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The evolution of Lianyungang Port fund from share market

Pengyu Bai

WORLD MARITIME UNIVERSITY

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THE EVOLUTION OF LIANGYUNGANG PORT FUND FROM SHARE MARKET

By

BAI PENGYU

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.

(Signature): _____

(Date): _____

Supervised by

Professor XU Dazhen

Shanghai Maritime University

Assessor

World maritime university

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ABSTRACT

Title of Dissertation: The Evolution of Lianyungang Port Fund from Share Market

Degree: Master of Science in International Transport and Logistics

Abstract: In January, 2007, Premier Wen Jiabao pointed out when he paid a visit to Lianyungang Port that：¡ It is not an easy job to develop Lianyungang Port but we can make it out by proper planning and quickening the steps. ¡With the development of the inter land in China and the ¡Go Western Campaign¡, Lianyungang has entered a new phase of its further development, in which process there are a lot of needs for capital. As a capital-oriented industry, supporting relative port equipment requires enormous investment. It can never work out again by relying on the government and the company itself alone. Therefore, Lianyungang Port is confronted with an urging problem which must be solves as soon as possible, that is, how to finance the investment and how to allocate the money.

This dissertation focuses on two actual issues. The first one consists of three chapters from chapter one to chapter three, mainly discussing on current situation about port investment theories and the financing ways based on the actual condition of the Port of Lianyungang by being listed in the market. Lianyungang Port became a listed company in April 26, 2007.820million Yuan was collected in order to construct Xugou No59 multipurpose dock and coke dock. The economic index of IRR, NPV and payback period in the two projects is cumulated by emulation, in order to judge whether the projects are reasonable. The outcome is so desired that both are worthy.

Keywords: Modal of Investment and Financing，Lianyungang Port, Economic Indicators

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LIST OF ABBREVIATIONS

DRC   Development and Reform Commission

NELB   New Eurasian Land Bridge

NPV   Net Present Value

IRR   Internal Rate of Return

ROR   Rate of Return

PRC   People Republic of China

KMTC   Korea Marine Transport CO., LTD

BOT   Build -Operate -Transfer

TOT   Transfer-Operate-Transfer

ABS   Asset-Backed Securities

P/E   Ratio Price to Earning Ratio

Chapter 1 Introduction

1.1 Background

Lianyungang port was opened in 1933, more than half a century has past, Lianyungang has become the world's attention as Oriental bridgehead of the new Eurasian Continental Bridge for vast economic hinterland, convenient transportation and excellent natural port. After progressive development, it has changed from a small port at the beginning to comprehensive international trade port with a set of berth facilities, both bulk and transport functions, mainly to foreign trade transportation. Its designed throughput capacity is nearly 40 million tons and the actual throughput is about 70,000,000 tons. Lianyungang is one of China's 500 largest service companies.

With the rapid development of national economy and the foreign trade imports and exports, Lianyungang throughput also grows rapidly. The company's terminal capacity is in shortage and urgent to be developed. And all levels of government also attach great importance to the development of Lianyungang. Its new strategic position has been established: Lianyungang City, in Jiangsu Province has been identified as the leading for the revitalization of northern Jiangsu and East Longhai economic zone. The provincial and municipal governments have set up two Co-ordination Group for Lianyungang Port and are gradually increasing infrastructure construction and policy supporting for Lianyungang port. Premier Wen Jiabao visited the Lianyungang this year drive the development of Lianyungang to a high state level. He pointed out that Lianyungang links the south and the north, the east and the west, promotes regional coordinated development, to make Lianyungang an important tie that integrates the economic development between the area along Longhai railway line and the coastal area. It is a major task to do a good

job in the port of Lianyungang which can bring a very bright future. Also it is necessary to do well in planning and to speed up development. "

Under the "high hopes" from all levels of the Government's, it requires a large amount of capital investment in the port development process by leaps and bounds. As for construction funds, in terms of the source investment, is mainly input by national, provincial and municipal financial investment and enterprise¡s own fund. It effectively ensures the port infrastructure, play an important role in promoting port and economic development. However, the port is a capital-intensive industry. Along with the rapid development of the national economy, there is a growing demand for sea transport, and large corresponding demand for funds of port construction. The time of solely relying on the country's financial and corporate funds to engage in port construction has passed. It is unable to meet the needs of economic development as time goes by. Therefore, Lianyungang is faced with urgent practical problems: First is how to solve fund razing. Second is the cost-effectiveness evaluation of raised funds during the allocation process. So it become a top priority task to establish of a model to evaluate the reasonableness of the use of funds with relevant economic indicators under that situation when fund raised is limited, in the purpose of achieving the greatest effect of the use of funds. This article is based on this consideration, with emphasis on building a system dynamics model to calculate the various economic indicators; the adoption of the model calculated the optimal allocation of program funds.

Eight years has passed to the April 26 2007, Lianyungang Port Co., Ltd. successfully entered the stock market in Shanghai Stock Exchange. It brought about a new breakthrough of raising funds for the port, which produced huge social benefits, brand benefits and customer benefits thus raised 820 million funds for port construction. Under this background, the Lianyungang Port Group set up a group to study the financing channels and the use of the funds. According to the company's

development plan and the actual situation in the hinterland, it is planned to raise funds constructing the Xugou 3, No 59 and coke dock. And for the expected economic effects of the project construction, how reasonably calculate NPV, IRR and other indicators become a very important topic. The thesis is written on the background.

1.2 Literature Review

Research includes port investment and financing projects in Lianyungang port by implementing the system dynamics model to get the economic indicators. Because of the data collection and other factors, in accordance with the throughput of data over the years, the author will using time series method, and SPSS software to do system operation. The thesis includes both qualitative and Quantitative analysis for applying system dynamics model.

Various studies have been conducted on choose their financing policies for the listed companies. Zhanggang , Huangshaoan (2001) pointed out that the reason why Chinese listed companies obtain characteristics of preferring equity financing is that the Differences in funding costs between their debt and equity financing. Lu Zhengfei, Ye Kangtao (2004) on the financing of China's listed companies choose two variables, enterprise net capital gains rate (corporate industry Performance) and free cash flow, to do an empirical analysis of behavioral factors, reflecting impact of agency problem between shareholders and managers on the corporate financing behavior. Evidence shows that these two indicators have influent China's listed companies. Guanzheng, Fan Conglai(2006) by applying Myer and Majluf (1984) framework of the modified model, taking into account China's a serious information asymmetry and sound governance structure under the specific system context, to show that it is the asymmetric information causes China's preference shares of listed

companies to refinance. Zou Weiqian, Xu Song (2005) shows in their research that in the condition that abroad capital markets are imperfect, the external capital market have a significant impact on financing of the enterprise¡s internal market operation corporate management personnel.

On the basis of successful listed financing, there are often further study of how to rationally use funds, how to establish evaluation standards and how to calculate evaluation indicators, to optimize the use of funds. Jin Di; Li Guangwei(2005) pointed out Internal sourced financing should be taken as the first choice and the external sourced financing should be the second one based on the introduction of the theory of the optimizing order financing and the financing practices of enterprises in developed countries.

1.3 Main Content of the Thesis and the MainIdea

1.3.1 Main idea

The core content of this article lies in calculation of financial indicators resulting from use of funds, to determine the reasonableness of project feasibility. To achieve this purpose, the also will do as followings. First of all, describe the port investment and financing theory and the status both at home and abroad, for the reference of capital financing for the Lianyungang port to provide alternative financing programs for Lianyungang. Second, in accordance with the status quo of Lianyungang port development, development strategies and development planning expatiate Lianyungang¡s financing status quo and the road leading to be listed and financing. On the basis of successful listed financing, the author will go further study of how to rationally use funds, how to establish evaluation standards and how to calculate evaluation indicators, to optimize the use of funds. Thus, according to the proposed

project, combined with the actual situation of port Lianyungang, the author will establish a system dynamics model, to calculate financial targets from 2007 to 2015, to carry out sensitivity analysis to determine the reasonableness and feasibility of the investment projects, to analysis the results of the model, to provide decision-making suggestion and complete of the core content of the dissertation.

1.3.2 Main content

This paper is divided into four parts: the first part is about related theory of port investment and financing and also summarizes Chinese ports features of financing channels. The second part introduces development of Lianyungang port and its investment and financing situation. In this part, the author provide with specific implementation of listed financing strategies during an extraordinary time of the port development. In the third part, the author will set the evaluation of the economic indicators, establish different system dynamics model for port investment and financing projects by flow of using funds in Lianyungang port. In this model, a cause and effect diagram and flow diagram for port investment and financing will be built. Next part is to determine the parameter values, applying the calculation of the model. In case of Xugou3 and Coke Dock project, specific economic indicators will be output by the system simulation in order to determine the reasonableness of funds using.

Chapter 2

Current Financing Situation of Lianyungang Port

2.1 The Current Situation of Lianyungang Port

2.1.1 Current situation

1. History of port development

The present port was founded in 1933; the first project was completed in 1936 with six 3,000-ton berths.

Lianyungang has a long history. Its predecessor Da Pu Port formally opened in 1905. Due to historical reasons, the liberation in 1948 caused the pier collapse, channel blockage. And as a result kiloton ship can not enter the harbor, the annual cargo throughput of was less than 100,000 tons. After the founding PRC, it was repeatedly extended and was formally opened in 1956. The large-scale construction began in 1973, when the expansion of the ¡horse back¡ port area appears. In 1982, there opened a new port area named Miaoling. In 1987 Miaoling phase 1 was put into operation with two coal berth project; in 1988 the second phase construction of Miaoling was begun with objection of five specialized berths (including a container berth),which was   completed and put into production in 1993. The project put an end to the history of no specialized container berths in Lianyungang port. In the same year, West Breakwater construction works are completed, forming a basin in surrounding shape, which create a good cover conditions for the port development. There also started a project Xugou 1 with six groceries berths. It was completed and put into production in 1999, with the initial formation of three main ports which are Mayao, Miaoling and Xugou in the south bank.

