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WORLD MARITIME UNIVERSITY

Shanghai, China

**Study on the development of COSCO dry bulk
transportation**

By

Yang Bo

China

A research paper submitted to the World Maritime University in partial
fulfillment of the requirements for the award of the degree of

MASTER OF SCIENCE

In

INTERNATIONAL TRANSPORT AND LOGISTICS

2008

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DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

Title of Dissertation: Study on the development of COSCO dry bulk transportation

Degree: Master of Science in International Transport and Logistics

In 2007 the BDI index broke through the 10000 points. The dry bulk shipowners have had much to celebrate this good market, as their vessels have been filled with abundant quantities of bulk cargo with high freight rate. The global economy keeps stable increasing and produce huge demand for dry bulk. Dry bulk market is a periodic market. The market always fluctuates fiercely which is based on the demand and supply of market. COSCO is the largest dry bulk shipowner in both domestic and global market. With fast development of China economy, COSCO is in the fast development. What long term objective COSCO should develop in future market is the objective of dissertation to solve. In the process of development there are also existing some problems, some solutions should be found to solve these problems.

This dissertation is the analysis of bulk markets. It consists of 6 chapters. Chapter One introduces the objectives of the topic, the main content, the research methodologies and the literature review. Main body of the paper is from Chapter Two to Chapter Six. Chapter Two introduces dry bulk market and the status quo of COSCO dry bulk transportation. Chapter Three the necessity of development of COSCO dry bulk transportation. Chapter Four The conditions that COSCO possesses of to develop dry bulk transportation. Chapter Five analyzes the objective of development of COSCO dry bulk transportation. Chapter Six analyzes the existing problem in development of COSCO and solutions .

Key Words: COSCO objective, dry bulk, development of COSCO

TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGEMENT	iii
ABSTRACT.....	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	ix
1.Introduction.....	错误！未定义书签。
1.1 The objectives of the topic	1
1.2 Main contents and methodologies.....	1
1.3 Literature review	4
1.3.1 Analysis of market through discounted payback period, NPV and IRR	5
1.3.3 Analysis of time charter and voyage charter to make optimal profits.....	6
1.3.4 Analysis of using the FFA to reduce the risks.....	6
1.3.5 Simple linear regression to forecast the demand and supply	7
2. Analyzing dry bulk market and the status quo of COSCO dry bulk transportation	9
2.1 The demand of dry bulk market	9
2.1.1. Iron ore market.....	9
2.1.2 Coal market	10
2.1.3 Grain market	11
2.1.4 Average haul.....	12
2.2 The supply of dry bulk market	13
2.2.1 Dry bulk fleet in the market	13
2.2.2 Bulk vessels delivery in future	15
2.3 Analysis of COSCO dry bulk transportation.....	15
2.4 Summary of the chapter	18
3 The necessity of development of COSCO dry bulk transportation.....	21
3.1 The importance of dry bulk transportation in the development of Chinese economy.....	21
3.1.1 Fast development of Chinese economy.....	21
3.1.2 Analyzing the importance of dry bulk transportation of China.....	22
3.2 The increasing demand of dry bulk market in the world.....	24
3.2.1 The world economy still keeps stable increasing	25
3.2.2 The forecast demand of dry bulk market in the world	25
3.3.3 The evaluation of the future dry bulk market.....	27
3.3 The own demand of COSCO development.....	29
3.3.2 Development of COSCO dry bulk transportation can make maximum profits	29
3.3.3 The own fleet of COSCO to develop	30
3.4 Summary of the chapter	30
4. The conditions that COSCO possesses of to develop dry bulk transportation.....	31
4.1 COSCO Chinese status and background to support the dry bulk transportation development.....	31
4.2 COSCO comes into stock market to support long term development.....	32
4.3 COSCO has an excellent and experienced management team to support long term development.....	33

4.4 Summary of the chapter	35
5. The objective of development of COSCO dry bulk transportation	36
5.1 Forecast the volume of COSCO dry bulk transportation	36
5.2 Make long term development target from 2010 to 2015	37
5.2.1 Long term objective for cargo volume of COSCO dry bulk carried	38
5.2.2 Long term objective for COSCO fleet development.....	39
5.3 Summary of the chapter	41
6. The existing problems in development of COSCO and solutions.....	43
6.1 The existing problem in development of COSCO	43
6.1.1 Competition between the COSCO dry bulk filiale.....	43
6.1.2 Lack experience and correct rule and instruction in FFA operation.....	44
6.1.3 Lack all-round risk system in the fast development of COSCO	45
6.2 The solutions in the development of COSCO	46
6.2.1 Integrate COSCO dry bulk filiale to avoid loss in the internal competition	46
6.2.2 Establish the right rules and instructions in FFA operation.....	47
6.2.3 Voyage charter, time charter, COA flexible combination to prevent risks	47
6.2.4 Establish the all-round risk system to keep COSCO smooth development	48
6.3 Summary of the chapter	48
Conclusion	50

LIST OF TABLES

Table 2.1.1 Dry bulk seaborne trade (million tonnes)	9
Table 2.1.2 Iron ore-imports (million tons)	10
Table 2.1.3 Major grains-imports/exports (million tonnes)	12
Table 2.1.4 Average Haul	13
Table 2.2.1 Total bulk carrier fleet	14
Table 2.2.2 Total average annual supply(mdwt)	14
Table 2.2.3 Dry bulk orderbook and delivery schedule (000 dwt)	15
Table 2.3.1 Total volume COSCO carried in 2007(0000t)	15
Table 2.3.2 COSCO Fleet in 2007(000 dwt)	17
Table 2.3.3 Comparing COSCO fleet with World dry bulk fleet	17
Table 2.3.4 COSCO dry bulk orderbook and delivery schedule (m dwt)	18
Table 3.1.1 Real GDP growth(% change previous periods)	21
Table 3.2.1 Dry bulk trade volume	26
Table 3.3.2 Regression Statistics	26
Table 3.3.3 The market forecast	27
Table 3.3.4 Summary the segment result * (million RMB)	29
Table 5.1.1 Volume of dry bulk cargo COSCO carried	36
Table 5.1.2 Regression Statistics	36
Table 5.1.3 Forecast Volume of dry bulk cargo COSCO carried	37
Table 5.2.1 Forecast Volume of dry bulk cargo COSCO carried	38
Table 5.2.2 Forecast COSCO dry bulk fleet	39
Table 5.2.3 Regression Statistics	39
Table 5.2.4 Forecast COSCO dry bulk fleet	40
Table 5.2.5 Structure of COSCO fleet in 2015 (mdwt)	41

LIST OF FIGURES

Figure 2.3.1 COSCO carried occupied the total Dry bulk	16
Figure 2.3.2 COSCO fleet occupied 8% of the world total fleet in 2007.....	18
Figure 3.1.1 Iron ore-imports in 2007(million tons)	22
Figure 3.1.2 China iron ore import(million tons).....	23
Figure 3.1.3 Chinese total seaborne trade of Coal in 2007	24
Figure 3.1.4 Chart Real GDP growth.....	25
Figure 4.1.1 ROE OF BULK CARRIERS' COMPANY	34
Figure 5.2.1 COSCO fleet structure in 2007.....	41
Figure 6.1.1 COSCO dry bulk filiale(mdwt).....	43

LIST OF ABBREVIATIONS

COSCO	China Ocean Shipping (Group) Company
BDI	Baltic Dry Index
DWT	Deadweight Tons
GDP	Gross domestic product
IP	Industry Production
FFA	Forward Freight Agreement
COA	Contract Of Affreightment
MT	Metric Ton
COMBI	Combine Carrier

1. Introduction

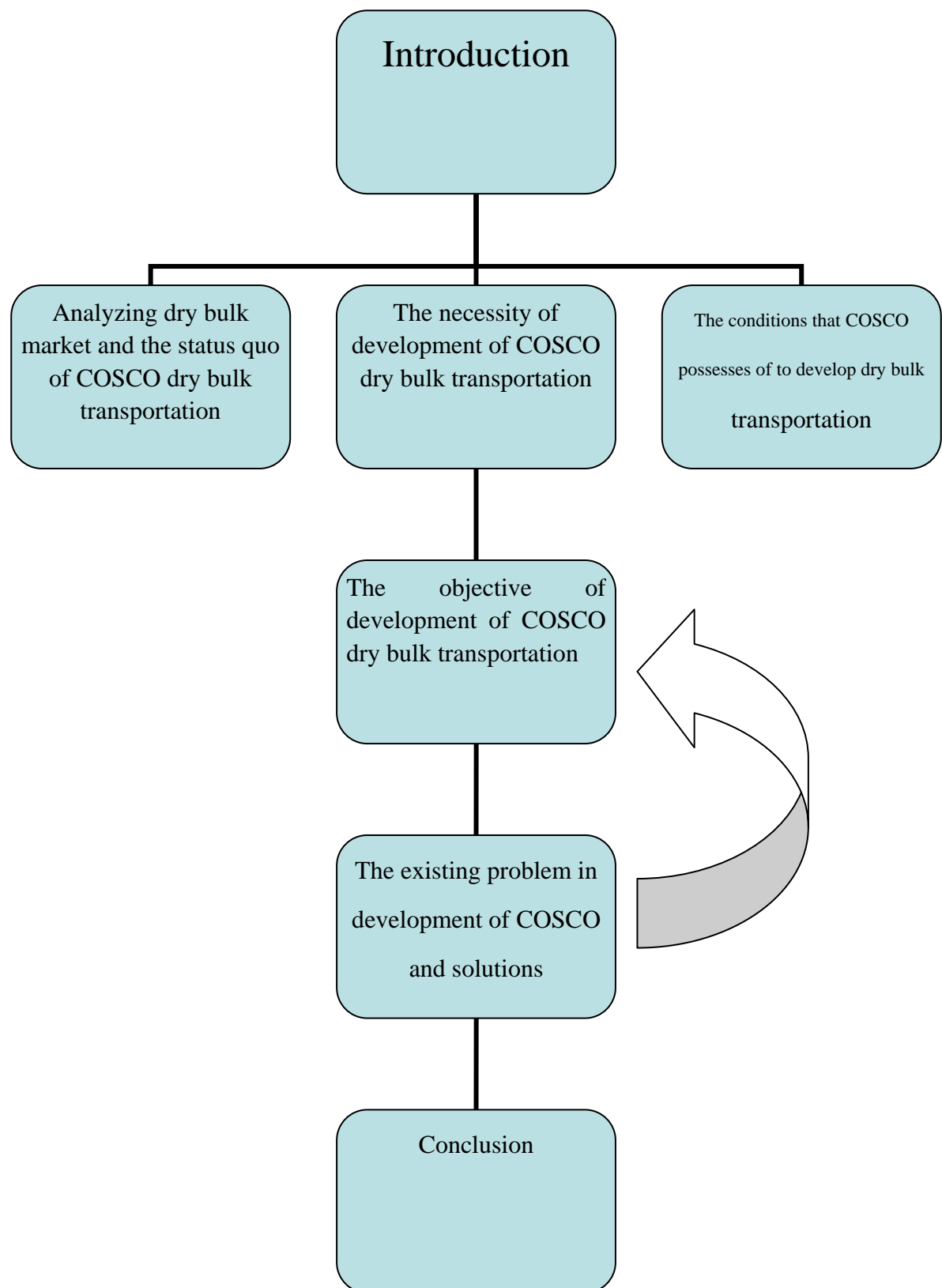
1.1 The objectives of the topic

COSCO dry bulk is the largest dry bulk shipowner both in the domestic and global market. From 2003 to 2007 COSCO was in the fast development. It developed to be largest scale of its dry bulk fleet and largest market share in both the domestic and global market. Whether COSCO need to continue to develop and what long term objective should COSCO develop to get are the objective for this dissertation to solve. This dissertation analyzes the necessity of development of COSCO dry bulk transportation including the internal and external environment analysis and evaluations. The global economy will still keep stable increasing and demand of dry bulk market will keep in the fast development. China keeps its fast development at high increasing rate and produce huge demand for dry bulk market. The huge demand in the internal and external and COSCO own demand decide that COSCO must continue to develop in the long term. And the advantage of COSCO analysis including COSCO Chinese status and background, financing platform and an excellent and experienced management team are important to support its long term development. And use simple linear regression to forecast the volume of dry bulk cargo COSCO carried. Then use the same way to forecast the scale and structure of dry bulk fleet of COSCO to get long term objective COSCO should develop. Then find some solutions to solve the disadvantage which may hinder the development of COSCO.

