RISK ESTIMATION OF SHIPPING RELATED PUBLIC LISTED COMPANIES IN MALYSIA

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Research report in partial fulfillment of the requirements for the degree of MBA

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ABSTRAK

Industri perkapalan adalah salah satu kegiatan utama dalam perdagangan dunia. Industri berkaitan dengan perkapalan adalah sektor yang sering dianggap sebagai perniagaan yang berisiko tinggi berbanding dengan sektor-sektor lain dalam ekonomi. Penyelidikan berkaitan dengan industri perkapalan akan meningkatkan mutu keputusan pelaburan dan menggalakkan pelaburan dalam sector ini. Kajian ini akan meneliti 14 syarikat berkaitan perkapalan yang disenaraikan di Bursa Malaysia. Kajian menggunakan "Capital Asset Pricing Model" (CAPM) akan digunakan untuk menguji pengaruh pelbagai indeks pasaran terhadap syarikat berkaitan perkapalan tersebut. Dua indeks pasaran tempatan iaitu Indek Komposit Kuala Lumpur dan Indek Perdagangan / Perkhidmatan Bursa Malaysia dan dua indeks antarabangsa iaitu Indek MSCI World Marine dan Baltic Dry Index selang digunakan sebagai proksi pasaran dalam kajian ini. Tafsiran yang berbeza berkenaan dengan risiko sistematik dan penilaian harga saham bergantung pada pilihan proksi pasaran yang digunakan. Maka member pengesahan kepada penemuan kajian lepas bahawa pengukuran risiko and pulangan bergantung kepada proksi yang digunakan. Indek Komposit Kuala Lumpur menghasilkan R^2 yang tertinggi dan dianggap sebagai model yang paling baik dalam penilaian saham-saham tersebut. Selain CAPM, model makroekonomi juga digunakan untuk menyiasat hubungan risiko dan pulangan saham-saham berkaitan perkapalan. Penyelidikan ini mendapati bahawa Indeks Pengeluaran Industri Malaysia tidak mempunyai pengaruh signifikan manakala faktor harga minyak mempunyai pengaruh signifikan terhadap saham-saham tersebut. Keseluruhannya, kajian ini menyimpulkan bahawa saham-saham berkaitan perkapaln yang disenaraikan di Bursa Malaysia mempunyai risiko yang sama dengan pasaran and harga-harga saham berada pada paras yang berpatutan.

ABSTRACT

Shipping is one of the major activities in world trade. The shipping related industry is a sector often perceived as risky business in comparison to other sectors in the economy. This study on Malaysian shipping related companies will enhance investment decisions and encourage investors to place a different weight of their investment funds in shipping sector. This study examine 14 shipping related companied listed in Bursa Malaysia. Capital Asset Pricing Model (CAPM) was employed to examine the influence of various market indexes on the risk return relationship of Malaysian public listed shipping related companies. Two local market indexes i.e. Kuala Lumpur Composite Index and Bursa Malaysia's Trading/Services Index and the other two international indexes i.e. MSCI World Marine Index and Baltic Dry Index were alternatively used as market proxy in this study. Different interpretations of systematic risks and valuations of the stocks were observed depending on the selection of market proxy confirmed earlier studies that risk return measures are dependent on market proxy used. The Kuala Lumpur Composite Index produced the highest R^2 and exhibited the best fit in explaining behavior of the stocks. Besides CAPM, the multifactor model using macroeconomic model were used to investigate the risk and return of the stocks. This study found that Malaysian Industrial Production Index has no significant influence on shipping related stocks; however, the oil price significantly influenced the risks and returns of stocks. Overall, this study showed that Malaysian shipping related stocks exhibit systematic risks that are indifferent with the general market and they are correctly priced.

