

## DESCRIPTIVE STATISTICS IN THE EVALUATION OF SUSTAINABLE DEVELOPMENT OF REGIONS



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### АННОТАЦИЯ

Ушбу мақолада ҳудудларнинг барқарор ривожланишини ифодаловчи статистик кўрсаткичлар тизимини дескриптив таҳлили, ҳудудларнинг барқарор ривожланишини аҳоли турмуш даражасига трансформациясини эконометрик моделлари, Хоразм вилоятининг иқтисодиётини барқарор ривожланишини статистик баҳолаш илмий тадқиқ этилган.

### АННОТАЦИЯ

В данной статье проведен описательный анализ системы статистических показателей, характеризующих устойчивое развитие регионов, изучены эконометрические модели трансформации устойчивого развития регионов в уровень жизни населения, статистическая оценка устойчивого развития экономики Хорезмской области.

### ANNOTATION

In this article, a descriptive analysis of the system of statistical indicators that characterize the sustainable development of the regions, econometric models of the transformation of the sustainable development of the regions into the standard of living of the population, statistical evaluation of the sustainable development of the Khorezm region's economy are studied.

**Калит сўзлар:** барқарор ривожланиш, иқтисодий, ижтимоий, маданий ва экологик фаровонлик, ресурс, статистик индикатор, статистик гуруҳлаш, қашшоқлик даражаси, кам таъминланганлик даражаси, вариация, диспропорция, сифат омиллари.

**Ключевые слова:** устойчивое развитие, экономическое, социальное, культурное и экологическое благополучие, ресурсы, статистический показатель, статистическая группировка, уровень бедности, уровень низкого дохода, вариации, дисперсия, качественные факторы.

**Key words:** sustainable development, economic, social, cultural and environmental well-being, resource, statistical indicator, statistical grouping, poverty rate, low-income level, variation, dispersion, quality factors.

## INTRODUCTION

Much work is being done by international organizations to combat social inequality in countries. This is widely practiced in our country as well. In particular, one of the main tasks of the Ministry and its affiliated organizations is the reduction of poverty. development of specific supports and mechanisms, implementation of measures to achieve the goals and objectives of socio-economic development of the regions and national sustainable development. Restoring strong economic growth and providing employment to the population is certainly a priority, especially in the current global pandemic.

During our study, econometric models were developed on the impact of sustainable development of the regions on the living standards of the population. In the development of these models, research conducted by international scientists has been studied.

## THE MAIN PART

Based on the above, we use our econometric models as a result of the level of poverty and the factors influencing it: GDP growth rate per capita, population growth rate, the share of the population receiving old-age pensions, gross per capita income growth, employment rate, unemployment level, Gini coefficient, GDP deflator and share of small business and private entrepreneurship in GDP were selected.

$Y$  = Poverty rate in countries and regions -  $LPP_{C(R)}$

$X_1$  = GDP growth rate per capita -  $PC_{GDP(GRP)}$

$X_2$  = Population growth rate -  $PGR_{C(R)}$

$X_3$  = Percentage of population receiving old age pension -  $PPRP_{C(R)}$

$X_4$  = Growth rate of gross income per capita -  $TIPC_{C(R)}$

$X_5$  = Employment Rate -  $ER_{C(R)}$

$X_6$  = Unemployment Rate -  $UR_{C(R)}$

$X_7$  = Gini coefficients -  $GC_{C(R)}$

$X_8$  = GDP deflator -  $DC_{C(R)}$

$X_9$  = Share of small business and private entrepreneurship in GDP -  $SBPE_{GDP(GRP)} [1]$

mathematical expression has been created that expresses the functional relationships between the variables of the constructed econometric models .

$$Y_{X_{it}} = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \dots + \beta_n X_{nt} + \varepsilon_t \quad (1)$$

based on the theoretical view of this multifactor econometric model, a mathematical expression has been developed for the correlation relationship between the selected factors.

$$Y_{X_{it}}(LPP_{C(R)}) = \beta_0 + \beta_1 X_{1t}(PC_{GDP(GRP)}) + \beta_2 X_{2t}(PGR_{C(R)}) + \beta_3 X_{3t}(PPRP_{C(R)}) + \beta_4 X_{4t}(TIPC_{C(R)}) + \beta_5 X_{5t}(ER_{C(R)}) + \beta_6 X_{6t}(UR_{C(R)}) + \beta_8 X_{8t}(DC_{C(R)}) + \beta_9 X_{9t}(SBPE_{GDP(GRP)}) + \varepsilon_t (2)$$

