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The Development of Shipping-Related Derivatives Markets in Shanghai/Pudong

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Executive Summary

'Derivatives' is a general term used to define a wide class of financial instruments that derive their price or have their value linked to some other asset according to certain conditions. In companies, their main usage is for risk management and hedging, i.e. the provision and dealing of situations which could lead to a decline of the value of a firm arising from events or various factor changes that may influence expected cash flows. This, however, does not exclude other purposes, such as pure speculation by the financial management of the shipping companies or to increase overall leverage of firms in various positions it may traditionally have.

The international derivative products trading volume is increasing exponentially worldwide. The notional amount of interest rate derivatives outstanding was \$426.8 trillion at year-end 2009, an increase of 3 percent compared to \$414.1 trillion at mid-year 2009. For the year as a whole, interest rate derivatives notional value went up 6% from \$403.1 trillion in 2008 (source: ISDA). According to The Bank of International Settlements in Basel, Switzerland, it is estimated that the total bets in all derivative classes from commodities options to credit swaps reached \$604 trillion worldwide at the end of June 2009.

Traditional speculators, hedgers (sellers of futures contracts), consumers (buyers of futures contracts), as well as institutional investors and financial institutions are trading Over The Counter (OTC) and Exchange traded derivative contracts providing liquidity to the system: they are all essential for its preservation.

Specifically in shipping, there are both over-the-counter (OTC) and exchange traded derivatives, for "exotic" and "plain" types, used for hedging or speculating on interest rates, commodity prices, freight rates, and other sources of risk. Ship owners, charterers and other parties involved in shipping mainly use all these instruments and mostly specialized freight derivatives for risk-management. For example, if a shipping company operates in the wet or dry market, exposure to unanticipated fluctuations is highly unwanted either on the cost or the revenue side, which explains the importance of forward freight agreements (FFA) and forward bunker contracts. In the same manner, shipyards with shipbuilding projects use interest rate based financial instruments for hedging the risk rising from exchange rate fluctuations. These are also adopted by traditional west based shipping companies expanding their fleet or shipyards, the vast majority of which are located in the east. Commodity derivatives are also important to shipping firms engaging in trading, when they use contango in oil-storage trading, or using futures contracts trading raw materials besides conducting the traditional trading business. Finally, listed shipping companies may use both shipping based but also traditional derivative products for hedging or profit making.

China constitutes the second largest economy worldwide and will most probably become number one economic superpower in the next one or two decades, while Shanghai's equity market is the world's

third largest stock market by market capitalization. Shanghai Futures Exchange was ranked the world's tenth-largest derivative exchange by contract volume in 2009. In order that Shanghai grow as a most influential international financial center, the derivatives market of the city must be further enhanced, globalized and enriched with new asset classes and rival directly with the American (CME Group) and European (Eurex) counterparts. Given that China represents an enormous market, where capital controls are gradually lifted, the strategic significance of the organization of derivatives market is enormous and it can no longer be a sole privilege of certain western sectors.

The main objective of this study is the viability analysis for the introduction of new financial derivative products for the shipping sector in the Shanghai/Pudong based market. The study reviews the current status of derivative products in Shanghai (including the newly proposed box derivatives by the Shanghai (Export) Containerised Freight Index (SCFI)) and in the international markets. It also reviews the current regulation, opportunities and limitations and suggests reforms in the framework and industry. It also reviews shipping related products available worldwide.

The study continues by assessing the potential for the introduction of additional derivatives classes in the Shanghai derivatives market (e.g., regarding credit risk interest rates, commodities) as well as the potential role that existing large Chinese financial institutions should play. It suggests changes in the trading of standardized and OTC derivatives that maximize liquidity / depth of the market by symmetrically stimulating interest from the buy side and sell side (meaning ship owners, liner companies, exporters, as well as “traditional speculators” should be equally represented in this exchange).

The eventual aim is to allow Shanghai / Pudong to differentiate both in China and in the international markets through the establishment of shipping related derivatives that are novel not only in China but also in the rest of the exchanges of the Pacific region and thus attract Chinese and other Asian clients from the Europe based exchanges to a new truly globalized trading center. The creation of this new class of contracts should be so executed that it will eventually protect investors from risk proportionally more than it rewards speculators.

The present study begins with the characteristics of shipping derivatives, their purpose and applications i.e. risk management - hedging and speculation, inherent major credit risk issues for OTC products, and the classification of different types which are mainly used for freight derivative contracts: forwards, futures, and forwards. Similarities and peculiarities for these similar financial instruments are briefly described.

Next, other useful OTC products for the shipping sector are presented, which however are not widely used, their importance is so far secondary compared to the quite popular freight derivatives, namely Bunker Price Derivatives, Sale and Purchase Forward Agreements (SPFAs), Vessel Value Derivatives, Vessel Scrapping Price Derivatives, which appeal to specialized hedging needs of the market.

Subsequently, we briefly deal with widely adopted shipping freight indices: the Baltic Dry Index, Baltic Capesize Index (BCI), Baltic Panamax Index (BPI), Handysize Index (BHSI), Baltic Tanker Dirty Index, and

Baltic Tanker Clean Index. It is emphasized how these are under revision, lately, so that they better reflect the evolving nature of global shipping.

The role of market participants, i.e brokers, shipping finance banking units, and regulators, such as the Financial Services Authority (FSA) and the International Swap and Derivatives Association (ISDA) is the theme of the next section. A special focus is then made on market leader companies, exchanges and associations in shipping derivatives trading / brokerage / market making / research / market clearing: IMAREX, NOS, NYMEX, Platts Price Assessments, London Clearing House Clearnet (LCH.Clearnet), SSY Brokers, Singapore Exchange (SGX), FFABA, FREIGHT INVESTORS SERVICES, and the Baltic Exchange.

In a separate, section we present past case studies on failures in international derivatives trading in other markets which must be taken into consideration, when designing new derivatives markets, as history tends to repeat itself in a similar, ironic matter.

In this context, the CDS crisis in the U.S., liquidity problems and failures in freight derivatives (BIFFEX case), a problematic time period for shipping derivatives, and the oil futures bubble of 2009 are indicatively addressed.

The section closes with observed market manipulation phenomena, and cornering / distortion problems in commodities derivatives which particularly impacted the gold (right now) and silver markets (in the past).

A special section is dedicated to Container derivatives and their viability potential after their introduction in the Shanghai derivatives market. Although China has made remarkable progress in financial innovation in the last 20 years, it still lags behind in shipping derivatives trading. The container derivatives are a brilliant opportunity for Shanghai to enter this market. We thus analyze the present status quo in China regarding the domestic attitude toward freight derivatives, the recent developments in Shanghai Shipping Exchange, the current state of Containers freight derivatives and how these could offer significant advantages to container shipping market participants who until now had only carrier contracts as eligible hedging tools.

The following section deals with the required regulatory framework in China which must be compatible with recent international reforms. These are now introduced, due to the financial overhaul of the Dodd-Frank Act in the USA and trigger important transformations in the OTC markets, and Clearing Houses. In this context, specialized topics on clearing and margins, liquidity, electronic trading platform and market resuscitation after extreme events are presented. Since the last global financial meltdown these issues have been high in the agenda of regulators / market makers and are constantly under scrutiny and debated. This will continue also in the forthcoming years. If Shanghai/Pudong wish launch a new shipping derivatives market, they will have to at some point address these issues taking into account the latest developments in these fields.

In the final sections, recommendations on the potential market segments that a future shipping derivatives market in Shanghai could control: the introduction of an organized exchange in SPFA through standardized contracts, or as OTC instruments is proposed. Furthermore, we explain the profitable role

of OTC market making for IMAREX, as it accounts for the largest part of the revenues of this major shipping derivatives broker. Thus, we focus on the importance of OTC markets, which have been demonized in the last years. The necessity of building an extended network of highly competent freight derivatives brokers, with international alliances is presented, as well as ideas about how to develop domestic and foreign demand for freight derivatives traded in Shanghai/Pudong.

We further expose issues on clearing houses and propose a consolidated Chinese / Pacific region clearing house, with market exposure to all securities markets that could be backed by the Central Bank of China.

Finally, propositions are made on introducing new bulk indexes and financial innovation through longer maturities of derivative products, following the LEAPS model and Exotic option structures in new derivative products traded OTC, or as standardized contracts: lookback / range / binary / barrier options.

In the appendix section, we present the current state of the market in terms of covered voyage routes through various freight derivative products (standardized contracts) on different trading platforms in the tanker, dry bulk, and in the new born container freight derivatives and oil derivatives market.

Table of Contents

Executive Summary.....	3
1 Introduction	9
2 World Shipping Derivatives Aspects	11
2.1 Types of Derivatives Linked To Freight Rates: Freight Futures and Forward Contracts	11
2.1.1 Forward Contracts.....	12
2.1.2 Futures Contracts.....	13
2.1.3 Comparison of Futures and Forwards.....	13
2.1.4 Freight Forward Agreements	14
2.1.5 Status-quo in Freight Forward Agreements.....	15
2.1.6 The use of Bunker Price Derivatives	15
2.1.7 The use of Vessel Value Derivatives.....	16
2.1.8 Sale and Purchase Forward Agreements (SPFAs)	16
2.1.9 Vessel Scrapping Price Derivatives.....	17
2.2 Linked Indices for Freight Rate Derivatives	17
2.2.1 Baltic Dry Index (BDI)	17
2.2.2 Baltic Panamax Index (BPI).....	18
2.2.3 Baltic Capesize Index (BCI)	18
2.2.4 Baltic Handysize Index (BHSI).....	18
2.2.5 Baltic Tanker Dirty Index (BDTI)	19
2.2.6 Baltic Tanker Clean Index (BTCI)	19
2.3 The Market Participants.....	20
2.3.1 Brokers	20
2.3.2 Shipping Finance Banking Units	20
2.3.3 Regulators: the Financial Services Authority (FSA) and the International Swap and Derivatives Association (ISDA)	21
2.3.4 International Maritime Exchange (IMAREX)	21
2.3.5 Norwegian Futures and Options Clearing House (NOS)	22
2.3.6 New York Mercantile Exchange (NYMEX)	23
2.3.7 Platts Price Assessments	23
2.3.8 London Clearing House Clearnet (LCH.Clearnet)	23
2.3.9 SSY Brokers.....	24
2.3.10 Singapore Exchange (SGX)	24
2.3.11 Freight Forward Freight Agreement Brokers Association (FFABA).....	25
2.3.12 Freight Investors Services (FIS)	25

2.3.13	The Baltic Exchange	26
3	Case Studies in History of World Shipping Derivatives Trading	27
3.1	The CDS Crisis Case	27
3.2	The BIFFEX Case - Liquidity Problems and Failures in Freight Derivatives Past Problematic Time Periods	27
3.3	The Case of Oil Futures Bubble Of 2009	28
3.4	The Case of Gold & Silver Commodities.	29
4	Shanghai/Pudong Shipping Derivatives Status and Recommendations.....	31
4.1	The Present Status-Quo in China	31
4.1.1	Status-Quo in the Shanghai Shipping Exchange	31
4.1.2	Status-Quo in Shanghai's Container Freight Derivatives	33
4.2	Recommendations for a New Compatible Framework in China / Shanghai	35
4.2.1	Implications of Dodd-Frank Act	35
4.2.2	Over the Counter Regulatory Reforms	35
4.2.3	Clearing House Issues.....	36
4.2.4	International Trends in Clearing Houses.....	37
4.2.5	Electronic Trading Platform Issues.....	37
4.2.6	Liquidity and Clearing Issues for the New Derivatives Market	38
4.2.7	Clearing and Margin Issues	40
4.2.8	Market Resuscitation after Extreme Events	40
4.3	Additional Recommendations.....	41
4.3.1	Introduction of an Organized Exchange in Sale & Purchase Forward Agreements (SPFAs) 41	
4.3.2	The Profitable Role of OTC in Trading for IMAREX, and the Importance of OTC Markets and freight Derivatives Brokers	41
4.3.3	Development of Domestic and Foreign Demand for Freight Derivatives.....	42
4.3.4	A Consolidated Chinese / Pacific Region Clearing House	43
4.3.5	Recommendations on New Bulk Indices.....	44
4.3.6	On Longer Maturities of Derivative Products (The LEAPS Paradigm).....	45
4.3.7	Exotic Option Structures in New Derivative Products	46
4.3.8	Introducing Container Derivatives Vis-a-vis Carrier Contracts	47
	References.....	48
5	APPENDIX.....	50

1 Introduction

Derivatives were devised and implemented as a countermeasure to protect businesses and investors from sharp price movements in markets, foreign exchanges, freight rates, interest rates, raw materials and various other underlying economic variables/factors. Generally, derivatives were created to cover the needs of hedgers. The most popular derivatives contracts are a) Forward contracts, b) Future contracts, c) Swap contracts and d) Option contracts. Derivative markets are functioning in a way that risks (price risks, such as freight rates in the shipping industry) are transferable. Thus, individuals are divided into two classes, those who are willing to bear the risks and those who wish to eliminate it. Derivatives in shipping industry are used from a risk management perspective in order to maintain the cash-flows within acceptable price ranges and curb the potential loss of income.

On the other hand, speculators are parties that will gladly undertake the risk, which the hedgers wish to minimize, in exchange for a higher than usual likely profit. Therefore, they frequently have appetite for high risks with a view to a fast and large gain, when they believe that a wager has high chances of success, but this does not mean that speculators do not implement risk management methods in their equity allocation.

The modern derivatives markets are more convenient for speculating than risk management, indicated by the vast majority of the transactions taking place in the derivatives markets. The features that make derivatives markets ideal for placing bets and speculating in general are high market liquidity, small transactions fees, ability to short the market, to profit from a market decline and high allowed leverage ratios.

Derivatives traders are facing additional risks in their operations. The credit risk involved, which mainly derives from the inability of the counterparties to make payments, has deep implications on banks as well as other financial institutions. Credit risk is comprised by a number of risks, from which the most significant and recognizable is the risk of default. The risk of default comes in two main forms of credit risk, the form of default, which means that the counterparty fails to meet their financial obligations, and a lighter version where the counterparty only appears to have creditworthiness problems, since the counterparty's creditworthiness drops after bad reviews of credit agencies, and therefore the market price of their issued securities suffers a "haircut". Additionally, credit risk combines the market risk of the contracts and the likelihood for a bad credit event such as default to take place. Hence, there are several technical issues emerging when attempting to approximate credit risk. In other words, it is difficult to calculate the probability of default of a bad credit event or alternatively, compute the recovery rate. Moreover, it must be taken into account that in the event of a default there is an expected loss, known as loss given default (or credit exposure), which should be also assessed a priori. The estimation of loss given default is a function of the features of the derivative contract. Nevertheless, the calculation of credit risk brings has some complications: First of all, the default probability is a theoretical concept. On the other hand, there is a positive relationship between time and credit exposure in a derivative contract. The credit risk increases as the contract's maturity prolongs, however

the credit risk usually drops through the passage of time, when the counterparty manages to make periodic cash-flow payments on contracts. Finally, when options are sold to counterparties, the only undertaken risk is the settlement risk at the expiration (delivery).

