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Important Role of Maritime Shipping in the Economy and Domestic Production (Case Study: Bandar Anzali)

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Abstract

Transportation plays a very important role in the process of economic growth and development, but it is also affected by this process and viewed as an industrial one, which can always help the growth and fertility of the potential of the community and increase profitability by shifting the load and the passenger. This economic priority is seen more within long distances. This study was conducted to examine role of maritime trade on economy of Iran. The economic variables defined in this research comprised per capita GDP (gross domestic production), GDP and business freedom index. Statistical population consisted of experts working in Bandar Anzali Customs. Data of this study (175 members) were collected through questionnaire. Data analysis was done through Structural Equation Modeling (SEM). Results indicated direct and significant effect of economic variables on maritime trade. GDP was the most substantial economic variable affecting maritime trade. Finally, some practical suggestions were proposed.

Keywords: Maritime Trade, Per Capita GDP, GDP

Introduction

It is essential for those who work in maritime and port transportation system to become familiar with shipping lines around the world. For instance, managers of shipping companies should identify competitors and their policies and strategies in today's competitive market; it is also crucial for them to know other shipping line regarding cooperation and collaborative actions like ship capacity and so on (Zarat Dakheli Parast, 2013). World trade and consequently shipping transport leads to ports' development and promotion. Political events and technical advances have changed the structure of world economy, organization and community fundamentally and continuously. The evolution caused by these changes has had direct effect on transportation and ports' activities.

Nowadays, more than 90% of world trade is done through maritime shipping, because this kind of transportation have some pros like low price, transporting a mass volume and weight of goods, rapid and safe transportation.

About 25 thousand billion tons is averagely transported by maritime shipping. Maritime transportation plays a vital role in foreign trade, in particular in world's transcontinental trade. Hence, there would not be any product import and export as the basis for modern world trade if there were not maritime transportation. Port is the main loop within maritime transportation that is the place for products entry and exit.

Ports are national strategic assets of every country all around the world. Few countries are capable of developing and promoting ports in favor of market and customers based on the modern technology in order to provide a suitable and efficient position not only for themselves but also for stakeholders in world competitive market. Moreover, efficient and active ports not only can contribute to economic diversification and exit from single-product economy of Iran due to fragile dependence on the oil, but also play a vital role in reducing price of products; hence, ports are intangible national assets that affect price of domestic products within two ways:

- Effect of price of raw materials, appliances, machineries, manufactured or semi-finished materials imported to the country in order to be used in production process or domestic service providing.
- Effect of cost of inventory, transportation, damages, etc. of manufactured goods for export.

Vadadi (2013) carried out a study entitled "future and situation of maritime transportation and ports" to show how the available data play the role of conceptual concepts to develop theories and attitudes toward future analysis and foresight. Moreover, data can generate required reasons for future planning.

Iran's ports in Caspian Sea, Oman Sea and Persian Gulf can transport about 160 million tons cargo within coming 10 years so they can provide beneficial services to owners of goods and customers. About 95% imports and 85% exports of Iran undergone through ports. Therefore, it is required to develop ports of the country as communicational gates regarding sea development considering the large volume of product import and export. Iran has more than 5800km coastal line taking into account islands so there is a high maritime transportation potential. Also, strategic situation of country in goods transit reveals the role of naval fleet in transportation development. Iran, as the world trade crossroad, is located in path of commercial corridors of North-South, East-West and Central Asia. In this sense, Iran can play a crucial role in providing goods transit-based services from Asia to Europe and vice versa; Iran also can transit goods to Persian Gulf states and Central Asia since this country is located at the center of commercial corridors. This opportunity has made policy makers to see transit issue as a substitute for oil incomes (Ghafari, 2014).

Saeedi et al. (2011) carried out a study under the title of "role of marine and port service in container ships marketing (Case Study: Shahid Rajaee Port Complex)". Average growth of container trade estimated to 5.7% up to the end of 2010. According to estimations, it is expected that share of Asia in containerized goods export reaches to 53% from 46%. Shahid Rajaee Port Complex is the largest Iran's container port covering 90% of total container operations and 60% of non-oil operations of Iran's ports.