1.2 Main contents and methodologies

The dissertation analyzes dry bulk market and the status quo of COSCO dry bulk transportation. Analyzing COSCO fleet scale and volume of cargo carried in 2007. Analyzing the necessity of development of COSCO dry bulk transportation which include global market and domestic market. Then the conditions that COSCO possesses of to develop dry bulk transportation which including COSCO Chinese

status and background, financing platform and excellent and experienced management team to support its long term development. Use the simple linear regression to forecast the demand and supply of COSCO in the future market to make the objective of long term development of COSCO. The disadvantage include competition between the COSCO dry bulk filiale, lack experience and correct rule and instruction in FFA operation and lack all-round risk system may hinder the development of COSCO. Some solutions should be applied to solve the problem existing in COSCO which integrate COSCO dry bulk filiale to avoid loss in the internal competition, establish the FFA department to use right way to operate in FFA and flexible combination of time charter, voyage charter and COA. The structure of this dissertation as following:



The main methodologies include the supply and demand model, discounted payback period, NPV and IRR to calculate the investment, time charter and voyage charter

applying in the market, using the FFA to reduce the risks and simple linear regression to forecast the volume of demand in the world, volume of COSCO carried and COSCO fleet scale.

1.3 Literature review

1.3.1 Demand and supply in dry bulk market

Dry bulk market is a periodic market. It always fluctuates fiercely which is based on the demand and supply of market. The demand and supply model is very important to analyze the market. According to principle of Economics, demand shows how the buyers respond to changes in price and other variables that determine quantity buyers are willing and able to purchase and supply shows how sellers respond to changes in price and other variables that determine quantity offered for sale. Demand and supply provide an analytical framework for the analysis of the behavior of buyers and sellers in the market. The interaction of buyers and sellers in the marketplace leads to market equilibrium. In other words, equilibrium occurs when price is at a level for which quantity demanded equals quantity supplied.¹ While in the dry bulk market, the demand represent the iron ore, coal, grain ect. These bulk cargos are demand in the market. And the vessels in the markets are supply in the market. And the sailing speed, time in ports, operation ratio and space utilization should be considered in supply. The freight rate represents the market equilibrium. When quantity supply exceeds quantity demand, the freight rate will be down. When quantity demand exceeds quantity supply, the freight rate will go up. Before judging the main the trend of the market, we need analyze demand and supply in the market and the factors that affect maritime demand and price elasticity. ²When we analyze the demand and supply, we will know the supply/demand gap in the market. The gap is wide which represents the freight rate will be down, because the supply exceeds the demand. The smaller the gap is, the more profits the shipowner will earn.³ Ten variables in the shipping market

¹ Dominick Salvatore(2006) *International Economics* WILEY P13-21

² Shuo, M. (2007). *Maritime Economics*. Class handouts. World Maritime University

³ Susan Oatway(2007) *Dry Bulk Forecaster* Drewry Shipping Consultants Ltd P31-35

including the world economy, seaborne commodity trades, average haul, political events, transport costs which are the factors influence the demand in the market and world fleet, fleet productivity, shipbuilding production, scrapping and losses and freight rates which are the factors influence the supply market. The factors influence the demand and supply market and market trend. Freight rates link supply and demand. When supply is tight and freight rate rises, stimulating shipowners to provide more transport. When they fall it has the opposite.

1.3.2 Analysis of market through discounted payback period, NPV and IRR

Discounted payback period, NPV and IRR is very useful tool to forecast the market which also consider the time value. Discounted payback period means that length of time required recovering the initial cash outflow from the discounted future cash inflows. This is the approach where the present values of cash inflows are cumulated until they equal the initial investment. NPV is Net Present Value. NPV is used in capital budgeting to analyze the profitability of an investment or project. NPV analysis is sensitive to the reliability of future cash inflows that an investment or project will yield. A project is accepted if its NPV is positive. A project is rejected if it is negative. IRR is Internal Rate of Return which is highly related to NPV. The IRR is the discount rate that makes the NPV of an investment equal to 0.¹ In the dry bulk market, the shipowner will use the discounted payback period, NPV and IRR to calculate the return of investment. They will compare different size of vessels' return to choose the highest return. They will make decision which is better the new order or the secondhand. Through using the discounted payback period, NPV and IRR, the investment which investment has shorter payback time, shorter discount pay back time, higher ROR and ROI, higher NPV ratio, higher IRR(which exceeds discount rate) is the best investment.²

¹ Eugene F.Brigham, Joel F.Houston(2003) Fundamentals of Financial Management P21

² Pierre CARIOU(2007) *Finance And Risk Management In Transport And Logistics* Class handouts. World Maritime University P12-22

1.3.3 Analysis of time charter and voyage charter to make optimal profits

Time charter and voyage charter are two main types of charter. The different vessel employment methods have different characteristics and responsibility. Voyage charter is a charter under which a shipowner hires out a ship for a specific voyage between the loading port and the discharging port. The shipowner is responsible for paying both ship operating expenses and voyage expenses. Typically, the charterer is responsible for any delay at the loading or discharging ports. The shipowner is paid freight on the basis of the cargo movement between ports. Time charter is a charter under which the shipowner hires out a ship for a specified period of time. The shipowner is responsible for providing the crew and paying ship operating expenses while the charterer is responsible for paying the voyage expenses and additional voyage insurance. The shipowner is paid charter hire, which accrues on a daily basis.¹ According to Professor Ma's opinion, the good way to avoid the risk and get maximum profits in the dry bulk market is that when you forecast the market will fall in the long term you should use time charter to charter your bulk vessels to charterers as long as possible. When you feel the market is good and will go up, you should use voyage charter to earn the maximum profits.

1.3.4 Analysis of using the FFA to reduce the risks

FFA is English Forward Freight Agreement (Forward Freight Agreement) title, and it is a long-term buyers and sellers to reach freight agreement, the agreement provides for specific routes, price, quantity, etc., and the two sides agreed in the future at a given time, the receipt or payment delivery routes based on the Baltic freight index official price and the contract price difference between the freight. FFA first was put forward by Clarkson.² With the fast development of dry bulk market, more and more shippers and shipowners and some financial companies join this market. ³ FFA

¹ Jeffrey Blum(2007) *Chartering Practice and shipping broking* Class handouts. World Maritime University P35-41

² Shuo, M. (2007). *Maritime Economics*. Class handouts. World Maritime University

³ Yangliu (2007) *The relation of FFA and dry bulk market* China Maritime P34-36

market trend has the same orientation. FFA market represents participants' expectation of the market. When the dry bulk market is up, the FFA market will have the same trend and rising extent will exceed the extent in the dry bulk market. When the dry bulk market is down, the FFA market will have the same trend and decreasing extent will exceed the extent in the dry bulk market. Some companies make much money in the market and some companies suffer loss. The reasons of different results are different judgments of market trend. The company which can grasp the right orientation in the market can make profits and reduce the risks. According to Professor Jeffrey's opinion, active participants have clearly stated that hedging their freight risk with FFA has not only reduced their risk but also often improved their cash flows. This endorsement brings more companies in turn, in spite of some of the less helpful misconceptions about the danger of derivatives. More and more participants join this market and more and more money are put into this market, FFA has greater influence on the dry bulk market. Right using of FFA market to reduce the risk needs right judgment of the market trend. ¹

1.3.5 Simple linear regression to forecast the demand and supply

Simple linear regression is to predict the value of one variable (the dependent variable) from the value of another variable (the independent variable). Simple linear regression is used to estimate this relationship, if the dependent variable and independent variable are related linearly.² In the dissertation we use this way to forecast the demand of dry bulk market in world, the volume of dry bulk COSCO carried and COSCO fleet development. We calculate it with 95% confidence, which the result of forecast within 95% confidence is relatively believable. Then use the forecast result to get the COSCO long term objective from 2010 to 2015. We use Excel which has the function of regression to calculate the forecast result. Then it will result a summary output which includes Coefficients, Standard Error, R Square, Adjusted R Square and the area

¹ Jeffrey Blum(2007) *Chartering Practice and shipping broking* Class handouts. World Maritime University PP 23-34

² Wayne L.Winston S.Christian Albright *Practical Management Science* Dongbei financial university P754-764

within the 95% confident. Then we use the coefficients to get the forecast result.

2. Analyzing dry bulk market and the status quo of COSCO dry bulk transportation

2.1 The demand of dry bulk market

As we known, the demand of dry bulk market is calculated as the ton mile. The main demand dry bulk market consists of seaborne commodity trades and average haul. The seaborne commodity trades in the dry bulk market include the iron ore market, coal market, grain market, steel products market, cement market, fertilizers markets. The iron ore market, coal market, grain market are the main markets in the demand market. The below table represents the total quantities of dry bulk seaborne trade increased from 2340 million tons to 2975.4 million tons from 2003 to 2007. And this market closely links with the world economy.

Table 2.1.1 Dry bulk seaborne trade (million tons)							
	Iron Ore	Coking Coal	Steam Coal	Grain	Minor Bulks	Total Trade	%Change*
2003	524.0	189.0	430.0	240.0	957.0	2340.0	3.6%
2004	586.9	196.0	454.0	248.4	1025.0	2510.3	5.5%
2005	660.1	207.0	468.0	253.0	1048.9	2637.0	5.0%
2006	721.8	220.9	488.5	262.0	1103.4	2796.6	6.1%
2007	785.1	229.1	531.9	268.7	1160.6	2975.4	6.4%
*Percent change on previous period							
Source: Drewry, MITI, IISI, MEPS, IGS, Comext							

2.1.1. Iron ore market

Iron ore is the largest bulk commodity trades in dry bulk market. It is the important and basic raw material of the steel industry. So the expansion of iron ore trade closely links with development of steel industry. From 2003 to 2007 global iron ore seaborne trade grew from 524 millions tons to 785.1. From table 2.1.2 we can see that in 2003 China accounted for 28% of the seaborne iron ore imports while in 2007 China occupied 49% of the seaborne iron ore imports. Through comparing we can get the

result that the seaborne iron ore market is depended on the Chinese steel production market development. And we forecast that its share will increase in the future. The reason for the great demand for iron ore is the rapid development of the Chinese domestic steel market.

Table 2.1.2 Iron ore-imports (million tons)								
	EU-15	Japan	S. Korea	China	Taiwan	USA	Total major	total seaborne trade
2003	141.0	131.9	43.7	148.2	15.6	12.6	493.0	524.0
2004	156.4	134.9	44.2	208.1	15.7	11.7	571.0	586.9
2005	156.6	132.3	43.6	275.2	14.6	13.1	635.4	660.1
2006	160.2	134.5	43.9	327.2	15.5	11.7	693.0	721.8
2007	158.6	139.5	46.6	383.6	15.5	9.9	753.7	785.1
Source: Drewry, MITI, Comext								

2.1.2 Coal market

Coal is the second largest dry bulk trades. The coal market divides into two markets: coking coal and steam coal. Coking coal is used as raw material such as for steel production making. Steam coal is used as a fuel such as for power plant.

For coking coal, from 2002 to 2007 the total seaborne trade increased steadily from 184 million tons to 229.1 million tons. The largest import country is Japan followed by EU-15 and S.Korea which occupied 34.5%, 22.1% and 7.68% respectively in 2007 in coal seaborne trade market. From 2002 to 2007, Japan kept steadily for coal import at 79 million tons. EU-15 has surging trend from 36.8 to 50.7. These years Chinese government has removed the duty on coal import and add tax on coal export. This policy raised the coal cost and encouraged the coal import. Now China has become coal net import.