2. Situation of Berth

At present, the Lianyungang port appears the layout of three main port area formed by the Mayao, Miaoling, Xugou and Guanghe port area. Production by the end of

2005 would be a total of 35 berths (terminals coastline is about 6.8 kilometers, integrated capacity is about 38.77 million tons (including 740,000 TEU). Among these berths, there are more than 28 one million-ton berths, with the largest 100,000 tons level berthing. In 2004 it complete 43.522 million tons of cargo throughputs, 502,000 TEU containers which in 2005 it completed 60.17 million tons goods throughput, up to 1,005,000 TEU, and achieve a historic breakthrough.

3. Infrastructure

1）Pilot

Lianyungang port channel consists of the main channel (Section A, curved section and section B, Miaoling fireway (Section A, and section B), and Xugou channel and Mayao port area branch channel, with a total of about 31.3 kilometers length. The main channel and Miaoling fairway are currently under enlarging construction according to the standard of 150,000 tons level channel. The effective width is of 230m, while the designed depth is 16.5m.

2）Anchorage

Lianyungang port obtains 4 pilotage and quarantine anchorage all of which are more than 10,000-ton ship anchor.

3）Breakwater

Mayao and Miaoling port area of Lianyungang Port are built with east and west of the breakwater of a length of 1050m and 1600m respectively and the same top width of 3.0m. At present, there exists a West Breakwater with the length of 6700m, and 12m in width.

2.1.2 Existing problems

1. Lack of overall port capacity and advanced facilities

Over the fifteen years, the Lianyungang port has increased the intensity of infrastructure construction and technology reform. After that, the port infrastructure begun to take shape initially and its face suffered a great change. But compared to

the overall port capacity, the growth in throughput is still insufficient, and port ultra - load operation is still a serious problem. At the same time, the construction part of part in the seventeenth of the last century dilapidated and in poor technology condition. The facilities are backward while berth capacity can not be effectively implemented.

2. Prominent structural contradictions in infrastructure

As on of the main costal ports in China, infrastructure structural contradictions in Lianyungang is prominent

1) Lianyungang is in serious shortage of large deep-water berths. Although the outer channel and the channel Miaoling has been extended to 70,000-ton level one-way channel, it is still facing great challenges from the development of the large ocean vessels and large bulk and container transport.

2) Lianyungang is in low level of Specialization, and intensive. Since entering the 21st century, the port's container, iron ore, coal (coke), alumina and other major category of cargo throughput has rapidly grown. As a result, the existing facilities can not meet the enlargement and specialization requirements of ships at sea.

3) Interdependence between port and city needs to be strengthened

As a result of relatively backward economic development in North Jiangsu region, Lianyungang port has been the main trans-shipment hub of goods outside the city for a long time. Currently, more than 80% of the cargo throughput is outside the hinterland of North Jiangsu, mainly from areas along the Longhai Railway. Lianyungang City, and North Jiangsu region¡s economic are relatively less dependent on the port.

4) Port development is constrained in space, transportation system is imperfect.

The external transport of Lianyungang are mainly rail and with road as a supplement. There has formed a external transport network with the double line of the Longhai Railway and Tongsan Lianhuo Road as the main trunk. The network has effectively

connected with the port. However, in rail transport organizations in the port, the national rail way and port rail way are not coordinated well. The through ability is restricted while the number of road is less than the number to form a complete system and is also cross-interference with the urban traffic. The channel capacity is low and poor. Besides, internal river network is clouded and the low-grade conditions do not qualify the multi-transportation. We can conclude that the transportation system remain to be improved.

5) Port function is single and it is urgent to improve the modernization level

Although in recent years the throughput of the port developed rapidly, along with consistent infrastructure expanding, the expansion of the port function is slow which can be seen from the fact that the port is still undergone handling, transport operating in traditional way, and the port function id mainly single. Besides modern port logistics, bonded warehousing, information services and other functions is weak to form a economic pattern led by port.

2.1.3 Opportunities

From the national level, it is pointed out the Yangtze Delta Area with Shanghai as the leader and Economic Belt along the Yangtze River region and in the 90th in 20century, the Chinese Government when programming the Ninth Five-Year Plan and the Long Term Goals for 2010. In Chinese Tenth Five-Year Plan, it is pointed out that *¡Re lying on the transport links and central cities of Eurasian Continental Bridge and the Yangtze River waterway, to String of points to lines and drive points to surface so as to promote the formation of economic zones such as West Longhai, Lan-Xin line economic belt and the upper reaches of the Yangtze River economic belt.¡* January 2007, Premier Wen Jiabao inspected Lianyungang. He portrayed Lianyungang¡s future as an inspiring blueprint,

¡Lianyungang plays an important role not only in the economic development of North Jiangsu, but also in linking the south and the north, the east and the west, as

well as in promoting regional coordinated development, to make Lianyungang an important tie that integrates the economic development between the area along Longhai railway line and the coastal area.¡

From the level of Jiangsu Province, Jiangsu Government continue advanced ¡Sea of East Jiangsu¡ program and accelerate Suzhou-Lianyungang and make great effort to development North Jiangsu and Coastal economy belts and economy belts along the Yangtze River as well as the East Longhai Industry Belt.

In the period of "Eleventh Five-Year", the average annual GDP growth of Lianyungang City is expected to more than 16% which will be the first to revitalize growth in North Jiangsu.

Strategic planning and work arrangements of national, provincial and municipal will speed up the expansion of economies of scale in the central and western China, northern Jiangsu and Lianyungang City, thereby stimulating the production and operation of the development of Lianyungang port.

Driven by a number of favorable factors, Lianyungang will enter a steady growth and healthy development phase who can effectively overcome the adjustment of national policies, macroeconomic volatility, as well as possible adverse effects on the company's production and operation from competition between ports for the same goods and same port economic hinterland.

2.1.4 Main advantages

1. Location advantages

Two national key expressways Longhai Railway and Lanxin Railway interact here with China costal line in Lianyungang with the T sharp. Lianyungang is the east bridgehead of the New Eurasia Land Bridge. The New Eurasia Land Bridge starts from Lianyungang in the east. Then it stretches westwards to Rotterdam, with the whole length of 10,900 km. It connects more than 30 nations and regions in Asia and Europe from Lianyungang to central and western China. Lianyungang is put into

the Yangtze River Delta ¡Half-day Traffic Circle¡ by the Ministry of Communications. Total length of railway is 99.248 km.

Lianyungang is one of China¡s 45 key highway hubs. Expressway density is 3.3km/100 k㎡. Lianyungang Port is one of China¡s ten largest ports and one of world¡s top 100 container terminals. A modern 3-D traffic network involving sea, land and air has been established. Lianyungang Port shine sas a comprehensive port for world trade at the coast of the China's Yellow Sea, and offers high-quality services to promote the economic and trade cooperation between Asia and Europe and the economic development along the New Eurasian Continental Bridge.

2. Natural resources advantages

For its abundant natural resource and convenient transport, Lianyungang has established a series of pillar industries, including foodstuffs, textiles, pharmaceuticals, chemicals, electronics, and building materials.

Lianyungang is embedded in the Yuntaishan scenic resort. It qualifies the city's diverse scenic spots and tourism resources. And the scenic resort make it one of the 49 main tourism cities in China..

Huaguoshan, is referred as a legendary mountain of the Chinese classical novel Journey to the West. It is located in Lianyungang city.

Lianyungang's Donghai County is a font of natural crystals. They are mostly white, but can also be seen in yellow, purple, brown, green and pink. And. Their types include the grass and water-core crystals. And hair crystal, which contains hair-like substances.

3. Cargo transport advantages

The port is located in eastern starting point of Longhai, Lan-Xin Railway and Lianhuo highway of. It is the main framework of our country's roads, and the important nodes of main crossing water way. Coastal railway line and the Longhai Railway intersected here. The eastern section of the Longhai Railway, following the

double-track is now implementing electrification. And this will further enhance the capacity of the Longhai Railway. To the West can reach to Alashankou in Xinjiang, to the North-South it is linked with the Beijing-Shanghai, Beijing-Guangzhou, Jiao-Zhi, Bao-Cheng, the Beijing-Kowloon Railway. The highways are extending in all directions. The two longest north-south highway trunk roads-Lianhuo and Tongsan highway which across in the east and west direction, intersect in the port. Besides, Ninglian highway as well as the Lianyan highway intersects here. Thus, the transport is convenient.

4. Advantages over hinterland economic development.

To intensify the implementation of the central eastern part as the lead, arising the central China, and explore the western development strategy, Lianyungang port was identified as one of the major 25 coastal ports and one of the main ports among Yangtze River Delta port cluster. North Wing of Shanghai International Shipping Center has expanded to Lianyungang Port. Jiangsu Province implement taking the lead in achieving a well-off society, taking the lead in realizing modernization strategy, constructing of the Longhai industrial zones and the eastern coastal economic zones, to promote regional economic revitalization of northern Jiangsu and the internationalization of the economy in Jiangsu. Lianyungang port has been put as an important productivity position on the production layout of the province as the leading city to revitalize northern Jiangsu. Lianyungang speed up the implementation of development strategy "revitalizing industry to revitalize port, revitalize port to revitalize city, develop city along with agricultural". The city of Lianyungang becomes an important relaying for the city¡s development by leaps and bounds to realize the take-off rise. Lianyungang port has also become a national, provincial and municipal, three levels focused port to be planed and constructed. It is bound to gain more space for business development and profitability. .