Chapter 1

INTRODUCTION

1.0 Background of the Study

Shipping is one of the major activities in world trade. According to Kavussanos & Marcoulis (2005), over 95% of world trade in volume terms transported by sea. There were numerous researches available on the diversification potential of alternative assets such as hedge funds, private equity, and real estate. However, relatively little research has been done on investments in shipping industry (Grelck *et al*., 2009). The water transportation industry is a sector often perceived as risky business in comparison to other sectors in the economy. According to Kavussanos & Marcoulis (1997), this perception of high riskiness in the sector might be a reason that even though water transportation companies go public, they did not attract a large number of investors. Kavussanos and Marcoulis (2005) mentioned that "the water transportation industry is a capital intensive industry which required huge investment outlays, while on the other hand it is subjected to cyclicality which more often than not is beyond the industry's control. This cyclicality is a result of the industry serving the world economy through the transportation of world trade which is a fact of life that the world economy goes through cycles and along with it world trade goes through cycles as well. Consequently, the water transportation industry is also subject to cycles whose amplitudes are a function of those of the world economy and of the demand and supply situation in the water transportation market".

Traditionally, shipping companies raise funds from financial institution such as banks. Only in the 1980s and in 1990s, shipping company began drawing funds from public such as through asset back finance (Kavussanos, *et al*., 2003). Risk-return profile in shipping industry is crucial in public funding. This is to enable valuation on the stocks of the shipping related industry by potential investors. The investors, who are not necessarily involved in the physical operation of the shipping related service, but are interested in investing in portfolios comprising shipping related stocks then, shall select the stocks based on its risk-returns trade-off. Cullinance and Gong (2002) evidenced that due to higher investment risk, the new issuance of water transportation stocks have to incur higher premium than other transport industry sectors.

In addition to the market condition, stock returns were also influenced by other macroeconomic fundamental factors and it was believed that by examining the sensitivities of industry stock returns to the set of fundamental macroeconomic factors, the investment manager may understand the behavior of stock prices better and therefore make better investment decisions (Kavussanos & Marcoulis, 2002). This reality has been observed by King (1966) who was suggest that stock price changes can be explained as a weighted sum of several factors such as market, an industry, and a company effect. Kavussanos *et al*., (2003) evaluated the systematic risk in international shipping and shipping related industry including changes in the economic, political and sociological environment. A further study on Malaysian shipping related companies will enhance investment decisions, possibly encourage investors to place a different weight of their

investment funds in shipping related sector and also shed some light as to the driver of value in this sector.

1.1 Shipping Industry in Malaysia

The Strait of Malacca is one of the world most important routes for merchants between East and West side of the world. According to Maritime Institute of Malaysia (MIMA), about 50% of global energy shipments pass through the Straits of Malacca every year. Between 2000 and 2008, LNG/LPG tankers using Straits of Malacca grow by 26% from 2,962 to 3,726. The number of merchant vessels exceeding 300 GRT which pass through the Straits increased by almost 37% while container and general cargo vessels rose 41% over the same period (www.mima.gov.my).

For Malaysia, its strategic location on the Straits of Malacca and South China Sea has spurred the formation of seaports along its peninsular coastal line. Major seaports located in peninsular Malaysia include Penang Port and Lumut in the north, Port Klang at the center, Port of Tg. Pelepas at the south and Kemaman and Kuantan Port at the east. In East Malaysia, the major seaports are Kuching, Bintulu and Miri port in Sarawak and Kota Kinabalu and Sandakan port in Sabah. Being at strategic locations, these ports have benefited from world trade. Numerous of these ports are owned by publicly listed companies (Bintulu Port Holdings, Integrax and Suria Capital) in Bursa Malaysia.

According to MIMA, in 2009, Malaysia ranked the 18th largest maritime nation in the world by United Nations Conference on Trade and Development (UNCTAD). In this regards, Malaysia contributing 1.3% to world maritime trade volume and merchant shipping tonnage (www.mima.gov.my). As Malaysia is one of the major exporting countries in the world, the demand for shipping services has encouraged establishment of numerous of local shipping companies. Malaysian International Shipping Corporation or MISC is one of the largest Malaysian owned shipping companies listed in Bursa Malaysia. MISC is one of the major players in oil tankers services as well as container liner services. Other sizable vessel owners are Global Carrier, Hubline, Malaysian Bulk Carrier, Malaysian Merchant Marine and PDZ Holdings. Beside local players, other major foreign owned companies such as Maersk Line, CMA CGM Group, Mitsui O.S.K Lines, Evergreen Marine Corporation, Mediterranean Shipping, Hapag-Lloyd, K-Line and Cosco are competitors with the local shipping companies.

