

## **Ship Investment Strategies in Fluctant Shipping Market Condition: Turkey's Perspective**

### **Authors**

Ayşe Asli Basak<sup>1\*</sup>

### **Affiliations**

<sup>1</sup>Master's Program in International Trade and Logistics Management, Graduate School of Social Sciences Yeditepe University, Istanbul, 34755, Türkiye

\*To whom correspondence should be addressed; E-mail: [ayseaslibasak@gmail.com](mailto:ayseaslibasak@gmail.com)

Preprint

## **Abstract**

Maritime transport has become the way of carrying the greatest amount of world trade, which has been the case in recent years. In maritime trade, ports are the most important points that logistics opens up to international routes. The United Nations Conference on Trade and Development has developed the "Link to Regular Maritime Route Routes" in order to enhance the contribution of international ports to the development of the country's ports and to measure their links to major global maritime logistics networks in maritime trade. Regression analysis, which is one of the quantitative research methods, was used to measure the relationship between this index and the "Economic Openness Index", which was developed to measure the economic vulnerability of the countries involved in global trade and which was obtained by calculating the total export, import and gross domestic product of countries. Analysis of results in improved maritime and gross domestic revenues of developing countries with a large share of Turkey's economy and examined the positions and strategies for the development of sea trade was aimed to determine. In addition to the general development of the country, it is predicted that maritime trade is one of the factors that will enable trade to be least influenced by the fluctuations in the global crisis and uncertainty period and this study aims to create a one-way model for the development of maritime logistics networks from every direction. Increasing port capacities and developing new logistic services for our students in line with the coastal structure of our country will be a bridge to provide a competitive advantage for our country in international global markets. In the near future, logistical networks, maritime and port development issues will be a requirement for the protection of our country's level of economic stability and prosperity in times of global crisis. Global success in this regard will be possible with a global strategy.

## **Keywords**

Maritime transportation; maritime; shipping trade; ship investment; shipping market

## **INTRODUCTION**

National economies have been an essential element of the sustainable life cycle process within the developing and evolving world. Therefore, countries have developed new policies and strategies to adapt to this change, follow up on world economic development, evaluate governance improvements in intra-industries and have a more stable economy by increasing the welfare standards of society. The increase in global industrial production has caused countries to be affected by this development and become more connected to global economies by the economic growth of countries within intra-industries. Trade activities of intra-industries and total industrial production rates show how countries are becoming open to international economies during globalization (Rose, 2004).

However, maritime transportation is considered a crucial component of the global supply chain and accounts for over 80% of international trade in terms of transportation volume (Dursun A. et al., 2012, UNCTAD, 2013). Therefore, it is essential to search for maritime trade indicators to estimate world economic development. Combining traditional trade indicators of countries with primary shipping factors can provide more specific results on countries' economic development to manage a shipping strategy. Emerging countries such as Turkey have different investment and governance policies on maritime trade. One of them is reducing taxes on ships' national flag registration and flying their flag on world seas as some of them prefer convenient flags (Stopford, 2002). Even though countries put specific shipping governance strategies on the investment side, the decision-making depends on ship investors' discretion. At this point, a significant financial resource issue is being faced. Financing ships are becoming more complex every day, even though the Turkish government has decreased the national taxes. Since there is a bad impression of Turkish ship investors in global ship financing due to not-in-time investments without analyzing the market conditions, financial corporations and ship finance banks find Turkish investors' position as a risk in the competitive market.

The shipping sector is very sophisticated in analyzing investors' behavior and putting a rationale action behind it. The market cycle is constantly changing, and specifications of shipping operations are getting more complicated as technological developments increase. Therefore, it creates unique characteristics for the sector, and international and volatile infrastructure invests in different types of ships. The company's investment decisions are

essential. However, the government-based investment policies such as investing in national flags instead of other convenient flags or improving liner trade standards by establishing good port infrastructures also have a significant role in a country's development. A national-based governance policy on shipping will incentivize shipping companies to fly their own countries' flags while financing their ships from national sources. Additionally, domestic funding sources will contribute to the country's economic progress in terms of trade balance and enhance the growth rate during the process of globalization.

Additionally, maritime trade continues to develop to newly established governance policies and strategies in Turkey. Decrease of register taxes on Turkish flag ships, coaster scrap incentives and steps on technical developments in maritime can be sorted for instance. Within this development, Turkish seaborne trade requires the most effective infrastructure on ship and port investment developments.

On the trade side of ship investment decision, Stopford (2002) mentioned that liner shipping which has been initiated with container transportation is a cost-effective method that either includes chemical, bulk, product and LNG carriage. On the country economics side, shipping lines provide direct development by depending on port development and increasing trade volume. According to Cumaloğlu (2010), not only liner shipping, also tramp shipping places an important role on seaborne trade. However, in this study, the tramp side is neglected and only liner shipping connectivity is added into the analysis.

In previous literature, it is seen that most of the researches include profit analysis on ship investment of companies without consideration of a governmental based development and policies. Since strategic development of shipping must commence at countries' level, private sector will also take benefits from this development as a team player. For competition, strategies must be well evaluated and organized.

The studies shows that the nature of the ship investment problem can not be disregarded while analyzing shipping strategies. Decision criteria varies between container operators and a bulk carrier shipowners. On the other hand, oil companies tend to adapt more logistical strategies and become an asset player by focusing to have good knowledge on technical management (Klausner, 1970), (Haralambides, 1993), (Thanopoulou, 2002).

The UNCTAD report introduced a formula for trade allocation, consisting of a 40% share for national export cargo, a 40% share for national import cargo, and a 20% share for cross-trading rights (UNCTAD, 1971). Therefore Shneerson D. (1983), mentioned that shipping is a subject of government intervention through operation and capital costs within subsidisation of shipbuilding industry and flag preferences. He researched profitability of investment in shipping from balance of payments aspect. He discussed methodological problems of shipping and calculated Domestic Resource Cost (DRC) for Israeli fleet for explaining the national view. He also optimized DRC as per ship's age for a bulk carrier and added the case study. His study showed that highest profitability can be provided from second hand ships between 10 to 13 years old. This study can be an initiative of ship investment analysis however, must be improved according to current market conditions as well as within consideration of government based policies.

