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# Chinese factor on world dry bulk market

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# Chinese Factor on World Dry Bulk Market (especially Iron ore market)

By

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**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**

**INTERNATIONAL TRANSPORT AND LOGISTICS**

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## DECLARATION

I certify that all the material in this research paper 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 research paper reflect my own personal views, and are not necessarily endorsed by the University.

(Signature):

(Date):

**Supervised by:**

Prof. Zhen Hong

Professor of Shanghai Maritime University

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Finally, but certainly not least, I would like to send my indebtedness to my beloved parents, who offer both financial and emotional support to me. I am fortunate to have their eternal love and encouragement as I go forward.

**Abstract**

China is a developing country, people in China are very shy from the aliens. With the devastating financial crisis, the world is staring at China hoping they can save the world. Do we really have so much large impaction on the world? What amazing I find is that we do have large power on the world dry bulk market.

I put these two charts – the stock market of china and the Baltic dry index –together, I find some correlations between them. Then I look deep into the whole market, I analyze the four markets currently: the freight market, the newbuilding market, the secondhand market, the demolition market. I analyze the dry bulk shipping market from supply side and demand side, what disappointing me is that I put the conclusion that the market can not revive in such a short time for the simple reason that the demand is far away behind the supply. Then I look into the history trying to find the code.

However, what encourages me to do the research is that we China absolutely have large impaction on the world dry bulk market. We import half of the iron ore which is the engine for dry bulk market revival. I forecast the future with two methods, one is to use the mean square error as the standard point, and the other is to use the combining forecast associating with the Delphi method. The forecasting results prove my thought.

Last, my findings--the current world dry bulk market situations and the forecasting results enable me to suggest government do not receive what the three giants offer unless they decrease the long-term contract price into such a level satisfying out need.

The content of this research paper is divided into introduction, main body and the conclusion.

From the very beginning, the paper explains the current situation of the world dry bulk shipping market. Introduction is about background, literature review and

meaning of this research paper. The main body of the research paper includes: first, the current situation of world dry bulk market, containg new building ship market, second-hand ship market and demolition market and freight market. Second, I analysis the World Dry Bulk Shipping Market concerning supply and demand. The most important part of my dissertation is on forecasting part, I analyze the current situation and have some future expectations. The conclusion part I made some suggestion to the government about their price negotiations between three giants iron ore production companies.

**KEY WORDS**：Chinese factor, World Dry Bulk Market, Iron Ore, price negotiations, three giants company, four trillion policy, combining forecast

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**There are 14 charts drawn by myself, and all the charts in the dissertation are made clearly about their source.**

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**All the tables are made by myself on spreadsheet software.**

**All the tables and formula in Chapter 4 and 5 are made by myself from the spreadsheet software and matlab software.**

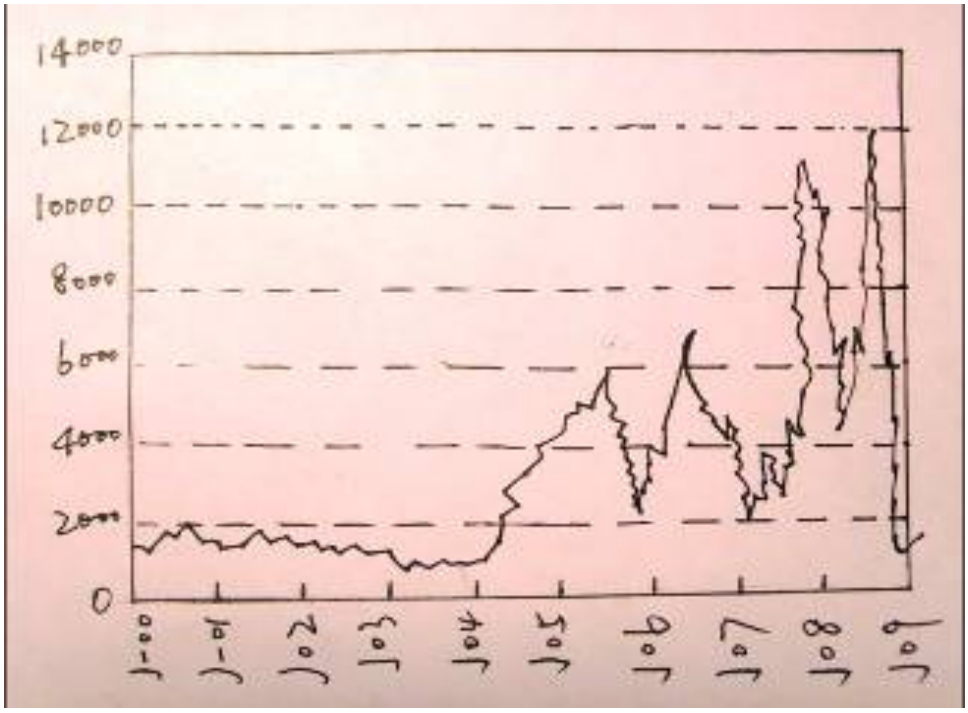
## LIST OF ABBREVIATIONS

| | |
|---|---|
| BDI | Baltic Dry Index |
| BCI | Baltic Capesize Index |
| BPI | Baltic Panamax Index |
| WTO | World Trade Organization |
| FOB | Free on Board |
| FTZ | Free Trade Zone |
| **Mt** | Metric ton |
| Pd | per days |
| Dwt | deadweight |
| K | 1000 |
| Mn | Million |
| YOY | year on year |
| MOM | month on month |
| 1Q09 | first quarter of 2009 |
| Ldt | length deadweight |
| Three giants | CiaValedoRioDoee, RioTintople and BHPBillitonLtd |
| Ppt | percentage |

## 1.1Background & Significance

We all know that the freight index of dry bulk shipping market is a concrete represent for the international dry bulk shipping market, and it is a very important reference for those parties that are engaged in this market to make good decisions for their business activities. In the recent three years, the Baltic Dry Index (BDI) touched an all-time high in May but by the latter half of the year it had fallen to such low levels that owners had difficulty in covering their operating costs. At the same time, the stock market (a public market for the trading of company stock and derivatives at an agreed price; these are securities listed on a stock exchange as well as those only traded privately. People all think that the stock market can on behalf of the economy) in China experience the same up and down.

Chart 1.1 BDI from 2000




Source: Clarkson & BLOOMBERG

Chart 1.1 shows the fluctuations of Baltic dry index, Chart 1.2 shows the stock market price of China, when I put these two charts together, something finds me. The two markets both boomed in 2007, and rocketed in 2008 and went down in 2009. The correlations between these two markets are coming to the face. I also discovered that

the iron ore takes large percentage of the dry bulk market and China are the largest imported country of iron ore. From Chart 1.3, in 2007, China imported 383.7 million tons which nearly half of the whole world importing iron ore tons and the growth rate is 57.4 million tons which 92.58% of the whole world growth rate. It is concluded that China has a large impact on dry bulk shipping market, and then I decided to write a dissertation about the Chinese factor on world dry bulk market, and try to give some advice to the government about the iron ore prices contract with the big three production company.

Chart 1.2 The stock market of China

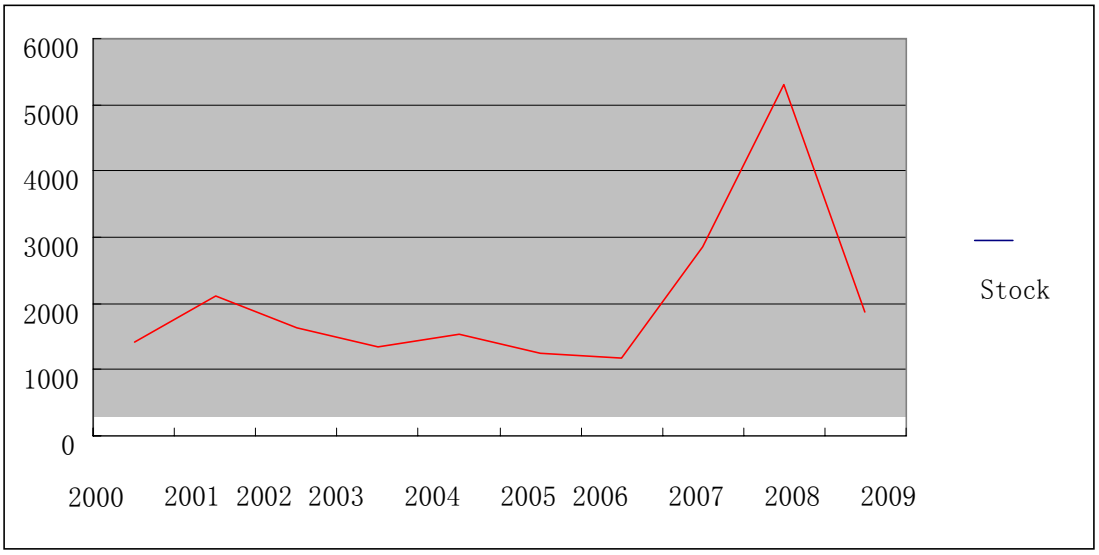
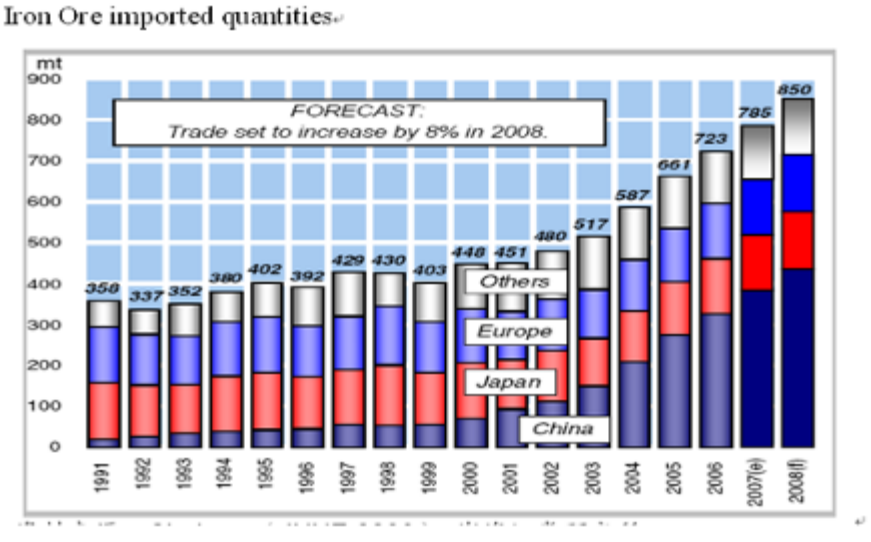



Chart 1.3 Iron Ore imported quantities




Source: Clarkson

## 1.2Literature review

### 1.2.1Recent research on world dry bulk shipping market

Both scholars in China and abroad have done quite a lot of research on world dry bulk shipping market.

First, there are a lot of researches on dry bulk shipping market. Martin Stopford(1997) reviewed of the whole shipping market which in his mind contains four market: the freight market, the purchase market of second-hand ships and newbuilding ships and the demolition market. Drewry and Clarkson explain the dry bulk market from the four different size of the fleet: capsize, panamax, handymax, handy. They analyzed the cargo demand especially focusing on the coal, iron ore and grain. Then they make comprehensive analysis of the dry bulk market from the supply side and the demand side.

Second, some people try to find the BDI relation with the market. The importance of knowing the history and the deep reason of the BDI, Zhejian(2007) has pointed out: The freight index of dry bulk shipping market is a concrete represent for the international dry bulk shipping market, and it is a reference for those parties that are engaged in this market to make good decisions for their business activities. Others stare at the future market's impact on the spot market BDI.. (Zhujianjiang 2008) proposed that: the forward freight agreement is the most active ocean freight risk management tool. And he studied the hedge function and price-discovery function of freight forward agreement market with econometric methods. The results show that the correlation coefficient between the spot price and FFA price is strong. However, this is not to say that the price-discovery function of the FFA market is obvious. In voyage charter line, the induction effect from spot price to FFA price is weak. In time charter line, when closer to the delivery date, the induction effect from spot price to FFA price becomes weak. Hampton(1991) emphasize the important part played by people and the way they respond to price signals received from the market: In today's modern shipping market it is easy to forget that a drama of human emotions is played out in market movements.

Third, focusing on dry bulk shipping company can be found in a lot of papers. (HuangWei 2006) analyzed the future bulk shipping market trend and make economic reasoning to mainstream bulk ship type, in the hope that it will provide some references to the bulk shipping companies. He pointed out that the correlative market of the shipping enterprise is a complex system, including the global shipping market, fuel market, and so on. For examples, the shipping market does not only include the different type of ship, and also the different area and flight course.

He also worried that there is a big problem faced by Chinese bulk shipping companies on how to hold the right direction in the shipping market and how to promote themselves in the management power. We can find that there are many papers coming to our eyes suggesting to Chinese companies what to do and what not to do. This phenomenon is rare compared to the old times, for the reason is that china has become the large power in dry bulk market.

Forth, there are many study that attempts to apply forecast on the market -Neutral network method was used to forecast the demand and supply trend, the paper adopt the demand-supply balance method to analyze the balance between supply and demand of the future market. Finally this paper makes single ship economic analysis to the mainstream ship type in the future, and selected the optimized bulk ship type according to the results.(Wang 2004).( WeiHai 2006) using the Economic cybernetics which describes the economy by the control theory concept and the method. All the factors can be observed at the same time in this method. The Economic cybernetics does not only reveal the action, and also the structure of the economy system, so it can reveal the essence of the market better. Another paper by (XU 2005) using wavelet analysis and support vector machine combined to forecast the freight index of international dry bulk shipping market. The freight index is the outcome of a complex nonlinear system, so we cannot get sound results by using classical forecasting models. Theoretical studies have showed that this method which based on the statistical learning theory can form good regression models for complex nonlinear systems, and avoid the defect artificial neural network has.

(Chen2006) made a conclusion that the marine traffic caused by the dry bulk international trade is dynamically changed. Except the historical statistics, it is an impossible task to have an accurate picture of the future marine traffic. There is not a clear function coincidence relation between the marine traffic and the time, such as y=x, It is certain that the international trade of the dry bulk complete the contract through delivering the cargo on time by the ocean shipping. But it is not certain to when and how much the marine traffic take place. He considers such uncertainty as a kind of fuzziness. So he adopts the methods of fuzzy forecasting to forecast the future which have the whole or part of fuzzy characteristics. The methods of fuzzy forecasting differ from the methods of classic forecasting lies in the different sets.

### 1.2.1Existing problems

First, WeiJiaFu(2006) World shipping industry has been undergoing a structural change over last decade and the changed map has never been clearer nowdays. The feature of the change is that, Asia, notably China, has overwhelmingly become the powerhouse of world shipping business as the largest importer of raw materials and the largest exporter of manufactured goods. In addition, WeiJiaFu's review of shipping market also notes that 'attempts to research aspects of Chinese factor on world dry bulk market have been few and far between', with little research on Chinese impact on the world dry bulk market.

Second, the research model of forecasting on world dry bulk shipping market is not that adaptable to situations with uncertainty and variables. And some forecasting methods is to complex for most people to understand. So I plan to use three methods to forecast- moving average, exponential average and grey forecast, and I use the mean square error as the standard to find the best method. In order to improve accuracy, I also bind the combining forecast and the Delphi to make the best outcome.

In a word, Chinese factor on world dry bulk shipping market still has a lot of areas waiting us to explore deeply inside. And forecasting on world dry bulk shipping is not

that abundant or practically mean well while using into real cases. Research of decision making on world dry bulk shipping market still has a long way to go.

### 1.3 Dissertation Objective

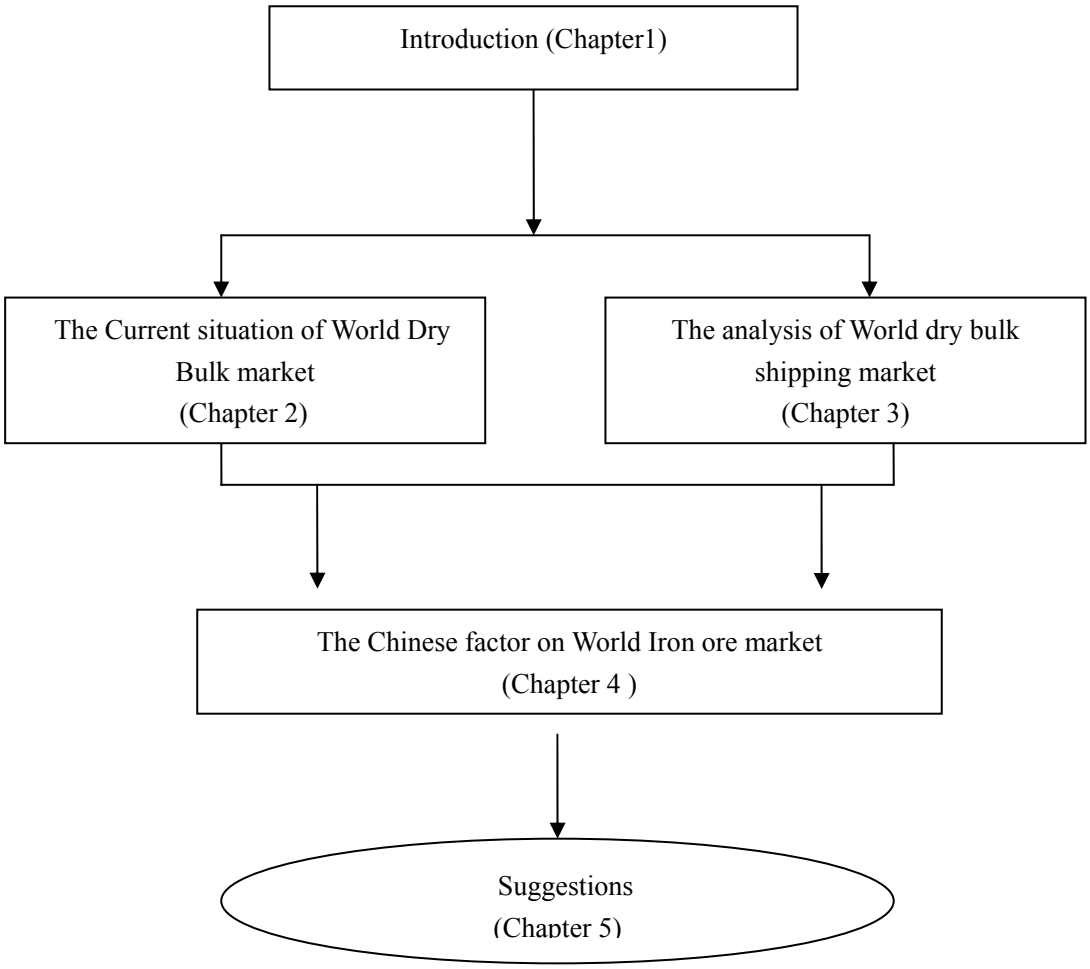
The purpose of this research paper is to give a general idea of the Chinese factor on world dry bulk shipping market.(especially on Iron ore market) This paper is actually forecasting the future dry bulk cargo quantity(the imported volume of iron ore in China) and give the suggestion to China on how to do the iron ore price problem on the price negotiations meetings.