In OTC contracts, the counterparty credit risk is always present. Due to the fact that the vast majority of FFA contracts implicate firms as counterparties of unknown creditworthiness, as no credit rating agency covers them, so credit risk is significant. Especially in shipping, firms are characterized by their secretive behavior. In order to curb credit risk in OTC FFA contracts, three measures have been developed. The first solution approaches the problem by modifying accordingly the terms and agreements of the FFABA contract form. Since 2002, two revisions of this contract form have been publicized; but the revised forms were not accepted by the market participants. Banks and financial institutions resort to the ISDA master agreement over the FFABA 2002 and 2005 forms. The second approach attempts to assess the creditworthiness of FFA counterparties. Prior to FFA trading, it is important to develop risk management control processes compatible to any form of institution, in order to have some sort of financial regulation for OTC contracts. Further, market participants in association with brokers should adopt an accept/reject mechanism based on the counterparty's credit rating, in order to minimize severe losses and default in the event of highly speculative contracts leading to large payments. The third one simply implements a clearing process of FFA contracts via a clearing house. In this case, i.e. the clearing house is acting in as the so called central counterparty and undertakes the entire credit risk.

The Basel Committee also dictates directives for OTC off balance-sheet contracts which have to be transformed into on-balance-sheet contracts using a so-called credit-equivalent amount, i.e. current exposure, which amounts to the replacement cost of the contract (market/liquidation price during valuation), and is a function of discount rates taken from forward rate curves incremented by the potential exposure, i.e. expected replacement cost in the future.

2 World Shipping Derivatives Aspects

2.1 Types of Derivatives Linked To Freight Rates: Freight Futures and Forward Contracts

There are basically three types of freight derivatives, classified as follows:

- Freight Futures, are traded on organized exchanges, such as NYMEX or IMAREX.
- Freight Options have been considered unsuccessful and their use was confined. Consequently, there are available only on specific routes.
- Hybrid FFAs are OTC agreements with the extra advantage of clearing through LCH.Clearnet, by paying a premium though for this additional guarantee along with the flexibility of futures.

As far as their advantages are concerned, freight derivatives can contribute to fixation of proceeds for up to 3 years forward and significant degree of freedom /ease to unwind positions prior to expiry, when it comes to standardized contracts.

Shipping derivatives are even suitable for statistical arbitrage trading according to past data, in cases where the freight derivatives price spread, between two freight rates in different regions, vessel size, or type of trade, is large, vis-a-vis the observed historical average until this moment, so a market player undertakes the risk of going long on the cheap freight rate and going short on the expensive one, if he anticipates a mean reversion, which of course is not guaranteed, as structural breaks frequently occur in time series, when it comes to markets. This is not pure arbitrage, but it has a speculative character, although not so accentuated.

So-called Portfolio switching is another option, as ship owners can go short on lower short-term volatility freight rates and go long, with a similar volume, on freight rates on more volatile routes, if they have appetite for increased risk, and their current ship allocation which may have become too conservative for their taste, does not satisfy them. This also includes offsetting undesirable previously undertaken time-charter contracts in the physical markets, by short selling the appropriate instrument. These derivatives do not entail the physical risks from operating a ship, or unwinding investments in the real market, as positions can be offset or reversed rapidly market conditions change. A further advantage is no control of the vessels is passed to other parties, as in time-chartering or COAs.

What is more, bullish ship-owners, having started a newbuilding (construction of a new vessel), and restrained by the delivery lead-time of the vessel, can resort to freight derivatives to compensate for the lost time, if their forecasts are accurate, or else suffer additional losses.

Banks can also issue easier loans if a potential client resorts to hedging by freight derivatives positions, because they are an equivalent of long-term time-charters which provide security for a vessel loan.

Academics also frequently refer to the term of price discovery, as futures and forward contract prices contribute to the negotiation/discovery/formation of current and futures prices in the spot market and market efficiency in general by means of a better information assimilation.

2.1.1 Forward Contracts

Forward Contracts are OTC agreements among counterparties reflecting the sale and purchase of a specific commodity/asset at a certain future date and a price agreed at the given moment. The conditions of a forward contract do not fall into the jurisdiction of regulated markets but they are formulated in accordance with the preferences of each of the counterparties. The notion of a forward contract opposes to the function of spot market, where the asset's price is determined and the transaction takes place instantly. Nevertheless, the spot market movements dictate whether counterparties will turn out to be lucrative or not. From the differential of the spot market asset's price and the forward price (price agreed at the delivery date), it is determined whether the purchasing party make profit or not. If the disparity between the spot and forward price is positive, the purchasing party has profit, otherwise the party incurs losses. Therefore, it is self-evident that profit for one of the counterparties entails loss for the other one. Moreover, when the future asset's price increases, the value of the forward transaction is positive for the buyer (long position) and negative for the seller (short position), and when the future asset's price decreases, the opposite is true.

Forward contracts are linked mainly to gold, silver, grain, freight rates, exchange rates, interest rates, currency etc. The usual participants of future contracts are financial institutions, banks, broker houses and multinational companies. Forward contracts are not typical assets (they can also turn into liabilities), and for their acquisition an adequate margin is required at the level of 3-10% of the contract's value. Further, the value of forward transactions derives from the underlying commodity and fluctuates throughout its lifetime. The initial / opening value in such transaction begins at zero, but through the future prices of the commodity the forward contract value can go upwards or downwards or revert to zero. The use of these contracts is similar to other derivative contracts. They are used for hedging, speculating and arbitraging, considering the counterparty's position in the physical market.

A forward contract requires a cash-flow at a specific future date. There are two forms of credit risk arising from forward contracts. The first form of risk is referring to the inability of one party to perform the obligations arising from the forward contract on the settlement day. Additionally, there is a relationship between the spot prices and the forward contract prices, indicating that the greater the deviation of spot prices from forwards prices, the greater the credit risk implicit in the contract. In the second form of risk, forward contract is considered as a "pure" credit instrument in which payment is made only at its maturity. Therefore, the risk of not fulfilling the settlement obligations persists until the expiration of the contract, signifying that the risk is very significant in the case of longer maturities.

2.1.2 Futures Contracts

Futures contract is an agreement among two counterparties of purchasing or selling an asset at a pre-determined future date and price. Unlike forward agreements, freight futures are listed/ traded on an exchange. Consequently, the type and quantity of the underlying assets described in the contracts are standardized as well as the delivery date. Thus, futures contracts are thoroughly specified by the following features: the underlying asset, the type of settlement, the amount of units per contract, the currency, and the grade of the deliverable, the last trading date and other details concerning the commodity. In this type of market, the underlying assets are not necessary commodities, but can be currencies, securities or financial instruments as well. Similar to forward contracts, futures contracts are not exactly an asset in the classical sense, but the contract gains value as the futures price changes. In the case of freight futures, the characteristics are: Sector, Routes (single-route or a “basket”), Cargo Size, and Settlement index). Moreover, the cash-flows of the freight futures are also parallel to those of forward contracts, but the timing of the existing cash-flows varies due to the daily clearing mandatory to futures contracts (Mark to market).

When a transaction involving futures contracts takes place, a safety margin is set in order to guarantee that the transaction’s participants will honor the obligations under the futures contract agreed. The safety margin is technically a safety account and is created by the negotiator. Because both parties are exposed to potential losses, both of them must deliver this kind of collateral. This account fluctuates according to the market movement and the resulting price for the futures. Unlike forward contracts, futures contract, all parties have the right to unwind their short or long position before the maturity date of the agreement. Thus, they can reap a current profit without risk, or stop losses, by terminating the contract before the expiration date specified in the start of the agreement.

As aforementioned, the obligations in a futures contract can be honored before the delivery date; this action is the so-called called compensatory transaction. The exact delivery date is preset by the contracts terms and depends on the needs of the participants, who can select whether there will be physical delivery or cash settlement.

In the futures market, all transactions are “undertaken” by legal entities called Clearing Houses, which are normally integrated in or owned by the relevant stock market or operate as an independent, separate organization. These organizations ensure the transactions that occur. Clearing houses are responsible for the smooth conduction business among counterparties.

2.1.3 Comparison of Futures and Forwards

Forwards agreements and futures contracts have a strong resemblance, however the basic difference of forwards and futures contracts lies in the daily clearing of the transactions and some other details. In futures contracts the specifications of the units traded as well as the size of the contract (the equivalent of notional value / principal), the delivery date and the price are standardized, whereas in forwards are selected as ordered by the contracting parties.

In futures, the transaction takes place physically or virtually within the Exchange market at specific trading hours and the participants are immune from counterparty risk, while forwards are 24 (hours per day) / 7 (days per week) OTC agreements, subject to credit risk.

Futures may have daily price limits in some cases while forwards do not have such constraints. The forwards have limited liquidity since they are private agreements with defined conditions by the investors. On the other hand, futures are tradable in exchanges, have time varying liquidity, depending on the open interest and the market players involved in the market. Futures are settled at the end of the day, when earnings are credited to those who are on the profitable side losses are charged to those who have chosen disadvantageous positions. However, in forwards there is a single payment made at the maturity date of the contract.

In futures, the clearing house secures the transaction and eliminates the risk, while in forwards each participant is depending on mutual trust and some prior collateral control. Regarding the delivery on maturity date, forward contracts are frequently physically delivered on that date, which does not apply in futures in most cases. Considering the process of delivery, futures have preset dates and days of delivery, whereas in forwards the date and day is customized according to the needs of the parties involved.

The information regarding the terms and details of the contract is accessible for the public, in contrast to forward contracts, where information is restricted among the counterparties and the broker.

Finally, futures are subject to the rules set by some governmental body, while forwards are almost like private contracts, i.e. self regulated.

2.1.4 Freight Forward Agreements

Freight Forward Agreements were devised to limit risks from fluctuations in the freight rates, vessel's value, scrap value, interest and exchange rates. FFAs were catered to securing ship owners and charterers. FFAs are also transactions between a buyer and a seller regarding the freight of a specific amount of cargo or a vessel for a single voyage, or a combination (basket) of the major routes of the dry bulk or tanker markets.

In 1992 OTC FFA contracts were introduced, as a substitute to BIFFEX, mainly by Clarksons, amongst others, with the contribution of the Baltic Exchange, as BIFFEX contracts were viewed as satisfactory for hedging. They fall into the category of principal-to-principal "Contracts for Differences" (CFDs), because a price for the forward contract is set at the opening of the contract and the spread between settlement price and the agreed price is paid, at the closing. No daily mark-to-market margining system is imposed here.

Thus, the contracts linked to the dry bulk market are based on time chartering and are arranged as the difference between the price specified by the contract and the average spot price of the calendar month. The size of the contract of a single charter depends on the type of ship and voyage, while for

time-chartering lies solely on the type of the ship. In the tanker market, an FFA refers to an agreement among counterparties, in which a freight rate in World Scale (WS) units is agreed for a pre-determined route and for a specific period of time. The routes are published by the Baltic Exchange and are categorized either in BDTI or BCTI.

These financial instruments are traded in OTC markets, tailor-made. Consequently, the OTC market allows players to adapt to the new circumstances of the market by compiling novel contracts or revising previous ones. The institutions that make this market are broker houses, investment banks and other financial intermediaries.

In the shipping sector, the charterer typically opens a long position, hypothesizing that the freight rate in a specific route and future date could be higher than the current one and thus he must purchase the FFA contract. On the contrary, the ship owner takes the opposite position and sells the FFA contract. The settlement is in cash - no physical delivery. Payment takes place in a predetermined date, where, in order to settle the agreement, freight rate indices, such as BDI and BITR, are taken into account.

2.1.5 Status-quo in Freight Forward Agreements

Recent trading reaches almost 60%-65% of the underlying physical market, mainly coal and iron ore, and 2008 was the best year where volumes were over 2billion tons. 27% of FFA is traded by freight traders, 43% by ship-owners, financial institutions (funds or banks) trade 24% and utility or mining companies approximately 6%. According to Clarkson Securities, there are now in excess of 200 market participants with more than 8,000 closed deals annually.

Freight Forward Agreements (FFAs) are easily comprehended and traded by shipping professionals, but the risk of market manipulation is always present. As no secondary market exists for OTC contracts, low liquidity in some routes is a great problem when trying to unwind open positions in thinly traded routes. FFAs are also considered dangerous if we take into account high potential cumulative gains/ losses in unlike futures contracts.

2.1.6 The use of Bunker Price Derivatives

Bunker Price derivatives are broadly used in shipping for obvious reasons and they are viewed as a prudent practice for obvious reasons: Vessel Operating costs consist of many expenses such as fuel costs, repair and maintenance costs, stores and lubes costs, insurance costs etc. The key element affecting the total amount of the operating costs, are bunker costs. Bunker prices are heavily volatile and highly correlated with crude oil price. By controlling bunkering prices, it is possible to minimize the exposure of bunkering volatility. Hedging bunker prices is useful for those who are directly connected with the expenses of a vessel, for instance ship owners and vessels operators.

The appropriate instruments for bunker price risk management are Bunker Derivatives Contracts, which are divided into the following types:

- a) Forward Bunker Agreement, tradable OTC markets, is an agreement linked to the future price of a certain amount and quality of bunker, price, and future delivery date.
- b) Energy Future Contracts are future contracts related with bunker fuels that have energy products as the underlying commodities.
- c) Bunker Swap Agreement, is part of a swap agreement wherein the swap is set including the bunker floating price and the bunker fixed price, for a specified period and volume per period. This agreement is taking place as well in the OTC market.
- d) Bunker Option Contracts, are option contracts traded on the OTC market, which enable the purchase (call option) or selling of bunker (put option) at the predetermined exercise / strike price during a specified time frame.

