E u r o E c o n o m i c a

The Analyse of the freight rates for the oil ships with big sizes

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Abstract

The purpose of this work is to approach the evolution of the freight rates for the oil ships of big sizes, that is of those with 200,000 dwt. In this field we intend to analyse the seasonality of the freight rates for the transport of the oil from Persian Gulf to other four destinations, that is: Japan, Korea Republic, Europe and Caribbean/the East Coast of the North America. This patchy evolution during an year is for sure determined by the capacity of processing and stockage from those zones, but this will be also reflected in the levels of the freight.

As the analysed period also includes the present crisis which the world economy is passing through, we wish stand the sense of reflecting this on the transport services market. Otherwise, we will analyse the trends of the transport and the seasonality of the transport of this segment of ships. The research of these aspects will be done with the help of decomposition of the time series, with Minitab software.

Key words: freight rate, vlcc, trend, seasonality, Minitab.

Content

The market for transport services of oil products is segmented depending on the ships which they deserve and which vary between these limits:

-   10,000–24,999 DWT: General Purpose tanker
-   25,000–44,999 DWT: Medium Range tanker
-   45,000–79,999 DWT: Long Range 1 (LR1)
-   80,000–159,999 DWT: Long Range 2 (LR2)
-   160,000–319,999 DWT: Very Large Crude Carrier (VLCC)
-   320,000–549,999 DWT: Ultra Large Crude Carrier (ULCC).

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They emphasize that each segment of ships created its own market with specific features, both in the contracting the transport services, and the operating of the ships. Thus, the ships vlccsiulcc type are those which offer the highest scale economies in transport and which score about 44% from the world fleet of tankers, in terms of dwt tonnage of the year 2010.

A major source of the world export of oil is Persian Gulf, and as destinations they are: Japan, the Republic of Korea, Europe and Caribbean/East Coast of the North America, so that the rates of transport are important indicators of the world demand and offer of the oil market and also of the world economy, taking into account the importance of this product. Due to the major importance of the trade with oil products, this attracted a special audience to the transports which tried to promptly answer to the users' solicitations. Thus, they appeared a table of tariffs, which named WORLD WIDE TANKER NOMINAL FREIGHT SCALE, or codified WORLD-SCALE-W.S. This tariff is annually revised by "THE INTERNATIONAL TANKER NOMINAL FREIGHT SCALE ASSOCIATION LIMITED" and by "THE ASSOCIATION OF SHIP BROKERS AND AGENT INC".

The level of the freight on this market is usually presented in percentage which have as basis W.S. So, if on the market the rate is of 100 W.S., that means that it is equal with that foreseen in the tariff. On the contrary, it is proportionally reckoned, that means in the majoring or decreasing the W.S. tariffs, varying with the market quotation.

The base for reckoning of the tariffs is the longue tone of 1016 kg, or of 2240 pounds, and also the voyage between the ports of loading, that is those of unloading and returning to the last port of loading. For the reckoning of the freight they consider the expenses for the loading-unloading, and also a medium cost of the fuel. Under these conditions, the freight does not represent the real level of the cost and does not stipulate a certain level of the profit, but only a celerity of reckoning of each voyage.

For building the scale of tariffs they started from a "standard" ship with the following specific features, and also from the engagement conditions, as follows:

- the capacity of loading, at the level of the tone limit of 19500 longue tons
- the draft, in the sea water at the limit of the tone, considered to be 30'06'' (30 feet and 6 inch)
- the speed of operation : 14 Nd
- the consume of fuel on going: 28 longue tones of heavy fuel/day
- time of lay days: 96 hours
- the fix freight: 1800 USD/day
- commission: 2,5%

In order to reckon the freight, using the W.S. tariff , they proceed like that:

- they take from the transport contract the level of the W.S. freight
- they determine the section from the contract of which section the tariffs belongs
- they take from the correspondent section the value of the W.S. freight
- it is reckoned the percentages from the value of the freight on which they agreed in contract