Method

This study was conducted to examine role of maritime trade in economy of Iran. For this purpose, theoretical studies began after finalizing the project then the collected data were analyzed. The process was done through following steps:

- Study of research literature and background
- Designing the questionnaire
- Examining the validity and reliability
- Evaluating and testing hypotheses
- Proposing solution

This was an applied research in terms of objective conducted to test hypotheses and gain requiring knowledge to develop e-commerce process. This was descriptive-survey study in terms of method.
The variables defined in this research included
Dependent variable: maritime trade
Independent variables: GDP, per capital GDP, business freedom index
Statistical population of this study comprised employees working in Bandar Anzali Custom.
In this research, sample size was calculated after designing questionnaires considering number of questions using $5q<n<15q$ formula in which, q is number of questions, and n is sample size

$q=25 \qquad 125 \leq n \leq 375$

Sample size obtained to 175.
Scientific texts and references as well as questionnaire were applied instruments.
To examine reliability of questionnaire, one-step pretest was implemented. Cronbach calculation formula was as follows:

$$Ra = j/j\text{-}1(1- (\Sigma Sj2)/s2)$$

Where,
j=number of subsets of questionnaire's questions
Sj2=variance of score of each subset
S2: total variance
The obtained reliability from Cronbach's alpha was reliable for questionnaires (12 questionnaires) that had been distributed within pretest step; more information about Cronbach's alpha are indicated in following tables.

Table 1. Cronbach's alpha of questions

Reliability statistics	
Cronbach's Alpha	**N of Items**
0.764	25

Cronbach's alpha of variables

Variable	**N of items**	**Cronbach's Alpha**
GDP	7	0.804
Per capita GDP	7	0.780
Business freedom	7	0.852
Maritime trade	4	0.792

Data obtained from inferential and SEM methods were used to analyze data due to existence of mediating role in case of hypothesis testing. Multivariate linear regression analysis is used to predict the linear relation between independent and dependent variables. The problem of regression analysis was only possible prediction of direct effect of each independent variable on dependent variable without possibility to identify indirect effect independent variables on dependent variable. In this case, the conceptual and theoretical model tested in this research was designed based on the relationships between independent variables.

To solve this problem, path analysis was employed. Therefore, we generalized path analysis that was developed by Sewall Wright in 1934 for first time; the multivariate regression method is in relation with causal models.

Research Hypotheses includes:

Hypothesis 1: GDP had significant effect on maritime trade in Iran.

Hypothesis 2: per capital GDP had significant effect on maritime trade in Iran.

Hypothesis 3: business freedom index had significant effect on maritime trade in Iran.

The conceptual model of study was designed based on the expressed hypotheses.

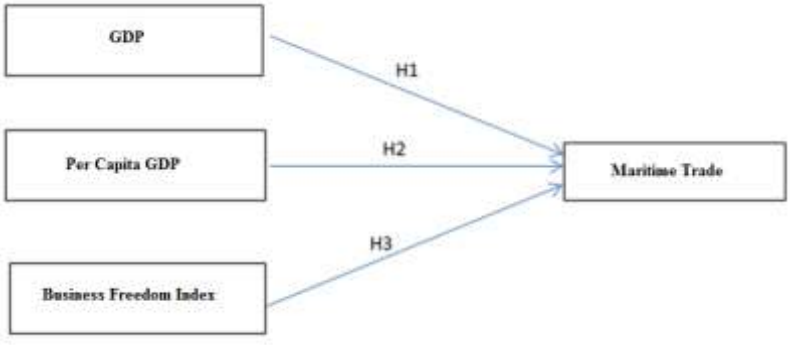


Figure 1. research model

Analysis of Results

1- Structural Model

To test normality of society distribution and selecting between parametric and non-parametric tests, Kolmogorov-Smirnov test was used and results showed normal distribution of studied society.
Table 2 indicates data normalization.