2.1.7 The use of Vessel Value Derivatives

An important cause of concern for ship owners and shipping companies is the vessel's price instability. The volatility of the vessel's value acts can be catastrophic for the balance sheet of a company and the creditworthiness of a ship-owner as well. Asset players, like ship companies and ship owners, are attempting to reap profits through vessel transactions. In a constantly changing market, buying and selling a vessel is a dangerous move. Once the vessel's price rises, profit is made; whereas the vessel's prices decreases loss is expected. Consequently, Vessel Value Derivatives were created by the Baltic Exchange in collaboration with Clarksons Securities Limited with a view to exploit the notorious shipping cycles (up- and down-turns) and diminish the vessel market fluctuations. In this spirit, even derivatives related to the scrap value and the second-hand value of selected types of vessels were devised. Therefore, by launching Vessel Value Derivatives in the vessel trading market, we manage to confine asset-price risk arising by the uncertainty of the market.

2.1.8 Sale and Purchase Forward Agreements (SPFAs)

Typical examples of the instruments mentioned above are SPFA's (Sale & Purchase Forward Agreements) and BSPA's (Baltic Sale & Purchase Assessments) which are both evolutions of FoSVAs and BaSVAs accordingly, established by the Baltic Exchange. Their value is linked to the Baltic Ship Valuation Assessments (BaSVAs). According to the Baltic Exchange, estimations for these are derived from a 5-year old vessel, following preset procedures.

SPFAs are flexible and variations can be made considering the clientele requirements. Therefore, adjustments can be made on the terms of the agreement, such as the maturity date and the settlement period. Due to the capital intensity in shipping, credit risk is exacerbated.

In order to mitigate credit risk, SPFAs are divided in multiple units and as a result, risk is dispersed. By this action, there are three main accomplishments. Firstly, the market entry into shipping is facilitated. Secondly, the risk and credit exposure is smoothed and, thirdly, hedging of old and different type of vessels becomes possible.

Ship owners and shipping companies, may take SPFA positions with the intention of hedging or speculating. A possible option for ship owners might be the short-position, in order to hedge the risk of an upcoming decrease in the physical market; whereas a shipping company may adopt a long or short position in an attempt to balance its portfolio and to avoid entering the physical market.

Furthermore, these instruments offer flexibility in contract volumes, maturity choices, no need to have physical ownership of vessels, vessel spread trading, simple and fast transactions, ability to short the vessel market, cost efficiency, and guidance by derivatives brokers. All these notwithstanding, there are also disadvantages, such as low liquidity, and low hedging effectiveness, i.e. basis risk and non negligible counterparty risk.

2.1.9 Vessel Scrapping Price Derivatives

Even financial products regarding the future scrapping value of vessels have been designed. In order to realize the value of Vessel Scrapping Price Derivatives, it is essential to understand the mechanism of vessel scrapping market/industry. Ship breaking, is a type of ship disposal, indicating the permanent end of a vessel's services. Scrap industry is mainly focused on the Light Displacement Tonnage and the materials contained in a vessel, such as hull, engines and spare parts. The facilities of this industry are not demanding on technology. In fact, a low capital and a dedicated beach are quite sufficient for this operation. The disassembly of a vessel is made by hand. The cut panels and sectors of the ship are collected, transported and sold to the construction industry, while, scrap supplier and ship owner are bargaining over the price of the steel scrap. Nevertheless, scrapping prices are generally based on demand and supply factors.

Regarding the Vessel Scrapping Price Derivatives, these are instruments created to hedge the fluidity of the vessel scrapping prices, which are susceptible to the demand/supply mechanism. The Baltic Exchange has initiated the Baltic Demolition Assessments (BDAs) to confront the hazard arising from the vessel scrap market. These assessments are issued in a weekly basis and are related to the actual demolition prices report. By observing the deviation of the demolition prices as stated on BDAs over the past months/years, the existence of derivative contracts becomes a necessity for both parts involved, the ship owners and the ship breakers. BDAs are, naturally, similar in use to future and forward contracts.

2.2 Linked Indices for Freight Rate Derivatives

2.2.1 Baltic Dry Index (BDI)

The Baltic Dry Index (BDI) represents a benchmark rate in the costs to transport raw materials, such as grain, coal, cement, i.e. dry bulk cargoes. It was created by the Baltic Exchange to substitute Baltic Freight Index (BDI) for the indicative measurement of dry bulk cargo freight rates. It is a complex index,

estimated as the equal average of the four subs-indexes the Baltic Capesize Index (BCI), the Baltic Panamax Index (BPI), the Baltic Handysize Index (BHSI) and the Baltic Handy Index (BHI). Hence, it is considered to be the most prominent of all other indices, as it exhibits an understandable overview of the complete dry bulk cargo spot market movement and offers a real time overview, since it is published on a daily basis.

2.2.2 Baltic Panamax Index (BPI)

The Baltic Panamax Index (BPI) was founded in May 1998, in order to track Panamax freight rates market segment. This type of index examines a standardized Panamax Vessel with a transportation capacity of 74.000 tons DWT, operating in four trip-charter routes. Voyage chartering is measured in “US dollars per cargo ton” (\$/ton), whereas time chartering in “US dollars per day” (\$/day). Moreover, the standardized vessel consists of the following specifications: maximum age of vessel is defined to seven years, net tonnage of 89.000 cb.ft, speed at about 14 knots, ship main particulars (length over all, breadth, draft) within limits etc. Regarding the default routes, BDI is based on calculating the following trips: a) the Skaw-Gibraltar trans-Atlantic round trip, b) a voyage to the Far East, where the ship is delivered in Europe and redelivered between Taiwan and Japan, c) a round trip Japan-South Korea and d) a trip having as a start point the Japan-South Korea area and as destination the Skaw-Gibraltar passing through Europe. The duration of the above voyages is estimated to between 35 to 65 days.

2.2.3 Baltic Capesize Index (BCI)

The Baltic Capesize Index (BCI) reflexes the cargo transportation at the Capesize part of the freight market. Like all other indices, BCI is estimated depending on representative routes around the globe. The routes are a complement of six voyage routes along with four trip charters. Voyage chartering is measured in “US dollars per cargo ton” (\$/ton) while time chartering in “US dollars per day” (\$/day). Particularly, BCI is expressing spot freight rates intended for shipment mainly of iron and coal cargoes. By this rationale, there are two sorts of voyages depending on the commodity transferred, coal routes and iron routes. All of the above routes, have a common basis on calculating, a standard “Baltic Capesize” vessel. The phrase “Baltic Capesize” is referred to a 74.000 ton DWT vessel, of a maximum age at seven years, capacity of 89.000 cb.ft and other specifications considering dimensions, fuel consumption and speed.

2.2.4 Baltic Handysize Index (BHSI)

The Baltic Handysize Index (BHSI) was launched in May 2006 to represent the Handysize vessel market. In order to reflect the Handysize spot sub-market, BTDI is composed by the six most important routes operated by a standard Baltic Handysize vessel. Each route comprises its own weight in the calculation

of the index. For instance, a voyage commencing from Japan-South Korea and redelivered to Gibraltar-Skaw is influenced BTDI by 25%, while a Skaw-Passero to US Gulf affects it just by 12.5%. The aforementioned routes can be geographical divided in two equal parts, based on the operating area of the vessel, which are the Atlantic basic routes and the Pacific basin routes. As transportation vessel, a standardized “Tess 52” Supramax is used with defined specifications in transportation ability, draft, length, beam, cargo capacity, speed, fuel consumption, outfit and age of the vessel.

2.2.5 Baltic Tanker Dirty Index (BTDI)

The Baltic Tanker Dirty Index (BTDI) is one of the two indices that Baltic Exchange is publishing for tanker routes. BTDI monitors the evolution of freight rates in standard cargo transport routes and is expressed in World Scale (WS) units. BTDI is the measurable quantity that adjusts daily, reflecting the average freight rate, introduced by ship owners and charterers on every route transporting dirty cargoes. Dirty cargoes include crude oil and lower distillates of the oil refining process. The index is calculated based on eighteen major routes, in which the vessels range from Aframax to VLCC regarding size. Nevertheless, BTDI is not only a function of demand and supply of transportation services, but depends as well on the oil prices, which have major implications upon tanker freight rates.

2.2.6 Baltic Tanker Clean Index (BTCI)

The Baltic Tanker Clean Index (BTCI) is the other price-index that Baltic Exchange is publishing, which reflects the freight rates for standardized tanker routes. The routes composing BTDI are the following: a) Ras Tanura to Yokohama transporting a cargo of 75.000 tons or 55.000 tons, b) Rotterdam to New York transporting 37.000 tons, c) Aruba to New York 38.000 tons, d) Skikda to Lavera 30.000 tons, e) Jubail to Rotterdam 65.000 tons and f) Ventpils to Le Havre 22.000 tons. The transported shipment is considered to be clean-cargo. Clean-cargo term stands for clean-products, consisting of light crude oil products such as kerosene, naphthalene and others. In order to transport these types of cargo, it is mandatory the vessel's cargo tanks to be coated. BTCI is expressed in World Scale (WS) units and estimated daily. Further, BTCI along with BTDI comprises the Baltic International Tanker Routes (BITR).

Generally, regarding the freight indexes, there are always discussions about changing the sizes of ships represented in the Indexes, e.g. the Baltic Dry Index, which will take place gradually and in a very careful manner. Participants in this effort are the Freight Market Information Users Group, the Forward Freight Agreement Brokers' Association and the Baltic Exchange's Freight Indices and Futures Committee, and even the clearing houses at a later stage, but the changes, if adopted, will be implemented no sooner than 2012 and with a prior notice.

The need for general review is clear, Handysize Index which commenced in 2006 when the capacity was set 28,000 tons DWT, maximum age limit of 15 years, with 4 x 30-ton cranes, but now the vessel sizes have grown significantly.

The same goes for the Supramax sector, where the need to make revisions can be seen in the order book, as well. The modern Panamax bulk carrier size has also undergone changes by increasing tonnage size; however these ships still follow the Panama Canal rules.

2.3 The Market Participants

2.3.1 Brokers

Broker is the party that intermediates between a buyer and a seller. Hence, the central role of brokers is to link the market agents that intend to buy/sell a commodity/contract. The primary task of a broker is to bring in an agreement two counterparties, for instance, a ship owner and a charterer in the chartering market, or a buyer and a seller in the sale and purchase vessel market. The number of brokers in the physical market is huge, nevertheless there are only few occupied in freight derivative services. The revenues for the brokers' services are referred as brokerage fees. Market participants considering cooperation with brokers, are facing the dilemma whether to use a broker in their freight derivative transaction or trade on their own account. Notwithstanding, it should be underlined that brokerage fees include services such as market information, information concerning the counterparty risk, consulting regarding derivatives and risk management and optimal execution of trades, while they also provide access to an extended list of potential counterparties.

2.3.2 Shipping Finance Banking Units

Market agents are increasingly attracted by the FFA market. Among those there are shipping-bank players. In an attempt to use FFA contracts for hedging, Shipping related banks have resorted to various strategies. For instance, the negative impact of falling freight rates influencing vessel values, which are mortgages of vessel loans and the revenue source of shipowners, can be mitigated, if banks have previously opened appropriate FFA positions to offset such negative developments.

Shipping related banks, in order to give a loan for a ship, may set as a term the use of the derivative contracts from the ship owner, in order to reduce default likelihood. In order to deal with the scarcity of time-chartering as FFAs become more popular, banks accept FFA contracts as a security.

FFAs are hedging instruments even for equity portfolios, in sectors where costs have a high correlation with freight rates, like electricity generation (coal) or mining. Banks are using freight contracts for intermediary activities, for "sleeving purposes": when two firms use different documentation (FFABA or ISDA) and there is incompatibility in trading, a bank steps in and acts an intermediary, by trading with both sides.

FFA contracts are also used by banks for speculating betting on the market direction with fundamental or technical analysis indicators as decision criteria, arbitrage between implied and real rate time-charters

equivalent rates, market-making by profiting from the bid-offer spread at times when liquidity in derivatives markets are low and exploiting market inefficiencies in general, which are temporary.

Almost all investment and shipping banks are conducting trades via FFAs, or their in-house trading desks / hedge funds / asset management divisions or other subsidiaries like commodities. This, however, does not apply for Chinese financial institutions which are deterred by various obstacles, such as regulatory restrictions as well as credit or documentation issues.

2.3.3 Regulators: the Financial Services Authority (FSA) and the International Swap and Derivatives Association (ISDA)

The *Financial Services Authority (FSA)* is a limited independent non-governmental company, responsible for supervising the regulations regarding the financial services industry in United Kingdom. In 2000, the idea of developing FSA was brought by the UK Parliament. Since its establishment, FSA has been regulating approximately 29.000 firms ranging from small businesses to global investments banks. FSA's aim is to regulate the market in order to work effectively benefiting all the market agents involved. Hence, the role of the FSA is to achieve risk elimination by applying a regulatory action. Lastly, the statutory objectives of FSA can be summarized into five modules: 1) market confidence, 2) public awareness, 3) financial stability, 4) consumer protection and 5) decrease of financial crime.

The *International Swap and Derivatives Association (ISDA)* was created in 1985 by the derivatives market participants, who are represented in the private negotiating derivatives industry. Its main purpose was to improve the private negotiated derivatives market and to facilitate the institutions that dealt in the market to network. The association counts more than 820 members, which are of institutional nature and can be sorted in three categories: a) primary (dealer firms), b) associate (service providers) and c) subscriber (end-users). The reason that led to this association was to spur growth of derivatives markets by supporting best practices in business operations such as the development and maintenance of derivatives documentation, helping the market adopt state of the art methods in risk management, promoting high standards of commercial conduct, supporting public understanding of the financial derivatives business, providing education on legislative regulatory, legal, documentation, accounting, tax, operational and technological issues and functioning as forum for the derivatives market participants.

2.3.4 International Maritime Exchange (IMAREX)

The International Maritime Exchange or IMAREX is a Norwegian limited liability company, which was founded in 2000 and since then it is associated with the Norwegian Futures and Options Clearing House (NOS). NOS is used as the clearing house for freight contracts, which IMAREX is publishing, such as freights for tankers, bulk cargoes and containers. IMAREX has been established as the most substantial freight derivatives exchange for the global maritime industry. The volatility of the freight rate market

signifies the necessity of risk management and arouses the interest of speculators. The above are characterizing the IMAREX's base of function. IMAREX is providing the following negotiations processes: I) Derivatives freight contracts in specific routes, II) Clearing and settlement, III) Anonymity of participation in the exchange, IV) Transparent procedures, valid information about the current condition of the market and stable prices and V) Secured transactions.