5. Advantages of market brand

After years of cultivation, Lianyungang port has cast a number of services brands of competitive types of bulk handling accepted by the market: It is China's first alumina exports with the share of more than 50% of total exports with the best handing efficiency. It is China's first export of aluminum, with the share of more than 40% of total exports; It is China's first plywood exports with the share of more than 50% of total exports, and its handing efficiency is world-class, and it has become distribution center of China's exports of plywood, shipping center as well as the trade loading center. It is China's second coke exports with the share of more than 25% of total exports. It is China's fourth largest imports of non-ferrous mining with the share of 10% of total export volume. It is also the China's Fourth fertilizer imports with the share of 10% of the total imports. Lianyungang¡s main cargo which obtain absolute competitive position among China¡s the top ten most comprehensive competitiveness ports in are coal, coke, aluminum, plywood, aluminum ingots, etc..

2.2 Development strategy of Lianyungang port

Combined with the development status quo of Lianyungang port and the existence of opportunities, the strategic orientation of the development of Lianyungang port can be made from the role of the port Lianyungang. The port development strategy can be thought from these aspects: from China's industrialization process and, from where the integration of urban location and the requirements of port City, from the powerful role of promoting innovation, from the concept of development of the port economic and port cluster, from the nature of logistics services. The strategic orientation turned out to be: Lianyungang, China's coastal areas will become an integrated transport hub for costal region and one of the main coastal hub ports. It will become important relying for the development of Lianyungang City and the northern region of Jiangsu's economic development and for the foreign trade. It will become the window for both internal and external development for the central and western regions in China and important transport ports for foreign trade. It is major

transit ports for land and water international container transport as the east head of the NELB. And it becomes a comprehensive international port mainly with foreign trade transportation and energy export. It mainly plays the role as port industry, combing with commerce and industry as well as passenger and cargo transport. It is a comprehensive international port with a full-featured function, scientific management and friendly environment.

2.2.1 Strategic objectives

"Eleventh Five-Year" is a critical period for Lianyungang to achieve large-scale, intensive transport, enhance the competitiveness of our port. The development will focus on: the phased implementation of 150,000-ton waterway construction projects to meet the all-weather navigation of large container ships, more than 150,000-ton bulk carrier requirements for one-way transport with the wave. And gradually achieve the depth of -16.5 meters, the standard bottom width of 230 meters. The key construction project is Miaoling Jetty Container Terminal 3, to build five new container berths, and form the initial shape of specialized container port and to start construction of embankment according to the hinterland container growth. To build new outer breakwater and reclaim land, to open up flag bulk cargo operations in Taiwan, Hong Kong area. To transport eastward major dry bulk, liquid bulk goods and dangerous goods in progress. To build the second phase of Xugou West operations area project. To further improve the port transport system into the dedicated rapid access for the southern bank of the port. To study deeply construction conditions of North and South wings of the Betterment and timely start the construction of infrastructure.

Lianyungang Development Goals in 2010 is : the depths of water in the port is adapt to the conditions of the basic development needs, which can effectively mitigated structural contradictions, to further enhance the level of intensification.

After 2010, port construction will continue to highlight ideas as large-scale, intensive, and systematic in development. It will highlight the construction of embankment and the flag of Taiwan, Hong Kong area, the construction of a professional deep-water pier with a high starting point.

Lianyungang¡s Development Goals in 2020 is: to become rational, functional, highly intensive regional hub port, and to meet the needs of economic and transport development of the hinterland.

2.2.2 Strategic measures

1. Multiple financing methods to speed up port construction, enhance port handling capacity

Actively promote the capital operation in accordance with the requirements of establishing the market economic system. To promote listing of high-quality assets of the port. Attract main investment, to take cooperation such as joint venture, equity participation, contracting, leasing etc. To form modern enterprise with capital diversification, the powers and responsibilities integration, scientific management and democratic decision-making in accordance with the requirements of modern enterprise system. Seek actively to increase China¡s input in Lianyungang port. Lianyungang will speed up the building, and build the central and western access to the sea, and will integrate into the whole infrastructure plates of the national development of the western region and be built synchronically. At the same time, to study and formulate relevant preferential policies to attract domestic and foreign, especially the central and western provinces and autonomous regions to come to Lianyungang to build the terminal or participate the terminal building. Encourage joint venture in North Jiangsu Province to build the port and relevant facilities. List the Lianyungang port as the first choice for the import and export ports in North Jiangsu to attract shipping companies especially foreign shipping companies and

cargo owners to participate in port construction.

2. Establish a market concept, form a modern enterprise system

Lianyungang Port Group in particular its subordinate departments, should operate in accordance with the requirements of modern enterprise system, and effectively change their operational mechanism, to enhance awareness of the market, based on their own to solve the problem of enterprise development. They should take measures to improve service quality, service levels, to lower prices, reduce fees, and highlight the introduction of talent. Through institutions, mechanisms and technological innovation, the comparative advantage can be transferred into a real competitive edge, to fast and better develop the port.

3. Layout of the Lianyungang port and development planning of Lianyungang city

It is a win-win strategy point of view to foster economic interdependence and interaction between North Jiangsu Lianyungang Port. Put the strategy -¡Develop the Port to Raise the City¡ as first and foremost development strategy. Do a good job in layout planning of Lianyungang city and Lianyungang port, so planning can meet its development needs and can combine with each other in order to be truly interactive for the City and Port. Focus on port construction; give full play to the east bridgehead status and role of Eurasian continental land bridge. To co-ordinate the arrangements and deployment of industry and trade industries and urban infrastructure of the City, to leave industrial sites for port development, the development of the costal industry. To adjust industrial structure and reasonably layout the industrial land and improve the economic and technological development zones to promote the healthy development of export-oriented economy. Rationally allocate berths ton and reflect the combination of professionalism with common using. Rationally plan channel configuration of the port access and put in to consider the requirement for construction of river transportation. It left a space for

the scale of the development to ensure the smooth flow of inbound and outbound channels.

4. Improve the transportation conditions

Port transportation should develop the railways, highways and waterways progressively, should improve the efficiency of double-track operation of East Longhai railway, should the implement the electrification of the East Longhai Line renovation project as soon as possible, should improve the highway network in North Jiangsu as soon as possible. Considering the integrated transport, it should open Xinxu Channel as soon as possible and give full play to preferential pricing policy, to implement favorable fees and charges to water transport.

2.3 Research on Lianyungang¡s listed financing

2.3.1Alternative means of financing

According to the current status of the development of Lianyungang port, development of strategic positioning and the actual situation both internal and external, there are suitable means of financing for the following:

1. The use of capital market financing

With China's continuous development of the port industry, increasing listed port companies, as well as the increasing improvement of financial markets, equity financing has increasingly become the main mode of financing for port.

The benefits of the Port brought by listed companies are self-evident. And the most prominent advantage is that enterprises can bring low-cost capital. Lianyungang Port Group can raise the funds for port construction needed through the way of listing methods to make up funds vacancies for the enterprise¡s self-development.

2. Government Investment

Since the State allocates the port of Lianyungang to the local place, it has greatly stimulated the enthusiasm of the development of the port. Lianyungang City and Jiangsu Province have considered port as a valuable resource and an important

vector to speed up local economic development of Lianyungang. Local government of Lianyungang and Jiangsu Province not only made construction and development policy to support the development of the Lianyungang port, but also support the port with the funds to ensure a certain amount of fund investment and to build Lianyungang into a billion ton port as soon as possible. Drive the development of industry along East Longhai line and to speed up the process of industrialization in North Jiangsu Province.

Besides to obtain support from local government to obtain funds for port construction investment, it also has great significance to obtain other forms of government preferential policies for the development of the port. Port industry and waterfront industry are the industrial sector with relatively large pre-investment, longer payback period, particularly, nowadays the Government's investment is diversified, and Government will have an important impacton port investment from the perspective of overall social development and develop of port policy in a scientific way.

3. The use of loans from financial institutions

In the end of the 70's 20th century, China's port enterprises took the policy of appropriation fund in stead of loan fund. And change the state¡s funding for the port construction into bank loans. At present, the bank loan is the most important means of financing for port construction and it is also the most traditional, the most direct mode of financing. World Bank, the Asian Development Bank and other international financial institutions have concessional terms for develop the port infrastructure projects in developing countries. Since 80's 20th century, China has constructed of a number of modern container terminal using the two loans mentioned above in Dalian, Qinhuangdao, Tianjin, Qingdao, Lianyungang, Shanghai, Guangzhou and other ports. It is the most traditional, the most direct mode of financing to loan from the domestic commercial bank for the port construction. From

Lianyungang¡s terminal building to the future construction of logistics facilities, the use of bank loans is a well-established method. Currently, the debt ratio of Lianyungang Port is relatively low. Thus has much possibility for bank loans.

4. Joint and cooperative ventures

At present, the equity or holdings project of Lianyungang Port Group is amounting to as much as 18, among which there are not only foreign enterprises, such as Kangyi International Private Ltd in Singapore, KMTC as well as the domestic famous enterprises, such as China Shipping Terminal Development Co., Ltd., Jiangsu Transportation Industry Group, Hong Kong Federation Resources Limited and other. These joint ventures and cooperation, resolved the Lianyungang port construction financing needs to some extent,.

Lianyungang Port Group can continue to strengthen this approach in the future construction of the port, and can concrete consider to work with an international terminal operators and companies, to attract co-operative of the well-known international shipping companies and port companies both at home and abroad.

5. Finance lease

For the port construction with huge investment, long payback period, good cash flow, financing leasing is a good way of investment and financing. It is a (balance) sheet means of financing. With one-time small funding, it can well solve the aging of port facilities; can speed up the upgrading of port facilities. A number of ports try to leasing and financing of loading and unloading machinery to address the problem of aging of port machinery and equipment to improve the efficiency of port cargo handling to meet the development of production and operation. For example, Dalian, approved by the municipal government of Dalian Port, and the financial sector, signed an agreement with the Dalian International Trust and Investment Corporation to lease 130 handling machinery and equipment, amounting to 80 million RMB. Port

raised funds and addressed port conflicts caused by the lack of port funds and lack of production and operation fixed assets through the way of finance leasing.

