

# **THE MODELING OF THE IMPACT OF LOGISTICS ON THE EFFECTIVENESS OF FOREIGN ECONOMIC ACTIVITY OF ODESSA REGION (ON THE BASIS OF THE STATE ENTERPRISE “ODESSA COMMERCIAL SEA PORT”)**

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## **1. Introduction**

The search for new and effective mechanisms of globalization and ways to mobilize resources in the regions for further dynamic social and economic development in the medium and long term perspective is the number one task nowadays for world economies.

However, many experts and scientists from different countries turn attention to find adequate economic and mathematical models to the given reality, able to reflect and address the urgent problems of improving competitiveness and diversification of regional economies.

During last decade the development of models that describe the impact on the economy of various enterprises, including opportunities and mechanisms to improve the efficiency of foreign economic activity in the region through the use of certain instruments became necessary.

## **2. Actuality of the research subject**

The modern public policy and planning to stimulate economic growth, provide modernization and restructuring of the economy must be carried out using market instruments, which provide increasing of competitiveness of individual companies, industries and the economy in general. One such tool is the creation and development of clusters – the integration of geographically and sectoral associations.

For the Odessa region such unions should be the seaports maritime clusters. International experience has proven the viability of cluster policy and confirmed the competitiveness of clusters, which can reduce costs due to the support and development of several businesses. Thus, geographical proximity provides cheapness and quick delivery time for business products and services required, and the concentration of firms within the same region contributes to the development of communications among them.

Cluster and its corresponding cluster policy as part of public policy are the instruments of medium- and long-term planning, and most importantly – an effective instrument for improving the efficiency of foreign economic activity of regions.

Nowadays the urgent problem is the availability and implementation of these instruments in Ukraine. Creating clusters today is the way to the development, the great possibility of reducing the budget deficit and at the same time filling revenue of the budget and creating competitive products.

A separate industry for application of cluster policy is the transport industry, including the activities of maritime transport and ports of Ukraine.

Development and implementation of an adequate to the economic realities seaport maritime cluster models for these ports is an essential condition for development of region. Such clusters have become points of economic growth.

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### 3. Main goal

In this research paper, the main task is to describe and disclose the impact of the Odessa port on the efficiency of foreign economic activity in the region using the created model.

### 4. Degree of problem development

Clusters and cluster policy are sufficiently widely covered in the works and publications of western and local scientists – Ukrainian and Russian experts. In particular, these issues are revealed in scientific publications and achievements of leading Western cluster specialists, among them such prominent authors like Michael E. Porter – the founder of a cluster concept, Peter W. de Langen, Dimitrios V. Liridis, Vassilios K. Zagkas, Maria Angel Diaz, Maria Esteban Soledad – world experts in the area of sea port clusters, Thomas Andersson, Sylvia Schwaag-Serger, and also Ukrainian and Russian scientists, among whom we distinguish such authors as A. Stepanov, A. Titov, L. Rybina, S. Sokolenko, J. Kovaleva., S. Gritsenko, S. Bludova, L. Pryshchyepa etc.

Many works of both Ukrainian and foreign scholars and scientists are dedicated nowadays to the issue of modeling of economic processes, as well as problems of foreign economic activity.

Among those who considered the problems mentioned in the article are such scholars such as already mentioned Michael E. Porter, as well as Lance Taylor, H. Amman, P. Dixon, B. Parmenter, and local scientists V. Makarov, A. Bakhtyzin, S. Sulakshyn, T. Pankova, N. Jankowski, L. Sukhova and others.

It should be noted that the issue of efficiency of foreign economic activity of individual industrial enterprises is covered quite extensively. But still up to now there was no research that could examine in detail the mechanisms and models for improving the efficiency of foreign economic activity in the region.

### 5. “Region-Cluster” model

For the calculation of efficiency of foreign economic activity of the Odessa region is suggested to use a “Region-Cluster” model.

For the first time for this purpose the methods of economic-mathematical modeling are applied.

Pursuing the structure of this model which is offered, there are three levels, which are determined by the groups of factors and special indexes. This model allowed us to form the unique method of calculation of efficiency of foreign economic activity of region through Odessa port [1].

Our method includes such steps:

1. For providing comparableness of data of various years we will correct the monetary indicators on the accumulated size of deflator. The indexes of the prices of the year 2009 should be taken (previous year to the research).