IMAREX is making a significant effort to be competitive in the maritime freight and the energy derivatives markets by any mean possible, such as merges, alliances etc. From this perspective, IMAREX is associating with the Norwegian Futures and Options Clearing House (NOS). NOS provides clearing services to the contracts that IMAREX is publishing. In 2001, IMAREX created a marketplace platform for freight derivatives initially for the transactions and clearing of tanker freight derivatives and later for dry bulk freight derivatives. Its derivatives products have as the underlying commodity indices that were created either by Baltic Exchange or Platts. Currently, IMAREX is publishing FFAs, option contracts and futures contracts.

2.3.5 Norwegian Futures and Options Clearing House (NOS)

The *Norwegian Futures and Options Clearing House (NOS)*, which was established in 1987, is the first clearing-house limited company. It was created to settle security issues between counterparties. In collaboration with IMAREX, they managed to create a regulatory market, which would provide the sufficient liquidity and substructure, in order to attract the investors' interest worldwide. Currently, NOS is operating and clearing all types of derivatives contracts traded either directly on IMAREX or through special Paperbrokers. Moreover, NOS services are not confined only as a clearing-house for the marketplace, but expanded as well for the clearing of OTC derivatives contracts and security loans. Throughout the clearing process, NOS is acting as the main counterparty among the parties involved. Consequently, it operates as the guarantor eliminating the risk of the other counterparty, in exchange with a safety margin, compensated by the other counterparty. Market participants and especially shipping companies, are capable of using the NOS services, either through an IMAREX broker or through their own derivatives broker.

In the past decade, NOS managed to establish a cleared ship freight derivatives market. Moreover, since 2007 NOS has entered and provided its clearing services in the seafood and the combined Nordic and German power market. Additionally, NOS assisted its participants in the demanding year of 2008 by settling their transactions with the minimum required cost. In the past two years NOS has expanded by offering services to further markets, such as Swedish El-certificate and, additionally, developing new types of financial derivatives, for instance UK NBP gas derivatives. Generally, the markets that NOS is involved in are the El-certificates, freight and oil products, gas, iron ore, power and seafood. The products that the clearing house is offering services in the freight and oil products market are Futures and Options contracts. Futures are traded in stock exchanges and daily marked-to-market. Options contracts are Asian style averagely priced.

NOS has suffered a drop in the volume of both tanker and dry bulk forward freight agreements cleared lately, as the international dry bulk market is not growing as anticipated as the volumes have shrunk vis-a-vis the previous quarter. Nevertheless, on a weekly basis NOS clears 12%-20% of dry bulk FFAs and its main rivals are London-based LCH.Clearnet and Singapore's SGX AsiaClear for business in the truly globalized FFA market. Recently, NOS introduced clearing operations for iron ore futures and option contracts, enhancing its product range in the freight option sector, as the competition is very fierce.

2.3.6 New York Mercantile Exchange (NYMEX)

NYMEX, which stands for the New York Mercantile Exchange, was founded in 1872 and ever since has been functioning with great success. Nowadays, NYMEX is established as the world's largest derivatives exchange and futures contracts market. Transactions taking place in this exchange aim at eliminating the risk borne by the participating counterparties. This is achieved by the participation of the Stock's Exchange Clearing house in each transaction made, as counterparty.

It consists of two trading floors, the first one is NYMEX, which trades hydrocarbons, electricity, platinum and palladium, and the second one is COMEX, where gold, silver, copper and aluminum are traded. The transactions in NYMEX do not include counterparty risk, because the stock exchange's clearing house is taking part in the transactions as a mediator between counterparties. The clearing subdivision of NYMEX is called CME Clear Port. Moreover, the NYMEX derivatives contracts have as the underlying commodity the route freight indices produced either by Baltic Exchange or Platts. NYMEX is executing trades with option and futures contracts (futures and forwards for routes or time chartering, wet or dry cargo).

2.3.7 Platts Price Assessments

Platts is supplying the industry with energy news, price benchmarks, energy intelligence, and decision support services. Expanded all over the world, it lists the market of petroleum, petrochemicals, electricity, natural gas, coal, metals, nuclear power, bunker fuels and freight rates. Furthermore, it publishes all kinds of reports, newsletters, pricing services etc. Platts' price assessments are considered to be reliable for two main reasons. Firstly, because their data are gathered from all of market's participants around the globe, such as traders, principals, brokers etc. and secondly, because every assessment is verified before put into use. Moreover, Platts tanker assessments are calculated daily, primarily expressed in World Scale units (WS).

2.3.8 London Clearing House Clearnet (LCH.Clearnet)

LCH.Clearnet was created in 2003, after the consolidation of the London Clearing House (LCH) and Clearnet S.A. It is an independent clearing house, serving major exchanges and trading platforms worldwide. In 2005, LCH.Clearnet initiated a process for OTC Forward Freight Agreements (FFAs)

regarding recording, clearing and settlement services. The clearing process is accomplished either by the ECS, which is an independent browser-based system, or by the Clearing Members. The clearing members have the opportunity of clearing the OTC freight contracts, if they are in compliance with the clearing-house rulebook and also authorized by the clearing house. Each member and trader of LCH.Clearnet will be provided with the same services and advantages that are provided to the broadly central counterparties. The above services are referring to the elimination of the counterparty risk, multilateral contract network and to funds adequacy. LCH.Clearnet contracts are FFA swaps (dry and tanker time charter or voyage) and FFA options (dry time charter basket routes).

2.3.9 SSY Brokers

Simpson Spence & Young (SSY) has been established as one of the largest ship broking houses worldwide. SSY is offering reliable information about the markets movements, the risks involved, new developments, occasional opportunities arising, ship management and expanding policy. The above are managed through the group's skills and experience, the technological means and the broadly expanded office network. The services SSY provides are related with dry cargo, tankers, liquefied gas and chemical chartering, sale and purchase market, enhancement of shipping portfolio and further investments (valuation), maritime finance market, freight futures derivatives, harbor towage and port agency. SSY is covering consultancy and research services as well. Specifically, the freight futures derivatives are referring to FFAs for tanker and dry cargo.

2.3.10 Singapore Exchange (SGX)

SGX was created in 1999 and was the first exchange listed in Asia-Pacific. SGX is as an investment holding company, which provides trading services of securities, derivatives and others. It is one of the largest stock exchanges in the Asia-Pacific region, with a huge total market capitalization, mostly owned by foreign companies. The main part of SGX profits are based on transactions in the security and derivatives markets, because it is the only clearing platform in the region.

SGX is cooperating with Baltic Exchange, in order to settle the Forward Freight Agreements for dry bulk and wet cargo dirty routes cleared on SGX OTC Clearing. By this action, SGX is supported in developing a clearing mechanism on OTC FFAs to suit the needs of the market participants.

The clearing process is operated by the SGX AsiaClear, where it is the only clearing platform in the region. It offers clearing services for freights, energy, commodities and financial derivatives. SGX AsiaClear presently is clearing commodity derivatives, freight derivatives such as Dry Bulk and Tanker FFAs, Container Derivatives, Oil derivatives and Interest rate derivatives. Container derivatives have been recently added to the Singapore's exchange clearing list to enhance credit and risk management. SGX contracts are FFAs (wet and dry bulk, time charter or voyage), container derivatives (first contract cleared in August 2010), and other (oil, petrochemical, and bulk commodity) derivatives.

2.3.11 Freight Forward Freight Agreement Brokers Association (FFABA)

The Freight Forward Freight Agreement Brokers Association (FFABA) was established in 1997 and is operated by the Baltic Exchange. FFABA is considered an autonomous association of the FFA Broking Exchange. The members of FFABA are trading the FFAs on OTC. This association was created in order to increase the FFA commerce, to promote high standards of conduct among participants, to interact with the Baltic Exchange ensuring the premium quality indices, to develop and promote standardized contracts, to provide a forum to resolve problems and to establish the use of derivatives for freight risk management.

2.3.12 Freight Investors Services (FIS)

FIS Ltd was created in 2002, and has ever since been continuously expanding not only to a global office network level but by the number of the associates dealing with as well. The company is providing full brokerage services, verified market information and trade operations. FIS is operating in the United States, Greece, Japan and Singapore and is specialized in the derivatives and physical shipping market. The products provided by FIS are: a) Container Swaps, b) FFAs, c) Freight Options, and d) Physical contracts. Container Swaps are mainly used as a management tool for hedging the movements of the containerized market. Participants trading CFSAs (Container Freight Swap Agreements) are those involved with seaborne containerized goods. Moreover, they are divided in three categories regarding their expectations, the net long or short on physical seaborne and the neutrals (speculators). FFAs comprise a tool for risk management against the fluctuant of freight rates, specifically for ship owners, charterers and traders. All contracts are based on the FFABA and the Derivatives Association. FIS is offering Capesize, Panamax, Handymax and Supramax FFAs. Freight Options are giving the right to counterparties without obliging them, to buy or sell a commodity at a specific future date. Participants can benefit or lose depending on the positions taken. Similar to other derivatives contracts, freight options can be used to hedge or speculate. Physical is a FIS service generated by the significant changes that took place in the physical market. FIS products are shown in Table 1.

Table 1. FIS Products

PRODUCTS	Description
Container Swaps	OTC cleared by LCH.Clearnet, settled Asian style
FFAs	<ul style="list-style-type: none">• Capesize• Panamax• Supramax• Handysize
Freight Options	Asian style
Physical	Concerning physical cargo

2.3.13 The Baltic Exchange

The Baltic Exchange is the only organization providing maritime information. The publishing information refers to the trading and settlement of physical and derivatives contracts. The Baltic Exchange is basically a membership organisation constituting the international shipping marketplace for the bulk trade (tankers and dry bulk), with more than 580 member companies from various countries, such as shipbrokers, shipowners, cargo interests, ship operators, banks, freight derivatives traders and brokers, lawyers, arbitrators and others.

The largest percentage of transactions freight derivatives market, forward freight agreements and options are executed by the members of the Baltic Exchange. The exchange is daily publishing freight indexes on various routes and cargoes. Even though several indices are published (see Section 2.2), only the Baltic Dry Index (BDI) is considered to represent the summary of the dry bulk market.

In 1984 Baltic Exchange members commenced trading activities with a novel product BIFFEX, cash-settled (having a standardized ship at a given location on a fixed day is infeasible) and linked to the Baltic Exchange Freight Index (BFI) and constructed based on the input from shipbrokers. BFI has changed its name and after revisions led to the introduction of Baltic Exchange Dry Index (BDI). In its first version, the BIFFEX was a futures contract, traded in a traditional fashion by brokers in a ring on the Baltic Exchange floor and cleared by the London Commodity Clearing House (the modern LCH.Clearnet).

In the 1990s brokers came up with new contracts based on components of the index, and baskets of these, as OTC arrangements and no clearing central counterparty liquidity gradually increased for contracts linked to certain routes (e.g. C4 Richards Bay-Rotterdam coal) or averages of the time charter routes for specific vessels, such as the four time-charter routes in the Capesize index, i.e. the 4 Time charter (4TC) Average.

In 1999 the Baltic enriched its services with several route assessments on tanker market, denominated as a percentage of the standard World Scale flat rate (i.e. a standardized \$/ton rate for the transportation of crude oil and oil products). And thus FFA contracts in the tanker market were also developed.

As trading activity increased, there was a need for optional clearing which was introduced in 2005, in order to extend credit to more counterparties, which of course was possible only under the conditions of adequate standardisation and liquidity. LCH, NOS and Singapore Exchange - SGX undertake clearing in dry bulk and tanker contracts, while NYMEX only in tanker contracts. This shift was gradual due to administrative issues and skepticism of the market regarding margin calls, but finally in 2008 up to 50% of the dry bulk market was cleared and this percentage has now risen to 90-95% (75% in tanker FFAs).

This a market based on telephone brokerage, where brokers, who receive commissions on a fully negotiated basis, use a proprietary trading screen for quoting prices and conducting trades. London is the market center, but many major market players are established in Germany, Greece, Norway, Denmark, France, Belgium, Italy, Switzerland, USA and Asian Middle East countries.

The Baltic Exchange is updated by the brokers about the volume every week for the dry bulk segment and every month for the tanker segment. The Baltic Exchange also gathers information from brokers every day in order to synthesize and forward price "curve" for mark to market applications and clearing houses which thus determine required margin (essential for its existence), and compiles the route assessments every day as an input to the monthly settlement rates. Some limited margining is also required in classic bilateral trades.

3 Case Studies in History of World Shipping Derivatives Trading

3.1 The CDS Crisis Case

An indicative situation where regulatory vagueness was catastrophic was the credit default swaps (CDS) which are not recognized financial securities and do not into the jurisdiction of financial regulatory bodies. They give coverage similar to insurance, but they are also exempt from insurance regulation. They just constitute private contracts, like bets between private parties, so only the private contract law applies. Even antigambling laws should apply in certain judicial systems and cancel CDS, nevertheless, the notional capital of roughly 10 trillion dollars remains in this way simply unregulated.

Although it all started with the best intentions, as bank regulations were aiming at protecting deposits from credit risk and other dangers, the simultaneous default events from various bond insurers proves the existence of unimaginable perils when underwriting "exotic" financial contracts with opaque counterparties. It is impressive, how supposedly heavily regulated international banks, were so dependent on unregulated counterparties (i.e. without regulatory oversight). This led them to purchase CDS contracts their CDS counterparties (i.e. their bond insurers).

3.2 The BIFFEX Case - Liquidity Problems and Failures in Freight Derivatives Past Problematic Time Periods

BIFFEX (as also discussed earlier) launched trading operations with dry cargo freight futures contracts in 1985, and had some minor success at first. The contracts were cleared via ICCH (International Commodity Clearing House, later renamed LCH.Clearnet-London Clearing House). A tanker freight futures contract was launched in 1986, but was a failure and was cancelled the same year. At the beginning, BIFFEX worked normally, but trading decreased in 1989. In 1992, the creation of freight options on BFI or over-the-counter forward freight agreements (FFAs), boosted BIFFEX trading volumes but market participants eventually shifted to FFAs on permanent basis and trading volumes on BIFFEX dropped until the termination of BIFFEX in 2003, as a result of low liquidity due to low hedging capability of BIFFEX contracts. Just like today's Baltic Dry Index, the BFI had an economic meaning, but it did not accurately track special market risks which are the source of concern in shipping business.