Table 2. Test value and significance level of Kolmogorov-Smirnov test for variables

Evaluated factor	Test value	Sig.	Result
Maritime trade	1.558	0.114	Normal
GDP	1.294	0.157	Normal
Per capita GDP	1.326	0.163	Normal
Business freedom index	1.302	0.172	Normal

1-1- Confirmatory factor analysis of research variables

Before entering to hypothesis testing steps and conceptual models, correctness of models measuring independent and dependent variables should be examined. Hence, measurement models for these variables have been described herein. This process was by first-order confirmatory factor analysis. CFA is one of oldest statistical methods used to examine relationship between latent variables (obtained factors) and observed variables (items) indicating measurement model (Biren, 1994).
Diagram of model at standard mode is illustrated in figure 2:

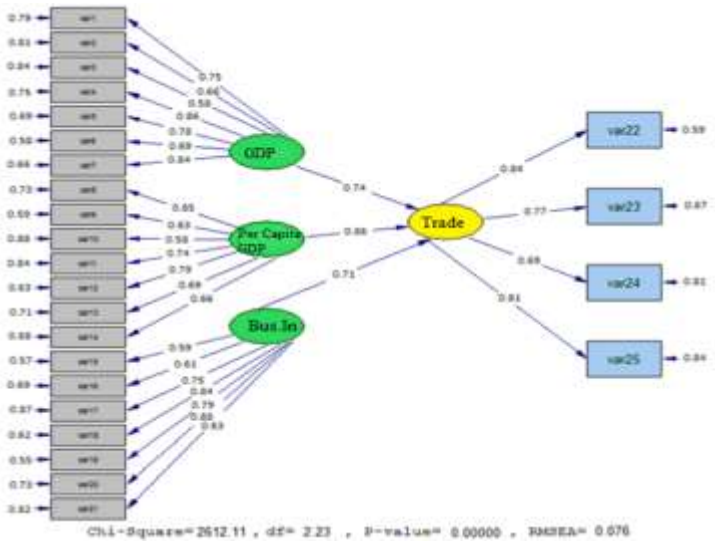


Figure 2. Research model at standard mode

As it is seen in figure 2, all of data were above 0.5; therefore, loading factors were confirmed.

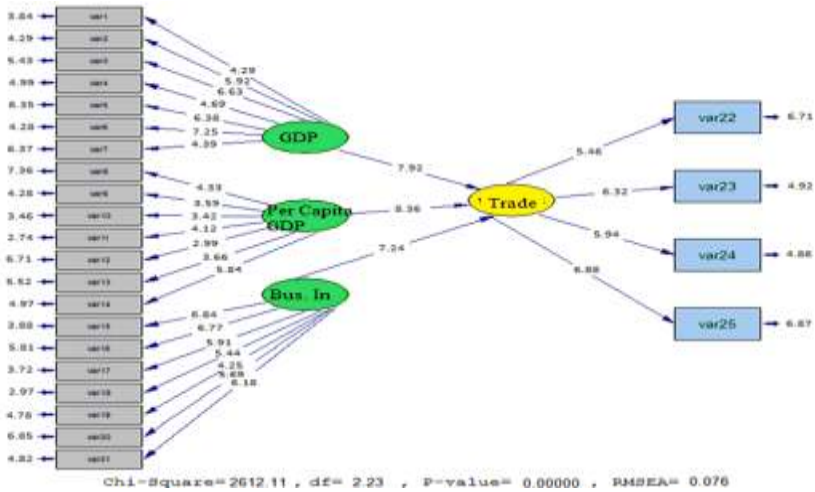


Figure 3. Research model at significance mode

If t value is above 1.96 or below -1.96, hypothesis will be confirmed and the relationship will be significant. Results of model quality have been indicated in table below:

Table 3. Quality of model in confirmatory factor analysis

Row	Model fit indexes	Index	Dimension	Optimal level	Result
1	Chi-square	X2/df	2.23	<3	Confirmed
2	Root mean square error of approximation	RMSEA	0.076	<0.5	Good fit
3	root mean square residual	RMR	0.052	Approximate to 0	Very good
4	Normed fit index	NFI	0.89	<0.9	Very good
5	Non-normed fit index	NNFI	0.96	About 1	Very good
6	Comparative fit index	CFI	0.95	>0.9	Very good
7	Relative fit index	RFI	0.94	>0.9	Very good
8	Incremental Fit Index	IFI	0.97	>0.9	Very good
9	Goodness of fit index	GFI	0.92	>0.9	Very good
10	Adjusted goodness of fit index	AGFI	0.91	>0.9	Very good

According to table 3, positive results showed optimal quality of model.