### 1.4 Framework and Content of Dissertation

The content of this research paper is divided into introduction, main body and the conclusion.

From the very beginning, the paper explains the current situation of the world dry bulk shipping market. Introduction is about background, literature review and meaning of this research paper. The main body of the research paper includes: first, the current situation of world dry bulk market, containg new building ship market, second-hand ship market and demolition market and freight market. Second, I analysis the World Dry Bulk Shipping Market concerning supply and demand. The most important part of my dissertation is on forecasting the future iron ore quantity imported into China, I analyze the current situation and have some future expectations on the China iron ore market. The conclusion part I made some suggestion to the government about their price negotiations between three giants iron ore production companies.

The structure of the dissertation is displayed as follows:



## 2.The current situation of world dry bulk market

### 2.1 The freight market

2008 was an unprecedented year for the dry bulk market. The Baltic Dry Index (BDI) touched an all-time high in May-11793 point, but by the latter half of the year it had fallen to such low levels-663 point that owners had difficulty covering operating costs. At the beginning of 2008 a decline in the dry bulk market had been expected, primarily due to the decrease in Chinese demand post-Olympics and an excess in supply. The market, however, was collapsed by the global financial crisis which is beyond our imagination. The destruction in freight rates brought a series of contract defaults, which entangled several charterparties and led to the bankruptcy of several leading shipping companies. What is more is that the difficulty in accessing credit coupled with the squeeze in cash flow of several shipping companies led the market confidence going to zero which making the freight rates worse than ever.

#### 2.1.1 BDI


Source: Clarkson & SIMIC

In 2009, The Baltic Dry Index (BDI) after an agonizing wait of three months finally recrossed the psychological mark of 1,000. Over the month the Index closed at 2262, mainly due to a surge in iron ore chartering. I firmly believed that the revival of the

Baltic dry index is on some people's hand, not on the recovery of the economy. Because the iron ore price negotiations is coming, three giants company hire a lot of ships to ship the iron ore into China on Fob price, for they are not sure who want these cargoes. The deep reason for them to do it is that they want the spot price closing to the long-term negotiations price, which making China have no reasons to reject their offer. If we go deep into the capasize market, we can find it more clearly.

### 2.1.2 BCI


Source: Clarkson & SIMIC

What happened last year, when traders stockpiled these cargoes at the ports while contract negotiations were underway between Baosteel and Australian miners. At that time this action led to a huge increase in freight rates.

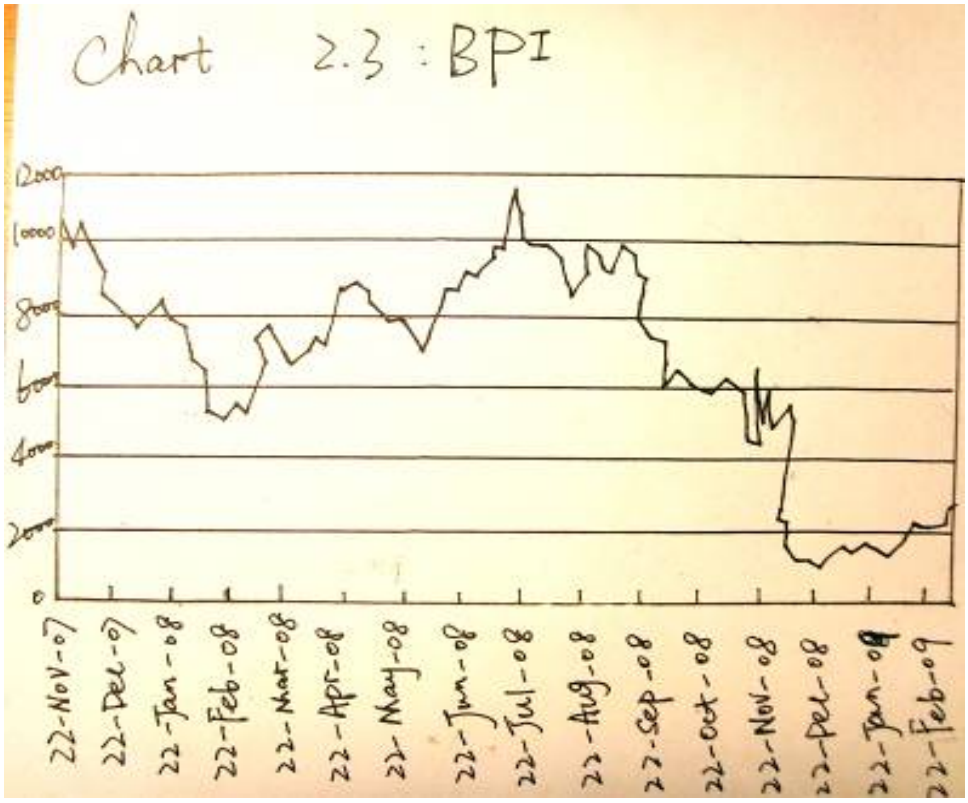
Nowadays, the Capesize segment received some respite from falling freight rates, as Chinese steel mills started importing huge amounts of iron ore from India. The market is expecting fresh cargo on both the transpacific and their neighboring routes, on the back of declining iron ore stocks at Chinese ports simply causing from the Chinese four-trillion policy.

The fact that the yearly price negotiations between Chinese steel mills and the major

iron ore miners is under way just as what happened last year. This year, China government sent Baosteel company on behalf of the whole market to negotiate between the three giants hoping all their buying power can be united. However, Chinese iron ore traders, mainly supplying iron ore to the medium and small sized Chinese steel mills, procured a huge amount of iron ore over the month. There are six hundred steel mills companies in China, so it is very hard to control their action, and all companies have different goals that the government can not control, which making their buying power hard to united leading the freight rates respite.

As per reports, spot iron ore FOB prices by end of January have increased by 40% from the November low of $50/mt. Spot prices on the Brazil-China route have also increased by a stark $8/mt. So the BCI index ended in the relative high position 2831 point.

**2.1.3 BPI**




Source: Clarkson & SIMIC

Over the December last year, Panamax shipowners were not as lucky as their Capesize brother, and their freight rates continued to decline. The Baltic Panamax

Index (BPI) lost 64 points and closed at 558. Mid-month the BPI touched 440 points: its lowest ever level since its inception in 1998. Ever since the Indian government abolished the 8% export duty on iron ore, along with the reduction in value added tax on iron ore from 5% to 15%, Capesize vessels have moved into areas that were previously the domain of Panamax and smaller vessels. In the first month of 2009, the Baltic Panamax Index posted a gain of 237 points and closed at 795.

Large Chinese steel mills that had contracted long term contracts with raw material suppliers are sourcing more and more Indian iron ore, which is currently quoted at $30/mt lower than the global benchmark price of $90-$95/mt.Over the last couple of months, China has increased iron ore shipments from India. I firmly believe that we importing a lot from India is the best leverage to deal with the price negotiations with three giants. The India/Far East route has predominantly been the domain of this particular vessel segment due to draft restrictions at Indian ports. It has been reported that Chinese traders and steel mills buy 87% of the Indian iron ore shipments.

Later, the index climb the mountain of 2000.

**2.1.4 BSI**


Source: Clarkson & SIMIC

China's coastal shipping employs a big number of Handy vessels; however, a huge

gap between demand and supply has opened up lately as the power stations in the south decreased their requirements for thermal coal from mines placed in the north. Meanwhile, freight rates on the US Gulf-Continent trip stood at $8,390pd, down by 7.6%. One-year time charter rates declined by more than 18%, however, long-term period activity witnessed a surge over the month.

On the back of increase in the grain and soybean shipments the voyage rates for the US Gulf to Japan, stood at $24.4/mt (up by 0.2%) and $17.3/mt (up by 1.5%) respectively. One year time charter rates for a five year old Supramax vessel stood at $10,500pd, up by 2% month-on-month. All these reasons contribute to the index going higher and higher.

As we can see from the above four different market, it is concluded that the market respite for the only reason that we China import a lot iron ore. However, I am not sure we do really import a lot, what amazing me is that some foreign peoples and three giants companies using the expectations on we going to import a lot to speculate on the future market, and deliberately shipping a lot of iron ore to out ports even no receiver at all. The reason behind that is they could take advantage of the high spot price to negotiate between China.

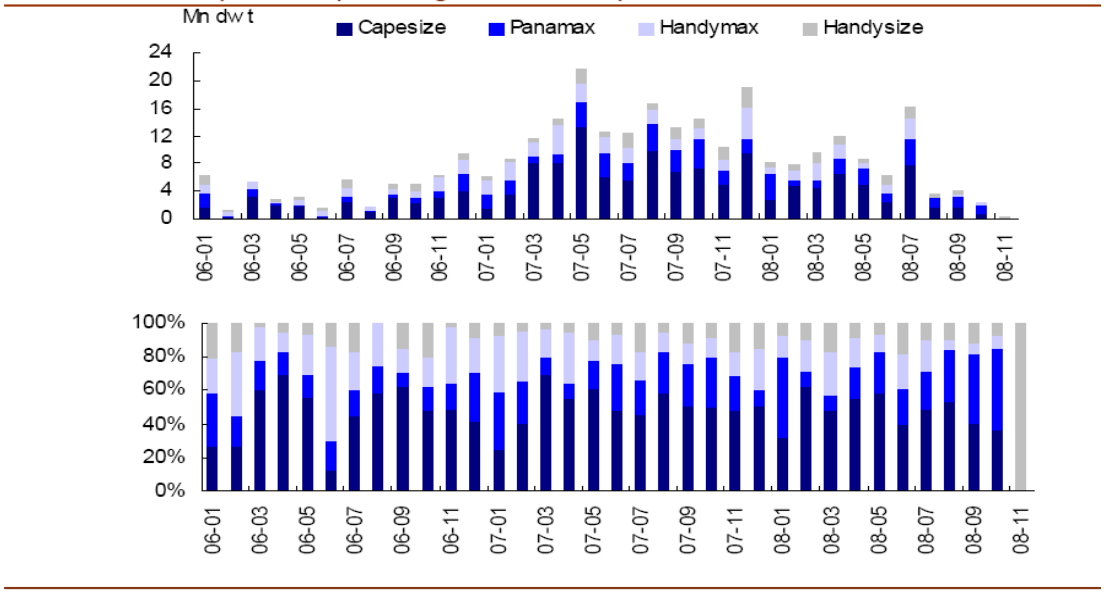
**2.2 New building market:**

Shipbuilding orders continued plummeting to less than 0.3mn dwt in November, the lowest monthly reading since 2002, due to weak freight rates. There were only orders of 8 Handymax vessels placed in the month and none placed on other types of bigger vessels. Shipbuilding orders fell 97% year on year in November and 45% over January-November in 2008. (Charts 2.5 and 2.6).

However, given the large amount of new orders signed in the last few years, current orderbooks are still as high as 71.85% of existing shipping capacity, remaining a historical high. Ratios of orderbook to existing shipping capacity are 107.8% for Capesize, 55.1% for Panamax, and 67.2% for Handymax, suggesting Capesize under

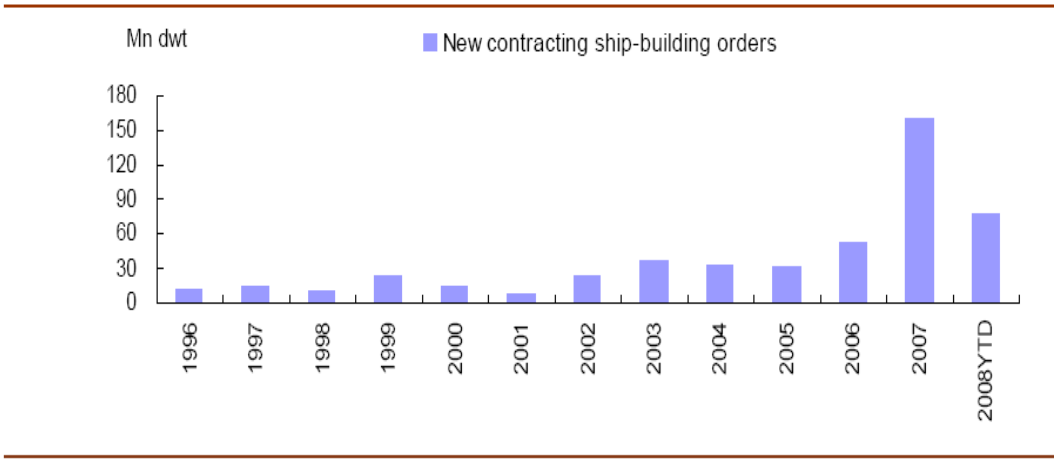
the most prominent supply pressure in the future (Chart 2.7).

Chart 2.5: Monthly new shipbuilding orders for dry bulk carriers



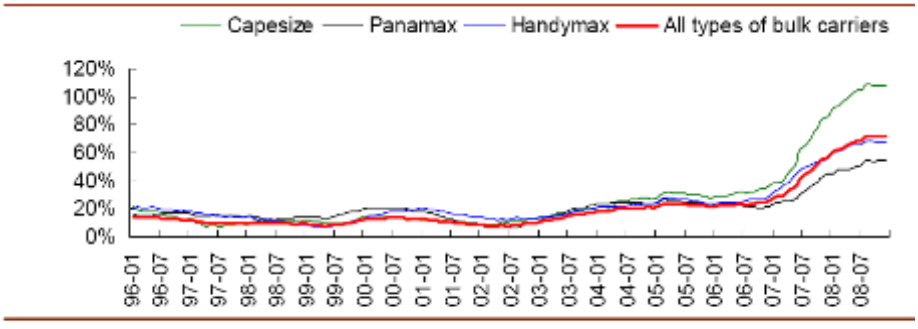

Source: Clarkson, CICC Research

Chart 2.6: Yearly new shipbuilding orders for dry bulk carriers




Source: Clarkson, CICC Research

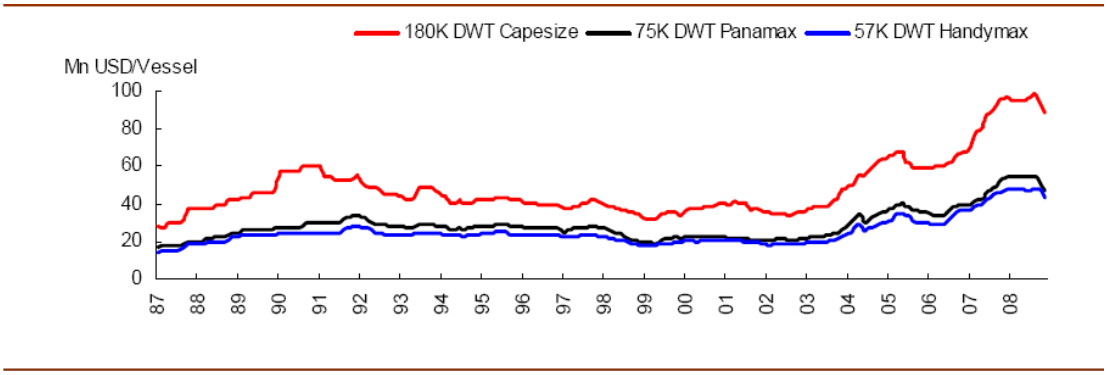
Chart 2.7: Ratio of orderbook to existing shipping capacity for dry bulk carriers




Source: Clarkson, CICC Research

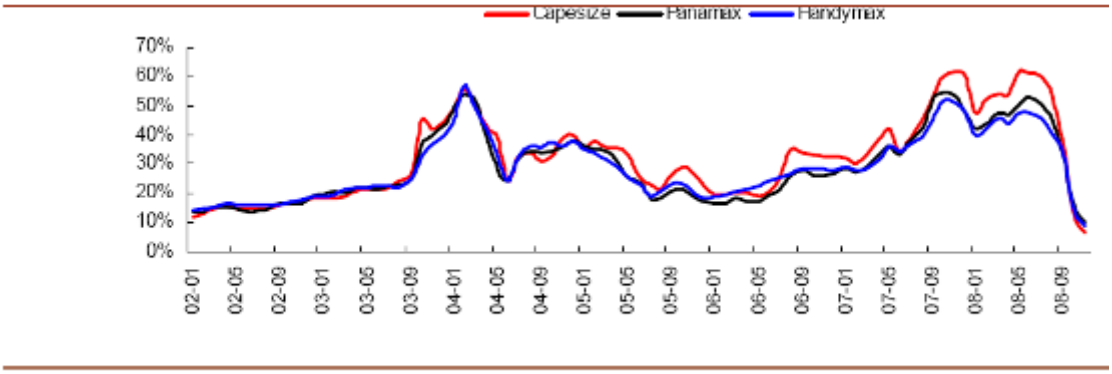
The building costs were down 3.8% month on month in November for Capesize, 6% for Panamax, and 8.5% for Handymax (Chart 2.8). Vessel yield (time charter equivalent × 350/new ship prices) fell markedly, as new ship prices declined far less than freight rates; yields were 6.5% in November for Capesize, 9.9% for Panamax, and 9.6% for Handymax, all down about 5ppt month on month (Chart 2.9).

