ИНДЕКС НА ТЪРСЕНЕТО (SDI) В МОРСКИТЕ ПРЕВОЗИ. КОРЕКТИВНИ ФУНКЦИИ НА ИНДЕКСА НА ТЪРСЕНЕТО КЪМ ДРУГИТЕ ИНДЕКСИ ВЪВ ВОДНИЯ ТРАНСПОРТ. МНОГОПОЛЯРНОСТ НА ФРАХТОВИЯ ПАЗАР

Проф. д-р Светлана Райчева Димитракиева
Технически университет – Варна

Огнян Денчев Костадинов
Докторант ВСУ „Черноризец Храбър“

***Резюме**: Различните сектори на морския транспорт използват няколко индекса за цените на услугите на морския транспорт. Обикновено индексите във корабоплаването наблюдават цените на превозите или нивата за наемане на кораби или приходите от наблюдавания вид и тонаж на корабите. Също така цените на корабите и цените на акциите на корабните компании са важни за икономическите анализатори. Всички въведени индекси в корабоплаването имат своите предимства, но и недостатъци. Основният недостатък на повечето индекси е, че те наблюдават само цените, което основно зависи от съотношението на търсенето и предлагането, всяко от които е променлива. Счита се, че балтийските индекси отразяват повече състоянието на китайския пазар. В това отношение някои съвременни икономисти, изучаващи глобализацията в икономиката, посочват нова глобална тенденция - многополярност. Оформиха се три икономически силни региона в световната икономика с центрове в САЩ, Китай и Европейския съюз. Също така страните от така наречената група държави от BRICS*

(Бразилия, Русия, Индия, Китай и Южноафриканската република), където живее 40% от световното население, се считат за много сериозен фактор в световната икономика. Предвид недостатъците на индексите в корабоплаването и новите световни икономически реалности, разумно е да се използва индекс за търсенето на морски транспортни услуги като коригиращ индекс. Този нов SDI трябва да се използва паралелно с обичайния индекс на корабоплаване, също така той трябва да се измерва по региони, като се наблюдава трафикът по определени корабоплавателни регионални маршрути.

***Ключови думи**: Предимства и недостатъци на индексите в корабоплаването, балтийски индекси, цените на морския транспорт, приходите от морските транспортни услуги, многополярния фрахтов пазар, предлагането, търсенето, индекса на търсенето на корабоплаване (SDI)*

SHIPPING DEMAND INDEX (SDI) FOR SEA TRANSPORATION. CORRECTIVE FUNCTIONS OF SHIPPING DEMANT INDEX (SDI) FOR OTHER INDICES OF WATER TRANSPORT. MULTIPOLARITY OF THE FREIGHT MARKET

Prof. Dr. Svetlana Raycheva Dimitrakieva
Technical University - Varna

Ognyan Denchev Kostadinov
PhD student at VFU "Chernorizets Hrabar"

Abstract: *The different sectors of sea transport use several indices for the prices of maritime transport services. Usually, Shipping indices monitor transport prices or ship rental levels or revenues from the observed type and tonnage of ships. Also, ship prices and stocks prices of shipping companies are important for economic analyzers. All established shipping indices have their advantages but also disadvantages. The main disadvantage of most indices is that they monitor only the prices, which principally depends on the ratio of supply and demand, each of which is a variable. Baltic indices are considered that they reflect more the state of the Chinese market. In this respect, some modern economists studying globalization in the economy are considering a new global trend - multipolarity. Three economically strong regions in the world economy with centers in the United States, China and the European Union were formed. Also, the countries of the so-called BRICS group of countries (Brazil, Russia, India, China, and the Republic of South Africa), where is living 40% of the world's population, is considered as a very serious factor in the world economy. Given the shortcomings*

use an index for the consumption of maritime transport services, as a corrective index. This new SDI should be used in parallel with the usual Shipping index, also it must be measured by regions, observing the traffic in certain shipping regional routes.

of the indices in shipping and the new world economic realities, it is reasonable to

Keywords:

Advantages and disadvantages of Shipping indices, Baltic Indices, Sea transport prices, Revenues from Shipping Services, Multipolar freight market, Supply, Demand, Shipping Demand Index (SDI)

Introduction

International trade is the main factor for shipping, which determines the trends in shipbuilding, maritime transport, and port activities. On other hand, sea-going merchant ships predetermine port constructions. Maritime transport is omy and become the beginning of a new cycle. The world is multipolar and long cycles are observed in different phases by regions, therefore, Kondratieff long cycles should be studied by regions. Currently, the three main economic regions in the world with centers in the United States, China and the European Union are in different phases of their long cycles. In terms of merchant shipping, the United States is at its peak. China's shipping is booming, which began in the late 1990s China and India, is leading to an increase in the quantities of goods transported over long distances. [5] The European Union's shipping is more in recession.

