companies in the same industry to conduce to the valuation of the share price. At the simplest level, the net asset value is calculated as the asset's value less liabilities:  $NAV = Assets - Liabilities$ . This second variable of debt value is easily identifiable as it is in the financial statements of the valuing company. The other variable, the asset value, is the one that should be appreciated by the analyst. A key determinant of the value of assets is the value of the company's fleet. The valuation of the fleet is basically done in two ways. The first way evaluates the vessels as charter free while the second and most commonly used in practice, evaluate them with an adjusted charter. In the second case, where the whole of the company's fleet is timely chartered, then the assessed value is also easily determinable since the daily freight value and the duration of the charter are usually made known through the company's announcements. There are, of course, cases of listed shipping companies, who do not prefer to time-charter their ships but to charter them for specific voyages on the market (Spot of Freight Market) as they consider that way they can achieve higher freight rates and therefore higher profits. In both cases the value of the fleet should be assessed with some basic assumptions.



This practice which is followed in these cases, is to examine broker reports showing indicative values of ships that are currently in the market (Mark to Market) and take them into account in their valuation. Clarkson's, one of the largest brokerage companies worldwide, is considered to maintain reliable databases (Shipping Intelligence Network) with detailed information and time series as well as weekly and monthly reports that are commonly referenced in valuations. The information mentioned in the Clarkson's reports relates to the type and age of each vessel. There are, for example, prices for ships of different types used for the carriage of dry cargo, oil, containers, etc. Also, values refer to ships of 5,10,15 and 20 years of age. In the case where the valuation of a 12.5 year vessel is necessary then the analyst takes the average of 10 and 15 years. We also consider it important to underline the fact that due to the low liquidity that characterizes shipping, there were times like in the first quarter of 2016 where companies such as Clarkson's were unable to provide any information regarding the values of the ships. At that time the freights of the ships had fallen to their lowest all-time levels. As a result, whenever any evaluation was made by the analysts, it had a strong element of subjectivity.

As mentioned above, the analysts choose to apply mainly the *charter adjusted* method to evaluate the fleet of the company. Part of the procedure required, is also the determination of the present value of the difference between the charter rate and the current market value of the charter, discounted by a rate commensurate with the charter party default. In this case, the market value of the charter is determined on the basis of reports issued by Chartering Brokers Reports. These quote the prices of recently chartered vessels based on supply and demand as they are shaped by the market.

Now that we emphasized on the importance of the valuation of the company's fleet and the assumptions that were needed to be made, we will present in more detail the two generally equal methods to calculate the NAV of a shipping company. The first method consists of totaling the market value of-the-water fleet and new building fleet, less the remaining capital expenditures, plus charter adjustment, less debt, plus cash. The second method entails summing the market value of the on-water-fleet, plus construction-in-progress payments made, plus change in contract value (the difference between the market of the new building fleet and the purchase price), plus charter adjustment, less

debt ,plus cash. Quite possibly, the most closely followed ratio in shipping equity valuation, price/NAV, shows whether the associated equity value trades at a premium or discount to its asset equity value. If a public shipping company is trading at a premium to NAV, it could have the ability to acquire ships or other shipping companies by using its shares as consideration instead of cash. (Kavussanos, Visvikis)

As an example of the way in which analysts use the Net Asset Value method we can point out the report of the Morgan Stanley's analyst for the company Diana Shipping Inc. Specifically on page 3 of this report issued on July 27th 2018, the analyst estimates the target price based on the Net Asset Value method, shown in table 5.1.

