Estimation of Sustainable Development of the Far Eastern Regions of Russia in Terms of Advancing the Implementation of the Growth Strategy

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Abstract: The article studies the problems of sustainable economic development of the Far Eastern regions of Russia, implementing the economic growth strategy. In the course of the regression analysis, multifactor models were formed and the key factors, stimulating the economic growth of the regions, were identified. The models show the influence of the factor of capital assets and investments, on the formation of which the increase in industrial production depends. In an insignificant part of the regions, favorable growth factors are socio-demographic capital and exports. Starting from 2015, the economic growth of the regions have been ensured from the positive effect from the implementation of the development strategy ahead of the others in comparison with the average Russian level. In the course of the research, the type of development of the regions, in which the advanced development zones function, was determined, based on the analysis of the interrelations between the indicators of the stability of the region's economy with the generalized indicators of residents of the advanced development zones. For four Far Eastern regions (Yakutia, Kamchatka, Khabarovsk Territory, Chukotka Autonomous District), an intensive type of development is characteristic, which contributes to the growth of GRP by increasing sales by enterprises, entering the advanced development zones, effective use of investments, and resources. The results of the research can be used to improve the mechanism for managing the factors of sustainable development of the regions of the Russian Far East.

1 INTRODUCTION

The stability of the region's economic system is characterized by dynamic transformations, that form the vector of long-term economic growth. The priority task for the development of the Russian economy is the strategy of stimulating the economic growth of the Far Eastern regions, which have a high resource potential, a favorable geographical location, high competitive advantages, but lagging behind in terms of their development. Since 2015, the advanced development zones have been functioning on the territory of the macroregion, which solve the problems of creating a comfortable living environment for the population and modernizing less-developed industries. Economic growth is facilitated by the inflow of private and budgetary investments,

cluster regional policy, and a set of tools to support the business climate.

The concept of "sustainability of the economic system" and "sustainable development" is quite multifaceted, but, as a rule, it is based on an effective combination of production, technological and human capital in a socially-oriented policy, rational use of natural resources, and environmental protection. The growth of the gross regional product does not guarantee the stability of the economy, a balance of the components of the system and a fixation on meeting the needs of the population, living in the territory, are required.

The evolutionary concept of stability presupposes such an equilibrium position of a stationary point, at which a change in the set of parameters does not change the stability of the entire system as a whole (Balakina and Oydup, 2012). The level of stability of

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the system is formed as a combination of internal and external factors, that stimulate or restrain the equilibrium state of the region's economy. The stability of the region's economy is ensured through ecologization, national security, equitable resource management, and competitive advantages of socio-economic development.

By sustainable development of the territorial-economical system, we mean the equilibrium state of the production, investment, socio-demographic, technical and technological, ecological spheres, when positive changes in a particular sphere do not restrain the development of any other sphere, but contribute to the achievement of a general economic equilibrium of the entire system of the region.

In the scientific literature, there are a number of indicators and models for estimating the stability of economic systems. To rate the sustainable development of the territory, indicators, developed by the UN (human capital index) and the World Bank (an indicator of net savings), are used. In the methods of economists, a set of socio-ecological indicators of stability is used: socio-demographic, financial and economic, technological, natural and ecological (Bezdenezhnykh et. al., 2015), institutional, geographic, demographic determinants (Moral-Benito, 2009), economic, social and ecological factors (Rahman and Velayutham, 2020), exports (Kahouli and Kadhraoui, 2012). For regions, where territories with a special economic status operate, an important development factor is the development of institutions, that provide access to funding sources, reducing administrative barriers, and receiving tax incentives (Pankova and Yakimova, 2020).

Economists (Hall, Jones, 1999, Bennett, 2019, Zubarevich, 2017) distinguish infrastructural and transport, and logistics factors as catalysts for the growth of regional economies and opportunities for developing resource and production capacity. In models of sustainable growth, national income, the level of accumulation of human and physical capital, the growth in the population of the territory, the share of the economically active population, and life expectancy are used as determinants (Rahman and Velayutham, 2020). Sustainable development of the social sphere is achieved thanks to social equality, the satisfaction of the population with living in the territory, social infrastructure, and opportunities to receive social benefits at a quality level. The ecological component of sustainable development reflects the efficient use of natural resources, preservation of natural potential, prevention of ecosystem dysfunctions, and loss of biodiversity.

Equilibrium is achieved by the stable development of natural capital and lean technologies.

On the brink of the economic development of the region, an important task is to maintain static and dynamic stability, not only in the short term but also in the medium and long term. Innovations and investments are catalysts for long-term stability and economic growth, employment and a high level of value added (Goridko and Nizhegorodtsev, 2018). The rational allocation of investments in projects, implemented in the region, guarantees an increase in the gross income of the region, and the creation of transport and logistics facilities, housing construction creates a comfortable living environment for the population of the region.

