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The research on ship financing lease mode and risk prevention

Yang Liu

WORLD MARITIME UNIVERSITY

Shanghai, China

The Research on Ship Financing lease mode and Risk prevention

By

Liu Yang

China

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DECLARATION

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

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

…….

(Liu Yang)

…….

Supervised by

Professor Liu, Wei

Shanghai Maritime University

Assessor

World Maritime University

Co-Assessor

Associate Professor

Shanghai Maritime University

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ABSTRACT

Title of Dissertation: **The Research on Ship financing lease mode and Risk prevention**

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From the global point of view, as a capital centralized and technology centralized industry, the development of shipping business is closely related to the capital support of the finance. As we all know, the shipping market is highly risky with big profits, at the meantime; it is closely related to the fluctuation of the market, which is so changeable. Entering into financing market is like going into the stock market, everyone wishes to go in low and get out high, however, no financial institution can be sure which the bottom of the finance market is, and when is the best time to enter the finance market. Whether they can find suitable finance channels or methods for companies' future development is the most remarkable problem for expansion of fleet and strengthening of competition. As one of the most important ways to perform ship financing, this essay would focus on ship financing lease. The dissertation is finally completed based on deeply investigations on many shipping enterprises and finance institutes home and abroad，combination with the shipping market status quo，ship leasing in environment, structure, laws and policy aspects of the comparative study between China and foreign countries，existed problems and risks of shipping finance leasing in our country, Use the multi-object investment decision-making model, and NPV model aiming at vessel purchase with loan and finance leasing is set up to analyze the superiority of finance leasing compared with vessel purchasing with examples.

KEY WORDS: Ship financing lease, risks of ship financing lease, multi-object investment decision-making model, NPV model.

TABLE OF CONTENTS

DECLARATION.....

ACKNOWLEDGEMENT.....

ABSTRACT.....

LIST OF TABLES.....

LIST OF ABBREVIATIONS.....

Chapter1. INTRODUCTION 1

1.1 Background of this Dissertation 1

1.2 Literature Review 2

1.3 The Framework and Content of this Dissertation 7

Chapter2. Summary of ship financing lease..... 9

2.1 Characteristics of Ship financing lease 9

2.2 Basic types of ship financing lease 12

2.3 Ship financing lease operation 13

2.3.1 Financing lease modes 13

2.3.2 Ship financing lease operation 13

2.4 Advantages of ship financing lease 14

2.4.1 Advantage in itself 15

2.4.2 Advantages compared with commercial loan 16

2.4.3 Advantages compared with operating lease 17

2.4.4 Advantages for ship leasers to adopt financing lease 18

2.4.5 Advantages for ship lessees to adopt financing lease 18

2.5 Comparative analysis on cost of ship finance lease and purchase ship with loans 20

2.5.1 Comparative analysis based on cash flow method..... 20

2.5.2 Formula of net present value calculation method 20

Chapter3. Analysis and suggestions on China's ship finance lease mode..... 30

3.1 Exploration and development of ship finance lease system. 30

3.2 Lease mode of ship finance 32

3.3 Experience of Europe and Korea in ship finance lease..... 32

3.4 Practical finance lease modes 37
3.4.1 Lease transaction modes of ship finance lease companies 37
3.4.2 Trust mode of trust institutions 39
3.5 Finance lease of shipping industry 40
Chapter4. Analysis on ship financing multi-objective investment decision-making 45
4.1 Characteristics of multi-objective financing decision-making 45
4.2 Establishment of multi-objective financing decision-making indexes 46
4.3 Improve multi-objective financing decision-making mode 50
4.3.1 Improve multi-objective investment decision-making mode 50
4.3.2 Major improvements to this investment decision-making model 53
Chapter5. Analysis on risk of ship finance lease and countermeasures 55
5.1 Common risks in ship finance lease and countermeasures 55
5.2 Credit risk, third party liability risk and countermeasures 57
5.3 Political risk and countermeasures 60
5.4 Current ship finance situation facing China's shipbuilding industry and risk prevention measures 62
Chapter6. Conclusion 68
Reference 69

LIST OF TABLES

Table 2.1 The ship's NPV with loan after Tax

Table 2.2 The ship's Finance Leasing NPV after Tax

Table 3.1 Typical structure of a KG Deal

Table 3.2 Total KG Capital Raised, 1989-2004

Table 3.3 Top 10 initiators of KG Shipping Investments

Table 3.4 Typical Structure of a Korean Shipping Fund

LIST OF ABBREVIATIONS

NPV	Net Present Value
IPO	Intial Public Offering
KG	Kommanditgesellschaft
KOMARF	Korea Marine Fund Corporation
KS	Kommandittsel Skap
KSF	Korea Ship Finance
LIBOR	London Interbank Offered Rate
MFI	Maritime Finance Incentive
LG	Letter of Guarantee
TEU	Twenty-foot equivalent unit
DWT	Deadweight ton

INTRODUCTION

1.1 Background of this Dissertation

Shipping is not only a capital-intensive, but also a technology-intensive industry. Shipping market is a large-scale, competitive market full of risks. The ship investment is large-scale in the shipping industry, and it is closely related to shipping development. The ship investment is not just in domestic investment ship areas, but also an important area for international investment, which predicts the complexity and risk of ship investing. Ship finance plays an important supporting role to the ship investment decision, which will cast direct influence not only on the whole process of management from purchasing ships to operating them, but also on the future business profit of shipping enterprises.

In the international community investment, it is very common for the developed countries to implement ship financing by financing lease, which also brought a lot of the profits. In China, some of the enterprises began to start the business of ship financing lease, but the number is limited. This essay probes into the necessity and feasibility of China's implementation of ship financial lease through research and analysis; which also analyzed the advantages as well as the risks of ship financial lease. This paper gives the suggestions on solving the practical problems in the process of China's shipping financial lease. The essay firstly made the As well as shipping center and financial center going forwards, ship financing lease business in China will catch more and more attention. However, the current capacity of the enterprises' risk management is weak, and lack modern risk management system. Therefore, it is helpful to draw on the risk management methods from other academic field for further development of ship financing lease business, which will significantly promote the overall development of the industry.

Due to the fact that ship investment and finance markets are enormously affected by world economy and international trade, and that ship investment project has such characteristics as big capital occupation, long profit-gaining period and many indefinite elements, there exists a great risk in the project of ship investment, which is, in many cases unpredictable. Therefore it is very necessary to make risk analysis on the projects of ship investment and finance by using scientific and appropriate means of decision-making. In the modern management shipping enterprise, various influencing factors of vessel investment and finance projects should be recognized, approximated and assessed before final decision is made.

1.2 Literature Review

First, Overview of the ship finance

The United Nations Conference on Trade and Development (UNCTAD) estimates that the operation of merchant ships contributes about US $ 380 billion in freight rates within the global economy, equivalent to about 5 % of total world trade.

"In addition, the shipping industry, with its 30.000 world-wide companies is one of the three most finance-intensive industries in the world, needing, by rough estimation, about 80 billion dollars per year for financing new buildings alone (Goulielmos et al., 2006)." [1]

"Capital payments dominate shipping companies cash flow and decisions about financial strategy are among the most important that their executives have to make. For this reason alone ship finance deserves a special place in the study of shipping economics (Stop ford, 1997)." [2]

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[1] **Goulielmos, A.M., Psifia, M. (2006). Shipping Finance: Time to Follow a New Track, Maritime Policy and Management. 33: 301-320.**

[2] **Stopford, M. (1997). Maritime Economics, 2nd Edition, Routledge Taylor&Francis Group, London and Ne**

"More than most other forms of finance, ship finance is international. The financing of large ocean-going ships are undertaken by banks all over the world, by no means just owners in their own country. On the contrary, and certainly for larger ships and larger owners, one is more likely to find, for example, an American bank, acting through its London office, lending to a Greek-controlled owning company and securing itself on a Liberian registered ship. There may be a degree of patriotism but if a foreign bank can offer better terms, then owners, accustomed to international dealings in the everyday operation of their ships, will not be troubled about dealing with foreign lenders (French, 2006). "[3]

"The shipping finance has mainly two advantages. These are the universal currency of the US dollar and the importance of English Law. Furthermore," London has a reputation as a centre for innovative ship finance structures and other options such as leasing. In ship finance, foreign commercial banks in London accounts for 17% of the global market (International Financial Services, 2005). "[4]

Second, the Developments of Ship Finance Methods:

The mainly world bank's range of products and services for shipping companies operating on an international scale includes long-term ship mortgage loans, finance during construction and structured ship finance. The commercial banks or financial institutions assist its customers both in carrying out projects to build new vessels and in purchasing ships from other sources.

"Originally, it is only in the last 20 years that there has been any significant

[3] **French, L. (2006). The international Element, In Shipping Finance, (S.Harwood, ed.), Euromoney Institutional Investor Plc., London, pp. 1-2.**

[4] **International financial Services, (2005). Maritime Services City Business Series, International Financial Services, London.**

development in alternative sources of capital available to shipping. These sources include both of debt and equity from the public markets, tax-based partnership such as the KS in Norway and KG in Germany, tax lease finance, equity funds and so on. Some of these financial products only become available periodically depending upon conditions in both the shipping and financial markets. At the time of writing, bank debt finance remains the dominant source of capital, providing over 70 percent of the industry's external finance needs. This is unlikely to change much in the foreseeable future, especially for bulk shipping, although much will depend upon how the shipping markets perform in the future (Brauner et al., 2006)." [5]

The number of banks interested in financing ships and the appetite for greater risk and underwriting capacity for such assets has grown substantially. Shipping finance now attracts a diverse group of financial institutions that range from shipping banks and project finance houses to export credit agencies and newer sources of finance such as Kommenditgesellschaft ('KG') funds, Initial Public Offering ('IPO'). Banks are willing to stretch loan maturities, reduce pricing, relax loan covenants and take higher project and country risks.

"Bank loans may be the main source of ship finance, however, as capital requirements in the industry increase and shipping companies become more sophisticated, the demand for alternative ways of raising capital, long available and regularly employed by corporations in other industries, increases. Some Shipping fund like German KG, Norwegian KS and Singapore MFI Scheme was introduced in recent years where one of the intentions is to create more alternative financing methods for ship-owners and operators. One of the markets that look set to develop is that of the equity finance market in Shanghai, China. This has made it relevant to study the development of equity finance of shipping and also to access the

[5] **Brauner, A., Illingworth, P. (2006). The banker's perspective, In Shipping Finance, (S. Harwood, ed.), Euromoney Institutional Investor Plc., London, pp. 67-92.**

international competition from other similar finance structures." [6]

Third, Basic characters and concept of ship financing lease

The so-called "financing" that is monetary circulation from the Macroscopic Angle, financing in bridge has been set up between capital supply and demand, promote the saving to investment, idle funds to construction capital, currency to capital transformation, not only can help various social economic elements effectively solve the contradiction of payment imbalance, maintaining social production and people's life of normal continuation, but also be able to grow a society's wealth creation ability, accelerate the commodity expanded reproduction process. From the Micro perspective, capital to become the enterprise's blood, and is the primary and continuous impetus in the enterprise economic activities. The ship financing means that the economic entity financing and raise the ship investment capital behavior and activity in shipping industry.

A recent research of shipping finance (2007) in the paper says "The merchant shipping finance is one of the products of the industrial revolution(James, 1929). The ship finance has been facing dramatic changes since Cyril James wrote these words in 1929. While global demand for banking services remains strong, the deregulated market place is forcing individual shipping companies for new and existing customers. As cost pressures and service demands escalate, ship owners and bankers or financiers are collaborating strategically to share resources and information while also realizing economies of scale. There are many models suited to the financing of ships, and numerous different ways of structuring these models by means of commercial banks, ship mortgage banks, investment and merchant banks, finance houses, brokers,

[6] **Pan Ju Gek，Erasmus University Rotterdam, MSc in Maritime Economics and Logistics， ship finance in Singapore, page1 2.**

leasing companies and shipbuilding credit schemes." [7] Along with the development of marine technology and regulation, the ship's newbuilding price and standard is increasing day by day, and shipping industry belongs to a substantial investment, long recovery cycles business, which makes the shipping enterprise on the basis of high efficiency using self-owned capital and also need to raise fund through multiple channels.

The dissertation is finally completed based on deeply investigations on many shipping enterprises and finance institutes home and abroad, combination with the status quo, existed problems and risks of shipping finance leasing in our country, and consultation in many famous experts' research fruits. It first makes a brief introduction about several shipping finance modes that are prevalently applied in practice and makes a profound analysis of the huge disparity between current domestic finance and international advanced finance. Subsequently, imports multi-object investment decision-making model, and meantime，the dissertation makes some advisable improvements on the model for consultation in many relevant experts' research fruits and combination with individual views and researches to reflect the actual situations more faithfully.

This paper analyzes various risks that may be encountered in practice and takes several effective methods to elude the finance risks. Finally it puts forward an optima scheme to set up specific ship finance fund to adjust the severe problems faced by the mini-scale shipowner and investors. It is not only beneficial for the banks to reduce risks effectively but also can help the mini-scale shipowner and investors raise sufficient funds to enlarge the scale of the companies. Subsequently, finance leasing which enjoys great popularity in the shipping world is expatiated in details and NPV model aiming at vessel purchase with loan and finance leasing is set up to analyze the

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[7] **E. Cihan Akca，Istanbul University, Institute of Marine Science and Management, Department of Maritime Management，Latest major developments in shipping finance, Property insurance, page1 2.**

superiority of finance leasing compared with vessel purchasing with examples. To sum up, it puts forward some constructive and useful suggestions for the internationalization of domestic shipping finance leasing.

1.3 The Framework and Content of this Dissertation

This paper firstly makes a brief introduction about several ship financing modes that are prevalently applied in practice and makes a profound analysis of the huge disparity between current domestic finance and international advanced finance. Through analyzing and modeling Europe and Asia finance lease pattern, obtains finance lease pattern which may be used in practice of our country, the paper introduces the situation of China ship financing lease market. As following, the paper makes a comparison research on operation of automotive sea transportation. In this part, it introduces multi-object investment decision-making model. Meantime，the dissertation makes some advisable improvements on the model for consultation in many relevant experts' research fruits and combination with individual views and researches to reflect the actual situations more faithfully. Subsequently, finance leasing which enjoys great popularity in the shipping world is expatiated in details and NPV model aiming at vessel purchase with loan and finance leasing is set up to analyze the superiority of finance leasing compared with vessel purchasing with examples. In the last, analyzes various risks that may be encountered in practice and takes several effective methods to elude the finance risks. It puts forward an optima scheme to set up specific ship finance fund to adjust the severe problems faced by the mini-scale shipowner and investors.

