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ISSUES OF SUSTAINABILITY OF DEVELOPMENT TRENDS OF THE CONSTRUCTION MATERIALS INDUSTRY OF SURKHANDARYA REGION

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ANNOTATION
The article analyzes the indicators of the stability of development trends of the building materials industry and evaluates the situation in the region using them.

Keywords: stability, sustainability, development, trends, tendency, oscillation, deviation, model, regression, construction materials, building materials industry.

Introduction

The issue of stability of development trends in the conditions of various economic crises occurring in the world economy today has become one of the main directions of economic research. Effective development of national economies depends on the sustainable development of its sectors, including the construction materials industry. Sustainable development is a required feature of current national economies, and the concept began to appear in the literature at the beginning of the last century.

Issues of sustainable development are discussed by several scientists, including Azapagic A.[2], Perdan S., Yaroshevich N., Kislitsyn Y.[3], Zodape H., Patil P.U., Ranvee A. [8], Lyubushina N.P., Babicheva N.E., Igoshev A. K., Kondrashova N.V.[4], Kazieva J.N. [3], Vinokurov S.S.[6], Nigmatov A.N. Kulmatov R., Rasulov A., Mukhamedov Sh.[5].

There are several important definitions of the concept of sustainable development in the research of scientists. Due to the diversity of viewpoints of scientists, the concept of sustainable development has been given different definitions depending on the field the economic and social process being studied. At the same time, if we consider the stability of the development trends of industrial sectors, including the construction materials industry, then the term "sustainable development" can be understood, as following: in our opinion, sustainable development means that during the observation period, the level of irregular movement of development trends is minimal, and it does not lose its direction of growth (decrease) in a certain degree. In this study, by evaluating the degree of irregular movement of the development trends of the construction materials industry, it is analyzed whether it does not lose the direction of growth (decrease) in a certain degree.

Methods

It is known that the stability of the time series constituting various development trends can be evaluated as their theoretical values. First of all, it is important to determine the trends of sustainable development and evaluate its features. In this sense, a stable trend that is more or less free of random fluctuations in a time series is a trend. Therefore, the determination of the existence of a stable trend is the determination of the existence of this trend. In turn, it will be possible to evaluate the characteristics of development trends through the trend and correctly assess the situation.

There are several ways to check the existence of a trend in the time series of economic processes. The most widely used of them are: visual analysis, autocorrelation function, method of differences of means,

Foster-Stuart test, series method, Wallis-Moore method, Cox-Stuart method, criterion of "ascending" and "descending" series, etc.

We used the method of differences of means in order to determine whether there is a trend in the production volume of the construction materials industry of Surkhandarya region. The results are presented in Table No.1.

Table No.1

The results of applying the method of "differences of means" to the production volume of construction materials industry of Surkhandarya region for 2010-2021

No.	Indicators	Mean squared deviation	Dispersion	Fisher's F criterion	The average of the mean squared deviations	Student's t-test	Conclusion
1	Production volume of construction materials industry	105,94	11223,42	$F_{calc} = 2,77$ $F_{table} = 4,54$ $\alpha = 0,05$	143,19	$t_{calc} = 10,19$ $t_{table} = 2,13$	Trend exists

Along with determining the existence of a stable trend, it is important to determine the levels and characteristics of stability through it. Therefore, the next task is to find the most suitable form of regression. Examples of such forms are linear, exponential, polynomial and others. Indicators such as Fisher's F criterion, mean absolute percentage error, coefficient of determination are usually used to determine the type of most suitable model for the economic process.

From our experimental work in the Gretl software, it became clear that the most suitable type of model for the economic process is the exponential trend, the determination coefficient of which was $R^2 = 0,97$ (Table No.2).