2 MATERIALS AND METHODS

Equilibrium growth is observed in the case of a one-time growth in all components of sustainable development: investment, economic, production, socio-demographic, ecological. Regional growth is determined by the growth in sales of manufacturing industry products, investments in capital assets, growth in fixed assets of enterprises, exports, and socio-demographic factors. The standard model is as follows:

$$GRD = b_0 + b_1 Q + b_2 I + b_3 F + b_4 E - \quad (1)$$
$$+ b_6 Kac + b_7 K + b_8 B$$

where GRD is GRP per head, Q is the volume of shipped products of manufacturing industries in the region, I is investments in capital assets of the region, F is the cost of fixed assets of enterprises in the region, E is exports, d is the demographic load factor (disabled persons per 1000 employable persons in the region), Kac is the employed population, K is the population, living in the region, B is the emissions of pollutants into the air.

The standard of a multifactor model of socio-economic development takes into account a set of factors, that form the preconditions for achieving sustainable equilibrium growth. The sustainable development model includes a set of resources, interacting with each other in the interests of increasing the efficiency of the entire socio-economic system of the region in the direction of the trend of economic growth.

3 MODEL AND DISCUSSION

3.1 Sustainable Development Model of Regions

Based on the standard model, multifactor models of socio-economic development of the Far Eastern regions of Russia are constructed. The method of stepwise multifactor regression analysis in the applied SPSS program made it possible to exclude insignificant factors and eliminate multicollinearity. The resulting models are presented in Table 1.

Table 1: Sustainable development models of the Far Eastern regions of Russia.

Region	Sustainable development model of the region	R^2
Investment and technological type		
Republic of Sakha (Yakutia)	$GRD = 145649,7 + 0,22F + 0,911I$ F (0.001) I (0.031)	0.97
Technical and technological type		
Kamchatka Territory	$GRD = 162807,3 + 0,92F$ F (0.006)	0.93
Chukotka Autonomous District	$GRD = 381703,744 + 6,141F$ F (0)	0.90
Exports and technological type		
Sakhalin Region	$GRD = -331421,916 + 0,459F + 63370,545E$ F (0) E (0.01)	0.91
Jewish Autonomous Region	$GRD = 127654,734 + 0,669F + 227105,951E$ F (0) E (0.03)	0.97
Socio-technological type		
Khabarovsk Territory	$GRD = -545014,544 + 1298d + 0,072F$ d(0) F(0)	0.99
Socio-investment type		
Primorsk Territory	$GRD = 872765,95 + 1220d - 1434Kac + 0,277I$ d(0) Kac(0) I(0.003)	0.99
Structural and production type		
Amur Region	$GRD = -75671,75 + 8,872Q$ Q(0)	0.93

Note: The significance of the factor in the model, according to the t-statistic criterion, is indicated within brackets. The decision on the statistical adequacy is made at <0.05.

In all 8 regions under study, the sustainable development model differs significantly from the standard one, since they use a maximum of three components.

At the same time, in all regions, with the exception of the Primorsk Territory and the Amur Region, the key factors include (F) the cost of fixed assets of enterprises in the region, which may be due to the predominance of capital-intensive industries (mining industry). An insignificant share is accounted for by manufacturing industries.

In two regions (Sakhalin and Jewish Autonomous Region), the export component belongs to the main components of the sustainable development model of the region, which is associated with a high export component in the GRP of the regions; in the case of the Sakhalin Region, this is the extraction of oil products, and the Jewish Autonomous Region - of iron stone.

Also, it should be noted, that only two regions (Khabarovsk and Primorsk Territory) have social components. This fact indirectly confirms the presence of socio-demographic problems in the Far East and associated with difficult living conditions, as well as the constant migration outflow of the population.

3.2 Estimation of the Impact of the Advanced Development Zones on the Stability of the Regional Economy

The formation of territories with a special economic status in the Far Eastern regions is intended to ensure economic growth through the creation of new industries and the consolidation of the manufacturing industry in the Far East. However, on the brink of stimulating development, there are a number of challenges and factors, restraining development. In such conditions of instability, the issues of estimating the impact of ASEDZ activities on the level of stability of the economic systems of the Far Eastern regions are relevant. The results of the regression analysis are presented in Table 2.

Table 2: Regression analysis of the relation between the economic indicators of the Far Eastern regions of Russia and the indicators of ASEDZ in the regions.

