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THE IMPACT OF GLOBAL ECONOMIC CRISIS ON THE DRY BULK SHIPPING INDUSTRY

Present global economic crisis had a strong impact on the maritime market. A drastic decline of freight rates and time charter rates was almost immediately visible in the tramp shipping segment. Irrespectively of the fact that global crisis caused fuel prices to drop as well, many shipping companies found themselves in a very unenviable position, struggling to cover their costs.

The authors have analysed the breakeven point for the dry bulk Handymax ship given in the time charter as well as a breakeven point for the same size ship engaged in grain transport from the US Gulf towards Japan. The results demonstrate that in time of crisis the breakeven point in time chartering is achieved by 15 years old Handymax ship that has never changed the owner. In other circumstances the operating results would be different, probably ending up in a loss. Freight rates in the analysed voyage charter, although significantly lower than before the crisis, still permitted the owner to operate with profit. Recent recovery, both in the freight rates as well as in the time charter rates, gives hope for the shipping industry as a whole.

Key words: *maritime market crisis, breakeven point calculation, time charter, voyage charter, seaborne grain transport*

1. INTRODUCTION

The demand for maritime transport is derived primarily from the needs of industrial processes, therefore conjectures and depressions in the shipping sector are typically motivated by the industrial cycles and global economic situation. These cycles are hardly predictable, and many shipping companies are forced to leave the business in the time of recession.

After years of a considerable positive economical situation worldwide, and a considerable trade growth driven mainly by the economic growth of developing countries, the economies worldwide are now confronting the economical crisis. The economic development has stagnated in many countries, and so has the trade. Knowing that around 80% of the world trade is carried out by maritime transport, it was to be expected that many shipping companies will experience trouble.

The goal of the paper is to present the impact of global economic crisis on the dry bulk market. This is a big and important shipping segment that can be crumbled into sub segments with regards to the vessels' size, cargo type or way of employment. The recent enormous fall in freight rates is a challenge to the ship-owners, ship-operators and analysts of the maritime market. The crucial task is to succeed in employing the ship in a way to achieve the breakeven point, or at least to cover the variable operating costs in a short time. This motivated the authors to analyze the breakeven point in the time charter employment of a ship as well as the spot marker employment of a Handymax ship transporting grain on the route from the US Gulf towards Japan.

2. THE IMPACT OF GLOBAL ECONOMIC CRISIS ON THE DRY BULK MARKET IN THE LAST 18 MONTHS

The collapse in global demand is brought on by the biggest economic recession in decades. It is estimated that exports will decrease by roughly 9% in terms of volume [27]. The global economic crisis affected the maritime sector almost immediately, which is actually not a surprising fact, having in mind that more than 80% of the global trade is performed by sea [31]. These impacts are demonstrated in lower freight rates, lower daily charter rates, dropped prices for new and second hand ships, declined steel price and raising number of ships being either laid up or demolished [30] as can be seen in the following tables (1 to 3) and in Figure 1.

Rates for dry bulk cargoes are leading indicators of the economic activity. Baltic dry Index, managed by the Baltic Exchange in London, measures dry bulk shipping rates on the main routes across the world every day. It usually holds that when trade is flourishing then the freight rates are rising, and charters tend to charter a vessel for longer periods, as further rises are anticipated, and vice versa, when the demand is low and the rates are expected to fall, then charters tend to charter for shorter periods. A long-term charter carries on the risk of a volatile market, therefore the rates of long-term charters are lower than those of a short-term charter, when the market is good. The other way round is when the market is in depression and the amelioration is expected.

***Table 1**: Time charter rates in the last 18 months [in US$]*

LSE Issue	Dec. 07		Jan .08		Mar. 08		Sep. 08		Nov. 08	
Period	mid Nov		mid Dec		mid Feb		mid Aug		mid Oct	
TC period	12m	36m	12m	36m	12m	36m	12m	36m	12m	36m
Handysize	41,000	28,000	40,000	27,000	35,000	24,000	38,000	27,000	16,000	13,000
Handymax	65,000	48,000	62,000	45,000	70,000	37,000	55,000	42,000	19,000	18,000
Panamax	80,000	62,000	76,000	58,000	57,000	50,000	70,000	56,000	30,000	28,000
Capesize	165,000	105,000	170,000	100,000	145,000	100,000	150,000	112,000	40,000	35,000