2-1- Path Analysis

Path analysis of research variables is implemented in this section. First, the mentioned model is illustrated.

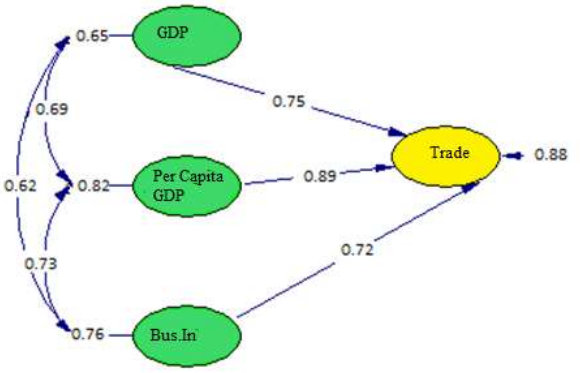


Figure 4. Path Analysis

According to figure 3, path coefficients obtained above 0.5 so there was positive relationship between research variables.

2- Testing hypotheses

Results of hypothesis testing based on SEM are indicated is table 4.

Table 4. Results of hypotheses testing

Hypothesis	t value	Path coefficient (β)
GDP has significant effect on maritime trade in Iran.	7.92	0.74
Per capita GDP has significant effect on maritime trade in Iran.	8.36	0.86
Business freedom index has significant effect on maritime trade in Iran.	7.24	0.71

Hypothesis 1: GDP has significant effect on maritime trade in Iran.

To confirm or reject hypothesis 1, significance coefficient (t value) was used; if t value is higher than 1.96 or lower than -1.96, hypothesis will be confirmed and relationship will be significant. According to the

obtained t value above 1.96; hypothesis 1 was confirmed. In other words, GDP has effect on maritime trade in Iran.
The conducted statistical calculations are demonstrated in table 5.

Table 5. Calculations related to hypothesis 1

t value	Path coefffcient (β)	Determination coefficient (R2)
7.92	0.74	0.71

Hypothesis 2: Per capita GDP has significant effect on maritime trade in Iran.
To confirm or reject hypothesis 2, significance coefficient (t value) was used; if t value is higher than 1.96 or lower than -1.96, hypothesis will be confirmed and relationship will be significant. According to the obtained t value above 1.96; hypothesis 2 was confirmed. In other words, per capita GDP has effect on maritime trade in Iran.
The conducted statistical calculations are demonstrated in table 6.

Table 6. Calculations related to hypothesis 2

t value	Path coefffcient (β)	Determination coefficient (R2)
8.36	0.86	0.79

Hypothesis 3: business freedom index has significant effect on maritime trade in Iran.
To confirm or reject hypothesis 3, significance coefficient (t value) was used; if t value is higher than 1.96 or lower than -1.96, hypothesis will be confirmed and relationship will be significant. According to the obtained t value above 1.96; hypothesis 3 was confirmed. In other words, business freedom index has effect on maritime trade in Iran.
The conducted statistical calculations are demonstrated in table 7.

Table 7. Calculations related to hypothesis 3

t value	Path coefffcient (β)	Determination coefficient (R2)
7.24	0.71	0.68

Conclusion
Results obtained from hypotheses testing based on SEM are indicated in table 8.