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- they extract the necessary differences   which will be added taking into account the geographic zone
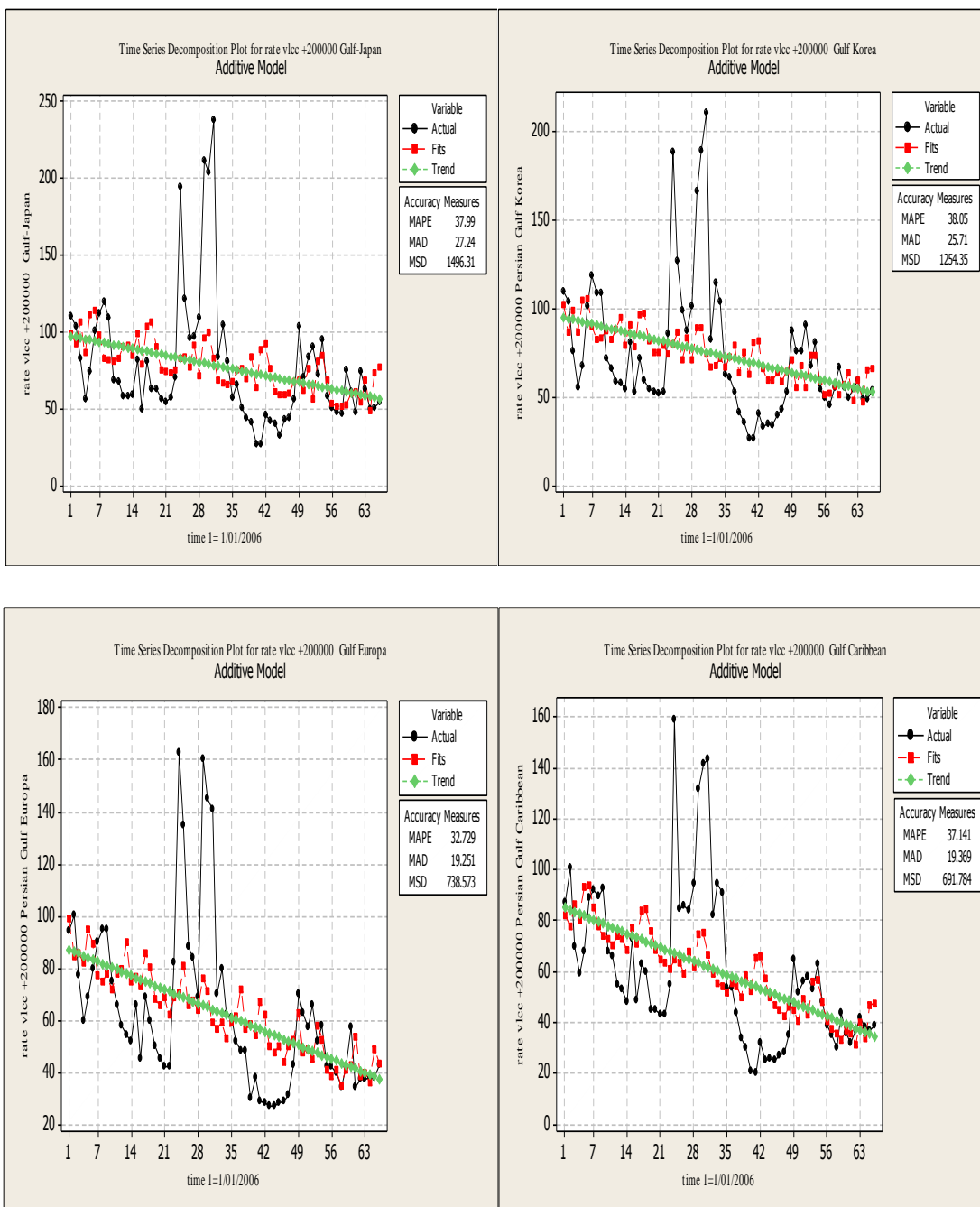
- there are summarized the totals.