				<b>NAV estimate - 2Q2018</b>		
<b>Existing Fleet</b>						
	# of vessels	Avg. Age	Avg. Value	Value (m)	\$ m	\$ per share
Capesize/Newcastlemax	18	7,9	31	551	1.100,00	\$ 10,2
Panamax	32	10,2	17	549	-	-
Supramax	-	-	-	-	82	0,8
Handymax	-	-	-	-	26	0,2
Handysize	-	-	-	-	17	0,2
Other	-	-	-	-	1	0
<b>Total</b>	<b>50</b>	<b>9,4</b>		<b>1.100,00</b>		
<b>Newbuilding vessels</b>						
	# of vessels		Avg. Value	Value (m)		
Capesize/Newcastlemax	-	-	-	-		
Panamax	-	-	-	-		
<b>Total</b>						
Less: Remaining Capex (m)						
Market Value of deposits						
<b>Investments in Diana Shipping Containerships Inc</b>						
DCIX stock price				\$ 1,61		
# of shares in DCIX				0,4		
Ownership stake in DCIX				0,6%		
Value of DCIX investment				1		
Net debt (incl. investments)/ Existing Fleet Value				42%		
Net debt & Capex (incl. invest.)/ Existing Fleet Value (incl. nbs)				42%		
				<b>Existing Fleet Value</b>		
				<b>Newbuilding / Contracted fleet value</b>		
				<b>Less: Remaining Capex</b>		
				<b>Cash &amp; Equivalents</b>	82	0,8
				<b>Restricted Cash / Compensating cash balance</b>	26	0,2
				<b>Other current assets</b>	17	0,2
				<b>Investments</b>	1	0
				<b>Due from related parties</b>	34	0,3
				<b>Other non-current assets</b>	23	0,2
				<b>Total debt</b>	(572,0)	(5,3)
				<b>Current liabilities</b>	(23,0)	(0,2)
				<b>Non-current liabilities</b>	-	-
				<b>Less: Preferred Equity (market value)</b>	(65,0)	(0,6)
				<b>NAV (charter-free)</b>	624	\$ 5,8
				<b>Charter value</b>	(41,0)	(0,4)
				<b>NAV per share (charter-adj)</b>	582	\$ 5,4
				<b># of shares outst. (diluted)</b>		107,9
				<b>NAV per share (charter-free)</b>	\$ 5,8	
				<b>NAV per share (charter-adj)</b>	\$ 5,4	
				<b>Price / NAV (charter-free)</b>		76%
				<b>Price / NAV (charter-adj)</b>		81%
				<b>EV/ Market Value of Assets</b>		90%
				<b>Market Value of Assets (incl. newbuilds)</b>	1.113,00	

Source: Morgan Stanley

This exhibit lists the ships of all the types of the specific company as well as the value in which the analyst evaluates them resulting in the calculation of the total fleet value. As shown, the company have 18 Capesize/Newcastlemax ships with average age 7.9 years, average value 31 million dollars and total value 551 million dollars. Also, Diana Shipping Inc. owns 32 Panamax ships with average age 10.2 years, average and total value of 17 and 549 million dollars respectively. These two types of ships sum up a total value of fleet of 1100 million dollars with average age 9.4 years. After the estimation of the fleet value the analysts proceed to the NAV analysis. He adds to the market value of the fleet the cash (82+26) and the remaining book value of its asset (17+1+34+23). Then he subtracts the total debt (572), the current liabilities (23) and the proffered equity expressed in market values (65). We note that the final estimation of the NAV model

(charter free) results in a value of 624 million dollars. After subtracting the charter value (41) we have the charter adjusted price which is 582 million dollars or 5.4 dollars per share which is the target price of the analyst. Noteworthy is the fact that market value of the fleet per share corresponds to a 119% the price of the stock. In other words, the share price does not reflect all the market value of the fleet the company owns. Finally, just to mention that the current share price on the day of the report's issuance was \$ 4.38 and the analyst proposal for Diana Shipping Inc was neutral.



## 6. ANALYSTS REFERENCES ON SHIPPING SECTOR PERFORMANCE DETERMINANTS.

In this chapter we will highlight the importance and practical use of the factors determining the performance of shipping companies. More specifically, we will cite characteristic excerpts from the reports of the financial analysts who refer to these factors (Section 3). The main purpose of this chapter is to present a brief but comprehensive view of how these determinants are analyzed in practice and not how often they are observed. For each factor we follow up with a comment, giving that way a more interpretive research approach.