The purpose of this paper is to discuss the necessity of developing domestic ship financing lease. This author will give answers to following questions:

- How is the future of China ship financing lease market
- Whether financing lease model is the best way to shipping enterprises comparing to other alternatives

- Whether it’s necessary to develop the Ship financing lease for Chinese shipping financial market
- How to prevent the risk of Ship financing lease for Chinese shipping companies

Chapter2. Summary of ship financing lease

2.1 Characteristics of Ship financing lease

Financing lease overview

Lease can generally be divided into operating lease and financing lease. Operating lease means that the lessee selects the rental items offered by the lesser, and the lessee is committed to paying lease payments to the lesser to acquire the right of use, and the lesser provides the relevant maintenance, repairing, and insurance services. Financing lease, also known as financial lease, the lessee chooses the lease item, and the lesser purchase the specified item requested by the lessee, and the lessee bears relevant maintenance, repairing and insurance fees.

Financing lease is a credit form combined by the capital form and commodity form, and is a new type of financial tool which has both the function of leasing money and object, lease equipment to the enterprises and meanwhile to solve the enterprises' capital problem, so it has the dualism of financing and trade. Specifically, financing lease has the following basic characteristics:

(1) Separation between ownership and use of right. In a financing lease transaction, although the equipment is appointed by the lessee and purchased by the lessor, within the agreed lease term, ownership of the equipment remains with the lessor, and the lessee is given right of use of the equipment, and the lessee is responsible for service and maintenance of the equipment and ensure it’s in good condition. When the lease is terminated, the leased equipment reverts back to the lessor but the lease contract may provide the lessee the option to purchase the equipment or to start a new lease term.

(2) Hire is repaid by stages. The repayment mode for hire of financing lease is the same as that of bank credit and consumption credit. This, on the one hand, the lessee, can obtain better economic benefit with less investment; on the other hand, the lessee can get full right of use of equipment in advance only by paying a certain amount of hire, thus improves benefits of the enterprise.

(3) Financing lease involves at least three aspects relationship, including two or more contracts. Lessor buys equipment from the supplier and then leases it to the lessee. Thus, the purchase contract between lessor and supplier and lease contract between lessor and lessee are signed. In addition to these two contracts, when it comes to leverage lease, there will also be a financing contract signed between financial market and lessor, generally it is a loan contract.

(4) Once the lease contract is signed, the lessee shall not drawback or throws a lease, and the lessor shall not cancel the contract unilaterally, this is determined by the specificity and long-term nature of leased object.

(5) The above basic situation determines the financing lease is different from other lease modes, it is not for short-term use, but to add equipment for long-term use, therefore, the lease objects are mostly large special equipment with long service life.

As modern lease can control ownership of lease object, thus it has better risk resistance capacity than banks. Despite of higher interest level of financing than banks, it still develops very fast in many countries. The main reasons are: the government provides preferential policy, so fix assets obtained through modern lease has better benefits than those obtained through other means, and is enough to offset the disadvantage of high interest. Specifically speaking, one major advantage of financing lease lies in its flexibility. Compared with medium and long-term bank loans, financing lease seldom leads to confinement by lessor to lessee’s operation capital level, capital structure, continuously debt-financed, dividend and other investment and

operation decisions. In this way, enterprises are free to make independent adjustment on their decisions based on the ever-changing external environment. Another main advantage is less tax expenses. Despite of the provision in tax law that depreciation and hire of fixed assets can deduct taxable income, hire paid by lessee for fixed assets is frequently higher than depreciation obtained when directly owning the assets. Therefore, obtaining fixed assets through leasing usually generates less tax expenses for lessee than purchasing. Moreover, the lessee can enjoy tax benefits through hire when continue to leaseback the fixed assets that have already been drawn of depreciation.

Still another advantage is avoiding the risk of outdated technology. Obtaining fixed assets through lease can avoid technology to be out-of-date, because the ownership of the fixed assets obtained through lease does not belong to the lessee, but to the lessor. If the fixed assets appear out-of-date due to development of technology, the lessor, not the lessee, shall undertake the loss.

Of course, financing lease also has disadvantages, like the lease liabilities can not be withdrawn, the lease cost is relatively higher, the chance to enjoy value increase in asset will be deprived, and it is not conducive to technical reconstruction of assets.

As an entirely new financing mode, financing lease, since appeared in America in 1950s, has witnessed remarkable development throughout the world in recent decades. In particular, it plays an important role in large fixed equipment and high-tech products. For a capital-intensive industry like shipping industry, ship financing lease has draw wide attention of shipping companies, especially some small and medium sized shipping enterprises which are limited in scale and capital, mostly adopt financing lease (bareboat lease) or operating lease (time lease, voyage lease) in ship financing or operating. The function of financing lease in ship industry will be illustrated in the following part to analyze advantages of this mode in ship financing.

2.2 Basic types of ship financing lease

(1) Direct financial lease. In direct financial lease, the leasing company purchases ship designated by ship-owner and charters it to the ship-owner as bare boat. The ship-owner shall pay hire in due time during the lease term. Upon expiry of the contract, both parties shall specify in the financing lease contract to transfer the ownership of the ship to the ship-owner or a third party at a nominal price.

(2) Sale-leaseback. In sale-leaseback, the leasing company buys the ship-owner's ship and leases it to the ship-owner. The ship-owner shall pay hire in due time during the lease term. Upon expiry of the contract, both parties shall specify in the financing lease contract to transfer the ownership of the ship to the ship-owner at a nominal price. This mode makes it possible to transfer fixed assets into currency capital when the ship-owner can still use the ship.

(3) Sublease. The leasing company buys the ship from other leasers as lessee, then leases the ship to lessees as leaser. As this must go through more than to leasing procedures, each of which requires hire, so the last lessee usually pays higher hire than direct buying. Therefore, subleasing is not common in ship financing lease. Lessees usually don’t choose this mode unless some advanced equipment of a foreign country is urgently needed.

(4) Leverage leasing. The financing lease company act as leaser pays 20 %～40 % of the total ship value with its own capital. Then with the ship as mortgage, transfer of the right to collect hire as additional guarantee, the financing lease company shall then get loans 80 %～60 % of the money used to buy new ship from banks, insurance companies, trusts and other financial institutions.

(5) Structured participation lease. The structure of structured participation lease and financing lease is basically the same, except being more flexible in paying hire.

During the lease term, cash flow is distributed between leasing company and lessee in certain proportion. After all leasing cost is written-down, the leasing company shall draw capital return in accordance with the component proportion ratio of ship price on hire. The ownership of the leasing object shall be transferred to the lessee by the leasing company at the end. Upon expiry of the contract, the two parties shall share the rest value of the ship in agreed proportion. Under this mode, the ship-owner is able to enjoy a favorable capital cost during the lease term and share risk with the leasing company upon expiry of contract.

2.3 Ship financing lease operation

2.3.1 Financing lease modes

Financing lease has a variety of modes, such as simple financial lease, sale-leaseback, financial sublease, leverage lease, proportion lease, risk lease, structured participation lease, synthetic lease, joint lease, etc. In leverage lease, a leasing company (leaser) firstly pays a small amount of capital, usually 20%～40% of the total price of the leased equipment, then mortgages the lease object and transfer the right to collect hire as additional guarantee, unite several financial institutions to jointly provide financing lease, so as to gather more capital to buy capital-intensive equipment which will be leased to lessees. The lessee shall pay hire to the lender, so as to repay debts for the leaser's. Leverage lease belongs to leases that rely on policy (system lease). It is a kind of financing lease used specially for large-scale leasing projects and enjoys tax preference. As this mode features tax preference, standard operation, sound overall benefit, safe capital return and low cost, it is usually used in financing lease of planes, steamboats, telecommunication facilities and large unitized equipment.

2.3.2 Ship financing lease operation

Ships, large unitized equipment and oil rig and other sea engineering equipment are capital-intensive products, thus leverage lease is a good choice. When leasing ships to

shipping companies by adopting ship financing lease, the leaser usually needs to pay only 20％-40％ of the total amount of equipment (ship), while the rest money will find solutions from loans from financial institutions with the leased ship as mortgage. The leaser can be the shipyard, investment organization or a temporary financial institution. For instance, most capital used for building ships can be obtained from investment of shipyard, security investment company, asset management company or ordinary investors, so as to build more channels for capital needed by ship financing lease. At the end of basic lease term, the shipping company can buy, continue to lease or return the ship. Usually, the shipping company only needs to pay a small amount of fees at the end of the lease term to acquire the ship's ownership. Under the circumstance that financial institution supplies loans, the institution shall have no recourse, what guarantees repayment is the equipment it self and gains from ship leasing. Financial (leverage) leasing makes full use of tax preference of the government in ship building and leasing, so as to bring better economic benefits to all parties in the transaction, especially shipyard, shipping company and investors.

By adopting leverage lease, generally speaking, ordinary investors are required to pay less or no income tax for their benefits. For shipping companies, they not only have the right of use, but also pay much less hire. For shipyards, they can get more orders for new ships, solving the problem of lack of orders. For financial investment institutions, risk is reduced to some extent as first lien which has higher value than total lending is obtained and loan recovery is more guaranteed. For leasers, only by investing in cash lower than ship price, they can obtain all ownership benefits and tax preference enjoyed when paying 100% of the price of the equipment— investment tax reduction and accelerated depreciation reduces the actual tax rate, significantly speeding up return of cash capital. 60%～80% of the capital used to buy the equipment is loaned, large amount of interest can be used to pay fees while no tax is required to be paid, thus increases return on investment.

2.4 Advantages of ship financing lease

2.4.1 Advantage in itself

(1) Expanding financing channels. Traditional financing channels can hardly meet the needs of shipping enterprises' development, especially for some small and medium sized shipping enterprises. With small operation scale and relatively lower credit level, it is difficult for them to get loans from the government or banks, or finance by issuing stocks or creditor's rights, therefore, financing lease plays a key role in their survival and development.

(2) The pressure of repayment is relieved. Performance of shipping enterprises differs in low and high seasons. The hire payment of financing lease is more flexible compared to loan repayment of banks, so shipping enterprises are not required to repay certain amount and interest regularly, and is able to make adjustment according to the performance. This ensues sufficient and rational distribution of shipping enterprises' cash flow, thus relieving and decentralizes capital pressure of lessee enterprises to some extent.

(3) Able to enjoy preferential policy. To encourage investment in shipping industry, the state provides preferential policies such as accelerated depreciation, while the leaser in ship financing lease contract usually transfer the obtained preferential tax payment to lessee in the way of reducing hire.

(4) Helpful to tap idle assets for large enterprises. Some large shipping companies have ship types that have been phased out, high residue value of which can cause huge capital pressure for enterprise. Such enterprises have the ability to lease these ships to some small and medium shipping enterprises through financing lease. In this way, a win-win situation can be achieved by tapping idle assets of large enterprises and solving financing problems of SMEs.

(5) Helpful to improve core competitiveness of shipping enterprises. Shipping

enterprises, through financing lease companies, give their ships to specialized companies for management in the way of sale-leaseback and other means, so as to disperse risk, finance capital and improve the overall efficiency and profit of the enterprise without loosing the right to use the ship.

(6) Financing lease embodies modern logistics idea. The essential idea of modern logistics is “integration”. Large shipping enterprises are fully capable of adjusting their asset structure through financing lease, leasing non-core assets to finance capital and renting needed assets for operation, thus effectively supporting comprehensive logistics service.

2.4.2 Advantages compared with commercial loan

Bank loans are hard to get and can increase assets liabilities ratio and financial risk of enterprises. Besides, ship-owners usually have no right to dispose ships before debt is cleared, thus operation of ship is much limited.

Through ship financing lease, capital can be financed through “financing object”. Shipping enterprises can obtain the right of use of the ship at a time, and pay hire on installment, equivalent to getting a low-interest long-term credit. By doing this, shipping enterprises can control financial risk at a lower level. Compared with buying ship with loans, although ship financing lease has a longer financing time (lessee can pay hire for as long as 15 years), this brings considerable cash flow at the early stage of ship using, and relieves pressure from repaying huge capital and interest in the early years after ship is purchased through loans. What’s more, as hire paid by lessees is usually calculated based on annuity, same annual expenditure generated in the entire lease term does not change along with interest rate, so lessee’s cost and profit can be estimated and assessed more accurately, thus reducing financing risk. In addition, ship financing lease can form better match cash flow and maintain a good balance between assets and debts.

Financing lease also have the following advantages compared with commercial loan: solve the problem of limited financing channels while shipping enterprises expect to enhance their shipping ability; usually requires no payment in advance; helpful to upgrade of equipment; according to provisions of the Ministry of Finance and State Taxation Administration, accelerated depreciation is allowed for assets added in the way of financing lease; it is more flexible and convenient compared with bank loans, for the right of use is in the hands of the leaser, and no complicated procedures for mortgage holding under loan procedures are needed, such as arrest of ship, compulsory sale, etc.

2.4.3 Advantages compared with operating lease

(1) The hire of financing lease is lower than operating lease. For example, the sales tax of operating lease is 5% based on hire income, while that of financing lease is collected based on hire income minus actual cost of the lease object; stamp tax of financing lease is 0.05%, compared with 0.1% of operating lease.

(2) Having more stable status. Financing lease contract is signed under the preposition of full investigation toward lessee and full verification toward investment project. It emphasizes common interest with lessee, thus there will be no calling back of ship by the ship owner under the pretense of delayed or insufficient hire, especially when ship shire is on a rise.

(3) Own the ship finally through leasing. Operating lease is faced with variable leasing market and the cost is hard to control, even worse, the scale of fleet can not be expanded; while in financing lease, the ownership can be obtained upon expiry of lease term. For example, China Ocean Shipping(Group) Company has hire purchased 5 six-generation container ships at least from Germany company Nordcapital through financing lease with 10 year contract and get the ownership.

2.4.4 Advantages for ship leasers to adopt financing lease

(1) The lessee does not enjoy off-hire excuses available in operating release, for the essence of financing lease is financing, not leasing.

(2) No guarantee liability on defects of leased object. In ship financing lease, the lessee bears the risk of inconformity of ship quality and the contract, even if the ship has serious defects. This is different from BARECON contract, in which the leaser has to bear liability on defects for 18 months after the ship is delivered.