**Figure nr. 1: The monthly series of the freight rates of the ships vlcc WS–
empirical adjusted sizes, and the linear trend**

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In this work we frequently use the composing of the time series in linear trends and in the seasonality indexes. The results we'll get will be used for obtaining the foreseeing values as: the sum of the trend and of the indexes for seasonality. All the diagrams were done with Minitab programme.

During the year 2006 -2011 the rate of the freight for the ylcc ships, that is more than 200,000 dwt, specialized in the transport of the oil from the Persian Gulf, Japan, the Republic of Korea, the West Europe and Caribbean/East Coast of the North America evolved monthly as they can be seen in the Figure nr. 1 (*3). The empirical values were linear adjusted depending on the time, the results being expressed in the relations (1) – (4):

$$YtJaponia = 97.95 - 0.626358*t ; \quad (1) \qquad Yt\ Korea = 96.05 - 0.653603*t \qquad (2)$$
$$YtEurope = 87.81 - 0.763396*t ; \quad (3) \qquad Yt\ Caribbean = 85.85 - 0.774930*t \quad (4)$$

Table nr. 1 Accuracy Measures

	MAPE	MAD	MSD
Japan	37.99	27.24	1496.31
Korea	38.05	25.71	1254.35
Europe	32.729	19.251	738.573
Caribbean	37.141	19.369	691.784

92

As they could notice in all cases there are scored negative values of the "b" parameters, that is as an average, by enhancing the time with one unit, that means in one month the rate of freight are reduced, thus being the consequence of the world crisis. This tendency of regress of the rates of freight scored after a tendency of strong rising during the years 2007-2008, before the crisis. The accuracy of the adjustments is represented by the table nr. 1, in which:

- **MAPE** (Mean Absolute Percent Error) - measures the accuracy of fitted time series values. It expresses accuracy as a percentage;
- **MAD** (Mean Absolute Deviation) - measures the accuracy of fitted time series values. It expresses accuracy in the same units as the data, which helps conceptualize the amount of error;
- **MSD** (Mean Squared Deviation) - measures the accuracy of fitted time series values. MSD is always computed using the same denominator (the number of forecasts) regardless of the model, so can compare MSD values across models and therefore can compare the accuracy of two different models.

In the analysed period they scored seasonality indexes in the table nr. 2 and they are shown in the figure nr. 2:

Table nr. 2 – The indexes of the seasonality of the freight rates

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| month	Japan	Korea	Europa	Caribbian
1 Jan	1,2899	7,5052	12,1545	- 2,6875
2 Feb	- 4,7309	-7,7031	-1,9705	-6,3750
3 Mar	10,1649	4,9844	0,1545	3,3125
4 Apr	-9,1476	-6,5573	-2,7830	-2,5417
5 May	16,5608	12,1302	10,6545	11,5417
6 Jun	20,2899	13,3594	6,1128	12,7500
7 Jul	4,7691	-1,5781	-5,0747	4,9792
8 Aug	9,6476	-7,9115	-6,6163	-2,0208
9 Sep	-10,4809	-6,5365	-3,2413	4,3958
10 Oct	-10,3559	-1,8281	-8,6580	-5,0208
11 Nov	-8,3976	-6,2448	-1,7413	6,9375
12 Dec	-0,3142	0,3802	1,0087	-2,6042
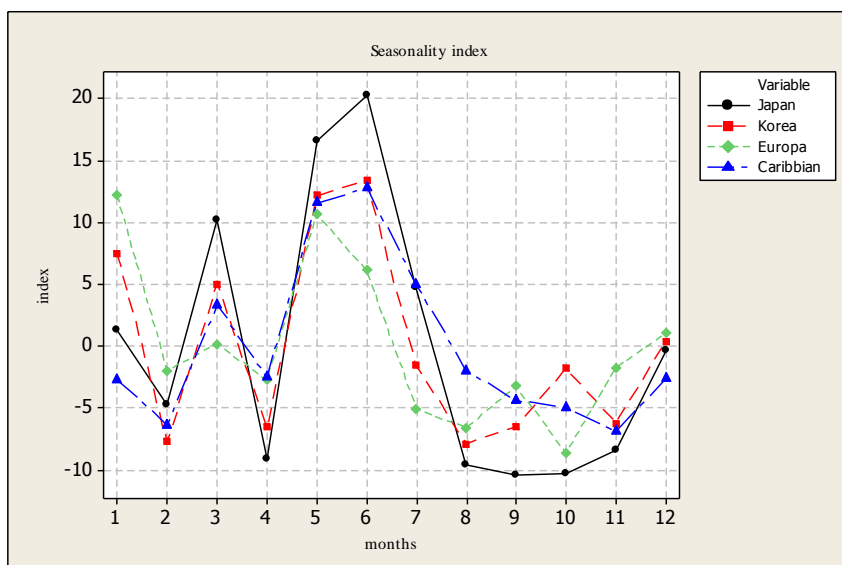
Figure nr. 2 – The monthly indexes of the seasonality