6. Project finance

Project financing is a special kind of financing methods, which rely on their own future cash flow as security for the financing. Project financing is non-recourse or limited recourse financing. In other words, if the project were unable to repay loans in the future, creditors can only get the income and assets from the project, and has no right to meddle in other assets owned by the initiators of the project.

Project finance has models of direct bank loans, the direct use of foreign investment / foreign direct investment, BOT (Build-Operate-Transfer), TOT (Transfer-Operate-Transfer), ABS (Asset-Backed Securities) etc.

2.3.2 The importance and significance of Lianyungang¡s listed financing

To realize the development strategies of Lianyungang it is urgent to invest more fund to the port construction. With the exception of the rational use of own funds, investment, bank loans, etc. to raise funds to construct the port, it is an important financing options of healthy development of capital markets for Lianyungang financing. The visiting the capital market will lead to more broad development space for Lianyungang. After listing, obtained funds will become an effective complement for a number of financing ways. In addition, it can bring tremendous social benefits, brand benefits and customer benefits. Listing financing is a "multiplier"- to raise funds to build piers, improve new throughput capacity, increased efforts to improve the handling, transport, storage capacity, and to continuously meet the company's berth capacity demand caused by sustained and rapid growth of cargo throughput, to strengthen and upgrade the port¡s position among coastal hub ports.

Lianyungang¡s going into stock market is landmark milestone for the port development. It means that it cracked one of the bottlenecks encountered over the years for the capital development, to speed up the realization of Billion Ton port.

Seize the opportunity of listing helps promote the port to change towards specialization, large-scale, intensive to enhance the level of ports management services to outcome good social benefits, brand benefits and customer benefits.

2.3.3 Basic information of Lianyungang¡s entering stock market

1 The basic situation, the shareholder structure

To achieve the listing financing, since 2001, Lianyungang Port Co., Ltd. set up by the Lianyungang Port Authority (now the Lianyungang Port Group Co., Ltd.), co-sponsored by China Cinda Asset Management Company, Yanzhou Coal Mining Company Limited, China's coal Lianyungang Industrial Import and Export Group Corporation, Lianyungang Shipping Agency Co.,Ltd. The share capital increase programs has undergone twice and up to December 31, 2006, the shareholding structure of Lianyungang is as show in table 1

Table 1 Ownership structure of Lianyungang Port Co., Ltd

share holder	Share(10 thousand)	Share percent （%）
Lianyungang Port Group Co.,Ltd.	21865	73.37
China Cinda Asset Management Corporation	7590	25.46
Yanzhou Coal Mining Company Limited	115	0.39
China Lianyungang Coal Import and Export CO.,LT	115	0.39
Lianyungang Shipping Agency Co.,Ltd	115	0.39
Sum	29800	100

Resources: Lianyungang prospectus

2. Road of entering stock market and capital financing

Since the company¡s 8 years history, through ups and downs it has finally listed as Lianyungang Port Co., Ltd. in April 26, 2007. The first issue of the company is 150 million shares, raise funds amount to 820 million yuan. The first day of "Lianyungang" shares listing, the opening price is as high as 15.26 yuan, rising more than the issue price of 10.28 yuan, the highest price reached 15.58 yuan, and closed at 14.31 yuan, rising by more than 187.35% to issue price and the exchange rate is 64 % while the P/E Ratio is 77 times, and the amount of turnover is 1.123 billion yuan. The market performed well.

Chapter 3

Research of Listed Raised Fund Flow of Lianyungang

Port

3.1 Analysis of Rasied Fund Flow

3.1.1 Fund raising flow projects

Financing flow projects of listed fund

1 application of raised fund and the amount

1）Xugou Project 3rd No59 multipurpose dock , the investment is 317.57billon

2）Coke specialization dock, the   investment is 512.22billion

The project needs 829.79billion or so. The process can be seen from table 2

Table 2 Approval of funds of Lianyungang

project name	Year of investment		Approve Situation
	Fist year	Second Year	
Xugou Project 3rd No59 multipurpose dock	100%		Approved by DRC in Jiangsu Province
Coke dock.	60%	40%	Approved by DRC in Jiangsu Province

Resources: Lianyungang Prospectus

2 Introduction of fund raising investment project

1）Xugou Project 3rd No59 multipurpose dock

Before the completion of coke specialized berth, the project have been arranged with throughput of 2,600,000 tons of coke, which can meet the growing throughput requirements, but also can solve the existing parking spaces for the problem of lack of shipping capacity. During the transitional period (2008 ~ 2010), the berths and the

pieces of coke grocery operate at the same time with the annual throughput of about two million tons. Forward capital berth still gives first place to loading and unloading of break-bulk cargo. The berth built by the project is the berth being applied or used universally, with annual handling capacities of 140 ten thousand tons.

2）The berth build by the project is special in coke handling with loads and unloads and the estimated throughput is 320 ten thousand tons.

3.1.2 Necessity to raise project fund

1. Adapting to the Western Development need

Western part hinterland of Lianyungang port is the main benefit area of West Development , important future economic growth region as well as zone to realize sustainable development strategy. It is estimated that Lianyungang¡s rate of economic development will overtop average development targets of the whole nation, and it will become new growth point of Chinese economy. Lianyungang port, as one of the most convenient utter of area in central and western China and countries in Central Asia, whose rapid growth will keep exuberant need to Lianyungang port's cargo throughput. As a result, Lianyungang needs to enlarge throw into, raise a harbor traffic capacity, to adapt to the fast growing economy and satisfy the economy pattern, with the main body of development of natural resources as well as resource harbor enlarge requirement home and abroad.

2. Satisfy Lianyungang port¡s operating and managing.

Since 1997, Lianyungang berth handling capacity has exceeded the design capacity. At that time insufficient problem of design capacity is outstanding. According to scattered sundry goods¡ increasing trend these years. Berth being applied or used universally can not adapt to the need that the handling capacity increases. As a result, starting raises funds project timely may expand the synthesis traffic capacity of Lianyungang port, relief the pressure brought about by the breach through capacity

partly and satisfy the call for the unceasingly increased port capacity. Since 2003 Lianyungang¡s exporting coke, supported nu the railway, Lianyungang become the nation's largest coke export port with high quality and efficient personalized service. In 2006 coke throughput of Lianyungang has been completed more than 4.177 million tons, representing a 148.11% growth in 2005. It can be foreseen that throughput capacity of coke in Lianyungang port will grow consistently in the case of sufficient in the railway capacity, especially loading and unloading capacity. The sharp increase in the throughput of coke, in addition to a serious shortage of through capacity in shipping berths of the port, call for urgent need of Lianyungang port to increase the capacity of coke to meet the needs of the market. At present, general-purpose berths and the handling equipment of port of Lianyungang can not meet with coke ships¡ needs of large development. Its high shipping costs, low operating efficiency and scattered handling and transportation venues, is not conducive to management and also greatly impact the environment. Concerning the specialized berths, as ship tonnage is designed to be large, resulting high-capacity ship loading and unloading equipment, concentrated space for loading, unloading and transportation operations, all of which cause the relatively low shipping cost, more efficient loading and unloading of ships, small impact on the environment by cargo handling. And also relatively improve the competitiveness of the port, in order to attract more ship owners and cargo owners to come to Lianyungang port to discharge, and promote the sound development of the port. Objectively, an urgent need to speed up the coke Lianyungang port construction specialized berths to meet the needs of the market.

The implementation of the project to raise funds, not only can effectively alleviate the existing shortage of parking spaces for design capability, and released more space for the incremental for other bulk cargo and groceries.

3.1.3 Prospect Analysis of implementing investment projects to raise funds

1. Market and industry trends

Northwest Province including Shaanxi, Gansu, Ningxia, Qinghai and Xinjiang is an important base for raw materials and energy. Coal resources are distributed from east to west, accounting for 45% of the country's total coal reserves. With the westward movement of the secondary industries, these provinces and autonomous regions become industrial base mainly featured with coal, electric power, metallurgy, petrochemicals, and machinery, military and aerospace. With economic development, the eastern provinces of China and East Asia region are in serious shortage of mineral resources. The growth of port throughput requirements have become increasingly prominent for import and export volume has increased year by year of mineral resources and raw materials.

2. Capacity analysis of new investment projects Fund-raising

1）Xugou Project 3rd No59 multipurpose dock

For the reason that there are no coke dock in Lianyungang Port, after general berth project¡s completion and putting into production, the arrangements for the near future will be the throughput of 2,600,000 tons of coke which can not only meet the growing throughput requirements, but also to solve the existing parking spaces for the problem of lack of shipping capacity. During the transitional period (2008 ~ 2010), the coke and grocery in the berth are arranged to operated at the same time. But for the long-term grocery¡s loading and unloading are still the mainly items berths. To sum up, according the port functions¡ orientation and layout of all berths, the completion of general-purpose berth project can greatly ease the need of short-term services demand of coke export and long-term contradiction among loading and unloading groceries such as iron and steel, lumber, plywood, etc. to further raise Lianyungang¡s overall throughput strength.

2）Coke dock.

In accordance with the actual handling capacity and the arrangements of berths cargo

handling types as well as the throughput forecast, the coke project cargo throughput is forecast to be 3,200,000 tons. Volume set of the works are railways and export volume are through waterways

3.2 Decision-Making Analysis of Port Investment and Financing

3.2.1 Port investment and financing fund using analysis and evaluation

In general, investment decision-making analysis of water transport enterprises consists of three parts: the financial evaluation, economic evaluation and comprehensive evaluation. Financial evaluation is study of corporate financial efficiency under the conditions of the country enforcement of investing in infrastructure, taxation system and the price of the item. In a narrow sense, the economic evaluation of the national economy is from the perspective of the contribution of the project on the national economy, while in a broad sense, economic evaluation including financial evaluation. Comprehensive evaluation is to make a comprehensive analysis and comprehensive evaluation to the impact of the project from the social, economic and business point of view to justify the feasibility of the project. In this thesis, the author will judge the reasonableness of the use of funds by economic and financial evaluation.