(3) Able to enjoy tax and policy preference. Many countries establish preferential tax and policy measures as a way to support financing lease industry, such as America's tax relief on investment, accelerated depreciation of leased objects. These measures, on one hand, attract enterprises with high tax paying ability to invest, purchase and then lease equipment, obtaining many advantages of tax credit and deferred tax, avoiding tax and reducing hire; on the other, they attract enterprises with large investment but low tax paying ability and are disqualified to enjoy these two tax preferences to share a part of tax subsidy from leasers by using leasing to collect equipment. In leverage lease, the leaser needs to pay 20%-40% of the total price of the equipment only to enjoy full investment preference and deferral tax, laying a foundation for leaser to cut down hire and enhance competitiveness. For leaser, they also enjoy tax and policy preferences.

2.4.5 Advantages for ship lessees to adopt financing lease

(1) Ship lessees usually refer to ship company or ship owner. By adopting financing lease mode, a major problem for ship companies, financing, is solved, and repayment pressure is relived. This is important for small and medium size ship companies in particular, as it is difficult for them to get loans from banks due to credit reason. Meanwhile, shipyard has the right to make choices, and bear maintenance, service and

insurance of ships.

(2) Able to avoid impact of inflation. It would take a ship company a long time to accumulate capital and buy ships on its own. In times of inflation, getting ships as early as possible through financing lease and then repay with money earned during operation is like “borrow a chicken to lay eggs and sell the eggs to buy chickens”.

(3) Avoid risk from exchange rate and interest. Foreign currency is needed to lease ships from foreign countries. Financing lease is able to convert foreign currency to domestic currency, and calculate the hire based on the latter. This can protect ship companies against foreign exchange risk caused by degradation of domestic currency. As financing lease adopts fixed interest at the very beginning, ship companies can also avoid interest risk caused by interest fluctuation.

The above chapter analyzed advantages of financing lease for leaser and lessee. Despite of disadvantages in financing lease it self, like the leasing liabilities can not be withdrawn, high leasing cost, loosing the chance enjoy value increase in ships and not conducive to technical reconstruction of ships, financing lease can still compete with other financing means relying on its advantages. In the past 20 years, many types of ships are leased, from sailboat to large steamboats for ocean shipping. In times of inflation, although some special provisions allow ship companies to delay subsidy to selling expenses of new ships optionally, still many ship companies found it hard to obtain maximum tax subsidy. Through cooperation with leasing companies, ship companies can perfectly enjoy these benefits. Under the circumstance that assets value can fluctuate considerably in unstable economic and political environment, for leasers, owning ships is a tangible, long-term and realizable means to maintain value of assets. Ship manufactures can also share advantages of leasing, as they can obtain more orders through financing of financing lease companies. To sum up, financing lease mode is a favorable financing mode for shipping enterprises and is being extensively used in international ship financing lease.

2.5 Comparative analysis on cost of ship finance lease and purchase ship with loans

2.5.1 Comparative analysis based on cash flow method

A ship, whether built and purchase with loans or obtained through finance lease mode, it has the same efficiency in the use, and produces same income for shipping company. Therefore, there are two plans for option, one is to purchase a ship with loans from banks, the other is to have the ship through finance lease. Here is a comparative analysis on these two finance plans and their costs.

To ensure effectiveness of the analysis, time value of cash flow needs to be considered. Net present value is often chosen to evaluate cost of a plan. The cost present value of any kind of plan is based on cost of investment, cash flow in the future is transferred to a same value at present, and the influence of tax also needs to be considered. One reason why an enterprise chooses finance lease is to acquire tax benefits, as an investor will always consider economic benefit of an investment from the perspective of after tax profit. Under the circumstance of finance lease, the enterprise acquires tax benefit by deducting depreciation fee and finance charge to cut down taxable income. In this way, by comparing the cost present value of ship finance lease and purchase ship with loans, the best plan would be the one with least after tax finance cost present value.

2.5.2 Formula of net present value calculation method

1. Calculation method of purchasing a ship with loans

Repayment to the bank

To facilitate calculation, suppose that money is repaid to the bank in equal installments. When the ship is built and delivered, the calculation formula is as follows:

(1). Amortization of lease capital

Lease capital is the fee got by distributing the total amount to build the ship into each period of the lease term. Considering time value of the capital, money repaid in each period is different, but is closely related to discount rate of the bank. The formula is as follows:

$$C = \frac{C_0}{M} \tag{2-1}$$

C: Amortization of lease capital;

C_0: Total loans;

M: Loan terms;

(2). Depreciation amount

To facilitate calculation, this paper adopts straight-line depreciation.

$$F = \frac{D(1-f)}{N} \tag{2-2}$$

F: Annual depreciation amount;

D: Total construction cost;

F: N years ago, ratio of net salvage account for original cost; .

N: Depreciation period;

(3). Loan balance

$$B_i = B_{i-1} - C \tag{2-3}$$

B_i: i stages loan balance, i=(1,2, …N);

$B_0=C_0$;

(4). Payment of interest

Suppose the interest is fixed in each period and does not change along policy and time, and suppose the interest rate for semiannual period is half of the annual interest rate.

$$R_i = B_{i-1}r \tag{2-4}$$

R_i: i stages interest cost , i=(1,2, …N);

B_{i-1}: i-1 stages loan balance, i=(1,2, …N);

r：annual interest；

(5). Amount of deducted tax

In accordance with tax law, the income tax rate for most enterprises in China is 25%. Interest payment and depreciation amount are seen as benefit reduction thus enjoy tax relief.

$$S_i = (R_i + F) \times 25\% \tag{2-5}$$

S_i：i years tax deduction amount，i=(1,2，…N)；

(6). After tax finance cost

$$S_k = (R_i + B_i) - S_i \tag{2-6}$$

S_k：i years after-tax financing cost，i=(1,2，…N)；

As depreciation life of ship is generally longer than repayment term of banks, N>M, therefore, the loan payment, interest payment and balance of loan payment in M years are all assigned as zero, i.e. :

$$B_M = B_{M+1} = \cdots = B_N = 0;$$
$$R_M = R_{M+1} = \cdots = R_N = 0;$$

From year M to year N，C=O；

(7). Present value

To facilitate comparison, after tax finance cost of each period is converted cash present value, then add the present value of each period together, we will get the total net present value in account period.

$$PV_{i-1} = \frac{S_k}{(1+t)^{i-1}} \tag{2-7}$$

$$PV_{N+1} = -\frac{D \times f}{(1+t)^{N+1}} \tag{2-8}$$

$$NPV = PV_0 + PV_1 + PV_2 + \cdots + PV_{N+1} \tag{2-9}$$

PV_{i-1}：i-1 stages net present value，i=(1,2，…N)；

t：discount rate；

PV_{N+1}： cash value of vessel net salvage；

NPV： *N* years net present value；

2. Calculation of net present value of finance lease

(1). Amortization of lease capital

Lease capital is the fee got by distributing the total amount to build the ship into each period of the lease term. Considering time value of the capital, money repaid in each period is different, but is closely related to discount rate of the bank. The formula is as follows:

$$A_1 + A_1(1+t) + A_1(1+t)^2 + \cdots + A_1(1+t)^{q-1} = D_0$$

$$A_1 = \frac{D_0 \cdot t}{(1+t)^q - 1} \tag{2-10}$$

Meanwhile $A_{j+1} = A_j \cdot (1+t)$ (2-11)

where：

A_1 : First lease capital amorization；

A_j : j stages lease capital amortization，j=(1,2，…q)；

q: lease term；

t: discount rate；

D_0: Total value of the vessel；

(2). Remaining lease capital balance

$$D_j = D_{j-1} - A_j \tag{2-12}$$

D_j： Financing lease repayment balance，j=(1,2，…q)；

(3). Lease interest

$$R_j = D_{j-1} \cdot r \tag{2-13}$$

R_j： i years rent interest，j=(1,2，…q)；

r： annual lease interest；

(4). Capital and interest of lease

$$E_j = A_j + R_j \tag{2-14}$$

E_j： i years lease principale interests，j=(1,2，…q)；

(5). Commission charge

$$e = D_0 \cdot \frac{g}{q} \tag{2-15}$$

e：Commission charge (annual fixed)；

g：Ratio of lease commission charge account for original investment；

(6). Tax saving

$$S_j = (E_j + e) \cdot 33\% \tag{2-16}$$

S_j： i years tax saving amount，j=(1,2，…q)；

(7). After tax finance cost

$$S_k = (E_j + e) - S_j\,, \tag{2-17}$$

S_k： i years after tax finance cost，j=(1,2，…q)；

(8). Present value

$$PV_j = S_k(1+t)^i \tag{2-18}$$

$$NPV = PV_1 + PV_2 + ... + PV_j + ... + PV_q \tag{2-19}$$

PV_j: present value of j years after tax financing cost，j=(1,2，…q)；
NPV：Total amount of net present value；

2.5.3. Application of net present value

Examples for application of NPV in practice:

A ship company needs to purchase a 150 thousand DWT ship with a cost of $ 80 million. The company can choose loans or finance lease. Under the first plan, the loan

conditions are those formulated by OECD and the loan value is 80% of the ship price. The annual interest rate is 8% and the repayment period is 8.5 years. The bank releases the whole loan in three years and once every half year, 6 times to release all. Repayment and interest payment are once very year. The base period is the time when the ship is built and delivered. Annual discount rate is 100, and the income tax rate is 25%. The depreciation life of the ship is 10 years. The net residual value is 5% of the ship's original value. Adopt straight-line depreciation.

Interest payment and depreciation amount are seen as benefit reduction thus enjoy tax relief. Under finance lease plan, suppose the lease term is 12 years and annual lease interest rate is 12%, the commission charge is 1.5% of the original investment in the ship, and the rental is paid equally once every half year. The payment of rental is also seen as benefit reduction and the enterprise enjoy tax preference. To facilitate calculation, the lending rate, lease rate and discount for semiannual period are assigned as half of annual lending rate, lease rate and discount.

Table 2.1 The ship's NPV with loan after Tax（Unit: Million Dollars）

Period (half year）	Owned fund and net salvage retrieve	Bank loan payment	Bank loan repayment	Interest payment	Depreciation amount	Tax saving amount	lease cost after tax	Present value
-6	16	—	—	—	—	—	—	21.4415
-5	—	10.67	10.67	—	—	—	—	
-4	—	10.67	21.34	0.4268	—	0.1067	0.3201	0.3891
-3	—	10.67	32.01	0.8536	—	0.2134	0.6402	0.7411
-2	—	10.67	42.68	1.2804	—	0.3201	0.9603	1.0587
-1	—	10.67	53.35	1.7072	—	0.4268	1.2804	1.3444
Vessel delivery	—	10.67	64	2.134	—	0.5335	1.6005	1.6005
1	—	4	60	2.56	3.8	1.59	4.97	4.7333
2	—	4	56	2.4	3.8	1.55	4.85	4.3991
3	—	4	52	2.24	3.8	1.51	4.73	4.0860
4	—	4	48	2.08	3.8	1.47	4.61	3.7927
5	—	4	44	1.92	3.8	1.43	4.49	3.5180

6	—	4	40	1.76	3.8	1.39	4.37	3.2610
7	—	4	36	1.6	3.8	1.35	4.25	3.0204
8	—	4	32	1.44	3.8	1.31	4.13	2.7953
9	—	4	28	1.28	3.8	1.27	4.01	2.5849
10	—	4	24	1.12	3.8	1.23	3.89	2.3881
11	—	4	20	0.96	3.8	1.19	3.77	2.2042
12	—	4	16	0.8	3.8	1.15	3.65	2.0325
13	—	4	12	0.64	3.8	1.11	3.53	1.8720
14	—	4	8	0.48	3.8	1.07	3.41	1.7223
15	—	4	4	0.32	3.8	1.03	3.29	1.5825
16	—	4	0	0.16	3.8	0.99	3.17	1.4522
17	—	—	—	—	3.8	0.95	-0.95	-0.4145
18	—	—	—	—	3.8	0.95	-0.95	-0.3947
19	—	—	—	—	3.8	0.95	-0.95	-0.3760
20	—	—	—	—	3.8	0.95	-0.95	-0.3581
21	-4	—	—	—	—	—	—	-1.4358
Sum	12	64	64					69.0409

Table 2.2 The ship's Finance Leasing NPV after Tax(Unit: Million Dollars)

period（half year）	Balance of Lease cost	Amorization of lease cost	Lease interest	Interest payment			Tax saving amount	Lease cost after tax	Present value
				Rent Interest	Commission charge	Sum			
Vessel delivery	80	—	—	—	—	—	—	—	—
1	78.202	1.798	4.8	6.598	0.05	6.648	1.662	4.986	4.748
2	76.315	1.888	4.692	6.580	0.05	6.630	1.657	4.972	4.510
3	74.333	1.982	4.579	6.561	0.05	6.611	1.653	4.958	4.283
4	72.252	2.081	4.460	6.541	0.05	6.591	1.648	4.943	4.067
5	70.067	2.185	4.335	6.520	0.05	6.570	1.643	4.928	3.861
6	67.772	2.294	4.204	6.498	0.05	6.548	1.637	4.911	3.665
7	65.363	2.409	4.066	6.475	0.05	6.525	1.631	4.894	3.478
8	62.834	2.530	3.922	6.451	0.05	6.501	1.625	4.876	3.300
9	60.178	2.656	3.770	6.426	0.05	6.476	1.619	4.857	3.131
10	57.389	2.789	3.611	6.400	0.05	6.450	1.612	4.837	2.970
11	54.461	2.928	3.443	6.372	0.05	6.422	1.605	4.816	2.816
12	51.386	3.075	3.268	6.342	0.05	6.392	1.598	4.794	2.670
13	48.158	3.228	3.083	6.312	0.05	6.362	1.590	4.771	2.530
14	44.768	3.390	2.890	6.279	0.05	6.329	1.582	4.747	2.398

15	41.209	3.559	2.686	6.245	0.05	6.295	1.574	4.722	2.271
16	37.472	3.737	2.473	6.210	0.05	6.260	1.565	4.695	2.151
17	33.548	3.924	2.248	6.172	0.05	6.222	1.556	4.667	2.036
18	29.427	4.120	2.013	6.133	0.05	6.183	1.546	4.637	1.927
19	25.101	4.326	1.766	6.092	0.05	6.141	1.536	4.607	1.823
20	20.558	4.543	1.506	6.049	0.05	6.098	1.525	4.574	1.724
21	15.789	4.770	1.234	6.003	0.05	6.053	1.513	4.540	1.630
22	10.780	5.008	0.947	5.956	0.05	6.005	1.501	4.504	1.540
23	5.522	5.259	0.647	5.906	0.05	5.956	1.489	4.467	1.454
24	0	5.522	0.331	5.853	0.05	5.903	1.476	4.427	1.373
Sum	—	80	70.973	150.973	1.2	152.173	38.043	114.130	66.354

Under finance lease, the lessee can enjoy tax preference of all rental payment, while under ship purchase with loan, only interest payment and depreciation may enjoy tax preference. By comparing various factors influencing the two plans, it can be seen that: first, as the discount rate increases, the advantage of finance lease becomes more obvious; second, depreciation method has a great effect on finance cost of the loan plan. Fast depreciation method prevails over straight-line depreciation method, as using the former, more tax preference can be enjoyed in the early period of use, and smaller tax preference in the late period reduces present value of finance cost; finally, lending rate and rental has significant effect on finance cost for both finance lease and purchase with loans. The result shows that the present value of finance cost under the plan of loan is $ 69.04 million and that under finance lease plan is only $ 66.35 million, showing that finance lease has obvious advantage against build with loans. Generally, the rental of finance lease and interest of loan are both paid by installments, the difference is that interest payment decreases with loan balance, but rental is usually paid based on annuity, and the amount paid in each period is the same.