As they could notice the freight rates of the vlcc ships score seasonality indexes between months to the four destinations of relative similar forms, but of different intensities. The most important variations of the seasonality indexes are scored at the freight rates for the oil transport from Persian Gulf, Japan which is in a variation interval of 30.77, comparing with 21.27 for the Republic of Korea , 20.81for Europe, and 19.69 for the Caribbean and the East zone of the North America. This more emphasized seasonality for the transport of the oil products to Japan is one of the factories which determines the rates expressed by WS to be bigger, comparing with the other destinations. An assessment of these different intensities of the seasonality indexes of the freight rates for the four destinations at this category of specialized ships for the oil transport could be done with figures nr. 3 and nr. 4.

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In figure nr. 3 they are represented the histograms and curves of normal distribution for each destination, and in figure nr. 4 they are the seasonality indexes, the percentage of variation on each month, the data after the seasonal period, as well as the residue after the seasonal period.
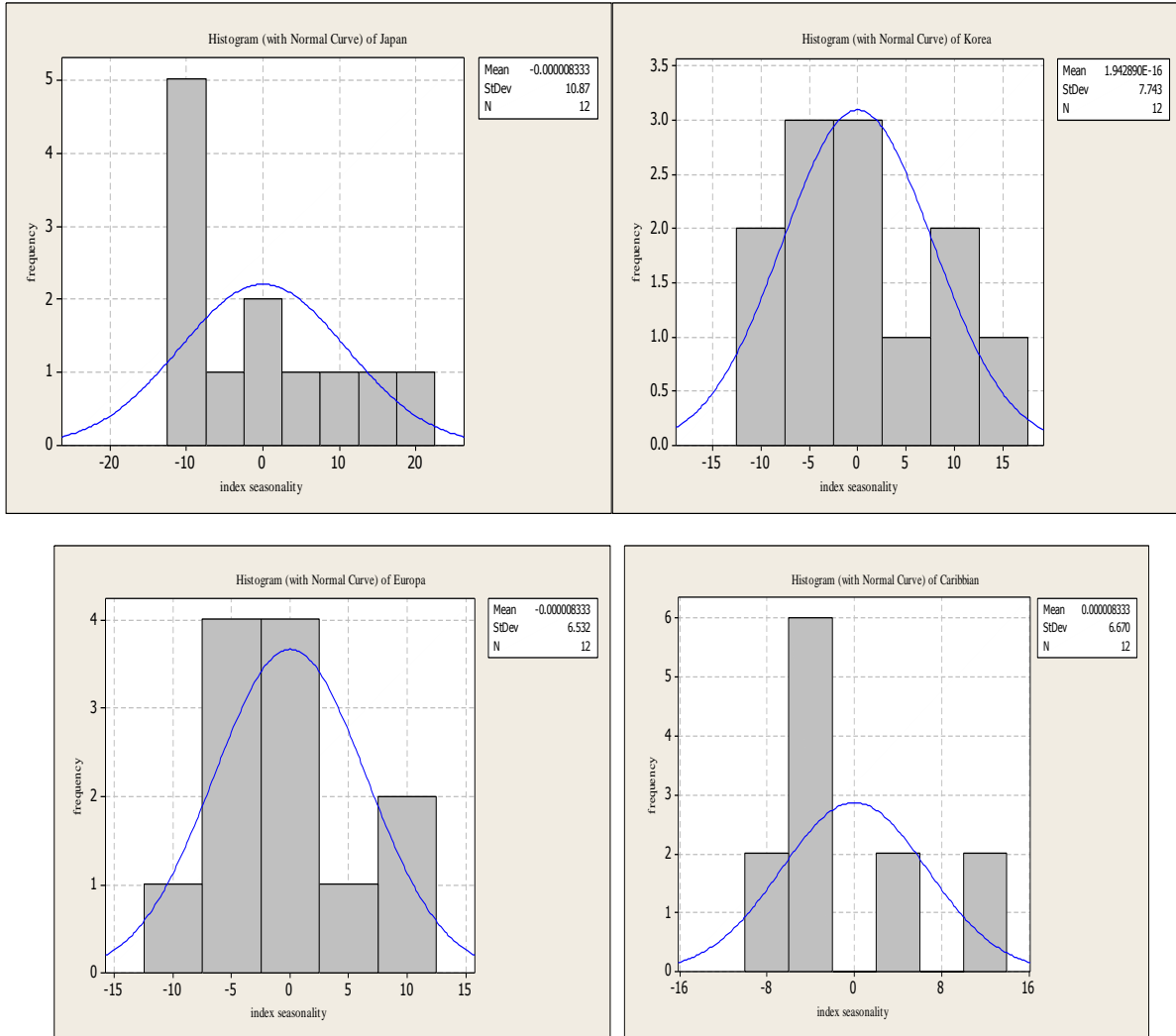