The first factor we mentioned in Section 3 was international economic activity and changes in world trade. At the same time we underlined China's important role in shaping global demand. As stating in the report of investment brokerage house Maxim Group, for the shipping company Eurodry Ltd. on June 15 2018:

*"Chinese demand is still the prevailing theme shaping the dry bulk sector, and we expect this trend to continue through our forecast period. China's move towards a more advanced economy should help to spur additional ton-mile demand due to its appetite for commodities. As China continues to transition to a services oriented economy, we expect meat consumption to increase, leading to increased demand for soybean imports (animal feed). Furthermore, Chinese domestic grain production has yet to reach a sustainable level, and we believe the country will look to rely on higher levels of imports to meet domestic demand. And, as China has historically sourced the majority of soybean imports from Brazil and the U.S. (85%+), we expect ton-mile demand growth to remain robust for the Panamax and Supramax segment."*

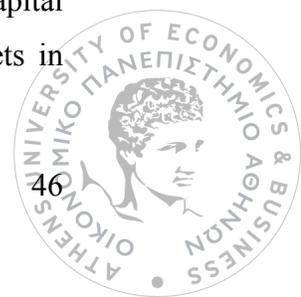
This quotation highlights the fact that the demand for soybean is closely linked to China's import policy. As we mentioned in a previous chapter, China is considered the driver of global dry cargo demand and according to the analyst, due to China's insufficient production in soybeans, it is expected to maintain its policy on high demand for the grains for the upcoming year.

The second factor that we noted on Section 3 is the supply and demand fundamentals that drive the freight rates. The upcoming excerpt that we present as an example is derived from Deutsche Bank's report for the Gaslog Ltd. shipping company on October 10th 2018. More specifically, at page 6 the analyst states:

*"As demand is inflecting higher, supply growth will begin decelerating starting in 2019 with the current orderbook at its lowest level since 2012. From 2000-2018, the LNG carrier fleet grew by an average of 11% per year however we project net supply growth will fall to just 5.7% in 2019 and 6.0% in 2020. Given the 2+ years it takes to build an LNG carrier and the visible orderbook, we have high conviction that supply growth will slow which underpins our positive outlook for global LNG shipping market. Newbuild ordering has picked up in 2018 due to the rising rate environment however we still view the market to be short vessels relative to the growth in liquefaction capacity. We project the market will tighten 4.6% in 2019 and 8.5% in 2020, this would mark the strongest two-year tightening since 2010-2011 when spot rates surged nearly 300% from \$35k/d in 2009 to \$135k/d in 2011. With the market expected to tighten over the next two years, we project rising dayrates, cash flows and asset values across the industry..."*

The analyst here notes the high demand in relation with the expected decelerating supply in 2019 and how they will affect the future rates and assets of the company. Due to the two year period needed in building a new LNG vessels, the supply for shipping services can not adjust to the current demand in the short run. As a result, the market is expected to tighten over the next two years and the daily freight rates, cash flows and asset values are likely to rise. Indicating is also the fact that in a similar case during 2010-2011 the spot rates surged nearly 300%.

The third important factor is the new environmental regulations that could possibly drive higher scrapping. These 2020 IMO regulations (The marine sector will have to reduce sulphur emissions by over 80% by switching to lower sulphur fuels.) lead to increased scrapping by forcing owners to either scrap earlier or makes significant vessel capital expenditures to remain operationally competitive. Noble Financial Capital Markets in



their report for Pyxis Tankers Inc on April 23 2018 note:

*" In January 2020, new stricter regulations on sulfur emissions kick in and the limit on the sulfur content in bunker fuel drops from 3.5% to 0.5%. Tanker owners, as well as other marine transportation companies, will face an investment decision; either install a scrubber (~\$3.0 million cost vs. ~\$4.0 million vessel scrap value) to continue to burn the same heavy fuel oil (HFO), or pay a premium (currently ~ \$240 per ton or \$7,200 per day) to burn marine gas oil (MGO) or low sulfur fuel oil (LSFO) fuel and operate at slower speeds to manage fuel consumption. "*