LSE issue	Dec. 08		Feb .09		Mar. 09		Apr. 09		June 09	
Period	mid Nov		mid Jan		mid Feb		mid Mar		mid May	
TC period	12m	36m	12m	36m	12m	36m	12m	36m	12m	36m
Handysize	8,000	8,000	7,000	9,000	9,000	10,000	10,000	10,000	10,500	10,000
Handymax	9,000	12,000	9,000	11,000	10,500	13,000	12,500	12,500	12,500	13,000
Panamax	14,000	17,000	11,500	12,500	14,000	17,000	15,000	14,000	16,000	14,500
Capesize	18,000	19,000	22,500	23,000	29,500	27,000	29,000	21,000	26,500	23,000

Source: [4-13]
Note: 12m – 12 months, 36m – 36 months

The reflection of global exports on time charter rates in maritime transport is clear. The primary vertical axis indicates the time charter rate per day in US $, while the secondary vertical axis indicates the world exports starting from 2007Q4.

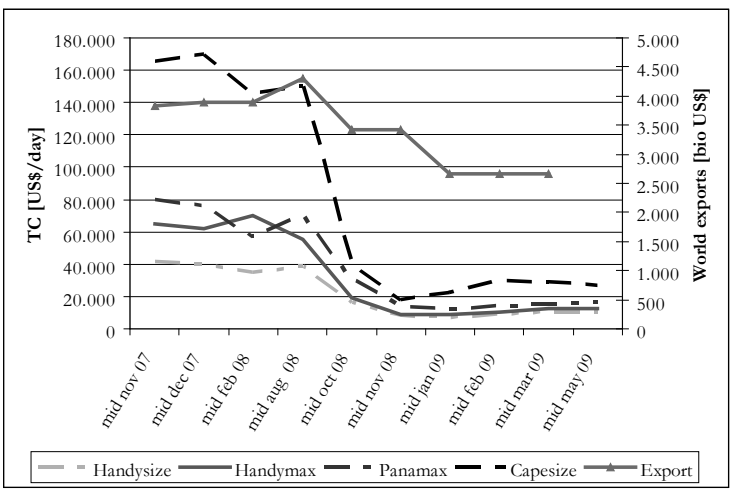

***Figure 1:** The relation between time charter rates and global export*

Source: Authors, based on [3-13, 27]
Note: The information for exports is given on the quarterly basis

Table 2: *Freight rates trends in the last 18months [in US$/tonne]*

LSE issue period	Dec 07	Jan 08	Mar 08	Sep 08	Nov 08	Dec 08	Feb 09	Mar 09	Apr 09	Jun 09
	Oct	Nov	Jan	July	Sep	Oct	Dec	Jan	Feb	Apr
55.000 DWT USG - Japan (grain)	115.0	120.0	100.0	121.0	75.0	50.0	24.5	25.0	43.0	41.5
150.000 DWT S.AF.- NWE (coal)	48.9	45.2	27.0	42.0	28.0	12.6	5.1	7.5	10.5	7.5
70.000 DWT HR – NWE (coal)	45.0	41.0	32.0	38.0	20.0	13.3	6.5	6.5	10.5	9.9
160.000 DWT Brazil – NWE (iron ore)	46.4	47	25.0	45.0	21.0	11.6	5.1	8.0	12.5	8.8
160.000 DWT Brazil – Far East (iron ore)	85.2	84.2	61.0	86.0	47.0	22.5	9.0	16.5	22.5	18.2
160.000 DWT Aus. – Japan (coal)	38.5	38	32.0	36.0	18.0	12.5	5.8	6.5	10.5	8.2

Source: [4-13]

Bottom time charter rates and freight rates are usually cost-based calculations, while the upper limit results from the market situation. It can be seen that charter rates went up while the exports were still dropping. The last data indicated that the market is still not steady. This dissonance might have happened because of a decreased active fleet. In May 2009 there was almost 4.5% of dry bulk fleet idle [13] and the number of ships being sent to demolition has increased for about 10 times comparing to the pre-crisis period [3-13]. The excess supply makes the steel price dropping. Although, steel is an important constituent in shipbuilding, the prices of new ships are more market-driven. During good market, the prices of a 5 year-old or even 10-year old ship surpass the prices of similar new buildings. In the time of crisis, the vessels' prices generally drop and the situation turns up side down, as the delivery time becomes unimportant. These relations can be seen in Table 3.

