

論文の内容の要旨

Methodology Study on Relationship between Macro Economy and Container Throughput (マクロ経済とコンテナ取扱量に関する方法論)

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Container transport has been so closely connected with macro economy since its birthday in 1956, and now more than half international seaborne trade in terms of value are carried by containers from frozen tuna to aircraft parts.

As port infrastructure are generally considered to be a long-term investment offering steady returns and container transport has exhibited quite potential due to its indispensable contribution to globalization, container terminal financing and investment has become one of the choices for government, asset managers, corporate investors and even public pension funds. Definitely, supply demand analysis in such kind of capital-intensive industry will be dealt seriously for every specific case.

Container throughput is taken as demand factor in supply demand analysis since container terminals charge carriers by container movement between terminal and vessel, namely container throughput. Therefore, container throughput research is always a hot topic in container transport field.

Due to its close connection with national or regional economic development, container throughput was always analyzed by macro indicators in regression approach, especially GDP data was always adopted integrally to make regression analysis with container throughput. However, most researches focused on statistical model comparison or optimization but rarely discussed economic facts behind container throughput and macro indicators.

Meanwhile, system structure evaluation was hardly found in most past researches while term of data series and data processing were seldom mentioned. However, a stable system structure was a sufficient condition for sound regression. Furthermore, this study did not find any structural analysis on relationship between container throughput and various industries in macroeconomic structure which could tell us more information of container throughput generation mechanism.

After literature reviewing, System of National Account (SNA) was recognized as a treasure for macroeconomic analysis when GDP data was just one of macroeconomic indicators. SNA did not only provide statistics data source but also many efficient methodologies for macroeconomic analysis, just like GDP expenditure approach or input-output analysis.

By use of SNA's methodologies, this study firstly raised question on GDP as a suitable variable to explain container throughput after examining economic facts behind GDP and container throughput and re-organized aggregate regression analysis methodology while proposing structural analysis methodology for national container throughput analysis before we tried to integrate aggregate and structural analysis together.

Firstly, this study distinguished business model from statistical model and made first attempt to create business model against container throughput generation mechanism which divided gross container throughput into domestic, international and international transshipment segments by trade nature.

Secondly, only gateway container throughput not gross container throughput was identified to be correlated with macro economy while international transshipment throughput did not make remarkable contribution to hub's economy.

Thirdly, data series' term and processing were strongly emphasized. Macro indicator data series in real term and input-output table by producer's price were selected to match the economic facts behind container throughput as much as possible in this study.

Besides above common points, specific methodologies for both aggregate and structural analysis were developed individually. For aggregate analysis, macro indicators including value of domestic demand and international merchandise trade from GDP expenditure approach were selected as independent variables to correspond to domestic and international container throughput segments by most reasonable causality. Secondly, the evaluations of industry structure, trade structure and transport structure were proposed to qualitatively describe the economic background when aggregate regression analysis was made. Thirdly, both quantitative and qualitative analysis was integrated to explore exact causality and avoid nonsense regression in container throughput analysis.

For structural analysis, input-output table was chosen to make analysis on the mechanism between industries and container throughput. Leontief inverse matrix was used to establish function between container throughput segments and industries' final demand after conversion coefficients were calculated by trade statistics.

In line with above methodologies, the empirical analysis was made by macro indicators and container throughput data from Japan, China, Korea and Hong Kong SAR.

Both aggregate and structural empirical analyses made use of same generation mechanism and data source from SNA evidently supported with each other and methodologies we proposed as well.

This study started with container throughput generation mechanism and the outcome further enriched the contents of this mechanism. The new enrichment included two parts. Firstly, container throughput was evidently connected with macro economy. Though GDP was questioned to be a suitable variable for regression analysis, domestic demand, international merchandise trade and other indicators in SNA were still able to explain container throughput. Secondly, different macroeconomic structure had different driving force on container throughput. Industry structure was a decisive factor while transport structure mutually reinforced with container throughput as well as container terminal investment.

Meanwhile, structural analysis was additional quantitative study for industry structure evaluation in aggregate analysis. Aggregate analysis illustrated container throughput trend while structural analysis identified every industry's contribution to gateway container throughput. The key industries identified by structural analysis in this study was logic and in line with common sense. Structural analysis was consistent with aggregate analysis while both approaches identified physical industries generated container throughput efficiently.

Anyway, the aim of this study was to develop new methodologies by matching economic facts behind macro indicators and container throughput as much as possible. SNA was a big treasure which did not only present data source but also provide a lot of valuable methodologies to secure the consistence of theory, model and data in the study.

Since this study focused on methodology, it was independent to statistical models so that there is not any challenge on statistical model or algorithm in this study and only correlation analysis and simplest linear regression analysis was made. This study made every effort to explain methodology with concise economic facts and the simplest language while trying to provide more statistics materials rather than use complicated mathematic tools.

Keyword: macro economy, gateway container throughput, aggregate analysis, structural analysis, methodology