Chart 2.8: New building prices for dry bulk carriers




Source: Clarkson, CICC Research

Chart 2.9: Yield on dry bulk carriers tumbled



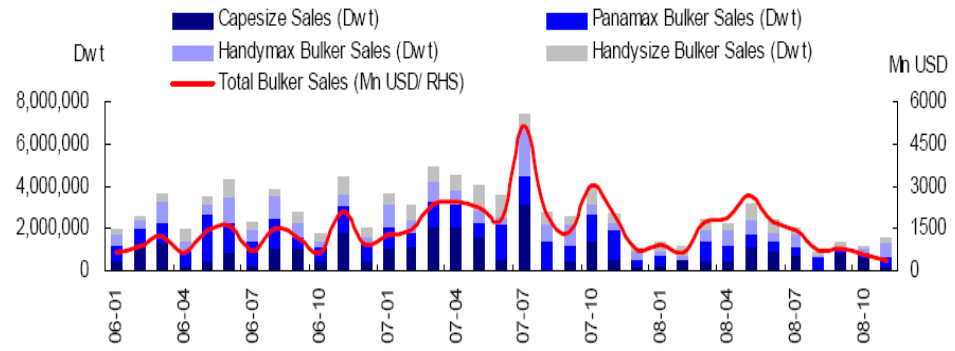

Source: Clarkson, CICC Research

**2.3. Secondhand sales:**

28 secondhand dry bulk carriers were sold in November 2008, with a value of US$390mn and dwt of 1.54mn, remaining depressed. The November transactions rose marginally MoM in dwt terms but contracted 32% in sales amount terms, already to

the lowest level in nearly two years (Chart 2.10).

Charter 2.10: Monthly secondhand sales and value in the global dry bulk market

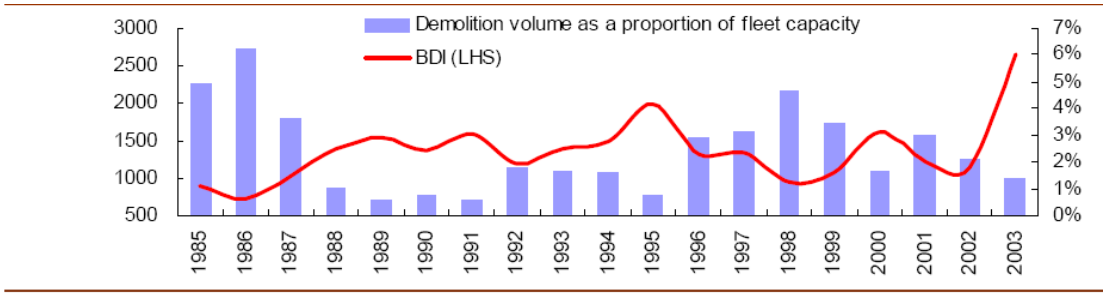



Source: Clarkson, CICC Research

**2.4.Demolition:**

Demolition volume reached 2.02mn dwt in November, the record monthly high since 1975. The aggregate volume, however, represented only less than 0.5% of the shipping capacity at the beginning of November 2008, far below the 6.3% in 1986 and 4.6% in 1998, both of which were cyclical troughs (Chart 2.11). In this sense, the shipping industry is just beginning to bottom.

Chart 2.11: Proportion of bulk ship demolition (volume) and correlation with freight rate movements




Source: Clarkson, CICC Research

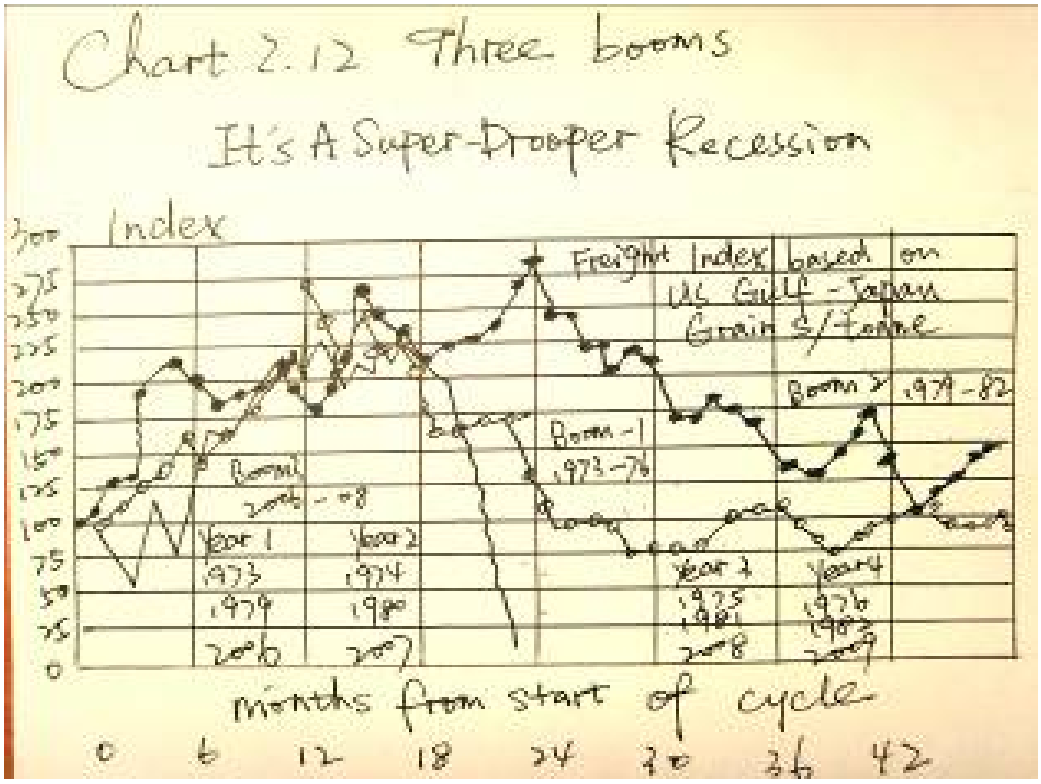
From the above chart, we can imagine that the demolition just kick off.

Above all, the freight market and the demolition market have seen some light, on the contrary, the newbuilding and secondhand sales are still in the rainy days. All these facts prove the belief that the respite of the market is not on the back of economy but on the people's expectation, on some people's speculation. The world is still what I

have said before- difficulty in accessing credit coupled with the squeeze in cash flow of several shipping companies

**2.5 The history and the future**

If we go back to the history, there are three super-booms of the last 30 years. The first started in 1973 and went on to 1975; the second from 1979 to 1982 and the third started in 2006. The graph shows an index of each cycle based on the US Gulf to Japan route, starting from 100.




Clarkson research make a detail about the three booms:

The first boom is from 1973 to 1975, the boom is mainly comes from a strong recovery in the world economy. And the downturn started in June 1974.

The second boom comes from 1979 to 1982, boom 2 also started with a rapidly expanding world economy which generated 7.5% growth of sea trade, but only 2.5% growth of tonnage supply.

The third boom is from 2006 to 2008.

Boom 3 was caused by a number of events just like the last two previous booms. Highly economic growth, badly congestion and the most important reason causing the boom is that the strong demand of China. For the clearly reason that we China import

a lot of iron ore to support our steel mill. In 2006 the world economy was in its 4th year of growth and China steel production surged past 400mt, putting pressure on the iron ore capacity and transport logistics.

The Chinese factor, in world dry bulk market, coming to the face in the third boom.

The Clarkson researches find that the booms accelerated at the same rate, but landed very differently. The most gentle was 1979-82 which took 18 months to wind down; the 1973-5 boom fell more quickly, but it still took over a year. But the 2006-8 boom took just 5 months.

So, we do not know how this time the boom will end in which way-gentle or quick? How long we will wait to see another boom. And what's the reason for next boom. We find a lot of people still hold their belief that the next boom still comes from China.

It is very hard to forecast the future, However, In spite of the fact that the market is now at the bottom, there are benefits to be made in the longer term. What we now have to do is waiting, and I have found some encouraging fact that China as a developing country still import a lot dry bulk cargoes to meet their need.

## 3.The analysis of the World Dry Bulk Shipping Market

### 3.1 The analysis of World Dry Bulk Market demand

Global dry bulk trade continues to be drastically affected by the current global economic slowdown, driven largely by the US economic and developed countries slowdown and difficulty in accessing credit. The traditional end fourth quarter decline in dry shipping markets was highly exaggerated and is expected to continue until 2009. The expectation is done by the drewry report. Any revival is only expected in 2010. However, we see some respite in Baltic Dry index, the index going up and up to 3000, for the simple reason that China import a lot of iron ore. I myself firmly hold that China will not import that much just as the last two years. We can see that on the back of declining steel demand and heavy sourcing of iron ore by Chinese steel mills from its domestic ports, iron ore demand in 2008 declined by 13%.

Also, the price negotiation was coming. In order to deal with the negotiations, China try import a lot iron ore from India. There were reports that Chinese steel major, Baosteel had called up Australian miners for early iron ore contract negotiations. During this time period Chinese steel mills started procuring iron ore from Indian miners, which has led to a decline in vessel tonne-mile demand. Total vessel demand during forth quarter of 2008 stood at 3,753 billion tonnes, marginally down from earlier estimates, declining 12.3% over third quarter of 2008.

Demand for most commodities was expected to decline further in 2009. However, the financial crisis in America causing China having the same problem in their economy, then China put out a fiscal stimulate policy which entangled the revival need for iron ore. The iron ore stock piles have been brought to mills and steel companies to digest them. These will be necessary for Chinese traders to replenish them by the end of first quarter of 2009 with the policy and plan.

The Chinese steel mills and Australian miners yearly iron ore negotiations should have concluded , with these obviously facts that China still need a lot of iron ore for their urbanization leading to a slight surge in demand and causing the negotiations more difficult for both of them to agree.

Table 3.1: Tonne-mile demand by major and major dry bulks (billion tonne-miles)

| | Iron ore | Coal | Grain | Bauxite/Alumina | Phosrok | Minor Bulks | Total Demand | Change% |
|---|---|---|---|---|---|---|---|---|
| 2004 | 3525 | 3412 | 1089 | 258 | 171 | 4630 | 13086 | 6.60% |
| 2005 | 3899 | 3544 | 1112 | 277 | 170 | 4631 | 13087 | 4.90% |
| 2006 | 4113 | 3842 | 1161 | 291 | 178 | 4632 | 13088 | 6.00% |
| 2007 | 4411 | 4166 | 1196 | 306 | 187 | 4633 | 13089 | 6.50% |
| 2008 | 4785 | 4162 | 1259 | 316 | 194 | 4634 | 13090 | 3.90% |

Source: Drewry

Table 3.2: Demand by ship sector

| Tonne-Miles (Billion) | Handysize | Handymax | Panamax | Post-Panamax | Capesize | VLOC | Total |
|---|---|---|---|---|---|---|---|
| 2004 | 2348 | 3285 | 2944 | 457 | 3876 | 176 | 13086 |
| 2005 | 2399 | 3399 | 3073 | 469 | 4191 | 195 | 13728 |
| 2006 | 2479 | 2938 | 3598 | 911 | 4416 | 206 | 14547 |
| 2007 | 2599 | 3102 | 3828 | 974 | 4775 | 222 | 15500 |
| 2008 | 2691 | 3154 | 3792 | 1212 | 4775 | 478 | 16102 |
| 2009(forecasted) | 2666 | 2926 | 3243 | 1041 | 3696 | 351 | 13923 |
| | | | | | | | |
| Deadweight (Million) | Handysize | Handymax | Panamax | Post-Panamax | Capesize | VLOC | Total |
| 2004 | 61.7 | 51.9 | 69.9 | 5.1 | 75.8 | 11.9 | 276.3 |
| 2005 | 63.5 | 57.5 | 76.0 | 6.3 | 82.6 | 13.5 | 299.5 |
| 2006 | 65.0 | 63.0 | 81.2 | 10.1 | 92.4 | 15.6 | 327.2 |
| 2007 | 68.7 | 70.1 | 86.7 | 13.5 | 100.6 | 20.5 | 360.2 |
| 2008 | 69.1 | 72.0 | 86.0 | 15.1 | 97.3 | 24.4 | 363.9 |
| 2009(forecasted) | 71.6 | 68.8 | 78.8 | 14.0 | 87.7 | 20.9 | 341.8 |
| Source: Drewry | | | | | | | |

### 3.1.1The main cargoes trade

From the above Table 3.1, we can find that the 28.1%, 26.4%, 7.6% of the world dry bulk trade are from iron ore, coal and grain.

Iron ore

The global recession has hammered consumption of iron ore, as consumers shy away from big purchases and companies cancel infrastructure projects. From table3.3 and 3.4, we see that the million tones imported in China, Japna, EU15 and South Korean are increased steadily. So, all the reports and professors are expecting that there will

be a turning point in 2009. And, in the first quarter, the world is what we all expected. But with the China government negotiating between three giants companies are coming, the market is suddenly back to the old days. People forget that the developed countries are still looking at their unemployment rate, GDP figures. They turn their head to China thinking that their demand will save the world. Accidently, the world is just what they think about just after China put the four trillion fiscal policy. I hold that the world iron ore market will have some color only in few months, if we look into the future days, I still pessimistic about the iron ore market.

Table 3.3: Iron ore-imports (million tonnes)

| Imports | China | EU-15 | Japan | S.Korea | Taiwan | USA | Total Major | Others | Total Seaborne |
|---|---|---|---|---|---|---|---|---|---|
| 2004 | **208.1** | 160.4 | 134.9 | 44.2 | 15.7 | 11.8 | 575.0 | 69.9 | 643.9 |
| 2005 | **275.2** | 156.6 | 132.3 | 43.5 | 14.6 | 13.0 | 635.1 | 80.9 | 715.4 |
| 2006 | **326.0** | 160.2 | 134.3 | 43.9 | 15.5 | 11.5 | 691.4 | 66.0 | 761.7 |
| 2007 | **383.7** | 160.7 | 138.9 | 46.2 | 16.1 | 9.4 | 798.6 | 56.8 | 822.4 |
| 2008 | **441.1** | 161.6 | 140.5 | 49.8 | 14.8 | 9.5 | 817.4 | 71.1 | 888.5 |

Source: Drewry

Table 3.4: Iron ore-exports (million tonnes)

| Exports | Australia | Brazil | India | Canada | South Africa | Russia | Sweden | World Total |
|---|---|---|---|---|---|---|---|---|
| 1997 | 155.5 | 140.4 | 32.9 | 32.3 | 20.7 | 12.6 | 18.3 | 472.3 |
| 1998 | 143.2 | 143.2 | 32.8 | 30.6 | 22.1 | 13.4 | 16.0 | 462.2 |
| 1999 | 146.2 | 140.2 | 31.0 | 26.9 | 21.1 | 11.2 | 13.9 | 446.3 |
| 2000 | 165.2 | 160.1 | 34.9 | 26.5 | 21.4 | 15.4 | 16.0 | 507.1 |
| 2001 | 175.3 | 155.7 | 36.6 | 22.0 | 23.5 | 13.7 | 13.7 | 503.3 |
| 2002 | 174.2 | 170.0 | 54.9 | 25.6 | 24.3 | 14.3 | 14.5 | 543.9 |
| 2003 | 196.8 | 184.4 | 57.3 | 27.8 | 23.4 | 17.8 | 16.1 | 594.1 |
| 2004 | 221.2 | 200.9 | 62.7 | 22.5 | 24.7 | 19.3 | 17.4 | 643.9 |
| 2005 | 239.0 | 223.4 | 80.9 | 27.9 | 26.6 | 20.1 | 17.8 | 715.3 |
| 2006 | 247.3 | 246.6 | 89.3 | 27.8 | 26.2 | 22.8 | 18.2 | 761.7 |
| 2007 | 268.8 | 269.4 | 93.7 | 28.3 | 30.3 | 25.5 | 19.4 | 822.4 |
| 2008(till June) | 152.7 | 131.2 | 50.0 | 14.2 | 15.2 | 10.6 | 8.6 | 429.6 |

Source: UNCTAD

Coal

With the worldwide slump in the economy originating in the USA, the demand for steel products in the major countries has rapidly cooled down just as I have said in the above chapters. There seems no respite to the gloomy forecast until at least the start of next year.

Forget that the coal is for the steel company, we all know that coal is the substitute of the oil, and the coal is energy for the electricity. From the table 3.5, we can see that China import a lot more of steam coal year on year. Electricity securitization in China is on their policy schedule, there are 1.3 billion people in China, and 0.7 billion in rural are from which the infrastructure, especially the power supply foundation can not meet the people need. Also, with the regions differences in the east of China and the west of China, the government support that the east of china receiving the electricity power from their west poor cousin. Therefore, the large amount of rural people in China can not receive electricity power. China government has discovered this phenomenon, so they are going to improve the people's life. On this reason, I hold that China will import a lot of steam coal than before.

