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2010

Online at <https://mpra.ub.uni-muenchen.de/38100/>
MPRA Paper No. 38100, posted 15 Apr 2012 14:02 UTC

The Impact of the Global Economic Crisis on Non-oil Operations of Ports in Iran

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Abstract

It is generally accepted that the recent economic crisis of 2007-2010 has caused widespread economic recession in different countries. Since the ports and coastal regions are of great importance to economic infrastructure, this study examined the possible impact resulting from such a global economic crisis on the ports in Iran. First, the annual number of berthing vessels of gross tonnage over a thousand tons as well as loading and unloading of non-oil cargoes and containers were extracted from statistical reports of Ports and Maritime Organization. Then an attempt was made to predict the amount of expected non-oil operation by the advanced quantitative statistical methods in Iran's ports. According to the results obtained from comparing predicted and actual statistics, these ports have been affected by the current economic crisis, but after one-year delay.

Key words: Loading/unloading, vessels of gross tonnage over a thousand tons, port performance, gross tonnage, TEU

1. Introduction

The global economic crisis in the late 2007 led to demise of Lehman Brothers' investment bank. As soon as Lehman's bankruptcy, more serious global economic crisis began to emerge. The United States was caught in the outcomes of Lehman's bankruptcy as well. Because of Japan and Europe economic dependence on the United States economy, this crisis easily penetrated deep into these countries and into whole world around and even into Iran. Around 90% of the world's transportation in terms of exchanges and 96% of volume of Iran imports are carried out through marine transportation, with regard to transportation's role as an indispensable basis of all economic planning [1]. This article now tries to discuss the effects and consequences

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of the current economic crisis on operation and performance of Iranian ports in 2008 and 2009.

2. Measuring Port Performance

Indeed the studies analyzing port performance in terms of economic and managerial aspects date back to the 1960s. The early research studies focused on the aspects of costs and payments with regard to the facilities structure and port policy-making system [2-3]. On the other hand, the researchers tended to focus on the role of port infrastructure on economic activities. Therefore, these studies concerning serving port calculates the total number of jobs and costs reduction economically [4-5].

Over the next years, general instructions associated with port economics were provided [7-9] and was increasingly being supported by other studies covering new aspects of the productivity and the efficient factors determining these aspects [10-16]. Then, it was resumed with discussion on investment [17] and planning [18-20] under the topic of the analytical efforts to determine the optimal infrastructures using queuing theory and dynamic planning. Also some tendencies emerged in the aspects of port privatization [21-22], increased competition [23-27], port selection criteria [28] and the other similar cases. The studies of the cost estimation and the scale advantage provided deep knowledge about ports and determining the estimated cost of these ports [29-31].

3. Materials and Methods

3.1 Data Collection Methods

The methods used for collection of the primary data including electronic bulletins, books, articles published in newspapers and magazines as well as reliable economic websites and official statistics of the related organizations were briefly explained as follow.

In the present study, concepts, definitions and methods were widely taken from authentic academic books and scientific articles published in the valid electronic library resources. All facts and figures relating to maritime activities have been provided through official statistical information derived from Port and Maritime

Organization (PMO), Central Bank of the Islamic Republic of Iran, and non-governmental organizations in this country.

3.2 Data Analysis Methods

This project intended to employ a quantitative approach to statistical methods and to take advantage of the tables and figures in order to display the data more clearly. Also, the main objective was to use SPSS software to draw the tables and figures, perform statistical operations, and the analysis task.

The figures on port performance up to 2007 were directly entered into SPSS software (the nearest time in terms of changes made to different ports in Iran). Considering the key performance indicators, the main data during the years of 2008-2009 was predicted. Comparing the figures and the actual statistics, the changes to the levels, the differences between the expectations and the actual levels, the researcher in interpreted the results in-depth from the studies carried on discussion and conclusion.