3.2.2 The necessity of using decision-making for the fund-using in port investment and financing

Decision-making is the key to modern management. A correct decision-making depends not only on smart talent managers but, more importantly, rely on the scientific method to come with the quantitative optimization results through the use of system analysis theory and methods, the use of mathematical models, through calculation and analysis. And these are considered to be the basis for the implementation. The reason for investment decision-making before investment in port project construction is due to the objective law of construction of port investment projects, as well as the of decision constraints. And it can be summed up

as the following two aspects:

1) Huge fund demand for the port investing construction and limitation of port resources.

2) Technical complexity of Port investment projects and uncertainty in investment return.

Different investment programs will bring about certain impact on future throughput of the port and the competitive position of ports in the region. It can also result different economic benefits. To identify the best investment programs, ports will compare different investment program to pursue best economic benefit.

3.2.3 Existing problems of decision-making for the fund-using in port investment and financing

Decision-making for the fund-using in port investment and financing is economic efficiency indicators followed by the port¡s financial evaluation, national economic evaluation and post-production of projects. Usually in the process of doing these assessments, there are a number of parameters which are frequently checked statistical in the calculation of the process. Such as port handling capacity is usually the designed handling capacity of the project, taken no account of re-investment process, including technology, equipment and so on. Usually this re-investment in the construction of the port enables a change in volume of the handling capacity of ports, which will lead to changes in the economic benefits. Changes in investment returns will continue to further stimulate port investment, thus cause changes in the economic benefits of the port in circle, and affecting port selection of the investment and financing programs. This is actually a feedback process after port investment and financing which is often ignored by past investment evaluation. In addition the port needs to review the benefit of the entire operation period after investment and financing. And this period is often relatively long, can be as long as two to three decades. But common calculation method applies short to medium term. Ports such

as investment and financing decisions, when calculated are related to the future of the throughput of the port, which is the importance data for calculating future investment income. The econometric model is usually suitable for short and medium term forecasts, not suitable for medium and long-term forecast. This will inevitably affect the final calculation of the economic benefits, thus affecting the correctness of the decision-making.

3.3 Indicators of the Economic and Financial Evaluation of Port Investment and Financing Decision

Port mainly put into account of the financial evaluation after the project put into operation. And then compare financial evaluation indicators obtained from a variety of financing options so as to select the best investment and financing programs. When making Port investment and financing decisions, the main financial indicators are as follows:

3.3.1 Payback period

Investment payback period also referred to as recovery period is the time required when cumulative investment amount equal to investment cash flows. Also it can be referred to the time required when net investment income for the project covers all of the net investment (including investment in fixed assets and unfixed capital investment). It is an important indicator to reflect the investment recovering ability.

The calculation formula is:

Pt＝（N-1）+P/C   (Formula4.1)

Terminology

> N————The year when Cumulative net cash flow began positive
>
> P———— The year when Cumulative net cash flow began positive
>
> C———— Net cash flow

3.3.2 NPV Financial net present value

Net present value equals Present value of cash flows minus initial investments. Net

present value (NPV) or net present worth (NPW)[1] is defined as the total present value (PV) of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met.

Each cash inflow/outflow is discounted back to its present value (PV). Then they are summed. Therefore NPV is the sum of all terms $\dfrac{R_t}{(1+i)^t}$, where

t - The time of the cash flow

i - The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.)

R_t - the net cash flow (the amount of cash, inflow minus outflow) at time t (for educational purposes, R_0 is commonly placed to the left of the sum to emphasize its role as (minus the) investment).

The Cash Flow could be positive or negative at any time period.   Normally it is negative at time 0 to represent initial capital investment or cash out flow (usually the cash flow change sign, the number of IRR will increase)

3.3.3 IRR

The internal rate of return (IRR) is a capital budgeting metric used by firms to decide whether they should make investments. It is also called discounted cash flow rate of return (DCFROR) or rate of return (ROR).

The IRR is the annualized effective compounded return rate which can be earned on the invested capital, i.e., the yield on the investment. I can also be said that the internal rate of return for an investment is the discount rate which makes the NPR of

the investment's cash flow stream equal to zero.

Formula：

$$\sum_{t=1}^{n} \left(C_1 - C_0\right)_t \left(1 + IRR\right)^{-t} = 0$$

IF IRR of a project is greater than the rate of return that could be earned by alternate investments of equal risk (investing in other projects, buying bonds, even putting the money in a bank account), the project is a good investment proposition. The IRR should be compared to any alternate costs of capital including an appropriate risk premium.

Chapter 4

The evaluation of Lianyungang Port Fund

As described in the previous chapter, how to assess the project and rational calculation of its economic indicators has become the focus of this paper while raising funds through the market financing for Xugou 3 No59 Dock and coke dock construction, for ports specialization, terminals intensive professional development, to adapt to the requirements of economic development in the hinterland.

4.1 Factor Decomposition

1. Demand Forecasting Module

Port analysis of investment and financing decision-making must be based on the existing port handling capacity, on the future economic development and forecasting the future port throughput in order to analyze necessity of new investment in port or expansion and construction scale.

2. Income Module

Income module is an examination of the major investment income after the completion of the investment and the future investment income through the measurement of income, calculating after the completion of the port project's, which includes handling, storage income and other income.

3. Cost Module

The cost module is to investigate the cost needed of port construction projects to be invested in the cost, and through the cost calculation, to calculate the port cost during the period of the calculation term. Port costs include the financing of major capital costs, operating costs, taxes.
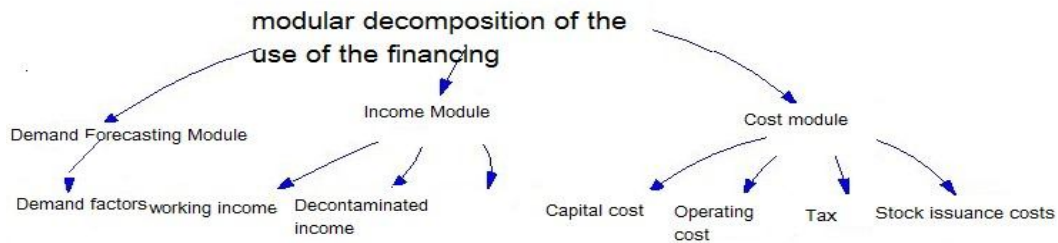
Figure 1 Model Decomposition map

Based on the above analysis, build the analysis of port investment and financing system flow diagram, to link the investment and financing programs module , income the cost of demand forecasting module with the port demand module, to build system dynamic model module to do investment and financing analysis. When take concrete different financing options,(show in map5.1) the figure of the financing package is for a specific mode of financing and demand map will also differ according to different projects under the port.

4.2 Causal Relationship

Causal relationship between the port investment and financing plan are as follows: The map links the factors affecting investment and financing plans. In this model, there are a number of feedback loops, mainly are the following two important loop:
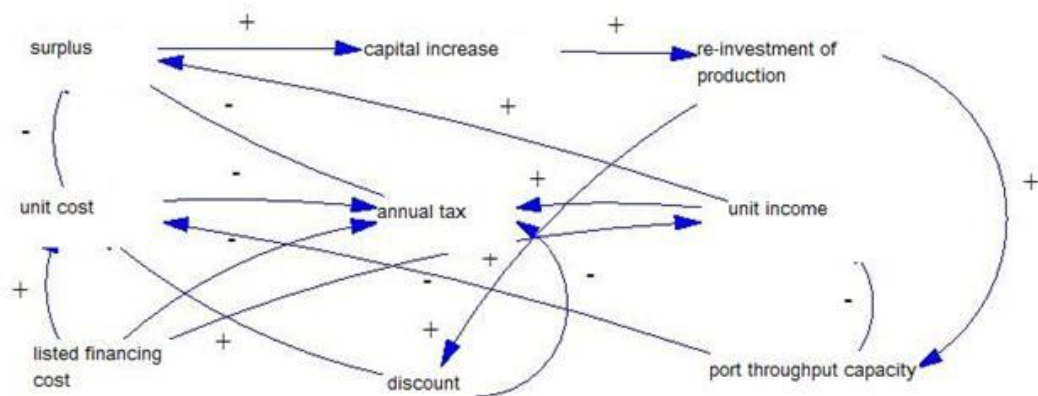
Figure 2 Causal Relationship

1. Port handling capacity - total revenue - surplus this year- the capital increase - the

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production of re-investment - the port's handling capacity - total revenue - surplus this year- the amount of capital increase

2. Port handling capacity - total cost- surplus this year- the capital increase - the production of re-investment - the port's handling capacity - total revenue - surplus this year- the amount of capital increase

These two circuits is the main general investment and business activities in the port. It reflects the port investment, production and management and re-investment cycle. In construction period, the port enterprises raise funds to invest in port through financing, form the port handling capacity and production. While in operation phase, the port access to surplus funds through the production operations, which results in operating costs and achieves operating income. In order to enhance productivity and capacity to further expand the throughput of the port, part of the surplus funds are used in the production of re-investment, expanding production scale, in order to create a greater profit, to increase enterprise capital.

4.3 Forecast of port throughput

4.3.1Throughput Projections and forecast Methods

1. Lianyungang port throughput data

Table 3 Lianyungang port throughput data

2. Lianyungang port throughput data （ Unit: 10,000 tons ）									
Cargo types \ Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
coke	76.75	79.42	67.57	78.1	86.37	252.52	417.7	487.4	523.4
Oil and products	56.75	54.78	53.74	53.18	96.12	116.07	89.68	105.5	96.62
Food	120.45	160.02	117.65	333.08	268.25	268.25	268.2	270.5	323.6
Container	129.23	167.57	217.19	299.23	497.02	750	900	1255	1565
Total grocery items	2325.05	2596.32	2860.03	2988.16	2863.7	3360.9	3845.69	4306	4520

1. The choice of forecasting methods

Often time-series forecasting methods, and causal relationship are the two major categories. In this article, because of the data collection and other factors, in accordance with the throughput of data over the years, the author will using time series method, and SPSS software to do system operation. And it will be combined with the reasonable forecast of Lianyungang port, to obtain the best results.