As trade increases, more ships plying the local ports and this has spurred the demand of other related services such as ship building, yard and ship repair activities. Local companies in this area are Boustead Heavy Industry, Coastal Contract and Scomi Marine. This is a highly competitive industry requiring heavy investment, modern technology and equipment and skilled workforce to compete with foreign shipyard such as Korea, China and Japan.

Local authorities overseeing the shipping sector is Domestic Shipping Licensing Board (DSLB), Malaysia Maritime Enforcement Agency and Marine Department. DSLB is responsible for the issuance of licenses to Malaysian as well as foreign registered vessels. Local shipping activities are governed by regulations such as Merchant Shipping Ordinance, Merchant Shipping Act, Merchant Shipping Order and also Boat Rule.

1.2 Problem Statement

Shipping related industry is always associated with high risk and very capital intensive kind of industry. The higher investment risk of water transport stock has resulted in higher risk premium than other transport industry on the new issuance of stocks in this sector as according to Cullinance and Gong (2002). There were numerous researches on U.S. as well as international water transportation companies but there are very little researches focusing on public listed shipping companies in Malaysia. Thus, investors may have limited avenue to obtain an insight on the risk and return profile of this industry. One of the reasons to study Malaysian shipping related stocks is; these companies do not have such a long history, with most companies entering the stock exchange to raise funds in the 1990s and early 2000s.

In the studies of risk and return of stocks, there are no conclusive findings on the most appropriate model either CAPM or multifactor model. For example, Kavussanos and Marcoulis, (2005) supported the application of CAPM due to its simplicity and also

Chang (1991) who argued that the market model was the best model compared to a variety of different macro model because a typical market index reflects as much relevant information as does a typical multifactor model. However, there are others who have contradictory view such as Naughton and Veeraghavan (2005) who argued that CAPM alone was inadequate to evaluate the performance of equity and hence a multifactor was an appropriate model rather than CAPM model. As such, there is a need to find a suitable model for the estimation of risks and returns of Malaysian shipping related stocks.

Kavussanos *et al*., (2003) suggested that the selection of the proxy index can lead to different interpretation on the fair pricing of stocks and may affect the evaluation of maritime fund managers' performance as a consequence. Gong *et al*., (2006) also found that the selection of market proxy can lead to difference estimations of shipping related stocks' systematic risks. This has risen a question on how sensitive are Malaysian shipping related stocks to various market indexes in term of risk and return relationship.

Besides the market, it is important to understand other factors which would influence the risks and returns of Malaysian shipping related stocks. Kavussanos and Marcoulis (2005) suggested that industrial production index and oil price impact directly on the returns of shipping related stocks. Drobetz *et al*., (2009) found the same phenomenon when they examined the returns of international shipping related stocks. As Fama (1991) pointed out, any correlation found between fundamental factors such as macroeconomic factors and returns of stock can be documented it may lead to a better

understanding of the behavior of stock prices and hence will resulted in better investment decisions.

1.3 Research Objectives

The first objective of this study is to examine the risk-return profile of Malaysian shipping related stock. This shall include the investigation on the sensitivity of the shipping related stock against local market proxies and international market proxies by using Capital Asset Pricing Model (CAPM).

The second objective is to determine whether the shipping related stocks are undervalued, overvalued or correctly valued. Mispricing of stocks is measured by the alpha value from CAPM as well as multifactor model.

The third objective is to investigate the influence of macroeconomic factors on the risk-return profile of Malaysian shipping related stocks. The sensitivity of the shipping related stock will be examined against macroeconomic variables using multifactor regression model.

1.4 Research Questions

1. How do the risk-return behaviors of Malaysian shipping related stocks influenced by local market indexes such as the Kuala Lumpur Composite Index (KLCI) and Bursa Malaysia's Service/Trading Index (BMSTI); and by international indexes such as MSCI World Marine Index (MSCIWMI) and Baltic Dry Index (BDI)?
2. On average, is the Malaysian shipping related stocks over-, correctly or under- priced during period under reviewed?
3. Do the macroeconomic factors influence the behaviors of the Malaysian shipping related stocks?
4. How well do CAPM and multifactor equations explain the risk and return of Malaysian shipping related stocks? And thus, which model can be considered as more suitable in estimation of risk and return for Malaysian shipping related stocks.
5. Is there any difference on the α and β generated by CAPM and multifactor macroeconomic model?