Table No.2

The parameters of the exponential trend in the production volume of the construction materials industry of Surkhandarya region and the results of its verification

Model 1: OLS, using observations 2005-2021 (T = 17)
Dependent variable: QMS

	Coefficient	Std. Error	t-ratio	p-value	
const	1.74863	0.127105	13.76	<0.0001	***
time	0.280824	0.0124042	22.64	<0.0001	***

Mean dependent var	4.276047	S.D. dependent var	1.438692
Sum squared resid	0.941647	S.E. of regression	0.250552
R-squared	0.971566	Adjusted R-squared	0.969671
F(1, 15)	512.5445	P-value(F)	5.20e-13
Log-likelihood	0.471421	Akaike criterion	3.057158
Schwarz criterion	4.723584	Hannan-Quinn	3.222804
Rho	0.591305	Durbin-Watson	0.802907

The trend equation takes the following form:

$$\hat{y} = 5,746734038e^{0,28082393t} \quad (1)$$

Using the model (1), it is possible to determine and evaluate the characteristics of the stability of the development of the production volume of the construction materials industry. After determining the trend in the time series, it is possible to determine the features of its sustainable development. Several indicators are used for this. Afanasev V.N. summarized and systematized such indicators (Table No.3).

Table No.3

Main indicators of stability of production dynamics [1].

№	Indicator	Formula	The essence
1.	Oscillation width	$R_{\hat{y}} = \bar{y}_{pos} - \bar{y}_{neg}$ $\bar{y}_{pos}$ – average value over positive periods above the trend; $\bar{y}_{neg}$ – average value over negative periods below the trend.	Represents the average swing range relative to the trend.
2.	Mean linear deviation	$d(t) = \frac{\sum_{t=1}^{n}\lvert y_t - \hat{y}_t\rvert}{n-p}$ y_i – the actual level of the time series; $\hat{y}_i$ – smoothed level of the time series; n – number of time series's levels; p – number of trend parameters.	The results indicate low and high stability of the series levels.
3.	Standard deviation	$S_y(t) = \sqrt{\frac{\sum_{t=1}^{n}(y_t - \hat{y}_t)^2}{n-p}}$	A large value of the standard deviation means that the true levels of the series have a greater spread than its smoothed levels and at the same time it indicates the low and high stability of the series levels.
4.	Level stability index	$i_{\bar{y}} = \frac{\bar{y}_{pos}}{\bar{y}_{neg}}$	Denoting the level of stability, the closer the value is to 1, the less fluctuation and the higher the stability.
5.	Coefficient of linear oscillation	$V_y^d(t) = \frac{d_y(t)}{\bar{y}}$	The indicator reflects the amount of fluctuation relative to the average level of the time series.
6.	Oscillation coefficient	$V_y(t) = \frac{S_y(t)}{\bar{y}}$	The indicator reflects the amount of fluctuation relative to the average level of the series.

Results

Based on the system of indicators presented in Table No.3, we evaluate the stability of the levels of the main development trends of the building materials industry of Surkhandarya region. At first, trend models were estimated for the main development trends of the region for 2010-2021, and their compatibility with the economic process and the statistical significance of their parameters were determined (Table No.4).

Table No.4

Characteristics of trend models for the main development trends of the region in 2010-2021

Кўрсаткич	Тренд тенгламаси	Фишер F мезони	Параметрларнинг статистик аҳамиятлилиги
Construction materials industry production volume (billion soums)	$y_1 = 77{,}92170716 - 23.26463176 \cdot t + 5{,}363701749 \cdot t^2$	193,373	$t_a = 2{,}517$ ** $t_{b_1} = -2{,}124$ * $t_{b_2} = 6{,}541$***
Production of other non-ferrous mineral products (billion soums)	$y_2 = 28{,}0250926 \cdot e^{0{,}235114829 \cdot t}$	1 440,544	$t_a = 73{,}108$ *** $t_b = 37{,}955$ ***
Production of wooden products (except furniture), straw and weaving materials (billion soums)	$y_3 = 2{,}858322613 \cdot e^{0{,}218928374 \cdot t}$	146,0602	$t_a = 7{,}877$ *** $t_b = 12{,}086$ ***
Production of rubber and plastic products (billion soums)	$y_4 = e^{0{,}24249919 \cdot t}$	380,5381	$t_b = 19{,}507$ ***
Production of finished metal products, excluding machinery and equipment (billion soums)	$y_2 = 9{,}564588961 \cdot e^{9{,}564588961 \cdot t}$	428,899	$t_a = 23{,}695$ *** $t_b = 20{,}710$ ***