In his book of Stopford (2002), mentioned that shipping market cycle is a bridge between supply and demand sides. The traditional supply and demand model in economics is usually used to analyse market's turnover. It is accepted that shipping market is competitive and this supply and demand amount can be an indicator which affect charter freight rates. To Stopford (2002), the demand side is world economy and affected from many different variables such as global crisis, sudden economic shocks, value of transported goods and services and other force majors. Therefore, shipping market is defined as volatile and this factor causes discussions on decision-making of ship investors.

A study conducted by Meifeng L. et al. (2010) investigated the investment patterns of container shipping firms and examined the decision-making process of fleet expansion in a highly competitive shipping industry. The research utilized a combination of theoretical and empirical methods to analyze companies operating with vessels of different sizes. The theoretical aspect focused on explaining the important factors influencing firms' capacity investment decisions from operational and strategic perspectives, taking market competition into account. In the empirical part, they gathered data from shipping firms regarding ship investments and found that market demand played a key role in investment capacity. According to Meifeng L. et al. (2010), firms' investment would increase in response to competitors' capacity investments. However, they argued that time charter rates and newbuilding prices were not significant factors in shipping capacity investment. As a

result, their study falls short in providing precise estimations for the overall shipping market due to its emphasis on theoretical analysis rather than quantitative shipping market indicators. Additionally, it only focuses on the container segment of ship investment.

Evangelos P.R. et al. (2012) conducted an analysis of multi-criteria factors in ship investments. Typically, shipping projects are evaluated primarily in monetary terms, with investment decisions made to achieve financial benefits. However, the authors argue that there is a need to expand the traditional perspective of shipping investment decisions in a multi-criteria environment. They suggest that the influences on shipping decision-makers (DM) cannot be solely explained in financial terms, and therefore, a multi-criteria optimization approach using the Analytical Hierarchy Process is necessary to address the problem. DMs have the ability to make trade-offs between financial and non-financial considerations based on their individual preferences. Thus, the authors state that controlling biases in the psychological aspects of the shipping industry not only enhances efficiency but is also essential. According to Evangelos P.R. et al. (2012), adopting a multi-criteria evaluation approach for shipping investment processes represents an alternative attempt to develop new strategies for fleet portfolio management and provide diversification alongside the traditional quantitative approach.

Floriano C.M. et al. (2012) conducted research on investment strategies for tanker ships using Monte Carlo simulation, which involved analyzing auto-correlated series of time-charter rates as well as prices of new building and second-hand ships. The authors employed a real option approach to estimate the likelihood of project abandonment. Their methodology only included a specific tanker segment which is called Suezmax and has deadweight tonnage more than 110,000 metric tonnes. It is indicated in their researches that investment analysis return is significantly sensitive according to managerial flexibility to project abandonment and explains risk behaviour of the investors. However, this study focused on only Suezmax tanker segment and the other segment of ships such as container or bulk carriers can not be included in such method of calculations and there is a lack of model on providing general strategies before investment attempt.

Metin C. et al. (2009) utilized a fuzzy approach to examine the dynamic parameters of the shipping market and their impact on ship investment decisions. Their study focused on applying the principles of Quality Function Deployment (QFD) within the framework of

Ship of Quality (SoQ) to the shipping investment process. The authors incorporated the Fuzzy Analytic Hierarchy Process (FAHP) and Fuzzy Axiomatic Design (FAD) algorithms to determine shipping investment decisions specifically in the crude oil tanker market, including Very Large Crude Oil Carriers (VLCCs), Suezmaxes, and Aframax. By employing the SoQ framework, they identified key factors such as market priorities, charterers' perceptions, data-oriented investment decisions, and final investment decisions. As Floriano C.M., et al., (2012), their model was also included only for tanker ship investment. However, it is necessary to expand the model for other types of ships. Additionally, by thinking of the background of shipping executives, their model involves more engineering definitions and may not be competitive for quick use of shipping executives and governments to develop new shipping strategies.

Revenko V.L and Lapkina I.A. (1997), noted that political and economic factors can not be disregarded in international shipping. He drew an inference that owners' behaviours tend to continue to operate their fleet in order to reach utilization of tonnage most efficiently despite the volatile and uncertain market conditions. In his research, many different quantitative models have been indicated. Main topics of the models when used for analysing company's policy are asserted as structure of existing fleet, cash flow projections and company's management performance. According to this model, a shipping company's stable operations can only be maintained with a modern fleet and profitable charter contracts. At this point, sale and purchase activities of ships place at important level.

Alizadeh H.A. and Nomikos N.K. (2006) examined the performance of trading strategies that combine technical trading rules and fundamental analysis in the buying and selling activities of dry bulk ships. They conducted a time series analysis using data from 1976 to 2004 to assess the relationship between ship prices and average time charter rates. The results of their analysis indicated that trading strategies based on earnings were significant when considering the second-hand market for ships. According to Alizadeh H.A. and Nomikos N.K. (2006), their analysis of future ship price behavior can be utilized for timely investment decisions in the shipping industry.

Greenwood R. and Hanson S.G. (2013) studied volatility of ship prices and return on investment of dry bulk cargo ships. In their research, they established a correlation between ship earnings, secondhand ship prices, and industry investment. Their model also includes

basic assumptions of Kaldor's (1938) cobweb theory which describes fluctuations can arise from rules and causes behavioural actions of investors. They suggested that pro-cyclical investor expectations by neglecting the competition may cause economic volatility in competitive industries and rejected the rational expectations of perfect foresight.

As the most updated one, Danish Ship Finance (2015), analyzed shipping market semi-yearly and mentioned that a new structure must be provided in the shipping industry. Currently, shipping industry is in a structural slowdown due to decreasing trade volume rather than expected is encountered. Due to the overcapacity of in-service ships, market cycle faces a counter trend. However, investment decisions are still continued. At this point, government based precautions keeps an important role unless the overcapacity is outfaced.