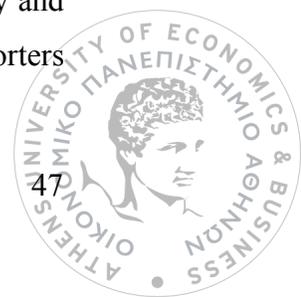
The analyst here tries to visualize in numbers the costly installment of the scrubber and how this will affect the performance of the vessels if they chose not to.

The fourth factor we consider significant is the dividend yield. Companies operating in "mature" sectors with limited prospects of achieving high growth rates usually opt for a high or stable dividend distribution rate. Investors and analysts therefore look forward to high dividend shipping companies. As an indicative example we point out the statement in page 4 of Arctic Securities regarding the dividend policy of Nordic American Tanker Shipping Ltd. The report was issued on October 24 2018.

***84 consecutive quarter of dividends*** – *As mentioned above, since listing back in 1995, one of NAT's key focuses has been to distribute cash to its shareholders. In fact, the USD 0.02 per share dividend announced for the third quarter of 2018 marks the 84th consecutive quarter of dividend from NAT. We expect that paying dividends will remain a key priority in the future as well. With a depressed tanker market and an unresolved funding situation, we believe that NAT will continue to distribute small, symbolic dividends. However, once the market recovers and the financing situation is resolved, we expect that NAT will increase its distributions to become a function of its earnings.*

The analyst here underlines the 84 consecutive quarter dividends that were given to the shareholders. It is a significant driver for the performance of the stock the ability of Nordic American Tankers to be able to maintain a stable sustainable dividend yield per share even if at difficult times is not that high.

The fifth factor determining shipping efficiency is the international financial activity and the changes in the global trade. China and USA which are considered major importers



and exporters of manufactured goods can affect the daily freights of containership companies with their currently active war trade. Specifically, Maxim Group refers at page 3 in its report for SINO-Global Shipping America company issued on 17 September 2018:

*" The trade imbalance between China and the U.S. has led to a disproportionate number of empty containers leaving the U.S., which has led to lower freight rates for liner companies. Through its proprietary freight matching and logistical expertise, SINO is able to increase the amount of cargoes exported to China from the U.S. By operating an asset-light model with strong freight matching capabilities, SINO is able to offer lower container rates, helping the company win market share. Coupled with the company's partnership with COSCO, SINO should be able to take advantage of growing exports of empty containers as liner companies look to increase outbound container revenues. "*

The analyst points out the imbalance of the two countries and how this affects the freight rates. In addition, he describes how the company manages to cope and how it can benefit from such harsh condition for the liner sector.

Last but not least, we mention as an important determinant for shipping companies' efficiency the age of the fleet. We have mentioned in previous sections the importance of the fleet and how it is determining the price of the stock through the NAV model. In this section we offer the analyst's view on this factor by providing an excerpt from JPMorgan investment brokerage house report issued on 17 October 2018 regarding Diana Shipping Inc.

*" The table below shows our NAV estimate for DSX at the end of 2019 as well as an estimate of how much cash flow can be generated relative to the loss in value of the fleet as it ages. Using depreciated new build values, NAV is \$6.06, while using current asset values, NAV is \$5.33."*

The analyst here refers to the connection between the fleet age and the cash flow generated due to the depreciation of the vessels. As the fleet ages it is expected to have higher operational expenses (fuel consumption, maintenance and survey annual costs). Moreover, according to JPMorgan analyst:

*" A decline in the market value of the company's fleet could negatively impact the company's borrowing capacity and/or result in non-compliance under restrictive covenants."*

As the fleet ages and therefore lose market value, the company find difficulties in raising debt with beneficial terms and sometimes restrictive covenants are forced for this reason.