Calculations should be taken after a formula 1.

$$D_i^A = D_{i+1} \times D_{i+1}^A, \quad (1)$$

Where,

$D_{i+1}$  – deflator for the next year after i-d year;

$D_{i+1}^A$  – the accumulated size of deflator for the the next year after i-d year;

$D_n^A = 1$  – prices of 2009 year.

2. The integral indexes should be applied to objectively characterize all categories of efficiency of second level of the offered “Region-Cluster” model: investments in the fixed assets in millions of hryvnas (UAH, national currency), unemployment rate in Odessa region after the methodology of ILO in percents, turnover of goods of Odessa port in thousands of tones.
3. The real foreign trade turnover in the prices of 2009 should be calculated.
4. Next step is to calculate the correlation of the real commodity turnover in the *i*-year (in millions UAH) to turnover of goods of *i*-year (in thousand of tones). Value, which is got for turnover of goods for 2009 year we take as a standard, at the same time the calculation index is equal 1 (one).
5. Then we should calculate the turnover of goods in “conditional units of commodity”, taking into account the indexes of calculations, that represent high-quality changes in a model, which take place in the structure of loads that are transported through Odessa port.

A model was tested after the Fisher’s test which confirmed its adequacy.

The compared data for this model resulted in Table 1. Source: Data of the State Statistics Committee of Ukraine of 1999-2009 years is used [2; 3; 4; 5].

**Tab. 1. Compared data in the prices of 2009 year in the “Region-Cluster” model\***

<b>Years</b>	<b>GRP real per capita in UAH in the prices of 2009</b>	<b>Investments in the fixed assets of Odessa Port in millions of UAH in the prices of 2009</b>	<b>Turnover of goods in Odessa port in conditional units of commodity</b>	<b>Unemployment rate in a region after the methodology of ILO, %</b>
<b>1999</b>	13 025,87	3 553	11762	12,6
<b>2000</b>	13 474,63	4 733	22294	12,6
<b>2001</b>	14 258,54	7 894	19147	10,3
<b>2002</b>	14 750,14	7 930	25072	6,9
<b>2003</b>	15 626,04	9 313	29339	5,7
<b>2004</b>	17 184,53	12 561	34845	7,4
<b>2005</b>	16 927,52	10 122	30570	5,9
<b>2006</b>	17 756,20	12 555	30888	5,6
<b>2007</b>	19 278,71	14 640	33101	4,8
<b>2008</b>	19 400,09	13 483	36035	4,9
<b>2009</b>	17 451,13	6 426	28008	5,1

From this model the direct dependence between a gross regional product per capita and investments in the fixed assets and turnover of goods of port is obvious.

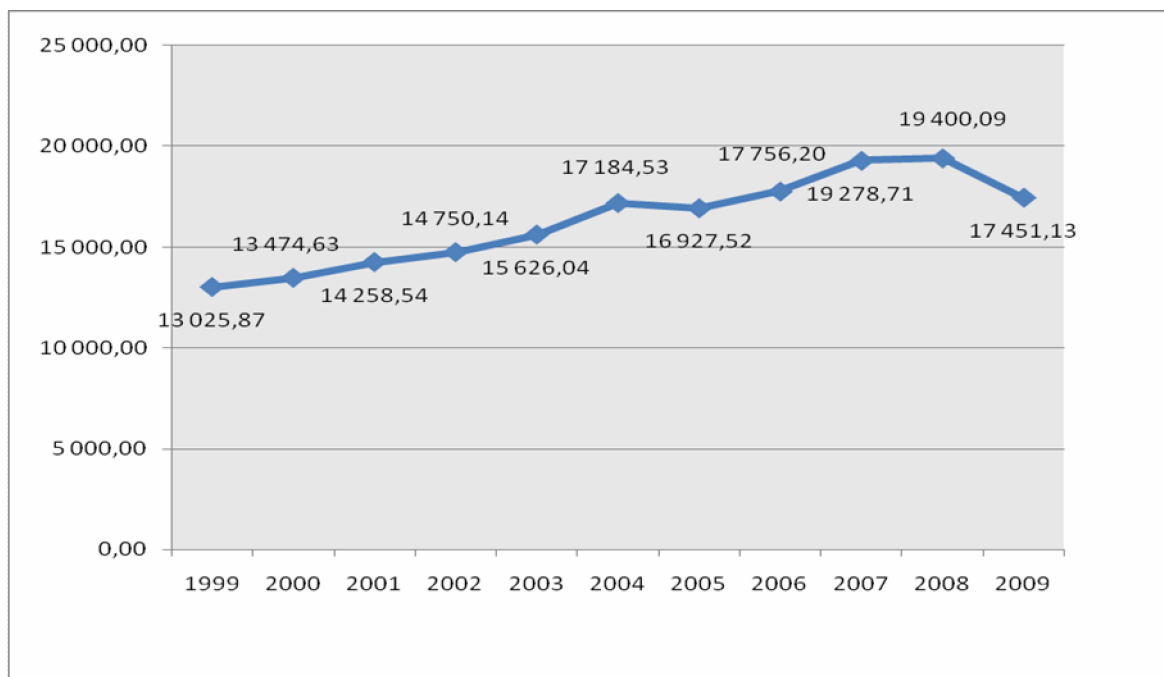
Thus there is a reverse dependence between a gross regional product per capita and unemployment rate in the Odessa region.