3.3 Data Analysis

3.3.1 Loading and Unloading Non-oil Goods

In this section, after entering the amount loading /unloading goods in all Iran's port in 2007, the amount of loading /unloading goods in terms of tonnage over the years of 2008 to 2009 was predicted according to ARIMA method (Fig. 1):

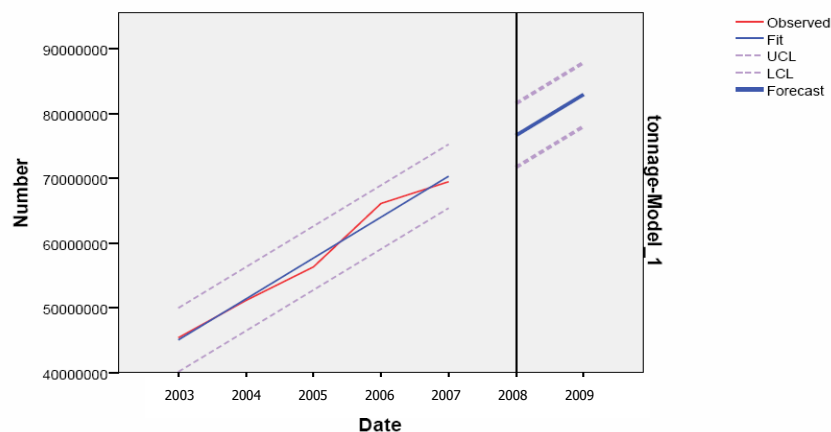


Fig. 1: Estimated Amount of Loading/Unloading Non-oil Goods

In figure 1, horizontal axis represents time, and the vertical axis represents the number of loading and unloading non-oil goods of ports in Iran. Also, the observed line in the diagram shows the actual tonnage data of loading/unloading goods of ports until 2007. The fit line drew on the line of data amount represents the expected amount of loading/unloading goods -forecast line- in Iran's ports and two dotted lines above and below the forecast line indicate respectively limit up and limit down to ensure the predictions. The equation of the forecast line is as follows:

$$Y = 6321580 X + 38713455 \quad (1)$$

In Table 1, the input data into SPSS, actual tonnage was loaded and unloaded up to 2007 - as well as the obtained data were demonstrated as shown in the different columns of "predicted tonnage", "limit up", and "limit down".

Table 1: The actual statistics taken from Port and Maritime Organization's statistics and the researcher's obtained predictions

Year	Real tonnage of loading/unloading	Predicted tonnage of loading/unloading	limit up	limit down
2003	45362851	45035035	499965602	40104467
2004	751114717	51356615	56287183	46426048
2005	756313701	57678195	62608762	52747627
2006	63595729	63999775	68930343	59309208
2007	66707933	70321355	75251922	65390787
2008	73232937	76642935	81573503	71712368
2009	71299898	82964515	87895082	78033947

The following table (Table 2) indicates the percentage of actual and predicted changes compared to 2007:

Table 2: Comparison of Actual and Expected Change Compared with 2007

	2008	Direction of change	2009	Direction of change
Percentage of actual changes compared to 2007	9.8	increase	6.9	increase
Expected percentage of changes compared to 2007	14.9	increase	24.3	increase

3.3.2 Berthed Vessels

In this section, the total number of the annual input amount (vessels over 1000 ton non-oil) to Iran's ports up to 2007 was entered into SPSS and the total number of the input vessels into ports was predicted during 2008 and 2009 by Holt's forecasting methods (Figure 2):

