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ECONOMETRIC ANALYSIS OF INDUSTRIAL PRODUCTION'S VARIANCE IN THE SECTION OF CITIES AND DISTRICTS OF THE NAVOI REGION

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ABSTRACT

The article provides an analysis of industrial production of the Navoi region territories for 2010-2020, a variance analysis of the potential of different cities and districts in the region. Differences between cities and districts were identified and their causes and consequences were discussed. Suggestions and recommendations for smoothing the gaps in industrial production are given.

KEYWORDS:- Industry, Industrial Product, Statistical Analysis, Variance, Analysis Of Variance, Standard Deviation, Coefficient Of Variation.

INTRODUCTION

In Uzbekistan, Navoi is the youngest regional center of the republic. Navoi region is one of the industrially developed regions of Uzbekistan, and the share of industrial production in the gross regional product is on average 60-65% [1]. As the country's economy develops high value-added industries, incomes will grow and socio-economic problems will decrease.

There are such large industrial plants as the Navoi Mining and Metallurgical Combine, which produces gold, which has received worldwide recognition, the "Navoiazot" association, specializing in the production of

mineral fertilizers, ammonia and artificial nitron fiber, and an electrochemical plant. Navoi Hydro-circulation power plant (HCPP) is also located here - the basis of the energy of the region, the largest in Uzbekistan JSC "Kyzylkumcement" and many other industrial facilities of republican significance.

THE MAIN FINDINGS AND RESULTS

In Navoi region, the production of industrial products and the determination of the share of these products at the city and district level are divided into information about the differences between cities and districts. To do this, we will conduct an analysis of variance, using indicators such as the average quantity or average volume of product per capita, which will allow us to form more accurate conclusions about the internal characteristics of the situation in the region.

The variance can be calculated using the following formula [2].

$$\sigma_x^2 = \overline{x^2} - (\bar{x})^2$$

$$(1)$$

$\overline{x^2}$ – the arithmetic mean of the squares

of all variants of the statistical population;

$(\bar{x})^2$ - the square of the mean of these variants themselves.

To measure the degree of fluctuation of individual values of a feature relative to the average, the main indicators of variation are calculated. Information about the average levels of the studied indicators is usually insufficient for a complete analysis of the studied process or phenomenon. Sometimes aggregates that are completely dissimilar in their internal structure may have equal average values. Therefore, for a more detailed study of a particular phenomenon, it is necessary to take into account the spread or variation of the values of individual units of the population.

Variations, the inherent variability of the values of indicators in different units of the explored population for the same interval of time.

And to assess the intensity of variation and compare it in different populations, as well as to compare different features of the population, it is recommended to use relative

indicators of variation of statistical modeling. Since, they are calculated as the ratio of the absolute values of the strength of variation to the arithmetic mean of the attribute.

It is required from the above formulas to compare the standard deviations with the arithmetic averages of these features and calculate the coefficient of variation, expressed as a percentage:

$$V = \frac{\sigma * 100}{\bar{x}} \qquad (2)$$

$\bar{x}$ - average arithmetic mean;

σ – avarage square deviation.

When the mean is close to zero, the coefficient of variation will approach infinity and therefore is sensitive to small changes in the mean [3].

Based on the methodology described above, we analyze the volume of industrial production in the cities and districts of the Navoi region.

We will analyze the volume of industrial production in the cities and districts of Navoi region is based not on current prices, but on comparable prices, while excluding changes related to prices over the years, the results and conclusions will allow us to describe the real situation.

In the analysis of variance when calculating specific prices, the 2020 price was set as the base price. The price index for the period from 2010 to 2019 is calculated in comparison with 2020. The price index for the Navoi region for 2010-2020 is shown in Table 1.

Table 1.

Price index for determining the volume of products in 2010-2020 compared to 2020 in Navoi region

Of the year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020

Indexes for calculating comparable prices in 2020	0,125	0,137	0,160	0,181	0,206	0,227	0,246	0,338	0,500	0,802	1,0

Source: development by the authors based on data from the Department of Statistics of the Navoi Region.

The analysis of industrial production volumes in Navoi region in 2010, 2016 and 2020 was carried out to determine the results of the reform carried out over the past 5 years, in accordance with the Action Strategy for the Further Development of Uzbekistan for 2017-2021.

In Table 2 the indicators for the cities and districts of Navoi region is analyzed, including the cities of Navoi and Zarafshan and 8 rural districts [5].

According to Table 2, it can be concluded that the indicators of the Karman district are much higher than those of other districts. These results are mainly the merit of our government in the creation and development of the Navoi free economic zone in the Karmaninsky district, thereby it led to the attraction of foreign and domestic investments, integrated and efficient use of the production and resource potential of the regions, as well as ensuring the accelerated development of industrial, engineering and communication, road transport, social infrastructure.

In Table 2, the indicators of the volume of industrial production in the Navoi region for 2010, 2016 and 2020 are compared with each other and the percentage of change is calculated.

Table 2.

The change in the volume of industrial products created in the cities and districts of Navoi region (in comparable prices for 2020, in billions soums)

Cities and districts	2010 y	2016 y.	2020 y.	2016 y.	2020 y.