For steam coal, from 2002 to 2007 the total seaborne trade accrued from 386 million tons to 531.9 million tons. The largest importer is EU-15 followed by Japan and S.Korea which accounted for 19.23%, 18.82% and 12.56% respectively in 2007 in coal seaborne trade market. These importers have obviously raising trend, for EU-15 as example, it raised from 77.5 million tons in 2002 and reached a peak at 102.3 million tons in 2007.

From above analysis we can get the results that the global coal trade has a raising trend from 570 million tons to 761 million tons in the recent six years. The demand of coal keeps for increasing with development of economy.

2.1.3 Grain market

Grain is the third largest dry bulk trades. As we known, grain is very important for our daily lives which used as human food and animal feedstuff. Grain trade is different from iron ore and coal trade which has seasonal features. For grain is belong to agricultural commodity, the volume of grain is uncertainty and irregular for many reason such as weather. Grain trade mainly includes wheat and coarse wheat.

From table we can see that the grain trade had booming trend from 2003 to 2007, it raised from 240 million tons in 2002 and reached a peak at 268.7 million tons in 2007. Pacific Asia is the largest importer followed by Africa which took up 23.22% and 15.89% respectively. USA is the largest exporter covered 38.25% in the global grain trade market which is about five times as the second largest exporter Argentina.

From above statistics we can get the result that grain trade closely links with food. Food demand is based on the many factors such as prices, population, income etc. And its export or supply depends on prices, weather, policy etc. The grain trade kept increasing steadily.

Table 2.1.3 Major grains-imports/exports (million tons)							
Imports	Pacific Asia	S. Asia	Africa	S. America	N&C America	CIS	Near East Asia
2003	64.3	2.4	32.9	18.2	23.9	12.1	23.8
2004	66.5	4.1	37.7	17.6	24.8	9.1	25.9
2005	67.4	5.8	44.6	17.2	27.4	5.8	29
2006	65.5	5.3	47.3	20	26.7	6.2	31.1
2007	62.4	10.8	42.7	23.5	30.5	6.8	29.7
Exports	USA	Australia	Canada	Argentina	EU	Seaborne trade	
2003	74.5	12.7	13.2	18.3	21.1	240	
2004	83.7	26.4	18.1	20.6	12.9	248.4	
2005	77.6	15.7	18	25.2	17.9	253	
2006	86.3	20.5	22.5	20.8	18.7	262	
2007	102.8	10.1	21	26.2	17.2	268.7	
Source: Drewry, IGC, USDA, FAO							

2.1.4 Average haul

The demand in dry bulk market is based on the distance over which cargo is carried. The distance is referred to as the average haul. The effect on ship demand of changing the average haul is based on the trade of different countries. Changing in the average haul of trade is a complicated problem. More trade information and price of cargo analysis are needed to analyze average haul. For example, China imported most the iron ore from Australia before. Now China imports more iron ore from Brazil which is 2.5 time distance as China to Australia. Japan also meets the same situation. The increasing will increase the demand in dry bulk market. From the table, the average haul increased every year from 2003 to 2007.

Table 2.1.4 Average Haul						
	Dry bulk trade(Ton Mile)(Billion)	% Change	Dry bulk trade(m tons)	%Change*	Average haul(Mile)	% Change
	1)	2)	3)	4)	5)	6)
2003	10763	2.60%	2340	3.60%	4600	
2004	11978	11.29%	2510	7.26%	4772	3.75%
2005	12745	6.40%	2637	5.06%	4833	1.28%
2006	13694	7.45%	2797	6.07%	4896	1.30%
2007	14746	7.68%	2975	6.36%	4957	1.24%
Source: Drewry						

2.2 The supply of dry bulk market

The supply of dry bulk means vessel supply. The vessels have a physical life 20-30 years. And building a new one needs more than 12 months. So the characteristics of the supply in the market are slow and ponderous comparing with demand. Shipowners should decide when to order new vessels, scrapping overage vessels and lay up ones according to the whole market. Dry bulk fleet has four kinds of vessels which consist of Handysize, Handymax, Panamax, Capesize. And some combined carrier fleet also can provide supply for dry bulk cargo. So the supply in the market are changing all the time through new vessels in the market, old ones be scrapped and some vessels lay up. Following will describe and analyze the supply in the market.

2.2.1 Dry bulk fleet in the market

The dry bulk fleet had a raising trend from 2003 to 2007. The total dwt is from 303.8 million dwt to 394.8 million dwt which keeps about 6.5% increasing every year. For four kinds of vessels, Handysize remained around 43 million dwt from 2003 to 2007, the others had obvious raising trend, Capesize had highest increasing rate following Panamax and Handymax which was 41.27%, 34.8%, 26.45 respectively. But not all the vessels can provide supply in the market. Some vessels are inactive for some reason such as repairing or lay up. From table we can see that from 2002 to 2007 the total bulker inactivity fluctuated within 4000 thousand dwt. It seems irregular

fluctuation, because some accidents for vessels are accidental and hard to control. From table we can find that from 2002 to 2005 the total dwt of combined carrier has declining trend from 12348 thousand dwt to 11468 thousand dwt and from 2005 to 2007 it remain same at 10909 dwt, while the combined carrier fleet' trading dry has raising trend from 2005 to 2007 for the good market and it reached a high peaking at 7127 thousand dwt in 2007 which covered 65.3% of total dwt of combined carrier fleet.

From above statistics and analysis, total average annual supply for bulk cargo from 2003 to 2007 has a raising trend. Through calculating, total fleet minus bulker inactivity plus combined carrier fleet for dry we get final supply in the market. In 2007 the supply reached at 386 millions dwt which has 6.8% increased by 2006. From 2005 to 2007 the supply kept about 6.7% increasing.

Table 2.2.1 Total bulk carrier fleet										
	Handysize		Handymax		Pananmax		Capesize		Total	
	No	mdwt	No	mdwt	No	mdwt	No	mdwt	No	mdwt
2003	1888	42.7	2082	87.2	1136	81.0	564	92.8	5670	303.8
2004	1912	43.3	2193	92.4	1217	87.2	604	100.1	5926	323.1
2005	1924	43.6	2320	98.6	1304	94.0	653	110.0	6201	346.1
2006	1918	43.5	2417	103.7	1398	101.6	703	119.2	6436	368.0
2007	1958	44.2	2551	110.3	1492	109.2	766	131.1	6767	394.8
Source: Drewry										

Table 2.2.2 Total average annual supply(mdwt)					
	Fleet	Minus Inactive	Plus Combis In dry	Total Supply	% Change*
2003	299.8	3.3	3.9	300.4	4.2%
2004	313.4	2.7	6.6	317.4	5.7%
2005	334.6	2.0	6.6	339.2	6.9%
2006	357.1	1.7	6.1	361.5	6.6%
2007	381.4	1.9	6.5	386.0	6.8%
Period averages *Change on pervious period					
Source: Drewry					

2.2.2 Bulk vessels delivery in future

Dry bulk orderbook is very important for future supply evaluation in the market. From the Drewry statistics report we see that from 2008 to 2010 the supply has obviously raising trend, accounting for 30.45 million dwt, 55.16 million dwt and 82.15 million dwt respectively. The reason for the raising trend is that the fast development and strong demand in the dry bulk market and shipowners and investors' good expectation. Building a new bulk vessel needs more than 12months and lack of enough shipyards, so many new order will delivery in two or three year. The total orders cover more than 50% of the total fleet. In the four kinds of vessels, Capesize has most orders and occupies about 87% of its current fleet because the strong demand in the iron ore trade.

Table 2.2.3 Dry bulk orderbook and delivery schedule (000 dwt)												
	2008		2009		2010		2011		2012		total	
	No.	Dwt	No.	Dwt	No.	Dwt	No.	Dwt	No.	Dwt	No.	Dwt
Handysize	53	1226	44	933	20	466	8	232	0	0	125	2857
Handymax	228	10917	401	18653	385	18093	182	8697	34	1600	1230	57960
Panamax	114	894	121	9915	201	16470	127	10579	26	1906	589	39764
Capesize	47	9350	139	25659	263	47120	135	25286	27	5459	611	112874
Total	442	30446	705	55159	869	82149	452	44795	85	8965	2553	221514
Source: Drewry												

2.3 Analysis of COSCO dry bulk transportation

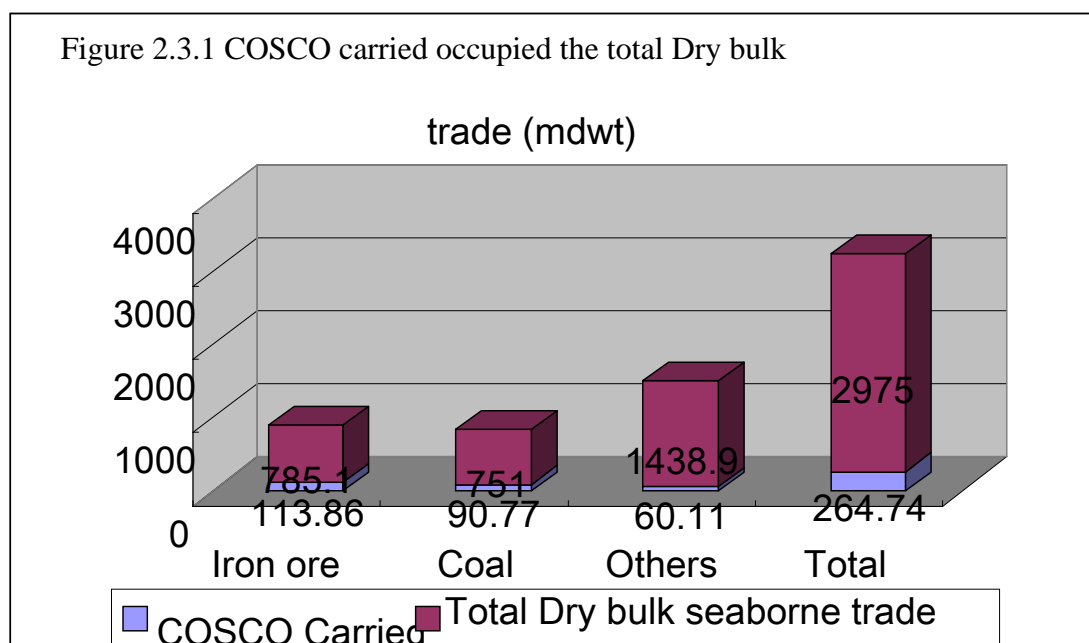
COSCO is the largest dry bulk shipowner with its largest fleet scale and largest market share in both domestic and global market.

Table 2.3.1 Total volume COSCO carried in 2007(0000t)			
	2007	2006	% Change*
Iron ore	11386	9560	19. 1%
Coal	9077	8274	9. 7%
Others	6011	4879	23. 2%
Total	26474	22713	15. 10%
Source: COSCO			

Above table represents the total volume COSCO carried in 2007. COSCO carried

total 264.74 million tons dry bulk cargo in 2007 which increased 15.1% comparing with the volume in 2006. COSCO carried 113.86 million tons iron ore in 2007 which occupied 43% of total volume carried in 2007 and increased by 19.1% comparing with 2006. From above analysis of the structure of COSCO fleet, we find the proportion of Capesize is big. As we know, Capesize usually carries iron ore and coal. In 2007 cargo that Capesize carried 67% was iron ore and 33% was coal. So COSCO carried much iron ore and the volume of iron ore COSCO carried occupied 14.5% of total iron ore seaborne trade in the world.

Figure 2.3.1 COSCO carried occupied the total Dry bulk



We can see the above figure which represents the volume comparing between the COSCO carried and total dry bulk seaborne trade. Though the other cargo COSCO carried increased 23.2% which seems to be higher than increasing rate of iron ore, the volume of the other cargo such as grain, steel production and fertilizer COSCO carried only occupied 4.17% of total other cargo seaborne trade in the world. The reason for this is that the Handysize and Handymax took up small proportion of total world fleet.