Table 3: *Prices of new and 5-year old ships [in million US$]*

LSE issue	Jan.08		Mar.08		Sep.08		Nov.08		Dec.08		Feb.09		Mar.09		Apr.09		June 09	
period	Dec		Feb		Aug		Oct		Nov		Jan		Feb		Mar		May	
	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O	N	O
Handysize	39	34	39	34	40	58	40	58	36	58	32	22	30	22	30	21	28	20
Handymax	48	71,5	48	75,5	48	71	48	71	45	35	39	24	36	24	33	24	33	25
Panamax	54	90	55	90	55	90	53	90	49	29,5	43	28	40	29	38	29	36	29
Capesize	97	150	97	150	98	160	98	160	90	68	84	44	80	49	75	49	72	49

Source: [4-13]

Note: N – new ship, S – old ships

3. GRAIN PRODUCTION AND TRADE

Knowing that the term grain includes wheat, coarse grains (such as corn, barley, oats, rye and sorghum), as well as rice and oil seeds extracted from different crops (like soyabeans or cottonseeds), it is easy to understand that the importance of grain in everyday life is vast. The global grain harvest has nearly tripled since 1961, during the time when the world population doubled resulting in an increased amount of grain produced per person grew [32]. However, grain is not only the source of food for humans and feeding stuff for animals (for example it takes in average five kilograms of grain to produce one kilogram of meat [15]), but can also be a (controversial) source in the production of bio-fuels; People consume a little less than half (48%) of the world's grain directly, roughly one third (35%) is used as livestock feed, and a growing share, 17%, is used to make ethanol and other fuels [32]. The total world grain production of the recent years can be seen from Table 4.

Table 4: *Total world grain production [in million tonnes]*

Total grains*	2006/07	2007/08	2008/09 (est)	2009/10 (f'cast)
Production	1,584	1,687	1,781	1,715
Trade**	222	239	239	231
Consumption	1,626	1,680	1,722	1,731
Closing stocks	277	284	343	327
of which 5 major exporters***	99	92	117	96

Source: [4]

Note: * wheat & coarse grains; ** IGS grains trade year – July/June; *** Argentina, Australia, Canada, EU, USA

Grain production is a very seasonally affected industry, and harvest can unpredictably fluctuate significantly over the years. This makes the planning of seaborne grain trade and transportation very difficult, therefore the shippers recon greatly on the spot market. Spot market employment is a risky situation not only for shippers, but also for ship-owners, as no one can guarantee the ship's employment. However, if the ship is employed, than higher revenues are usually gained than if she was employed in a time charter.

The maritime transportation of grain demands careful planning of the voyage as some additional actions need to be taken into consideration in order to make the voyage safe. Besides obtaining the ship, it is necessary to organize carefully the entire loading and unloading process, which demands numerous barges or car boxes when there is no direct silos-ship connection[1]. This is the

[1] This connection is called *marine leg*, and was developed in 1842 by Joseph Dart

fundamental reason why Handymax or at maximum Panamax ships are mostly used in seaborne grain trade. However, once traditional agricultural bulk cargo is nowadays increasingly being transported in containers (when available), avoiding in this way higher freight rates in the spot bulk market and reflecting the greater economies of scale available to containerships [31]. Freight rates in the bulk sector surged for about a year beginning in mid-2007, and available capacity of bulk vessels was limited, so grain shippers began to switch to container transportation. Furthermore, they liked the service they received from rail and liner companies [22].

The international distribution of grains and oilseeds are influenced by many factors. These include agricultural production, consumption, population growth and income changes, as well as agricultural and trade policies. In addition, the relative costs of production, interior shipping, handling and ocean shipping costs have an impact on trade and competitiveness.

4. SEABORNE GRAIN TRADE

Grain is one of the dry bulk cargoes, and although things are changing, it is still mainly transported in the tramp market by dry bulk cargo ships. These ships can be employed in three different ways, as can be seen in Table 2.

Table 5: *Contractual agreements and their main characteristics*

Type	Bareboat	Time charter	Voyage charter*
Master	Appointed and directed by a charter	Appointed by the owner, directed by a charter	Appointed and directed by the owner
Revenue	Depends on hire rate and duration	Depends on hire rate and duration	Depends on the quantity of cargo and rate
• Costs (paid by the owner)	• Capital (depreciation, interests) • Brokerage Operating costs	• Capital (depreciation, interests) • Brokerage • Crew costs • Stores • Maintenance & repairs • Insurance • Administration Voyage costs	• Capital (depreciation, interests) • Brokerage • Crew costs • Stores • Maintenance & repairs • Insurance • Administration • Port charges • Light dues • Stewadoring charges • Cleaning holds • Cargo claims • Bunker fuel • Canal fees

Source: [30]