The underlying asset of BIFFEX contracts, the Baltic Freight Index (BFI), was a weighted average of the spot prices from eleven shipping routes. The weighting and composition of the index varied over the years. A market player just needs to reduce freight rate risk for the transportation of a specific commodity on a given route, so a derivative linked to a weighted price index of other routes and commodities may not be strongly correlated to the freight rate that have to deal with.

The routes contained in the BFI were too varied regarding cargoes, vessel sizes, and other features, which leads to the so-called cross-hedging. They were much less effective in eliminating spot market risk than contracts in other commodity and financial futures markets. In practice, the contracts neutralized just 4-19 percent of market risk, in contrast to 98 percent risk reduction from hedging instruments in the rest of commodity and futures markets. Most market participants operate on specific routes; therefore they need derivatives custom made to their specific needs.

Hedging effectiveness is guaranteed when contracts are linked to just one route, not just an underlying index which explains why FFA contracts, which trade on specific routes rather than on the entire index, have become popular.

3.3 The Case of Oil Futures Bubble Of 2009

After the collapse of the housing market, equities, credit default swaps and subprime CDOs in 2008, speculators turned to the commodities market, because there was an increasing aversion to paper markets at the moment, even the freight derivatives market had dropped.

Oil futures suddenly jumped as the barrel price went from around \$60 in to \$147 in 2008. The standard explanation would normally be oil supply and at the moment statements from politicians in the U.S.A. even deteriorated the problem, as they talked about moratorium on offshore drilling and hybrid cars.

In reality, although global supply of oil will one day end, the market supply had actually been increasing; the world oil supply rose from 85.24 million barrels a day to 85.72 million, while over the same period, world oil demand dropped from 86.82 million barrels a day to 86.07 million. At the same time investment banks were convincing pension funds and other large institutional investors to consider an investment opportunity to speculate with long positions in oil contracts. Therefore, from 2003 to 2008, the value of commodities market jumped from \$13 billion to \$317 billion, i.e. 2300%. In 2008, a barrel of oil would be traded 27 times, on average, before it could be physically delivered and consumed in reality.

There was a law since the Era of the Great Depression supposed to prohibit such behavior: as the commodities market was built mainly to protect farmers, who were interested in selling their production at a fixed price a priori. A provision was introduced for the so-called "traditional speculators" who would warehouse the crop and sell it later and the market to ensure that there was always demand for the products. In 1936, Congress decided that speculators should not exceed real producers and consumers something that could lead to serious market distortions.

A new act gave the Commodity Futures Trading Commission – the power to control speculative trading in commodities which led to market stability for several decades, with very few exceptions.

In 1991, J. Aron (commodities- trading subsidiary of Goldman Sachs) convinced CFTC that farmers should not be the sole potential users of hedging, but also financial market participants should also benefit from hedging of commodities prices, because they were also affected by price fluctuations. The bank thus received the right to participate, the so called "Bona Fide Hedging" exemption, constituting J. Aron a physical hedger and other 14 companies also did the same afterwards.

After some years, the speculators exceeded real physical suppliers and consumers and in 2008, speculative trading was behind over 75% three quarters of the trading volume on the commodity markets, and led to historical increase in retail prices for gasoline. Even a rule from CFTC ensuring secrecy about the open positions or trading companies complicated the problem of the increasing speculative activity in the markets.

Another factor that exacerbated the inflation in oil prices was the fact that the Goldman Sachs Commodities Index linked to 24 major commodities prices is biased (overweight) to oil. But this index is also benchmark and being tracked by the portfolios of institutional investors taking mostly large long only positions (and very rarely short positions) on commodity prices and this drove prices only up.

In the summer of 2008, the oil futures controlled by speculators were equivalent to 1.1 billion barrels of crude oil, i.e. more "virtual / future/ paper "oil than real oil stockpiled than the aggregate quantity of U.S. storage tanks and the Strategic Petroleum Reserves. It was a typical bubble just like the *dot com* mania years ago or the housing market, which of course wiped out billions from the funds of pension funds (normally considered to have a conservative portfolio strategy), when it collapsed and crude oil prices dropped from \$147 to \$33. What is more, the commodities bubble also led to a dramatic increase in food prices leading to millions of hungered people and riots in the Third World.

Ironically, at the time that oil price hit historical highs, oil supply had also reached a 20-year high and oil demand a 10-year lowest point, which proves the potential of the paper/ derivatives market for distorting the economic equilibrium of prices, when there coincides a collision of major market participants and intentional naivety from the regulator side.

3.4 The Case of Gold & Silver Commodities.

There is a lot of controversy over the market manipulation that can take place via derivatives contracts for commodities futures. Precious metals derivatives trading exhibits many anomalies which should be taken into account when designing new derivatives markets and related financial instruments.

There is little bullion in storage at the London Metals Exchange or New York's COMEX to back the metals trading, i.e. low physical inventories which is at the moment acceptable as one ounce out of one hundred traded is paid out in physical metal. Physical delivery was up to now very rare in this market,

but lately, Asian and Mid East buyers and owners of bullion are starting to take gold from their dealers' vaults a move that lowers inventories in London, New York and Toronto vaults.

GATA (Gold Anti-Trust Action Committee) claims manipulation of precious metal markets has existed since long. Major Banks like JP Morgan are said to hold gigantic "naked" short positions on silver and gold which are simply impossible to deliver by using extremely high leverage.

There are investigations on JPMorgan's precious metals trading activity on the London Bullion Market Association's (LBMA) exchange, which is a physical delivery market, and the New York Mercantile Exchange (Nymex) for future paper derivative trades (relative article in New York Post). It is claimed that by shorting silver, JPMorgan systematically sells large blocks of silver option contracts or physical metal after news that would normally push precious metals prices higher.

Simultaneous placement of a many selling orders could only be aimed at suppressing gold. The traders behind this would gain from having shorted the metal at the expense of its physical owners, who held long positions or were purchasing futures contracts betting the price of the metal would go up. This phenomenon is not new, as the market had experienced Silver Thursday, an extreme event in the silver commodity markets on Thursday 27 March 1980, where speculators had attempted to corner the market in silver, when price of silver went up from \$6/oz to an all-time record high of \$48.70/oz.

Furthermore, there were also rumors of manipulation on copper from Rogue trader Yasuo Hamanaka of Sumitomo Corporation who roughly directed 5% of the world copper market in the 1990s. Finally, in the late 1950s, United States onion farmers claimed that speculators in Chicago Mercantile Exchange were trying to manipulate the market on onions which led to the banning of trading in onion futures.

Generally, market manipulation takes place in many ways: via pools i.e. collusion of many market participants to assign to a single trader trading activity in a specific security for a given period of time who may systematically use wash trades/ bear trades / ramping, or churning where placement of multiple places buy and sell orders aims at attracting other speculators, or by creating trading volume above normal. Other methods may be runs which are deliberate rumors attempting to move up prices artificially for an asset.

These incidents illustrate the potential dangers of market manipulation which could happen to shipping derivatives as well, if the paper market become gigantic, large players enter it and resort to high leverage, which provokes multiple anomalies in the physical markets and it is also bad for the reputation capital of derivatives exchanges, which can be tainted by the bursting of bubbles or manipulation incidents. At the moment, shipping derivatives do not have a spectacularly high trading volume; in fact it is lower than historical highs, so such dangers appear rather distant. However, the perils are there for the future, as speculators, e.g. some hedge funds are looking for new markets to place new uncorrelated bets (with the rest of their portfolio, something that is very hard to do these days).

4 Shanghai/Pudong Shipping Derivatives Status and Recommendations.

4.1 The Present Status-Quo in China

Regulatory “uncertainty” prevents Chinese market participants from trading in dry freight derivatives and makes state-owned and private ship-owners or charterers establish offshore legal entities, in order to trade. Chinese are viewed as “risk averse” by Western standards (only as far as trading in freight derivatives is concerned), thus they could be the ideal target group for forward freight agreement especially now that worldwide trading volumes in these derivatives have dropped: 1bn tons of freight with a value of \$25bn will be traded in 2010, the same as in 2009, but a 50% decrease in comparison to 2008. Asian traders constitute just 10% of the market, although China plays a very big role in the underlying seaborne physical trade for bulk commodities.

Until today there appears to exist an opaque legal system of financial services rules (sometimes apparently contradictory): for example it is not clearly specified whether the term futures may also mean FFAs. The market participants are concerned about their rights and the regulatory framework for FFAs for domestic or incorporate international trading, thus they resort to overseas markets. Even some state-owned enterprises having international shipping activities have established subsidiaries overseas in Singapore and Hong Kong in order to deal with the trading approval process; so do private companies as well. Currency transaction issues complicate the issue even more.

Nevertheless, Cosco, Chinese-government owned shipping conglomerate, has suffered more than \$600m FFA losses after taking wrong-way positions before the freight market meltdown in 2008. Executives from Chinese shipping firms, which set up an offshore subsidiary to trade FFAs, state that that regulations now prohibit FFA trading therefore they were forced to quit the market.

Growth in FFA trading involving Chinese companies is thus very slow, and mainly smaller operators participate, so only large, government-owned companies could significantly boost volume. Specialists shortage with hands on experience in swaps are another handicap in Asian markets, but also the lack of any prototype major firm for the rest of the market which could function as a model.

The whole business model must be revised in China in terms of risk management and the same applies for commodities trading as well. Especially senior management appears more risk averse in comparison to junior executives from state-owned companies who are better trained and in favor of FFAs

4.1.1 Status-Quo in the Shanghai Shipping Exchange

The Port of Shanghai has exceeded the Port of Rotterdam and the Port of Singapore, the former champions based on measurement on cargo tonnage handled (total weight of goods loaded and discharged).

Thus, the establishment of Shanghai as the world's busiest port led to the development of the Shanghai Shipping Exchange like the Baltic Exchange and challenges London as the global center for shipping related finance.

In 2005, the growth of Shanghai container liner service led to the Shanghai (Export) Containerized Freight Index (SCFI) developed by SSE. The SSE is a joint venture between the Chinese Ministry of Communications and the London Municipal Government. It was founded on November 28th 1996. The SSE is responsible for service and agency support, data and research products and acts as the liaison for legal and legislative matters in between industry and the government.

SSE currently publishes the following indices, introduced in 1998 through 2001:

- SCFI - Shanghai Containerised Freight Index
- CBFI - China Coastal Bulk Freight Index
- CCFI - China Container Freight Index

SSE compiled CCFI under the sponsorship of Ministry of Transport (MOT) which after 10 years of operation, is considered a reliable freight index like Baltic dry bulk indices and it is recognized by UNCTAD in the maritime yearbooks.

The new SCFI is improved and derives from the original SCFI (since December 7, 2005) with an initial value of 1,000 points and the base date of October 16th 2009, as a function of the freight data which is produced by 30 panelists of the CCFI Panel.

All these initiatives are also endorsed by the Circular on Promoting Faster Development of Modern Service Industry and Advanced Manufacturing Industry in Shanghai and Construction of Shanghai International Finance Center and International Shipping Center (also known as the Circular) published by the State Council which set as primary objectives in fostering the international shipping center, "To improve supportive policies for modern shipping development ... broaden the product line of shipping finance, speed up development of freight index derivative and provide risk control for domestic shipping enterprises."

The Shanghai Containerized Freight Index, comprises 15 shipping lines and 15 freight forwarders. It accounts for more than 60 percent of global container-shipping. It is an indicator of spot rates for shipments on a weekly basis, to Europe, the Mediterranean and the US destinations. It was officially launched in October 2009 by the Shanghai Shipping Exchange (SSE), but has run in a Beta form since March 2009. Each Friday, at 15:00 Beijing time, SSE publishes the new SCFI and spot rates for the 15 separate routes.

Panelists assess these freight rates for general cargo on spot rates ex London for 15 tradelanes (average USD per TEU (or FEU for USWC/USEC)) including certain surcharges in the spot rate (BAF/FAF - EBS/EBA - CAF/YAS - PSS - WRS - PCS - SCS/SCF/PTF/PCC) and excluding THC, port facility security surcharge, South China origin place surcharge, US automatic customs declaration fee, inland on-carriage surcharge on Friday.

The 15 trading routes include various destinations and every route/tradelane has one or more base ports:

- Europe: Hamburg, Rotterdam, Antwerp, Felixtown, Le Havre
- Mediterranean Sea: Barcelona, Valencia, Genoa, Naples
- US West Coast: Los Angeles, Long Beach, Oakland
- US East Coast: New York, Savannah, Norfolk, Charleston
- Persian Gulf: Dubai
- Australia New Zealand: Melbourne
- West Africa: Lagos
- South Africa: Durban
- South America: Santos
- West Japan: Osaka, Kobe
- East Japan: Tokyo, Yokohama
- Southeast Asia: Singapore
- Korea: Pusan
- Taiwan: Kaohsiung
- Hong Kong: Hong Kong

For each tradelane an average USD per TEU (or FEU for USWC/USEC) price is given. The new SCFI clearly presents these market freight rates of routes from Shanghai, and supports container derivatives transactions. Nevertheless, US shippers conducting import business from China are worried about freight rate confidentiality issues and leakage of information (Negotiated contract terms and tariff rates). These are viewed as strictly private by certain lines Container lines and their customers and they have concerns over their processing by the Shanghai authorities and a possible leakage to wrong hands.

4.1.2 Status-Quo in Shanghai's Container Freight Derivatives

In the past, a container index was not even relevant for the Baltic Exchange, because this was always specialized in tramp shipping, where haul tendered cargoes are transported to various ports rather than operating according to a preprogrammed schedule.

Container rates are affected by several factors unlike dry-bulk rates, a fact that complicates the creation of a container derivatives market and index; what's more the future entrance of third parties like hedge funds, speculators, traders etc. may influence the accuracy of the index. Generally, trading activity amplifies fluctuations in rates due to changes in shipping supply and demand. A typical example is the Baltic Dry Index, the benchmark index for commodity-shipping costs which increased in 2007, collapsed by 92 percent in 2008 and then tripled in 2009.

However, the container freight market has experienced high volatility in rates. For example, the rate from Asia to Europe jumped from \$400 per 20 foot equivalent units in March 2009 to \$2,100 per TEU in

March 2010, thus large corporations importing goods to the U.S.A. would certainly be interested in novel derivatives mitigating business risk.

But also the sell side, i.e. container shipping companies and operators are required to participate for this market to work, as no positions can be opened or closed if ship owners and liners do not enter these trades in sufficient volumes.