COSCO is the largest shipowner in China who owned a dry fleet of 202 vessels in 2007. Hong Kong COSCO, Tianjin COSCO and Qingdao COSCO mainly operate these dry vessels which cover a wide size from Capesize to Handysize.

Table2.3.2 COSCO Fleet in 2007(000 dwt)							
	Own fleet			Charter in		Total	
	No.	Dwt	Average age	No.	Dwt	No.	Dwt
Handysize	39	1319	20.6	30	1291	69	2610
Handymax	78	3690	13.5	55	2855	133	6545
Panamax	65	4538	14.5	68	5100	133	9638
Capesize	20	3337	7.1	64	10851	84	14188
Total	202	12884	14.6	217	20097	419	32981
Source: COSCO							

Above table represents total fleet in COSCO in 2007 including own fleet and the fleet chartered in. From this table, we can see Capesize got to 14.2 million dwt which occupied 43.02% of total fleet. Following is the Panamax which occupied 29.22%. The average age of COSCO own fleet is relevant young. Especially for Capesize, the average of this size is only 7.1 years which is more competitive in the dry bulk market.

Table 2.3.3 Comparing COSCO fleet with World dry bulk fleet										
	Handysize		Handymax		Panamax		Capesize		Total	
2007	No	mdwt	No	mdwt	No	mdwt	No	mdwt	No	mdwt
World fleet	1958	44.2	2551	110.3	1492	109.2	766	131.1	6767	394.8
COSCO fleet	69	2.6	133	6.5	133	9.6	84	14.2	419	33.0
Source: Drewry, COSCO										

From above table, we can see clearly that the proportion of COSCO fleet occupied in the world dry bulk fleet. The dwt of Capesize in COSCO fleet occupied 10.83% of total dwt of Capesize in world fleet. The dwt of Handysize in COSCO fleet took up relatively small proportion which is only 5.9% of total dwt of Handysize in world fleet. We can see clearly in figure that COSCO fleet occupied 8% of the total dwt of world fleet.

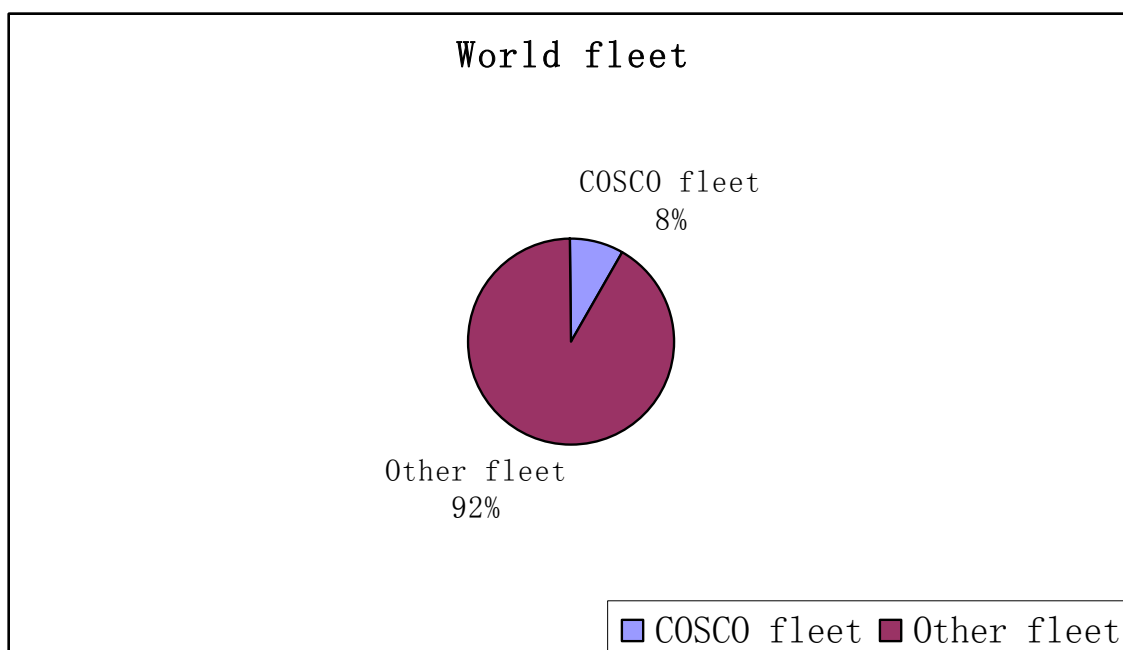


Figure 2.3.2 COSCO fleet occupied 8% of the world total fleet in 2007

	2008		2009		2010	
	No	Dwt	No	Dwt	No	Dwt
Handysize	---	---	---	---	---	---
Handymax	13	72	11	78	---	---
Panamax	4	31	5	38	4	30
Capesize	2	48	8	202	11	218
Total dwt	19	151	24	318	15	248
Source: COSCO						

From this table we can see that COSCO newbuilding order and delivery schedule statistics. Capesize is also the main size of vessel to develop. In 2009 and 2010, the dwt of Capesize took up 63.5% and 87.9% respectively of the total dwt delivery. One reason is that dwt of Capesize owned by COSCO is occupied relevant small proportion. Much dwt were chartered in. The other reason is that COSCO think the demand of iron ore market will still keep increasing. The demand of Capesize will be more than supply in the future market.

2.4 Summary of the chapter

From 2003 to 2007 the world economy keeping a steady increasing rate. Especially

China and India kept high increasing rate which produce huge demand for dry bulk market. So the demand of dry bulk market kept increasing from 2003 to 2007. The supply also adjusted by fast development of demand market. For new orders are delivered for more than a year more new buildings will be delivered after 2008. COSCO is the largest dry bulk shipowner in China which controlled more than 32.98 million dwt. And they carried 264.74 million tons cargo which occupied 8.9% of total dry bulk seaborne trade and finished 1400 billion ton miles. From the structure of the COSCO fleet, the proportion of Capesize was largest in 2007. So they put their main dwt supply in iron ore and coal market.

3 The necessity of development of COSCO dry bulk transportation

3.1 The importance of dry bulk transportation in the development of Chinese economy

The main dry bulk cargos are the iron ore, coal, grain market, steel products, cement and fertilizers which are the basic demand for human consumption. The characteristics decide its important role in the development of the economy. The dry bulk transportation is very important to finish this displacement to realize its final value.

3.1.1 Fast development of Chinese economy

Table 3.1.1 Real GDP growth(% change previous periods)						
	2003	2004	2005	2006	2007	
China	10	10.1	10.4	11.1	11.4	
Source: National Bureau of Statistics of China						

From above table, Chinese economy keeps high increasing rate which is at more than 10% increasing rate. The high increasing rate of economy needs huge demand of raw materials such as iron ore, coal and grain. The fast development of the Chinese steel industry is to promote the demand for raw materials such as iron ore and coal. The steel mills such as Baosteel, Angang steel and Tang steel have huge production capacity which is more than 20 million one year. The development of real estate in China and development in the basic construction in the country especially in Olympic Games in 2008 are main factors in driving the growth of demand. The development of machine industry such as vehicles and shipbuilding also has huge demand for steel production. The third season is that China is the largest steel production exporter with volumes of 10.3 million tons. For coal demand, Chinese government has added export duty on the coal exporting. China has change its role to net import coal country. With

the energy demand increasing, the power plant will have huge demand for coal and will import big volume of coal. China is a large population country which has more than 13 billion people. The grain trade keeps stable increasing these years to meet the demand of China.

3.1.2 Analyzing the importance of dry bulk transportation of China

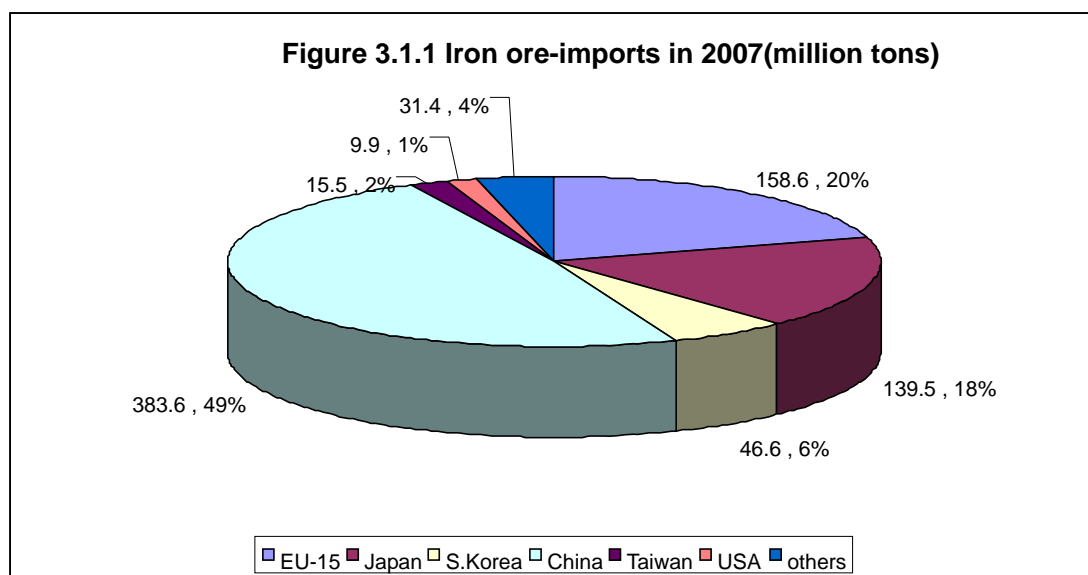


Figure 3.1.1 Iron ore-imports in 2007(million tons)

This pie is made according to table 2.1.1. China imported 383.6 million tons in 2007 which occupied about 50% of the total volume of iron ore importing. The fast development of Chinese economy and fast development of steel industry have huge demand for iron ore import. From below figure, we can see that the volume of iron ore import of China kept fast increasing from 2003 to 2007. The rising trend seems to be continued in future years. The proportion of China iron ore import will continue to expand.

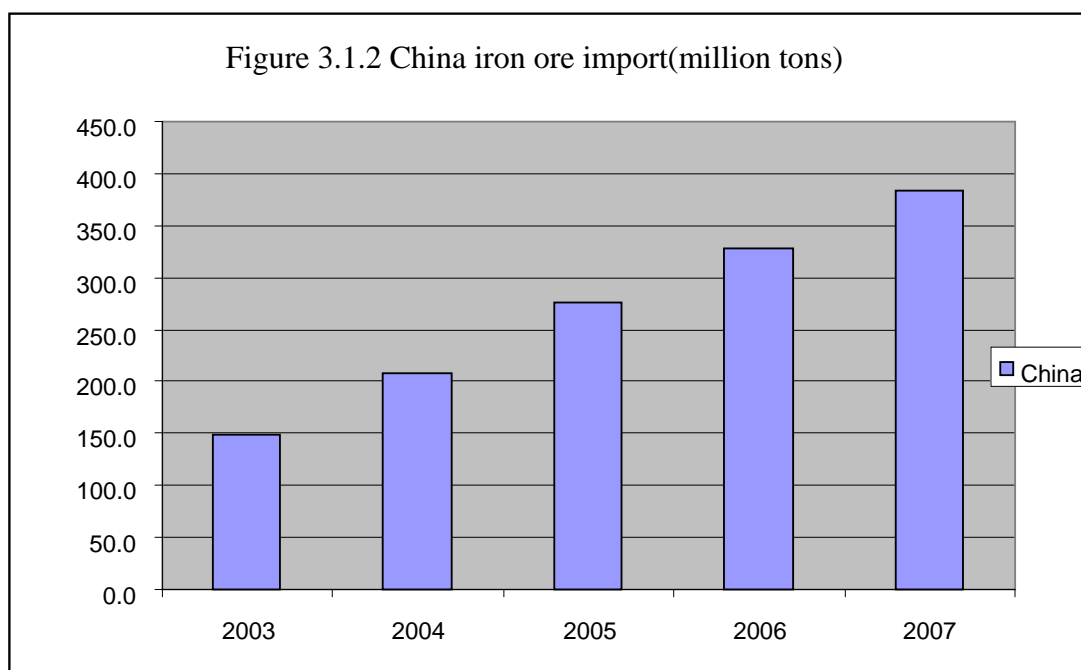


Figure 3.1.2 China iron ore import(million tons)

From 2003 to 2007, the volume of coal export from China decreased from 93.1 million tons to 53.17 million tons. But the volume of coal import increased from 11.02 million tons to 51.02 million tons. The volume of coal import was 2.15 million tons more than the volume of coal export. The total coal trade did not change much comparing with pervious years.