If we compared table 3.5 and table 3.6, I find that we China import steam coal, and we are the bigger-export-steam coal country. In china, the steam coal market is not controlled by the government, so people can choose what to do. However, in order to keep the electricity price lower, the government compel the electricity plant keep their price lower, lower to the level that people can bear. So the electricity plants spare no efforts to make the steam coal cost lower. Therefore, businessmen in China want export their cargoes.

However, the world price of steam coal is lower than the domestic price in china, so people will import more than export. After all, I hold that the import volume of steam coal will increase while the export volume of steam coal will decrease. But the whole market of coal will increased by China's government policy of paying more attention to the rural area.

Table 3.5: Coal-imports (million tonnes)

Coaking Coal

| Imports | EU-15 | Japan | S.Korea | Others | Total Seaborne |
|---|---|---|---|---|---|
| 2004 | 45.1 | 80.1 | 19.2 | 51.7 | 196.0 |
| 2005 | 46.5 | 78.8 | 16.3 | 65.5 | 207.0 |
| 2006 | 48.7 | 79.7 | 15.1 | 95.7 | 239.3 |
| 2007 | 50.7 | 79.9 | 17.3 | 98.6 | 246.4 |
| 2008 | 52.1 | 80.4 | 19.5 | 101.4 | 253.4 |

Steam coal

| | EU-15 | Japan | S.Korea | China | Other | Total Seaborne |
|---|---|---|---|---|---|---|
| 2004 | 89.6 | 94.3 | 53.1 | 3.9 | 161.5 | 454.0 |
| 2005 | 90.7 | 96.1 | 55.9 | 6.1 | 167.1 | 468.0 |
| 2006 | 98.9 | 91.4 | 59.0 | 11.0 | 211.7 | 529.2 |
| 2007 | 108.0 | 100.7 | 67.6 | 15.7 | 234.7 | 586.7 |
| 2008 | 99.0 | 104.8 | 73.6 | 10.0 | 231.5 | 578.8 |

Source: Drewry

Table 3.6: Coal-exports (million tonnes)

Coaking Coal

| Exports | Austalia | China | Canada | USA |
|---|---|---|---|---|
| 2003 | 111.2 | 13.1 | 23.7 | 16.6 |
| 2004 | 116.9 | 5.7 | 24.0 | 20.9 |
| 2005 | 124.7 | 5.3 | 26.6 | 22.0 |
| 2006 | 124.4 | 4.4 | 24.6 | 20.8 |
| 2007 | 137.6 | 2.5 | 26.6 | 25.9 |
| 2008 | 72.8 | 2.9 | 21.2 | 29.0 |

Steam coal

| | Austalia | China | Indonesia | S.Africa | Colombia | Venezuela | USA |
|---|---|---|---|---|---|---|---|
| 2003 | 102.9 | 73.4 | 83.6 | 69.8 | 44.4 | 8.0 | 3.4 |
| 2004 | 107.2 | 74.5 | 89.5 | 67.4 | 51.2 | 8.6 | 6.3 |
| 2005 | 107.2 | 60.8 | 106.9 | 73.9 | 54.6 | 7.8 | 5.4 |
| 2006 | 110.9 | 537.0 | 138.3 | 67.4 | 58.3 | 7.8 | 5.9 |
| 2007 | 112.0 | 45.3 | 145.7 | 67.0 | 64.7 | 8.3 | 10.7 |
| 2008 | 124.2 | 34.4 | n/a | n/a | 67.9 | 6.3 | 17.0 |

Source: Drewry

Wheat and coarse grain trade

If there is one thing to talk about in the grain markets, it is volatility. The prices and volumes can change overnight. No matter who is to blame, be it an unexpected rain, be it a strong cold wind, be it the stock markets or even be it the seasonal uncertainties, quantity and prices have moved around to unexpected highs or lows. And the market price is so sensitive about the inventory volume of America and China. However, China always keeps the inventory volume as the secret that can not tell everybody. So, the whole market in under the control of the future market in America.

Developing countries like India and China continue with the recent urbanisation trends, and the countries will import even a few percent more of their total demand for grains, the entire world's grain export would be swallowed whole. In this situation, Urbanisation plays a large role. As Prof Amartya Sen famously said in his book 'Poverty and Famines' reflecting famines of Bangladesh, it is not drought that creates famines rather ownership and exchange. This urbanisation may lead to a structural shift in trade patterns. Growth in urbanisation leads to fewer crops. There are less people farming, therefore there is a lower output of grains. However the main concern doesn't lie in the shifting career choices of citizens in these countries, but rather the location of the ever-developing urban sprawl and which crops are being planted. Many of the areas where city growth is happening are right on top of previously fruitful agricultural land and what fruitful land is left is no longer devoted to growing grains. All these things we can see in China that recently the Hangzhou minister has been arrested for the reason that he compelled the rural people who on their plantful land to move into the city and collect their land to build house. This will certainly overtax the world's grain production, meaning that many poor developing countries will be facing the worst grain crisis we have seen in modern times and also a shift in the grain patterns. We can find the above situation in China, just as China's professor Mao YuShi has pointed that we shall guarantee 1.8 billion acres to plant grains in order to satisfy the need of our China people.

Since China's agriculture and rural economy has ushered in a new period of

development, along with the rapid development of the national economy, the formal accession into WTO and, the accelerating establishment of FTZ with neighboring countries and regions as well as the deepening reform of important agri-products circulation system such as grain and cotton, thereby, the degree of agri-products marketization and trade liberalization improve rapidly, which urges great internal demand for the modern agri-products logistics. But China's current development of agri-products logistics, compared with developed countries, still exists a large gap regardless of theoretical study or the practical aspect, which makes China opened the whole market to the outsiders. This fact can bring serious situations that we see now. The whole supply chain of soybean is under the control of the foreign assets, which make the soybean price never going down. Even worse, the future market in under the control of American, due to political and economy reason, they will not let the price going down. Because China is in an urgent need for grain and wheat.

I firmly believed in the next years, some developing countries will import more grains than ever before, and with the future market impact, some countries will also keep some grain in their house to keep the risk lower.

Table 3.7: Major grains trade (million tonnes)

| Imports | Europe | CIS | N&S America | S.America | Pacific Asia | S.Asia | Near East Asia | Oceania | Africa | World Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 2004 | 19.6 | 9.1 | 24.8 | 17.6 | 66.5 | 4.1 | 25.9 | 0.7 | 37.7 | 207.9 |
| 2005 | 13.2 | 5.8 | 27.4 | 17.2 | 67.4 | 5.8 | 29 | 0.9 | 44.6 | 211.9 |
| 2006 | 12.3 | 6.2 | 26.7 | 20 | 65.5 | 5.3 | 31.1 | 0.8 | 47.3 | 214.8 |
| 2007 | 13.6 | 7.1 | 30.5 | 23.7 | 62 | 10.7 | 29.7 | 0.8 | 42.6 | 220.5 |
| 2008 | 30.4 | 6.6 | 32 | 23.4 | 59.4 | 7.4 | 31.2 | 0.9 | 45.8 | 237.6 |
| 2009(forecasted) | 12.7 | 5.8 | 30.8 | 23.7 | 62.3 | 7.1 | 39 | 0.9 | 46.5 | 229.6 |

| Exports | USA | Australia | Canada | Argentina | EU | Others | Total Seaborne |
|---|---|---|---|---|---|---|---|
| 2004 | 83.7 | 26.4 | 18.1 | 20.6 | 12.9 | 45.8 | 207.5 |
| 2005 | 77.6 | 15.7 | 18.0 | 25.2 | 17.9 | 57.6 | 211.9 |
| 2006 | 86.3 | 20.5 | 22.5 | 20.8 | 18.7 | 52.2 | 221.1 |
| 2007 | 98.2 | 9.2 | 22.3 | 26.7 | 17.0 | 54.5 | 227.8 |
| 2008 | 96.0 | 13.5 | 20.8 | 28.7 | 20.9 | 60.0 | 239.8 |

Source: Drewry

### 3.2 The analysis of World Dry Bulk Market supply

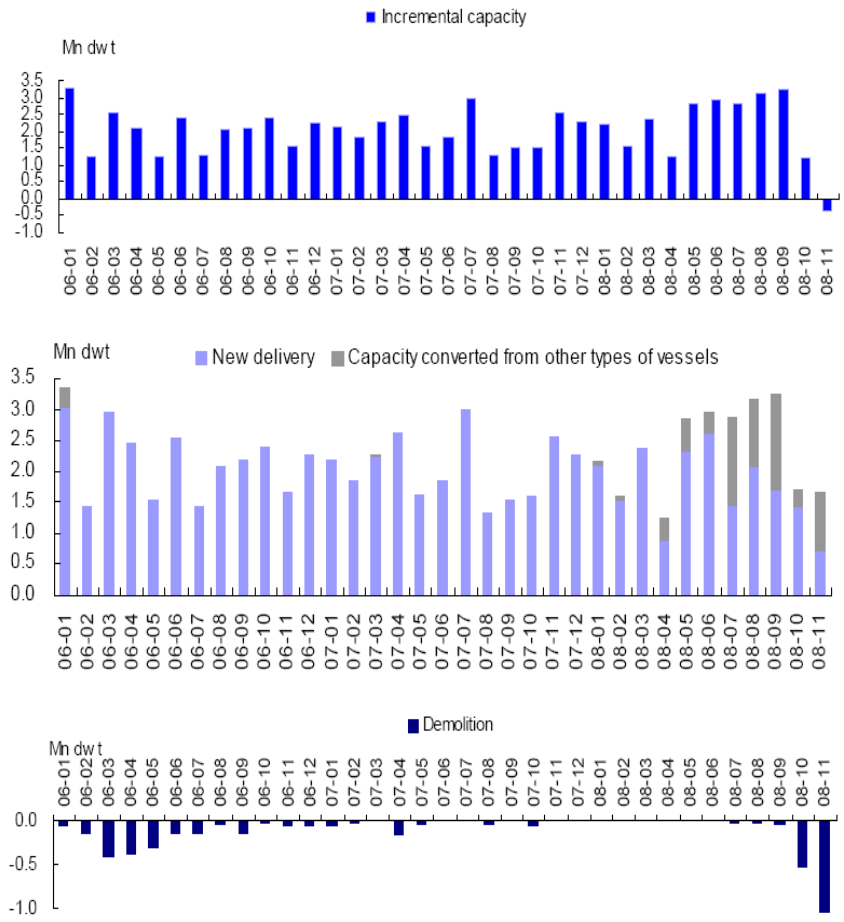
The number of new ships delivered in 2008 dropped notably while demolition surged amid weak freight rates and outstripped the newly-delivered capacity.(chart 3.1) However, by the end of November 2008, the global capacity still increased 5.8% from the beginning of the year, driven by the fact that many oil tankers have been converted into dry bulk carriers, though the pace was slower than the same period last year (6.5%).( Table3.8)

Table 3.8: Dry bulk shipping capacity changes

| *Mn dwt* | Nov-08 | Oct-08 | MoM | Nov-08 | Nov-07 | YoY | 2008.1-11 | 2007.1-11 | YoY |
|---|---|---|---|---|---|---|---|---|---|
| New delivery | 0.71 | 1.42 | -50% | 0.71 | 2.57 | -72% | 19.21 | 22.37 | -14% |
| Capacity converted from | 0.93 | 0.29 | 221% | 0.93 | - | n.a | 6.56 | 0.05 | 13020% |
| Demolition | -2.02 | -0.52 | 288% | -2.02 | - | n.a | -2.61 | -0.36 | 625% |
| Incremental capacity | -0.38 | 1.19 | -132% | -0.38 | 2.57 | -115% | 23.16 | 22.06 | 5% |
| Global fleet capacity | 415.59 | 415.97 | -0.1% | 415.59 | 390.39 | 6.5% | n.a | n.a | n.a |

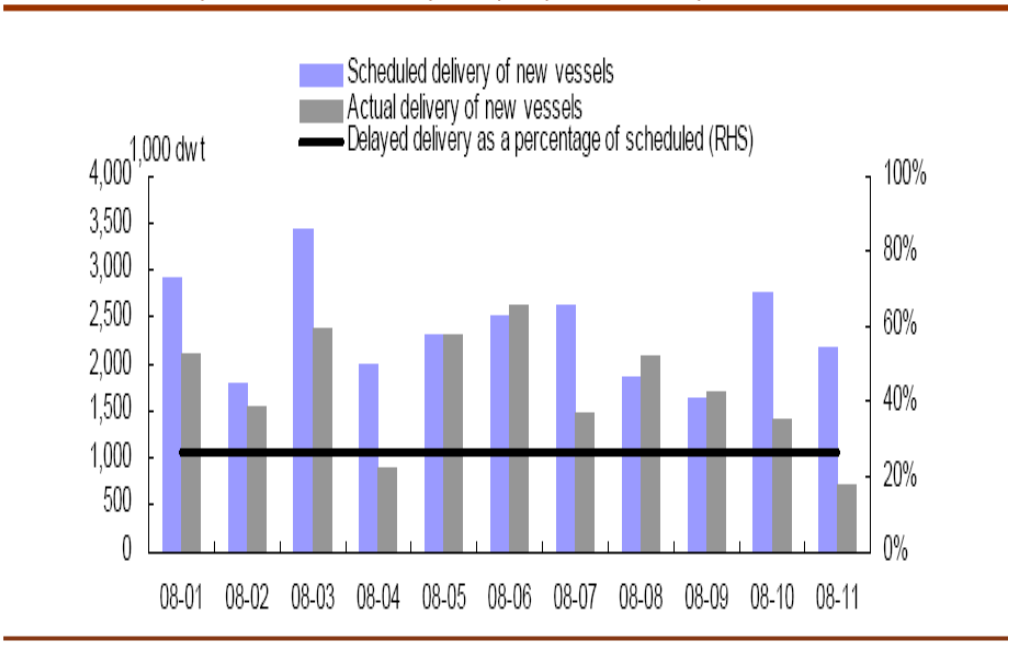
Source: Clarkson, CICC Research

Charter 3.1: Monthly incremental dry bulk shipping capacity and new ship delivery, conversion and demolition




The postponed delivery ratio (the proportion of ships not delivered on time) stood at 26% over January~November 2008, largely due to the delays in new ship deliveries. The ratio reached 68% in November, the highest monthly reading year to date. The reason behind that is the difficulty in accessing credit. And the countries like USA do not have much need for new cargoes to meet their luxury need.

Charter 3.2: New dry bulk carrier delivery and postponed delivery ratio estimate




Source: Clarkson, CICC Research

Above that, we can find that although the supply of new ships are delayed by many reasons, the current supply and the certain supply of new ships is still too much for the market to bear.

At the end of 2008, the dry bulk fleet stands at 7,076 vessels amounting to 418.8 million dwt, an increase of 6.1% over the previous year. (Table 3.9)

The following chart and table reflect the current situation of world total bulk fleet in terms of age and numbers and deadweight.

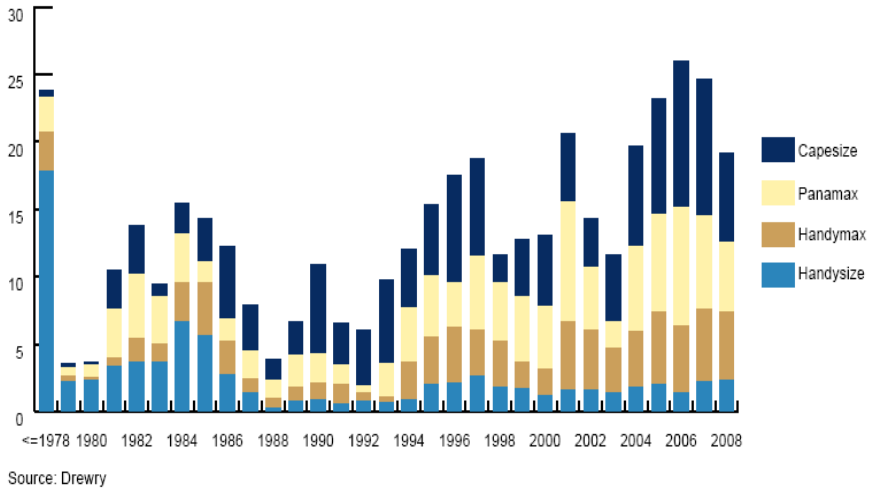
Overall, capacity expansion depends on new ship delivery, old ship demolition, and other factors like capacity converted from other types of ships. Therefore, we need to look at these three market situation.