1. Multipolarity of International Trade and Regional Freight Markets

- International Trade by Region

Gross Domestic Product (GDP) is an internationally recognized economic indicator that measures the state of each economy as a sum of the prices of the goods and services rendered in the country. In principle, it is measured for each country individually but it can also be measured for the whole world - Gross World Product (GWP).

$$GDP = C + I + G + X$$

where:

C - consumption

I - Investments

G - Government purchases

H - Net Export (Gross Export – Gross Import)

	Region	GDP (nominal, 2017)	GDP growth	Share of World GDP
	Asia	$28,964,074,012,908	4.75%	35.79%
	Northern America	$21,132,514,175,449	2.30%	26.11%
	Europe	$20,266,185,923,246	2.36%	25.04%
	Latin America and the Caribbean	$5,391,967,806,492	1.78%	6.66%
	Africa	$2,253,387,990,527	3.07%	2.78%
	Oceania	$1,565,397,861,708	2.08%	1.93%

Figure 1. Gross domestic product by regions [9]

The table reflects the world's Gross Domestic Product by region, three of which North America, Europe and Asia have roughly similar performance. On the other hand, the percentage shows that North America and Europe lag in their pace of development, while Asia and Africa have a higher percentage. This is a prove of the thesis of the new multipolar development of the world economy.

There are signs of multipolar economic development of the world, which could be considered in some sense as a continuation of the theory of the Western line of world development (West Line), also the multipolarity of the economy reflects on Shipping, too.

- Regional Freight Markets

From geographical the point of view, the international trade is divided into global and regional. Most of the trade in raw materials is global, and most of the trade in finished goods is rather regional. The reasons for these trends are the

uneven distribution of raw materials and the shipping prices. In terms of raw materials, the only thing that can be done is the use of large tonnage ships, and in terms of finished products, the reduction of transport costs is achieved with container transport. The upward trend in the sizes of containerships is mainly motivated by economies of scale, which has led to a significant reduction in average cargo transport costs. [4] Container transport is a combination of transport at regional and global level. Regional container shipments are between feeder ports and hub ports, and global container shipments are only between hub ports only. Despite the tendency to increase global international trade at the expense of regional international trade, these two sectors, separated in a natural way, by virtue of economic laws will continue to exist. From an economic point of view, maritime transport can be divided into global and regional.

Given the thesis, we accept the existence of regional freight markets. Demand and supply in regional freight markets depend on regional trade. Regional international trade is part of global international trade, which covers all regions.

Pattern of seaborn trade and shipping is:

- Global Interregional Trade - Global Freight Market (GFM)
- Regional International Trade - Regional Freight Market (RFM)

The freight trade between North Sea, Baltic seaports and Mediterranean Ports is considered as regional freight trade covered by coaster shipping. Containers Trade Pattern has both elements of GFM and RFM.

2. Shipping Demand Index (SDI) for sea transport

Demand for maritime transport grows in tandem with the growing world population, consumption needs, industrial activity, urbanization, trade and

economic growth. [6] Given the shortcomings that have emerged in the predictive capabilities of the Baltic Index, we conducted a study of the consumption of maritime transport services. For this purpose, with the help of VT Explorer - a global system for monitoring the movement of sea and river vessels, we collected data on the carrying capacity of bulk carriers that passed through the English Channel in a northerly direction. The surveyed ships and traffic are used for the transport of bulk cargo, which are the raw materials for the heavy industry of the euro area countries.