Note: * variations of a voyage charter are a consecutive voyage charter and the contract of affreightment; both have same characteristics regarding costs, revenue and master appointment as voyage charter

For the transportation of agricultural cargoes, the ships are often engaged in a voyage charter that is on spot market. Trade of dry bulks reached 5.34 billion tons in 2007, while world seaborne trade of grain[2] alone achieved 1,857 billion of ton-miles in the same year [31]. As can be seen from Table 1, 239 million tonnes of grain is an estimated grain trade volume for the period July 2008 – June 2009. Of course not all of the traded grain is transported by sea, but it also holds that some domestic grain movements are performed by sea as well. World grain shipments are estimated to have grown at a modest rate of 2.4% reaching 302 million tons in 2007. Wheat totalled about 103 million tons, while coarse grains totalled 199 million tons [31].

4.1. US grain production and trade

North America is one of the major grain producing regions in the world. In 2007, US corn production rose to 349 million tonnes. An estimated 62 million tonnes were used to produce ethanol, so this left 308 million tonnes available for the US consumption and export [15], making the USA one of the five most important grain exporters (as seen in Table 4). The main US grain export region is the Mississippi River – the US Gulf Coast region. With the three ports, namely Port of South Louisiana, New Orleans and Baton Rouge, the region is serving as a gateway for nearly 55 to 70 percent of all the US exported corn, soya, and wheat [2].

It seems that global economic crisis has not significantly affected the US grain exports as it can be seen through the comparison with the pre-crisis period (see Figure 2 and Table 6). However, there are many other factors, like altered domestic consumption, weather conditions, global supplies or increased competition that can affect the exports and lower the unit value in time.

[2] Wheat, maize, barley, oats, rye, sorghum and soya beans

Table 6: *US grain exports by the number of sailings and volume*

LSE issue	Period covered	No. of sailings	Volume [mdwt]	Average shipment [tonnes]
Jan 08	Aug 07	29	1,83	63.103
	Sep 07	38	2,53	66.579
Mar 08	Oct 07	38	2,53	66.579
	Nov 07	35	1,88	53.714
Sep 08	Apr 08	38	2,38	62.632
	May 08	40	2,58	64.500
ov 08	Jun 08	38	2,33	61.316
	Jul 08	33	2,06	62.424
Dec 08	Aug 08	37	2,22	60.000
Apr 09	Nov 08	39	2,60	66.667
	Dec 08	30	1,95	65.000
Jun 09	Jan 09	34	2,31	67.941
	Feb 09	32	2,06	64.375

Source: Authors, based on [5-9, 12-13]

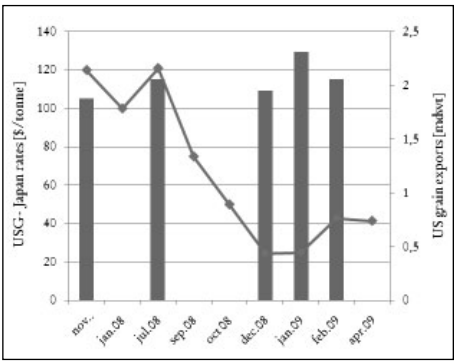

Figure 2: *US grain exports (in mdwt) and freight rates on the route US Gulf – Japan (in US$/tonne)*

Source: Authors, based on [5-9, 12-13]

Note: No data on US grain exports availale for Jan., Sept. and Oct. 08; Not all US grain is exported to Japan, but the majority is, therefore the rate on USG towards Japan is taken as a representative one

In the Figure 1 it was clearly visible that the US grain exports do not depend on the freight rate, but, from Figure 2, it is clear that the freight rate reflects the changes in the fuel price. It holds that the majority of shippers are not affected, at least not in a short period, by the changes of freight rates, as the cargo needs to be transported. This is the case with the grain trade as well. In fact, in the time of a global economic crisis, when unemployment is growing and personal incomes are dropping, the type of purchased food is changing and more rice, cereals and vegetables are needed.