4.3.2 The simulation predict results

1. Total throughput prediction of Bulk

Fitting the equation will use time for the variable, the throughput for the dependent variable, to simulate the throughput of four fitting curves. Four curves were linear functions, quadratic functions, cubic polynomial function, and the growth function.

Model Description

Model Name		MOD_3
Dependent Variable	1	Throughput
Equation	1	Linear
	2	Quadratic
	3	Cubic
	4	Growth [a]
Independent Variable		Time
Constant		Included
Variable Whose Values Label Observations in Plots		Unspecified
Tolerance for Entering Terms in Equations		.0001

a. The model requires all non-missing values to be positive.

Source: by author¡s calculation

Fitting results:

Among the four curves, R^2 in the linear, quadratic polynomial and cubic polynomial are greater than R^2 value of the growth curve. So, first of all, we should consider the use of linear, quadratic polynomial, cubic polynomial as fitting curve. Then second, we should study F values in linear, quadratic polynomial, cubic polynomial. F value in the cubic polynomial is greater than the F value of the other two functions. To sum up, three times polynomial curve fitting gets the best effect.

Model Summary and Parameter Estimates

Dependent Variable: Throughput?

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	.946	123.707	1	7	.000	-460889	231.580		
Quadratic	.946	123.730	1	7	.000	-229079	.000	.058	
Cubic	.946	123.751	1	7	.000	-151809	.000	.000	1.93E-005
Growth	.943	116.088	1	7	.000	-166.991	.087		

The independent variable is time.

Sources: by author¡s calculation

The figure shows four of the fitting curve of which we can see that the three polynomial curve fitting gets the best effect
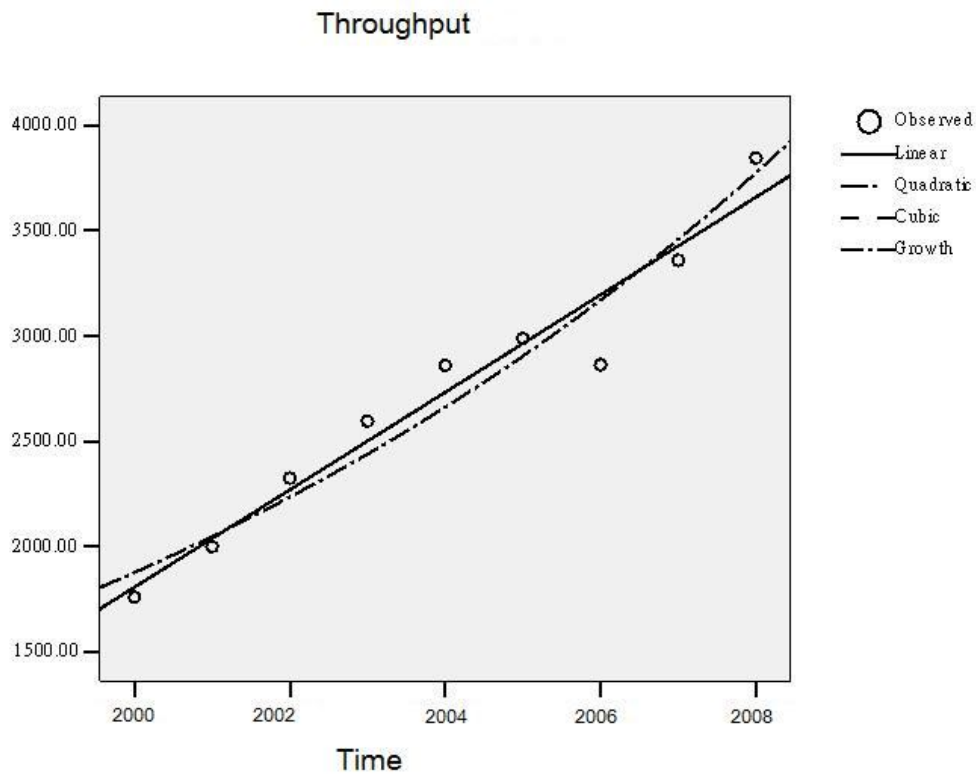
Figure 3 Throughput of Lianyungang Port from 2000 to 2008

Source: Lianyungang Port

Throughput regression equation is ： $Y = -151809 + 1.93 \times 10^{-5} t^3$

General cargo terminals mainly handle plywood, steel and the share of the throughput within three years. After the projected terminal put into operation, plywood, coke total cargo throughput, are respectively, 7%, 3% of the total throughput.

Table 4 Throughput Of cargo in sub-species of Lianyungang port during the year06-08

throughput Of cargo in sub-species of Lianyungang port						
And its share						
Species	2006	share	2007	share	2008	share
Coal	1169.83	41%	1131.09	34%	962.06	25%

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Coke	86.37	3%	252.52	80%	417.7	11%
Metal mining	513.03	18%	504.08	15%	382	10%
Alumina	314.23	11%	457.07	14%	320.23	80%
Plywood	61.02	2%	254.14	8%	246.94	6%
Cement					222.12	6%
Cassava stem	137.7	5%	235.36	7%	221.99	6%
Steel	58.38	2%	83.59	2%	196.27	5%
Fertilizer	166.32	6%	179.46	5%	105.24	3%
Liquid chemicals	149.01	5%	116.07	3%	89.68	2%
Other	207.91	7%	147.54	4%	681.46	14%
Sum	2863.8	100%	3360.92	100%	3845.69	100%

Source: Lianyungang Port

Table 5 Predictive value of throughput

General Terminal Cargo Throughput Predicting Value（Unit: millions）					
Year	2009	2010	2011	2012	2013
Total Forecast	4684.79	4918.60	5152.64	5386.91	5621.41
Plywood	327.9356	344.302	360.6846	377.0836	393.4989
Steel	140.5438	147.558	154.5791	161.60726	168.6424
Sum of Plywood and Steel	468.4794	491.8599	515.2637	538.69086	562.1413

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General Terminal Cargo Throughput Predicting Value（Unit: millions）								
Year	2014	2015	2016	2017	2018	2019	2020	2021
Total Forecast	5856.15	6091.12	6326.32	6561.76	6797.43	7033.34	7269.47	7505.80
Plywood	409.93048	426.3784	442.8427	459.3233	475.8202	492.33353	508.8632	525.406
Steel	175.68449	182.7336	189.7897	196.8528	203.923	211.00009	218.0842	225.174
Sum of Plywood and Steel	585.61498	609.112	632.6324	656.1761	679.7432	703.33362	726.9474	750.58

2. Coke throughput forecast

Fitting equation used time for the variable, the throughput of coke for the dependent variable. Four fitting curves are used for the throughput of the coke used. Four curves were linear function, quadratic polynomial function, S-shaped curve and growth curve.

Model Description

Model Name		MOD_5
Dependent Variable	1	Coke
Equation	1	Linear
	2	Quadratic
	3	S [a]
	4	Growth [a]
Independent Variable		Year
Constant		Included
Variable Who¡s Values Label Observations in Plots		Unspecified
Tolerance for Entering Terms in Equations		.0001

a. The model requires all non-missing values to be positive.

Sources: by author¡s calculation

Result：

Among the four curves, R^2 in the linear equals the value in quadratic polynomial

and are all smaller than R^2 value of S curve and the growth curve. So, first of all, we should consider the use of growth curve, then linear, quadratic polynomial, S-shaped curve and growth curve, which is the biggest, as fitting curve. To sum up, curve fitting of growth curve for coke throughput gets the best effect.

Model Summary and Parameter Estimates

Dependent Variable: Coke

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	.634	8.656	1	5	.032	-99129.6	49.566	
Quadratic	.634	8.671	1	5	.032	-49504.4	.000	.012
S	.673	10.284	1	5	.024	551.103	-1094327	
Growth	.674	10.319	1	5	.024	-541.888	.273	

The independent variable is ?ːY.

The figure shows four of the fitting curve of which we can see that the growth curve fitting gets the best effect
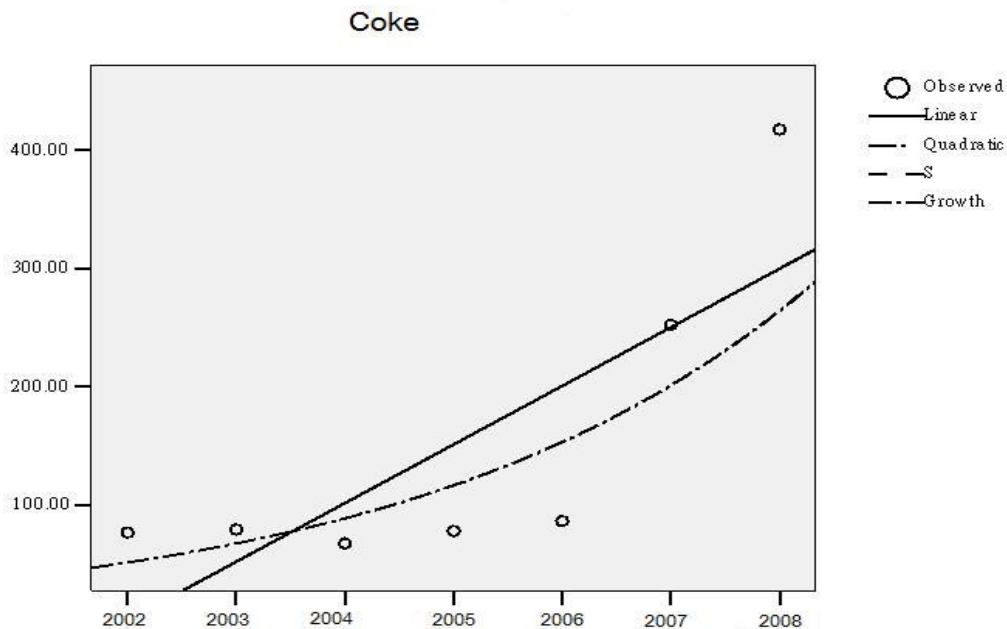
Figure 4 Coke Throughput of Lianyungang Port from 2002 to 2008

Source: Lianyungang Port

Regression equation is: $Y = e^{-541.888 + 0.273t}$

Coke throughput forecast（unit：million）			
year	2009	2010	2011	2012
volume	712.6568	936.36	1230.284	1616.469938

Sources: by author¡s calculation

Taking into account factors such as GDP growth, coke throughput from 2012 to 2021

calculated as 16.16 million with no more growth.