As additional to journal papers, there have been different master and doctorate dissertations on ship investment issues. According to PhD thesis of UmutTolgaGumus, financial risk concept of ship investments is explained and the importance of assessing financial risks before performing investments is asserted. He used Monte Carlo Simulation Method on evaluating possible risks which are arisen from market's uncertainty. For setting up a new investment strategy, this analysis' risk assumptions may be used for putting a theoretical approach to new models.

SinemDerindereKoseoglu stated in her PhD thesis that volatility of shipping market causes some companies to get profit while others fail in the industry. She investigated the factors effecting investment decisions of maritime companies by focusing risks of shipping freight rates and secondhand values of capesize ships by using economic tools and methods. According to her, maritime transportation is affected from many domestic and international factors such as trade volume, political changes, oil prices, interest rates, exchange rates, meteorologic conditions and cash flow operations between ship owners and charterers. This causes fluctuation and unexpected risks in the market. Since the cycle of the market, speculative investment processes can not be underestimated. Timely investments provide both success and failure and therefore, analysing financial risks plays an important role. In her study, she found that secondhand ship prices are completely correlated with new ship building prices of ships which means when new-built ship prices increase or decrease secondhand ship prices linearly do the same. Also, while investments in new-built ships



are mostly based on the expenditure, secondhand ship prices are affected by supply and demand side in shipping market. However, this cycle complicates investment decision of ships due to high risks. Due to the fact that her study only includes capesize vessels investments, it is very restricted to insert trade factors in the model. Therefore, a new model including more variables of trade will be more effective on conducting new investment estimations for various segments at shipping market.

In master thesis of Ozgur Alemdag, explained a new management model for ship owners. He asserted that ship management concept is new for Turkish ship owners due to having a traditional and family-based structure. As per his study, ship owners must choose a management model and evaluate their performance to be assertive in the competition. He provided a questionnaire by using “Balance score card” and measured performance criterias of ship management companies. However, this study has lack of investigation on evaluating ship owners’ real perception on investment and their attitudes to government based strategies.

In master thesis of IpekAkmanDurgut, she included more perceptual analysis of ship owners to ship management concept. She conducted a questionnaire between Turkish ship owners in order to analyse their attitudes and perceptions to third party ship management. According to her, outsourcing has become very important on providing cost effective of companies in other sectors and maritime sector can also get benefit from this new method. As additional to ship management concept as IpekAkmanDurgut stated, merging of companies under one management can also be profitable for maritime companies in Turkey, however this must be well analysed.

Within this respect, this study consists of total six chapters. This chapter includes a general overview of strategic investment and Turkey’s perspective with mentioning in previous literature. In the second chapter the significance of maritime transportation in the global trade market has been explained with sub-titles of competition in maritime transport, freight markets of different types of ship segments and trade indicators which have possibility of affecting maritime transportation have been described. Third chapter comprises investment factors in shipping in more details with topics of ship finance, financial evolution of shipping, historical part of global ship financing including types of financial corporations, sensitivity of finance models against crisis and ship finance status

in Turkey as well as types of ship managements. Fourth chapter presents data selection and collection process as well as the methodology that can be effectively used to generate a new statistical model. In the fifth chapter, analysis results and recommendations combining quantitative and qualitative technics have been inserted. In the last section, a conclusion of the overall study has been depicted.

## RESULTS

As per model summary, R square ratio is also calculated as 16% and has a less value, however it can not be disregarded due to other tests' significance levels are well compliant with the whole model.

Table 5.1.

Model summary/significance results (R square)

Adjusted R Square	Std. Error of the Estimate	Change Statistics
	R Square Change	F Change
,152	,42798	,158 23,501

Table 5.2.

Collinearity diagnostics breakdown

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions
		(Constant)	fleetlog	
1	1	1,886	1,000	,06 ,06
	2	,114	4,071	,94 ,94

a. Dependent Variable: lcsilog

As seen in herebelow ANOVA table, the overall equation seems significant since it shows value of 0,000<sup>b</sup> significance and null hypothesis is rejected for the equation.

Table 5.3.

ANOVA table

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4,305	1	4,305	23,501 ,000b
	Residual	22,896	125	,183	
	Total	27,201	126		

a. Dependent Variable: lcsilog

b. Predictors: (Constant), fleetlog

It is already been summarized in section 4.3.1 with Table 4.3.14 for the analysis results of the coefficients of dependent and independent variables. Thus, the model of intended equation will be as in following for this study:

$$\ln(y_i) = \ln(0.875) + 0.136 \ln(x_i) + \varepsilon_i \quad (5.1)$$

(0.082)      (0.028)

## DISCUSSION

The above model shows that deadweight tonnage of merchant fleet of countries can be used to predict the possible liner shipping connectivity of countries in a 10 based logarithmic scale. Countries and ship owners can use the basic regression model in order to estimate necessary investment and budget planning while maintaining development, investment strategies or master plans.

In this model, the coefficients play a crucial role in assessing the impact of independent variables (x) on the dependent variable (y) in the usual manner. The coefficients in the log-log model reveal the elasticity of the dependent variable within the framework of linear regression. Specifically, these coefficients indicate the estimated percentage change in the

dependent variable given a proportional change in the independent variable, or vice versa (Pedace, 2015). According to Simonoff (2016), the log-log model elucidates a parabolic relationship between  $x$  and  $y$ , suggesting that the model can be enhanced by incorporating both linear and quadratic terms. The primary characteristic of this model is its multiplicative relationship, which aligns with proportional variations in the independent variable. Consequently, the model allows for the logarithm of both sides of the equation. Moreover, this model is particularly suitable for monetary data, data with extremely high or low values, as well as investment analyses and the estimation of demand functions in trade. Calculus demonstrates that the elasticity remains constant (denoted as  $\beta$ ) in the log-log model, earning it the moniker "constant elasticity model." Under the assumption of constant elasticity, the slope coefficient for price in a log-log regression model can be used to estimate elasticities. As a result, a convenient interpretation of the slope in the log-log model is that, with all other factors held constant, a 1% change in  $x$  corresponds to a  $\beta\%$  change in  $y$  (Simonoff, 2011).