Figure nr. 3 – The histograms and the normal curves of the indexes of Seasonality for the freight rates at the "vlcc" ships
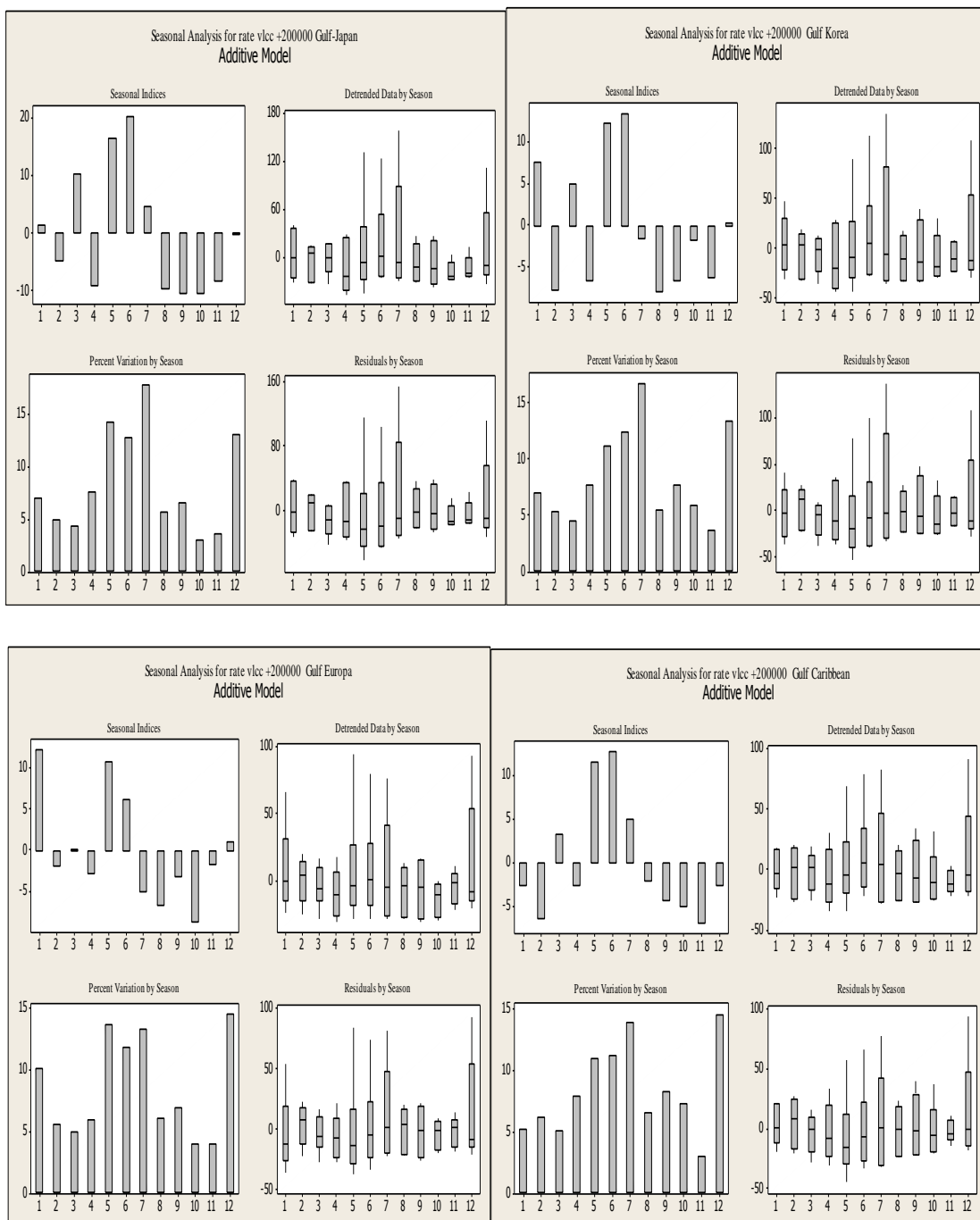
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Figure nr. 4 – The analyse of the seasonality for the freight at the "vlcc" ships