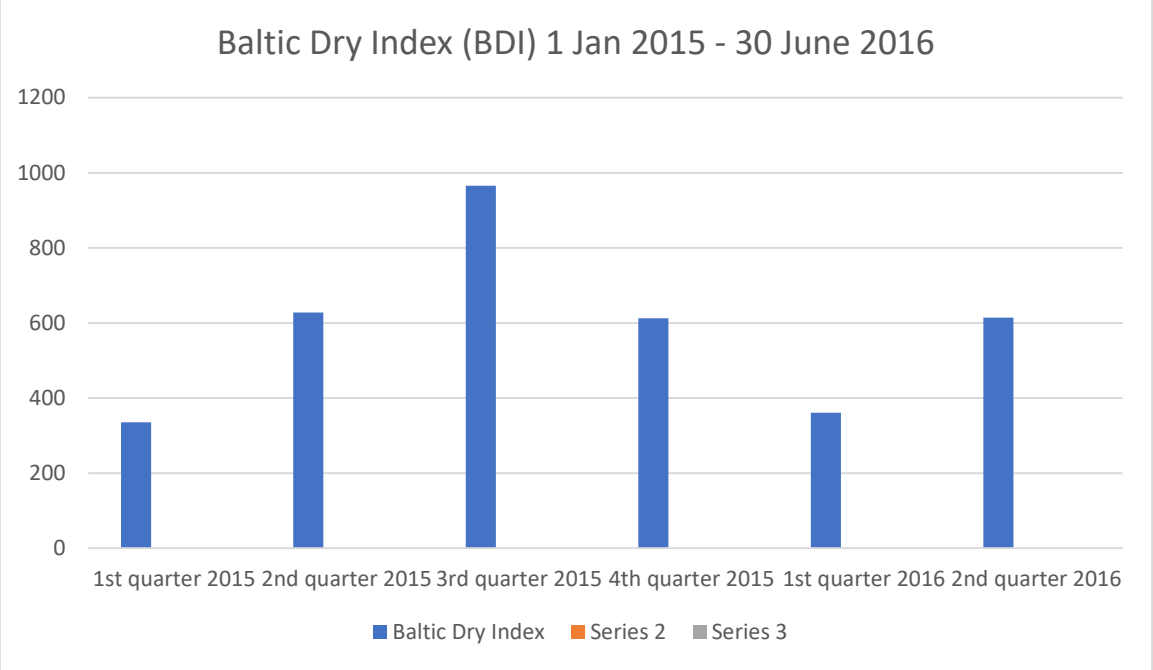

Figure 2. Baltic Dry Index for the period of 2015 - 2016 [10]

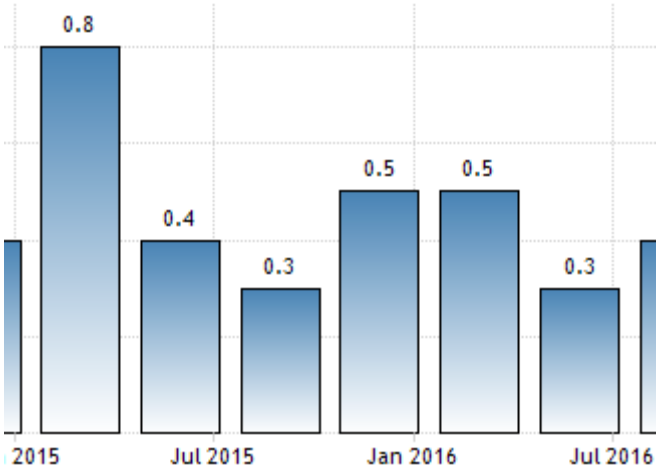

Figure 3. Growth GDP of EU [11]

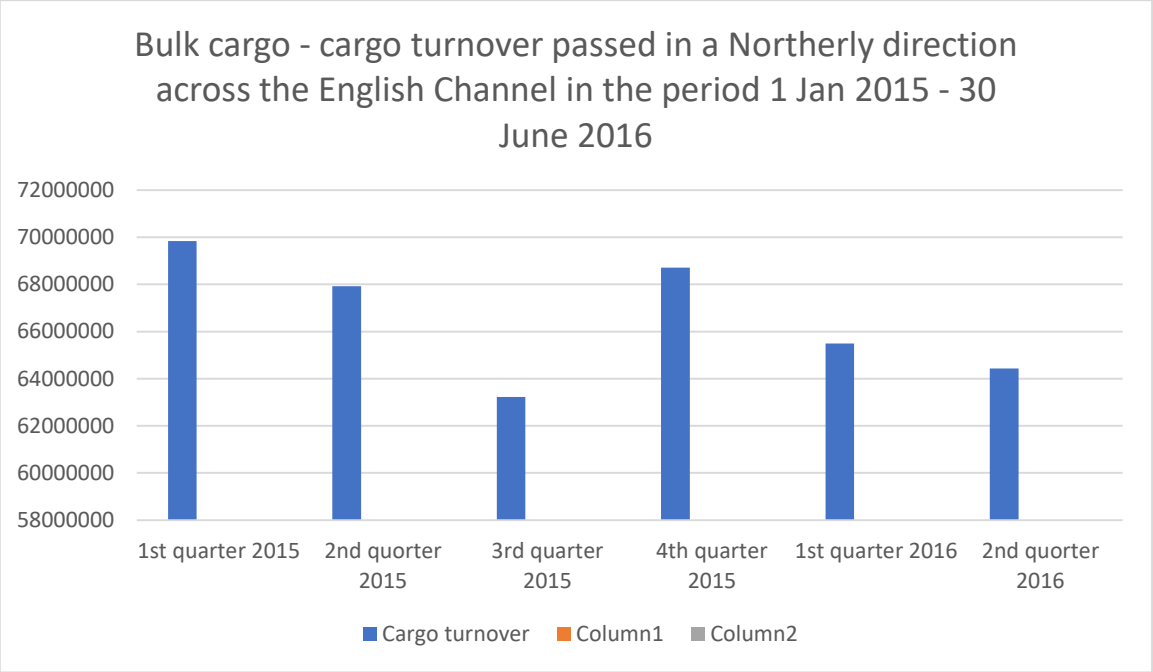

Figure 4. Cargo turnover across the English Channel [12]