Table 3.9: Total bulk carrier fleet

| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | Vloc | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | mdwt | No. | mdwt | No. | mdwt | No. | mdwt | No. | mdwt | No. | mdwt | No. | mdwt |
| 2004 | 2811.0 | 75.1 | 1298.0 | 60.8 | 1156.0 | 81.9 | 67.0 | 6.0 | 545.0 | 87.8 | 59.0 | 13.6 | 5936.0 | 325.1 |
| 2005 | 2849.0 | 76.2 | 1403.0 | 66.4 | 1232.0 | 87.6 | 83.0 | 7.4 | 583.0 | 94.6 | 68.0 | 15.5 | 6218.0 | 347.7 |
| 2006 | 2847.0 | 76.2 | 1496.0 | 71.4 | 1284.0 | 91.6 | 131.0 | 11.5 | 629.0 | 102.8 | 77.0 | 17.3 | 6464.0 | 370.8 |
| 2007 | 2915.0 | 77.8 | 1594.0 | 76.7 | 1330.0 | 95.2 | 168.0 | 14.7 | 661.0 | 108.5 | 99.0 | 22.0 | 6767.0 | 394.8 |
| 2008 | 3010.0 | 80.4 | 1694.0 | 82.2 | 1364.0 | 97.7 | 204.0 | 17.9 | 676.0 | 111.3 | 128.0 | 29.3 | 7076.0 | 418.8 |
| 2009f | 2959.0 | 79.9 | 1816.0 | 89.6 | 1328.0 | 95.7 | 253.0 | 22.1 | 719.0 | 119.7 | 147.0 | 34.3 | 7222.0 | 441.4 |
| 3Q07 | 2895.0 | 77.4 | 1568.0 | 75.3 | 1318.0 | 94.2 | 159.0 | 13.9 | 652.0 | 106.9 | 93.0 | 20.6 | 6685.0 | 388.2 |
| 4Q07 | 2915.0 | 77.8 | 1594.0 | 76.7 | 1330.0 | 95.2 | 168.0 | 14.7 | 661.0 | 108.5 | 99.0 | 22.0 | 6767.0 | 394.8 |
| 1Q08 | 2939.0 | 78.5 | 1622.0 | 78.2 | 1342.0 | 96.1 | 176.0 | 15.4 | 668.0 | 109.7 | 99.0 | 22.0 | 6846.0 | 399.9 |
| 2Q08 | 2973.0 | 79.4 | 1647.0 | 79.6 | 1352.0 | 96.8 | 184.0 | 16.1 | 676.0 | 111.1 | 107.0 | 23.9 | 6939.0 | 406.9 |
| 3Q08 | 3004.0 | 80.3 | 1684.0 | 81.6 | 1367.0 | 97.9 | 194.0 | 17.0 | 684.0 | 112.4 | 122.0 | 28.0 | 7055.0 | 417.1 |
| 4Q08 | 3010.0 | 80.4 | 1694.0 | 82.2 | 1364.0 | 97.7 | 204.0 | 17.9 | 676.0 | 111.3 | 128.0 | 29.3 | 7076.0 | 418.8 |
| 1Q09f | 2967.0 | 79.5 | 1701.0 | 82.8 | 1348.0 | 96.8 | 211.0 | 18.5 | 674.0 | 111.1 | 127.0 | 29.1 | 7028.0 | 417.7 |
| 2Q09f | 2945.0 | 79.1 | 1725.0 | 84.3 | 1337.0 | 96.1 | 221.0 | 19.4 | 678.0 | 112.3 | 130.0 | 29.9 | 7037.0 | 421.0 |
| 3Q09f | 2945.0 | 79.3 | 1764.0 | 86.6 | 1331.0 | 95.8 | 236.0 | 20.6 | 693.0 | 114.9 | 137.0 | 31.8 | 7106.0 | 429.1 |
| 4Q09f | 2959.0 | 79.9 | 1816.0 | 89.6 | 1328.0 | 95.7 | 253.0 | 22.1 | 719.0 | 119.7 | 147.0 | 34.3 | 7222.0 | 441.4 |

Source: Drewry

Charter 3.3: Dry bulk fleet age profile (m dwt)




Source: Drewry

3.2.1 **Orderbook**

The current orderbook stands at 3,411 vessels amounting to 294.4 million dwt and represents 70.4% of the total fleet. (chart 3.5) The major share of the orderbook, nearly 46%, lies with China, followed by Japan at 26% and South Korea at 20%. As we all know these three countries are the major ship building countries. And we can not deny the fact that ships are sometimes to used as the military reason, so even in this pessimistic view, we China still build a lot of ships.

The global credit squeeze has impacted the East Asian Economies more deeply than was earlier anticipated. Japanese shipbuilder, Tsuji Heavy Industries (TSUJI Heavy industries, a leading deck equipment manufacturer and shipbuilder has filed for bankruptcy protection, leaving shipowners and shipbuilders in the dark as to what will happen to their orders. ) became the first Japanese shipbuilder to feel the cold wind of filed for bankruptcy protection.

The South Korean government and banks that were creditors to Korean yards, are now planning to put small and medium-sized shipbuilders under their microscope for these yards just like their new boring child.

Chinese state-owned banks are also reportedly pumping in a large amount of liquidity into selected shipbuilding companies. We China just put a policy-Shipping revitalization planning. In order to resist the financial crisis and arising postpone ratio. Many yards are benefiting from the plan.

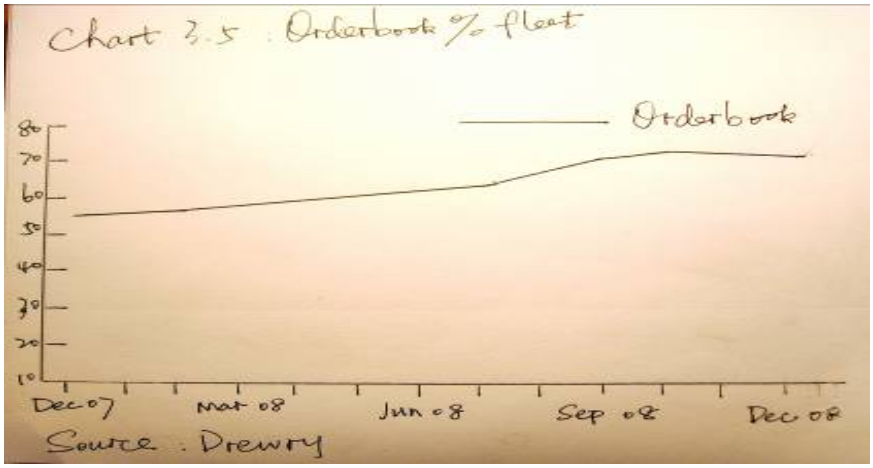



Table 3.10: Dry bulk orders placed ('000 dwt)

| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | Vloc | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwy |
| 2004 | 37 | 956 | 43 | 2321 | 36 | 2748 | 17 | 1397 | 16 | 2787 | 10 | 2818 | 159 | 13026 |
| 2005 | 26 | 766 | 21 | 1107 | 17 | 1274 | 10 | 863 | 14 | 2469 | 7 | 1815 | 95 | 8294 |
| 2006 | 133 | 3865 | 151 | 8216 | 24 | 1828 | 38 | 3327 | 68 | 12017 | 14 | 4094 | 428 | 33348 |
| 2007 | 318 | 9971 | 463 | 26280 | 82 | 6238 | 225 | 19803 | 345 | 58261 | 52 | 14063 | 1485 | 134614 |
| 2008 | 215 | 6958 | 215 | 12139 | 83 | 5933 | 86 | 7562 | 179 | 29619 | 53 | 16753 | 831 | 78964 |
| 3Q07 | 108 | 3279 | 79 | 4470 | 26 | 1945 | 69 | 5937 | 97 | 15736 | 4 | 920 | 383 | 32287 |
| 4Q07 | 107 | 3516 | 98 | 5564 | 20 | 1573 | 70 | 6292 | 70 | 11826 | 21 | 6485 | 386 | 35254 |
| 1Q08 | 80 | 2573 | 99 | 5631 | 27 | 2061 | 27 | 2335 | 67 | 11289 | 15 | 4136 | 315 | 28025 |
| 2Q08 | 37 | 1220 | 43 | 2439 | 14 | 1088 | 14 | 1265 | 46 | 8273 | 21 | 7710 | 175 | 21995 |
| 3Q08 | 73 | 2342 | 59 | 3257 | 38 | 2492 | 39 | 3432 | 57 | 8457 | 8 | 2330 | 274 | 22309 |
| 4Q08 | 25 | 824 | 14 | 812 | 4 | 292 | 6 | 530 | 9 | 1600 | 9 | 2577 | 67 | 6635 |

Source: Drewry

From the above Table 3.10, the total deadweight of ships in 2008 slipped quickly compared to the deadweight in 2007. This may be can give some hope for some shipowners, but the orderbook is still so high, 70.4% of the current fleet market.(Table 3.11)

Table 3.11: Total orderbook ('000 dwt)

| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | VLOC | | Total | | % of fleet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | |
| 2004 | 166 | 4845 | 259 | 13922 | 189 | 14290 | 82 | 6945 | 85 | 14930 | 45 | 10619 | 826 | 65551 | 19.8 |
| 2005 | 171 | 4742 | 238 | 12680 | 160 | 12107 | 113 | 9659 | 83 | 14623 | 44 | 10699 | 809 | 64510 | 18.6 |
| 2006 | 271 | 7888 | 297 | 15924 | 124 | 9382 | 120 | 10391 | 112 | 19081 | 68 | 16730 | 992 | 80116 | 20.1 |
| 2007 | 574 | 17703 | 728 | 40503 | 204 | 15004 | 386 | 33440 | 479 | 81921 | 106 | 27967 | 2477 | 216537 | 55.2 |
| 2008 | 868 | 27216 | 969 | 54367 | 235 | 16772 | 541 | 46699 | 652 | 109929 | 146 | 39951 | 3411 | 294935 | 70.4 |
| 3Q07 | 467 | 14045 | 637 | 35247 | 201 | 14882 | 252 | 21816 | 378 | 64398 | 89 | 22912 | 2024 | 173299 | 37.7 |
| 4Q07 | 574 | 17703 | 728 | 40503 | 204 | 15004 | 386 | 33440 | 479 | 81291 | 106 | 27967 | 2477 | 216537 | 44.8 |
| 1Q08 | 652 | 20380 | 782 | 43654 | 206 | 15115 | 414 | 35867 | 521 | 88480 | 109 | 28465 | 2684 | 231961 | 55.2 |
| 2Q08 | 717 | 22494 | 829 | 46396 | 194 | 14210 | 427 | 36993 | 577 | 97989 | 125 | 32465 | 2869 | 250547 | 58.3 |
| 3Q08 | 863 | 27090 | 946 | 52988 | 238 | 17011 | 488 | 42342 | 642 | 108737 | 146 | 39906 | 3323 | 288075 | 69.3 |
| 4Q08 | 868 | 27216 | 969 | 54367 | 235 | 16772 | 541 | 46699 | 652 | 109929 | 146 | 39951 | 3411 | 294935 | 70.4 |

Source: Drewry

### 3.2.2 Deliveries

In 2008 a total of 334 vessels were delivered amounting 22.6 million dwt, a decrease of 7.2% over the previous year. In 2009, a total of 540 vessels (40.8 million dwt) are forecast to be delivered, growth of 80% over 2008. Drewry is estimating a delivery slippage of 70% in 2009 (considering the backlog of over 100 vessels for 2008), 45% in 2010, 25% in 2011 and 10% in 2012. Also 13 vessels amounting to 2.6 million dwt are estimated to join the dry bulk fleet after conversion from VLCC. In 1Q09, 80 vessels amounting to 5.1 million dwt are forecast to be delivered. Thereafter the number of deliveries is expected to grow steadily as ships due this year are not so susceptible to cancellations.

Table 3.12: Dry bulk orderbook and delivery schedule ('000 dwt)

| | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | Total | | % of fleet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | |
| Handysize | 38 | 1085 | 275 | 8209 | 267 | 8293 | 194 | 6435 | 86 | 2934 | 8 | 261 | 868 | 27216 | 33.80% |
| Handymax | 61 | 3306 | 303 | 16888 | 327 | 18444 | 210 | 11867 | 61 | 3463 | 7 | 398 | 969 | 54367 | 66.20% |
| Panamax | 11 | 805 | 54 | 3960 | 80 | 5872 | 55 | 3906 | 30 | 1925 | 5 | 305 | 235 | 16772 | 17.20% |
| Post-panamax | 11 | 932 | 90 | 7874 | 205 | 17599 | 177 | 15307 | 45 | 3888 | 13 | 1100 | 541 | 46699 | 261.30% |
| Capesize | 6 | 1044 | 137 | 23960 | 311 | 53513 | 155 | 24725 | 35 | 5385 | 8 | 1302 | 652 | 10929 | 98.80% |
| VLOC | 2 | 505 | 24 | 6166 | 24 | 6249 | 43 | 12145 | 40 | 11246 | 13 | 3640 | 146 | 39951 | 136.10% |
| Total | 129 | 7676 | 883 | 67058 | 1214 | 109970 | 834 | 74585 | 297 | 28841 | 54 | 7006 | 3411 | 294935 | 70.40% |
| Orderbook as on end 4Q08 | | | | | | | | | | | | | | | |
| Source: Drewry | | | | | | | | | | | | | | | |

Table 3.13: Dry bulk deliveries ('000 dwt)

| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | VLOC | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt |
| 2004 | 60 | 1755 | 76 | 3988 | 76 | 5751 | 6 | 543 | 34 | 5948 | 7 | 1471 | 259 | 19458 |
| 2005 | 65 | 1893 | 99 | 5333 | 74 | 5604 | 17 | 1469 | 38 | 6729 | 10 | 2041 | 303 | 23070 |
| 2006 | 49 | 1341 | 91 | 4873 | 62 | 4704 | 48 | 4080 | 50 | 8796 | 9 | 1868 | 309 | 25662 |
| 2007 | 85 | 2115 | 96 | 5160 | 46 | 3489 | 41 | 3573 | 33 | 5839 | 20 | 4264 | 321 | 24441 |
| 2008 | 102 | 2836 | 120 | 6553 | 44 | 3228 | 31 | 2656 | 24 | 4154 | 14 | 3254 | 334 | 22681 |
| Source: Drewry | | | | | | | | | | | | | | |

Source: Drewry

From the above table 3.12 and 3.13, we can find that delivery is focused on the 2009, 2010, 2011, 2012, for the reason that these ships are planed to build in2006 and 2007. So, there are many peoples talking about the world shipping market will be come back in 2010, I myself firmly do not agree what they have said, because if we look deep in the deliveries, we find that the next three years is much dangerous than now.

### 3.2.3 Demolition

By the end of 2008, the demolition market witnessed a high surge on both the Indian subcontinent as well as in China, on the back of financial crisis historically low freight rates. And the surge will continue in 2009. There are 69 vessels amounting to 4.0 million dwt were scrapped, while in 2007 only 12 vessels amounting to 0.4 million were scrapped for the simple reason that at that time the freight rates enjoying historically high. In the forth quarter of 2008 alone, 67 vessels amounting to 4 million dwt were brought to the demolition yards. Interestingly, 11 Capesize vessels were scrapped in the last quarter of 2008, simply due to their age profile, (Chart 3.3) while previously elderly VLCC were being converted into Capesize vessels. China, the country is famous for their developing, need a lot of steel to support their construction. So, the demolition market is supported by the government for the simple reason we need steel. China became one of the favorite destinations for ship breaking despite offering reduced scrap prices. The Shipowners are trying their best selling off their old tonnage to the Chinese ship breakers.

Over the last quarter of 2008, the financial crisis is all over the world, due to huge shortage of hard currency, Bangladeshi ship breakers were unable to secure any of the huge level of tonnage on sale. Local banks, amid the global credit crunch, were asking double the amount of margin money from Bangladeshi ship breakers. However, Indian breakers took the lead in acquiring tonnage supported by huge domestic demand for scrap steel and expected easing in acquiring credit. It is also expected that the shipbreaking industry on the Indian sub-continent, which incurred losses in the previous quarters when scrap prices were hovering above $700/ldt, is finally looking at better profit margins on the back of low scrap prices and stable steel prices.

In 2009, demolition market is expected to increase substantially as the forecasted lower freight rates and age profile of the fleet focus owners' minds on operating margins. Nowadays, a total of 23.8 million dwt of the fleet is over 30 years. Before the financial crisis, because of unbelievable trading options, owners had been postponing the scrapping of their vessels but now with no goods to trade and the maintenance costs rising for older ships, they are likely to send their vessels to the

breakers.