Conclusions

The analysis on the evolution of the fright rates for the oil products transport from the Persian Gulf to the four major destinations of consumption reveals a series of common aspects as: the tendency of

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reduction of the transport rates, as a direct consequence of the present world crisis. Nevertheless, they reveal a strong seasonality of the freight rates for all destinations, the most powerful turnovers being scored in the oil transport for Japan. It is the consequence of the processing capacities of this product in this country, which is known as one without resources.

The strong seasonality in the oil transport induces the scored levels of the freight in Japan to be bigger in the trading of the transport services.

A leading role on the market of the transport services are being held by the oil transport services with ships with great dimensions, as "vlcc" and "ulcc" ones; this is due to the differences between the resources of production and those of consumption, as they could be seen in the table nr. 3.

We appreciate that the present research could be succeeded in a scientific manner due to the use of the informatics Minitab products, which is proven useful in the investigation of the social and economic phenomena.

Table nr. 3 - Oil major consumers and producers, 2010[1]
(world market share in percentages)

World oil production		World oil consumption	
Western Asia	31	Asia Pacific	31
Transition Economies	17	North America	25
North America	13	Europe	17
Africa	12	Latin America	9
Latin America	12	Western Asia	9
Asia Pacific	10	Transition Economies	5
Europe	5	Africa	4

References

- **F.N.Hopkins**, *Business and Law for the Shipmaster*, Editura Brown, Son &Ferguson,Ltd, Glasgow, 1993
- **Martin Stopford**, *Maritime Economics*, 3rd edition, EdituraRoutledge, London, 2009
- UCTAD Review of Maritime Transport.

[1]U.C.T.A.D. REVIEW OF MARITIME TRANSPORT, 2011

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