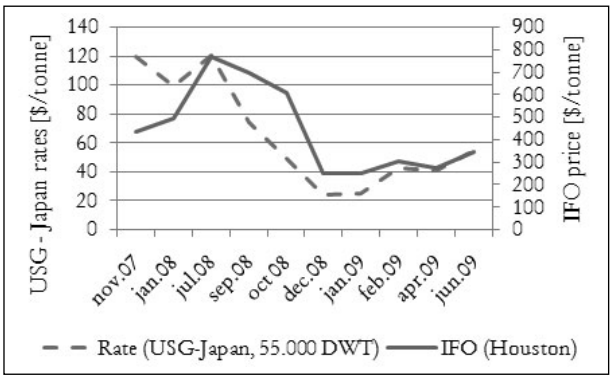

Figure 3: *The relation between IFO price and freight rate on the route US Gulf – Japan*

Source: Authors, based on [5-9, 12-13]

Important structural changes are taking place in the world grain trade that will impact the longer-term competitiveness of countries and regions and ultimately impact the spatial distribution of grain flows [33], but, nevertheless, it is predicted that US grain exports will still grow in the following decades, assuring the US the still dominating position in the world grain trade, as can be seen from Table 7.

Table 7: *US grain shipments by exporting region in relation to global grain imports*

	2001	2005	2010	2015	2020	2025
US East	17,435	18,397	18,842	18,388	18,601	19,501
US Gulf	63,392	67,090	77,209	79,903	83,318	89,330
US West	9,793	9,768	9,746	9,869	9,981	10,180
Total US exports	**90,620**	**95,255**	**105,797**	**108,160**	**111,900**	**119,011**
Total grain imports	**269,364**	**290,988**	**324,147**	**346,119**	**369,621**	**397,131**

Source: Authors, based on [32]

4.2. US trade with Japan

Japan is currently the US's 4th largest goods trading partner with 206 billion US$ in total (both ways) goods trade during 2008. The top US export categories in 2008 were: machinery (7.8 billion US$), optic and medical instruments (6.8 billion US$), aircraft (6.3 billion US$), cereals (corn and wheat at 5.9 billion US$), and electrical machinery (5.2 billion US$) [25].

It is more expensive to grow wheat in Japan than in many other countries, and some analysts say that the Japanese domestic production would crash down if exposed to free market competition. The Japanese, through the government grains agency, import about 5.5 million metric tons of wheat each year. The majority of it, around 3.1 million tons, comes from the US, with Canada supplying 1.5 million tons and Australia about 1.1 million tons [18]. The main discharging ports for grain in Japan are: Kamaishi, Kashima, Kinuura, Toyohashi, Yatsushiro and Kagoshima [19].

The US exports of agricultural products to Japan totalled 13.3 billion US$ in 2008, making Japan their 3rd largest export market for these products (beside Canada and Mexico). The leading categories include: coarse grains (4.1 billion US$), red meats (fresh/chilled/frozen with 1.9 billion US$), wheat (1.6 billion US$) and soya beans (1.4 billion US$) [25].

5. ANALYSIS OF THE GRAIN SPOT MARKET FROM THE US GULF TOWARDS JAPAN

When a ship is employed in a spot market, then the ship-owner or operator has to take into consideration at least the following three groups of costs. These are:

- Capital charges costs including capital amortization (loan interest and loan repayment), depreciation, profit and taxes on profit or tonnage (depending on the ship's registration) and broker's provision,
- Operating costs including crew costs (depending on the number and nationality of the crew), costs of provisions and stores, costs of maintenance and repairs (routine work and drydocking), insurance costs (comprising Hull insurance and P & I premium) and administration costs,
- Voyage costs comprising bunker costs, port charges, canal fees, tugs, pilotage.

The terms of a charter party determine who pays the cargo handling costs as follows [17]:

- Gross terms (Gross); the ship-owner pays for loading and discharge
- Free on board (FOB); the charterer pays for loading
- Free discharge (FD); the charterer pays for discharge
- Free in and out FIO); the charterer pays for loading and discharge

When planning a seaborne voyage, it is thus necessary to be well acquainted with the charter party clauses and their meanings in order to be able to compare the arising costs with the expected revenue. On the spot market, the revenue depends directly on the quantity of loaded cargo and on the offered freight rate.

5.1. The inputs of the calculation

The amount of cargo, in our case the grain, which can be loaded aboard the ship depending on the ship's deadweight capacity, storage volume, cargo characteristics, voyage length (bunker, water and other stores requirements), and the master's ability to do all the necessary calculations accurately and rapidly. For the purpose of this paper, a study on a voyage charter with a 55,000 DWT Handymax dry bulk ship carrying grain from the US Gulf region towards South Japan has been carried out.

In 1994, the cash price for such a ship was about 24 million US$ [30]. The loan with 20% of down payment with an interest rate of 7 % and the paying period of 7 years with half-year repayments is considered as a usual way in the vessels' financing. The operating costs considered in the calculation are 1,732,063 US$ and are retrieved from the Lloyd's shipping economist issued in December 2008, which in the article "Counting the pennies"[28] summarizes the highlights from Moore Stephen's 2007 annual OpCosts report (Table 8).