There have been variations between different kind of segments however the shipping industry is currently going in a downward trend. The log-log model shows there is a direct impact on liner shipping connectivity and the total national fleet capacities of countries and the governments should consider to provide incentives on the correct investment type for ship owners/managers. For instance, dry bulk sector has seen the deepest levels in 2006, however, owners still continued to invest in new dry bulk ships without analyzing the total national and beneficial fleet status, port capacities and also the liner shipping connectivity. Due to the fact that liner shipping is more likely related with container fleet development, the study can be widened with specifically to the other segments. In this study, inserting the whole tonnages of national and beneficial owned fleet will provide a global-based thought on fleet development of countries not by considering the only national development. The ship owners/managers which fly foreign flagged vessels and their participation in import and export activities from/to Turkish ports also keep significant role on development of liner shipping.

In the model fleet capacities which assumed as independent variable have a logarithmic value of 0.136 and show that the effect of the fleet capacities on to liner shipping is not too much, however it also can not be disregarded. Constant of the equation is also logarithmic

based and has the value of 0.875 which reduces the errors of the model. To make further forecasts with the above model world fleet development, freight rates, time-charter rates, commodity/oil prices, import/export volumes, economic openness levels, GDP/GNP, existence of new shipping routes and technological changes also should be taken into account as the unknown assumptions of the model. Therefore, a deeply shipping fleet analysis is necessary to incite the companies on investment or scrapping on the side of government. Maritime economy must be started as national strategy first and to be continued with global side. A brief overview of the global fleet development reveals that tanker segments have experienced favorable rates, while containers, dry bulk, and offshore vessels have encountered challenges in managing a substantial influx of new vessels amidst dwindling demand. Crude and product tankers have benefitted from heightened trading activity, influenced by various factors including low oil prices and the establishment of new refineries. However, concerns are emerging for other segments of the market due to the fragile demand outlook, a significant order book, and a limited number of apparent scrapping opportunities.

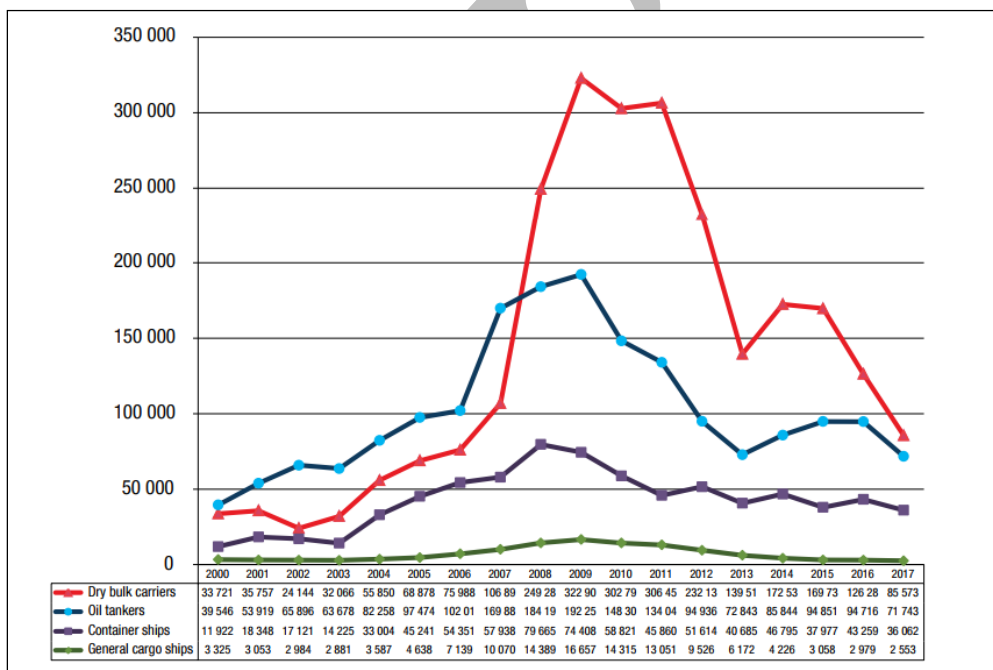


Figure 51. Ordered World Tonnage between 2000-2017  
(UNCTAD &Clarksons, 2017)

The primary concern lies not only in the size of the orderbook but also in its delivery schedule. The orderbook is anticipated to be distributed evenly over the next three years, which would facilitate the integration of new vessels. However, the orderbook is heavily concentrated in the near term. In fact, more than 70% of the orderbook is slated for delivery before the end of 2016 (see Figure 51). Typically, larger vessels offer cost advantages per transported unit and are favored for long-distance voyages. Nevertheless, economies of scale diminish if the vessel operates below its full capacity. Hence, it is crucial to maintain an average vessel size that aligns with global demand requirements. Considering the current global economic landscape, where emerging economies with large populations but limited disposable incomes are replacing previous growth powerhouses, we are apprehensive that the size of the existing fleet and vessels on order reflects outdated market conditions rather than future prospects. Our World demand indicators section emphasizes the expectation of stagnant or declining seaborne trade volumes in the next five years. Therefore, it is essential to consider new strategies to improve national fleets and manage the fleet distribution on a government supported strategic development.