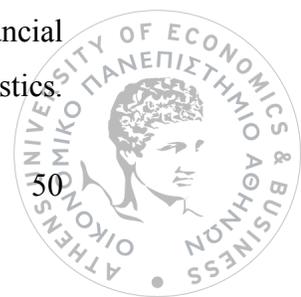
## 7. CONCLUSIONS

The primary purpose of this dissertation is the examination of the valuation models used by the sell-side research analysts for their valuations of shipping stocks. For this purpose, a sample of one hundred eleven (111) analysts' reports was used, which included listed shipping companies in the NASDAQ and NYSE stock exchange. The examined time period of these reports was from the 1<sup>st</sup> of January to the 31<sup>th</sup> of December 2018.

It is worth to mention some restrictions that we faced in the investigation of our research. The database of Thomson Reuters Eikon does not co-operate with all the investment brokerage houses and as a result does not include reports from all the financial analysts who cover the valuation of shipping stocks. However, we believe that our results are representative of the practices the financial analysts use, as our sample includes reports from seventeen (17) brokerage houses. (Morgan Stanley, JPMorgan, Deutsche Bank etc.)

Concerning the study of the financial reports, we assume that the financial analysts present, in the content of the report, the model they really used to conclude the stock's fair value and not the model they chose in order to "satisfy" better the investors with the result of their valuation. Even we cannot totally eliminate this peril; we believe that we largely restrict it by analyzing reports that exceed the ten (10) pages because there is a more extensive analysis to the used valuation models and how they determine the target price.

The empirical analysis of our research has shown that the methods that dominate analysts' preferences are the Net Asset Value method, a synthetic algorithm (SMW) of multiples called StockMarks, the Enterprise Value to Earnings Before Interest, Taxes, Depreciation and Amortization method and lastly Price to Book model. Out of one hundred eleven (111) reports, the analysts prefer NAV method as their primary model for target price estimation in sixty three (63) reports. The other three mentioned methods which are multiples are preferred in thirty four (34) reports in total. The first method, although not widely used elsewhere, is considered one of the most important in the maritime sector. The reason for its frequent application to companies in this sector is explained by its particular qualitative characteristics and mainly by the significant degree of asset consolidation. Subsequently, it was examined to what extent the preferences of financial analysts differ in cases of valuating companies with different qualitative characteristics.



Particularly, whether there is a differentiation in valuation cases depending on the financial results of the company and also, according to the degree of optimism or pessimism they have regarding future prospects of the specific stock which is expressed as the difference in target price from its current market value. The results demonstrate that analysts show a preference for using non earnings related methods such as NAV and P/B multiple in cases of profit making companies. In contrary, for loss making companies there is a tendency to use multiple models like the SWM synthetic multiple we mentioned in a previous chapter and EV/EBITDA method. Finally, for company valuations, based on the degree of optimism or pessimism the results show that NAV model is favoring the expectations of the analysts for high increase in the near future, whereas SMW synthetic multiples algorithm seems to be the most optimistic regarding the future stock price of the shipping companies.

In conclusion, in Chapter 5 we encapsulate the practical application of the most used model, according to our research, which is the NAV method. Referring to specific examples, from the reports of our sample, we present the process in applying these models. At the same time an interpretation is made of the effects extracted from their application. Moreover, with excerpts from reports issued by the investment brokerage houses, we demonstrate the importance of the risk factors that affect the financial performance of shipping companies, which have been discussed in previous Section. The analysts in the valuation process, take these factors into consideration as they affect their estimation to some extent.

This study contributes to filling a gap in international bibliographies by examining the valuation methods used in practice to calculate the fair value of maritime transportation stocks. Nevertheless, the recommendation of this thesis, is that further research can be conducted in order to examine how well these models can estimate and therefore interpret the companies' fair value of other transportation sectors which are heavy asset consolidated such as airplane transportation companies. Moreover, future research in the area could potentially investigate the effectiveness of book value models to reflect the short-term supply and demand shocks which affect directly the market value of the shipping companies.



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