Table 8: *Age factors of total operating costs*

	1-7 years old	8-15 years old	16-25 years old	Total operating costs in 2007
Handymax bulker	0.90	0.96	1.08	1,804,232

Source: [28]

$$daily\ operating\ costs = \frac{0.96 \times 1{,}804{,}232\ \$}{330\ days} \cong 5{,}249\$ \tag{1}$$

A normal depreciation period for such ships is 20 years, and the depreciation method used is the balanced temporal method with 2 % of salvage value. For the fifteen year-old dry bulk ships, a usual exploitation period is 330 service days per year. The summarized intermediary calculations are presented in Table 9.

$$capital\ recovery\ factor\ (CRF) = \frac{0.035 \times 1.0035^{14}}{1.0035^{14} - 1} \cong 0.091570729 \tag{2a}$$

$$instalment = CRF \times 80\% \times 24{,}000{,}000\$ \cong 1.758.158\$ \tag{2b}$$

$$price\ (loan) = 20\% \times 24{,}000{,}000\$ + 14 \times 1{,}758{,}158\$ = 29{,}414{,}212\$ \tag{2c}$$

$$daily\ depreciaton = \frac{0.98 \times 29{,}414{,}212\$}{20\ years \times 330\ ^{days}/_{year}} = 4{,}368\ ^{\$}/_{day} \tag{2d}$$

$$daily\ fixed\ costs = 5{,}249\$ + 4{,}368\$ = 9{,}616\$ \tag{2e}$$

Table 9: *Daily fixed costs*

Daily depreciation [US$]	4,368
Daily operating costs [US$]	5,249
Daily fixed costs [US$]	**9,616**

Source: Authors

The details of the ship and the analyzed voyage are presented in Table 10.

Table 10: *Ship's details and voyage details*

Handymax bulk carrier	
Deadweight [mt]	55,000
GRT	28,500
Cargo capacity [m^3]	80,655
Speed [knots]	14
IFO consumption at sea [t/day]	35
IFO consumption at sea [t/day]	4
Water consumption [t/day]	8
Distance (Port of South Louisiana – Chiba) [miles]	9,272
Port days	10
Panama canal passage [days]	0,5
Reserve (fuel, water)	25 %

Source: Authors

The Table 11 shows the average stowage factor for various grain types, accompanied by the information on the ship's loading capacity needed in case of the total storage space usage.

Table 11: *Stowage factors for different grain types and the possibility of the model ship to accommodate volumes of different cargoes*

Grain type	SF [Kg/ m^3]	Max volume of cargo aboard [tonnes]	Grain type	SF [Kg/ m^3]	Max volume of cargo aboard [tonnes]
Barley	643.6	51.910	Sorghum	733.7	59.177
Corn	707.9	57.096	Soyabeans	720.8	58.136
Linseed	643.6	51.910	Sunflower seed	360.4	29.068
Millet	733.7	59.177	Wheat, ember durum	785.2	63.330
Oats	514.9	41.529	Wheat, hard winter	798.0	64.363
Peanuts	656.5	52.950	Wheat, northern spring	772.3	62.290
Rice	772.3	62.290	Wheat, soft red	759.4	61.249
Rye	746.6	60.193	Wheat, white	785.2	63.330
Safflower seed	527.7	42.562			

Source: Authors, based on [23] and the selected ship's storage capacity

Note: the listed test weights are average figures based upon information obtained from grain loading ports

$$commercial\ capacity = DWT - (1 + reserve) \times (fuel\ \&\ water\ consumption) =$$
$$= 55{,}000\ mt - 1{,}25 \times \left[\left(\frac{9{,}272\ miles}{24\ h \times 14\ knots} + 0{,}5\ days \right) \times (35\ t + 8\ t) + 10 \times (4\ t + 8\ t) \right] \cong \quad (3)$$
$$\cong 53{,}340 mt$$

It is clear that the analysed ship cannot be full of all the grain types, so given the information that Japan mainly imports heavy grains (like corn, wheat and soyabeans) from the US, it is expected that the commercial capacity will be reached, while some storage space will be left empty. This means that additional precautions need to be taken in order to ensure a safe voyage. To achieve the ship's stability and minimize the cargo movements, it is important to trim and secure (with the bagged grain or other suitable cargo) the grain and to install longitudinal divisions. According to the Grain Loading Manual, available on board a ship, the master or chief officer should determine the heeling moments due to the grain shifts in all reasonable loading conditions. These calculations can affect the economic output of the voyage. At the same time the charter rates for a Handymax ship have been analysed, and the results are shown in Table 13.

