Economical Analysis of Certain Types of Industrial Production In The Regions

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Abstract. **This article examines the theoretical and methodological aspects of the production of certain types of industrial products in the regions and their econometric analysis.**

Keywords: Industry, network, econometrics, test, regression, correlation, trend, T-Student, Fisher test.

I. INTRODUCTION

Globally, there are certain scientific trends in the identification of factors for the development of industry in the regions, the study of ways to effectively use the existing production capacity. In particular, significant research is being conducted to minimize the uneven distribution of economic resources in the regions and their negative impact, optimize interregional economic relations, use the cluster system to establish mutually beneficial activities of different economic entities, identify factors influencing the development of the sector and regulate them. .

In the context of the ongoing socio-economic reforms in Uzbekistan in recent years, the issues of improving regional economic policy and the effective and rational use of the rich economic potential of the regions are becoming increasingly important. At the same time, special attention is paid to increasing the employment and income of the population on the basis of deep industrial processing of agricultural raw materials and mineral raw materials for the production of finished products, primarily through the rapid development of modern high-tech industries. In particular, paragraph 3.5 of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 identifies areas for "comprehensive and balanced socio-economic development of regions, districts and cities, effective and optimal use of their existing potential." [1]

II. LITERATURE REVIEW

The issues of scientific study of regional economic problems and their solution have always been in the focus of economists. In particular, the theoretical and practical aspects of this issue, in particular, the issues of increasing regional competitiveness, foreign economists A. Venables, H. Glenn, P. Krugman, B. Robert [6], M. Fujita [7], M. Enright [8]. , B.Shaun [9] and others have made significant contributions.

Among the economists of the CIS countries are A.G. Granberg [10], Gadzhiev Yu.A.[11], I.N. Merenkova, A.N.Nosov, O.I.Panteleeva, D.Sepik, L.A.Serebryakova and others Theoretical issues of regional economic development, management of regional economic growth and development, diagnosis of regional economic development, regional economic potential and competitiveness who have paid particular attention to issues of enhancement.

In Uzbekistan, the issues of development and management of the regional economy, the effective use of the economic potential of the regions are the areas of scientific interest of economists in this area. In particular, issues such as modeling the socio-economic development of regional industrial complexes, integrated development of regions, territorial location and management of productive forces, improving the methodological framework for increasing the competitiveness of the country's regions were discussed by Uzbek economists S.S. Gulomov, A.M. Sodiqov, A.M.Qodirov, B.Ruzmetov, T.M.Akhmedov, Sh.B.Imamov, P.Z.Khashimov, F.T.Egamberdiev, A.A.Qayumov, Sh.H.Nazarov, A.J.Siddikov, I.O.Yakubov and has been widely used in the scientific research of others.

III. RESEARCH METHODOLOGY

In this study, regression models for the production of certain products in the food, chemical and textile industries of the country were developed, and the statistical significance and adequacy of the model was tested on the basis of T-student, F-fisher tests.Таҳлил ва натижалар

The results of the study show that the experience of developing and newly industrialized countries shows that most

of the economic success in these countries is explained by profound structural changes in industry, especially in the processing industry [2]. Numerous studies have shown that the development of the industrial sector is the main driving force of economic growth, and this view in most studies is explained by the high availability of new combinations of innovations and knowledge in industry compared to other sectors of the economy. This leads to an increase in labor productivity and production, resulting in economic growth.

Menu	Number sold	Cost of item	Menu price	Gross Sales	Profit per item	Total gross profit
Pizza	60	$ 5,00	$ 7,00	$ 420,00	$ 2,00	$ 120,00
Bun	120	$ 0,50	$ 3,00	$ 360,00	$ 2,50	$ 300,00
bread	180	$ 1,00	$ 1,50	$ 270,00	$ 0,50	$ 90,00
Pecheniy	40	$ 2,00	$ 3,00	$ 120,00	$ 1,00	$ 40,00
Baton	35	$ 1,50	$ 2,30	$ 80,50	$ 0,80	$ 28,00
Total	435			$ 1 250,50		$ 578,00

Today, the industry provides an opportunity to ensure the necessary balance in the market, increase the competitiveness of the economy and increase incomes, localize production, and play an important role in job creation. In particular, the creation of one job in the processing industry leads to the creation of two or three jobs in other industries. [3,4,5]

The production potential of the region is formed in the process of interaction of natural and labor resources, fixed capital and scientific and technological development, and in this regard, fixed assets are of particular importance. One of the aggregate indicators of production capacity is the value of fixed assets. (Table 1)