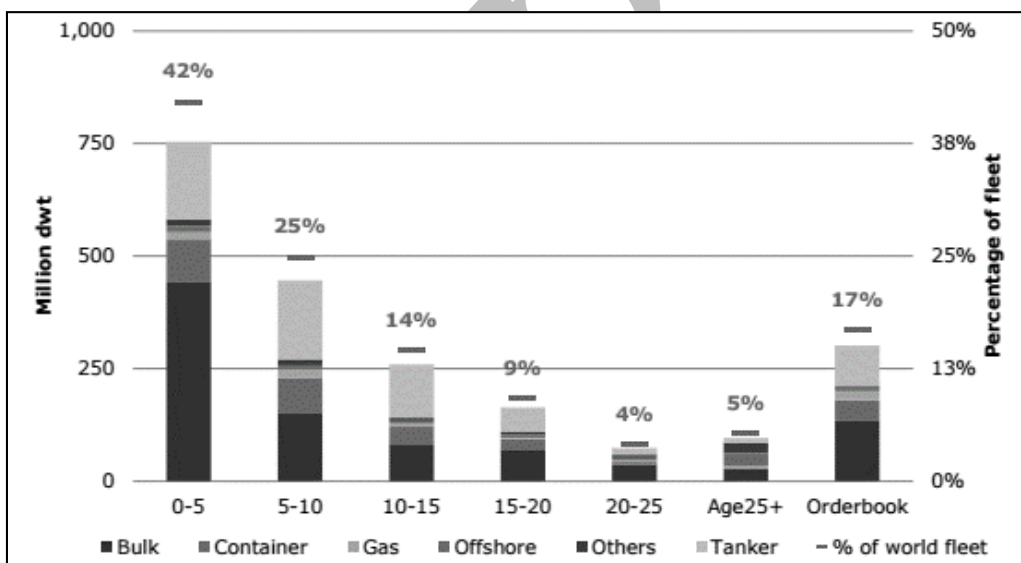


Figure 52. The World Fleet and Age Distribution

Sources: Clarksons& Danish Ship Finance, 2015

When an outlook to the worldwide fleet structure by ages, it is still seen that bulk carrier segment has the utmost ratio in global fleet even though the demand to bulk carrier ships

still remains the same. 42% ratio of vessels have been found as between age of 0 and 5 which have relatively younger age. This means that almost half of the world fleet has younger ages than the remaining and this situation causes an increase on competition of young ships are alternative for charterers with their well based technical conditions. Therefore, our model can be specifically repeated according to the age scale of different kind of ships, for instance which type of and which age of ships mostly affect the liner shipping. Their participation to liner transportation can be measured for further studies as additional to our mentioned model.

## **CONCLUSION**

As a result, the field of shipping finance is experiencing ongoing expansion, driven by the growing demand for services within the global shipping industry. However, it is important to recognize that shipping markets are characterized by cyclical fluctuations and significant volatility, and the current exceptional market conditions are unlikely to persist indefinitely. In this context, the involvement of private equity funds and government-backed ship finance institutions plays a crucial role in fostering the sector's growth and can influence its trajectory in various ways, such as facilitating consolidation and vertical integration of transportation services. This necessitates efforts to enhance the sector's efficiency and promote the development of financially robust companies. While the investment horizon in foreign ship finance companies and/or banks is typically between three and ten years. Within the evaluation of worldwide ship finance systems and current market condition in Turkey, it has been found that it is necessary to provide incentives as governmental to shipowners in Turkey in order to increase economy level by decreasing the import rates which caused by foreign flagged ship investments. If Turkish maritime industry has its own ship finance system either government supported or private corporations, maritime economy would be more certain and powerful with national investors. National based ship finance might also increase Turkish flagged vessels in world merchant fleet and assist Turkey being a “Reproducer” country within world maritime activities. By the aim of this research, best model for Turkish economy is indicated as Danish system which is more useful by supportable positions of government via controlling the financial status. Also, a “One-hand management” policy can be developed and supported as specific to ship types,

segments and their tonnages by gathering all small ship-owning companies under one management. Ship financing in Turkey must be evolved in order to adapt the current market conditions in worldwide. A new structure of mortgaging the ships can be constructed according to ship types and market statuses against possible bankruptcies of the companies. Further follow-up mechanism with special financial analyses must be also prepared to decrease high risks of volatile market and to prevent shipowners' failure due to lack of knowledge. Competition within ten years' period will increase rapidly as it has already commenced by the end of 2014. Turkish shipowners' perception must be changed to more informative and technological solutions either with maritime authority in Turkey incentivised. As the shipping market is not smooth and becoming more volatile day by day, it is necessary to take an action for ship investments in Turkish maritime sector in order to be successful in world shipping.

On the other hand, the most important factor that provides countries well-known reputation in international trade is absolutely logistics and transportation. Developing standards for logistic networks have positive impact on economic activities as well as maritime transportation by the fleet expansion. Therefore, steps of development in maritime sector must be strategically planned. In this study, how much the total ship fleet capacity has impact on to liner shipping activities have been statistically researched. On the side of Turkey, it is highly important to increase port investment activities within a technologic and innovative infrastructure in order to contribute the development of national economy. There is a shift in growth as the industry transforming into services and consumer economy. Concerns have arisen regarding the potential limitations of outsourcing and globalization, as indications of near sourcing and nationalization are beginning to emerge. This represents a notable deviation from the previous norm in the shipping industry, characterized by restricted financing, asset deflation, and a shift in demand. These changes are expected to endure over an extended period of time, indicating a prolonged period of adjustment for the industry. Therefore, the governments are invited to generate new real-time models and strategies on maritime logistics and transportation particularly on investment side within cooperation philosophy. By considering the geopolitical status of Turkey, the regions where have potential to growth as infrastructural must be indicated and new investment methods must be generated. It is not only important; it is crucial for Turkish economy to



determine a national fleet development based maritime strategy in order to become a leading economy in global trade competition. The model in this study is aimed to provide governments quantitative based methods to issue new development strategies. For further studies it is recommended that the more specific data can be used in regression analysis by upgrading the model to multiple regression analysis. Additionally, data is used in 10 based log-log format in this model. The logarithmic basis of the model can also be changed with appropriate values instead of 10 based and more significant results can be gathered by the statistical analysis. The global economy is very tough to bear especially for developing countries. Therefore, Turkey is required to obtain a national development strategy on shipping to become a big competitor of the global trade as a developing economy.

In summary, it is evident that the role of shipping finance holds significant importance in the economy of Turkey. Given the volatility of commodity and freight markets, it is important for Turkey to adopt effective ship investment strategies. Turkey's position as a key player in the global economy depends on its ability to invest in shipping and maritime strategies. Therefore, it is imperative that Turkey continues to prioritize the development of its shipping industry, and works towards building a robust and sustainable maritime infrastructure. By doing so, Turkey can continue to grow as a global player in the shipping and logistics space, and reap the benefits of a thriving maritime industry for years to come.

## REFERENCES AND NOTES

Alemdag, O. (2006). Gemi yönetiminde strateji ve performans: Türkiye analizi. Sakarya Üniversitesi, Turkey.