2.5.4 Other questions need to be considered in ship finance lease operation decision-making

In ship finance operation decision-making, given the particularity of international shipping industry, the influence of other factors needs to be considered.

When comparing finance cost of purchase with loans and finance lease, sometimes, the present values of the two are close. Under such circumstance, cash flow will be a very important factor to consider. Because, cash flow can have obvious impact on decision-making of purchase ship with loans and ship finance lease. Finance lease has the following three advantages compared with purchase with loans:

1. Finance lease can provide 100% of the ship cost as finance capital. In this way, the ship company does not need to pay advance payment at the very beginning of shipbuilding. Meanwhile, the ship company does not need to pay interest, legal charge, contract charge, etc. before ship delivery.

2. The rental payment period for finance lease is often much longer than loan repayment period for purchase with loans. This will undoubtedly favorable large cash flow in the early period of ship use. However, under the plan of purchase with loan, large mounts of money needs to be paid for capital and interest. Under finance lease plan, although rental needs to be paid until the debt is cleared before obtaining the ownership of the ship, this considerably improves the ship company's cash flow and relieves the huge burden of capital in the early period of operation.

3. The rental of finance lease is usually paid based on annuity and annual cash expense is equal in the entire lease term. This can avoid lending rate fluctuation of banks and ship companies can do a better budget.

4. Although the ship-owner can not obtain ownership of the ship before paying off all rentals during lease term, he can obtain the right of management of the ship for daily operation. Therefore, in most cases, the ship-owner can pay lease fee with stable rental income. This will relieve the debt pressure of the enterprise. As long as the operation is standard and the right market is chosen, the ship company have many channels to obtain capital. Of course, there's risk too. For example, before paying off

all lease fee, as the ownership has yet to be acquired, the ship company can not sell the ship when the market is on rise so as get huge profit. Moreover, many countries require state flag of their own countries be placed on the ships adopting finance lease and the lessee must be citizen of their own countries. This may be a great constrain for ship-owners who want to display convenient flags.

Generally speaking, finance lease mode can help shipping enterprises with limited money purchase ships. This is undoubtedly the best choice for small and medium sized shipping enterprises and those who want to expand their fleet. On the other hand, finance lease may promote shipping enterprises to build and purchase ships blindly, providing more ships than the market needs, and lead to decline in shipping market. But this can be gradually controlled with effective macro control of the state and self-regulation of the market law.

Chapter3. Analysis and suggestions on China’s ship finance lease mode

3.1 Exploration and development of ship finance lease system.

China’s financing is a long-term and progressive process and China’s ship finance system is under constant exploration and progress.

As China’s ship industry develops tremendously, policy banks and commercial banks have all accelerated their research on ship finance business, in particular, more and more commercial banks involve themselves in ship finance business. Meanwhile, the Export-Import Bank of China, taking into consideration of actual needs of ship export enterprises and changes in international competition, actively makes creations in finance business and provides "one-stop " and all-round finance service, for which it is given the title of “China mode” proceeding “Japan mode" and “South Korea mode”. In this mode, the Export-Import Bank of China provides seller’s credit on export before the ship is delivered, and at the same time, performance guarantee and advance payment guarantee, to meet enterprises’ need of capital to build ships. After the ship is delivered, the bank will, based on situation of the ship-owner or guarantee, provide either buyer’s credit on export or seller’s credit on export, so that ship enterprises and ship-owners an enjoy all-round finance service. At the end of 2004, China Shipping (Group) Company issued 2 billion worth of company bond for the first time, all of the capital raised will be used in ship fleet building. This event pioneered domestic ship finance mode and has an essential significance in expanding financing channels and controlling financing cost. Given the fact that capital for building ships to be exported is hard to be found, export credit insurance company not only controls external risks for ship building enterprises and finance banks through buyer's default insurance but also use financing guarantee measures as support, providing financing guarantee for enterprises having ability to build ships but difficulties in financing. Recently, Jinling

Shipyard, New Century Shipbuilding Cooperation and other domestic shipbuilding enterprises have successfully tried mortgage finance mode for ship under construction. Professionals said that after over two years of booming, international shipbuilding market is likely to enter a stable period of adjustment, which would bring ship price to a slight decline. This new finance mode will decrease finance cost for shipbuilding enterprises and relive pressure from production cost and lack of capital. At present the mortgage finance mode for ship under construction is mainly applied to export ship projects of Jiangsu enterprises. As financial institutions are introduced, this mode has better ability in preventing risks in market, technology and finance. Besides, experience from some major shipbuilding countries is valuable to us, both Japan and South Korea, for instance, carried out a series of financing supporting policies in different development times of shipbuilding industry. In the takeoff stage of ship industry, Japanese government implemented planned shipbuilding system to encourage domestic ship-owners to order domestic ships. Based on this policy, the government provided preferential financing for domestic new ship orders within the plan through revitalizing financial vault, Japanese bank, US aid bank and development bank, providing loans with large amount, long term and low interest. Besides, interest subsidies are given to ship-owners who borrow money from government banks and commercial banks. South Korean government actively responded to OECD's policy to further liberalize relative financing conditions, made changes to maximum payment period and relevant interest of loans for export 121 ship financing. At the same time, stimulate measures in company reconstruction scheme, stimulate measures of South Korea export-import 121 bank as well as tax stimulate measures are given to ship finance. From Mar, 2004, South Korea’s first ship finance company began to finance from the society through stock market for shipbuilding. The company has been formally approved for establishment by Korean Ministry of Oceanic and Marian Products and Financial Supervision Committee, and it is known as the first ship finance company in northeast Asia.

3.2 Lease mode of ship finance

In December 2008, Far Eastern International Leasing Co., Ltd. began negotiation concerning finance lease with Mintai Shipping Co., Ltd. in Shishi City, Fujian Province. On Dec. 22nd, the two sides signed the Creative Lease Contract. The International Far Eastern Leasing, with the purpose of lease, purchased the 100 million Yuan handy-size CCS bulk cargo ship under construction that can enter unlimited navigation areas and rented it out to Mintai Shipping Company with a lease term of 5 years and total rental of 116,729,167 Yuan paid by quarter. In addition to rental, Mintai Shipping Co., Ltd. by Shares needs to pay commission charge to Far eastern leasing at a time (equal to 1% of the actual cost of the leased object) and management fee (equal to 0.53% of the actual cost of the leased object). Upon expiry of the lease term, Mintai Shipping Company shall pay 1000 Yuan to Far Eastern Leasing Co., Ltd as transfer charge before acquiring ownership of the ship. Besides, Mintai Shipping Company shall pay 20% of the total value of the leased equipment as deposit to Far Eastern Leasing. In this way, Mintai Shipping was able to obtain the right of use of the ship costing 100 million Yuan only with 22 million Yuan. Ship finance lease solved the problem of capital for shipping companies who want to purchase new ships. This is especially important for shipping companies lacking financing channels and it effectively boosted domestic shipping industry. For shipbuilding enterprises, ship finance lease brings orders, reaching the purpose of building the market with capital and then propel shipbuilding industry to advance. In particular, when international shipbuilding market is low, they can make full use of ship finance lease mode to obtain orders.

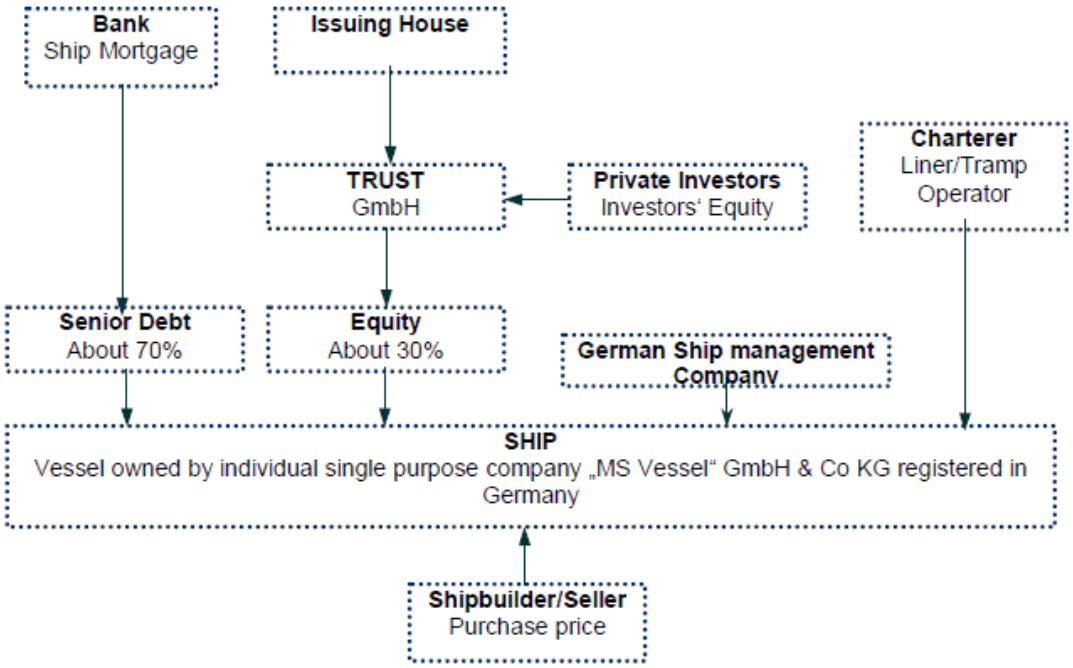
3.3 Experience of Europe and Korea in ship finance lease

To boost shipbuilding industry and shipping industry, Germany and Korea have started ship finance lease quite early. Germany was the first to implement KG plan to encourage domestic investors to invest in domestic shipbuilding and help domestic

shipping companies finance for shipbuilding. At the same time, preferential tax was provided to investors. In KG plan, a number of partners jointly establish a ship company limited and order new ships with capital acquired and then lease them to shipping companies. Meanwhile, tax preference with varying ranges is provided to investors, the preference to the largest extent is high amount tax relief to pretax income returned by investment (the range of tax preference goes down with the passage of time). Ship finance companies fall into a variety of categories due to varying ranges of preference.

Advantages of Germany KG ship finance lease mode

Table 3.1: Typical structure of a KG Deal

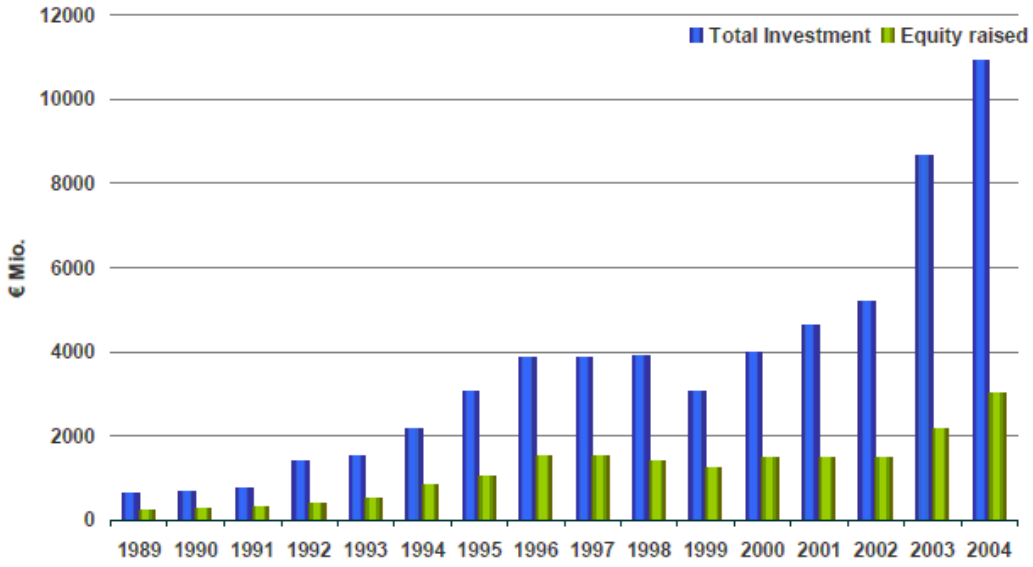


Data source: Von Oldershausen, 2005

The diagram above illustrates that ship finance lease mode of partnership company limited is attractive to investors in the following manners: to start with, there're many advantages for ship lesser to adopt limited partnership. First, for limited partners, only undertaking limited liabilities, they can avoid troubles come along with unlimited liabilities, so they are more willing to invest in such enterprise; second, for ordinary

partners, undertaking management of the enterprise and implementing unlimited liabilities can arouse their enthusiasm, creative ability and responsibility, so ethic risk of ordinary partners is avoided or reduced and the problem of agency by agreement is also solved; third, the management structure of partnership is simple and the decision and implementation is highly efficient; four, partnership enterprise can avoid dual taxation; fifth, the operation of limited partnership is still conducted by ordinary partners in the way of partnership operation, thus it has the flexibility of ordinary partnership operation system but no requirements of operation procedure of ordinary companies, so administrative expense is controlled; six, the finance cost is low. Existence of ordinary partners undertaking unlimited liabilities convinces borrowers that the enterprise will operate and manage in favor of them, so finance cost of limited partnership is lower than other enterprises undertaking limited liabilities.