1.5 Significance of the Study

This study will be useful to individuals involved directly or indirectly in the shipping related business such as investors, bankers and managers. This study will provide an insight into the risks and returns profile of Malaysian shipping stocks and assist those involved in this business to make better and accurate decisions in financing as well as in

investing. For the shipping manager and banker who involved in the evaluation of shipping related companies and in financing, this study can be useful particularly for calculation of cost of capital, capital budgeting and determination of capital structure.

More choices are available to investors to invest in shipping related industry with more companies being listed in Bursa Malaysia. However, investors must be able to evaluate the risk and return profile on this sector before making any decision to invest. Generally, this study shall contribute to better understanding of risk-return relationship, increases investors' confidence and thus driving the sustainability of investing as well as financing environment in this industry.

1.6 Organization of the Study

The First Chapter of this study is the introduction which includes background related to shipping industry, problem statement, research objectives, research questions, and the significant of the study. Second Chapter will focus on the review of related literatures, theoretical framework and development of hypothesis. Chapter Three provides for the methodology used in this study. The collected data will be analyzed and presented in Chapter Four. The conclusion, discussion and limitation of the study can be found in Chapter Five, besides; some recommendations for future research will be presented.

Chapter 2

LITERATURE REVIEW

2.0 Introduction

The single factor CAPM and multifactor model are two methods used in risk-return analysis. Researchers in financial field such as Kavussanos and Marcoulis (1997, 2001, 2005), Kavussanos *et al*., (2003), Gong *et al*., (2006), Drobetz *et al*. (2009) and Grelck *et al*., (2009) have been using CAPM and multifactor model in their studies on behaviors of shipping related stocks. Besides, several market indexes, micro- and microeconomic factors have been employed by the researchers in their studies of risks and returns of shipping related stocks. This chapter shall delve into the previous studies on CAPM, shipping related industry and multifactor studies.

2.1 CAPM Model of Risk and Return Relationship

CAPM is a linear function of a single factor that estimates the expected return on the market portfolio of assets. It was developed by Sharpe (1964, 1970) and Lintner (1965) independently. This idea can be link to a research by Markowitz (1952 & 1999) that when an investor holds more than one stock in their portfolio, the overall risk of the portfolio will be decreased and thus offer safer returns to the investors. However, one problem with a large portfolio of stocks was the difficulty in the calculation of variance-

covariance matrix of which measure the risk of the portfolio. As a result, Sharpe (1964) and Lintner (1965) developed a single factor which can be explained by the market returns and thus the birth of CAPM. In the application of CAPM, it was assumed that (1) investors act as though the stock prices are unaffected by their trade; (2) investors hold the stock for one identical period; (3) investors may borrow or lend any amount at risk free rate; (4) there is no whatever costs in the trading of stocks and no taxes on the stocks returns; (5) investors are rational mean-variance optimizers; and (6) all investors analyze stocks in the same manner. This assumption also called homogenous expectations. Due to the homogeneous expectations, the price of a particular stock already reflects all available information and this phenomenon were referred to Efficient Market Hypothesis or EMH. As such, EMH implied that investors should only expect to obtain a normal rate of return on the stock traded (Ross *et. al.,* 2008).

Numerous of researches in the area of shipping related industry have been carried using CAPM despite the fact that there was no consensus among practitioners regarding the right model to be used for estimating the cost of capital. Among them were Kavussanos *et al*., (2003), Kavussanos and Marcoulis (2005), Gong *et al*, (2006) and Drobetz *et al*. (2009). Previously, most researches were employing the capital asset pricing model (CAPM) mainly due to its simplicity (Kavussanos and Marcoulis, 2005). Following equation describes the relationship between returns of stock and its systematic risks:

$$\check{R}_{it} = R_{Ft} + \beta_i(\check{R}_{Mt} - R_{Ft}];\ i = 1,\ldots..,n;\ \ t = 1,\ldots.,T \qquad (1)$$