The region where the ASEDZ was established	Statistical estimation parameters	Interrelation between investments and invested capital of ASEDZ residents	Interrelation between GRP and the volume of products, sold by ASEDZ residents	Interrelation between the volume of shipped products of the agricultural sector of the region and ASEDZ residents
Republic of Sakha (Yakutia)	R2	0.288	0.983	0.361
	T-st	0.46 (H)	0.09	0.4 (H)
	reg	1.37	0.09	54.28
Kamchatka Territory	R2	0.951	0.9	0.677
	T-st	0.025	0.047	0.177 (H)
	reg	0.203	0.09	0.195
Primorsk Territory	R2	0.664	0.811	0.613
	T-st	0.19 (H)	0.1 (H)	0.217 (H)
	reg	0.581	0.01	5.22
Khabarovsk Territory	R2	0.986	0.956	0.055
	T-st	0.07	0.022	0.764 (H)
	reg	0.810	0.04	0.526
Amur Region	R2	0.922	0.767	-
	T-st	0.04	0.12 (H)	-
	reg	0.333	0.01	-
Sakhalin Region	R2	0.03	0.468	0.995
	T-st	0.945 (H)	0.32 (H)	0.02
	reg	0.059	0.107	0.374
Jewish Autonomous Region	R2	0.37	0.02	-
	T-st	0.391 (H)	0.86 (H)	-
	reg	2.187	0.214	-
Chukotka Autonomous District	R2	0.988	0.979	0.507
	T-st	0.06	0.011	0.288 (H)
	reg	0.794	0.045	0.681

Note: R^2, t-statistics (the decision on statistical adequacy is made at <0.05), reg is the regression coefficient. H - the model has no statistical significance (based on t-statistics and R^2). Significant parameters are highlighted in gray.

Based on the results of regression analysis, it can be concluded, that in Yakutia, Kamchatka and Khabarovsk Territories, Chukotka Autonomous District, there is an relation between the region's GRP

and the volume of products, sold by ASEDZ residents, which is due to the fact, that a large number of projects, implemented by ASEDZ residents have already been completed, and they are in operation.

In Kamchatka Territory, Khabarovsk Territory, Amur Region and Chukotka Autonomous District, a high correlation between investments in the regional economy and investments in ASEDZ projects is noted due to the active investment phase of individual large projects. At the same time, investments can be made in projects, that are implemented from the initial stage (for example, the Amur gas processing plant in ASEDZ "Svobodny" in the Amur Region), and aimed at modernizing an existing production (for example, gold mining at NGK "Resurs" in ASEDZ "Nikolaevsk" Khabarovsk Territory).

The interrelation between the volume of shipped agricultural products of the region and ASEDZ residents is observed only in the Sakhalin region, which is caused by the low level of development of agriculture in this region due to its island location and adverse climatic conditions. In other regions, the level of development of agriculture is much higher and projects, implemented by ASEDZ residents in agriculture, have an insignificant share.

Investment growth is determined by federal and regional policies, the situation in the country, market conditions, credit policy, aimed at the preferential use of borrowed sources of financing, the fiscal system, return on investment and the rate of return.

Table 3: Regression analysis of the relation between socio-economic indicators of the Far Eastern regions of Russia and indicators of ASEDZ in the regions.

The region where the ASEDZ was established	Statistical estimation parameters	The interrelation between the volume of shipped products of regional enterprises and ASEDZ residents of the manufacturing industry	The interrelation between the value of the region's fixed assets and the fixed assets of the ASEDZ residents	The interrelation between the region's exports and the proceeds from the sale of ASEDZ resident-exporters	The interrelation between the number of employed population in the region and the number of ASEDZ resident-employees
Republic of Sakha (Yakutia)	R^2	0.88	0.926	0.971	0.819
	T-st	0,62 (H)	0.038	0.015	0,28 (H)
	reg	2.73	38.935	0.01	6.96
Kamchatka Territory	R^2	0.06	0.67	0.911	0.04
	T-st	0,923 (H)	0,182 (H)	0.045	0,96 (H)
	reg	-4.54	10.572	0	0
Primorsk Territory	R^2	0.796	0.933	0.805	0.896
	T-st	0,108 (H)	0.034	0.1 (H)	0,21 (H)
	reg	1.665	10.65	0.00007	-12
Khabarovsk Territory	R^2	0.99	0.758	0	0.505
	T-st	0.005	0,129 (H)	1 (H)	0,497 (H)
	reg	5.616	62.49	-0.00003	-15
Amur Region	R^2	0.947	0.999	0.707	0.745
	T-st	0.027	0	0,159 (H)	0,337 (H)
	reg	1.504	1.215	0.00002	-4
Sakhalin Region	R^2	0.758	0.988	0.625	0.907
	T-st	0,129 (H)	0.01	0,21 (H)	0,198 (H)
	reg	35.85	36.47	0	-5
Jewish Autonomous Region	R^2	0.01	0.902	0	0.999
	T-st	0.9 (H)	0.05	1 (H)	0.017
	reg	2.64	108.7	0	94.5
Chukotka Autonomous Region	R^2	0.779	0.714	0.242	0.01
	T-st	0.117 (H)	0.155	0.51 (H)	0.936
	reg	1.127	7.191	0	-0.043