Table 1: Gross domestic product (GDP) growth figures (as a percentage of the previous year)

	2000 y.	**2005 y.**	**2010 y.**	**2015 y.**	**2016 y.**	**2017 y.**	**2018 y.**	**2019 y.**
Republic of Uzbekistan	**103.8**	**107.0**	**107.3**	**107.4**	**106.1**	**104.5**	**105.4**	**105.6**
Republic of Karakalpakstan	89.7	106.9	113.4	111.1	113.3	106.0	105.5	106.8
provinces								
Andijon	102.8	110.2	109.4	103.3	100.5	104.2	109.8	106.5
Bukhara	104.2	109.9	110.2	108.8	106.7	102.5	105.4	106.1
Jizzax	104.2	108.3	109.5	108.6	108.2	104.2	104.0	105.9
Qashqadaryo	99.0	108.0	103.0	106.7	105.5	103.4	102.0	101.4
Navoi	103.2	102.2	103.9	103.9	103.7	101.3	104.7	105.2
Namangan	108.0	107.0	110.8	108.0	107.8	103.6	104.5	107.0

Samarkand	104.6	106.1	111.2	108.7	107.6	101.4	100.6	104.1
Surxondaryo	105.5	105.5	111.3	107.6	105.8	103.5	104.7	106.3
Sirdaryo	102.6	111.1	108.7	107.5	107.2	95.4	103.5	103.6
Tashkent	110.9	103.8	109.1	106.1	104.8	101.0	107.0	104.1
Fergana	106.1	106.5	106.8	107.4	105.4	98.8	107.7	105.4
Khorezm	94.8	103.4	107.1	109.4	104.9	104.6	103.1	107.7
Tashkent	104.5	106.6	113.5	110.0	111.5	111.7	112.1	110.5

IV. ANALYSIS AND RESULTS

The obtained indicators of dynamics indicate the presence of stable dynamics with periods of decline and periods of growth. Steady growth in industrial production was observed during the entire period under review. It has increased nearly 170 times in the last nineteen years. At the next stage of the analysis, it is advisable to move on to the study of trends. To this end, the hypothesis of the existence of a trend is put forward and tested. There are now many criteria that vary in strength and complexity of the mathematical apparatus to verify the existence of a trend. These methods allow to determine the general trend in the development of key indicators of industrial products over time, as well as the trend by type - the average and variance trends. (Table 2)

Table 2: Volume of industrial production in the regions of the Republic of Uzbekistan

	2003	**2004**	**2005**	**2010**	**2015**	**2016**	**2017**	**2018**	**2019**
Across the country	6128	8123	11029	38119	97598	111869	148816	235341	322535.8
The Republic of Karakalpakstan	99.2	142.1	198.8	697.2	2387.6	4265.7	6773.3	10911.9	12736.1
regions:									
Andijon	535.6	765.7	1177.5	4701	9744.6	7965.7	13270	27454.7	33122.3
Bukhara	358.9	451.2	517	1675	5143.9	5569.6	6422.3	8601.2	14798.2
Jizax	107.4	128.9	192.6	522.7	1474.5	2001.2	2548.8	3581.8	4586.1
Qashqadaryo	564.1	805.3	1436.3	4958	8721.9	9632.2	10946	14529.5	20360.1
Navoi	922.3	1220	1714.8	4039	9286.9	10657.9	13073	22892.4	44438.1
Namangan	185.3	242.8	330.5	1007	2861.8	3475.7	4615.5	6586.6	8818.1
Samarkand	250.2	313.2	383.6	2011	6095.5	7446	9242	13488.1	15783.6
Surxandaryo	134.4	188.9	219.1	756.4	1910.7	2200.7	2356.4	3234.7	4231.3
Smrdaryo	168.1	244.1	296.6	926.8	2820.6	3522.3	3806.5	5163.1	7293.0

Tashkent	1021	1484	1795.4	5471	14401	16864.7	21693	37724.4	53484.8
Fergana	646.1	840.8	1033.2	3266	7170.2	8040.7	9728.5	13613.8	18661.2
Khorezm	127.1	151.4	214.8	628.6	2616	2802.7	4070.4	6457.2	8538.6
Tashkent	951.4	1049	1247.4	6984	18986	23511.9	30460	43274.1	52747.5

One of the methods that allows us to reveal the general existence of a trend and its material expression - to identify a trend - is the cumulative T-criterion. This method is based on the calculation and analysis of the statistical description of the accumulated sums of deviations from the average level of Y of the series Y1 and the ratio of these deviations themselves. It has been hypothesized that the dynamics under study may not be a trend that can be examined on the basis of the T-criterion. Based on the data obtained on the series of dynamics of industrial production (Table 3), the hypothesis that there is no trend at a = 0.05 is rejected, so there is a trend.