Where $\check{R}_{it}$ is the expected return of stock *i* at time *t*, R_{Ft} is the risk-free rate of return at time *t*, $\check{R}_{Mt}$ is the expected return on the market portfolio at time *t*, and β_i is stock *i*'s systematic risk or beta, a measure of the stock's sensitivity to movements in the market portfolio. As R_{Ft} is not a constant over time, equation (1) cannot be used to estimate beta coefficient accurately, β (Miller & Scholes, 1972). According to Kavussanos *et al*., (2003), this problem has been solved by Black *et al*., (1972) by using their time series model:

$$R_{it} - R_{Ft} = \alpha_i + \beta_i(R_{Mt} - R_{Ft}) + e_{it};\ i = 1,\ldots..,n;\ \ t = 1,\ldots.,T \qquad (2)$$

Where R_{it} is the holding period return on the equity of the stock *i* in period *t*, R_{Ft} is the risk free rate, R_{Mt} is the holding period return on the market portfolio of stocks in period *t*, and e_{it} is the non-systematic or specific risk. α_i and β_i are the CAPM parameters for stock *i*. α values indicate whether the stock is correctly price or mispriced. The β is a measure of sensitivity of stock's returns against the changes in the market returns. A stock with β higher than one indicates that it has above average systematic risk and therefore required a higher expected return to hold it. On the other hand, if a stock's β is lower than one, it is said to pose a lower than average systematic risk. CAPM suggests that if a stock is correctly priced it should have α of zero. A stock said to be overpriced when α is

negative while its return is higher than interpreted by CAPM. A positive α indicated that a stock is underpriced since its return is lower than implied by CAPM.

Using logarithmic, monthly returns in percentage for company *i* at time *t*, R_{it} was calculated using the following equation:

$$R_{it} = 100 * \text{In}[P_{it} / P_{it\text{-}1}] \qquad (3)$$

Where P_{it} and $P_{it\ -\ 1}$ are the stock prices of company *i* at time *t* and *t* - 1, respectively and are excluding the dividend.

Drobetz *et al*. (2009), investigated the common risk factors affecting the shipping industry and its subsectors such as container, tanker, and bulker shipping. The sample consisted of the monthly returns of 48 publicly-listed shipping companies over the period from January 1999 to December 2007. They examined the risk exposures of shipping stocks using a set of country or other industry equity indices to estimate the economic risk profiles and the corresponding factor risk premiums.

In the study, Drobetz *et al*. (2009) tested the null hypothesis and revealed that all beta coefficients were equal across the shipping subsectors as well as across all market indexes. Besides MSCI world index, multiple market indexes were used as proxy to global market such as the Clarkson Liner Share Price Index, Clarkson Tanker Share Price

Index, and Dry Bulk Insight, a monthly report published by Drewry Publications. Drobetz *et al*. (2009) and Sercu *et al*. (2008) suggested that portfolio of stocks rather than individual stock should be used to estimate the aggregate risk-return characteristics of the shipping sector because beta estimations of portfolios were more reliable than of individual stocks. This was supported by Dimson (1979), Scholes and Williamson (1977) that the formation of portfolios can prevent problem of a possible thin trading bias, which has been reported for small stocks.

When single factor regression was used, Drobetz *et al*. (2009), reported that the estimated betas of the shipping industry were around one, implying that from a statistical point of view all of them were indifferent from unity. The coefficients for the subsectors of the shipping industry were also indifferent with each other. The intercept or the alpha values from the regressions of the shipping sectors were all positive and strongly significant. This implied that the shipping sector was systematically underpriced. Drobetz *et al*., (2009), found that the R^2s of the regressions fall into the range between 0.16 and 0.32. This was comparatively low to the market model regressions involving country and sector indices, but still relatively high compared to previous studies. This shown that the systematic risk in the shipping sector has increased over time. They claimed that little of shipping stocks' systematic risk that can be explained by the single beta model.