Table 8. Results of hypotheses testing

Hypothesis	t value	Path coefficient (β)	Determination coefficient (R2)	Result
GDP has significant effect on maritime trade in Iran.	7.92	0.74	0.71	Confirmed
Per capita GDP has significant effect on	8.36	0.86	0.79	Confirmed

maritime trade in Iran.				
Business freedom index has significant effect on maritime trade in Iran.	7.24	0.71	0.68	Confirmed

Determination coefficient related to effect of GDP on maritime trade obtained to 0.71 indicating that GDP could predict 71% of variances in maritime trade. Determination coefficient related to effect of per capita GDP on maritime trade obtained to 0.79 indicating that per capita GDP could predict 79% of variances in maritime trade. Determination coefficient related to effect of business freedom index on maritime trade obtained to 0.68 indicating that business freedom index could predict 68% of variances in maritime trade. Maritime shipping industry plays a vital role in developing international trade and globalization trend. More that 905 of world trade (goods import and export) are done through seas and oceans using ships and vessels. According to predictions proposed by international organizations, the upcoming years will experience slower global economic growth besides global trade compared to 2015. China's economy is under the pressure and this means lower growth of demand than supply. However, world trade will grow with a rate about 2.5%. Therefore, it is expected that maritime shipping industry will grow with a mild rate. Maritime shipping is an industry matched with world cycle. This industry will grow during economic boom periods and will stop developing during stagnation years.

Iran is a strategic country in context of logistic and this strategic position has been expanded due to accessibility to extensive transportation system (rail, aerial, marine, and road) and free waters having commercial ports in south and north of country. Development of logistic centers in ports can contribute to new services and increased function of port with more attraction for customers leading to gradual improvement and advance in competitive situation of port; in other words, there will be change is functions and costs of ports making the as logistic platforms instead of being only a product wharf creating benefit for national and regional economy. On the other hand, this protects the position of country in transportation network and sustainable trade providing field for value added creation and sea-oriented economic development.

In this case, following executive solutions are proposed to benefit from potential advantages of ports:

- Developing infrastructures and superstructures
- Reforming port's structure
- Promoting human capitals

In field of developing infrastructures and superstructures, following options should be taken into account:

- Developing and creating suitable port infrastructures like docks, access channels, enclosures, inland ports accessibilities, port entrance and exit doors
- Developing urban infrastructures like airports, access ways to port, railway, hotels, recreational centers, telecommunication and IT
- Modern port equipping, strong and centralized software
- Strengthening inland distribution and transportation networks in terms of volume and efficiency
- Facilitating in creation of industrial and manufacturing centers in port
- Reinforcing feeder network and supporting it by government to construct port
- Applying preferable tariff system and liberalizing private sector in this context

- Reforming financial and operational rules and regulations to support transship and transit
- Making cooperation between relevant organizations like custom, railway, police force and so on
- Creating facilities for privet investment and encouraging this sector to invest in port

According to statistics of demand and supply in maritime shipping industry and goods trade (oil, gas, containers, dry and wet bulk cargos) and growth rate of international import and export- that form demand side of Iran's maritime shipping industry-, loading rate have been increasing during three past decades (since 1980) and developing countries has been playing a crucial role in this field. In this sense, ships used to anchor in these countries for cargo loading in past decades and loading rate was high but rates of loading and unloading became equal in 2013 and this indicate industrial growth. Moreover, share of Asian countries is a considerable in loaded and unloaded tonnage.

In terms of supply side of this industry, the main indicators including number of vessels, recorded commercial tonnage, frequency of orders and ship manufacturing, number and tonnage of constructed ships, share of different kinds of finished vessels (tanker, bulk, container, general cargo and so on) that support this industry.

The most important port of Iran that covers 39% of import and export and about 90% of container operations is Shahid Rajaee Port in Bandar Abbas; Imam Khomeinin Port in Bushehr is at second rank. Situation of loading and unloading based on the types of cargos and oil or non-oil products indicate the increasing rate of loading and unloading and more development and growth is expected in this process after removal of sanctions.

According to comparative study of financial statements of maritime shipping companies in Iran considering the situation of assets, debts, equity, income of services, price, gross profit, operational and bureaucratic costs, operational profit, net profit, financial costs and some of significant financial ratios in companies indicate that maritime transportation industry face various complexities in terms of tariffs' rate and contracts. Accordingly, there is ambiguity in predicting profit situation of these companies. It is recommended for executive managers working in associated firms to remove such complexities and ambiguities.

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