Table 3: One-dimensional criterion

	Criterion value = 0					
	t	**Standard variables**	**2 dimensional value**	**Average difference**	**95% reliability interval of the lifferentiation**	
					lower	**high**
Food products (billion soums)	13,790	16	,000	504,8941	427,276	582,513
Textile products (billion soums)	14,903	16	,000	108,40588	92,9854	123,8264
Chemical products (billion soums)	9,724	16	,000	157696,29412	123317,7009	192074,8873

In practice, since three types of trends are distinguished - averages, variances, and autocorrelations, it is necessary to examine the initial dynamics of the existence of each type of trend. (Table 4)

Table 4: Results of the implementation of the cumulative T-criterion in assessing the trend in the volume of industrial production

Indicators	**Unit of measurement**	**T -criterion unit of account**	**Of trend availability**
Food products	billion soums	13,790	available
Textile products	billion soums	14,903	available
Chemical products	billion soums	9,724	available

Checking the dynamics of the series of key indicators of industrial products for the presence of averages and variance trends can be done on the basis of the method of comparing the average levels of the series and the Forster-Stewart method.

The average comparison method is based on comparing the average levels of series and variances. In this case, the time series (time-dependent series) is divided into two parts that are approximately equal in number of members. Each is considered as an independent selection set with a normal distribution. If the time series has a trend, the calculated averages and variances for each set should differ significantly from each other. Thus, the existence of a trend in the

line under study verification is a hypothesis about the equality of two normally distributed sets on average leads to verification.

Testing the hypothesis of equality of variances is carried out using the G-criterion, the calculated value of which is determined as the ratio of the calculated variances for the two parts of the dynamics series.

If the calculated value of G at a given level of probability is greater than that in the table, the hypothesis that the variances of two normally distributed sets are equal is rejected.

Table 5: Equalization of the trend of industrial production volumes in the Republic of Uzbekistan for 2000-2019

Procedure number	**Indicator**	**Measurement unit**	**Model**
1	Food products	billion soums	$\overline{Y_t}$ = 28.863- 57452.975t
		billion soums	$\overline{Y_t}$ = 0.007 t^2-28481.987
		billion soums	$\overline{Y_t}$ = exp (-107.0399+0,0564 • t)
2	Textile products	billion soums	$\overline{Y_t}$ = 5.776471*t-11490.747
		billion soums	$\overline{Y_t}$ = 0.001* t^2-5692.683
		billion soums	$\overline{Y_t}$ = exp (4.1786+0.0525376*t)
3	Chemical products	billion soums	$\overline{Y_t}$ =12352.142-24645405.2*t
			$\overline{Y_t}$= 0.001*t^3-8116644.655
			$\overline{Y_t}$ = exp (-139.45584+0.075373*t)

Examination of the average trend in all considered series of indicators of industrial production in the Republic of Uzbekistan for the period 2000-2019 (Table 5) shows that the hypothesis of equality of averages is rejected for all indicators under consideration, because >tp = (0.05 ; 10), which means that the averages differ significantly from each other, and the trend of the averages is present in these series.

Trendy models presented in Table 6 have been developed using different levels of polynomials using the analytical alignment method to characterize the trend of industrial production indicators.

An important problem in the next stage of analysis and modeling of the trend of key indicators of industrial production in the country by the method of analytical alignment is the selection of a mathematical function that best describes the real existing laws of change of indicators. Conclusions about the laws of industrial output indicators depend on the correct solution of this problem.

1. Food production

Model summation and evaluation of parameters

Related variables: Food

	Model Summary					Parameter Estimates			
Equation	R^2	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	0,932	206,118	1	15	0	-57453	28,863		
Square	0,933	207,764	1	15	0	-28482	0	0,007	
Growth модели	0,963	392,447	1	15	0	-107,04	0,056		

Independent Variables Years.

2. Manufacture of textile products

Model Summary and Parameter Estimates

Dependent Variable: Textile products

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,946	262,324	1	15	,000	5895,34	5,776		
Cubic	,947	267,359	1	15	,000	-3759,995	,000	,000	,000
Growth	,982	808,744	1	15	,000	-100,844	,053		

The independent variable is Years.