Chang (1991), attempted to compare (i) a single-factor market model, (ii) a multifactor pure macro model, and (iii) a combined macro-market model with connection

to pricing significance of factor risks, parameter stability, and forecasting ability. Using a multifactor macroeconomic model, the author discovered a market factor which represented an aggregate consensus measure of all the existing factors and six other less significant factors. Chang (1991) also found that the market model outperformed the pure multifactor macro model in predicting portfolio returns both inter-temporally and cross-sectionally. Another significant finding from Chang (1991) was; pure macro model might be empirically inferior to the simple market model. Nevertheless, he also argued that pure macro model was almost as good as market model once a market residual variable was included in the estimation. Of this phenomenon, Chang (1991) argued that the market model was the best model over a variety of different macro model because as much relevant information has been reflected in a typical market index compared to a typical multifactor model.

2.2 Risk and Return in Shipping Related Industry

In a previous study on the behavior of various industries in U.S., Kavussanos and Marcoulis (1997), found that the water transportation industry exhibited lower than the average systematic risk over two sub-periods (66 months interval each from July 1984 to June 1995) as indicated by beta being significantly less than unity. Nevertheless, the systematic risk of the water transportation industry showed no difference over the two sub-periods analyzed. Thus, Kavussanos and Marcoulis (1997) concluded that water transport was the only transportation industry with a market beta which was significantly

lower over period under reviewed. The results showed that the water transportation industry exhibited the lowest average market beta compared to other transportation industries such as air, rail and truck. In the study, Kavussanos & Marcoulis (1997) also found that the systematic risk of each industry remains unchanged as estimated using CAPM equation and multifactor model. However, they argued that the magnitude of the constant or alpha value for each industry changes at least in some industries when moving from the single factor CAPM to the multifactor model. For example, the CAPM tends to overestimate the constant when compared to the multifactor model for six out of eight industries in their sample for the whole period.

In a subsequence study, Kavussanos *et al*., (2003) compared the behaviors among various subsectors in the shipping-related industry. They examined whether systematic risk differs from the average in the market and across sub-sectors of the maritime industry. In the study, Kavussanos *et al*., (2003) classified 108 public listed shipping and shipping-related companies across stock exchanges of the world according to their core business activity. They grouped maritime company listed continuously in stock exchanges in the world over 3-years period from 1996 to 1999 under pre-defined sub-sectors of the industry such as bulk, container, cruise, drilling, ferry, offshore, shipping, tanker, yard, diversified and a category which shall include all of the mentioned.

To include the possible effect of diversification on the risk-return profiles of sectors, the companies were further classified and analyzed according to whether 60, 75

and 90% of their core business activity was in the same sector. 36 monthly time series data of returns were used to enable estimation, analysis and inference. Kavussanos *et al*., (2003) used the Capital Asset Pricing Model (CAPM) to estimate the stocks returns and measure shipping sector's systematic risk or beta coefficients for the period under reviewed.

Kavussanos *et al*., (2003) applied various market indexes such as Morgan Stanley Capital International (MSCI) All Country World Index (MSCI-ACWI) and MSCI International Shipping Index (MSCI-ISI) for their CAPM model. MSCI International Shipping Index is a sectoral index which maritime funds used to benchmark. It is one of the 38 industry indexes introduced by Morgan Stanley where they attempt to construct homogenous groups of stocks which are expected to react similarly to economic and political trends and events (Kavussanos *et al*., 2003).

Kavussanos *et al*., (2003) evaluated the average R^2 values for the regression of excess stock returns against the excess return over the MSCI-ACWI and MSCI-ISI respectively for each sectors across classification criteria. They found that R^2 values of regression against MSCI-ACWI were ranging from 0.02 to 0.35. This showed that the behaviors of the stocks in the sectors were not very well explained by the CAPM equation. However, comparatively the R^2 values for regression against MSCI-ISI were found to explain the stocks' behaviors better than the MSCI-ACWI.

Kavussanos *et al*., (2003) also attempted to investigate possibility of mispricing using values of average αs. They claimed that more sectors appeared to be correctly priced when the MSCI-ISI was used as the market proxy for estimation in comparison to the MSCI-ACWI. Kavussanos *et al*., (2003) concluded that interpretations on the fair pricing of stocks were influenced by the selection of the proxy index.