				Percentage compared to 2010y.	*Percentage compared to 2010 y.*	*Percentage compared to 2016 y.*
Navoi region	**32389,17**	**43389,38**	**65116,7**	**133,96**	**201,04**	**150,08**
Navoi city	28699,13	31934,52	55006,5	111,27	191,67	172,25
Zarafshan city	422,66	636,72	315,70	150,65	74,69	49,58
Karmana district	2047,53	5044,50	6958,50	246,37	339,85	137,94
Kenimekh district	40,10	237,75	129,50	592,89	322,94	54,47
Kyzyltepa district	476,39	1727,37	1136,00	362,60	238,46	65,76
Navbakhor district	332,83	1071,51	521,00	321,94	156,54	48,62
Nurata district	48,92	639,98	289,20	1308,22	591,17	45,19
Tamdy district	12,03	124,17	44,40	1032,17	369,08	35,76
Uchkuduk district	53,73	309,81	147,00	576,61	273,59	47,45
Khatyrchi district	255,84	1663,04	568,90	650,03	222,37	34,21

Source: development by the authors based on data from the Department of Statistics of the Navoi Region

According to the analysis, the volume of industrial production in all the above regions of Navoi region increased by 101,04% in 2020 compared to 2010, while compared to 2016 it increased by 50,08%. The production of industrial products in the city of Navoi in 2020 increased by 91,67% compared to 2010, while compared to 2016, production increased by 72,25%. If we compare other district of this area , then high growth rates in 2020 can be observed only in the Karmana district. So, in 2016, if industrial production increased 2,5 times compared to 2010, then in 2020 it has already increased 3.4 times compared to 2010, and compared to 2016 it increased by 37,94% [4].

According to Table 2, the production of industrial products in all other districts and the city of Zarafshan in Navoi region decreased. The main reason for this may be based on the fact that there has been a process of urbanization around the relatively large city of Navoi, as well as with the development of

industrial infrastructure in the city of Navoi and the districts of this region.

In order for the indicators of the dispersion analysis of the volume of industrial production in the cities and districts of the Navoi region to be determined more useful and statically significant, in order to avoid sharp discrepancies in the range of variation and a strong spread of the indicators of the object under study, it is advisable not to include in the dispersion analysis the indicators of the volume of industrial production of the city of Navoi.

The volume of industrial production in other cities and districts of Navoi region was recalculated with comparable prices in 2020, and the results are recorded in Table 3 [5].

Table 3.

Dispersion analysis of the volume of industrial products produced in cities and districts of Navoi region

Cities and districts	2010 y.		2016 y.		2020 y..	
	X_i	X_i^2	X_i	X_i^2	X_i	X_i^2
Zarafshan city	422,66	178641,48	636,72	405412,36	315,70	99666,49
Karmana district	2047,53	4192379,10	5044,50	25446980,25	6958,50	48420722,25
Kenimekh district	40,10	1608,01	237,75	56525,06	129,50	16770,25
Kyzyltepa district	476,39	226947,43	1727,37	2983807,12	1136,00	1290496,00
Navbakhor district	332,83	110775,81	1071,51	1148133,68	521,00	271441,00
Nurata district	48,92	2393,17	639,98	409574,40	289,20	83636,64
Tamdy district	12,03	144,72	124,17	15418,19	44,40	1971,36
Uchkuduk district	53,73	2886,91	309,81	95982,24	147,00	21609,00
Khatyrchi district	255,84	65454,11	1663,04	2765702,04	568,90	323647,21
$\sum X_i$	3690,03		11454,85		10110,20	
$\sum X_i^2$		4781230,73		33327535,33		50529960,20
Average	410,00	531247,86	1272,76	3703059,48	1123,36	5614440,02
$(\sum X_i)^2 / n$	168102,73		1619920,85		1261927,70	
Dispersion (6^2)	363145,13		2083138,64		4352512,32	
Standard deviation, 6	602,62		1443,31		2086,27	
Coefficient of variation, V	146,98		113,40		185,72	

Source: development by the authors based on data from the Department of Statistics of the Navoi Region.

As can be seen from the analysis of the variance of Table 3, the mean square gap in the production of industrial products in 2010 in the cities and districts of Navoi region amounted to 602.620 billion. sum, in 2016. 1 trillion 443,310 billion. sum, and already in 2020 it amounted to 2 trillion. 086,27 billion. soums.

CONCLUSION

According to the conducted variance analysis of the volume of industrial production by cities and districts of Navoi region, the coefficient of variation in 2020 was 185,72%, in 2016 – 113,40% and in 2010 – 146,98%. This means that in the cities and districts of Navoi region, the level of fluctuations in 2016 in terms of industrial production was the lowest, and in 2020 this indicator increased. Analyzing the above analysis, we came to the conclusion that the range of variation in 2020 has increased, the differences in indicators between cities and districts are high, and the level of fluctuations has increased. It is necessary to take measures to mitigate this situation and prevent further deterioration of the situation in areas of Navoi region with a low level of industrial production, develop local production infrastructure, pay more attention to industrial production.

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