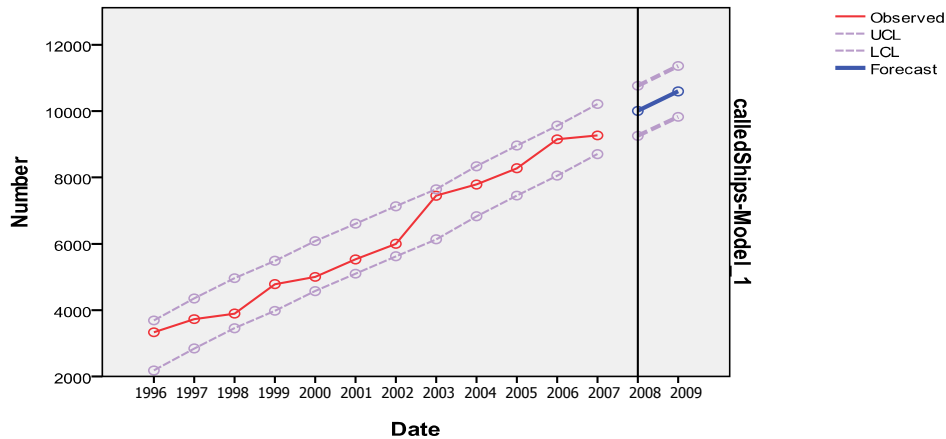


Fig.2: The annual number of vessels entering the ports and predicted values for 2008 and 2009

Based on the above table, the horizontal axis represents time and vertical axis represents the number of the input vessels of net tonnage over 1000 tons into the ports over 1996 to 2009. The observed line indicates the number of input vessels into Iran's ports over a specific period and the forecast line indicates the predicted amount over 2007 to 2008 and finally the two dotted lines represent limit up and down of the forecast line. Here, determining the subordinate equation of the forecast line is almost impossible. However, regarding actual figures and statistics taken from SPSS, the following table presents the results obtained (Table 3):

Table 3: The actual statistics of input vessels taken from PMO statistics

Year	Number of actual input vessels	Number of predicted input vessels	limit up	limit down
1996	3334	2938	3691	2184
1997	3732	3599	4353	2846
1998	3898	4211	4964	3457
1999	4784	4736	5490	3983
2000	5005	5331	6084	4577
2001	5530	5854	6607	5100
2002	6000	6377	7131	5624
2003	7450	6890	7644	6137
2004	7787	7584	8337	6830

2005	8276	8208	8962	7455
2006	9152	8807	9561	8054
2007	9266	9459	10213	8706
2008	8999	10008	10761	9254
2009	6829	10593	11361	9826

The following table indicates the percentage of actual and predicted changes compared to 2007 (Table 4):

Table 4: Comparison of Actual and Expected Change Compared with 2007

	2008	Direction of change	2009	Direction of change
Percentage of actual changes compared to 2007	2.9	decrease	26.3	decrease
Expected percentage of changes compared to 2007	8	increase	14.3	increase

3.4 Loading and Unloading Containers

At the end of this section, in order to predict 2007 and 2008 statistics, the information concerning the annual number of loading/unloading containers was entered into SPSS software in terms of TEU. Here, ARIMA method was used to predict the figures (Figure 3):