In examining β coefficients, Kavussanos *et al*., (2003) found that the values were significantly different from zero using both MSCI-ACWI and MSCI-ISI in CAPM regression. They reported that grouping all maritime sectors together, the β coefficients were significantly lower than market. This implied that on average maritime stocks exhibit below average market risk. As such, Kavussanos *et al*., (2003) opined that the formation of international portfolios including stocks listed across country borders in the industry will certainly reduced average market risk and thus gaining benefit from international portfolio diversification.

In a recent study, Gong *et al*., (2006) investigated whether the differences in the values of the estimated beta may be influenced by on the proxy selected to represent the market portfolio. In the study, Gong *et al*., (2006) utilized the same sample as analyzed by Kavussanos and Marcoulis (2001) of which comprised of 14 water transportation stocks and 13 air transportation stocks which were listed on the US stock exchanges during the period from July 1984 to June 1995.

According to Gong *et al*., (2006), the differences in the values of the estimated beta may be significant depending on the proxy selected to represent the market portfolio. In this context, Gong *et al*., (2006) utilized CRSP equally weighted market index and CRSP value weighted market index together with the returns data of shipping related stocks which were retrieved from the University of Chicago's Centre for Research in Security Prices (CRSP) database as at December 1999. The average beta for the whole period under review was estimated to be 0.88. However, these results were found to be lower (0.9411) than estimate by Kavussanos and Marcoulis (2001) through CAPM and with the S&P 500 Composite as the market proxy. Subsequently, Gong *et al*., (2006) found that when CRSP's value weighted market index was used, the average beta was found to be 1.10. They observed that 27 out of 28 cases in the study, the use of the value weighted market index appeared to produce higher beta estimates and thus they concluded that beta was higher using the value weighted market index as compared to the equally weighted market index.

To probe further, Gong *et al*., (2006) conducted a paired-observations *t*-test of differences on the average betas estimated using value weighted market index and equally weighted index. They found that the average beta was indeed significantly higher using the value weighted index. According to Fama (1976) and Brailsford *et al*., (1997), a value weighted index reflects more of a true market portfolio and as such it is probably preferred in the sense that it is able to produce a more reliable and consistent beta estimate (Gong *et al*., 2006). However, Gong *et al*., (2006) did not explained why the US-listed

water transport industry exhibit relatively low market betas despite being perceived as a risky business which required substantial capital and operating leverage. As such, even if it can be argued that the most significant business risks inherit within this industry sectors were diversifiable but does not adequately explained for the phenomenon of low value betas. This may due to the influence of other factors such as economic and operating characteristics that were directly related to the key determinants of systematic risk (Gong *et al*., 2006).

Grelck *et al*., (2009) compared several portfolios consisting of bonds and stocks. The bond and stock performance were obtained from the Lehman Bond Composite Global Index and the MSCI World Index, respectively. They further enhanced the portfolios containing an investment in shipping as a third component using MSCI World Marine Index as a proxy. The MSCI World Marine Index represents the investment in shipping. It aggregates the performance of 10 major listed world shipping stocks which have a relatively long data history. Two hypothesizes have been developed and tested in the study i.e. Hypothesis 1: Investments in shipping provide attractive risk-return combinations and Hypothesis 2: Adding a shipping component to traditional stock and bond portfolios enables investors to achieve more efficient risk-return combinations. Grelck *et al*., (2009) found that investment in shipping stocks yielded an attractive risk-return combination and there were almost no evidence to show that addition of an investment in shipping stocks to the base portfolio worsened diversification. However, two points have been concluded by Grelck *et al*., (2009) in their study; (1) the composition of

the shipping stocks portfolio significantly influence the portfolio performance, (2) diversification effect were not consistent throughout the period under review with larger diversification benefits during the bear market from March 2000 to March 2003 compared to the bull market from April 2003 to October 2007.

2.3 Macroeconomic Determinants

Typically, there are two common approaches to analyzing and selecting stocks such as fundamental and technical analysis. Traditionally, technical analysis attempts to exploit market inefficiencies by identifying for recurring stock price movement patterns. Whereas, fundamental analysis is based on the idea that any stock has an intrinsic value which is related to the general state of the economy, the market, the structure of the industry the company operates in, and the company's internal fundamental factors.