4.4 Model Calculations

4.4.1 Determination of the main parameters

Note: The data in this section are internal information from Lianyungang Port

1. The rate of terminal handling

Table 6 the rate list based on good type of Lianyungang port

the rate list based on good type of Lianyungang port			
Rate (yuan / ton)	2008	2009	2010
Coal	12	13.3	12.9
Coke	24.75	22.6	22.5
Metal mining	25.74	25.74	25.74
Alumina	29.54	29.24	29.74
Plywood	34.8	30.46	38.3
Cement	9.68	9.68	9.68
Cassava stem	30.46	30.46	30.46
Steel	21.13	21.13	21.12
Fertilizer	34.19	34.19	34.19
Liquid chemicals	19.47	19.47	19.47
Other	2.07	2.07	2.07
Integrated rates	19.91	20.27	20.31

Handling prices of goods in various kinds are expected with little increase in the next few years, and will remain stable. Therefore, when calculating loading and unloading of coke of the general-purpose terminals, in the former 5-year, the rates are calculated as 22.6 yuan / tons; long-term loading and unloading of steel, plywood and other grocery items, the initial value are calculated by the average rate of iron and steel plywood as 25.8 yuan / ton, every 5 years after with an increase of 5%.

2. Throughput

Table 7Throughput plan of General dock and coke doc

Throughput plan of General dock						
year	2009	2010-2012			After 2012	
Cargo type	coke	coke	steel	plywood	steel	plywood
Throughput (unit:10thousand)	260	80	70	50	70	70

Note: by the end of May 2007, inspection has been completed, plan can start using

Sources: by author¡s calculation

Throughput plan of coke dock	
year	2012
Cargo type	Coke
Throughput (unit:10thousan)	320

Note: The coke started by the end of 2009, and it is expected to use in 2012.

Sources: by author¡s calculation

Table 8 comparison of

Actual handling capacity and designed throughput in Lianyungang port

comparison of Actual handling capacity and designed throughput			
Year	Actual handling capacity	Designed	Ultra-design

	throughput (10,000)	throughput(10,000)	capability（%）
2008	2874	2125	35.2
2009	3348.4	2125	57.8
2010	3845.43	2125	80.96

Based on historical data,   in calculating the throughput, when the difference of actual throughput and designed capacity is more than 60%, and   15% of the amount of capital increase should be re-investment to the port for updating equipment, increasing bonus to improve port capacity . The expected return on investment rate is 80 tons / million.

1. main business income

Table 9   08-10main business income of Lianyungang port

main business income proportion						
	2008		2009		2010	
Item	Amount (Yuan)	percentage （%）	Amount (Yuan)	percentage （%）	Amount (Yuan)	percentage （%）
Handling income	15300.92	87.55	21474.31	84.06	68524.54	85.93
Decontaminated income	1538.47	8.8	2885.48	11.29	6069.78	7.61
Port management incom	637.84	3.65	1187.32	4.65	5153.82	6.46
Total	17477.23	100	25547.11	100	79748.14	100

Sources: internal information from Lianyungang Port

Main business income of Lianyungang port, covering the three contents: handling revenue, storage cleared port management revenue. In accordance with the table 6.7, there derived for the calculation:

Principal operations Income

= storage income + port management income + handling income

= Unit price * quantity * 0.85 + handling unit price * quantity * 0.08 +
handling unit price * quantity * 0.07 handling

4. Fees and cost calculation

Fees include management fees, finance charges. Management fees are shown in the
table 6.8, depreciation value is included in the cost using a straight-line depreciation
within 50-year period.

Table 10 Management fee of Lianyungang port in 2008

management fee of Lianyungang port in 2008			
Project cost	Amount (10,000Yua)	Unit cost (Yuan / ton)	percentage
Wage	10139.02	5.06951	43%
Employee welfare	1092.78	0.54639	5%
Material	3182.43	1.591215	13%
Fuel	4142.9	2.07145	17%
Maintenance	3551.2	1.7756	15%
Electric lighting	270.7	0.13535	1%
other	1369.38	0.68469	6%

Source: internal information from Lianyungang Port

5. Income tax calculation

Income tax in 2007 calculated by 33%, while after 2008 calculated by 25%.And in
the period 07-10 years income tax will less 5.48 million annually.

4.4.2 Economic calculation indicators

1. Main operating parameters of the procedures

(01)   Sponsors underwrite cost = fund-raising amount *0.0035

Units: Yuan

(02) Tool material costs =1.6

Units: Yuan/Ton

(03) Production period =RAMP(1, 2007 , 2021)

Units: Year

(04) Unit income price =IF THEN ELSE(Production period =0,22.6,IF THEN ELSE(Production period <=5, 25.8 , 25.8*(1+(Production period -5)*0.03)))

Units: Yuan/Ton

(05) Cost of Lighting and electricity fuel =0.13

Units: Yuan/Ton

(06)   Storage Income = Unit price revenues * handling volume (port throughput)*0.07

Units: Yuan

(07) Issue costs =IF THEN ELSE(Time limit 1<=5,(Sponsors underwrite cost +Issue procedure cost +accountant fee+ Assessment fee+ Legal fee)/5 , 0)

Units: Yuan

(08) Sponsors underwrite cost = fund-raising amount *0.0035

Units: Yuan

(09) Fee=management fee

Units: Yuan

(10) Port re-investment =IF THEN ELSE(The difference between the demand for supply >=1.2e+006, Capital increase*0.15 ,0)

Units: Yuan

(11) Port management fee= Unit price revenues * handling volume (port

throughput)*0.08

Units: Yuan

(12) Wage and welfare=5.6

Units: Yuan/Ton

(13)Bonus=0.03

Units: Dmnl

(14) Port management fee = (Materials fee + electric lighting fuel costs + wages and welfare + other fees + maintenance costs) * handling capacity (the throughput of the port) + issue costs

Units: Yuan/Ton

(15) Accountant fee=1.4e+006

Units: Yuan

(16) Fund-raising amount =3.1757e+008

Units: Yuan

(17) Assessment fee =500000

Units: Yuan

(18) Other fee =0.68

Units: Yuan/Ton

(19) Annual net profit = Operating profit - income tax - (operating profit - income taxes) * dividend dividend

Units: Yuan/Ton

(20) Legal fees =800000

Units: Yuan

(21) Supply demand difference = handling demand - the existing supply

Units: Ton

(22) Tax fee=Main business income tax* composite tax rate

Units: Yuan/Year

(23) Time limitation 1=RAMP(1, 2007 , 2021)

Units: Year

(24) Time limitation 2=RAMP(1, 2007 , 2021)

Units: Year

(25) time limitation 4=RAMP(1, 2007, 2021)

Units: Year

(26) Income tax=IF THEN ELSE(time limitation 2<=3, Operating profit * Income

tax rate -5.48e+006 , Income tax rate *Operating profit)

Units: Yuan/Year

(27)　　Income tax rate =IF THEN ELSE (time limitation 2>=3, 0.33, 0.25)

Units: Dmnl

(28) FINAL TIME = 2021

Units: Year

The final time for the simulation.

(29) Maintenance costs =1.77

Units: **undefined**

(30) The contribution investment rate=0.08

Units: Ton/Yuan

(31) Increase amount of the port re-investment throughput= port re-investment *
the contribution rate

Units: **undefined**

(32) INITIAL TIME = 2007

Units: Year

The initial time for the simulation.

(33) Existing supply =IF THEN ELSE(Production period =0 ,2.6e+006,0)+IF THEN

ELSE(Production period =1, 2e+006 ,0)+IF THEN ELSE(Production period =2,

2e+006 , 0)+IF THEN ELSE(Production period >=3, 1.4e+006 , 0)

Units: Ton

(34) Operating profit = Operating Profit - Cost

Units: Yuan

(35) Handling capacity (the throughput of the port) = IF THEN ELSE (existing supply + increased amount of investment throughput> = handling requirements, handling requirements, the existing supply capacity + increased amount of investment throughput)

Units: Ton

(36) handling requirements = WITH LOOKUP (Time Limit 4,

([(0,0)(20,8e+006)],(0,4.12815e+006),(1,4.45122e+006),(2,4.68479e+006),(3,4.9186e+006),(4,5.15264e+006),(5,5.38691e+006),(6,5.62141e+006),(7,5.85615e+006),(8,6.09112e+006),(9,6.32632e+006),(10,6.56176e+006),(11,6.79743e+006),(12,7.03334e+006),(13,7.26947e+006),(14,7.5058e+006)))

Units: Ton

(37)Handling   Income=   Unit   income   price   *   handling   volume(port throughput)*0.85

Units: Yuan

(38)Capital Increasement= INTEG ((Annual net profit),0)

Units: Yuan

(39) Main business costs = depreciation

Units: Yuan/Year

(40) Main business costs = Main business income - Main business costs ¨Tax Fee

Units: Yuan

(41) Main business income =Storage Income+ Port income + handling income

Units: Yuan/Year

(42) Comprehensive tax rate =0.0335

Units: **undefined**

(43) Depreciation =3.1757e+008/50

Units: Yuan/Year

(44) SAVEPER= TIME STEP

Units: Year [0,?]