Alizadeh, A. H. & Nikos K. Nomikos, N. K. (2006). Investment timing and trading strategies in the sale and purchase market for ships. *Transportation Research Part B: Methodological*, 41(1), 126–143.

Allied Ship Research (2016). Weekly Market Report, 26/2016.

Arnsdorf, I. & Brautlecht, N. (2014). Private-equity funds bet \$5 billion on shipping rebound. Bloomberg. Accessed on 18 February 2020. Retrieved from: <http://www.bloomberg.com/news/2014-02-18/private-equity-funds-bet-5-billion-on-shipping-rebound-freight.html>.

Baltic Exchange (2013). Baltic Exchange indices calculation methods and upcoming regulation. IMSF, April 2013.

Baltic Exchange (2016). Ningbo Containerised Freight Index. Retrieved from: <https://www.balticexchange.com/market-information/containers>

Basak, A. A. & Akkartal, E. (2015). Ship finance systems in the world and a future study for Turkish maritime industry. Proceedings Book of 13th International Logistics and Supply Chain Congress, Izmir, Turkey.

Beenstock, M. & Vergottis, A. (1989). An economic model of the world tanker market. *Journal of Transport Economics and Policy*, Vol XIII, No.3, pp. 263-280.

BIMCO (2016). Market analysis for drybulk. Accessed on 20 May 2021. Retrieved from: [https://www.bimco.org/Reports/Market\\_Analysis/2016/0506\\_DrybulkSMOO\\_201602.as](https://www.bimco.org/Reports/Market_Analysis/2016/0506_DrybulkSMOO_201602.as)

px?mobileToken=SJnZWKBSXziaJiP3bexKQgUcsg5bL+u||xZBnlGhIix4Tg+t35USidApA3q+gPQGG/FDFv92/rCRw5AoaqmcZ6A==&ResumePage=true. Accessed on 28 December 2016.

BIMCO (2016). Market analysis for tanker. Accessed on 20 May 2021. Retrieved from: [https://www.bimco.org/Reports/Market\\_Analysis/2016/0506\\_TankerSMOO\\_201602.aspx?mobileToken=SJnZWKBSXziaJiP3bexKQgUcsg5bL+u||OlglngsHm6ScmJeEXIRW4RZkk4AJJfewgiZn/OQYWmLZWtE5+rE3qw==&ResumePage=true](https://www.bimco.org/Reports/Market_Analysis/2016/0506_TankerSMOO_201602.aspx?mobileToken=SJnZWKBSXziaJiP3bexKQgUcsg5bL+u||OlglngsHm6ScmJeEXIRW4RZkk4AJJfewgiZn/OQYWmLZWtE5+rE3qw==&ResumePage=true). Accessed on 28 December 2016.

BIMCO (2016). Market analysis for container. Accessed on 20 May 2021. Retrieved from: [https://www.bimco.org/Reports/Market\\_Analysis/2016/0506\\_ContainerSMOO\\_201602.aspx?mobileToken=SJnZWKBSXziaJiP3bexKQgUcsg5bL+u||hjlbkiA/a8Sg/884q6nHwhdAv7BUfZarBge4ap3lsUwAWROzKbkjog==&ResumePage=true](https://www.bimco.org/Reports/Market_Analysis/2016/0506_ContainerSMOO_201602.aspx?mobileToken=SJnZWKBSXziaJiP3bexKQgUcsg5bL+u||hjlbkiA/a8Sg/884q6nHwhdAv7BUfZarBge4ap3lsUwAWROzKbkjog==&ResumePage=true). Accessed on 28 December 2016.

Biren, F. (2004). *Denizekilenler*. ISBN No: 189957, Istanbul, Turkey.

Bloomberg (2012). General Maritime files for bankruptcy protection with \$1.4 billion in debt. Accessed on 25 April 2020. Retrieved from: <http://www.bloomberg.com/news/2011-11-17/general-maritime-files-for-bankruptcy-protection-with-1-4-billion-in-debt.html>.

Capital Link (2016). Indices. Retrieved from: <http://marinetransportation.capitallink.com/indices>. Accessed on 25 May 2016.

Celik, M., Cebi, S., Kahraman, C., Er, I. D. (2009). An integrated fuzzy QFD model proposal on routing of shipping investment decisions in crude oil tanker market. *Expert Systems with Applications*. Vol.36, No.3, pp.6227-6235.

Chinadaily (2013). EXIM bank to finance Greek ship owners. 21 May. Retrieved from: [www.chinadaily.com.cn/business/2013-05/21/content\\_16516813.htm](http://www.chinadaily.com.cn/business/2013-05/21/content_16516813.htm).

Choudri & E. L. Cohen (1980). The Exchange Rate and the International Transmission of Business Cycle Disturbances: Some Evidence from the Great Depression. *Journal of Money Credit and Banking*. Vol. 12, No. 4, 565-574.

Clarksons (2015). Global Market Brief. Issue 219, Week 52, 1&2, 09 January 2015.

Clarksons (2016). Clarkson Database of New Order Books. Retrieved from: <https://sin.clarksons.net>

CNN Money (2012). Private equity has \$1 trillion to invest. 31 July. Accessed on 20 April 2020. Retrieved from: <http://finance.fortune.cnn.com/2012/07/31/private-equity-has-1-trillion-to-invest>.

Cullinane, K. (1995). A portfolio analysis of market investments in dry bulk shipping. *Transportation Research-B*, Vol. 29B, No. 3, pp. 181-200.

Dar, A. & Amirkhalkhali, S. (2002). Government size, factor accumulation, and economic growth: evidence from OECD countries. *Journal of Policy Modeling*, 2002, vol. 24, issue 7-8, 679-692.

Danish Ship Finance. (2015). Shipping market outlook. November, 2015.

Danish Ship Finance. (2016). Shipping market outlook. December, 2016.

Derindere Koseoglu, S. (2010). Uluslararası deniz yolu taşımacılığı sektöründe risklerin analizi ve gemi yatırımlarının etkili etken faktörlerinin araştırılması. İstanbul Üniversitesi, Turkey.