Kavussanos and Marcoulis (2005) examined single index models under which the market index alone was assumed to be a driving force behind market returns, and then they extends this idea to multi index models where sets of macroeconomic factors were considered as possible additional factors influencing stock returns. At the global level, shipping companies were classified into a numbers of subsectors according to similarity in their characteristic. Kavussanos and Marcoulis (2001), for instance, classified stocks into industries group based on the SIC (Standard Industrial Classification) index. They argued that the rationale for selecting the aforementioned industries was that the air

transportation, rail transportation and trucks industries were categorized as transportation industries and hence competing with the water transportation industry in the investor's stock selection decision (Kavussanos and Marcoulis, 2005).

Identification of possible factors that drive the returns for these stocks was also an equally important element to consider. According to King (1966) who proposed that stock prices were determined by developments at the macroeconomic level, which also affect industries and the stock market in general. On the other hand, the developments at the company's microeconomic level are in turn affect its fundamentals and hence its value.

While numerous of studies have been carried out to test the multi-factors model using macroeconomic factors, Chen *et al*., (1986) were among the first to test a set of economic factors which should affect stock returns. They utilized the following factors: inflation; the term structure of interest rates; risk premium and industrial production and evidenced that these factors were significant in explaining stock returns. According to Kavussanos and Marcoulis, (2005), Salomon Brothers (better known today as Salomon Smith Barney) have developed a macroeconomic model which used seven variables to estimate stock returns. The macroeconomic factors were: economic growth, the business cycle, long-term interest rates, short-term interest rates, inflation shock, the U.S. dollar and a market proxy. According to Kavussanos and Marcoulis, (2005), Salomon claimed that using monthly data, this model was able to explain about 40% of the fluctuations in the returns of a sample of 1,000 stocks.

From the estimation of CAPM, Kavussanos and Marcoulis (2005) concluded that the water transportation industry appear to be less risky than the investment community perceived. They revealed that the industry average beta of 0.92 seems parallel with the average market beta and the average explanatory power of the regressions (R^2) of around 23% was also typical in these kinds of estimations. Furthermore, despite the cyclical nature of this industry but the industry beta appear quite consistent over time and the beta of the water transportation industry appeared to be the lowest among betas of all transportation industries. In a series of studies, they identified two macroeconomic factors namely monthly industrial production and oil prices beside the market which influencing the returns of the water transportation industry and also other industries. They reported that the alphas observed in the study was positive indicated that the stocks of US water transportation companies were undervalued (Kavussanos & Marcoulis, 1997).

According to Drobetz *et al*. (2009), the macroeconomic shocks can be seen as shocks to the stream of expected returns and thus potentially used as proxies for the future economic environment. In their study, Drobetz *et al*., (2009) used the monthly log changes of a weighted currency basket, consisted of the exchange rates between the US-$ and the Euro, Canadian dollar, Japanese yen, British pound, Swiss franc, Australian dollar, and Swedish krona. To account for the influence of international economic activity and international trade, Drobetz *et al*., (2009) used two additional factors in their empirical tests such as weighted-average of the contemporaneous log changes of monthly

industrial production in the G-7 countries and in China. Other factors such as inflation rate and interest rate were also used in the study.

Drobetz *et al*. (2009) reported that the multifactor model was able to estimate the cross-section of expected stock returns when additional risk factors such as the change in the trade-weighted value of the US-$, and in the oil price were added to account for changes in industrial production. The global risk profile of the shipping sector, such as the sensitivities of shipping stocks against global systematic risk factors, was different from country to country and among industry equity indexes. However, Drobetz *et al*., (2009) observed that the risk profiles were similar for all three subsectors of the shipping industry i.e. container, tanker and bulker.

Furthermore, Drobetz *et al*., (2009) revealed two assumptions that were required when applying an international beta pricing model such as: (1) the national equity markets were perfectly integrated and (2) the taxes were similar across country or there were no transaction costs. These two assumptions were justifiable based on Bekaert and Harvey (1995) findings that the degree of integration on international stock markets was raising. From the study, Drobetz *et al*. (2009) evidenced that shipping stocks exhibit remarkably low stock market betas for example the market betas were ranged between 0.8 (for bulkers) and 0.87 (for tankers) and were significant at the 1%-level albeit the high cyclicality of this sector coupled with high operating and high financial leverage. They