Table 3.2: Total KG Capital Raised, 1989-2004



Data source: Lloyd's Shipping Economist (LSE)

Besides, leverage lease is used to cut down investment cost and enjoy tax preference. The ship lesser only needs to pay 20%-40% of the total price of the ship to acquire 100% right of use of the ship. This not only cut down investment cost, moreover, the lesser can enjoy tax preference set for paying total ship price. This is extremely attractive to high-income groups. Ship lesser usually reduces the hire after enjoying tax preference, so the ship lessee can have less capital pressure.

Table3.3: Top 10 initiators of KG Shipping Investments

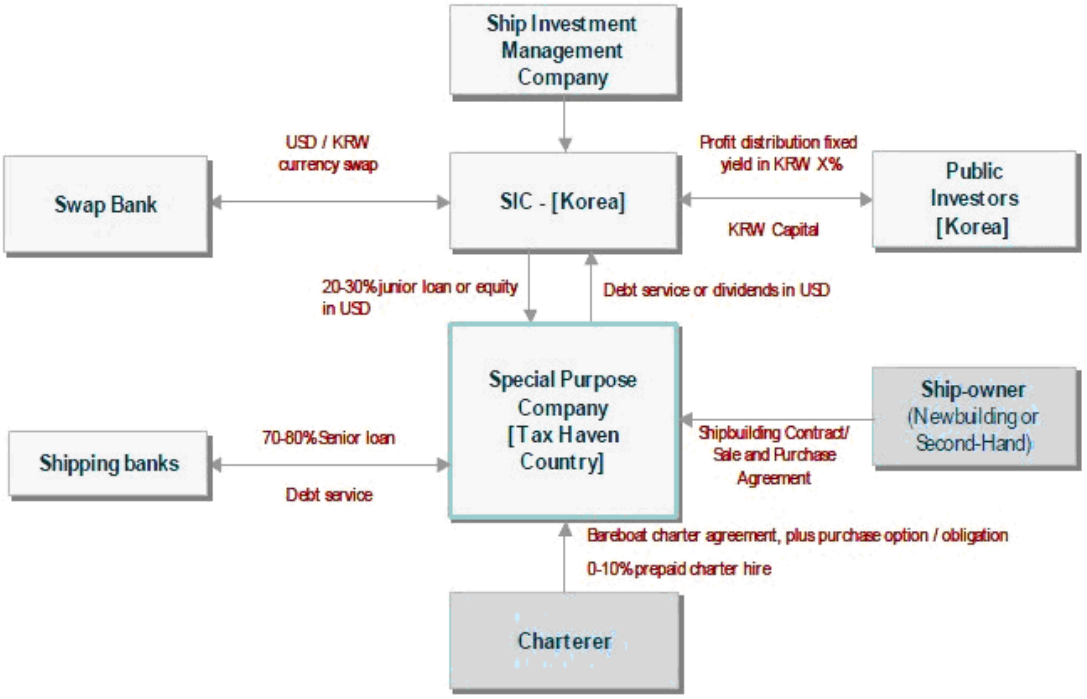
Top 10 initiators of KG shipping investments	(€ Million)
1. HCI Hanseatische Capital Invest, Hamburg	563.2
2. MPC Münchmeyer Petersen, Hamburg	298.9
3. CFB Commerz Fonds, Düsseldorf	278.8
4. Lloyds Fonds, Hamburg	235.6
5. Dr. Peters, Dortmund	175.8
6. König & Cie., Hamburg	171.1
7. Hansa Hamburg Shipping, Hamburg	124.1
8. Conti Gruppe, Putzbrunn	117.7
9. Nordcapital, Hamburg	89.2
9. Ownership, Hamburg	88.2

Data source: LSE (April 2006)

What's more, investors of ship limited Partnership Company usually invite professional ship management company to undertake management and operation of the company, so as to ensure that the company uses its capital rightly and the company operates scientifically and efficiently. Besides, generally speaking, the financing procedure is not complex and the return on investment is high.

Under the impact Asian financial crisis, South Korea ship-owners fell into hard times of operation that they had no other choice but to sell ships. The number of registered ships within the country dropped to 398, 7.35 million dead weight ton. Ship-owners were badly in need of capital and the average debt ratio was as high as 1011%, making it impossible for them to build new ships. To change the situation in which Korean commercial ship fleet was shrinking and there were almost no ship orders, the government emulated Germany's KG plan and started to adopt ship finance lease to encourage ship-owners to build ships at home and revitalize domestic shipping and shipbuilding industries. In 2002, South Korean government enacted and implemented Law on Ship Investment Company, encouraged investors to establish "Paper Company" and send new ship orders to domestic shipyards.

Table3.4: Typical Structure of a Korean Shipping Fund



Data source: NIBC (2006) with adjustments by author

This law provides that capital can be financed from ordinary investors to establish paper companies who shall order new ships from domestic shipyards and lease the ships out to shipping companies in South Korea. After the contract expires (over 5 years), benefits would be distributed among investors and the paper company shall disband. To encourage investors to invest to ship investment companies, the government decided to make a cut on investors' stock-transfer income tax, income tax of proceeds of sale, and income tax on part of income used for reinvestment and income tax on dividend were all exempted. At present, there has been the first ship investment company (named Korea Shipping Fund) under preparation. The capital in cash of the company is KRW 9.8 billion, with Dayu Shipbuilding and Oceanic Engineering Company, Samsung Heavy Industries and STX Shipbuilding Company 2 billion each, Korea Investment and Trust Securities Company, Central Committee of Aquatic Product Association and US MF Company contributing KRW 0.1 to 1 billion varyingly.

We should draw on the experience of big shipbuilding countries in terms of finance lease mode, enhance support to domestic shipping industry in financing and subsidies in ship building. As ship finance policy improves and all sectors of the society offer supports, the ship finance leas system of our country will surely develop and get perfect, so as to lay a foundation for catching up with ship building powers like Korea and Japan. We should pay much attention to new finance leas mode, so it can play more important role in ship financing in shipping and shipbuilding industry.

3.4 Practical finance lease modes

Given the analysis above, ship finance lease mode in our country has made some progress but there's still a long way to go. Based on experience from European and Korean ship finance lease, the writer of this paper made the following suggestions on finance lease modes that are practical to China.

3.4.1 Lease transaction modes of ship finance lease companies

1. Specific mode

Ship finance lease companies leases the ships ordered out to Shipping enterprises through finance lease and collect rental as agreed in the contract. In this way, financing problem is solved without increasing debt ratio of shipping enterprises and shipyards obtain orders. In this frame, ship finance leasing company is the buyer for shipyard, and the lesser for shipping companies. Type, variety, technical standard and price of finance lease ships are determined by shipping enterprises and shipyards.

Ship finance companies can be established jointly by big buyers, shipping companies, shipyards and financial institutions and at the same time, private capital can also be absorbed. This can improve company's management structure and ensure that the operation and decision meet market demand.

ship finance lease companies, at early stage, can be regarded as a bridge connecting domestic shipbuilding industry and shipping industry financing to build ships. Being developed and with some experiences, bareboat lease and sale leaseback will be exploited and financing support will also be provided to export-oriented ships.

2. Proposal financing schemes of ship finance lease companies

The state entrusted the Development Bank with the right to offer loans of $ 1 billion to ship finance companies. The conditions of loan are close to those of international ship finance: loan term 10～12 years, 20% payment in advance, interest rate LIBOR, and a small commission charge ranging from 0.3%～0.6%. With LIBOR 1.9%, the finance cost is about 2.7%. This a kind of full loan suitable to strong finance lease companies with high credit standing and large scale. Or special ship financing can be conducted by issuing enterprise bonds with ship finance companies as main body, financing RMB equal to $ 1 billion to meet capital needs for ship building. Given consideration to current market, however, bond finance has high cost and the interest rate is close to 4%, meanwhile, enterprises issuing “bonds” need to undergo rigorous “credit evaluation” and are required to have favorable management capacity and reputation. Therefore, this mode is only suitable to large-scale finance lease companies with good credit and strict approval procedures in issuing enterprise bonds.

Another mode is to finance through syndicated loan (the current market variable interest rate LIBOR+X=1.0~1.5%). Specific conditions are decided through negotiation of both parties. There are management fee, commitment fee, ship mortgage registration fee and retainer to be paid to the syndication. The financing cost is about 3.2～3.5％. For example, in August 2006, a contract signing ceremony was held between the China Shipping Container Lines Co., Ltd (CSCL) and ICBC, CMB, ABC and Shenzhen Development Bank for container ship that can load 4250 TEUs container vessel with a total syndicated loan of RMB 1.48 billion. This syndicated loan of CSCL is the first of its kind in China. It exploited a new field of cooperation for CSCL and banks and deepened cooperation between them. In this

way, ship finance lease companies can get loans from syndication by allying large shipping enterprises for ship financing.

However, the fact is that finance lease companies in China are still far from perfect, it is difficult for ship fiancé lease companies to reach the credit requirement of domestic banks in terms capital and strength. Meanwhile, ship loan features long term and big risk, if adopting commercial operation mode only, the financing cost would be high. Despite of shipbuilding subsidies, loan audit of commercial banks is still hard to pass. Therefore, the writer suggests getting loans from syndication by allying shipping enterprises or other lease companies before commercial operation.

3.4.2 Trust mode of trust institutions

Trust institutions can participate in social investment by issuing trust receipt to gather trust capital. Trust industry also takes finance lease as a key business, thus ship finance lease can draw support from the solid trust industry to obtain tremendous development.

1. Capital trust mode

Through implementing trust plans, trust companies gather several capitals together to form a capital combination that is large and powerful to purchase ships and lease them out to shipping companies. This mode has been practiced in China. At the end of 2003, the Union Trust Limited in Fujian Province used this mode, issued 200 trust contracts to form trust assets with which it purchased a 50000DWT bulk carrier and leased it out to Fujian Tangtou Shipping Company through finance lease. The lessee issued an irreversible LG as guarantee, and at the same time, transferred the jus fruendi during the ship’s lease term to the trustee as another means to guarantee payment of rental. To adopt this mode, powerful lessee good credit should be chosen to reduce risk. If the lessee is unable to pay the rental, the trust company can directly dispose the ship. Finally, it is important to propose insurance to insurance company and Ship-owners Mutual Assistance Association.

2. Movable property trust mode

In movable property trust, the owner of the equipment (client) and trust institution (trustee) sign trust agreement and transfer the ownership of the equipment to the latter. Then the trustee leases the equipment out or sells it by installment. The best advantage of this mode is that the fixed assets of the client can be revitalized relying on capital strength of the trustee. This is especially suitable to movable property requiring large investment like ships. In this mode, the ship-owner sells his ship to trust company, then sign finance lease contract with trust company to leaseback the ship. For example, the Royal P&O Nedlloyd (the world' s 4^{th} container shipping supplier) has recently sold 14 container ships with an average shipping capacity of 4050 TEUs to Germany's MPC CAPITAL Company, and signed a lease contract of the ship for 12 years. The advantage of this mode is that money supply can be quickly reduced and taken to ship types with higher benefit without reducing the original scale and shipping capacity, so as to make better use of capital's time value. Japan's Mitsui Shipbuilding Company also sold ships by using this mode. First, it entrust Mitsui Trust Institution with the ship under construction, then San-Ei Steamboat Company rents the ship from Mitsui Shipbuilding Company and will buy the ship within 10 years. Mitsui Shipbuilding Company recovers money through this mode. Now ships purchased through finance lease have developed from ordinary cargo boats to large steamboats. Ship trust has become a main part in movable property trust.

3.5 Finance lease of shipping industry

Generally speaking, the lease term is basically equal to use life of the ship. When lease contract expires, the lessee have several options: (1) continue the lease but with much lower rental; (2) purchase with a price negotiated by both parties; (3) throw the lease; the sales revenue will be distributed proportionally if the ship is sold. It should be noted that as the rental is closely related to exercise of options, so which mode to choose is a big deal to lessee.

Besides, as the leased ship is chosen by the lessee based on his need, therefore, the lessee shall not prematurely terminate the contract by sending back the ship. On the part of the lesser, as the ship has been purchased, he shall not increase the rental due to price rise in the market. In a word, generally speaking, neither party of the lease contract shall unilaterally terminate the contract during the lease term.

By breaking through “buy ship with loan, paying interest during operation” and reaching the purpose of financing capital through leasing assets, shipping enterprises can acquire the ship’s right of use at a time, then pay rental by installment. This is equal to obtaining a low-interest long-term credit, paying rental after the ship produces benefits and finally acquire ownership of the ship. This mode boosts shipping enterprises development, and controls financial risk of shipping enterprises at a lower level. Compare to buying ship with loans, though its financing period is longer (payment of lessee can last as long as 15 years), this is able to produce considerable cash flow during early period of use and relieve pressure of paying huge capital and interest at the first few year if ship is bought with loans. What’s more, as hire paid by lessees is usually calculated based on annuity, same annual expenditure generated in the entire lease term does not change along with interest rate, so lessee’s cost and profit can be estimated and assessed more accurately, thus reducing financing risk. In addition, ship financing lease can form better match cash flow and maintain a good balance between assets and debts.

By taking this mode, shipping enterprises can also enjoy tax preference. Many countries provide preferential tax policies to both parties of finance lease. The lessee can include the leasing expenses into cost and legally reduce taxable income.

Of course, to replenish shipping capacity, shipping enterprises also need to give serious consideration to ship flag. If they want to use convenient flags in ship finance lease operation, they need to consider policy of relevant countries. To encourage

investors, many countries provide that only citizen of their own countries can be lessee and ships must be registered and flagged in their own countries, so transnational ship lease is not allowed.

Relevant policies should support financial environment, give full play to guidance and driving function of government debt input and investment as well as preferential tax policies; promote ship finance input mode, issue shipbuilding national debt, use all money from this in the project to transport with domestic ships and to produce domestic steamboats. These ships will be leased out to large shipping enterprises for transporting minerals, oil, coal and other strategic materials by special finance lease companies, so as to realize sound, circular and fast development of shipping, shipbuilding and finance lease industry.