Table 3.14: Dry bulk demolitions ('000 dwt)

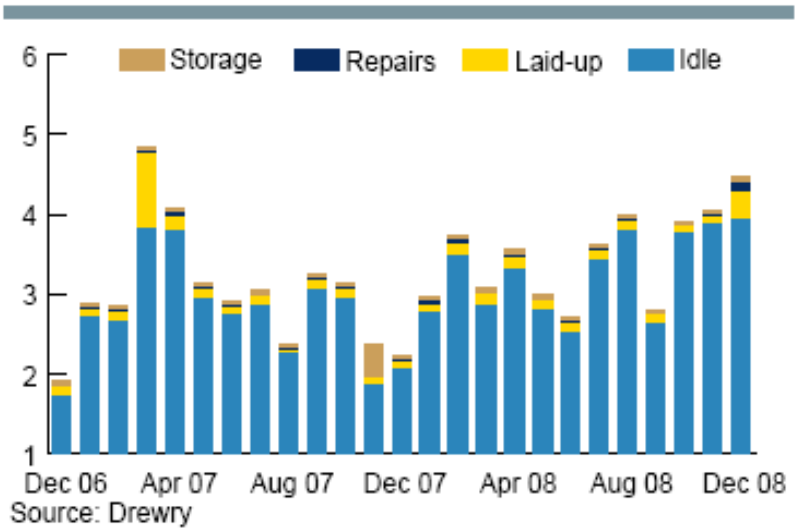
| | Handysize | | Handymax | | Panamax | | Post-Panamax | | Capesize | | VLOC | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt | No. | Dwt |
| 2004 | 6 | 125 | 0 | 0 | 0 | 0 | 1 | 95 | 1 | 123 | 0 | 0 | 8 | 343 |
| 2005 | 5 | 147 | 1 | 42 | 1 | 65 | 1 | 107 | 1 | 140 | 0 | 0 | 9 | 501 |
| 2006 | 30 | 745 | 3 | 151 | 9 | 611 | 0 | 0 | 2 | 296 | 0 | 0 | 44 | 1802 |
| 2007 | 10 | 232 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 141 | 0 | 0 | 12 | 374 |
| 2008 | 36 | 1050 | 7 | 335 | 15 | 981 | 0 | 0 | 10 | 1455 | 1 | 225 | 69 | 4046 |

Source: Drewry

### 3.2.4 Inactivity

Inactivity by the last quarter of 2008, on the reason of historically down freight rates, is increased by 100% year-on-year to reach 4.4 million dwt which is not surprising to everybody. Of all the ships, the Capesize were the worst hit and, at the end of forth quarter of 2008, 1.8 million dwt of tonnage was lying idle either in hot or cold lay-up.(Table 3.15)

Charter3.6: Dry Bulk fleet inactivity (m dwt)



Source: Drewry

| Table 3.15 Bulker inactivity-end period ('000 dwt) | | | | | | | |
|---|---|---|---|---|---|---|---|
| End Period | Handysize | Handymax | Panamax | Post-Panamax | Capesize | VLOC | Total |
| 2004 | 736 | 416 | 539 | 100 | 607 | 0 | 2399 |
| 2005 | 569 | 371 | 272 | 100 | 150 | 0 | 1462 |
| 2006 | 1202 | 751 | 1745 | 291 | 640 | 207 | 4837 |
| 2007 | 619 | 426 | 868 | 0 | 284 | 0 | 2227 |
| 2008 | 1168 | 333 | 1105 | 89 | 975 | 795 | 4464 |
| 3Q07 | 1014 | 526 | 745 | 0 | 445 | 528 | 3258 |
| 4Q07 | 619 | 426 | 898 | 0 | 284 | 0 | 2227 |
| 1Q08 | 923 | 514 | 826 | 0 | 590 | 214 | 3068 |
| 2Q08 | 981 | 392 | 869 | 0 | 472 | 0 | 2714 |
| 3Q08 | 658 | 364 | 737 | 170 | 614 | 255 | 2799 |
| 4Q08 | 1168 | 333 | 1105 | 89 | 975 | 795 | 4464 |
| Source: Drewry | | | | | | | |

| Table 3.16: Reported chartering activity by commodity ('000 dwt) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Grains/Meal | Other Agric | Iron ore | Other Ore | Coal/Coke | Fertiliser | Scrap | Others | Total |
| 2004 | 3606 | 828 | 51575 | 1041 | 38009 | 495 | 515 | 889 | 96958 |
| 2005 | 3540 | 260 | 53810 | 1250 | 33188 | 225 | 0 | 285 | 92558 |
| 2006 | 2538 | 428 | 59172 | 669 | 24068 | 300 | 38 | 410 | 87623 |
| 2007 | 1649 | 227 | 50876 | 387 | 20537 | 0 | 30 | 170 | 73876 |
| 2008 | 2483 | 202 | 75332 | 361 | 30053 | 144 | 82 | 235 | 84261 |
| 3Q07 | 447 | 26 | 11326 | 58 | 3907 | 0 | 30 | 55 | 15849 |
| 4Q07 | 545 | 82 | 10306 | 65 | 5094 | 0 | 0 | 75 | 16167 |
| 1Q08 | 379 | 29 | 17296 | 55 | 6792 | 30 | 0 | 50 | 24631 |
| 2Q08 | 254 | 0 | 16384 | 25 | 4442 | 44 | 0 | 80 | 21229 |
| 3Q08 | 547 | 118 | 22373 | 116 | 7066 | 0 | 0 | 55 | 30275 |
| 4Q08 | 1303 | 55 | 19279 | 165 | 11753 | 70 | 82 | 50 | 32757 |
| Source: Drewry | | | | | | | | | |

From the above table 3.15, I find some interesting things, that the market whole supply will be rocked, then there are many ships becoming inactivity, why these two things happened at the same time. My view is that the shipping companies' number is becoming fewer and fewer, with the financial crisis, there will be a lot of shipping companies going to bankruptcy, so the survival shipping companies are easy to count out. Therefore, in some way, you find the shipping market's supply is on the sky, in other way, you will find the actual number of supply is very few.

### 3.3 Supply/demand balance

The strong demand for raw materials, especially by Chinese steel mills company, was very encouraging for shipowners to increase vessel supply while the freight rates were surging to the universe. Therefore, in the last three years, we saw a lot of ships are going to be built. However, when the economic collapsed and declining demand became far away behind the supply cousin, the scenario showed a disappoingting picture. Even though the heavy ordering in the boom period becomes the history. The market has been added a lot of vessels to the supply team, in spite of the fact that many newbuild ships are being cancelled and many deliveries are delayed for the accessing credit reason. It is simply concluded that the cancellation and delay is not enough to stop the current growth rate. In 2008 the average fleet supply increased by 6%, while vessel demand rose by only 1% leading to excessive supply of 46.2 million dwt.

Table 3.17: Supply/Demand balances (m dwt)

| Period Averages | | Average Supply | Total Demand | Surplus/ (Deficit) |
|---|---|---|---|---|
| 2004 | | 319.5 | 276.3 | 43.2 |
| 2005 | | 341.1 | 299.5 | 41.6 |
| 2006 | | 363.7 | 327.2 | 36.4 |
| 2007 | | 387.2 | 360.2 | 27.1 |
| 2008 | | 410.1 | 363.9 | 46.2 |
| 2009 | | 431.4 | 341.8 | 89.7 |
| 2010 | forecasted | 490.4 | 361.5 | 128.9 |
| 3Q07 | | 392.3 | 353.2 | 39.1 |
| 4Q07 | | 399.7 | 360.2 | 39.5 |
| 1Q08 | | 404.3 | 352.5 | 51.9 |
| 2Q08 | | 411.6 | 361.4 | 50.2 |
| 3Q08 | | 421.7 | 372.7 | 49 |
| 4Q08 | | 420.5 | 344.6 | 75.9 |
| 1Q09 | forecasted | 416.7 | 333.1 | 83.6 |
| 2Q09 | | 422.4 | 350.5 | 71.9 |
| 3Q09 | | 430.4 | 352.9 | 77.5 |
| 4Q09 | | 442.4 | 330.5 | 77.5 |
| 1Q10 | | 458.2 | 349.4 | 111.9 |
| 2Q10 | | 482.2 | 370.5 | 111.7 |

Source: Drewry

According to the above table 3.17, it is concluded that the supply will higher than the demand, and the difference also becoming higher and higher, this phenomenon can

cause freight into the bottom which can make the shipping market in the frozen world. In my mind, we all anticipated that the above fact will happen, therefore, shippers and buyers and companies will try to avoid such thing happen, so the figures of demolition and inactivity will amaze us.

## 4 Chinese factor on world Iron ore market

### 4.1 The current situation of world iron ore market

The last quarter of 2008 saw many companies cutting their production and a sharp decline in trade because of bleak future demand. Major consumers of iron ore like Baostell, Magang, Angang, Arcelor, Mittal and Posco made a decision to close a number of their units and go for early maintenance works. Brazilian iron ore producer Cia Vale Do Rio Doee has reduced production of iron ore significantly due to the decreasing steel demand associated with the collapse of global economy. The Company announced specifically that operations at a number of iron ore mines in the Southern and Southeastern Systems in Minas Gerais will be shut down, with two pelletising plants suspended for maintenance. It is reported that the reduction of iron ore production will amount to 30 million tonnes annually. Due to the simple reason that there are not enough demand- downward in infrastructure building globally.

The global financial crisis has hammered consumption of iron ore, as consumers shy away from big purchases and companies cancel infrastructure projects. Iron ore imports to the EU have decreased by 8% in the first quarter of 2009 and expected by a further 27% in the last quarter of 2009 year-on-year. Only after that a rosy picture emerges when demand for steel starts building up. The rosy picture comes from some developing nations and their need on infrastructure project.

For some developing nations like China and India, global imports show similar trends overall. Iron ore imports in Japan in 2009 are forecasted to decrease by 12% over 2008. The reason behind that is Indian cut their export to China hoping these volumes can meet their own country. Overall iron ore trade is reduced by 12% in 2009. It is reported that the average price for iron ore in the third week of December in 2008 increased 2.3% from the previous week.

China imports take a bite in forth quarter of 2008 and reduce by 18%. However, the country is still at the stage of urbanization, too many people are moving to the city which they need houses. Also, China makes a four trillion policy to stimulate the economy by building infrastructure. Because The Chinese economy is expected to rely more on its infrastructure development projects, so increasing the demand for

steel.

China increased prices at the most representative mines turned out to be 4.8% at Hebei Tangshan, and 4.6% at Liaoning Anshan. For domestic prices increase, imports will become relatively cheaper so boosting trade.

Brazilian and Australian ore producers are currently negotiating prices. Chinese producers in particular are expecting a reprieve from the high prices they have paid in recent years. However, when Vale proposed a cut in prices of 10%, the China steel mills reportedly dismissed it. Recently, the three giants have made an agreement with Japan on cutting in prices of 30%. The decrease of 10% in the 2009 benchmark price for iron ore contracts looked far too little for the Chinese operators to accept. What I have said and try to find is how to deal with the three giants company about the price negotiations. Then we shall fist look into the current situation in China.

### 4.2 Chinese factor on iron ore market

As we are talking about the Chinese factor on iron ore market, we should have some expectations about the future demand of China.

#### 4.2.1 The future picture of iron ore in China

Chart 4.1 The urbanization of China, USA, Japan - %

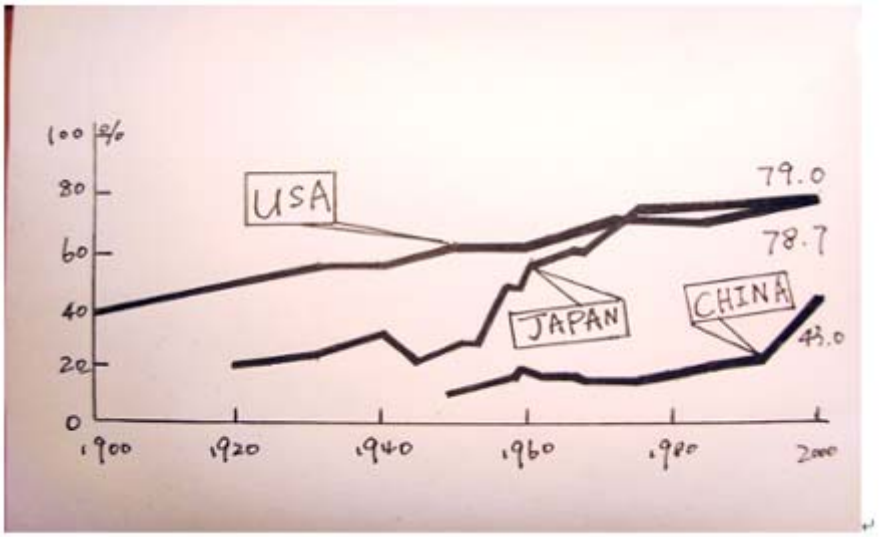


Chart 4.2 The length of railways per land area- meter/square kilometers

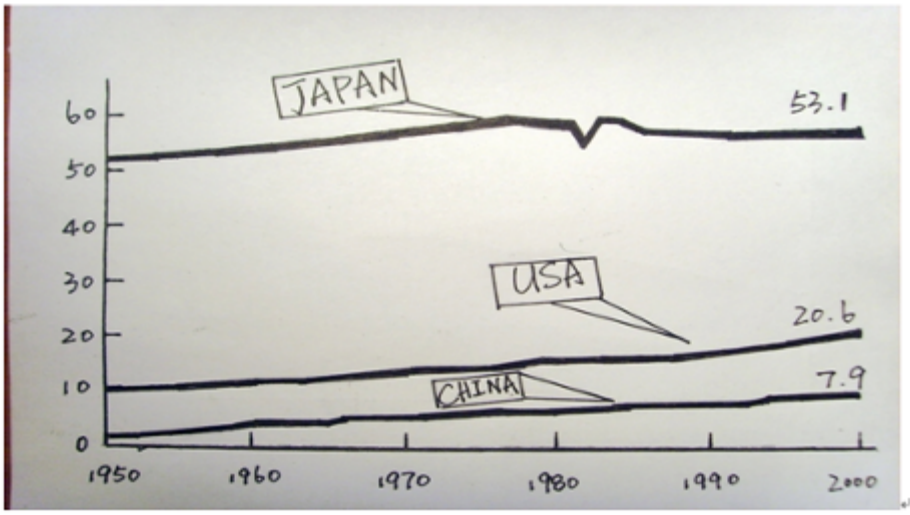
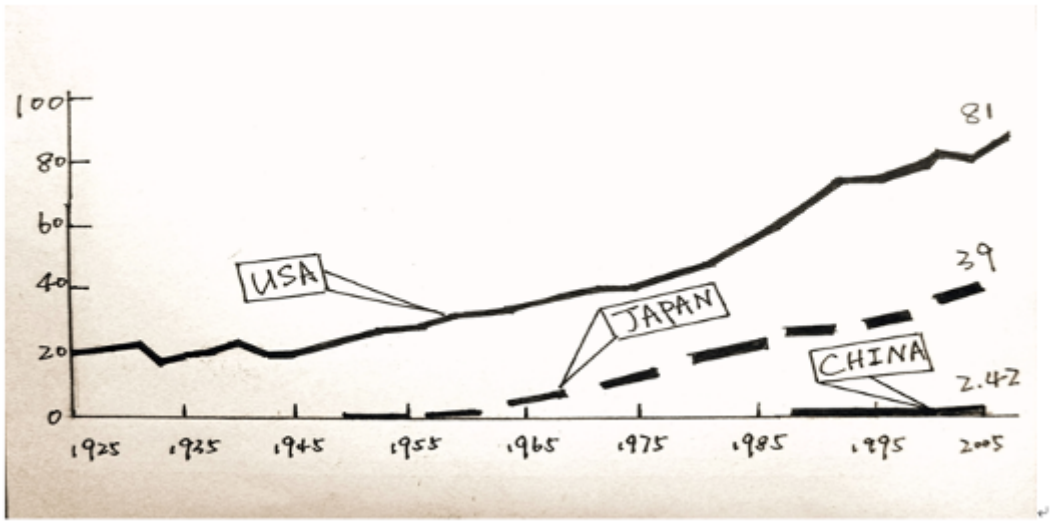



Chart 4.3 The number of car ownership of China, USA, Japan- one hundred people



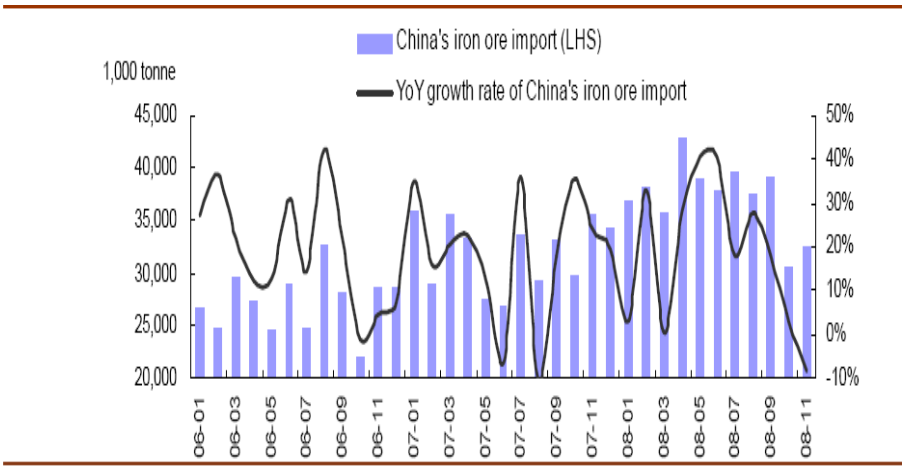

A few months ago, China put a four trillion fiscal policy which mainly talking about the infrastructure which need iron ore to build. These three charts reflecting the fact that we Chinese are developing countries and we are on the stage of urbanization, so we need a lot of iron ore to satisfy our need. So, it is obviously that we are hungry about the iron ore. The fact is the deep reason why three giants do not cut the price.

### 4.2.2 The current picture of Chinese iron ore market

Then we go back to the current picture. Iron ore is the biggest source of dry bulk shipping demand: China's iron ore imports dropped 8% year on year to 32.52mt in November 2008, the first monthly decline year to date. Imports rose 17.3% year on

year over January~November, flat with a year ago.