In contrast to dry-bulk and tanker sectors, container-shipping did not use FFAs, because the broad range of cargo and clientele utilizing containers complicates rate tracking. London's Clarkson Plc, pioneer in the introduction of FFAs in 1991, contributed to devising the four-month-old Shanghai Containerised Freight Index for container shipping futures. Morgan Stanley also supported the first FFA trades linked to the Shanghai container index in a pilot phase.

As these contracts are new, there are fears among market participants that once the index “messes” with derivatives trading, it may cease reflecting the market.

As liners are concerned about the volatility in their earnings and pricing, they should be also interested in risk management by means of financial instruments, however trading volume growth can only increase gradually.

Containers freight derivatives have been designed to tackle market risk which is the same reason other freight sectors have adopted freight derivatives for more than 20 years.

Clarkson Securities Ltd closed the first Container Freight Swap Agreement (CFSA) in January 2010 giving the opportunity to sell and buy sides, to set a predetermined freight rate (USD \$ per TEU or FEU) for forward positions eliminating business and credit risk.

Unlike a physical freight contract, the derivative model allows for the physical business to be conducted at the spot market rate whilst the derivative market provides each party with a fixed price. By transferring price risk onto the derivative contract, carriers, shippers and logistics providers must only focus on service quality and efficiency and they do not have to worry about the risk factors.

CFSAs constitute cash settled swap products created on a principal-to-principal basis. They are a versatile instrument based on the terms and conditions of the CFSA standard contract as determined between the principals. The basic terms of an agreement are:

- The agreed route.
- The day, month and year of settlement.
- Contract quantity.
- The contract rate at which differences will be settled.

Forecasts for 2011 volumes predict that the trading volume of the new derivatives will reach 5% of the underlying physical market from Shanghai to Europe and North America, approximately the equivalent of 25 million TEU.

Four brokers are conducting trades in the container derivatives sector, i.e. Clarksons, Freight Investor Services, interdealer broker GFI and ICAP Shipping, and two clearing houses LCH.Clearnet and Singapore's SGX AsiaClear will support the settlement.

4.2 Recommendations for a New Compatible Framework in China / Shanghai

4.2.1 Implications of Dodd-Frank Act

The Dodd-Frank Act could have serious consequences for the shipping derivatives market. The scope of the Dodd-Frank Act is diverse, not only derivatives-related, but it also deals with setting rates for debit card fees, the breaking up of financial institutions considered to be too big, or even directives for compensation of corporate executives, hedge funds and proprietary trading for banks.

Especially for swap markets, the Act brings in strict constraints for this gigantic \$615trn (principal value) over-the-counter derivatives market, such as specific central clearing requirements or reporting requirements for swap dealers and big market participants, and an implicit menace of increased enforcement.

Generally, derivatives trading will definitely necessitate more capital as collateral in the future and it will become complicated to trade traditional products. Regulatory and compliance expertise will also be a serious issue for participants, therefore positions such as compliance officers will be created, as well as codes of ethics, and risk management specialists will be assigned.

4.2.2 Over the Counter Regulatory Reforms

The financial regulatory system must be mature enough so that past failures from derivatives will not jeopardize the whole economy again with catastrophic losses. The lessons from the AIG case showed that huge risks in derivatives markets could be ignored by regulators and market participants who did not have the authority to intervene, anyway, even if they detected worrying signs indicating emerging crisis. The meltdown in the global OTC derivatives system coming especially from the U.S.A. is a great lesson for the emerging Chinese derivatives market, which can avoid allowing the development of a too loose regulatory framework that could bring catastrophic repercussions after some years. In order to control systemic risks, the American government has set certain guidelines in its effort to reform today's operations of OTC derivatives markets, which can be useful to other jurisdictions as well, since they are the result of the last financial crisis.

Securities laws should be revised in order to demand the clearing of all standardized OTC derivatives via so called regulated central counterparties which require appropriate margin requirements and other necessary risk control mechanisms and not allow customized OTC derivatives to break these conditions.

All OTC derivatives dealers must have robust capital requirements, business ethics rules, reporting requirements, initial margin requirements for credit exposures on all standardized and customized contracts

Recordkeeping and reporting requirements for audit trails should be introduced by the authorities: requirements for all contracts which have not been cleared by central counterparties should be declared in regulated trade repositories with aggregate public information on open positions and trading volumes, as well as individual counterparties' trading activities.

CCPs and trade repositories must provide analytical information on all positions held by individual market participants to central regulators. Especially regulated institutions should shift towards regulated exchange-traded derivatives.

Central regulators (such as the U.S. homologues of CFTC and SEC) will be clearly empowered with the investigation of attempts for abusive market practices like fraud or market manipulation and setting limitations on OTC derivatives position that perform or affect a significant price discovery function with respect to futures markets. Thus, central regulators have access to all data flows from central counterparties, trade repositories, and market participants in the OTC derivatives markets.

Finally, there is a lot of debate on how to protect unsophisticated parties from opening potentially catastrophic / highly speculative derivatives positions, having always in mind the events resulting from reckless trading activities of small municipalities, pension funds, etc. Measures towards this direction are hard to propose, since this mostly belongs to the authorities of the states all these institutions are from.

4.2.3 Clearing House Issues

In the future, it has been already planned that container freight rates to be settled by a clearing house instead of an over the counter agreement in order to be a complete hedging instrument by eliminating default risk. As it has happened before with other freight derivatives, that container swaps must be adopted by more trading parties, reach a certain level of liquidity and manage to provide a complete freight curve, before a clearing house can settle derivative transactions in this new derivative market segment. Container freight swap agreements, as designed by brokers Clarkson Securities and Shanghai Shipping Exchange, will be settled through 2 clearing houses at later development stages.

In the last 2 years of the current financial crisis, many customers quit their existing shipping derivatives trading activities and even went away from the contracts they were involved in and demanded new terms owing to the collapse of freight rates.

Up to now, there was a dilemma whether derivatives prices should be linked to charter or freight rates among container shipping participants. As the spot container freight market was sufficiently liquid, while the spot charter market was relatively illiquid during the peak of the crisis,(in better periods, charter

contracts tend to extend to six or 12 months and spot trading drops), freight rates were selected for this innovative hedging instrument by Clarksons.

4.2.4 International Trends in Clearing Houses

Bank of America Merrill Lynch said it created a clearing service for over-the-counter derivatives. There is a global trend towards the expansion of clearing house in the whole spectrum of in OTC derivatives clearing; the securities business division of Bank of America launches a Global Futures and Derivatives Clearing Services (GFDCS) group "in anticipation of the substantial growth."

This is a consequence of the Dodd-Frank Wall Street Reform Act dictating that the bulk of credit default swaps shall evolve into standardized products which are tradable on electronic exchanges and "swap execution facilities."

What is more, Bank of America also prepares a business unit that would meet "the tremendous demand for education and related services from the company's institutional investor and corporate clients".

BofA's already provides clearing services and access to futures exchanges, so this group will function as part of BofA Merrill Lynch's Global Markets Financing and Futures operation covering prime brokerage and services.

Approximately 95% of all FFA transactions choose clearing houses as an intermediary in order to neutralize credit risk. However, not all traders can conduct business with clearing houses, which demand guarantees and credit checks for counterparties. Thus, most market participants resort to General Clearing Members, which extend the line of credit necessary for initial and variation margins in order to open FFA positions.

At LCH, 27 clearing members operate in the freight derivatives business. Clearnet as a clearing house processes about 75% of all dry FFAs transactions from financial institutions.

The Cleartrade Exchange introduces a credit filter or Client Margin Manager, setting financial limits for the clients of Clearing Members automating and accelerating confirmations and risk management for transactions, which is a request of the market participants.

4.2.5 Electronic Trading Platform Issues

There is a hot debate on the issue of an electronic trading platform for counter derivatives trades under the pressure of new US laws and pending EU regulations, while volumes traded on the dry freight derivatives market continue to shrink. At the moment, four proprietary screens are available by Imarex, GFI, SSS Futures and ICAP, while the so-called Baltex central screen is under construction.

Approximately 12 brokerages, mainly based in London voice-broker roughly 95% of all transactions, worth \$27 billion last year, with a 0.02 cents commission per lot traded. (One lot = 1,000 tons or one day's average time charter). There are also four brokers with few electronic transactions on a proprietary online platform.

Brokers are against any central screen if it does not “mandate compulsory broker nomination” to deal with incoming trades, a view which is opposed by The UK Financial Services Authority. So, they stopped supporting the Baltic Exchange-run central screen proposal when the regulator rejected compulsory broker nomination for all trades placed on the screen, as SSY Futures and other brokers use individual trading screens.

FSA must also approve this new Baltic Exchange proposal, the so-called Baltex screen first. Therefore, the Baltic Exchange waits for approval from the Financial Services Authority during this year.

It is a classic case of conflict of interest, as the brokers conduct 95% of freight derivatives transactions via telephone and they are against electronic trading which could minimize their role and squeeze commissions. Nevertheless, The Baltic Exchange is expecting to shift 30% of trades to the screen and bring additional liquidity to the market from banks and hedge funds. What's more forecasts show that over one billion tons of freight, 60% of the underlying physical market will be traded this year.

Additionally, there are various issues about how the whole system will be implemented. Different classes of users such as brokers, ship-owners, freight traders, banks and funds have different preferences and interests:

Banks and funds constitute almost 25% of traders, and are in favor of any additional liquidity that could enter the system and provide better price discovery which a central exchange or trading platform could achieve. Contrary to ship-owners, roughly 40% of the market, they are acquainted with electronic trading.

Another major group consists of commodity traders. 200 active traders conduct transactions worth about 1bn tons of freight a year, i.e. 60% of the underlying physical market, or 50% of the market at the peak of 2008 and they support broker nomination.

How to connect the different brokers' individual screens with the central Baltic Exchange screen, and accelerate the trading process for the central screen is another important problem, as are also screen transaction costs. According to the Baltic Exchange's proposal of \$6 per lot for each side of the trade, costs are estimated to be 25%-30% higher.

4.2.6 Liquidity and Clearing Issues for the New Derivatives Market

Commodities and derivatives markets are an evolving system going through deregulation or overregulation phases, financial and technological changes especially as new financial centers and markets are emerging. The liberalization of the economy usually introduces market deregulation but

sometimes there are also steps backwards in terms of degrees of freedom as we observe today with over-the-counter (OTC) markets, where major market participants closed custom made contracts among without intermediaries. However, the lack of transparency sparking the 2007 credit crisis will force markets to reconsider such policies.

Derivative markets must enhance trading opportunities which typically exist in spot markets and generate trading interest, if they create the belief among speculators/ hedgers/ arbitrageurs that they can contribute either to risk elimination or potential trading profits, although it is a zero sum game in the final analysis.

Prices must incorporate useful economic information and be, at least under normal conditions most of the time, immune to manipulation which is not always feasible, if large players are involved (i.e. energy markets).

A market is judged by its capability to provide competitive pricing to the players while it maximizes its profits. This is an optimization problem where the objective function, the operating profits depends on the sum of revenues minus processing and expected costs from the possibility of default (insurance cost).

The most important feature of a successful exchange system is transparency through price dissemination, so that market players have an accurate view of the market price for their bets and high magnitude are rare.

A significant issue in commodity and freight trading platforms is the opening of very large positions, as the physical nature of the underlying market creates price high elasticity vis-a-vis traded quantity, so large traders can obviously affect prices. Restricted disclosure for positions and anonymous quotes appear to be required, as markets that adopt such policies, provide more efficient price discovery than conventional option markets with the application of open outcry and a unique market maker.

An efficient implementation of such a system (with cleared and / or OTC Contracts) is ISE or multiple dealer markets, (the International Commodity Exchange). Liquidity is a function of bid-ask spreads, or decomposition of the variance of transaction prices, and when it is high, more transactions are executed through such a system, so it finally prevails, otherwise its sustainability is at stake.

If an exchange is controlled by a small number of large players, or crucial inventory data leak out, its future is endangered, as the story of the tin cartel proves, which led to non unacceptable inventory financing cost.

A policy of certain markets deals with liquidity dangers by enabling users to close a position at a quoted price of the exchange (only under special circumstances, though). When a market exhibits sudden, broad price fluctuations, this is a signal that players are modifying their strategy.

If transaction price changes are not attributed to different counterparties, liquidity soon runs out and time series time series exhibit a so-called regime. A solution for the prevention of such phenomena is to allow different position limits for hedgers, who generally tend to maintain their contracts up to their

expiration, unlike speculators. Nevertheless, OTC transactions through financial intermediaries / brokers which are so popular, has cancelled out such measures. Financial intermediaries, more often, open positions with hedging purposes, in order to offset the contracts they have with clients, but incomplete price discovery due to OTC contracts is observed. Thus, regulators are forced to introduce restrictions on short selling (e.g. electricity markets), but this prevents traders with a negative view on the market prices to contribute to price formation, and then prices are upwards biased.

4.2.7 Clearing and Margin Issues

Margins are acting as protection against daily price movements, which proves to be insufficient at extreme events. The remaining risk is undertaken by counterparties in OTC contracts or the clearing houses in organized exchanges.

Such highly unlikely events motivate market regulators not to build capital reserves, but instead, they resort to non transparent insurance schemes, which also entail systemic risk, i.e. perils from a broader systemic financial meltdown. Thus, a wider consortium of underwriting insurance parties as capital contributors could mitigate the probability of failure of the insurance contract during a systemic crisis.

Solely public authorities, like the Chinese State could market integrity for a new derivatives market, because a rapid intervention of liquidity is vital for market integrity.

Moral hazard issues always exist and they could be mitigated if exchange members and other parties are obliged to contribute to the covering of the losses, as well, in order to prevent intentional negligence.

4.2.8 Market Resuscitation after Extreme Events

Disaster contingency plans are nowadays necessary for guaranteeing market integrity after extreme events, as in the case of defaulted portfolios under harsh market conditions, where further loss increase must be stopped. Necessary operational and legal provisions such as the assignment of who will liquidate these portfolios and the appropriate legal framework, simplify the enforcement of such measures have to be prepared.

Sometimes, official resort to information non disclosure in order to be able to liquidate “toxic” portfolios, but if they are large enough, a fast liquidation will signal the truth and drive away market liquidity which may have cascade effects.

Societe Generale went through such a trial on January 2008 when 2 billion Euro losses on European equities positions multiplied to 5 billion within just one trading day, owing to hasty actions, i.e. attempting to unwind positions fast by dumping large volumes. It is much safer to negotiate with private parties, but also expensive.