Ship finance lease is a highly comprehensive business involving finance, investment, trade, technology, management, financial affairs and law, thus it has high requirement concerning professional quality of personnel. Therefore, to better implement ship finance lease mode, the writer suggest the following preparations be made:

Ensure good work in internal construction of shipping enterprises. Have a clear knowledge of current situation and prospect of the enterprise. Get to know external financing environment and consult professional persons in financing. As shipping enterprises usually lack financing experience, time and energy, therefore, it is necessary for them to seek help from persons outside the enterprises. Professional financing consultants will provide professional suggestions on each procedure of finance lease for the favor of enterprises, and make use of accumulated finance lease channels to introduce suitable finance lease companies and trust institutions to shipping enterprises, so as to create condition for successful finance lease. Draw on successfully experience of counterparts in ship finance lease, make all efforts to research and launch ship finance lease work that is suitable to reality of the group on a high starting point and with proper operation method. For example, China Shipping,

together with Shanghai Municipal Government, established Shanghai Shipping Industry Fund in 2011 to build Shanghai International Shipping Center. It is expected that this fund will raise 5 billion Yuan in the first stage and the total financing scale is estimated at 50 billion Yuan.

In this process, preparation of document and personnel is also indispensable. The information and finance lease plans of shipping enterprises should be shown in brief and persuasive written documents to show the value of the enterprise, and to make finance lease companies have better understanding of and more interest in the enterprise. Notably, when all work has been properly done, professional quality of internal personnel who operate all this is very important, as their mistakes can lead to improper finance lease contract to be formulated. Therefore, enhancing management of finance department and organizing professional trainings are also very important. Employ more professional talents from shipping, finance, trade, law, management, etc. so as to form a comprehensive operating group. Besides, more research should be conducted on laws and regulations concerning finance lease tax, credit, insurance, foreign exchange, subsidies and financial affairs.

As most finance lease companies are upset about repaying capacity of shipping enterprises and are cautious in requirement to them. Therefore, to open the gate of finance lease and international capital market and establish sound credit, management and operating capacity of finance lease should constantly be enhanced to improve operating and management of shipping industry to international level.

Intensify ship type development plan. Because investment to ships is large and the return period is quite long, so cautiousness is necessary in capacity developing capacity and determining ship type. The development plan should be proper and meet relevant provisions and technical requirements during use. In LNG market, in particular, new ships are continuously added, but engineering on wharf and shore is probably delayed. Building a LNG wharf is very complicated, it involves

environment protection, finance and technology, any stage can cause delay. Therefore, ship type should be considered cautiously. Once improper plan is made, risks in finance lease will be accelerated.

Formulate finance lease strategy. In the process of formulating finance lease strategy, there are a few aspects to be considered, namely, occasion of finance lease, the finance lease company be chosen, trade mode with the lease company, formulation of finance lease contract, options of the ship upon expiry of the lease contract, etc. Shipping enterprises should consider the amount and occasion of investment of ship finance lease based on their development stages. Give serious consideration to ship flag, policies of relevant countries and competition in relevant industries; seek strategic alliance and long-term acceptance of carriage agreement. This is not only a major means to avoid operating risk in finance lease, but also an essential precondition determining whether the ship finance lease can be launched.

Chapter4. Analysis on ship financing multi-objective investment decision-making

4.1 Characteristics of multi-objective financing decision-making

In chapter 2, net present value method is introduced, model is established and examples are given to compare and analyze purchasing ship with loans and finance lease. A number of advantages of ship finance lease compared with purchasing ship with loan are concluded. Ship finance lease is simple and intuitive. It usually takes pursuing net present value of enterprises or minimizing cost as its decision objective. But as the factors being considered are not comprehensive, the result is far from satisfaction. The capital chain of ship investment and finance is extremely complicated and contains a great many of factors, including investment cost, operation cost, opportunity cost. Even the state policy and enterprise decisions can directly or indirectly have influence on the entire financing process. Today's shipping market is full of changes. Magnificent profit can be obtained if the trend of the shipping market can be accurately expected, ship fleet scale of shipping enterprises can be timely adjusted and market share can be expanded. The multi-objective decision-making method to be introduced in this chapter is a ship finance decision-making method exactly based on actual situation of shipping market, giving consideration to various factors influencing ship financing, establishing comprehensive evaluation model and taking maximizing of investment satisfaction as objective.

Here a brief introduction to characteristics of multi-objective financing decision-making method is given:

1. Compared to net present value, multi-objective financing decision-making method gives consideration to more factors and the evaluation system is more comprehensive. It not only includes influence coming from net present value, but also comprehensive

consideration to other indexes, such as investment opportunity loss index, investment efficiency evaluation index and financial affaires evaluation index. Based on all of these, a decision-making model is finally established to comprehensively evaluate various investment plans and choose the best one. The process is a little bit complicated.

2. As multi-objective financing decision-making is complex and too many factors need to be considers, therefore it is suitable to financing decision-making analysis of large shipping enterprises. While net present value, being simple in calculation and intuitive in result, is more suitable for small and medium sized shipping enterprises to conduct evaluation.

3. Multi-objective financing decision-making involves many variables and the calculation is complicated. It is usually done under help of professional computer software, like Matlab and Minilab. As it usually involves integer programming, so the results need to be analyzed in order to get the best one; while the NPV net present value only requires EXCEL and other office software and the result needs no selection.

4.2 Establishment of multi-objective financing decision-making indexes

1. Economic evaluation index

Ship operation involves a number of details, like capital, salary for ship's crew, insurance premium of hull, maintenance cost, fuel and material charge, port and canal use fee, handling charge, dispatch money, enterprise management fee, etc. The income mainly comes from freight, demurrage charge and dead freight.

For privately owned ships, as they are frequently influence by market demand, season, shipping line, variety of goods, etc., the freight changes from time to time, thus it is difficult to establish a model to conduct specific calculation and analysis. However, if

the ship is leased out, in addition to stable income, the rental is slightly influenced due to market situation or other factors. In consideration of this fact, this chapter aims to establish economic evaluation system and the model starting from the perspective of long-term ship lease. There are many indexes that can be used as economic indexes, like net present value, total present value, internal rate of return, payment period, etc., each reflecting investment result from different perspective. In this chapter, NPV is chosen as the economic evaluation index for various investment plans. Suppose cost generated during lease does not change, like depreciation cost, maintenance cost, material fee, salary for ship's crew, insurance premium, etc., then the formula to calculate NPV is the following:

$$NPV = -P + (R - C_1) \times (P / A, i, n) + C_2 \times (P / F, i, n) \quad (4\text{-}1)$$

Where:

$R=t*r$ —stands for annual rental income;

t —annual operation time;

r—daily rental of the ship;

C_1—fixed annual cost;

C_2—net residual value of the ship, let depreciation rate of ship be i, then according to straight-line method of depreciation, the net residual value after n years is

$C_2 = P(1 - n \times i)$;

P—market price of the ship;

In economic evaluation, a good investment plan meets NPV >O, therefore, the plan in which NPV<O is firstly eliminated.

2. Loss of investment opportunity or benefit evaluation index

As either order a new ship or purchase a second-hand ship requires along time from project approval to operation, additionally, the shipping market is full of changes, therefore, whether the trend of the market can be mastered is of great significance to shipping enterprises. For example, when the market is on rise, timely invest in ships can not only earn large profits, but also expand market share; vice versa, leasing the ship out when the market is sluggish can avoid risk and heavy loss to some extent. By

introducing loss of investment opportunity or benefit evaluation index, if the decision maker's expectation of market trend is consistent with reality and proper measures be timely taken, large benefit is sure to come; but if the expectation is the opposite of reality and blind action is taken, then heavy loss can not be avoided. Therefore, by introduction of this index can effectively reflect how the investment result is determined by whether shipping enterprises can seize investment opportunity. C stands for this index and the formula is shown as follows:

$$C(k,t,i) = \beta \frac{1}{365} \times R \times S(k,t,i) \qquad (4\text{-}2)$$

$C(k,t,i)$ —loss of investment opportunity or benefit index;

$S(k,t,i)$ —time lag of the ship into operation;

β=1—when investment yields benefits ;

β=-1—when investment brings loss

3. Utility evaluation index of investment decision maker

This index evaluates investment plan by analyzing the investment decision maker's style and character. It reflects the importance of human factor in ship finance decision making. For example, major personnel adjustment in shipping enterprises, internal operation and management, development strategy and sensitiveness to market, all of these can find reason from the decision maker's style in dealing with things. Now the shipping market is undergoing fierce competition, the function of decision maker is very important when enterprise invests in ships. Because utility index integrates a variety of factors, and mainly shows its effect from subjective and personal view, thus it usually evaluates by comparing advantages and disadvantages of the investment plans in pairs. The standards include best, good, so-so, bad. The weight of indexes is quantized as 9, 7, 5, 3 and 1. This index is shown by *FZ*.

4. Financial affairs evaluation index

Financial affair is the core of enterprise. It can fully and directly reflect an enterprise's operation, creative capacity, all-round competitiveness, resource advantage and

disadvantage, profit and loss, etc.

The financial affair evaluation mainly consists of debt paying ability evaluation, operation capacity evaluation, profitability, development potential, etc. Debt paying ability evaluation index mainly includes liquidity ratio, quick ratio, assets liabilities ratio and fixed assets ratio; the operation capacity evaluation index mainly includes market share, turnover of total capital and accounts receivable turnover; the profitability evaluation index includes ratio of sales, return on assets, return on capital; the development potential evaluation index includes sales growth ratio, net asset growth ratio, etc.

As shipping industry is capital-intensive and debt-intensive industry, therefore, whether correct, intuitive evaluation and analysis can be conducted on financial affairs is directly related to rise and decline of shipping industry.

Financial affair evaluation involves many indexes, but as most of them can not be directly shown in data, to make it simple, this paper assigns the four indexes based on weight. According to the standards of best, good, relatively good, so-so, and bad. The values assigned are respectively 9, 7, 5, 3 and 1. This index is represented with *FE*, and the formula is as follows:

$$FE = \gamma_1 a + \gamma_2 b + \gamma_3 c + \gamma_4 d \qquad (4\text{-}3)$$

Where:

FE— stands for financial affair evaluation of shipping enterprises;

a—debt paying ability index of shipping enterprises;

b—operation capacity index of shipping enterprises;

c—profitability index of shipping enterprises;

d—development potential index of shipping enterprises;

$\gamma_1, \gamma_2, \gamma_3, \gamma_4$ are successively coefficients for the above four indexes, $\sum_{j=1}^{4} \gamma_j = 1;$;

4.3 Improve multi-objective financing decision-making mode

4.3.1 Improve multi-objective investment decision-making mode

The objective function built by this model pursues best ship fleet financing plan. By comprehensively evaluate the plan's economic effects, the decision maker's attitude, loss of investment opportunity or investment benefits as well as overall situation of financial affair, the most satisfying investment plan is chosen as reference for the shipping enterprise. Professionals and scholars have conducted systematic research on multi-objective investment decision-making mode for ship financing. This paper makes some improvements to the mode by referring to their research results.

The formula of multi-objective financing decision-making mode is:

$$TM = \sum_{k=1}^{K}\sum_{t=1}^{T}\sum_{i=1}^{M} F(k,t,i) \times X(k,t,i) \tag{4-4}$$

where：

$$F(k,t,i) = \alpha_1(k,t,i) \times RNPV(k,t,i) + \alpha_2(k,t,i) \times RFZ(k,t,i) + \alpha_3(k,t,i) \times RC(k,t,i) + \alpha_4(k,t,i) \times RFE(k,t,i) \tag{4-5}$$

Constraint condition：

1. $\sum_{t=1}^{T}\sum_{i=1}^{M} P(1,t,i) \times X(1,t,i) \le B_1;$ (4-6)

2. $\sum_{t=1}^{T}\sum_{i=1}^{M} P(2,t,i) \times X(2,t,i) \le B_2;$ (4-7)

3. $\sum_{k=1}^{K}\sum_{i=1}^{M} X(k,t,i) \times DW(k,t,i) \ge Q_t;$ (4-8)

4. $\sum_{k=1}^{K}\sum_{i=1}^{M} X(k,t,i) \times DW(k,t,i) \le Y_t;$ (4-9)

5. $X(k,t,i) \ge 0$ and is integral; (4-10)

$k = 1,2,3,\cdots,K;$

$t = 1,2,3,\cdots,T;$

$i = 1,2,3,\cdots,M;$

6. $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 1$ (4-11)

Where:

TM—overall degree of satisfaction;

$X(k,t,i)$—number of ships with k investment modes, t ship types and i ship tonnage. This mode has all together $k \times t \times i$ decision-making variables;

$F(k,t,i)$—degree of satisfaction of ship investment plans (k,t,i). It is the linear weight sum obtained by comprehensively considering the ship's technical performance, economic performance, transportation quality and other factors in multi-objective evaluation;

$\alpha_1(k,t,i)$—weight of NPV index;

$\alpha_2(k,t,i)$—weight of utility evaluation index;

$\alpha_3(k,t,i)$—weight of loss of investment opportunity or investment benefits;

$\alpha_4(k,t,i)$—weight of financial affairs evaluation index;

$FZ(k,t,i)$—utility evaluation index of ships;

$C(k,t,i)$—evaluation index of loss of investment opportunity or investment benefits;

$FE(k,t,i)$—financial affairs evaluation index of ships;

B_1---------- capital may be raised by the enterprise to invest in new ships;

B_2---------- capital may be raised by the enterprise to purchase second-hand ships;

$RNPV(k,t,i)$—result of normalized NPV;

$RFZ(k,t,i)$—result of normalized utility evaluation index;

$RC(k,t,i)$—result of normalized loss of investment opportunity of investment benefits evaluation index;

$RFE(k,t,i)$—result of normalized financial affairs evaluation index;

Q_t----------minimum total tonnage of t types of ships;

Y_t----------maximum tonnage of t types of ships;

K ----------total ship investment modes;

T ----------total ship types to be invested;

$P(1,t,i)$ —after tax financing cost present value of new ships;

$P(2,t,i)$ —first renewed after tax financing cost present value at the end of economic life of new ships;

$N(k,t,i)$ —ship economic life (unit: year);

Explanations to relevant modes:

(1) Influenced by development of shipping technology and scale economy effect, large-tonnage ships are more welcomed by shipping enterprises. In this paper, the best ship type, amount and tonnage are all considered so as to satisfy the need of transportation capacity with limited capital, develop and adjust ship fleet scale at the same time.

(2) Initial selection of alternative plans. To make the mode more accurate in calculation, initial selection of alternative plans is needed. Before operating this mode, firstly financing plans to purchase new ships (or finance lease) with high after tax financing cost are eliminated, then investment plans whose NPV<0 are eliminated.

(3) Multi-objective comprehensive investment decision-making mode combines quality and quantity. Weight of some indexes of the mode is obtained by professionals after comprehensive evaluation and quantification. Scientific decision-making does not deny the function of leader's experience, wisdom, ability and courage, on the contrary, it has higher demand for them.