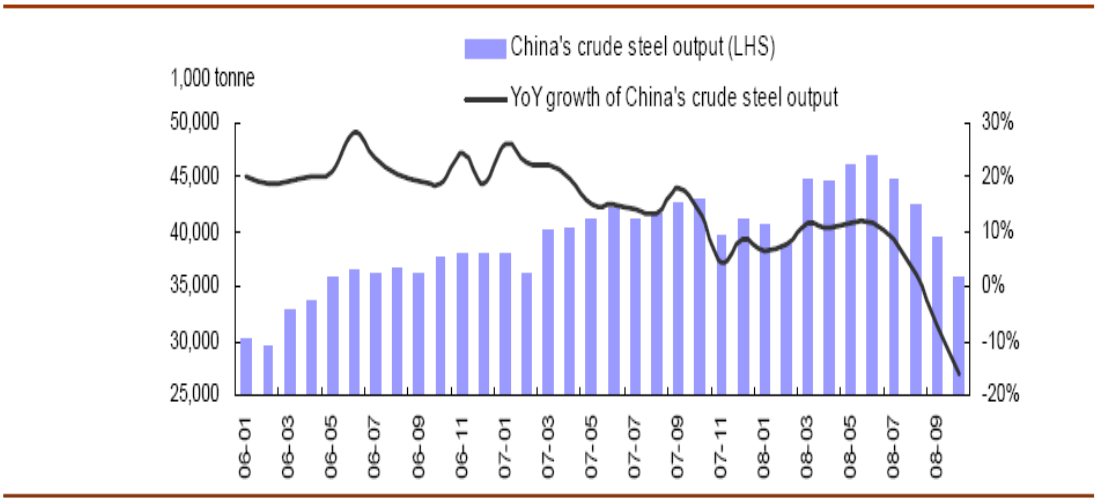
Chart4.4: China's monthly iron ore imports




Source: CEIC. CICC Research

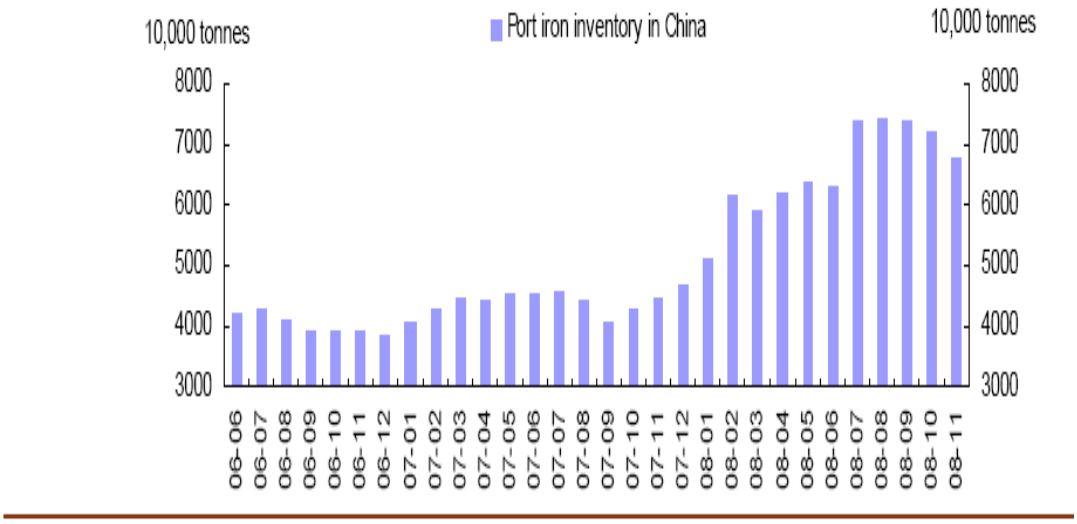
The reason behind the iron ore import slowdown was the moderated growth in China's crude steel output. With relevant data still unavailable, crude steel output is expected to continue the year on year contraction. China's steel output stayed low in forth quarter of 2008 due to production cuts. As the pace of iron ore imports slowed, iron ore inventories at ports have fallen from 75.46mt on September 5 to 65.98mt on December 8, but still 41% above year-beginning level.

Chart 4.5: China's monthly crude steel output



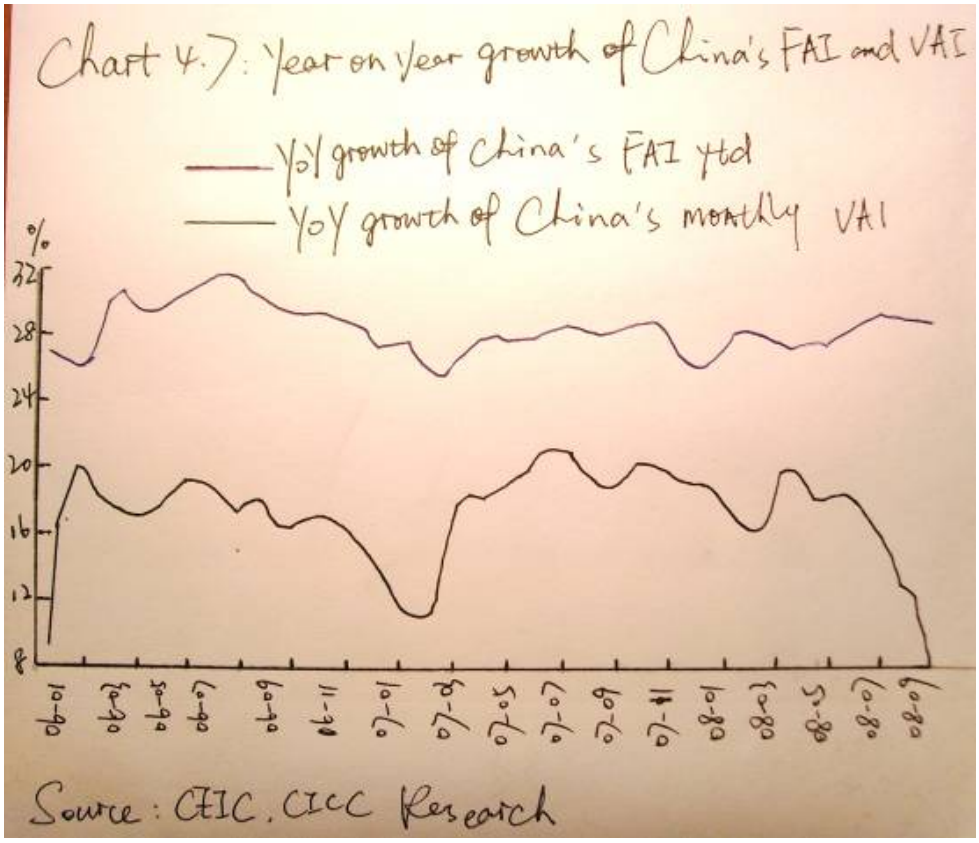

Source: CEIC, CICC Research

Chart 4.6: Monthly iron ore inventory at China's ports




Source: Bloomberg, CICC Research

In another way, China's FAI (fixed-asset investment) and industrial value-added growth is a mirror of the steel demand of domestic downstream industries (real estate, automobile, home appliance etc.), and furthermore, a mirror of China's iron ore import demand. Amid the weakening steel demand, the growth of China's crude steel output and iron ore imports has both slid significantly. China's urban FAI growth held up relatively well in nominal terms in the first 10 months this year. However, in real terms (that is, adjusted for inflation), urban FAI growth is projected to slow from 21.5% in 2007 to 15.3% in 2008 and further slip in 2009. Growth of industrial value added has slumped markedly. October growth at 8.2% YoY was 9.7ppt slower than the same period last year (Chart 4.7).




After we look deep into the current picture, we may have a different view compared to we skipping into the future. The demand (real estate, automobile, home appliance etc.), a mirror of China's iron ore import demand has no reason to keep pace with the old times.

**4.2.3The feature of the demand of Chinese iron ore**

1. The quality of domestic iron ore resources is very poor, so the quantity dwarfed by the demand

Although China's iron ore reserves is the forth of the world, but 90 percent of the reserves are low quality which can not satisfy the demand. Moreover, the exploiting high-grade mining is hard to find, which make the production cost is very high compared to import.

2. The import of iron ore is highly dependent on the foreign market

China is at a stage of industrialization, so the demand of iron ore enjoys the explosive growth resulting that we import a lot. And the places we import are mainly from

Australia and Brazil from which take 60 percent of the total goods we import.

3. Due to three giant companies CiaValedoRioDoee, RioTintople and BHPBillitonLtd monopolizes the market, the negotiations between them to talk about the price is on their side.

The three giants control the 2/3 of the world iron ore export, so they lead the price negotiations causing the prices fly to the sky. On the contrary, we import nearly half their export, what disappointing me is that we do not let the situation on our side.

The three features and both the future picture and the current picture can explain why the asking for cutting price in price negotiations is so hard. The complicated situation intrigue me to find the exactly number of demand, if I knew the exactly demand, then I have more power to control the negotiations. Therefore, I do some forecasting method to find.

## 4.3Forecasting

There are so many principles are used to summarize knowledge about forecasting. They cover formulating a problem, obtaining information about it, selecting and applying methods, evaluating methods, and using forecasts.

### 4.3.1 The structure of the forecasting

FORMULATING THE PROBLEM

1. Setting Objectives

Specify the objectives in the situation, and then consider what decisions relate to reaching those objectives. The issues in this section can help to decide whether it is worthwhile to use formal procedures to make forecasts.

2. Structuring the Problem

The problem should be structured so the analyst can use knowledge effectively and so that the results are useful for decision making.

OBTAINING INFORMATION

This section examines the identification, collection, and preparation of data to be used in forecasting.

3. Identify Data Sources

Identify data that might be useful in making forecasts. While this should be guided by theory, you may need creativity in seeking alternative types of data.

4. Collecting Data

Once you identify a source, collect relevant, valid, and reliable data

5. Preparing Data

Prepare data for the forecasting processes.

IMPLEMENTING FORECASTING METHODS

This section examines the selection and implementation of judgmental and quantitative methods. These tasks become more complex when policy decisions are involved. In some situations judgmental and quantitative methods should be integrated or their forecasts should be combined.

6. Selecting Methods

Select the most appropriate methods for making the forecasts. You can expect that more than one forecasting method will be useful for most forecasting problems.

7. Implementing Methods: General

Some principles are common to implementing all forecasting methods.

7.1 Keep forecasting methods simple.

7.2 The forecasting method should provide a realistic representation of the situation.

7.3 Be conservative in situations of high uncertainty or instability.

7.4 Do not forecast cycles.

7.5 Adjust for events expected in the future.

7.6 Pool similar types of data.

7.7 Ensure consistency with forecasts of related series and related time periods.

8. Implementing Methods

EVALUATION OF FORECASTING METHODS

When many forecasts are needed, you should compare alternative methods. The comparison should include accuracy and other criteria. Among these other criteria, it is of particular importance to properly assess uncertainty.

9. Evaluating Methods

The principles for evaluating forecasting methods are based on generally accepted scientific procedures

USING FORECASTS

10. Presenting Forecasts

- I want to give advice to the government on price negotiations
- I use forecasting methods to find the import quantity of iron ore to China on 2009 and 2010.
- The information I find is on the Chinese customs statistics and Drewry& Clarkson report
- The method I use is quantitative method.
- I choose three methods :moving average method , exponential smoothing, grey method
- I use mean square error as the standard to choose the best result.
- In order to improve the accuracy, I associate combining method and Delphi method.
- I presented this forecasts, upon the results, I make some suggestions to government.

### 4.3.2 Apply method

#### 4.3.2.1 Moving average

In statistics, a moving average, also called a rolling average and sometimes a running average, is used to analyze a set of data points by creating a series of averages of different subsets of the full data set. So a moving average is not a single number, but it is a set of numbers, each of which is the average of the corresponding subset of a larger set of data points.

A moving average can be applied to any data set, but is perhaps most commonly used with time series data to smooth out short-term fluctuations and highlight longer-term trends or cycles. The threshold between short-term and long-term depends on the application, and the parameters of the moving average will be set accordingly.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | the volume of iron ore imported in China | | | | | | 0.1 billion tonnes | |
| | year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| import volume | | 0.92 | 1.12 | 1.48 | 2.08 | 2.75 | 3.25 | 3.79 | 4.43 |

Formula

$$CA_i = \frac{x_1 + \cdots + x_i}{i}. \quad (4\text{-}1)$$

$$CA_{i+1} = \frac{x_{i+1} + iCA_i}{i+1}, \quad (4\text{-}2)$$

According to these calculations , I use spreadsheet to do the calculations

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | year | 0.1 billion tones | | Moving average forecast | | | |
| 2 | | | | | | | |
| 3 | 2001 | 0.92 | | | | | |
| 4 | 2002 | 1.12 | | | | | |
| 5 | 2003 | 1.48 | | | | | |
| 6 | 2004 | 2.08 | | 1.17 | AVERAGE(B3:B5) | | |
| 7 | 2005 | 2.75 | | 1.56 | AVERAGE(B4:B6) | | |
| 8 | 2006 | 3.25 | | 2.10 | AVERAGE(B5:B7) | | |
| 9 | 2007 | 3.79 | | 2.69 | AVERAGE(B6:B8) | | |
| 10 | 2008 | 4.43 | | 3.26 | AVERAGE(B7:B9) | | |
| 11 | 2009 | | | 3.82 | AVERAGE(B8:B10) | | |
| 12 | | | | 4.11 | AVERAGE(B9:B11) | | |
| 13 | MSE | | | 1.22 | SUMXMY2($B$6:$B$10,D6:D10)/COUNT(D6:D10) | | |

**4.3.2.2Exponential moving average**

An exponential moving average (EMA), sometimes also called an exponentially weighted moving average (EWMA), applies weighting factors which decrease exponentially. Formula:

The formula for calculating the EMA at time periods t > 2 is

$$S_t = \alpha \times Y_{t-1} + (1-\alpha) \times S_{t-1} \quad (4\text{-}3)$$

This formulation is according to Hunter (1986)[2]. The weights will obey α(1 − α)xYt − (x + 1). An alternate approach by Roberts (1959) uses Yt in lieu of Yt−1[3]:

$$S_{t,\,\text{alternate}} = \alpha \times Y_t + (1-\alpha) \times S_{t-1} \quad (4\text{-}4)$$

According to these calculations , I use spreadsheet to do the calculations

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | Exponential Smoothing forecast | | | | | | | | | | | | |
| 2 | year | 0.1 billion tones | | | | | | | | | | | | | |
| 3 | | | a=0.1 | a=0.2 | a=0.3 | a=0.4 | a=0.5 | a=06 | a=0.7 | a=0.8 | a=0.9 | | | | |
| 4 | 2001 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | |
| 5 | 2002 | 1.12 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | | |
| 6 | 2003 | 1.48 | 0.94 | 0.96 | 0.98 | 1.00 | 1.02 | 1.04 | 1.06 | 1.08 | 1.10 | 0.9*B5+0.1*k5 | | | |
| 7 | 2004 | 2.08 | 0.99 | 1.06 | 1.13 | 1.19 | 1.25 | 1.30 | 1.35 | 1.40 | 1.44 | 0.9*B6+0.1*k6 | | | |
| 8 | 2005 | 2.75 | 1.10 | 1.27 | 1.42 | 1.55 | 1.67 | 1.77 | 1.86 | 1.94 | 2.02 | 0.9*B7+0.1*k7 | | | |
| 9 | 2006 | 3.25 | 1.27 | 1.56 | 1.82 | 2.03 | 2.21 | 2.36 | 2.48 | 2.59 | 2.68 | 0.9*B8+0.1*k8 | | | |
| 10 | 2007 | 3.79 | 1.47 | 1.90 | 2.25 | 2.52 | 2.73 | 2.89 | 3.02 | 3.12 | 3.19 | 0.9*B9+0.1*k9 | | | |
| 11 | 2008 | 4.43 | 1.70 | 2.28 | 2.71 | 3.03 | 3.26 | 3.43 | 3.56 | 3.66 | 3.73 | 0.9*B10+0.1*k10 | | | |
| 12 | 2009 | | 1.97 | 2.71 | 3.23 | 3.59 | 3.84 | 4.03 | 4.17 | 4.28 | 4.36 | 0.9*B11+0.1*k11 | | | |
| 13 | | | | | | | | | | | | | | | |
| 14 | MSE | | 3.50 | 2.42 | 1.72 | 1.26 | 0.94 | 0.73 | 0.57 | 0.46 | 0.38 | SUMXMY2($B$6:$B$11,K6:K11) | | | |
| 15 | | | | | | | | | | | | /COUNT(K6:K11) | | | |
| 16 | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | |

#### 4.3.2.3 Grey method

The core of the grey method is: add the discrete raw figures cumulatively to become a grey model, which can turn the fluctuating time series figures into the figures becoming monotonic rising and exponential. Then we build differential equation to forecast.

The following routes are :

1. Add the raw datas cumulatively

$$X^{(1)} = \left\{x_1^{(1)}, x_2^{(1)}, \ldots\ldots x_{n1}^{(1)}\right\}$$

$$x_i^{(1)} = \sum_1^i x_j^{(0)} \qquad (4\text{-}5)$$

2. Build the Data Matrix X and Data vector Y

$$X = \begin{bmatrix} -\frac{1}{2}\left(x_1^{(1)} + x_2^{(1)}\right) & 1 \\ -\frac{1}{2}\left(x_2^{(1)} + x_3^{(1)}\right) & 1 \\ \vdots & \vdots \\ -\frac{1}{2}\left(x_{n-1}^{(1)} + x_n^{(2)}\right) & 1 \end{bmatrix}$$

$$Y = \begin{bmatrix} x_2^{(0)} & x_3^{(0)} & \cdots & x_n^{(0)} \end{bmatrix}^T \qquad (4\text{-}6)$$

3. Use least square method to calculate a&b

$$\hat{B} = \begin{pmatrix} a \\ b \end{pmatrix} = \left(X^T X\right)^{-1}\left(X^T Y\right) \qquad (4\text{-}7)$$

4. Build differential equation

$$x_{i+1}^{(1)} = \left(x_1^{(0)} - \frac{b}{a}\right)e^{-ai} + \frac{b}{a} \qquad (4\text{-}8)$$

I use differential equation to forecast, the we use the formula

$$x_i^{(0)} = x_i^{(1)} - x_{i-1}^{(1)} \qquad (4\text{-}9)$$

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | x1 | | | | | | | | |
| | year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| 0.1 billion tone | | 0.92 | 1.12 | 1.48 | 2.08 | 2.75 | 3.25 | 3.79 | 4.43 |
| | x2 | | | | | | | | |
| cumulative data | | | | | | | | | |
| | | 0.92 | 2.04 | 3.52 | 5.6 | 8.35 | 11.6 | 15.39 | 19.82 |
| | | | | | | | | | |

According to these datas and these formulas, I use Matlab software to calculate (MATLAB software is a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and Fortran)

```
clc, clear, close all;
x1=[0.92 1.12 1.48 2.08 2.75 3.25 3.79 4.43];
x2=[0.92 2.04 3.52 5.6 8.35 11.6 15.39 19.82];

X=[-0.5*(x2(1)+x2(2)) 1
    -0.5*(x2(2)+x2(3)) 1
    -0.5*(x2(3)+x2(4)) 1
    -0.5*(x2(4)+x2(5)) 1
    -0.5*(x2(5)+x2(6)) 1
    -0.5*(x2(6)+x2(7)) 1
    -0.5*(x2(7)+x2(8)) 1];

Y=x1(2:8).';

B=inv(X.'*X)*(X.'*Y);

a=B(1);
b=B(2);

x3=zeros(1,10);
for i=1:9
    x3(i+1)=(x1(1)-b/a)*exp(-a*i)+b/a;
end

x3=x3(2:10);

% the first figure of x4 corresponding with the third figure of x3
x4=zeros(1,8);
for i=1:8
    x4(i)=x3(i+1)-x3(i);
end

e=zeros(1,6);
for i=1:6
    e(i)=x4(i)-x1(i+2);
end
```

And then the outcomes are

```
Command Window
File  Edit  Debug  Desktop  Window  Help
a =

   -0.2032

>> b

b =

    1.0492

>> x1

x1 =

    0.9200    1.1200    1.4800    2.0800    2.7500    3.2500    3.7900    4.4300

>> x2

x2 =

    0.9200    2.0400    3.5200    5.6000    8.3500   11.6000   15.3900   19.8200

>> x3

x3 =

    2.2907    3.9702    6.0281    8.5497   11.6395   15.4253   20.0642   25.7482   32.7129

>> x4

x4 =

    1.6795    2.0579    2.5216    3.0897    3.7859    4.6389    5.6840    6.9647
```

X4 is the data from the year 2003 that forecasted

| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | | | x1 | x4 | |
| 2 | | 2003 | 1.48 | 1.6975 | |
| 3 | | 2004 | 2.08 | 2.0579 | |
| 4 | | 2005 | 2.75 | 2.5216 | |
| 5 | | 2006 | 3.25 | 3.0897 | |
| 6 | | 2007 | 3.79 | 3.7859 | |
| 7 | | 2008 | 4.43 | 4.6389 | |
| 8 | ▮SE= | | | 0.02822 | |
| 9 | SU▮X▮Y2(C2:C7,D2:D7)/COUNT(D2:D7) | | | | |
| 10 | | | | | |

**(0.1 billion tones)**

After I used three methods , we find different methods having different MSE, and I try to use MSE as the criteria to find the best methods

#### 4.3.2.4Mean squared error

In statistics, the mean squared error or MSE of an estimator is one of many ways to quantify the amount by which an estimator differs from the true value of the quantity being estimated. As a loss function, MSE is called squared error loss. MSE measures the average of the square of the "error." The error is the amount by which the estimator differs from the quantity to be estimated. The difference occurs because of randomness or because the estimator doesn't account for information that could produce a more accurate estimate.