Calculations for correlation between the main variables are presented in Table 1[13]:

Table 1. Data use to calculation of different correlations

Quarter Year	Average BDI	Cargo turnover across English Channel	**SDI**	Growth GDP
1st quart'15	335	69839066	1000	0.80
2nd quart'15	628	67918407	972	0.40
3rd quart'15	965	62875770	900	0.30
4th quart'15	613	68711677	984	0.50
1st quart'16	361	65495216	938	0.50
2nd quart'16	614	64434973	923	0.30

The correlation coefficient is also known as the Pearson Correlation Coefficient. The correlation coefficient r can be calculated with the following formula:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

The summary of all correlation results are:

- Cargo turnover across the English Channel - Eurozone growth GDP = 0.798438
- Cargo turnover across the English Channel - BDI = - 0,624329
- Growth GDP - Average BDI = - 0,75714
- European coaster shipping freights – BDI = - 0.62439

Conclusion

In the final analysis, it may be concluded that:

- the new Shipping Demand Index (SDI) index has better predictive potential for the European economy than the Baltic index.
- the new Shipping Demand Index (SDI) index can be used in parallel with BDI as a corrective instrument to suggest the reason why BDI goes up or down, considering the Demand for sea transport.

Suggestions:

- We propose to be created an index that considers the demand for general and small bulk cargoes transportation across Gibraltar and the Bosphorus by Coaster General Cargo Ships of size between 2000 – 8000 dwat.
- We propose to create an index that considers the total average speed of Coaster General Cargo Ships of size between 2000 – 8000 dwat passing across Gibraltar and the Bosphorus.
- We propose to create a common index that considers the consumption of cargo capacity in ton-miles of ships passing through Gibraltar and the Bosphorus.
- We recommend the time interval for which the accumulation of raw materials and the average speed are measured to be 3 weeks, for the fluctuations to be clear.

Literature

1. A. Molodchik, N. Molodchik, D. Dimitrakiev, *Platform economy opportunities and risks*, The 11th International Scientific Conference “Digital economy and blockchain technologies”, Varna, Bulgaria, 2018, ISBN 978-619-7026-28-3

2. D. Dimitrakiev, K. Atanasova, *Aspects of the planning of maritime transport activities*, Industrial Management, year 12, issue 1, 2015, ISSN 1312-3793

3. K. Atanasova, *Model for solving an optimization problem in the maritime transport system,* Proceedings of the XIII International Scientific Conference "Management and Engineering'15", Sozopol, 2015, ISSN 1310-3946, ISSN 1314-6327

4. Ryuichi Shibasaki, Hironori Kato, Cesar Ducruet, *Global Logistics Network Modelling and Policy Quantification and Analysis for International Freight*, Elsevier, ISBN: 978-0-12-814060-4

5. Y. Dachev, D. Dimitrakiev, K. Atanasova, *The new sea routes on the world map*, Scientific works of Nikola Vaptsarov Naval Academy, 31/2017, ISSN 1312-0867

6. Harilaos N. Psaraftis, *Sustainable Shipping,* Springer, ISBN 978-3-030-04329-2

7. Harry Geerlings, Bart Kuipers, Rob Zuidwijk, *Ports and Networks*, Routledge, 2018, ISBN: 978-1-4724-8500-7

8. Peter Lorange, *Innovations in shipping*, Cambridge University Press, 2020, ISBN 978-1-108-42487-5

9. World Meter-Reputable and World recognized web-site, https://www.worldometers.info/gdp/

10. Fearnley Weekly – Dry bulk, https://www.fearnleys.no/

11. Trading economics, http://www.tradingeconomics.com/

12. VT Explorer – AIS, http://www.vtexplorer.com/bg/

13. Data received from VT Explorer – AIS, http://www.vtexplorer.com/bg/

Автори:

Проф. д-р Светлана Райчева Димитракиева
Технически университет – Варна
e-mail:s_dimitrakieva@abv.bg

Огнян Денчев Костадинов
Докторант във ВСУ „Черноризец Храбър“
e-mail:ognyan.kostadinov@gmx.com
mobile:+359 884 884444
www.dss-bg.eu