

## 論文の内容の要旨

論文題目: Research on the Framework of the Global Maritime Transport Indices in the Big Data Era

(ビッグデータ時代におけるグローバル海運指数の構造に関する研究)

氏 名 趙 一 飛

With the development of communication technology, the big data became a hot topic in the world. Many new concepts appear not only on internet but also in research papers like as e-business platform, internet plus, big data, smart society or smart city, etc. UN Global Pulse handles many project to promote big data technology. The Whitehouse of US announced a “Big Data Research and Development Initiative”. The governments of UK, Australia, Japan and China also took their actions in this area. Some think tanks as IBM, Oracle, PwC, etc. are making research and development of big data products for public service and business.

The global maritime transport industry carries over 80 percentage of international trade goods among people and communities all over the world. Waterborne transport is the most efficient and cost-effective method of goods transportation, providing a dependable, low-cost means of transporting goods globally, facilitating commerce and helping to create prosperity among nations and peoples. The prosperity of global economy is strongly related with the development of global maritime transportation market. The bulk market, the tanker market and the container liner market are the three main sub-markets of the global maritime transport market. Each of them has the special regular pattern. So the BDI, the Clarksea Index and the CCFI, etc. are developed. But they are not enough.

Based on the market structure analysis and economic index theory, this paper outlined the indices framework of the global maritime transport market that includes three series of indices: the prosperity index, freight index and earning index. The prosperity index illustrates the investment value of the market, and the freight index indicates freight rate change of the market, earning index show the possibility of the market. We believe that not only the whole maritime transport market needs a prosperity index, but also the bulk market, tanker market, liner market, etc. need their prosperity index. Meanwhile, as the shortage of data source, there is not a global container liner freight in the market. The aim of this research is to find the way to set up the prosperity index for global maritime transport market and the global container liner freight index.

After researching on the plenty results of NBER and many economists on business cycle indices, compared with the character of global maritime transport market, the Prosperity Index of the Global Maritime Transport Market (PIGMT) can be calculated with the data set of international trade indicators, freight indices, fuel price indices, capacity of fleet. Collecting the huge data of 27 indicators from January 2000 to December 2015, changing them to monthly data, putting them in the equations in the algorithm, the PIGMT for 16

years was born. Compared with the actual situation of the large scale shipping companies, the PIGMT can be used to reflect the company's profitability.

Based on a comparative analysis with the existing container freight indices, the method of integrating the framework with the use of data from e-booking platforms and illustrate the reason that the new index can provide more insightful information for shippers. This framework can be applied to have a daily Shanghai container freight index by combining data sources from the platforms linked to the Shanghai port. By implementing the index to a risk analysis problem, numerical results can be used to show the Daily Container Freight Index (DCFI) potential position in real investments for container liner markets.

The key points of this paper are: (1) The global maritime transport market is borderless. So every investment in this market is borderless. Investors just concern the global index but local index. Local freight index is only useful for shippers and carriers in local market. (2) For investor, the profit of company is more important than revenue. So the prosperity index can give the situation more correctly than freight index for investor as the freight rate just indicate the revenue of shipping company but cost. (3) The business cycle theory can be used in global maritime transport market as it also is a cycle market. (4) The PIGMT can be created by composite index method. (5) With the action of the big data strategy plan, more and more freight indices can be created as the DCFI. In big data era, the PIGMT will be more accurate.

Main creations of this paper are: (1) Proved only freight index is not enough for investors, prosperity index is needed in global maritime transport market. (2) Designed the framework of data products of the global maritime transport market. (3) Designed the algorithm of PIGMT according to the methodology of business cycle index, and tested its correction. The result is reliability. (4) Designed the algorithm of DCFI based on e-booking platform.