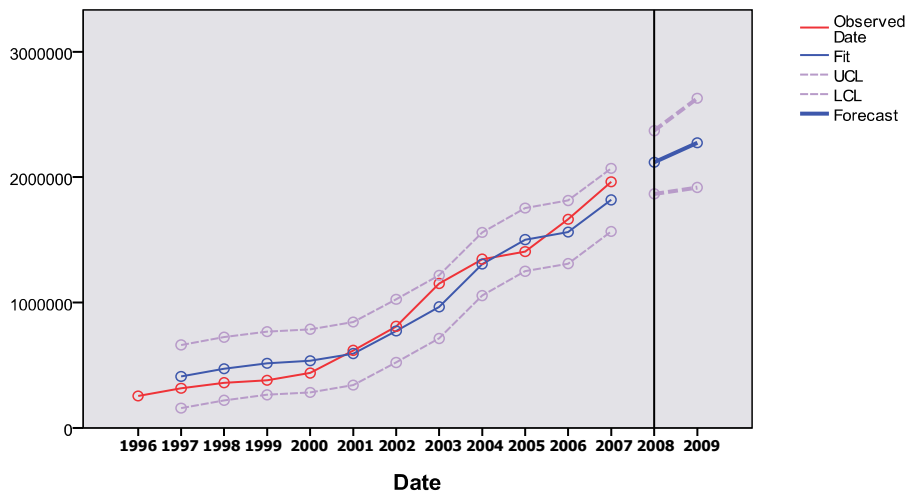


Fig. 3: Actual and Expected Number of Loading/Unloading Containers

As it was attested by the information Figure 3, horizontal axis represents time and vertical axis represents the number of loading/unloading containers in Iran's ports. Regarding the actual data as well as the outcome data reports, the observed line

indicates the actual data until 2007, the fit line indicates predictions and expectations, and finally the upper and lower dotted line indicate the limit up and down. The results are currently presented in the following table (Table 5):

Table 5: Port and Maritime Organization statistics

Year	Actual number of loading/unloading TEU	Number of predicted TEU	limit up	limit down
1996	254696	0	0	0
1997	316384	410007	661781	158233
1998	360162	471695	723469	219921
1999	379801	515473	767247	263699
2000	437341	535112	786886	283338
2001	618223	592652	844426	340878
2002	809905	773534	1025308	521760
2003	1151989	965216	1216990	713442
2004	1346137	1307300	1559074	1055526
2005	1406558	1501448	1753222	1249674
2006	1663639	1561869	1813643	1310095
2007	1963113	1818950	2070724	1567176
2008	2198556	2118424	18666500	1866650
2009	2611527	2273734	2370198	1917672

The following table indicated the percentage of actual and predicted changes compared to 2007 (Table 6):

Table 6: Comparison of Actual and Expected Change Compared with 2007

	2008	Direction of change	2009	Direction of change
Percentage of actual changes compared to 2007	12	increase	33	increase
Expected percentage of changes compared to 2007	7.9	increase	15.82	increase

4. Results and Discussion

While the actual figures showed 9.8 percent growth, the growth of loading and unloading of non-oil goods in Iran's ports was estimated about 14.9% in 2008 and this constituted 5.1% drop compared to the expected level and therefore no significant change took place. However, according to Table 8.4, the amount of loading/unloading of non-oil goods fell to 17.4% in 2009 and indeed this figure was impressive in contrary to the predicted value.

Addressing the vessels of tonnage over 1000 tons, the number of input vessels into the ports suffered 2.9 % drop in 2008, 10.9 percent lower than the predicted percent (8 percent growth), which was considered a significant number. In 2008, however, despite the predicted 14.3 growth, the figures suggested 26.3 % drop and these were completely in line with expectations. It was understood that the input number of vessels into the ports was about 40.61% lower than the predicted number defining a long recession though not very damaging in attracting the attention of other vessels over 1000 net ton.

While the prediction reports represented 7.9% growth, the loading/unloading containers experienced annual growth of about 12 % in 2008 as if the actual number was 4.1% more than the predicted number, yet it showed no significant progress. Although the container activities grew by 33%, the predicted growth was about 15.82 % and this would imply that the actual growth was 17.8% more than predicted growth and accordingly it was considered a significant growth during economic recession.

5. Conclusion

In the final analysis, the finding indicated that the non-oil operations of Iran's ports were rapidly affected by the global economical crisis of 2007 and, as a result of this crisis, the growing trend of the three variables stopped or even dropped after a year. The studies showed that the first year of crisis was quiet for the ports and no significant changes occurred in loading/unloading of berthing vessels and container operations, however, in the second year, the amount of loading/unloading non-oil goods as well as the number of input were considerably reduced. In contrary to these two variables, the number of container operations not only reduced, it significantly increased. Although the economical crisis instantly affected on the amount of loading/unloading non-oil goods, the number of input vessels was affected by the current crisis after one year delay. In other words, since Iran's interferred demand has less influenced by the reduced global demand, the delay will be more than a year.

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