The data in Tables 2 and 3 show the degree of influence of the ASEDZ indicators on the level of sustainable development of the regions and the contribution of residents of the territories to the indicators of the socio-economic development of the region.

As a result of the performed regression analysis, a relation between the volume of shipped products of enterprises in the region and ASEDZ residents in the manufacturing industry in the Khabarovsk Territory and the Amur Region was revealed. This relation is due to a large number of projects in the field of manufacturing industries in the Khabarovsk Territory (milling plant of LLC "Amur Timber Company", a plant for processing polymers and the production of plastic products, etc.), as well as large manufacturing industries in the Amur Region (vegetable oil extraction mill for advanced processing of soybeans).

The relation between the exports of the region and the proceeds from the sale of resident-exporters is observed in the Kamchatka Territory and Yakutia. In the regions, projects are being implemented in the field of fisheries, processing and manufacturing of jewelry.

The correlation between the number of the employed population of the region and the number of ASEDZ resident-employees is observed only in the Jewish Autonomous Region, which is associated with the small size of the region and the size of the population living in it. In other regions, this interrelation has not been identified, including due to the fact, that most of the projects, implemented by residents, do not require significant labour power intake due to the use of new and automated equipment.

In the Primorsk Territory, economic development is due to the growth of industries, that are not included in ASEDZ. It should be noted, that the largest share in the GRP structure of the Primorsk Territory is held by trade, as well as transportation and storage.

Moreover, in the regions of the Far East, development is taking place due to the development of various sectors of specialization of ASEDZ territories and "anchor investors". The analysis allowed the studied regions to be divided into three groups, depending on the type of development (Table 4).

Table 4: Type of sustainable development of ASEDZ in the region.

Type of development	Characteristic	Regions of the Far Eastern Federal District
Intensive type of development	GRP growth, ensured by an increase in investments, high attractiveness for new residents, investors, labor force. Effective use of factors of production and networking in the system	Republic of Sakha (Yakutia) Kamchatka Territory Khabarovsk Territory Chukotka Autonomous District
Intensive type for the development of industries of specialization	Development of the production and resource potential of certain industries of specialization, which is caused by a high inflow of investments and the effective use of individual factors of production	Sakhalin Region Amur Region
Extensive type of development	High accumulated resource potential, investments, but no growth of GRP is observed. Economic returns are possible in the long term	Primorsk Territory Jewish Autonomous Region

The first group, which includes Yakutia, Kamchatka and Khabarovsk Territories, Chukotka Autonomous District, is the most successful and has signs of intensive development, since investments are made in various industries and there is a return on these investments. Territorial economic systems have an complex and systematic approach, and there is a balance in key spheres of sustainable development.

The second group, consisting of the Sakhalin and Amur regions, also has signs of intensive development, but specific selective industries. In the Sakhalin region, the bulk of the GRP is formed by the oil extraction industry, in addition residents are implementing major projects in the field of tourism and agriculture. The specification of the economy of the Amur Region is agriculture and mining, while large projects of ASEDZ residents are aimed at manufacturing industries.

The third group of regions, represented by the Primorsk Territory and the Jewish Autonomous Region, has an extensive type of development, which is associated with a low return on projects, implemented by ASEDZ residents, since most are still in the investment stage.

4 CONCLUSIONS

The economy of the Far Eastern regions of Russia is unbalanced and has a clear raw material orientation, which made it possible, after the collapse of the Soviet Union, to actively sell natural resources to the developing countries of the Asia-Pacific region. At present, the resource orientation of most sectors of the regional economy prevents the comprehensive development and growth of manufacturing industries, in particular.

As a result of constructing of sustainable development models of regions, a significant deviation from the standard model in favor of one or two components, which are key in the region's GRP, as well as practically no social factors in these models, was revealed.

The tool of the advanced socio-economic development zones, introduced in 2015 in the Far East, despite its short application period, shows its effective impact on regional indicators. At the same time, in each region, the effect of the creation of the advanced development zones has its own characteristics due to differences in the field of activities, size, and stage of development of ASEDZ projects.

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