5.2. The outputs of the calculation

The voyage charter rates are considered as the best indicators of the market dynamics in tramp shipping. They are influenced by cargo size, commodity type, port dues and canal transit fees, fuel price, as well as by delivery and redelivery regions. The outputs of the calculation are summarized in Table 8. Huge dropdowns in the freight rates, accompanied by fuel price changes caused even greater dropdowns in the profit per day. E.g. in November 2007 the analyzed ship was making a stunning 141,311 US$ per day with the freight rate of 120 $^{US\$}/_{tonne}$ and IFO price of 438 $^{US\$}/_{tonne}$. Only 13 months later the ship-owner who decided to take the risk and employ the ship on the grain spot market was making only 11,813 US$ per day at the freight rate of 24.5 $^{US\$}/_{tonne}$ and IFO price of 254 $^{US\$}/_{tonne}$. Yet, the chance to operate on spot market was a much better solution than to employ the ship in a time charter, at least in short time. In fact, not many companies were able to cover the costs by giving their ships in a time charter by the end of 2008 when the global economic crisis was already striking all around the world, as the average operating costs were in general higher than the offered hire value (see Table 13). Such ships were laid up, and eventually employed on spot market or in a time charter after a certain period of time.

According to the analysis, the ship-owner that succeeded in employing the ship on spot market will make profit even with the low freight rates, but the nominal daily profit will need to be disposed over the longer period to cover the time of an eventual laid up period. However, generally speaking, the time charter option is safer as the ship is usually employed for longer time periods. So the decision on how to employ the ship is a tough one. As can be seen from Tables 12 and 13, the freight rates and time charter rates are in a constant growth in the past couple of months, giving the possibility for more profitable operation for more shipping companies.

Table 12: *Grain voyage charter calculation*

LSE Issue	Jan. 08	Mar. 08	Sept. 08	Nov. 08	Dec. 08	Feb. 09	Mar. 09	Apr. 09	June 09	IGC
Period	Nov. 07	Jan. 08	Jul. 08	Sep. 08	Oct. 08	Dec. 08	Jan. 09	Feb. 09	Apr. 09	Jun. 09
Rate (USG-Japan, 55.000 DWT) [US$/tonne]	120	100	121	75	50	24,5	25	43	41,5	55
TOTAL FIXED COSTS [US$]	366,362	366,362	366,362	366,362	366,362	366,362	366,362	366,362	366,362	366,362
IFO (Houston) [US$/tonne]	438	495	771	698	610	254	252	305	273	347
Fuel costs at sea (day) [US$]	15,330	17,325	26,985	24,430	21,350	8,890	8,820	10,675	9,555	12,145
Fuel costs in port (day) [US$]	1,752	1,980	3,084	2,792	2,440	1,016	1,008	1,220	1,092	1,388
Fuel costs at sea (total) [US$]	430,700	486,750	758,150	686,367	599,833	249,767	247,800	299,917	268,450	341,217
Fuel costs in port (total) [US$]	17,520	19,800	30,840	27,920	24,400	10,160	10,080	12,200	10,920	13,880
TOTAL FUEL COSTS [US$]	448,220	506,550	788,990	714,287	624,233	259,927	257,880	312,117	279,370	355,097
Brokerage (3,75%) [US$]	240,750	200,625	242,756	150,469	100,313	49,153	50,156	86,269	83,259	110,344
Panama canal fee [US$]	97,945	97,945	97,945	97,945	97,945	97,945	97,945	97,945	97,945	97,945
Port dues OUT [US$]	74,100	74,100	74,100	74,100	74,100	74,100	74,100	74,100	74,100	74,100
Port dues IN [US$]	38,554	38,554	38,554	38,554	38,554	38,554	38,554	38,554	38,554	38,554
Pilotage OUT [US$]	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Pilotage IN [US$]	1,730	1,730	1,730	1,730	1,730	1,730	1,730	1,730	1,730	1,730
Tugs OUT [US$]	10,902	10,902	10,902	10,902	10,902	10,902	10,902	10,902	10,902	10,902
Tugs IN [US$]	11,250	11,250	11,250	11,250	11,250	11,250	11,250	11,250	11,250	11,250
TOTAL COSTS [US$]	1,050,163	1,108,493	1,390,933	1,316,230	1,226,176	861,870	859,823	914,060	881,313	957,040
REVENUE [US$]	**6,420,000**	**5,350,000**	**6,473,500**	**4,012,500**	**2,675,000**	**1,310,750**	**1,337,500**	**2,300,500**	**2,220,250**	**2,942,500**
Difference [US$]	**5,369,837**	**4,241,507**	**5,082,567**	**2,696,270**	**1,448,824**	**448,880**	**477,677**	**1,386,440**	**1,338,937**	**1,985,460**
PROFIT PER DAY [US$]	**141,311**	**111,619**	**133,752**	**70,954**	**38,127**	**11,813**	**12,570**	**36,485**	**35,235**	**52,249**