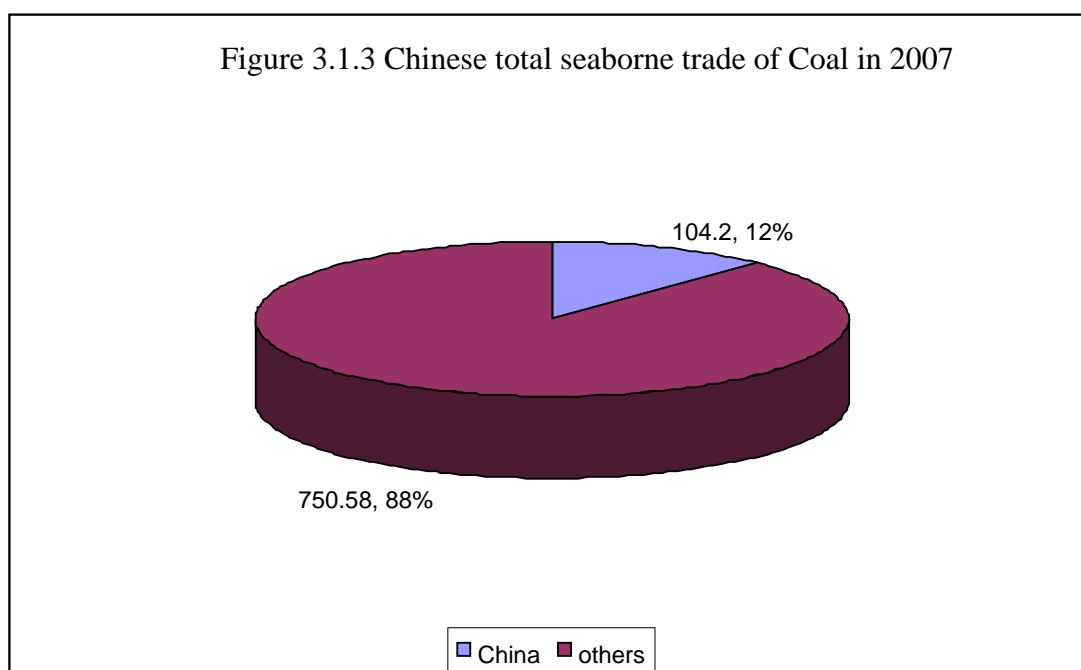


Figure 3.1.3 Chinese total seaborne trade of Coal in 2007

Source: Drewry

From above Pie we see total coal seaborne trade of China occupied 12% of the total world seaborne trade.

For steel production seaborne trade, China is the largest exporter in the world which exported 62.6 million tons steel production in 2007.

From above analysis and statistics, we find that volume of dry bulk cargo is very big in China especially for iron ore trade. But the total dwt supply in China occupied less than 20% of total world fleet scale. With the freight rate of dry bulk fast increasing, the dry bulk transportation seems more important for China economy. When the freight rate went to high level or BDI exceeded 10000 points, the freight rate was exceed value of the dry bulk cargo. If the China have not own dry bulk fleet and not develop their own fleet, they will be in the disadvantage position in the development of economy. The fast increasing the freight rate and price of raw material will have negative impact on the fast development of China, when price elasticity make its effect and China economy can not afford the high price. COSCO as the largest and state-owned company they must develop itself to be charged with the task to develop the Chinese economy smoothly.

3.2 The increasing demand of dry bulk market in the world

With the development of global economy, the demand of the dry bulks keeps increasing. From 2003 to 2007, the total quantities of dry bulk seaborne trade increased from 2340 million tons to 2975.4 million tons. And this market closely links with the world economy. The demand of dry bulk seaborne trade increased steady with the stable increasing of global economy.

3.2.1 The world economy still keeps stable increasing

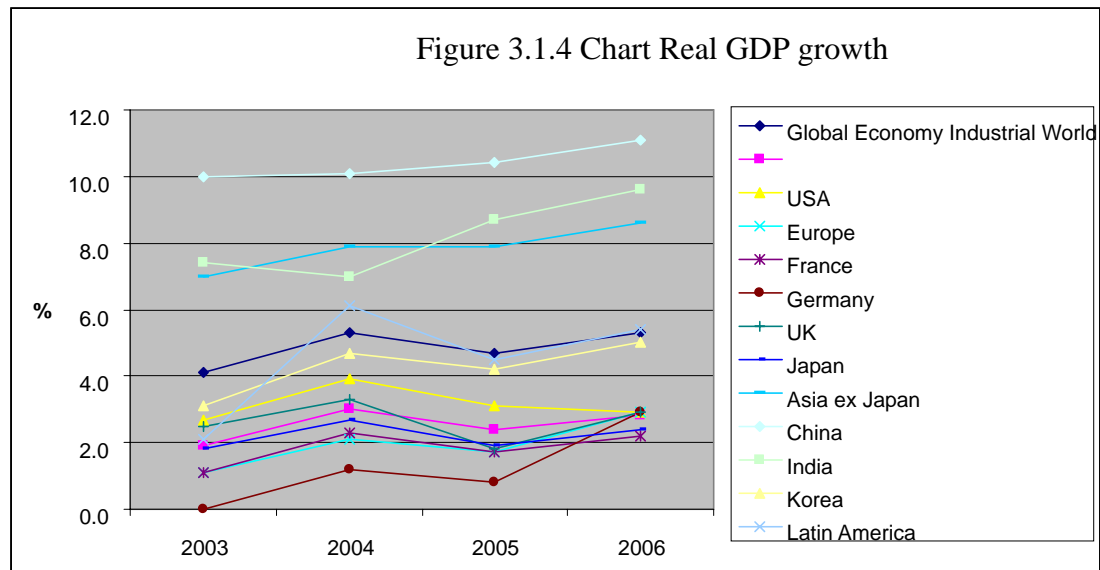


Figure 3.1.4 Chart Real GDP growth

From above chart we see that the US seems to cease to be the sole mover and leader of the global economy growth. The strong economic mover is from the developing countries especially China and India. Their high level of economy growth and high demand stimulates the global economy and the dry bulk market. From table we can see that the GDP of China and India keeps high growth rate from 10% to 11.1 and from 7.4% to 9.6% relatively between 2003 and 2006. And we see some developed countries such as USA and Europe, they keep low growth rate or some have recessionary trends. The developing countries fast development promoted the global economy stably increasing which also produce huge demand for raw material such as iron ore, coal and grain.

3.2.2 The forecast demand of dry bulk market in the world

Forecast the demand market we should know the trend of world economy development from 2008 to 2011. Gross domestic product (GDP) and industry production (IP) is directly influence the demand market. We see table USA was at low increasing rate from 2003 to 2007 and the housing market slowdown and a general

bank run on the capital markets lead to impend recession possible in USA. From above analysis, the trend of global economy will still increase steady which will be pushed by the fast development of developing countries. We use average move way to forecast the future demand market. Average haul is another important factor in the demand market. From 2005 to 2007 the increasing rate kept at 1.25%, it seems that the increasing rate keeps very stable. From the 2008 to 2011 the average haul will keep this increasing rate within 1.2% and 1.3%. One reason is that China and Japan will import more iron ore from Brazil which is obviously longer distance than importing from Australia and Indonesia. For countries in Asia such as China and Vietnam increase export taxes on the coal, the volume of coal export will decrease and other countries will import coal from Australia or Indonesia, Russia, US, Canada and Colombia. The distance haul will increase. We use the sample linear regression to forecast the future demand.

Table 3.2.1 Dry bulk trade volume			
	X Variable 1	Dry bulk trade(Tonne Mile)(Billion)	% Change
2003	1	10763	2.60%
2004	2	11978	11.29%
2005	3	12745	6.40%
2006	4	13694	7.45%
2007	5	14746	7.68%
Source: Drewery			

Through calculating, we get

$$y=968.2x+9880.6$$

Table 3.2.3 Regression Statistics	
Multiple R	0.997925084
R Square	0.995854473
Adjusted R Square	0.994472631
Standard Error	114.0502813
Observations	5

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9880.6	119.6169442	82.60201	3.911E-06	9499.9255	10261.275	9499.9255	10261.275
year	968.2	36.06586567	26.84533	0.0001134	853.42232	1082.9777	853.42232	1082.9777

So we get 95% confident that true value is between 853.42 and 1082.97. Then we get the forecast result as following:

Table 3.3.3 The market forecast			
	X Variable 1	Dry bulk trade(Ton Mile)(million)	% Change
2003	1	10763	2.60%
2004	2	11978	11.29%
2005	3	12745	6.40%
2006	4	13694	7.45%
2007	5	14746	7.68%
2008	6	15689.8	6.40%
2009	7	16658	6.17%
2010	8	17626.2	5.81%
2011	9	18594.4	5.49%
2012	10	19562.6	5.21%
2013	11	20530.8	4.95%
2014	12	21499	4.72%
2015	13	22467.2	4.50%

We forecast that the volume of dry bulk transportation will still increase, but the increasing rate will be down. The forecast result seems reasonable that the demand will increase steady with stable development of global economy.

3.3.3 The evaluation of the future dry bulk market

From the statistics of vessels delivery from 2008 to 2011 in Charter two, we find that many new vessels will be delivered after middle of 2009 which occupies more than 50% of total fleet in world. So the supply/demand gap is expected to widen obviously

from 2009 to 2011. So there will be a supply surplus during 2009 to 2011 which will push down the freight rate. Especially in 2010-2011 the more supply will be delivered, the gap is expected to widen. It is hard to forecast the details about BDI fluctuation in future markets. It is irregular and hard to find its rule. The average BDI seems to be down from 2008 to 2011. But this is just forecast result, we need observe some factors, firstly port logistics which is a bottle neck causes the port congestion. Port congestion will decrease the supply in the market which will push the freight up and up. Secondly, whether the new orders will be cancelled and new building will be delivered delay is another factor we need to observe. The global credit crunch may make the shipowners cancel their shipping order. And some new shipping yards may lack experienced workers or lack advanced building equipment will make vessels delivery delay. Thirdly, we also observe the price of fuel. If the price of fuel rises too high, it will make shipowner slowdown their vessels' speed which lead supply decrease in the dry market and push the freight rate up for the cost rising. The fourth reason is that if the freight rate is down too much, many old and inefficient vessels will be put in the demolition market. For the good market there are many old and inefficient vessels in the market. According to Drewry research and statistics, The number of vessels of over 25 years old (which was built before 1983) reach 1,415, 52.76 million DWT, accounting for 21.9% and 12.9% respectively of the total dry bulk fleet. Vessels built between 1983 and 1987 total 1,201 and 58.24 million DWT. Vessels aged more than 25 years are already reaching the limit of acceptance in international shipping routes with deteriorating economic efficiency and safety. Ports of Brazil and Australia have already refused the entry of such vessels. These old ones will in demolition market when the market is down, which will decrease the supply in the market. The four factors also influence the supply and freight rate in the future market. Any factors change will adjust the forecast result. So we get the trend that the market will be down after middle of 2009, but the whole gravity of freight rate has been raised. The average decreasing rate will be controlled and the demand is still big, the market will be good.