Evangelos, P. R., & Byung, S. L. (2012). Multicriteria analysis in shipping investment evaluation. *Maritime Policy & Management: The flagship journal of international shipping and port research*, 39:4, 423-442. Doi: 10.1080/03088839.2012.690080.

Fearnleys (2017). Fearnleys Weekly Market Report. Accessed on 17Jan2019. Retrieved from: <https://fearnleys.com/research/>

Fearnsearch (2015). Fearnleys Weekly Market Report. Accessed on 17 Jan 2019. Retrieved from: <https://fearnleys.com/research/>

Financial Times (2013). Private equity investment in shipping predicted to double. 20 June.

Floriano, C. M., Felipe, L., & Rezende, M. (2012). A real options approach to ship investment appraisal. *African Journal of Business Management* Vol. 6(25), pp.7397-7402, 27 June, 2012.

French, L. (2006). *The international Element in Shipping Finance*. Euromoney Institutional Investor, Plc. pp. 1-2, London.

Granvile, V. (2014). 10 types of regressions. Which one to use? Accessed on 18 Jun 2020. Retrieved from: <http://www.datasciencecentral.com/profiles/blogs/10-types-of-regressions-which-one-to-use>

Green4Sea (2015). Shipowners' concerns with ballast water management. Accessed on 19 Jan 2017. Retrieved from: <http://www.green4sea.com/shipowners-concerns-with-ballast-water-management>

Greenwood, R. & Hanson, S. G. (2015). Waves in Ship Prices and Investment. *The Quarterly Journal of Economics* – Harvard Business Review, 55–109. doi:10.1093/qje/qju035.

Gujarati, D. N. & Porter, D. (2009). *Basic Econometrics*. 5th Edition, McGraw-Hill Irwin.

Gumus, U. T. (2011). Risklibiryatırımıprojesiolarakgemiyatırımlarınınfinansaldeğerlemesi: Simülasyonyaklaşımı. Adnan Menderes Üniversitesi, Turkey.

Haralambides H (1993). Sensitivity Analysis of Risk in Shipping Finance. In Current Issues in Maritime Economics – Kluwer Academic Publishers.

Hofstra (2013). Baltic Dry Index 1985-2013. Accessed on 20 Jan 2019. Retrieved from: <https://people.hofstra.edu/geotrans/eng/ch7en/conc7en/bdi.html>

Hofstra (2016). Liner Shipping Connectivity Index. Accessed on 20 Jan 2019. Retrieved from: [https://people.hofstra.edu/geotrans/eng/ch3en/conc3en/liner\\_shipping\\_connectivity\\_index.html](https://people.hofstra.edu/geotrans/eng/ch3en/conc3en/liner_shipping_connectivity_index.html)

ICS (2012). Dry Cargo Chartering Work Book. International Chamber of Shipping, 2012.

IHS Global Insight (2015). IHS Global Insight: American economic consulting company. Retrieved from: [www.globalinsight.com](http://www.globalinsight.com)

Iliev, I. &Marinov, G. (2008). The Openness of the Economy as a Dynamic Process. *Oeconomica*. Vol. 2, No.1, pp. 519-623.

IMF (2016). World Economic Outlook 2016. April, 2016.

IMO (2016). Registration of ships and fraudulent registration matters. Accessed on 25Mar 2018. Retrieved from: <https://www.imo.org/en/OurWork/Legal/Pages/Registration-of-ships-and-fraudulent-registration-matters.aspx>.

Intermodal (2017). Intermodal Weekly Market Report 2017.

Klausner RF (1970). The Evaluation of Risk in Marine Capital Investment. Mar. Technol., Oct.

KPMG (2012). Ship Financing in Flux: Searching for a New Course. Accessed on 25Apr 2020. Retrieved from: <http://www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/Documents/PDF/Market%20Sector/Transport/ship-financing-in-flux.pdf>

Lane, H. D. (2007). A Guide to Measures of Trade Openness and Policy. 31 July 2007. Indiana University South Bend. Indiana, USA.

Li, L., et al. (2011). A Survey of Measurements of Interdependence. 15 Oct 2011. Claremont Institute for Economic Policy Studies.

Ling, Li (2014). Competitive strategy for a sustainable future. Managing Supply Chain and Logistics Book, World Scientific. Pg: 25-288.

Lloyd's List (2013c). Nearsourcing: Homespun yarn or material change?. 13 June.

Lloyd, P.J. et al. (2000). Measures of Trade Openness Using CGE Analysis. University of Melbourne Journal of Policy Modelling. Vol. 24, Issue: 1 (March), pp. 67-81.

Macqueen, J. (2006). Risky business. Lloyd's Shipping Economist (August), 9–13.

Maritime Advocate (2013). Step change in Chinese ship finance scene. Accessed on 20Feb 2018. Retrieved from: [http://www.maritimeadvocate.com/ship\\_finance/step\\_change\\_in\\_chinese\\_ship\\_finance\\_scene.Htm](http://www.maritimeadvocate.com/ship_finance/step_change_in_chinese_ship_finance_scene.Htm)

Maritime Briefing (2013). Private equity investments in ships and shipping companies. Watson, Farley & Williams. February. Accessed on 17 Jan 2019. Retrieved from:

[http://www.wfw.com/Publications/Publication1209/\\$File/WFW-Maritime-PrivateEquityGetsInterested.pdf](http://www.wfw.com/Publications/Publication1209/$File/WFW-Maritime-PrivateEquityGetsInterested.pdf)

Matthews, S. (2006). Taking stock. Lloyd's Shipping Economist, October, 9-13.

Meifeng, L. & Lixian, F. (2017). An Empirical Analysis for Container Ship Investment. The Hong Kong Polytechnic University, Hong Kong. Accessed on 17 Jan 2019. Retrieved from: [https://www.polyu.edu.hk/lms/icms/Papers/IFSPA10-Papers/06\\_17.pdf](https://www.polyu.edu.hk/lms/icms/Papers/IFSPA10-Papers/06_17.pdf)

Midship (2017). Midship Biweekly Market Report, 2017.

Mizuho Bank (2015). Ship financing. Accessed on 17 Jan 2019. Retrieved from: [http://www.mizuhobank.com/service/fin\\_product/ship\\_financing.html](http://www.mizuhobank.com/service/fin_product/ship_financing.html).