Source: Authors, based on [5--13], [19], [20], [23], [24], [29]

Note: 3 tugs for 2.5h for in and out manoeuvres

Table 13: *Time charter rates*

LSE Issue	Nov. 07	Dec. 07	Jan. 08	Mar. 08	Sept. 08	Nov. 08	Dec. 08	Mar. 09	Apr. 09	June 09
Period	mid Oct. 07	mid Nov. 07	mid Dec. 07	mid Feb. 08	mid Aug. 08	mid Oct. 08	mid Nov. 08	mid Feb. 09	mid Mar. 09	mid May 09
Handymax TC [US$/day]	60,000	65,000	62,000	70,000	55,000	9,000	9,000	10,500	12,500	12,500
Owner's costs [US$/day]	11,867	12,055	11,942	12,242	11,680	9,955	9,955	10,011	10,086	10,086
Relation owner's costs and TC [%]	19.8	18.5	19.3	17.5	21.2	110.6	110.6	95.3	80.7	80.7
Profit [US$/day]	48,133	52,946	50,058	57,758	43,321	-955	-955	489	2,414	2,414

Source: Authors, based on [3-9, 12-13]

6. CONCLUSION

The global economic crisis has significantly influenced the dry bulk market. Time charter rates and freight rates have dropped drastically. Furthermore, these droppings were quicker than the declination of global exports, meaning that at some point the elements of negative expectations arising from the global economic crisis had also the psychological effect on the dry bulk market. The same psychological effect influenced the fuel prices as well.

The calculation of a breakeven point for time charter rates showed that in the segment of the fifteen year-old Handymax ships the numbers turned into loss for a short period. At the same time the freight rates for grain transport in a voyage charter provided positive business results for ship-owners working on the spot market by their own. However, the ship-operators who chartered the vessel under high time charter rates and subsequently employed her in a grain spot market might have had troubles in reaching the breakeven point. From the analysis of the maritime grain trade between the US Gulf and Japan it is quite clear that the declination of the freight rate is impacted by the psychological effects and activities in other maritime sectors, as the transported volume has not changed significantly.

Ships operating under different circumstances have different costs structures, thus it is important to note, that this analysis has been based upon a fifteen year-old Handymay ship that has never changed the owner. However, it gives the basic methodology for the breakeven point calculation in any dry bulk shipping segment.

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Sažetak

UTJECAJ SVJETSKE GOSPODARSKE KRIZE NA PRIJEVOZ SUHOG RASUTOG TERETA

Današnja globalna gospodarska kriza je snažno utjecala na pomorsko tržište. Na tržištu slobodnog brodarstva dolazi do drastičnog pada vozarina i najma broda na određeno vrijeme. Pod utjecajem gospodarske krize smanjile su se cijene goriva, no unatoč tome većina brodara se našla u nezavidnoj situaciji, jer s niskim vozarinama ne mogu pokrivati troškove.

Autorice su u ovome radu analizirale točku pokrića kod najma broda na određeno vrijeme za brodove Handymax veličine i točku pokrića kod vozarina za prijevoz žitarica na relaciji US Gulf – Japan. Rezultati analize pokazuju, da je najam broda na određeno vrijeme za spomenuti tip broda točku pokrića dosegao kod 15 godina starog broda koji je cijelo vrijeme bio u vlasništvu istog brodara. U drugačijim okolnostima poslovni rezultati bi bili drugačiji, u najviše slučajeva rezultirali bi gubitcima. Vozarina analiziranog putovanju, iako drastično umanjena, i dalje brodarima omogućava zaradu. Najnoviji oporavci vozarina i najmova ukazuju na svjetlije dane za cjelokupni pomorski sektor.

Ključne riječi: *kriza pomorskog tržišta, točka pokrića, najam za vrijeme, vozarina za putovanje, pomorski prijevoz žitarica*

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