3.3 The own demand of COSCO development

With above analysis, the world demand of dry bulk market will be up and keep a stable increasing rate. COSCO as the largest and most competitive shipowner in China should expand its scale of fleet to keep up with the demand increasing.

3.3.1 COSCO keeps developing to keep its core role in the Chinese market

COSCO controlled 419 vessels which got to 33 million dwt. The fleet scale is largest not only in China but also in the world. The total dwt of COSCO was occupied 8% of total dwt. In 2007 COSCO carried total 264.74 million tons dry bulk cargo in 2007. The volume is very big but when comparing with fast development China economy and huge demand, it seems not to be able to meet the high demand of Chinese economy.

3.3.2 Development of COSCO dry bulk transportation can make maximum profits

Table 3.3.4 Summary the segment result * (million RMB)

Segments	1H 2007	1H 2006	Change
Container Shipping	595	708	-16.0%
Dry Bulk Shipping	7429	2945	152.3%
Logistics	248	216	14.6%
Terminals	496	376	32.0%
Container Leasing **	401	1442	-72.2%
Others ***	421	-193	317.7%

* Including share of profits less losses of jointly controlled entities and associates;

** Decrease in container leasing is due to disposal of 600,000 TEU boxes in 2006

*** Increase in others is due to the fair value gain on put option of CIMC.

Source: COSCO

According to segment results of 1H 2007, Dry Bulk Shipping was in the fast the development which increased by 152.3%. Dry bulk shipping takes the dominant role of all parts in COSCO. COSCO put main resources in dry bulk transportation investment which can provide maximum profits for COSCO.

3.3.3 The own fleet of COSCO to develop

From the fleet structure of COSCO, we find that the proportion of vessels chartered in exceeds the own fleet especially for Capesize. COSCO chartered in many vessels in 2003 to expand their fleet scale because they have not enough money to build so many vessels. With the good market in 2007, COSCO make huge profits and increase cash flow. They need to raise their own fleet especially for the Capasize. If COSCO do not build their own fleet, they have to charter in the vessels rate to keep the scale. With the freight rate up and up, shipowners have to pay high price to charter in the vessel. And for COSCO such a big company, the high proportion of vessels chartered in is reasonable when it developed at begin stage. With the development, they should adjust the proportion of own fleet according to the whole trend of economy development.

3.4 Summary of the chapter

The importance of dry bulk transportation in the development of Chinese economy, increasing demand of dry bulk cargo in the world and the own demand of COSCO development are three main factors and necessities to push the COSCO to develop. COSCO needs to develop to meet demand of fast development of Chinese economy to expand their share in the global dry bulk market. They must develop themselves to keep its core role in the Chinese market.

4. The conditions that COSCO possesses of to develop dry bulk transportation

4.1 COSCO Chinese status and background to support the dry bulk transportation development

COSCO dry bulk transportation is the leader in the Chinese market. In 2007, COSCO carried total 264.74 million tons dry bulk cargo in 2007. COSCO carried 113.86 million tons iron ore in 2007 which occupied 43% of total volume carried in 2007 and increased by 19.1% comparing with 2006. COSCO carried much iron ore and the volume of iron ore COSCO carried occupied 14.5% of total iron ore seaborne trade in the world. The dwt of Capesize in COSCO fleet occupied 10.83% of total dwt of Capesize in world fleet. The dwt of handysize in COSCO fleet took up relatively small proportion which is only 5.9% of total dwt of handysize in world fleet. COSCO fleet occupied 8% of the total dwt of world fleet. The largest dry bulk fleet and largest market share in the Chinese and global market. COSCO is state-owned enterprises which means that they can do business with biggest customers such as Baosteel, Tangsteel. This is important for COSCO development. Many big customers which are representatives of fast development of Chinese economy including all the industries. The long term partners of COSCO also keep fast development which represent the fast development of Chinese economy and ensure the fast development of COSCO. And COSCO have advantage in all sides including the customer relationship, operation, competition. The large scale of COSCO which including building shipyards in Nantong and Dalian and repairing shipyards is important for COSCO development. Especially in 2007, the market is very hot and shipowners all have good expectations for the future market. There are no slipways in the shipyards for newbuildings. So the shipyard of COSCO is the obviously important advantage for COSCO expanding their own fleet to catch the opportunities in the market. Government also encourage and issue policy to develop the maritime industry to guarantee the fast development of Chinese economy.

4.2 COSCO comes into stock market to support long term development

COSCO dry bulk assets came into stock market through acquisition in end of 2007. From the proclaim in the Shanghai Stock Exchange, COSCO issue 1,296,937,124 shares, through the A share placing in two sessions. COSCO Group subscribed 864,270,817 shares in the 1st session and 53,666,307 shares in the second session. Other 9 institutional investors in mainland China subscribed 379,000,000 shares in the second session. The 9 institutional investors are COSCO's long term partners in business which including China National Machinery Corp, COFCO Group, Aerospace Science & Technology China COSCO will use internal funds available and bank borrowings to pay the remaining consideration RMB 5.9 billion under the relevant acquisition agreements. So the total consideration got to RMB 34.61bn.³

This is very important event and is very important for long term development of COSCO. Firstly, COSCO dry bulk came into stock market, which provided finance platform for COSCO long term development. Development of dry bulk shipowners needs huge amount of money. They need money to order new buildings to expand their fleet. They need money to charter in vessels to adjust their structure of fleet. While the stock market is hot in the mainland, it is very easy to financing enough money for company long term development. The government encourages company financing in the market and investors like put their money in good investment items. So this is the obvious advantage for COSCO developments comparing with other dry bulk owners. Secondly, COSCO fetched in some long term partners such as Tang Steel to hold their shares for long term investment. This is very important to improve customers' trust and relationship. The important customers will be long term customers because they put a lot of money to be shareholders of COSCO. They will supply cargo to keep COSCO long term development. Thirdly, through in stock market, the extent of transparence was improved for every sides. Through standardizing everything in business operation, the risks will decrease into a safety area which is good for COSCO development.

³ China COSCO Holdings Company Limited http://www.tomolion.com/corpcasting/cosco_07ir/ppt.pdf

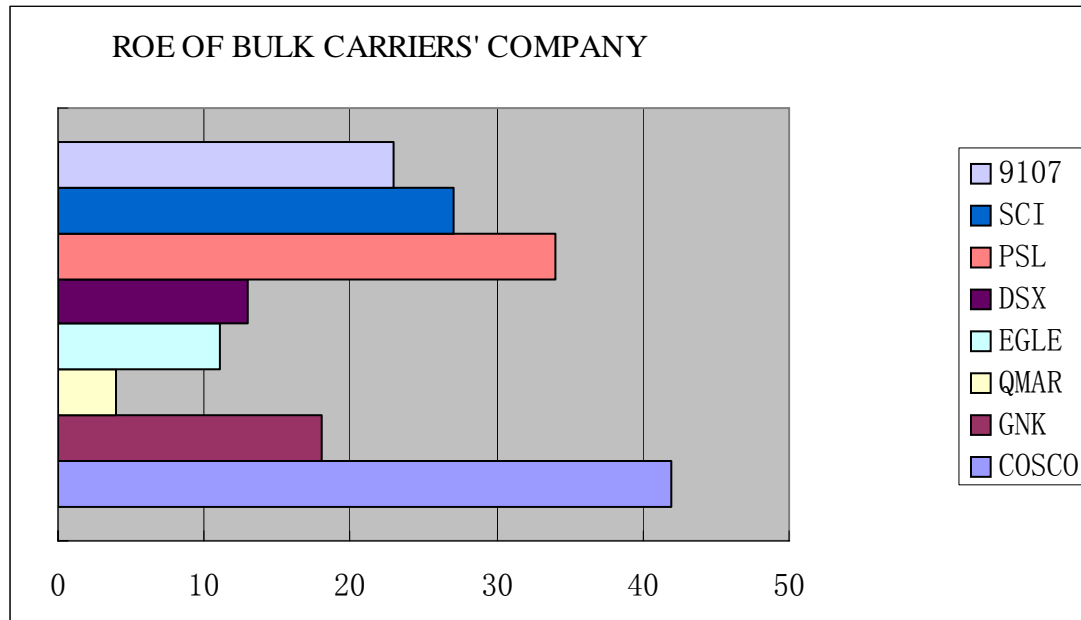
4.3 COSCO has an excellent and experienced management team to support long term development

COSCO companies have been in operation since 1960s, with over 40 years' experience in dry bulk shipping. So COSCO has an excellent and experienced management team to support its long term development. Members of senior management are seasoned industry experts. A large percentage of staff are highly educated. Young professionals form the backbone of the companies.⁴ Firstly, the management team has super ability to forecast the market trend and adjust their fleet to meet the demand in the market in time. They use the discounted payback period, NPV and IRR to calculate the return of investment. They compare different size of vessels' return to choose the highest return. They will make decision which is better for the new order or the secondhand and how to adjust the structure of the fleet. Through using the discounted payback period, NPV and IRR, the investment which investment has shorter payback time, shorter discount pay back time, higher ROR and ROI, higher NPV ratio, higher IRR(which exceeds discount rate) is the best investment. In 2003 COSCO has very small scale of bulk fleet. The management team has forecast the fast development of demand. The Chinese steel industry's fast development leads to large quantities of iron ore import in future market. Especially for the Capesize, more than 60% of this kind of vessels is for iron ore carrying. Through forecast and comparing the discounted payback period, NPV and IRR, they can find which size of vessel can make more profits. For COSCO, they found that Capesize would be the best investment but they have small proportion of Capesize. It seemed that the structure of bulk fleet was not reasonable. COSCO have not so much money to build so many vessels. They chartered many vessels in to improve their dwt supply and especially for chartering Capesize. In 2007, they forecast the market will be very good and they put large proportion of total dwt in the spot market and put few dwt in COA which can get maximum profits. It seems to be risky because very low proportion of COA. But their super ability of accurate forecasting lead to earning big

⁴ China COSCO Holdings Company Limited http://www.tomolion.com/corpcasting/cosco_07ir/ppt.pdf

money in 2007. Secondly, COSCO management team make good strategies for every side. In the market strategy, they focus on the main global markets and domestic market. They focus on main iron ore, coal and grain trade routes. They also take advantage of the seasonality and regional trade imbalances in the dry bulk shipping industry. For customers, they focus on main and important customers in key industries such as iron ore, coal and grain and offer them a full range of services through flexible combination of COA contracts, strategic partnership, specialty service agreements or joint operation. For competition, they take the initiatives to build market presence and competitive edges. They have built and maintained their competitive edge on the back of its business strengths, credit standing and long-term cooperative relationships with market participants. For operation, they have refined their operation to reduce and avoid waste of resources. They have maximized efficiency and minimized operating risks through enhanced risk management and established integrated operation and management systems.⁵ Comparing with their ROE

Figure 4.1.1 ROE OF BULK CARRIERS' COMPANY



(Rate of Return on Common Stockholders' Equity), ROE of COSCO was higher than other bulk fleet company. This represented COSCO good and success management in the market, customers, competition and operation.