3. Production of chemical products

Model Summary and Parameter Estimates

Dependent Variable: Кимё маҳсулотлари

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,870	100,586	1	15	,000	-24645405,157	12352,142		
Cubic	,872	101,827	1	15	,000	-8116644,655	,000	,000	,001
Growth	,958	342,333	1	15	,000	-139,456	,075		

The independent variable is Years.

The choice of the shape of the curve can be made on the basis of a criterion taken as the sum of the squares of the deviations of the actual values from the values calculated by the trend equation. From the set of curves, the one with the minimum value of the criterion is selected.

The results of the calculation of the values of the accuracy and adequacy criteria for the average residual modulus, the average error of approximation, the Darbin-Watson criterion, the dynamics of the main indicators of production of some industrial products in the country are given in Table 6.

Table 6: The main characteristics of the adequacy of the equations of trends in the production of certain industrial

products in the Republic of Uzbekistan in 2000-2019

Indicator	**Model name**	**Model**	**R^2**	**Mean square error**	**Fisher-criterion, F**
Food products	Linear	$\overline{Y_t}$ = 28.863- 57452.975t	0.932	40.609	206.118
	Square	$\overline{Y_t}$ = 0.007 t^2-28481.987	0.933	40.459	207.764
	Growth	$\overline{Y_t}$ = exp (-107.0399+0,0564 • t)	0.963	0.057	392.447
Textile products	Linear	$\overline{Y_t}$ = 5.776471*t-11490.747	0.946	7.204	262.324
	Square	$\overline{Y_t}$ = 0.001* t^2-5692.683	0.946	7.172	264.824
	Growth	$\overline{Y_t}$ = exp (4.1786+0.0525376*t)	0.982	0.037	808.744
Chemical products	Linear	$\overline{Y_t}$ =12352.142-24645405.2*t	0.871	24877.268	100.586
	Cubic	$\overline{Y_t}$= 0.001*t^3-8116644.655	0.871	24744.87	101.204
	Growth	$\overline{Y_t}$ = exp (-139.45584+0.075373*t)	0.958	0.082	342.333

The analysis of the adequacy and accuracy characteristics of the trend models presented in the table best describes the dynamics of food products in Uzbekistan using the straight-line equation. The value of the average error of the approximation varies by a fraction of up to 15% in all of the quoted equations of the trend, but the minimum value corresponds to the straight line equation.

Analysis of the main indicators of accuracy and adequacy of the equations on statistical indicators, the trend of change of the indicator can best be described by the GROWTH model, which allows them to conclude that the minimum value of the average modulus of residuals, as well as all accuracy criteria.

The obtained models allow us to compile forecast values of key indicators of production of certain types of industrial products. Forecasting refers to a scientifically based description of the possible future state of objects, as well as alternative ways and timelines to achieve that state.

Extrapolation method is used quite often in the construction of forecast models on one-dimensional series of dynamics. This is primarily due to the simplicity of implementing this method. The basis of this forecast is the transfer of the laws of development of events from the past to the future.

It should be noted that the forecast values obtained allow to determine the forecast of changes in the volume of production of certain types of industrial products only four years in advance. The increase in the number of observers in this statistical set is due to the fact that it allows to obtain a more accurate description of the set, while such an extension of the dynamic series does not always lead to similar results, especially when dynamic series are used to forecast key industrial output.

V. CONCLUSION AND SUGGESTIONS

In summary, the situation noted in the study is that the information value of the levels disappears as they move away from the prevention period, i.e., the values of the dynamic series levels in forecasting are not the same. Therefore, the parameters of the equations approximating the growth curves are not free from defects and can change their values by subtracting a part of the existing members of the series, which can be reflected in the accuracy of the calculated values of the dynamics series equations.

The following scientific proposals have been developed for the econometric analysis of the production of certain types of industrial products in the regions:

1. The issues of statistical assessment of the development of the food, textile and chemical industries in the country, econometric modeling of key trends, statistical assessment of production infrastructure serving the regional industrial sector are covered. The study suggests the use of trend models in statistical analysis and forecasting of the main trends in the production of certain types of industrial products.
2. It is recommended to use the Average residual module, the average approximation error, the Darbin-Watson criterion when calculating the values of the accuracy and adequacy criteria for the series of dynamics of the main indicators of industrial production in the country.
3. In case of insufficiency of the main indicators of production of certain types of industrial products in the country, the economic-statistical analysis by the method of indices serves to draw objective scientific conclusions.

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