The frequency with which output is stored.

(45) TIME STEP = 1

Units: Year [0,?]

The time step for the simulation.

3. Run results

Table 11 Run Result of Xugou Phase 3, No. 59 Dock

Simulation Result of Xugou Phase 3, No. 59 Dock and economic indicator（before tax）		
Year	Income（Yuan）	NPV1（Yuan）i=14%
2007	24027540	-£21,443,732
2008	27121202	NPV2（Yuan）i=13%
2009	31676332	£1,072,600
2010	27740728	IRR
2011	31986310	13.05%
2012	35766972	Payback period (year)
2013	43315288	8.87
2014	51276580	
2015	60823632	
2016	72320200	
2017	86220656	
2018	103094560	
2019	123657984	
2020	147327152	
2021	157938112	

Source: by author¡s calculation

Simulation Result of Xugou Phase 3, No. 59 Dock and economic indicator（after tax）		
Year	Income（Yuan）	NPV1（Yuan）i=19%
2007	22795636	-£11,007,950
2008	25046274	NPV2（Yuan）i=8%
2009	28360130	£14,598,891
2010	23344300	IRR
2011	20787904	8.56%
2012	23244956	Payback period (year)
2013	28150604	10.55
2014	33324648	
2015	39529276	
2016	47000900	
2017	56034804	
2018	67001152	
2019	80365320	
2020	95747912	
2021	102643976	

Sources: by author¡s calculation

4.4.3 Model simulating result of Coke Dock and its indicator calculation

1. Main operating parameters of the procedures

(01)　　Sponsors underwrite cost = fund-raising amount *0.0035

Units: Yuan

(02) Tool material costs =1.6

Units: Yuan/Ton

(03) Finance charges= Loan interest

Units: Yuan

(04) Production period =RAMP (1, 2007, 2021)

Units: Year

(05) Repayment of loan principal =IF THEN ELSE (Production period 1<=3,2e+007, 0)

Units: Yuan/Ton

(06) Cost of Lighting and electricity fuel =0.13

Units: Yuan/Ton

(07)Loan amount =6e+007

Units: Yuan

(08)Lending rate =0.005022

Units: Yuan

(09) Unit price revenues = IF THEN ELSE (Production period <=4, 22.6, 22.6+ (Production period -4) *0.05)

(10) Lighting electricity fuel cost=0.13

(11)Storage Income = Unit price revenues * handling volume (port throughput)*0.07

Units: Yuan

(12) Issue costs = IF THEN ELSE (Time limit1<=5, (Sponsors underwrite cost +Issue procedure cost +accountant fee+ Assessment fee+ Legal fee)/5, 0)

Units: Yuan

(13)Issue procedure cost= fund-raising amount*0.0035

(14) Fee=management fee+ management fee

Units: Yuan

(15) Port re-investment =IF THEN ELSE (The difference between the demand for supply >=2e+006, Capital increase*0.15, 0)

Units: Yuan

(16) Port management fee= Unit price revenues * handling volume (port throughput)*0.08

Units: Yuan

(17) Wage and welfare=5.6

Units: Yuan/Ton

(18)Bonus=0.03

Units: Dmnl

(19) port management fee = (Materials fee + electric lighting fuel costs + wages and welfare + other fees + maintenance costs) * handling capacity (the throughput of the port) + issue costs

Units: Yuan/Ton

(20) Accountant fee=1.4e+006

Units: Yuan

(21) Fund-raising amount =5.1222e+008

Units: Yuan

(22) Assessment fee =500000

Units: Yuan

(23) Other fee =0.68

Units: Yuan/Ton

(24) Annual net profit = Operating profit - income tax - (operating profit - income taxes) * dividend dividend

Units: Yuan/Ton

(25) Legal fees =800000

Units: Yuan

(26) Supply demand difference = handling demand - the existing supply

Units: Ton

(27) Tax fee=Main business income tax* composite tax rate

Units: Yuan/Year

(28) Time limitation 1=RAMP (1, 2007, 2021)

Units: Year

(29) Time limitation 2=RAMP (1, 2007, 2021)

Units: Year

(30) Time limitation 4=RAMP (1, 2007, 2021)

Units: Year

(31) Income tax=IF THEN ELSE (time limitation 2<=3, Operating profit * Income tax rate --2e+006, Income tax rate *Operating profit)

Units: Yuan/Year

(32)   Income tax rate =IF THEN ELSE (time limitation 2>=3, 0.33, 0.25)

Units: Dmnl

(33) FINAL TIME = 2021

Units: Year

The final time for the simulation.

(34) Maintenance costs =1.77

Units: **undefined**

(35) The contribution investment rate=0.08

Units: Ton/Yuan

(36)INITIAL TIME = 2007

Units: Year

The initial time for the simulation.

(37) Existing supply =IF THEN ELSE (Production period <=1, 0, 3.2e+006)

Units: Ton

(38) Operating profit = Operating Profit ¨ Cost- Repayment of loan principal

Units: Yuan

(39) Handling capacity (the throughput of the port) = IF THEN ELSE (production period<=1, 0, IF THEN ELSE (existing supply +2e+006 +increased amount of re-investment throughput> handling requirements, handling requirements, the existing supply capacity + 2e+006+increased amount of re-investment throughput)

Units: Ton

(40) handling requirements = WITH LOOKUP (Time Limit 4,

[(0,0)-(20,1e+009),(0,4.12815e+006),(1,5.42398e+006),(2,7.12657e+006),(3,4),(4,0),(5,0),(6,0),(7,0),(8,9),(9,0),(10,0),(11,33)],(0,4.12815e+006),(1,5.42398e+006),(2,7.12657e+006),(3,1.23028e+007),(4,1.61647e+007),(5,1.61647e+007),(6,1.616e+007),(7,1.616e+007),(8,1.616e+007),(9,1.616e+007),(10,1.616e+007),(11,1.616e+007),(12,1.616e+007),(13,1.616e+007),(14,1.616e+007)))

Units: Ton

(41)Handling Income= Unit income price * handling volume (port throughput)*0.85

Units: Yuan

(42)Capital Increase= INTEG ((Annual net profit), 5.1222e+009)

Units: Yuan

(43) Main business costs = depreciation

Units: Yuan/Year

(44) Main business costs = Main business income - Main business costs ¨Tax

Fee

Units: Yuan

(45) Main business income =Storage Income+ Port income + handling income

Units: Yuan/Year

(46) Comprehensive tax rate =0.0335

Units: **undefined**

(47) Depreciation =3.1757e+008/50

Units: Yuan/Year

(48)Increase amount of the port re-investment throughput= port re-investment * the contribution rate

Units: **undefined**

(48) SAVEPER= TIME STEP

Units: Year [0,?]

The frequency with which output is stored.

(50) TIME STEP = 1

Units: Year [0,?]

The time step for the simulation.

4. Run results

Table 12 Run Result of Coke Dock

Simulation Result of Coke Dock and economic indicator（before tax）		
Year	Income（Yuan）	NPV1（Yuan）i=18%
2007	-31802800	£-19,896,782.47
2008	-31802800	NPV2（Yuan）i=17%
2009	54164300	£16,138,479.89
2010	116605000	IRR
2011	183492000	17.44%
2012	184273000	Payback period (year)
2013	186254000	7.62
2014	187035000	
2015	187816000	
2016	188597000	
2017	189378000	
2018	190159000	
2019	190940000	
2020	191720000	
2021	192501000	

Run Result of Coke Dock and economic indicator（after tax）		
Year	Income（Yuan）	NPV1（Yuan）i=19%
2007	-21196600	£-9,659,202.35
2008	-21196600	NPV2（Yuan）i=11%
2009	41344500	£31,023,883.64
2010	77721400	IRR
2011	119251000	11.75%
2012	119759000	Payback period (year)
2013	121046000	8.9
2014	121554000	
2015	122062000	
2016	122569000	
2017	123077000	
2018	123584000	
2019	124092000	
2020	124599000	
2021	125107000	

4.5 Evaluation of economic and financial indicators

From the simulation results, internal rate of return of Xugou Project before the tax is 13.65% when meet the design capacity, 8.56 percent after-tax, both of which are higher than the 8 percent benchmark yield rate issued by national authorities and the 6.39 percent current annual long-term loans interest rate level of commercial banks. Payback period of forecast project is 8.87-year.

Internal rate of return of Coke dock before the tax is 17.44% when meet the design capacity, 11.75% percent after-tax, both of which are higher than the 8 percent benchmark yield rate issued by national authorities and the 6.39 percent current annual long-term loans interest rate level of commercial banks. Payback period of forecast project is 7.62 year.

Chapter 5 Conclusion

Summarized what we discussed in this paper, in Conclusion, from an economic point of view, Xugou Project or Coke dock Project are good in financial condition, both of whose internal rates of return are higher than the 8 percent benchmark yield rate issued by national authorities, and are reasonable investment behaviors. Compared the two project, Payback period and IRR OF coke dock project are better than general-purpose dock; therefore, investment in the coke dock is more valuable.

The evaluation process of fund using focuses primarily on its economic and financial indicators, while the traditional calculation of financial indicators, and mainly use the static technical economics method to calculate the return on investment, which is mainly used in the calculation of short-term financial projections. However, port investment recovery period is long with various impact factors that lead to one-sidedness of static technologies Economics. For example, port handling capacity is usually is the project designed capacity, taking into no account re-investment process after investment in the construction of the port, including technical re-investment, equipment re-investment and so on. These re-investment, frequently, enable the handling capacity of ports change greatly, which will lead to changes in the economic benefits of the port. Consequently, changes in investment returns will happen, which will continue to stimulate further investment in port, thus the caused changes in the economic benefits of the port, thus affecting port selection of the investment and financing programs. This is actually a dynamic feedback process of port investment and financing, including re-investment and re-financing investment, which are not considered by the past investment evaluation.

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