Definition and basic properties

The MSE of an estimator $\hat{\theta}$ with respect to the estimated parameter θ is defined as

$$\mathrm{MSE}(\hat{\theta}) = \mathrm{E}((\hat{\theta} - \theta)^2). \quad (4\text{-}10)$$

The MSE can be written as the sum of the variance and the squared bias of the estimator

$$\mathrm{MSE}(\hat{\theta}) = \mathrm{Var}(\hat{\theta}) + \left(\mathrm{Bias}(\hat{\theta}, \theta)\right)^2. \quad (4\text{-}11)$$

#### 4.3.2.5Applications

Minimizing MSE is a key criterion in selection estimators. Among unbiased estimators, the minimal MSE is equivalent to minimizing the variance, and is obtained by the MVUE.

In statistical modelling, the MSE is defined as the difference between the actual observations and the response predicted by the model and is used to determine whether the model does not fit the data or whether the model can be simplified by removing terms.

Above all, when I use the grey method, I can find the minimum MSE, so I choose the grey method as the best forecasting method,

| 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| 1.6975 | 2.0579 | 2.5216 | 3.0897 | 3.7859 | 4.6389 | 5.684 | 6.9647 |

**(0.1 billion tones)**

Through the grey method, we can forecast that China will import **586.4**Million tones in 2009 and 696.47 million tones in 2010.

In order to improve accuracy, then I try another method.

### 4.3.3 Combining Forecasts

In these days, when we do forecast, we always use combining forecasts.

By combining forecasts, you can incorporate more information than you could with one forecast. Combining also reduces risk due to effects of bias associated with a single method. Armstrong (2001) summarizes evidence from 30 empirical comparisons. Combining always reduced the error from the typical method. The average error reduction was 12.5 percent.

1 Combine forecasts from approaches that differ.

Description: Use forecasts drawn from different methods or data.

Purpose: To improve forecast accuracy.

Conditions: The situation must permit the use of more than one reasonable forecasting method. Combining independent methods produces greater benefits than combining similar ones, but even similar methods produce gains in accuracy.

2 Use many approaches (or forecasters), preferably at least three.

Description: The gain from adding more than three approaches decreases rapidly while costs increase.

Purpose: To improve accuracy.

Conditions: The situation must permit a range of reasonable approaches from which to choose.

3 Use formal procedures to combine forecasts.

Description: Specify the combining procedures before preparing the forecasts.

Purpose: To improve forecast accuracy.

Conditions: Formal procedures are important when some outcomes may be undesirable to the forecaster.

4 Start with equal weights.

Description: Equal weighting of forecasts is best in many situations.

Purpose: To improve forecast accuracy.

Conditions: Starting with equal weights is important when you are uncertain about the situation (low domain knowledge) or about the best forecasting method.

5 Use domain knowledge to vary weights on component forecasts.

Description: Ask domain experts, preferably a number of them, to assign weights to component forecasts.

Purpose: To improve forecast accuracy.

Conditions: The experts must have good domain knowledge and they should not be subject to obvious biases.

6 Combine forecasts when there is uncertainty about which method is best.

Description: Combining helps as long as each component has some predictive validity.

Purpose: To improve forecast accuracy.

Conditions: Combining improves accuracy (in comparison with typical forecasts) under nearly all conditions.

7 Combine forecasts when you are uncertain about the situation.

Description: When there is much uncertainty in the situation to be forecast, combining

is of potentially greater value.

Purpose: To improve forecast accuracy.

#### 4.3.3.1 Start with equal weight

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | 2009(million tons imported) | | |
| 2 | Moving average method | | | | | 382 | | |
| 3 | Exponential moving average | | | | | 436 | | |
| 4 | Grey method | | | | | 568 | | |
| 5 | | | | | | | | |
| 6 | | Start with equal weight | | | | | | |
| 7 | | | weight | 0.33 | | | | |
| 8 | | | | | | | | |
| 9 | | Combining forecast result | | | | 462 | F2*D7+F3*D7+F4*D7 | |
| 10 | | | | | | | | |

#### 4.3.3.2 Use domain knowledge to vary weights on component forecasts

Now, I associate Delphi method with combining forecast to do the forecast.

**a.Delphi method**

A technique to arrive at a group position regarding an issue under investigation, the Delphi. This method consists of a series of repeated interrogations, usually by means of questionnaires, of a group of individuals whose opinions or judgments are of interest. After the initial interrogation of each individual, each subsequent interrogation is accompanied by information regarding the preceding round of replies, usually presented anonymously. The individual is thus encouraged to reconsider and, if appropriate, to change his previous reply in light of the replies of other members of the group. After two or three rounds, the group position is determined by averaging.

**b.forecast**

I ask professor ZhenHong to give the weight about these three methods and do the forecast

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | 2009(million tons imported) | | | |
| 2 | **Moving average method** | | | | | 382 | | | |
| 3 | **Exponential moving average** | | | | | 436 | | | |
| 4 | **Grey method** | | | | | 568 | | | |
| 5 | | | | | | | | | |
| 6 | | **Vary weight** | | | | | | | |
| 7 | Moving average method weight | | | | 0.1 | | | | |
| 8 | Exponential moving average weight | | | | 0.2 | | | | |
| 9 | Grey method weight | | | | 0.7 | | | | |
| 10 | | | | | | | | | |
| 11 | | **Combining forecast result** | | | | 523 | F2*E7+F3*E8+F4*E9 | | |
| 12 | | | | | | | | | |

The result is 523 million tones.

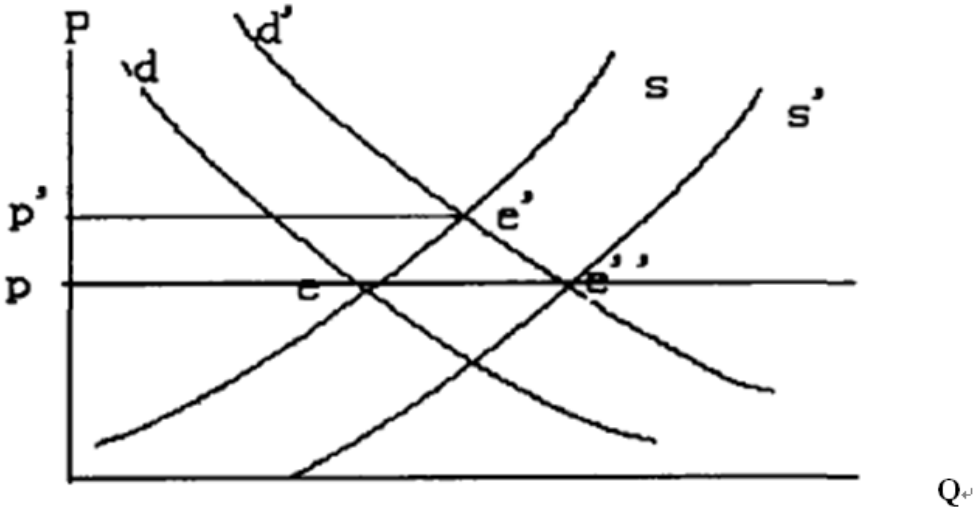
## 5. Suggestions to the government about the price negotiations

The iron ore price is resulted by the pure competition and imperfect competition, the pure competition is that the production cost of the iron ore and the market equilibrium. The imperfect competition refers to the oligopoly and monopoly competition. Nowadays, the strong demand of iron ore market is the deep reason for the higher price, moreover, the fact that the increase rate of the price is not reasonable is caused by the monopoly competition. So I try to analyze the price with economic theory.

### 5.1 The analysis of the fair competition of the iron ore market

#### 5.1.1 Market Equilibrium

**Chart 5.1: Market Equilibrium**




Demand (d) shows how buyers respond to changes in price and other variables that determine quantity buyers are willing and able to purchase. Supply(s) shows how sellers respond to changes in price and other variables that determine quantity offered for sale.

In the ideal situation, there are no outside influences that prevent price from bid up or

down, an equilibrium price and quantity is attained. The equilibrium price is that price at which quantity demanded is equal to quantity supplied.

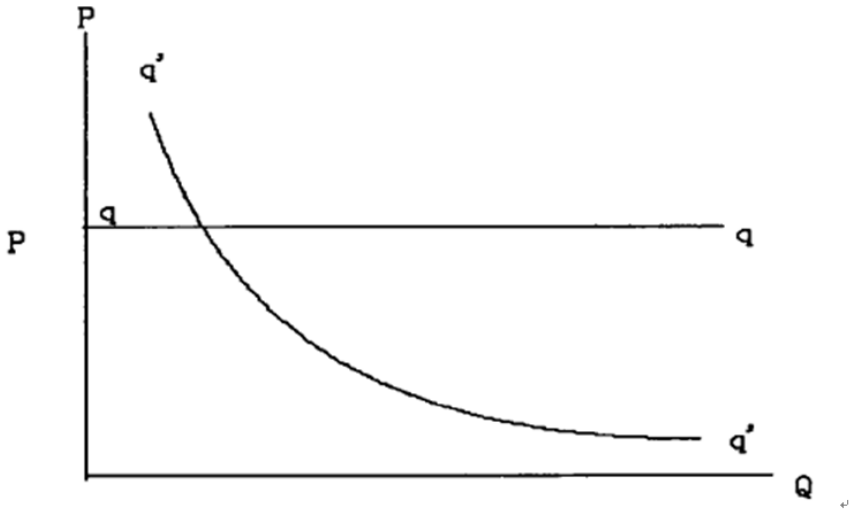
When the current price is above the equilibrium price, quantity supplied exceeds quantity demanded.(d' s s'). The resulting excess supply induces sellers to reduce price in order to sell the surplus. If the current price is below equilibrium, quantity demanded exceeds quantity supplied. The resulting excess demand causes the unsatisfied consumers to bid up price.(d s d')

Since prices below equilibrium are bid up by consumers and prices above equilibrium are lowered by producers, the market will converge to the equilibrium price-quantity combination.

In reality, the variables held constant when deriving demand and supply curve do change. Consequently, demand and supply curves shift, and equilibrium price and quantity change.

However, the above situation is not the world look like.

**Chart 5.2: The pure competition and imperfect competition**




In the pure competition, each company's demand curve (q_q) is horizon, each company's production can not affect the market price. In the imperfect competition (q'_q'), the market price can be affected by one company's production.

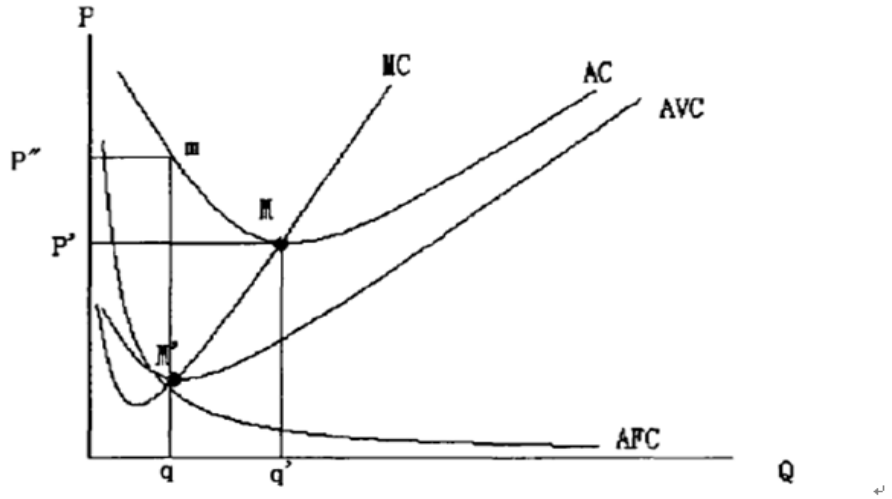
Nowadays, the world iron ore market is imperfect, and we called it oligopoly.

### 5.1.2 Oligopoly

An oligopoly market consists of a few relatively large firms that have moderate to substantial market power and, most importantly, recognize their mutual interdependence. Mutual interdependence means that the actions of any one firm in the market will have an effect on the sales and revenues of other firms. Each firm knows that its actions or changes will have such an effect and that the other firms will, in response, take actions or make changes that will affects its sales.

The reason for oligopoly is that other company can not be in the market.

**Chart 5.3: The cost of the product**




The cost P'' (AC=Q) must be less than the current price of iron ore, or the company will lose.

M ( MC=AC) is the minimum cost. When some iron ore countries can product q', the cost is at the bottom (p'). When they are at the bottom cost (p'), the company can survive even the price of iron ore is very low (only higher than the p'). In other way, there will be no other companies to coming into the marker for the simple reason that other companies cost is at (p'') higher that the (p') Therefore, enlarging their scale to q' is the best way to keep them in the oligopoly market.

| Table 5.1 | | | |
|---|---|---|---|
| 2005 The world main iron ore countires production (million tonnes) | | | |
| company | country | production | % or the world |
| 1 Cia Vale do Rio Doee | Brazil | 240.8 | 18.50% |
| 2 Rio Tinto ple | England | 122.3 | 9.40% |
| 3 BHP Billiton Ltd | Australia | 112.3 | 8.60% |
| 4 State of India | India | 56.0 | 4.30% |
| 5 Gazmetall | Russia | 39.3 | 3.00% |
| 6 Kumba Resourees | S.Africa | 33.5 | 2.60% |
| 7 Cleveland—CliffSIne | USA | 32.1 | 2.50% |
| 8 Mittal Group | England | 27.0 | 2.10% |
| 9 LKAB | Sweden | 23.3 | 1.80% |
| 10 Mitsui & Co Ltd | Japan | 23.0 | 1.80% |
| 11 Ferrominera | Venezuela | 22.1 | 1.70% |
| 12 US Steel Corp | USA | 20.3 | 1.60% |
| 13 Evraz Group | Russia | 17.6 | 1.30% |
| 14 Anshan Iron & Steel | China | 15.3 | 1.20% |
| 15 Inguletsky GOK | Ukraine | 13.5 | 1.00% |
| Top fifteen | | 798.0 | 61.10% |
| Total world | | 1305.0 | 100% |
| Soure: World Metal Newspaper | | | |

We can see from the above table that top fifteen companies take 61.10% of the whole world iron ore production.

### 5.2 Suggestion

In the second chapter, I analyze the current situation of world dry bulk market, I discover that a lot of Chinese factors in the four freight market. In the third chapter, I analyze the dry bulk shipping market in terms of demand and supply; in demand, the Chinese factor is everywhere, we are at a stage of urbanization and we have a lot of rural people, so we need a lot of infrastructures to meet their need. But I do not agree with the other people thought that the Chinese factor can bring another boom just like these days in Baltic dry index. I make a conclusion that the gap between supply and demand will become larger and larger. Then I have a negative view about the dry bulk shipping market. On the forecasting part, I try to find out the exact number of Chinese factor on iron ore market. I make out some results about how much volume China will import in 2009. The first method I used is to choose the best result upon the mean square error standard. The second method I used is associate combining forecast with Delphi. The two results are 586 and 523 million tones. On the drewry report, they forecast that the iron ore seaborne trade in 2009 is 780 million tones. So we import

about 2/3 of the whole trade. I still pointed out that the expectation we will still import a lot is the main reason three giants can make large profits by their big scale. Therefore, if we look deep into the negotiations, we can find that if we China do not import, their scale will become smaller, furthermore, more companies will enter the market which making the market becoming the pure competition market. However, it is childish to think that China will not import iron ore.

Therefore, I put the suggestion to the government that the best way for us to deal with this price negotiation is we can change our structure of development; the infrastructure is too much for our environment and people to bear, if the need for iron ore is not so urgent, then the power to bargain is on our side, because their large scale is their life.

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