From Table 4, we can see that all trend equations are consistent with the economic process. All model parameters are statistically significant at $\alpha = 0{,}05$, except for the fact that the parameter b_1 of the 2nd-level polynomial equation on the production volume of the regional construction materials industry. It is significant at $\alpha = 0{,}10$.

Table No.5

Results of assessment of the stability of the main trends of the construction materials industry of Surkhandarya region

Indicators	Construction materials industry production volume (billion soums)	Production of other non-ferrous mineral products (billion soums)	Production of wooden products (except furniture), straw and weaving materials (billion soums)	Production of rubber and plastic products (billion soums)	Production of finished metal products, excluding machinery and equipment (billion soums)
$\mathbf{R_{\bar{y}}}$	285,66	100,94	31,78	29,26	127,95
$\mathbf{d(t)}$	31,74	10,09	3,18	2,93	12,79
$\mathbf{S_y(t)}$	29,96	17,09	4,52	5,07	23,13
$\mathbf{i_{\bar{y}}}$	1,0	1,13	1,70	1,77	2,10
$\mathbf{V_y^d(t)}$	0,15	0,06	0,20	0,40	0,15
$\mathbf{V_y(t)}$	0,14	0,10	0,28	0,69	0,27
$\mathbf{K_b}$	86%	90%	72%	31%	73%

Discussion

As can be seen from Table No,5, the oscillation width, mean linear deviation and standard deviation indicators of the construction materials industry production volume are not much larger than the values of observation levels. This shows that the calculated indicators are a real representation of the

event change. The index of level stability compared to the trend shows that it is 1.0. We can also see that the stability factor is 86% with a oscillation coefficient of 0.14. We can see that the index of stability of levels relative to the trend is a high 2.1 in the volume of production of finished metal products, excluding machinery and equipment. This indicates a high level of oscillations. Also, the coefficient of stability in the volume of production of rubber and plastic products is 31%, indicating that the series levels are not stable. This is due to a sharp increase in production volume in 2021.

References

1. Afanas'ev V.N. Афанасьев В.Н. Development of methodology for statistical analysis of food security. Problems of statistics. 2015, (3), 17-26.
2. Azapagic A., Perdan S. Indicators of Sustainable Development for Industry: A General Framework. // Process Safety and Environmental Protection. Volume 78, Issue 4, July 2000, Pages 243-261
3. Kazieva Zh.N. Sustainable Development of Industry (Theory and Methodology). // Dissertation for the degree of Doctor of Economics. GOU VPO "Dagestan State Technical University", Makhachkala - 2009.
4. Lyubushina N.P., Babicheva N.E., Igoshev A.K., Kondrashova N.V. Modeling the sustainable development of economic systems of various hierarchical levels based on a resource-oriented approach // Economic analysis: theory and practice, 48, 2015 - 2-12
5. Nigmatov A.N. Kulmatov R., Rasulov A., Mukhamedov Sh. Sustainable development and its systematic indicators: Monograph - Tashkent: Spectrum Media Group, 2015. - 120 p.
6. Vinokurov S.S. Formation of the mechanism of sustainable development of the Russian industry. // Dissertation for the degree of candidate of economic sciences. Russian State Pedagogical University named after A.I. Herzen, St. Petersburg - 2009.
7. Yaroshevich N., Kislitsyn Y. Determinants of sustainable development of machine building industry under the new industrialization // Advances in Social Science, Education and Humanities Research, volume 240. Atlantis Press, 2019
8. Zodape H., Patil P.U., Ranvee A. Sustainable Industrial Development // International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 3 Issue XII, December 2015.