(4) The economic life of both new ships and old ships can be determined by maximum average annual profit. To make the calculation easier, the economic life is usually provided specifically.

(5) As the investment life of new ships is different from that of old ships, the most

frequently used methods are minimum common multiple method, maximum service life method and common computing method.

(6) To facilitate calculation, this mode uses time of delivery as the benchmark to calculate NPV and linear depreciation method to calculate depreciation.

4.3.2 Major improvements to this investment decision-making model

1. Improvement to investment opportunity index

In articles researching ship financing and investment multi-objective decision-making, most scholars only illustrated investment opportunity unilaterally. That is to say, to express with the benefits acquired when operation starts in advance or market opportunity lost when the operation is delayed. This is of course biased. This paper introduces the variable β and perfectly combines the two methods. When the investment gains, β=1; when investment looses, β=-1. This to some extent avoids one-sidedness of evaluation on investment opportunity. This is especially effective when several investments gain and loose at the some time.

2. Introducing financial affairs evaluation index

Based on the research of predecessors, this paper added financial affair evaluation of shipping enterprises, mainly because financial affair is the core of the entire enterprise, and shipping enterprises are capital-intensive, therefore, research on it is indispensable. Besides, if evaluation on internal financial affair of enterprises is ignored in shipping enterprise financing decision-making, having accurate and comprehensive evaluation on investment financing is hardly achievable. The former articles mainly focus on economic index, loss of investment opportunity index and effect of investment decision maker in evaluation. This paper, however, introduced financial evaluation index which will have great significance to investment and financing decision-making of shipping enterprises.

In terms of application of models, the paper didn’t make any creation or breakthrough

based on predecessors due to limitation of knowledge. Meanwhile, considering the complicated calculation, this part is omitted here.

Chapter5. Analysis on risk of ship finance lease and countermeasures

Shipping industry is capital-intensive. Both purchasing and leasing ships needs a huge amount of money. Compared with engineering projects and high-tech industry, ship financing has higher risk and longer payback period and needs more coordination. Especially in today's shipping market which is full of changes, there are many uncontrollable factors. Therefore, once strategic operation mistake occur in shipping enterprise, the loss would be huge or even disastrous. This is why to prevent and avoid risk to the largest extent is an eternal topic for ship finance institutions and shipping enterprises. It is directly related to flourish or survival of them. Ship finance risk includes interest rate risk, foreign exchange risk and political risk, credit risk from the lessor, lessee or third party. The sections below will analyze possible risks in finance lease one by one.

5.1 Common risks in ship finance lease and countermeasures

Financial risk and countermeasures:

Financial risk mainly refers to risk caused by fluctuation of interest rate and foreign exchange.

1. Interest rate risk and countermeasures

Interest rate risk is economic loss suffered by debit and credit sides due to interest rate fluctuation. In international ship finance lease, the lesser needs to borrow medium and long-term funds from a third party in order to purchase the ship, so both sides are likely to be faced with risk from lending rate fluctuation. Under fixed rental and frequently fluctuant interest rate, one side is doomed to suffer loss.

Most finance lease companies borrow money from domestic or foreign banks through various channels. When doing this, it is very important for lease companies to

determine the calculation method of lending rate according to that of rental interest rate. If the lease contract provides that the rental shall be adjusted along with changes of interest rate, when borrowing money, the floating interest rate should be adopted. Floating interest rate is most common in medium to long-term finance, so it is better to borrow with floating rate. No matter how market rate of interest changes, the lending interest will be calculated according to agreed interest rate. In this way, no matter which calculation method is used, as creditor's right and liability are calculated in the same manner, the lesser will not suffer any big loss due to frequent fluctuation in market rate of interest. Meanwhile, the two parties can specify rental change terms in the contract, i.e. when the interest rate goes beyond a certain degree, the two parties may make adjustment to rate of rental through negotiation. This can also avoid risk.

Besides, the lesser may finance by issuing foreign exchange bonds in international finance market. Some lesser, out of consideration for convenient cost budget, prefer to fixed rate of rental in lease contract. Under this context, to raise money by issuing long-term foreign exchange bonds is a good choice. In most cases, it is not easy to get international loans for a term as long as ship finance lease term, but liquidity of bonds makes it possible for international bonds over ten years to be issued and sold in international finance market smoothly. Therefore, shipping enterprises should actively try to combine loans and bonds together so that they can replenish each other. This can on the one hand raise more money and on the other hand reduce risk.

2. Foreign exchange risk and countermeasures

Although the international society today makes great efforts in financial supervision, as many factors can influence foreign exchange rate, the international financial market is still in turbulent with foreign exchange rate soars or drops. Risk from medium and long-term finance is especially worrisome.

International finance lease is generally a mixed type. It includes not only the low-interest loans provided by the government to support domestic export of ships

and large electro mechanical equipment, but also high-interest or interest-free loans provided by World Bank, organization of economic corporation and foreign exchange banks. Comparatively speaking, interest rate of foreign loans is much higher than that of domestic policy-based loans. But the latter usually is mall in amount and can not meet the need of enterprises. Only lease companies has established good credit and is capable in getting adequate loans from foreign banks. As different countries use different currency values, therefore, if the currency received is different from the currency given out, there can be foreign exchange risk if foreign exchanges fluctuates frequently. Therefore, the two parties in international lease business should try their best to choose a currency whose value is stable, like US dollar or Euro, in order reduce foreign exchange risk as much as possible. As most ship finance lease businesses are medium and long-term projects, buying and selling forward exchange for several times or using interest rate swap can also avoid foreign exchange rate.

5.2 Credit risk, third party liability risk and countermeasures

1. Credit risk and countermeasures

Credit risk refers to the risk of loss occurs because the two parties of finance lease completely or partially fail to fulfill their own part of liability agreed in the contract. Along with economic and social development, credit is drawing unprecedented attention, especially in such fields as ship transaction, ship lease and credit loan which involve large amounts. Many enterprises adopt credit evaluation and credit investigation before transaction. It’s no exaggerate to say that the amount and result of transaction to a large extent depends on grade of credit. Changes in shipping market and growth and decline of lesser and lessee’s strength can both directly or indirectly cause default.

(1) Credit risk of lesser and countermeasures

Credit risk of the lesser mainly refers to consequences caused by default of the lesser to the lessee. For example, the seller refuses or delays delivery of ship because the

lesser is in lack of money, thus the lessee suffer economic or default-related loss. During lease term of the ship, if the lesser withdraws the ship without reason, the lessee will also suffer huge loss.

(2) Credit risk of the lessee and countermeasures

As a matter of fact, default risk of the lessee is most common, mainly seen in the following:

(1) Due to sluggish economy and poor operation and management, the lessee suffers profit slips or even loss during market depreciation. This will lead to difficult turnover of capital and the lessee finally chooses default and requires return of ship in advance, cancel the contract or refuse to pay rental.

(2) The lessee bears ship insurance but defaults against the lesser. Ship finance lease generally adopt bareboat lease, so the lessee should undertake insurance of hull and other insurances. If the lessee fails to cover insurance based on the contract or ship value, or the insurance money is invalidate due to reasons of the lessee despite of insurance coverage, once the ship is completely or partially destroyed, the lesser may suffer the risk being unable to get back the capital and interest.

(3) The lessee disposes the ship without agreement of the lesser, lease or resells it to a third party or even dissembles the ship. Currently there has been no international maritime affairs law that can effectively prevent such fraud from happening. Especially when ship registration system is imperfect or competent authorities are corrupt, the possibility is even greater, giving a deadly hit to the lesser.

(4) During lease term of the ship, the ship is damaged and can not be restored due to force majeure or no reason of the two parties, the lessee requires the lesser to undertake the risk and refuses to pay rental on the ground that the ship belongs to the lesser.

Countermeasures targeting credit risk of the lessee:

To retrieve or reduce the loss to the largest extent, besides requiring compensation according to default terms, the lesser can also take the following measures to avoid risk:

(1) Credit investigation or project evaluation. This work should only be done before the contract is signed. It should go through the entire finance lease process. After all, the ownership of the ship belongs to the lesser. To discover problems timely and take corresponding measures to solve them can ensure the interests of the lesser.

(2) The contract may have exemption clause to protect the lessor when the ship is in danger due to force majeure. In ship finance lease, the lessor is actually the financier. According to the principle that debt in the form of money shall not take force majeure as a reason for exemption of liability, which means the lesser shall not be exempted from the liability of paying rental despite of force majeure during the lease term.

(3) Forbid termination of the contract in midway. In case the lessee terminates the contract in midway and the lesser has no rental to collect, the lesser can specify in the contract that termination of contract in midway is not allowed. Meanwhile, the lesser may set exceptional clause, specifying that if the lesser has adequate evidence to prove that the lessee has serious action of default or is on the verge of bankruptcy and is unable to pay rental, the lesser has the right to terminate the contract with right of rescission in order to protect himself.

(4) Set clause to exempt defect guarantee. In ship finance lease transaction, the lessee chooses the ship and seller based on independent judgment; therefore, the lessee should undertake potential risk of defects in the ship.

(5) Guarantee. Require the lessee to provide guarantee for ship finance lease. Guarantee from Ship-owners' Mutual Insurance of Association is more reliable.

(6) Insurance. Ship insurance includes voluntary insurance and compulsory insurance (like oil pollution liability insurance). As ships are used on the sea and are in special and obvious risks, therefore, almost all ship finance lease contracts include ship insurance terms. In practice, the lesser may cover the insurance and add this part to the rental, or the lessee may cover the insurance in the name of the lesser.

2. Liability risk of third party and countermeasures

During the period of time when the lessee manages or operates the ship, the lessee may be assumed of administrative liabilities due to default or infringement to third party or law or regulation violation, and indirectly puts the lesser in great risk. Based on such maritime affair request, either the third party or administrative authority has the right to request the court to arrest the ship. Under such circumstance, the lessee is obliged to provide guarantee to release the arrested ship. But for maritime affair compensation with large amount, the lessee usually can't or is unwilling to provide large-amount guarantee. The ship without guarantee shall be sold compulsorily. Therefore, when the lessee refuses to provide guarantee to release the arrested ship, the lesser is actually put in the responsible side, and shall finally pay the huge compensation. But after this, the lesser enjoys recovery right toward the lessee. However, whether the recovery right can be realized is still a question. In practice, debt and oil pollution liability often involves the lesser into huge risk. Therefore, in international ship finance lease, prevention of third party risk must be enhanced in order to guarantee the leaser's interest.

5.3 Political risk and countermeasures

Political risk refers to the risk that may be brought to both parties or one parity in a lease contract due to abrupt political changes or governmental macro control adjustment, like war, revolution, internal disorder, government acquisition or confiscation, state control over import, export or foreign exchange, exchange control, etc. Political risk, generally speaking, is hard to forecast or prevent, especially for

ships. They sail in various sea areas of the world and are subject to international laws and laws and regulations of various countries. The political risk undertaken by ships is also international. Therefore, study on relevant countermeasures is quite necessary.

1. Cover commercial insurance that can avoid political risk. At present, most commercial insurance terms can not cover all political risks, so despite of insurance, the guarantee is not 100%. For the two parities of ship finance lease contract, they should be clear about possible political risk, and decide whether to cover this insurance based on real situation included in the contract.

2. Cover the insurance of Ship-owners' Mutual Insurance Association. This insurance can effective avoid political risk. It not only covers ship loss caused by war, but also daily expense loss during arrest.

3. Study laws and regulations of relevant countries on finance and maritime commerce and conduct political risk evaluation. Because finance lease has yet to be developed in terms of political insurance system, therefore, when the lesser chooses finance project and the lessee chooses operation area, they should conduct risk evaluation by drawing on experience of the captain and legal experts as well as their own knowledge.

Natural disaster risk and countermeasures:

Natural disaster include water disaster, wind disaster, lightening strike, hailstone, earthquake, tsunami, mud-rock flow, etc. Natural disaster belongs to force majeure and usually causes huge economic loss to both parties of lease contract.

The ordinary means to prevent such risk is to cover ship special insurance. For example, in the “ship insurance terms” of People’s Insurance Company of China revised on January 1st, 1986, the risks listed in it include earthquake, volcanic explosion, lightning and other natural disasters.

5.4 Current ship finance situation facing China's shipbuilding industry and risk prevention measures

1. Current ship finance situation of China's shipbuilding industry

Finance lease is a key link in ship industry and it is a key factor showing a country's competitiveness in ship industry.

In 2010, China's ship industry exported 53 million tons of ships, and received new ship orders up to 75.23 million dead weight tons; up to the end of December, 195.9 million dead weight tons of ships are in hand. Shipbuilding enterprises above the designated size realized 393 billion Yuan in primary business. As China's shipbuilding capacity improves as a whole, privately-run shipyards in various parts of China also play an important role in addition to big shipbuilding groups CSSC and CSIC located in southern and northern part of China respectively. However, the current situation of most shipbuilding enterprises still show many problems demanding prompt solution, for example, singleness of source of funds, finance plans and choices are limited, forming a bottleneck for a great number of shipyards.

As it is known to all, ship finance has always been a hard nut to crack in China. The ignorance of financial institutions toward shipbuilding and shipping industry makes it full of obstacles for shipbuilding enterprises to get loans. Today, the development of shipping economy is drawing world attention. As shipbuilding enterprises become more competent in repayment and build up high credit, risk of large amount loans is reducing. Driven by high profit in ship industry, many financial institutions at home and abroad increased their financing to shipbuilding enterprises. But all these have not fundamentally improved financing situation of small shipyards. It is reported that except for CSSC and CSIC, COSCO, CSCL and other large state-owned shipbuilding enterprises, it is exceedingly difficult for privately-run shipbuilding enterprises to get large loans from domestic financial institutions. In the field of export-oriented ships, even a piece of insurance policy is hard to acquire, which almost become a key factor determining whether a small or medium sized shipyard can get the order and deliver the ship successfully. Although these enterprises may hold a great many of orders and

the slipway is full of ships, floating capital is tight and expanding building scale is difficult. Bank insurance policy is an essential condition for ship export. According to international practice, when foreign ship-owners send orders to Chinese shipyards, they usually pay a certain amount of down payment. To guarantee delivery of ships, before signing contract with domestic shipyards, most of them require the shipyard or ship agent to find a bank with good credit to issue an LG (usually a performance guarantee, quality guarantee and guarantee for refund of advance payment). By right of this insurance policy, once the shipyard fails to deliver the ship on schedule, foreign ship-owners can claim for compensation toward the bank accepting the insurance. This is the so-called finance guarantee, i.e. most of the expenses during shipbuilding, like money spent on labor, equipment and material, are obtained through loans.