Another related source of trouble is the legal enforcement of claims on margin or collateral, when multiple parties claim the same capital. A special legislation must make provisions for priority rules, or even cancel certain pending contracts. China, planning to develop OTC freight derivatives markets, must develop the appropriate legislation, by taking into considerations the lessons of the last financial crisis. Trading regulation must create clear and fair game rules, so that investors will not give up trading after repeated systemic crises leading to loss of credibility for the market.

Judicial systems are too slow in settling differences, so market oversight must be under the jurisdiction of exchange authorities.

4.3 Additional Recommendations

4.3.1 Introduction of an Organized Exchange in Sale & Purchase Forward Agreements (SPFAs)

SPFA on ship vessels derivatives on vessels as exchange traded contracts could be a very promising future market segment, because it gives the chance to smaller funds to have a view on vessels and engage in asset play, with smaller capital. A coming maritime exchange in Shanghai could also cater such financial instruments to retail investors as well, who may wish to invest in shipping, but they prefer to avoid opening a long or short position on a specific maritime company.

4.3.2 The Profitable Role of OTC in Trading for IMAREX, and the Importance of OTC Markets and freight Derivatives Brokers

A new derivative market in Shanghai must focus on the OTC business divisions, as it is major revenue contributor in other competitive exchanges, such as IMAREX: in 2009, 75% of its revenues originates from OTC deals, 8% from organized exchange activities, 11% from clearing and 6% from market services. In order to achieve this, this new entity in Shanghai must offer OTC contracts that are not common in other maritime exchanges.

OTC markets are so powerful, because they follow an evolutionary path, whereas exchange-traded contracts are totally non adaptive from the first moment, and thus frequently incompatible with the marketplace, and not able to be calibrated afterwards.

OTC markets are being dictated by so many governmental regulation agencies around the world to follow standardization, since standard financial instruments have limited liquidity risks compatibility with Clearing processes, but they lack the optimization taking place in OTC products due to market-place competition.

A new shipping exchange in Shanghai must focus on the domestic shipping forms and shippers by deploying native Chinese brokers, trained by Western experts, using the Chinese language, with Chinese

clientele, in order to attract domestic firms, more easily, that that had refrained from freight derivatives until now.

The role of a broker is crucial as an intermediary in the OTC market. Although there are many shipbrokers in the physical freight market, just a few are major market players in freight derivatives trading, namely Clarksons Securities Ltd., Freight Investor Services (FIS) and Simpson Spence and Young (SSY) in UK, and IMAREX in Norway. International alliances are crucial in the first steps of a Shipping derivatives market.

The building of a powerful network of brokers in Shanghai is essential for the success of the exchange as they serve a multitude of functions, which individual players like small ship-owners or shippers cannot serve systematically and efficiently:

- timely access to market information and its dissemination to the interested clients, such as daily reports, fixtures and major freight derivatives deals between brokers on a daily basis, counterparty risk related proprietary information
- risk management / financial / investment advisory
- develop a cluster of contacts of potential counterparties, diagnosing the state of the market, access to all trades
- contribution to the preparation of non-standardized OTC contracts: selection of the basic derivative form, negotiation of the main terms of the freight derivatives contract, finalization of the details
- building long, trustful, personal relationships with the clients
- offering tailor-made solutions to clients.
- having a liquid freight derivatives trading desk, capable of unwinding freight derivatives positions fast and with a minimum market impact / slippage and in parallel a separate physical broking desk
- providing competitive freight derivatives bid-ask spreads / brokerage fees
- specialization in specific market and/ or geographical segments and/or areas
- timely quotation for all contract types and durations.

4.3.3 Development of Domestic and Foreign Demand for Freight Derivatives

It is of great importance to stimulate domestic and foreign demand for freight derivatives for maximizing liquidity / depth of the market by symmetrically stimulating interest from the buy side and sell side, which means that ship owners, liner companies, exporters, as well as “traditional speculators” could be participating in this exchange, so that it became broadly accepted.

The container swaps can be viewed as measure / proxy of the macroeconomic variable related to the Chinese manufacturing output. Potential interest of Hedge Funds in container derivatives should be significant and it could boost trading volume in container derivatives, if they are allowed to participate in this exchange in the future, without constraints. A particular type, the so called global macro

investment style, could find useful application in its strategies. By including them into their portfolio with long or short positions, fund managers can more efficiently place bets on macroeconomic factors and neutralize risks on which they do not have a view. In order to do so, these container derivatives should not only be linked to exports from the port of Shanghai, but other major export ports must be eligible by means of derivative instruments for opening positions. Only through speculative trading activity can a recently born exchange achieve high trading volumes, so that hedgers can find adequate liquidity in the market.

Therefore, these new freight derivatives should not only track container shipping rates for routes departing from Shanghai with destinations to the Mediterranean Sea, Europe, US west coast, US east coast, Australia/New Zealand, West Africa, South Africa, South America, Persian Gulf, West Japan, East Japan, Southeast Asia, Korea, Hong Kong and Taiwan as proposed by the Shanghai (Export) Containerized Freight Index (SCFI): in the coming Shanghai futures exchange trading shipping derivatives, other routes starting from other major Asian ports as well, such as Singapore, Taiwan, Hong Kong etc. and even Europe, i.e. North Germany (Bremerhaven/ Hamburg) could be traded as well. What is more, the common import routes of commodities for China could be one of the first market segments that a new shipping exchange in Shanghai should attempt to conquer first, as the Chinese interests in these routes are increased. Therefore, these bulk freight derivatives routes could be starting from India, Latin America, and Australia.

4.3.4 A Consolidated Chinese / Pacific Region Clearing House

Shanghai must follow the Singapore paradigm where the Singapore Exchange launches the clearing of four new over-the-counter container swap contracts linked to the Shanghai Shipping Exchange's Shanghai Containerized Freight Index, while container freight swap trading also takes place on the LCH Clearnet Exchange in London.

Thus, counterparty credit risk is eliminated for participants who will not need to resort to credit agreements with the other side of the trading position. The necessity for an independent consolidated clearing house group in Shanghai is clear which should aim at serving Pacific region exchanges & platforms as well as participating in various OTC market deals and competing with Singapore's counterpart.

By clearing various asset class transactions such securities, exchange traded derivatives, energy, freight, interbank interest rate swaps, credit default swaps, or bonds and security lending, economies of scales and synergies can be achieved. What is more, clients can have higher leverage by using more sophisticated risk management protocols in this unified / consolidated clearing house. The level of margin is determined by the clearing house's sophisticated risk management division, who systematically analyze clients' positions and market risk.

A clearing house mediates in trades, neutralizing credit risk always inherent in trading. When the transaction is registered by a clearing house, it assumes the role of counterparty for the given trade,

guaranteeing a safe transaction. In the event of default, the clearing house intervenes. This of course boosts confidence in the financial system and the markets.

Initial and variation margin (also known as collateral) is paid by clearing members; should they fail, this margin is used to fulfill their obligations. This new consolidated clearing house could be regulated / overseen or constitute a subsidiary of the national securities regulator and/or Central Bank of China.

The compilation of a consolidated forward curve is essential for clearing purposes / daily mark to markets and the appropriate calculation of required margin.

If counterparty has inadequate capital cannot trade bilaterally or at least be obliged to present substantial collateral and even resort to clearing exclusively, in order to participate in the market. The solution of collateral as a security mechanism is a highly complicated method which is reserved for large players only, which is why bilateral trading is only for selected clientele in the final analysis. It must be stressed that during the 2008 financial meltdown, credit issues emerged in the physical shipping market as a first phase, with cargo interests defaulting on contracts for shipment and this is how ship operators propagated these problems to the FFA market, which was not the root of the crisis.

In theory, even a central data repository for market participants could be valuable for OTC trading and FFA deals in particular, but a lot of opposition could be met given the secretive character of shipping companies. Normally, no one should have a problem, if information from a CCP, such as trading volumes and open interest are freely accessible, but there could be resistance to publish data for client accounts (not just aggregate data for General Clearing Member positions).

4.3.5 Recommendations on New Bulk Indices

According to statements of officials, the Shanghai Shipping Exchange does not intend currently to launch some sort of dry bulk freight competing Baltic Dry Index and defy Baltic Exchange for tankers and bulk carriers.

There is a possibility for the Shanghai Shipping Exchange to establish its own dry bulk freight indices in the future, the current priority, however, is to expand and perfect the container freight indices focusing on the international shipping liner sector and even creating a secondhand ship index.

Morgan Stanley and Cargill International SA conducted the first transaction of a shipping iron ore to China from India forward freight agreement via Freight the broker Investor Services.

There is a great potential in India-China routes for the development of iron ore FFA, as well as freight and iron-ore swaps. This also shows a promising future for the design of new derivative products based bulk freight rates on new routes, centered on Chinese and other major Asian ports of India, for example.

Nevertheless, it is vital for the prestige of a new derivatives market in Shanghai, competing with the international rivals who are established, not to have failures which can be quite costly in terms of

reputation capital by launching highly generalized financial instruments that do not cater to the specific hedging requirements of hedgers, such as shippers and ship owners / charters. It must be emphasized that during the last 20 years, a multitude of novel exchange traded contracts have failed, and only evolution and trial by error in terms of testing the market acceptance, led the brokers to the present form of contracts and market status quo.

4.3.6 On Longer Maturities of Derivative Products (The LEAPS Paradigm)

The greatest problems of investors considering investment decisions for their participation in an IPO, a shipping loan (e.g. financial institutions), just equities purchase of shipping firm, or fleet expansion, because there is no price discovery mechanism in the mid-term horizon that can enable the investor to fix revenues for a decade. If we consider a 30-35 year age for a vessel, where all scenarios for the world economy can happen and thus cancel out really bad shipping cycle periods with subsequent brighter ones, the undertaken risks are not so severe; and one can bet on the shipping sector, in various ways, more carelessly. But as the maturity of modern freight derivatives is very limited, a financial instrument that would definitely be of use to a broad investor base is FFA with an increased duration, even up to 10 years, that would cater to the needs of various market participants, who wish to make a long term commitment to shipping with their investment, but the price volatility and uncertainty in the next decade is a risk factor they may prefer to eliminate.

A financial innovation that could be introduced in the Shanghai derivatives market is to combine features of standard freight derivative types, such as Forward Freight Agreements, Futures or with features from LEAPS (Long-Term Equity Anticipation Securities): These do not differ dramatically from typical short-term publicly traded options, but the later expiration dates gives a chance to mid-term market participants to have exposure to price fluctuations having to roll over shorter-term option contracts.

The premiums for LEAPs may be costlier than typical options for a given equity (as they are also thinly traded, commissions costs are also higher and longer maturity means that they have increased chances to be in the money, i.e. profitable at expiration), but the prolonged expiration date could lead to higher payoffs as the price of the linked asset can make larger fluctuations, since more time elapses until the termination date. What is more, the investor can allocate smaller amounts of funds and achieve high leverage in the future.

In the shipping derivatives case, one could use an even longer duration for FFAs and come up with a financial product that can provide hedging for a freight rate route, or even better a combination of routes for up to a decade.

The key to success for the launching such instruments is to achieve a robust secondary market, where counterparties will find it relatively easy to liquidate contracts and exit their trades, if they need too.

4.3.7 Exotic Option Structures in New Derivative Products

Generally, the instruments presented so far are called plain vanilla, as they are standardized and traded regularly and have a simple structure, so their prices or implied volatilities can be quoted financial intermediaries systematically.

Financial engineers have come up with a multitude of new “exotic” products, sometimes out of a real hedging problem in the market; such as tax, accounting, legal, or regulatory issue, which must be solved, or in order to speculate; Some other times, they just serve the purpose of an investment bank that wants to make a more intricate investment product appear more valuable than it is to an ignorant counterparty.

Exotic Derivative types that could be linked to freight rates in the Shipping market are:

Range options

Their payoff is a function of the range (i.e. the spread between the maximum and the minimum values) of the underlying asset during its duration, and it can find applications in freight rates

Barrier options

Their payoff depends on whether an asset's price will reach a predetermined level within specified time limits. A number of different types of barrier options regularly trade in the over-the-counter market. It makes them interesting because they are less expensive than plain vanilla options and they fall into two categories: knock-out options or knock-in options. A knock-out option is invalid when the linked asset price hits a barrier; a knock-in option becomes valid by the time the linked asset price hits a specified barrier.

Digital / binary options

Here, the payoff is a predetermined amount of capital or an asset or just nothing. Thus, they are called either cash-or-nothing binary options or asset-or-nothing binary options. Sometimes, they are embedded in other option contracts constituting so-called structured products. An effort should be made to standardize some of these options and introduce them as exchange traded contracts, in the cases where this is possible.

Lookback options

These have path dependency regarding the payoff. There are two varieties of Lookback options: with floating strike or with fixed strike.

In the first case, the exercise price is floating and is set only at maturity. The floating strike is the maximum or minimum value of the linked asset's price through the option's lifetime. The payoff is the spread between the linked price at maturity and the floating strike, the lowest asset's price for the call, and the highest asset's price for the put. This is not exactly an option, as it always pays for the holder to exercise it at the maturity, i.e. it cannot be out-of-the-money.

In Lookback Options with Fixed Strike, the option's exercise price is given, and it generates a cash flow equal to the spread between the maximum (call option) or the minimum (put option) exhibited in the linked asset price time series and the exercise price. These instruments resemble plain vanilla options (call or put), but the only difference is that the maximum or minimum value throughout the lifetime of the contract determines the payoff, not the value at expiration.

4.3.8 Introducing Container Derivatives Vis-a-vis Carrier Contracts

Container swaps can address inherent weaknesses of long-term carrier contracts: if their market reaches a critical liquidity levels, it could boost carrier contract volume and long-term commitment in business relationships of carriers / shippers which would lead to minimization of default risk and moral hazards of not honoring carrier contracts, as it used to happen in the past.

The negotiation of fixed rates is indispensable in all business sectors guaranteeing operational and financial stability and reducing pricing volatility. However, the possibility of contract default was frequently tempting, but the risk-management approach of container derivatives through clearing conserves all positive aspects of carrier contracts and enhances them, as there is no need to renegotiate rates on an already closed contract, if it is expected that costs such as bunker, port charges, and insurance will go up. An opposite position in container swaps can undo the contract in a synthetic manner: previously, a fixed, inflexible, long-term box-rate agreed in a contract would be highly problematic for the financial planning of a carrier, and force the operator to either renegotiate the annual rate, or resort to a fuel surcharge on the contract (and force the shipper not to honor the contract sometimes), or even default on the contract with a shipper and risk losing the customer, who will prefer another line in the future, by upsetting him.