In accordance with the abovementioned model and conducted calculations we can assert that increase of investments in the fixed assets in the Odessa region on 1 million UAH through port results in growth of gross regional product per capita on 23 copecks (1 UAH = 100 copecks).

Multiplying unemployment on 1 % brings to the loss of 292 UAH over 24 copecks of gross regional product per capita.

Multiplying turnover of goods with a nowadays commodity structure per 1 million tones will result in multiplying of gross regional product per capita on 7 copecks.

Dynamics of gross regional product of the Odessa region (efficiency of foreign economic activity) per capita in the prices of 2009 year for 1999-2009 years is represented on Figure 1.



**Fig. 1. The dynamics of GRP of the Odessa region (efficiency of foreign economic activity) per capita in the costs of 2009 for 1999-2009 years in UAH**

## **6. A conditional situation**

We considered a conditional situation, when from the Odessa region the Odessa port is withdrawn and how these changes will influence on efficiency of foreign economic activity of Odessa region.

At first, certainly, Odessa region will lose all workers of Odessa port which is 0,32 % vid a common amount of economic active population after the methodology of ILO at the Odessa region as of 2009. That means an unemployment rate will grow at once on 0,32% at a current unemployment rate 5, 1%. That unemployment rate thus will be 5, 42%.

Secondly, investments in the fixed assets of port will diminish accordingly.

In 2009 year the volume of the attracted investments in the Odessa region was 6,426 billions of UAH. If from the Odessa region Odessa Port will be withdrawn, the volume of investments in the fixed assets of region fall down to 5, 9346 billions of UAH [6].

Thirdly, turnover of goods of Odessa port will be absent and will make 0 conditional units of commodity in a model.

That in the case of conditional situation, when from the Odessa region Odessa port will be withdrawn the index of gross regional product per capita will be 14206, 16 UAH in the prices of

2009.

That means that general efficiency of foreign economic activity of the Odessa region, if we compare it with the current, at once will fall down on 19%.

The provided analysis confirms of the last importance of Odessa port for an economy and foreign economic activity of the Odessa region and country on the whole.

## **7. Conclusions**

Consequently, it enables to talk about possibilities of multiplying influence of port and increase efficiency of foreign economic activity of the Odessa region by means of creation of Maritime Seaport Cluster.

The results and impact of modeling technique presented can be used at sea ports, logistics and other industrial enterprises, as well as other sea port clusters.

This model is universal, so it could be used to design and build sea port clusters and other industry clusters in Ukraine and abroad as well.

## **References**

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## **Summary**

The cluster-concept is frequently used to analyse the competitive advantage of countries. Countries are specialized in a few clusters of economic activities. The competitiveness of a cluster depends on the behavior of firms in the cluster and the interaction between these firms and the whole sectors. The article considers model of influence of the logistical enterprise on efficiency of foreign economic activity of the Odessa region. In the given article the model is connected with the State enterprise “Odessa Commercial Sea port”. The received results can be used on seaports, at logistical and other branch enterprises, as well as for creation of the marine seaport clusters. Based on the received data some conclusions are made about the effectiveness of these mechanisms for the Ukrainian transitive economy in the globalization era. The model mentioned in this article is universal; therefore it can be used for calculations on increase of efficiency of foreign economic activity of regions.

**Keywords:** foreign economic activity; modeling of economic processes; the State Enterprise “Odessa Commercial Sea Port”; “Region-Cluster ” model; the Maritime Seaport Cluster.

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