Based on the bank LG, if the shipyard defaults in terms of time limit for project, quality or standard, the ship-owner will claim compensation or return of down payment toward the shipyard. If the shipyard is unable to make compensation, then the bank who issued the LG shall compensate as the LG provides. If the shipyard is able to make compensation some day in the future, then the bank that issued the LG will loose less, otherwise, it will suffer great loss.

Building a bulk ship 80-100 thousand tons needs tens of millions US dollars. Once there is an accident, the financial institution providing guarantee will be faced with great risk. Almost all big shipyards in China have once been fined with large amounts. Under such circumstance, the shipyard needs to pay hundreds of thousands of money as compensation. As most small and medium sized ship enterprises can not undertake huge compensation, finally it is the bank which needs to deal with what is left. Under the context of credit crunch, banks are very likely to tighten assessment of loans and guarantee for shipbuilding enterprises. Given the fact that shipbuilding industry relies heavily on bank and other financial institutions, financial control can be deadly to shipbuilding industry.

Therefore, uncertainty of credit is a natural obstacle for small and medium sized shipyards to get finance guarantee. The current situation shows that relying on government support and years of credit guarantee, it is not difficult for domestic large ship groups to get LG issued by banks. But when it comes to privately-owned ship enterprises, the banks require them to provide an equal amount of security deposit. Take a new ship over a million US dollar for example, the ship enterprise needs to make a deposit of equal amount before getting LG from the bank. Even for some privately-owned enterprises with good credit, they also need to pay security deposit 20% or more of the ship price. During construction of the ship, the security deposit increases based on the progress until it reaches 60% of the ship price. Then the rest will be paid-off upon delivery of the ship.

The process from starting to build the ship till the ship is delivered is also the process in which the financial pressure of ship company grows. It is reported that current guarantee institutions at the market can hardly undertake financial guarantee for huge funds needed to buy ships due to the reason that they require high premium and the amount is limited. Besides, other enterprises, considering the imbalance between benefit and risk, are reluctant to provide guarantee for shipbuilding enterprises. This sometimes can break funds chain of shipbuilding enterprises.

Ship industry is capital-intensive. Financing is an essential factor in enhancing competitiveness of ship industry and accelerate shipbuilding development. In this sector, however, we lag far behind Japan and Korea. If the financing problem can not be solved, we could never catch up with the two countries in shipbuilding industry.

Gao Yanming, Chairman of the Board of Hebei Yuanyang Transport Limited （HOSCO）has said more than once that most Chinese financial institutions have not realize the huge potential of domestic ship finance market. Because domestic financial institutions are not fully prepared, China’s shipping industry is constraint to some extent. China’s ship finance lease industry develops slowly, the fundamental reason is that it is not professional enough and lacks bold creation and attempt.

2. Countermeasure of ship finance difficulty in shipbuilding industry and risk prevention

The above analysis on shipbuilding finance situation shows that finance problem of small and medium sized shipbuilding enterprises to a large extent depends on whether the enterprises can obtain bank insurance policy. If this key link can not be solved, it will certainly retain development of small and medium sized shipbuilding enterprises, and even retain the development of China's ship industry.

It is shown in investigation and analysis that the reason why banks are reluctant to issue insurance policy for small and medium sized shipbuilding enterprises is that the investment amount is high and risk of underwriting is big. In past time, local small and medium sized shipyards could obtain insurance policy only by holding their assets or let other enterprises to provide guarantee. But now, the cost of a ship is far beyond the whole assets of an enterprise, the old guarantee method surely died out. As a solution, several shipyards in Fujian, Fuan and Wenzhou adopted joint security guarantee. But this still has limitations. It is common to see that the total assets of several enterprises can only guarantee cost of one ship, and other shipyards are excluded from guarantee. So the result was far from satisfactory. On the other hand, bank and other financial institutions have little in-depth knowledge of shipbuilding enterprises. Even if they are willing to issue insurance policy, they never study the subject in-depth. Guarantee companies outside the industry usually guarantee simple-designed small ships, or ships of enterprises that have experience in shipbuilding or export of ships. They never guarantee special ships, new type ships and large ships.

There have been mature professional institutions concerning ship finance guarantee abroad. They treat all shipyards equally, whether they are state-owned or privately-run, big or small, regardless of ship types. therefore, they can ensure that the funds chain of ship export is smooth. Domestic financial institutions, however, treat

state-owned shipyards and privately-run ones differently in financing. They do not cooperate as they should, on the contrary, they compete. Therefore, it is not difficult to understand why privately-run small and medium sized shipyards find it hard to find guarantee.

3. Ship finance mode of the Export-Import Bank of China

(1) Basic conditions and requirements in applying buyer’s credit on export

Out of consideration for preventing and controlling major risks under buyer's credit on export (mainly include construction and performance risk of shipyard and exporter, credit risk of borrower and ship-owner, political and state risk of borrowing country), applying and using buyer’s credit must meet the following requirements:

1) The exporter and shipbuilding enterprise must have good credit and have good performance record in terms of shipbuilding capacity;

2) The ship-owner must have powerful capital strength and sound operation performance, especially, the ship-owner must have favorable credit and reputation among shipping enterprises;

3) As to country risk, the Export-Import Bank of China would usually comprehensively analyze the country risk of the borrowing country, credit of the borrower and repayment guarantee before determining whether to issue 1:3 credit guarantee.

(2) Major credit conditions

In principle, buyer’s credit condition of the Export-Import Bank of China complies with general rules in OECD-“gentlemen’s agreement"

1) In principle, the amount of the contract supported by buyer’s credit shall be no less than 2 million US dollar;

2) In principle, the amount of loan shall not exceed 80% of the contract value;

3) Term of a loan shall not exceed 20 years;

4) The capital of the loan shall be repaid equally once every half year, and the interest shall be repaid once every hard year;

5) Percentage of home-made parts of the ship in principle shall be no less than 500/ns；

6) In principle, the lending rate shall be applied with reference to commercial industry reference rate announce by OECD. This rate is announced by OECD once every month and is fixed in the entire term;

7) The borrow have to pay management fee, underwriting fee and bank charges;

8) The currency shall be US dollar or other convertible currencies acceptable to the Export-Import Bank of China.

(3) Procedures

Getting a loan mainly has the following three procedures:

1) The exporter or importer propose credit application;

2) The Export-Import Bank of China shall accept and review the materials provided by the applicant;

3) Upon approval of the loan project review department of the bank, the borrower shall sign a loan agreement with the bank and then the two shall sign guarantee agreement (credit guarantee or mortgage).

Chapter6: Conclusion

This paper introduced ship finance lease mode in details and, based on characteristics of finance lease mode, it analyzed the feasibility for capital-intensive industries, like shipbuilding and shipping industry, to adopt finance lease mode. Current situation of China's shi finance lease, existing problems, risks and countermeasures are all discussed in this paper by combining principle and reality. In-depth comparative analysis is conducted with a method integrating qualitative analysis and quantitative analysis. By drawing on experience from Europe and Korea on ship finance lease mode, this paper proposed several finance lease modes that can be adopted in practice and also preparations need to be done by shipping enterprises in finance lease.

During the research, the writer realized that the composition and operation flow of ship finance lease is quite different from other transaction. Ship finance lease involves both financial service industry and shipping industry; and ship is special movable property, featuring high price and long investment term; rights and obligations of various parties in finance lease are not in good balance; ship finance lease involves many links in flow.

To sum up, China's ship finance lease at present still lag far behind countries with mature financing in terms of experience and professional level. There are such problems as finance plans are limited, financial institutions are not professional enough, lacking well-capitalized ship finance companies, tax relief policy for finance lease is not attractive enough, etc. Because of these problems, China's ship finance lease is retained to the current level. As shipping enterprises, shipbuilding enterprises and financial institutions become more standard, more and more problems are being solved. What's more, domestic ship finance market has huge potential. It is hopeful that in the near future, China's ship investment and finance industry will stand high among international counterparts.

Reference:

[1] Denizcilik finansmanindaki son gelismeler, E. Cihan Akca, J.Black. Latest major developments in shipping finance, Sea/Mediterranean Environment Vol. 13: 181～189 (2007).

[2] Bruce G. Paulsen, Paula Odysseos, Kassandra L. Savicki. New Horizons: an Analysis of Public Markets Financing of Shipping Ventures and the Impending Wave of Shipping securities Litigation. Tulane Law Review, 2007(6)

[3] Francis X. Nolan, IIIEquipment Leasing, Vessel Financing Issues, American Law Institute - American Bar Association Continuing Legal Education ALI–ABA Course of Study，March 25, 1993

[4] Peter Measures, Angelo L. Rosa. Outpacing the Tempest the Consequences of Basic II on Institutional Lending in Shipping Finance Transactions. The Tennessee Journal of Business Law, 2004

[5] Daniel C. Rodgers. Banking and Finance Law Client Strategies. Thomson Reuters/Aspatore; Daniel C. Rodgers, 2009(4)

[6] Donglai Yang. A comparative Analysis of Maritime Lien Priority under United States and Chinese Maritime Law. Tulane Maritime Law Journal, 1999

[7] Robert M. Jarvis. Marine Financing. Florida Bar, 1996

[8] Angelo L. Rosa. Contrariety: Divergent Theories of State Involvement in Shipping finance Between the United States and the European Union. Tulane Maritime Law Journal, 2005

[9] Helen B. Bendall. Ship investment under uncertainty: a real option approach [dissertation]. Sydney: University of Technology, 2004

[10] David McI. Williams. Yacht Financing After Public Law 100-710: the Ship Mortgage and State Law Liens. Consumer Finance Law Quarterly Report, 1994

[11] Altman E I．Financial Rations Discriminate Analysis and the Prediction of Corporate Bankruptcy．Journal of Finance，1968，September：589--609

[12] Amembal S P．International Leasing：The Complete Guide．Salt Lake City：Amembal＆Associates．2000．

[13] Amembal S P．Operating Leases．Salt Lake City：Amembal&Associates. 2001．

[14] BelkaoniAR. Long-term Leasing-Accounting, Evolution, Consequences. New York：Ouornm Books. 1998.

[15] Bennie N H，Plath DA，Helene J W. Corporate Lease Analysis. New York：Quorum Books. 1991.

[16] Bollerslev T. Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics，1986，31：589. -609

[17] Boudoukh J，Richardson M，Whitelaw R F. Investigation of A Class of Volatility Estimators. The Journal of Derivatives，1997，Spring：63-71

[18] Dowd K. Andjusting for Risk：An improved Sharpe Ratio. International Review of Economics and Finance，2005，July：209-222

[19] Fabozzi F J，Modigliani F. Capital Markets：Institutions and Instruments. Englewood Cliff。NJ：Prentice Hall. 1992.

[20] Halladay S. A Guide To Equipment Leasing. Chicago：Carpediem Consulting Corporation. 1998.

[21] Hymer S H. The International Operations of National Firms：A Study of Direct Foreign Investment. MIT：MIT Press. 1999.

[22] Jarrow，Robert A. Default Parameter Estimation Using Market Prices. Financial Analysts Journal,2001，5：1-18

[23] Mckinnon，R 1. Money and Capital in Economic Development. Washington D c：Brooking Institution. 1973.

[24] Mishkin F. The Economics of Money. Banking and Financial Markets. New York：Addision Wesley Longman. 2001.

[25] Schallheim J S. Lease or Buy? Principles for Sound Decision Making. Boston：Harvard Business School Press. 1994.

[26] Shaw E S. Financial Deeping in Economic Development. New York：Oxford university Press. 1973.

[24] Thomas L. Money, Banking and Financial Markets. Ohio：South—Western College Pub. 2005.

[25] Richard M. Contino，Negotiating Businem Equipment Lease，2nd Edition (June 11，1998)，American Management Association, U.S.A, 1992.

[26] Sudhir Amembal，International Leasing：The Complete Guide，volume one，(May 1，：2000)Amembal&Associates，U．SA，2000．

[27] Claude D．Rohwer & Gordon D.Schaber, Contract。

[28] D．R．Thomas，Maritime Liens，London Steven＆Sons，1980．

[29] Willam Tetley, Brain G Mcdonough，Maritime Liens and Claims, Business Law Communications Ltd.，1985．

[30] Carey, N. (2007). Maritime IPO activity seen thin in 2007, Reuters.

[31] Dourish, A. Robertson, S. (2006). An Introduction to Islamic Finance, In Shipping Finance, (S. Harwood, ed.), Euromoney Institutional Investor Plc.,
London. pp. 537-546.

[32] French, L. (2006). The international Element, In Shipping Finance, (S.Harwood, ed.), Euromoney Institutional Investor Plc., London, pp. 1-2.

[33] Goulielmos, A.M., Psifia, M. (2006). Shipping Finance: Time to Follow a New Track, Maritime Policy and Management. 33: 301-320.

[34] IMO World Maritime Day (2005). International Shipping Carrier of World Trade, Maritime International Secretariat.

[35] International financial Services, (2005). Maritime Services City Business Series, International Financial Services, London.

[36] James, C. (1929). Financing the Merchant Shipping Industry, J. Business of the University of Chicago. 2: 204-216.

[37] Jensen, F. (2005). Survey of shipping IPOs in the US Market: 2005, Holland & Knight LLP, New York.

[38] Lunde, D. (2005). Ship Financing Developments. J. International Transport. pp. 33-34.

[39] Macqueen, J. (2006). Domestic Bliss, Lloyd’s Shipping Economist, Informa Maritime and Transport, London.

[40] Matthews, S. (2006). Bulk Demand, Lloyd’s Shipping Economist, Informa Maritime and Transport, London.

[41] McGruarty, R.D. (2006). Waves of Demand, Lloyd’s Shipping Economist, Informa Maritime and Transport, London.

[42] Ownership Emissionshaus (2004). Basics of the German KG Finance, Ownership Emissions

GmbH.

[43] Stopford, M. (1997). Maritime Economics, 2nd Edition, Routledge Taylor&Francis Group, London and New York.

[44] The European Bank (2001). Shipping Operations Policy, Document of the European Bank for Reconstruction and Development. pp. 28.

[45] The IMO Library Services (2006). International Shipping and World Trade Facts and Figures, IMO Library Services External Relations Office, 7.

[46] Wolfe, G. (2006). The US capital markets, In Shipping Finance, (S. Harwood, ed.), Euromoney Institutional Investor Plc., London, pp. 109-125.