⁵ China COSCO Holdings Company Limited http://www.tomolion.com/corpcasting/cosco_07ir/ppt.pdf

4.4 Summary of the chapter

COSCO has its advantage for its development. COSCO Chinese status and background can support the dry bulk transportation development. COSCO comes into stock market can provide huge mount of money and financing platform for its long term development. COSCO has an excellent and experienced management team which accurate judgment of market trend and good market strategies in all sides to guarantee its long term development

5. The objective of development of COSCO dry bulk transportation

5.1 Forecast the volume of COSCO dry bulk transportation

As the largest dry bulk shipowners in the world, COSCO was in fast development from 2003 to 2007. Before making the target of COSCO development, the volume of COSCO dry bulk transportation should be forecasted. The way that use to forecast the volume is simple linear regression. When we try to explain and forecast a dependent variable Y with regression which is volume of cargo carried, there is only one independent to choose from which is year we use X variable. The forecast process and result as following:

Table 5.1.1 Volume of dry bulk cargo COSCO carried			
	X Variable 1	Dry bulk trade(Tonne Mile)(Billion)	% Change
2003	1	0.52	
2004	2	0.76	46.15%
2005	3	1.02	34.21%
2006	4	1.19	16.67%
2007	5	1.40	17.65%
Source: COSCO			

Through calculation, we get the summary output as following:

$$Y=0.219X+0.321$$

Summary output:

Table 5.1.2 Regression Statistics	
Multiple R	0.997435
R Square	0.994876
Adjusted R Square	0.993168
Standard Error	0.028694
Observations	5

		Standard			Lower	Upper	Lower	Upper
	Coefficients	Error	t Stat	P-value	95%	95%	95.0%	95.0%
Intercept	0.321	0.0300943	10.666473	0.0017613	0.2252265	0.4167735	0.2252265	0.4167735
X Variable 1	0.219	0.00907377	24.135498	0.0001559	0.1901232	0.2478768	0.1901232	0.2478768

So we get 95% confident that true value is between 853.42 and 1082.97. Then we get the forecast result as following:

Table 5.1.3 Forecast Volume of dry bulk cargo COSCO carried			
	X Variable 1	Dry bulk trade(Tonne Mile)(Billion)	% Change
2003	1	0. 52	
2004	2	0. 76	46.15%
2005	3	1. 02	34.21%
2006	4	1. 19	16.67%
2007	5	1. 40	17.65%
2008	6	1. 64	16.79%
2009	7	1. 85	13.39%
2010	8	2. 07	11.81%

We forecast that the volume of dry bulk transportation will still increase, but the increasing rate will be down, which seems to be similar trend with the global dry bulk demand development trend.

5.2 Make long term development target from 2010 to 2015

In the charter 3 we forecast the volume of world dry bulk seaborne trade. Comparing with the above forecast we find that the volume of world dry bulk seaborne trade and volume of dry bulk cargo COSCO carried all keep increasing. The increasing rate will decrease after 2007. COSCO as largest dry bulk shipowners in the world, its increasing rate is higher than the increasing rate of world dry bulk seaborne trade. COSCO market share is less than 10% which has huge space for COSCO development. The long term development of target from 2010 to 2015 is increase its volume to occupied more market share.

5.2.1 Long term objective for cargo volume of COSCO dry bulk carried

To get more market share, first we should make target of dry bulk volume COSCO carried in long term development. We still use above forecast, the forecast result is in the area of 95% confident. We get the result as following:

Table 5.2.1 Forecast Volume of dry bulk cargo COSCO carried			
	X Variable 1	Dry bulk trade(Tonne Mile)(Billion)	% Change
2003	1	0. 52	
2004	2	0. 76	46.15%
2005	3	1. 02	34.21%
2006	4	1. 19	16.67%
2007	5	1. 40	17.65%
2008	6	1. 64	16.79%
2009	7	1. 85	13.39%
2010	8	2. 07	11.81%
2011	9	2. 29	10.56%
2012	10	2. 51	9.55%
2013	11	2. 73	8.72%
2014	12	2. 95	8.02%
2015	13	3. 17	7.43%

From above forecast table, we get that the volume of dry bulk cargo COSCO carried in 2015 will be about 3.17 billion ton miles which is 2.26 time as the volume they carried in 2007. The market share will enhance because increasing rate for COSCO is higher than world volume. According to two forecast tables, COSCO market share of volume of dry bulk transportation will get to 14.15% which is 4% higher than COSCO market share in 2007. The long term development target seems reasonable, the volume from 2010 to 2015 is 2.07, 2.29, 2.51, 2.73, 2.95 and 3.17 billion tons mile respectively.

5.2.2 Long term objective for COSCO fleet development

The long term objective for volume of dry bulk cargo COSCO carried has been confirmed. Then the long term objective for COSCO fleet development should adjust and develop according to the volume of dry bulk cargo carried developing. We also use the regression to forecast COSCO fleet development.

Table 5.2.2 Forecast COSCO dry bulk fleet		
	Dry bulk trade(Tonne Mile)(Billion)	COSCO dry bulk fleet (mdwt)
2003	0. 52	17. 50
2004	0. 76	21. 20
2005	1. 02	24. 20
2006	1. 19	27. 20
2007	1. 40	33. 00
2008	1. 62	?
2009	1. 85	?
2010	2. 07	?
2011	2. 29	?
2012	2. 51	?
2013	2. 73	?
2014	2. 95	?
2015	3. 17	?

Forecast a dependent variable Y with regression which is COSCO dry bulk fleet, one independent X is dry bulk trade. The following is the process and result:

$$Y=16.74X+8.24$$

Summary output:

Table 5.2.3 Regression Statistics	
Multiple R	0. 984523782
R Square	0. 969287078
Adjusted R Square	0. 959049437
Standard Error	1. 19482991
Observations	5

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>
Intercept	8.24385579	1.76579422	4.668639	0.018554	2.62431	13.8634	2.62431
X Variable 1	16.7445237	1.72086392	9.730301	0.002306	11.26797	22.22108	11.26797

So we get 95% confident that true value is between 11.26 and 22.22. Then we get the forecast result as following:

Table 5.2.4 Forecast COSCO dry bulk fleet		
	Dry bulk trade(Tonne Mile)(Billion)	COSCO dry bulk fleet (mdwt)
2003	0.52	17.50
2004	0.76	21.20
2005	1.02	24.20
2006	1.19	27.20
2007	1.40	33.00
2008	1.62	35.37
2009	1.85	39.22
2010	2.07	42.91
2011	2.29	46.59
2012	2.51	50.27
2013	2.73	53.96
2014	2.95	57.64
2015	3.17	61.32

From above forecast table, we get that COSCO dry bulk fleet in 2015 will be about 61.32 million dwt which is 1.85 time as the scale of COSCO fleet in 2007. From the structure of COSCO fleet in 2007, total control 32.98 million dwt which including

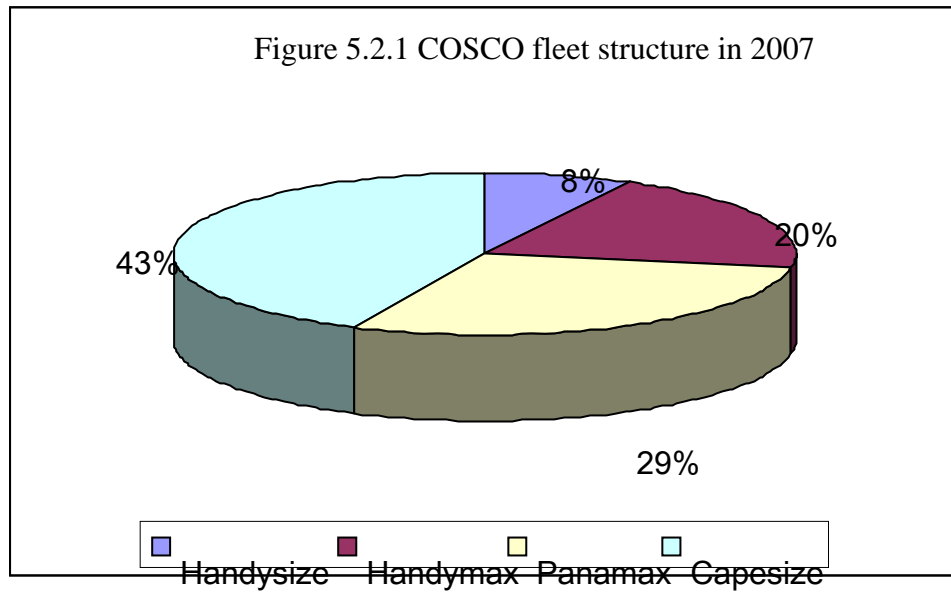


Figure 5.2.1 COSCO fleet structure in 2007

Handysize 8%, Handymax 20%, Panamax 29% and Capesize 43%. The proportion of size seems to be reasonable because the iron ore and coal is occupied main proportion in the total COSCO fleet. If COSCO keeps this proportion in 2015 and keep 50% of own fleet, the fleet should adjust as following:

Table 5.2.5 Structure of COSCO fleet in 2015 (mdwt)			
	Total fleet	Own fleet	Dwt chartered in
Handysize	4.91	2.45	2.45
Handymax	12.26	6.13	6.13
Panamax	17.78	8.89	8.89
Capesize	26.37	13.18	13.18

So the COSCO need enhance the own fleet proportion of Capesize. Comparing with the fleet in 2007, they need develop their fleet scale to order 1.15 million dwt Handsize, 3.43 million dwt Handymax, 4.39 million dwt Panamx and 10 million dwt Capesize from 2008 to 2015. Other dwt will be chartered in the market.

5.3 Summary of the chapter

Make long term target of COSCO from 2010 to 2015 through simple linear regression forecast way. Firstly, use simple linear regression to forecast the volume of dry bulk cargo COSCO carried. Then make long term development target from 2010 to 2015.

Simple linear regression forecast result in 2015 that the result in area of 95% confident. Then confirm the volume target and the volume from 2010 to 2015 is 2.07, 2.29, 2.51, 2.73, 2.95 and 3.17 billion tons mile respectively. Use linear regression to forecast the fleet scale and the structure of fleet and the fleet scale will be 61.7 million dwt. Then the long term objective of COSCO development is made.

6. The existing problems in development of COSCO and solutions

6.1 The existing problem in development of COSCO

In the last charter we have made COSCO long term target. There is a long way to go to reach this goal. There are also some problems in development of COSCO. Competition between the COSCO dry bulk filiale causes losses. Lack correct instructions in FFA operation can not avoid risks and lock profits in the dry bulk market with fierce fluctuation. During fast development, lack all-around system to prevent the risks in the market.

6.1.1 Competition between the COSCO dry bulk filiale

COSCO Bulk, Hong Kong COSCO and Qingdao COSCO are main three filiale to constitute the whole COSCO dry bulk fleet. The below the Pies show the different proportions of the three filiale.

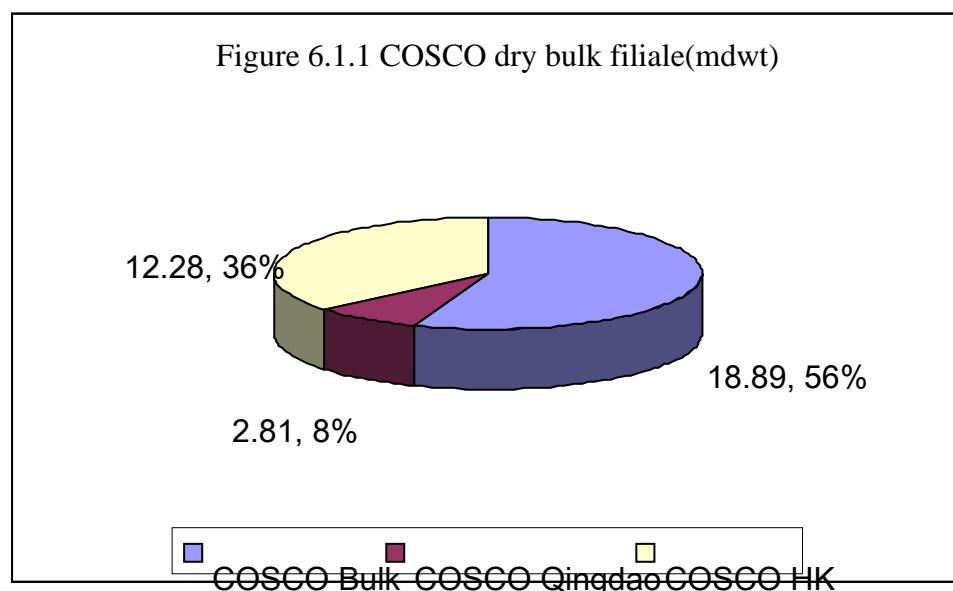


Figure 6.1.1 COSCO dry bulk filiale(mdwt)

Though the three filiale belong to COSCO, they operate and make marketing decision

and strategies individually. In the end of year, they will hand in their profits to COSCO which lead to competition to get better outstanding achievement. The three filiale occupied more than half of market share in the China market, so there are furious competitions between them in every size of vessels such as Handysize, Handymax, Panamax and Capesize. For example, COSCO Bulk put one Capesize in the market to charter out in short term. And Hong Kong COSCO also put one Capesize in the market to charter out in short term. If the charter is the same, there is a freight competition between them through put down their freight rate. Finally, whether which company to charter out the vessel, the result is the same that freight rate will below the market price. And another example is that one broke chartered in one Capesize from Qingdao COSCO in short term at \$100000/per day, then the broke chartered out this vessel at once to in short term to Hong Kong at \$105000/per day. The two examples represent that lack fleet status in quo information and market information share and competition between them lead to large profits loss. This internal competition is not for long term development.