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- Interviews with experts and industry stakeholders.

5 APPENDIX

Specifics of International Exchanges

SSE

SGX OTC Contracts for Clearing	Routes
FFAs	<p>Wet</p> <p>TD3 Tanker Dirty Route 3, Middle East Gulf to Japan (Ras Tanura Chiba), 260,000 MT</p> <p>TC4 Tanker Clean Route 4, Singapore to Japan (Singapore Chiba), 30,000 MT</p> <p>TC5 Tanker Clean Route 5, Middle East Gulf to Japan (Ras Tanura Yokahama), 55,000MT</p> <p>Dry Bulk</p> <p>C3 Capesize Route 3 Tubarao - Beilun/Baoshan, 150,000 MT</p> <p>C4 Capesize Route 4 Richards Bay-Rotterdam, 150,000 MT</p> <p>C5 Capesize Route 5 W Australia Beilun/Baoshan, 150,000 MT</p> <p>C7 Capesize Route 7 Bolivar - Rotterdam, 150,000 MT</p> <p>P2A Panamax Route 2A, Skaw/Gibraltar Far East, re-delivery Taiwan/Japan range, 60/65 days</p> <p>P3A Panamax Route 3A, Trans Pacific round either Australia or Pacific, delivery and re-delivery Japan/South Korea range, 35/50 days</p> <p>CTC Capesize Time Charter Basket</p> <p>PTC Panamax Time Charter Basket</p> <p>STC Supramax Time Charter Basket</p> <p>HTC Handysize Time Charter Basket</p> <p>Half-Day CTC Capesize Time Charter Basket</p> <p>Half-Day PTC Panamax Time Charter Basket</p> <p>Half-Day STC Supramax Time Charter Basket</p> <p>Half-Day HTC Handysize Time Charter Basket</p>

Other Derivatives	Oil Dubai Crude Oil Brent-Dubai Crude Oil Swaps Spread Gasoil Swap FOB Singapore Kerosene Swap FOB Singapore Naphtha Swap FOB Singapore Fuel Oil 180 cst Swap Fuel Oil 380 cst Swap Balance-of-Month Fuel Oil 180 cst Swap Balance-of-Month Fuel Oil 380 cst Swap Balance-of-Month Gasoil Swap FOB Singapore Balance-of-Month Dubai Crude Oil Swap Balance-of-Month Kerosene Swap Mini Fuel Oil 180 cst Swap Mini Fuel Oil 380 cst Swap Visco Spread Regrade Spread Petrochemical Benzene Swap FOB Korea Bulk commodity Iron Ore CFR China (62% Fe Fines) Swap
Container Derivatives	Shanghai-Europe Container Swap Shanghai-Mediterranean Container Swap Shanghai-US West Coast Container Swap Shanghai-US East Coast Container Swap

NYMEX

Contracts on CME ClearPort	Routes
Futures	Route TD3, Arabian Gulf to Japan, 250,000 tons Route TD5, West Africa to the U.S. Atlantic Coast, 130,000 tons Route TD7, North Sea to European Continent, 80,000 tons Route TC2, Rotterdam to the U.S. Atlantic Coast, 37,000 tons Route TD9, Caribbean/U.S. Gulf, 70,000 tons Route TD10, Caribbean/U.S. Gulf, 50,000 tons

Forwards	TD3, Middle East – Japan, 260,000 tons TD5, West Africa – US East Coast, 130,000 tons TD7, North Sea – European Continent, 80,000 tons TD9, Caribbean / US Gulf, 70,000 tons TD10D, Caribbean – US East Coast, 50,000 tons TC2, Continental Europe – US East Coast, 37,000 tons TC4, Singapore – Japan, 40,000tons TC6, Algeria – European Mediterranean Coast, 30,000 tons TC1, Middle East – Japan, 75,000 tons
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NOS

Products on freight and oil products market	Routes
Future Contracts	Tankers TD 7, Aframax, North Sea - Continent, 80,000 mt TD 9, Aframax, Caribs – USG, 70,000 mt TD 5, Suezmax, West Africa - USAC, 130,000 mt TD 3, VLCC, AG – East, 260,000 mt TD8, Aframax, Kuwait – Singapore, 80,000 mt TD17, Aframax, Baltic Sea – Continent, 100,000 mt TD11, Aframax, Cross – Med, 80,000mt TD16, MR, Black Sea – Mediterranean, 30,000mt TC 4, MR, Singapore - Japan, 30,000 mt TC 2, MR, Continent – USAC, 37,000 mt TC 5, LR 1, AG – Japan, 55,000 mt TC 6, MR, Algeria – Euromed, 30,000 mt TC11, South Korea – Singapore, 40,000 mt TD18, MR, Baltic Sea – Continent, 30,000mt TC2USD, MR Continent-USAC, 37,000mt TD3USD, VLCC AG-East, 260,000mt TD3_TCE, VLCC AG-East, 260,000mt Dry Bulk C4, Capesize, Richards Bay Rotterdam, 150,000 mt C7, Capesize, Bolivar Rotterdam, 150,000 mt

	<p>C4 AVG: Capesize, Richards Bay Rotterdam, 150,000 mt</p> <p>C7 AVG: Capesize, Bolivar Rotterdam, 150,000 mt</p> <p>P2A, Panamax, T/C Skaw Gibraltar Far East</p> <p>P3A, Panamax, T/C S.Korea Japan Pacific R/V</p> <p>S7, Supramax, East Coast India China</p> <p>P1A, Panamax, T/C, Transatlantic RV</p> <p>CS 4 TC, Capesize, T/C Average</p> <p>PM 4 TC, Panamax, T/C Average</p> <p>HS 6 TC, Handysize, T/C Average</p> <p>SM 6 TC, Supramax, T/C Average</p> <p>Oil Products</p> <p>RDM35FO, Fuel Oil 3.5% FOB Barges Rotterdam</p> <p>NWE10FO, Fuel Oil 1% FOB Cargoes NEW</p> <p>SPO180FO, Fuel Oil 180 CST FOB Cargoes Singapore</p> <p>SPO380FO, Fuel Oil 380 CST FOB Cargoes Singapore</p> <p>USG30FO, Fuel Oil US Gulf Coast No.6 3.0% Sulphur FOB</p>
Option Contracts	<p>Tankers</p> <p>TD 7, Aframax, North Sea - Continent, 80,000 mt</p> <p>TD 9, Aframax, Caribs – USG, 70,000 mt</p> <p>TD 5, Suezmax, West Africa - USAC, 130,000 mt</p> <p>TD 3, VLCC, AG – East, 260,000 mt</p> <p>TD8, Aframax, Kuwait – Singapore, 80,000 mt</p> <p>TD17, Aframax, Baltic Sea – Continent, 100,000 mt</p> <p>TD11, Aframax, Cross – Med, 80,000mt</p> <p>TD16, MR, Black Sea – Mediterranean, 30,000mt</p> <p>TC 4, MR, Singapore - Japan, 30,000 mt</p> <p>TC 2, MR, Continent – USAC, 37,000 mt</p> <p>TC 5, LR 1, AG – Japan, 55,000 mt</p> <p>TC 6, MR, Algeria – Euromed, 30,000 mt</p> <p>TC11, South Korea – Singapore, 40,000 mt</p> <p>TD18, MR, Baltic Sea – Continent, 30,000mt</p> <p>TC2USD, MR Continent-USAC, 37,000mt</p> <p>TD3USD, VLCC AG-East, 260,000mt</p> <p>TD3_TCE, VLCC AG-East, 260,000mt</p> <p>Dry Bulk</p> <p>C4, Capesize, Richards Bay Rotterdam, 150,000 mt</p>

	C7, Capesize, Bolivar Rotterdam, 150,000 mt C4 AVG: Capesize, Richards Bay Rotterdam, 150,000 mt C7 AVG: Capesize, Bolivar Rotterdam, 150,000 mt P2A, Panamax, T/C Skaw Gibraltar Far East P3A, Panamax, T/C S.Korea Japan Pacific R/V S7, Supramax, East Coast India China P1A, Panamax, T/C, Transatlantic RV CS 4 TC, Capesize, T/C Average PM 4 TC, Panamax, T/C Average HS 6 TC, Handysize, T/C Average SM 6 TC, Supramax, T/C Average
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LCH.Cleynet

LCH.Cleynet contracts for clearing	Routes
FFA Swaps	Dry Cargo C4, C4E (Capesize Richards Bay – Rotterdam) C7, C7E (Capesize Bolivar – Rotterdam) C3E (Tubarao – Qingdao) C5E (W Australia – Qingdao)P1A, P1E (Panamax Transatlantic RV) P2A (Panamax Cont Trip Far East) P3A (Panamax trans Pacific round voyage) S7 (East coast India - China) Tanker TD3 (260,000 mt ME Gulf – Japan) TD5 (130,000 mt W Africa – USAC) TD7 (80,000 mt North Sea – Cont) TD11 (80,000 mt Cross Med) TC2 (37,000 mt Continent – USAC) TC4 (30,000 mt Singapore – Japan) TC5 (55,000 mt ME – Japan) TC6 (30,000 mt Algeria/Euromed) TC2 (DC2) (37,000 mt Continent – USAC) TD3 (DD3) (260,000 mt ME Gulf – Japan)
FFA Options	Timechartering

IMAREX

Products	Routes
Future Contracts	<p>Tankers</p> <p>TD 7, Aframax, North Sea - Continent, 80,000 mt</p> <p>TD 9, Aframax, Caribs – USG, 70,000 mt</p> <p>TD 5, Suezmax, West Africa - USAC, 130,000 mt</p> <p>TD 3, VLCC, AG – East, 260,000 mt</p> <p>TD8, Aframax, Kuwait – Singapore, 80,000 mt</p> <p>TD17, Aframax, Baltic Sea – Continent, 100,000 mt</p> <p>TD11, Aframax, Cross – Med, 80,000mt</p> <p>TD16, MR, Black Sea – Mediterranean, 30,000mt</p> <p>TC 4, MR, Singapore - Japan, 30,000 mt</p> <p>TC 2, MR, Continent – USAC, 37,000 mt</p> <p>TC 5, LR 1, AG – Japan, 55,000 mt</p> <p>TC 6, MR, Algeria – Euromed, 30,000 mt</p> <p>TC11, South Korea – Singapore, 40,000 mt</p> <p>TD18, MR, Baltic Sea – Continent, 30,000mt</p> <p>TC2USD, MR Continent-USAC, 37,000mt</p> <p>TD3USD, VLCC AG-East, 260,000mt</p> <p>TD3_TCE, VLCC AG-East, 260,000mt</p> <p>Dry Bulk</p> <p>C4, Capesize, Richards Bay Rotterdam, 150,000 mt</p> <p>C7, Capesize, Bolivar Rotterdam, 150,000 mt</p> <p>C4 AVG: Capesize, Richards Bay Rotterdam, 150,000 mt</p> <p>C7 AVG: Capesize, Bolivar Rotterdam, 150,000 mt</p> <p>P2A, Panamax, T/C Skaw Gibraltar Far East</p> <p>P3A, Panamax, T/C S.Korea Japan Pacific R/V</p> <p>S7, Supramax, East Coast India China</p> <p>P1A, Panamax, T/C, Transatlantic RV</p> <p>CS 4 TC, Capesize, T/C Average</p> <p>PM 4 TC, Panamax, T/C Average</p> <p>HS 6 TC, Handysize, T/C Average</p> <p>SM 6 TC, Supramax, T/C Average</p>

	<p>Oil Products</p> <p>RDM35FO, Fuel Oil 3.5% FOB Barges Rotterdam</p> <p>NWE10FO, Fuel Oil 1% FOB Cargoes NEW</p> <p>SPO180FO, Fuel Oil 180 CST FOB Cargoes Singapore</p> <p>SPO380FO, Fuel Oil 380 CST FOB Cargoes Singapore</p> <p>USG30FO, Fuel Oil US Gulf Coast No.6 3.0% Sulphur FOB</p>
Option Contracts	<p>Tankers</p> <p>TD 7, Aframax, North Sea - Continent, 80,000 mt</p> <p>TD 9, Aframax, Caribs – USG, 70,000 mt</p> <p>TD 5, Suezmax, West Africa - USAC, 130,000 mt</p> <p>TD 3, VLCC, AG – East, 260,000 mt</p> <p>TD8, Aframax, Kuwait – Singapore, 80,000 mt</p> <p>TD17, Aframax, Baltic Sea – Continent, 100,000 mt</p> <p>TD11, Aframax, Cross – Med, 80,000mt</p> <p>TD16, MR, Black Sea – Mediterranean, 30,000mt</p> <p>TC 4, MR, Singapore - Japan, 30,000 mt</p> <p>TC 2, MR, Continent – USAC, 37,000 mt</p> <p>TC 5, LR 1, AG – Japan, 55,000 mt</p> <p>TC 6, MR, Algeria – Euromed, 30,000 mt</p> <p>TC11, South Korea – Singapore, 40,000 mt</p> <p>TD18, MR, Baltic Sea – Continent, 30,000mt</p> <p>TC2USD, MR Continent-USAC, 37,000mt</p> <p>TD3USD, VLCC AG-East, 260,000mt</p> <p>TD3_TCE, VLCC AG-East, 260,000mt</p> <p>Dry Bulk</p> <p>C4, Capesize, Richards Bay Rotterdam, 150,000 mt</p> <p>C7, Capesize, Bolivar Rotterdam, 150,000 mt</p> <p>C4 AVG: Capesize, Richards Bay Rotterdam, 150,000 mt</p> <p>C7 AVG: Capesize, Bolivar Rotterdam, 150,000 mt</p> <p>P2A, Panamax, T/C Skaw Gibraltar Far East</p> <p>P3A, Panamax, T/C S.Korea Japan Pacific R/V</p> <p>S7, Supramax, East Coast India China</p>

	P1A, Panamax, T/C, Transatlantic RV CS 4 TC, Capesize, T/C Average PM 4 TC, Panamax, T/C Average HS 6 TC, Handysize, T/C Average SM 6 TC, Supramax, T/C Average
FFAs	-

FIS

FIS PRODUCTS	Routes
Container Swaps	Far-East-US west coast (Contract Code: CEW) Far-East -US east coast (Contract Code: CEE) Far-East-Mediterranean (Contract Code: CNM) Far-East -North Western Europe (Contract Code: CNW)
FFAs	Richards Bay – Rotterdam Bolivar - Rotterdam Pacific round Continent – Far East US Gulf – Japan Time charter
Freight Options	-
Physical	-