OFAC (2016). Sanctions Programs and Country Information. Accessed on 20 Jan 2017. Retrieved from: <https://ofac.treasury.gov/sanctions-programs-and-country-information>

OPEC (2017). Mission & History. Accessed on 25 Jan 2018. Retrieved from: [https://www.opec.org/opec\\_web/en/index.htm](https://www.opec.org/opec_web/en/index.htm)

Pedace, R. (2015). Econometrics and the log-log model. Accessed on 21 Jan 2017. Retrieved from: <http://www.dummies.com/education/economics/econometrics/econometrics-and-the-log-log-model>

PIMCO (2012). Viewpoints. Global shipping: Any port in a storm? Accessed on 28 Sep 2018. Retrieved from: <http://www.pimco.com/EN/Insights/Pages/Devabhaktuni-and-Kennedy-on-Global-Shipping.aspx>

Ragnar F. (1934). Statistical Confluence Analysis by Means of Complete Regression Systems. Institute of Economics, Oslo University, publ. no. 5, 1934.



Reinert, K. A. (2012). *An Introduction to International Economics New Perspectives on the World Economy*. Cambridge University Press, New York.

Revenko, V. L. & Lapkina, I. A. (1997). Methods and models of investment analysis in shipping. *Cybernetics and Systems Analysis*, Vol. 33: 571.

Rose, A. (2004). "Do WTO Members Have More Liberal Trade Policy?". *Journal of International Economics*, Vol. 63, Issue 2, 2004, pp. 209-235.

Rowlett, R. (2000). *How many? A dictionary of units of measurement*. University of North Carolina, Chapel Hill.

Seabornetrade (2016). Million dollar question: The Oil prices? Accessed on 24Feb 2017. Retrieved from: <http://seabornetrade.blogspot.com.tr/2016/02/million-dollar-question-oil-prices.html>

Shneerson, D. (1983). The profitability of Investment in Shipping. *Journal of Transport Economics and Policy*, Vol: XVII, No: 3, 285-298.

Simonoff, J. (2011). *Regression the basics*. New York University Courses.

Simonof, J. H. (2016). *Transformations in regression*. New York University Course.

Sismanyazici, H. (2014). BDI iyi birindikatörmü? Accessed on 28 Jan 2017. Retrieved from: [http://www.kaptanhaber.com/index.php?sayfa=yazar&id=40&yazi\\_id=100891](http://www.kaptanhaber.com/index.php?sayfa=yazar&id=40&yazi_id=100891)

SSY (2016). *Monthly Shipping Review*, 15th April 2016. Accessed on 18Feb 2017. Retrieved from: [www.ssyonline.com](http://www.ssyonline.com)

Stopford, M. (1997). *Maritime Economics*. Routledge 11 New Fetter Lane, London, UK.

Stopford, M. (2002). *Maritime Economics*. Routledge, ISBN 0-203-44266-0, London, UK.

Strandenes, S. R. (1984). Price determination in the time charter and second hand markets. Discussion paper 0584, Norwegian School of Economics and Business Administration, Bergen, Norway.

TAB (2015). Kuru yükgemileri. Accessed on 18Feb 2017. Retrieved from: <http://www.armatorlerbirliđi.org.tr/bilgi-ve-egitim/gemi-bilgisi/gemi-tipleri/amaclarina-gore-gemi-turleri/yuk-tasiyan-gemiler/kuru-yuk-gemileri>

Thanopoulou H (2002). Investing in Ships: An Essay on Constraints, Risk and Attitudes. In *The Handbook of Maritime Economics and Business – LLP – London*.

Trakya KalkınmaAjansı (2015). Trakya BölgesiLojistik Master Planı TR21. Trakya BölgesiLojistik Master Plan Çalıştayı. 29 Şubat 2012. Çorlu, Türkiye.

Tsolakis, S., Cridland C., Haralambides H. (2003). Econometric modelling of second-hand ship prices. *Maritime Economics & Logistics*, 5(4), 347-377.

TÜİK (2015-2016). DışTicaretveGelirİstatistikleriVeritabanı. Retrieved from: <http://www.tuik.gov.tr/PreTabloArama.do>.

UK P&I (2015). Circular 7/14: Iran Sanctions Circular on the Extension of Sanctions Relief under the Joint Plan of Action. Accessed on 21 Jan 2016. Retrieved from: <https://www.ukpandi.com/news-and-resources/circulars/pre-2015/2014/circular-714-iran-sanctions-circular-on-the-extension-of-sanctions-relief-under-the-joint-plan-of-ac/>

UNCTAD (2012). Liner Shipping Connectivity Index (LSCI). Presentation of Conference on Port Logistics Performance Le Havre, 13-15 Nov 2012.

UNCTAD &Clarksons (2017). Review of Maritime Transport 2017. Accessed on 22 Mar 2018. Retrieved from: [http://unctad.org/en/PublicationsLibrary/rmt2017\\_en.pdf](http://unctad.org/en/PublicationsLibrary/rmt2017_en.pdf)

Velson, J. (2015). What is the difference between the baltic clean and baltic dirty tanker indexes? Accessed on 17 Jan 2018. Retrieved from: <https://www.quora.com/What-is-the-difference-between-the-baltic-clean-and-baltic-dirty-tanker-indexes>. Accessed on 25 May 2016.

Wikipedia (2016). Container ship. Accessed on 27Sep 2016. Retrieved from: [https://en.wikipedia.org/wiki/Container\\_ship](https://en.wikipedia.org/wiki/Container_ship)

Winters A., et al (2004). Trade Liberalization and Poverty: The Evidence So Far. Journal of Economic Literature. Vol. XLII (March 2004) pp. 72–115.

Woo Lee, T. (1990). Korean Shipping Policy: The Role of Government. Marine Policy, Volume 14, Issue 5, September 1990, pp. 421-437.

World Bank (2015-2016-2017). The World Bank Databank. Accessed on 18Mar 2017. Retrieved from: <https://databank.worldbank.org/>

Zachariassen (2016). Weekly market report 20th, 26th of April 2016.