6.1.2 Lack experience and correct rule and instruction in FFA operation

FFA is English Forward Freight Agreement (Forward Freight Agreement) title, and it is a long-term buyers and sellers to reach freight agreement, the agreement provides for specific routes, price, quantity, etc., and the two sides agreed in the future at a given time, the receipt or payment delivery routes based on the Baltic freight index official price and the contract price difference between the freight. FFA provide a market tool to avoid risks and hedging.

With good market in the recent years, more institutions join FFA including shipowners, traders, banks and some financial investors. More institutions bring more money, which means bringing more opportunities and risks. FFA fluctuation has the same orientation as the dry bulk markets which depends on the demand and supply. When the supply than demand the market will be down the FFA will be down and

vice versa. But FFA make the fluctuation more fiercely. FFA enlarges the range of fluctuation of the market which brings more uncertainties in the market. When market is up, the freight rate will be up and the joiners will push it higher.

Many Chinese shipowners have not joined FFA to use it to avoid risks. Though COSCO has joined this market, they have not long operating experience, no special operator and correct instruction to operate in FFA. They should pay more attention to some famous dry bulk shipowners operate failure in this market. For instance, many shipowners such as DRYSHIPS, OLDENDORFF, STXPANOCEAN suffered a loss in FFA. NASL loss 30 million dollars and announced its bankruptcy. With COSCO putting more and more money in FFA, they should be aware of the risks in the market and establish the company right instructions and employ the experts to operate. Any wrong operation such as gambling in this market will make big loss which will hinder long term development.

6.1.3 Lack all-round risk system in the fast development of COSCO

In the fast development step, companies always will lack awareness of risks. In the Chinese market, the most two important Chinese bulk carriers are COSCO and China Shipping. The two shipping companies have different style of market strategies in the market. China Shipping pursues the long term corporation and has signed many COA with many famous shippers such as BAO Steel to keep steady profits. While COSCO pays more attention to spot market, they carry cargo with market price and want to make more profits in the market. The two different styles market strategies exist in the Chinese market and have its advantage and disadvantage. For China shipping, it has full cargo but at relatively low freight rate. When the market is not good or supply is more than demand, this style could guarantee enough cargo for the company. But in good market or market demand than market supply, this style management can not get high freight rate cargo. In 2007, the bulk cargo market is very good so COSCO make more profits.

There are small proportions of COA in COSCO which lead to make more profits in the good market but loss more when market is down. Forecast the market trend is very hard, no one can predict correctly every time. COSCO put big proportions of their fleet on the spot market will meet risks and suffer loss when market is down which is not good for its long term development. COSCO such a large dry bulk fleet should increase its proportion for COA to prevent market risk.

6.2 The solutions in the development of COSCO

Analysis of above existing problems in the development of COSCO, we will find some solutions to solve these problems. Some valid solutions such as integrate COSCO dry bulk filiale, establish the rules and instruction for FFA operation and establish the all-round risk system are analyzing in following.

6.2.1 Integrate COSCO dry bulk filiale to avoid loss in the internal competition

To avoid profits loss from internal competition, three dry bulk filiale should cooperate each other to share the market information, commercial information, and fleet status in quo information to provide the market the same freight rate. But this is hard to realize because they all want to make more profits which is hard to share information for each other. The best way is to integrate them to one big dry bulk owner. The Hong Kong COSCO is responsible for operate Capesize, COSCO Bulk is responsible for Panamax and Qingdao COSCO is responsible for Handysize and Handymax. The department should be adjusted for better information share. This integration could avoid internal competition validly three filiale integrate into one and they have control one size of dry bulk vessel. The integration make the dry bulk fleet management has one target that make maximum profit. And they will have more power in the market and have the right of decide freight rate in some area. They can get more benefits from the integration.

6.2.2 Establish the right rules and instructions in FFA operation

For the important FFA operation, COSCO should establish FFA department and employ and train special operator to do the operation in this market. And it is very important to establish the right rules and instruction in FFA operation.

Before 2003, 80% participants in FFA are European intuitions. COSCO joined to exchange in FFA in recent years. In 2007, COSCO also had 2.4 billion RMB freight contracts in FFA market. To safely operate in the FFA market, COSCO should establish FFA department and employ and train special operator to do the operation in this market. And it is very important to establish the right rules and instruction in FFA operation which should include several points as following:

Firstly, the right way of operation FFA is very important. In essence, FFA is a freight risk management tools. Hedging is the driving force behind the futures market. The freight is as a commodity, exchange in FFA ensures its sustainable development and stability operations. The rules of COSCO exchange in FFA are to reduce the risk and lock the profits when the market is high. They should obey this rule. For the market is full of risks, gamble is not a good way for COSCO to develop sustainable. Secondly, the right judgment of the market trend is most important. Right exchange in FFA market is based on the right judgment of market trend. COSCO has an excellent manage team and has ability to analyze the demand and supply in the market which can provide most important information for FFA operator reference. Thirdly, through research the FFA especially the traders and shippers' action in FFA will get some important information for the trend of market. FFA department should establish the information platform, so COSCO use it to analyze the relationship of demand and supply in the future market and forecast the market trend to grasp the opportunity in the market.

6.2.3 Voyage charter, time charter, COA flexible combination to prevent risks

Time charter and voyage charter are two main vessel employment methods which

have different characteristics and responsibility. Voyage charter is that the shipowner is paid freight on the basis of the cargo movement between ports. Time charter is a charter under which the shipowner hires out a ship for a specified period of time. The shipowner is responsible for providing the crew and paying ship operating expenses while the charterer is responsible for paying the voyage expenses and additional voyage insurance. The shipowner is paid charter hire, which accrues on a daily basis. Dry bulk market is a game that shipowners buy low sell high. If COSCO forecast the market will be up, they should use voyage charter to earn more profits, if they forecast the market will be down, they should use time charter to lock their profits. Dry bulk market fluctuates fiercely and COSCO also can charter bulk vessels from other shipowners when the market is low and charter vessels to others as the market is high. The flexible using the time charter and voyage charter is very important for COSCO operating in short term in the dry bulk market. While in the long term, COSCO as the largest shipowner in the Chinese market should improve COA proportion with some big customers which can reduce system risks in the market. For the market will be down after middle of 2009, COSCO should pursue the COA and increasing the proportion to relative high level which keep safety for the financial condition to support long term development.

6.2.4 Establish the all-round risk system to keep COSCO smooth development

Establish the all-round risk system which include FFA operation rule, time charter, voyage charter and COA combination operation rules, market forecast and expand the fleet and fuel price and consumptions monitor ect. The all-round risk system is important to support COSCO long term development.

6.3 Summary of the chapter

During the fast development of COSCO, there are some existing problems which may hamper the long term development of COSCO. Some solutions should be taken to

solve the existing problem such as internal competition, lacking criterion of operating in FFA and lack all-round risk system. For long term development of COSCO, they should take integration to avoid profits loss and establish the FFA department to reduce risks and lock profits in the operation process. Voyage charter, time charter, COA flexible combination is helpful for COSCO to prevent risks to make more profits to support the development.

Conclusion

The dry bulk market is in fast development with stably increasing global economy. COSCO as the largest dry bulk shipowner is also in fast development. The long term objective of COSCO depends on the internal and external development trend and own demand of COSCO. The internal is the fast development of Chinese economy and external is stably increasing global economy, which decides COSCO to continue to develop. The dry bulk segment is most profitable segment in COSCO which is also necessary condition to develop COSCO. The COSCO dry bulk fleet occupied 8% of total world dry bulk fleet and its market share got 10% in 2007. COSCO has big space to enhance market share. All these necessary conditions decide that COSCO dry bulk transportation needs long term development objective. COSCO Chinese status and background, its advantage financing platform and its excellent and experienced management team are its advantage conditions to support the dry bulk transportation development. Through simple linear regression to forecast the volume of COSCO dry bulk carry and fleet scale of COSCO from 2008 to 2015, the long term objective will be made from 2010 to 2015. The objective of COSCO in 2015 will get 3.17 billion ton miles which is 2.26 time as the volume carried in 2007 and increase market share from 10% in 2007 to 14% in 2015. The fleet of COSCO will get 61.32 million dwt which is 1.85 time as the fleet scale in 2007. For fast development of COSCO, there are also some existing problems to hamper the development such as lacking experience and correct rule and instruction in FFA operation and loss for internal competition. The solutions such as integrate COSCO dry bulk filiale to avoid loss in the internal competition, establish the FFA department and right rules and instructions and voyage charter, time charter, COA flexible combination to prevent risks to solve the problems to keep the long term objective.

References

CAO Yu; YIN Hong; PING Qiang; HU Guangbin (Dalian Maritime University; Dalian; 116026; China) *International Dry Bulk Market's Nonabsolute Competition* , World Shipping

Stopford, M. (2005). *Maritime Economics(2nd edition)*. Routledge P46-58, P126-136

Pierre CARIOU(2007) *Finance And Risk Management In Transport And Logistics* Class handouts. World Maritime University P15-25

Shuo, M. (2007). *Maritime Economics*. Class handouts. World Maritime University

Chenqing Hui (2004) *Study on Fluctuant Character of Freight Index in International Dry-bulk Shipping Sub divisional Market* Dalian Maritime University

Liufeng (2005) *Option Pricing in Dry Bulk Shipping Market* Dalian Maritime University

Yangliu (2007) *The relation of FFA and dry bulk market* China Maritime

Jeffrey Blum(2007) *Chartering Practice and shipping broking* Class handouts. World Maritime University P27-37

Shipyard Orderbook MonitorWorld Shipyard Monitor Database

Liqiang(2005) *Dry Bulk Cargo Market Analysis and Managing Decision Study* Dalian Maritime University

Yinghong (2005) *Study on the Development of Main Demands of International Dry Bulk Shipping Market* **Dalian** Maritime University

Susan Oatway(2007) *Dry Bulk Forecaster* Drewry Shipping Consultants Ltd

Jiangyan nie (2007.03) **China's iron ore import benefits dry bulk cargo market**, China Maritime,

Eugene F.Brigham, Joel F.Houston(2003) *Fundamentals of Financial Management*

Suping(2008) *Analysis of 2007 dry bulk cargo trade in China* China Maritime
P38-42

Xiangyuan(2007.06) *A comparison of prospects of Indian and Chinese bulk cargo markets* China Maritime

Dry Bulk Insight 2007 Drewry

Yangxing (2007.08) *Future operation analysis of oil tanker and dry bulk freight market* China Maritime

WANG Jie; LU Chun-feng (Dalian Maritime Univ.; Dalian 116026; China) *Review and prospect the international dry bulk shipping market* World Shipping

Xiangyuan(2008) *Analysis of COSCO in 2007* China Maritime

Zhuoling(2007) *The Research and Application of the Model of the Evaluation of State in Large Craning Equipment of a Bulking Port* Shanghai Maritime University

Dominick Salvatore (2006) *International Economics* WILEY

Zhou Huaming(2007) *The way of forecast the Baltic Index* World Shipping