Table 2 Descriptive statistics

Indicators	LPP <sub>c</sub> Y	PC <sub>GDP</sub> X <sub>1</sub>	PG <sub>R</sub> <sub>c</sub> X <sub>2</sub>	P <sub>PRP</sub> <sub>c</sub> X <sub>3</sub>	TIPC <sub>c</sub> X <sub>4</sub>	ER <sub>c</sub> X <sub>5</sub>	UR <sub>c</sub> X <sub>6</sub>	D <sub>c</sub> X <sub>8</sub>	SBPE <sub>GDP</sub> X <sub>9</sub>
Average	19.0	104.5	101.6	7.4	126.6	67.7	4.2	19.0	104.5
Median	17.7	104.7	101.5	7.4	124.8	67.7	5.0	17.7	104.7
Minimum	11.0	99.8	101.1	7.0	112.7	66.1	0.2	11.0	99.8
Maximum	28.9	107.9	104.0	8.2	155.8	69.4	10.5	28.9	107.9
Standard deviation	6.5	1.9	0.6	0.3	11.8	0.9	3.2	6.5	1.9
Variation	0.343	0.018	0.006	0.044	0.093	0.013	0.765	0.343	0.018
Asymmetry	0.169	-0,413	3,090	1,091	0.968	0.133	0.197	0.169	-0,413
Excess	-1,616	0.075	10,183	0.777	0.257	-0,112	-0,768	-1,616	0.075
5% Percent	11.0	100.0	101.1	7.0	112.8	66.1	0.2	11.0	100.0
9 5% Percent	28.8	107.9	103.8	8.2	155.2	69.4	10.4	28.8	107.9
Range	13.4	3.0	0.4	0.3	15.5	1.0	4.9	13.4	3.0

The factors influencing the resultant sign for the republic are given in Table 2 and according to their descriptive statistics results were obtained.

Factors 21 cycles were selected on dynamic series and formed in the observed tables. X<sub>7</sub> (GC<sub>c</sub>(<sub>R</sub>)) - Due to interruptions in the periodic data of the Gini coefficient and the fact that it is not formed by regions, the share of the population receiving old-age pensions - X<sub>2</sub> (PPRP<sub>c</sub>(<sub>R</sub>)) and employment rate X<sub>5</sub> (ER<sub>c</sub>) Due to the low probability of a strong impact on the level of poverty in the regions, the correlation between the factors X<sub>3</sub> (PPRP<sub>c</sub>) and X<sub>5</sub> (ER<sub>c</sub>) is low when the correlation between the factors X<sub>3</sub> (PPRP<sub>c</sub>) and X<sub>5</sub> (ER<sub>c</sub>) is weakly related factors were excluded due to the presence of a multicollinearity phenomenon in the correlation table.

$$Y_{X_i}(LPP_c) = 0,454X_1(PC_c) + 0,067X_4(TIPC_c) - 0,542X_6(UR_c) - -0,400X_9(SBPE_{GDP}) - 5,08 \quad (3)$$

This econometric model (3) can be interpreted as follows, i.e. we look at it with the aim of reducing the resultant sign, because the goal of statistical research is also exactly what factors should be considered to reduce the level of low-income population. Therefore, the interpretation is as follows: if the GDP growth rate per capita increases by one unit when other factors do not change, the poverty rate decreases by 0.454 units. An increase in the rate of growth of gross per capita income by one unit reduces the level of poverty in the country by 0.067 units, even in this case when the remaining factor signs remain unchanged. It was found that a decrease in the unemployment rate in the country by one unit will lead to a decrease in the poverty rate by 0.542 units. The increase in the share of small business and private entrepreneurship in GDP by one unit led to a decrease in the level of poverty in the country by 0.400 units.

As a result of this study, multifactor econometric models were developed for each region. Statistical software packages such as STATA, MINITAB, Microsoft Excel, EViews and GRETL were used to create these models.

1. Republic of Karakalpakstan:

$$Y_{X_i}(LPP_R) = -5,36X_2(PGR_R) - 17,85X_3(PPRP_R) - 1,35X_9(SBPE_{GRP}) + 768,98$$

2. Andijan region:

$$Y_{X_i}(LPP_R) = 3,96X_3(PPRP_R) - 1,02X_6(UR_R) - 0,42X_9(SBPE_{GRP}) + 18,56$$

3. Bukhara region:

$$Y_{X_i}(LPP_R) = -0,53X_6(UR_R) - 0,33X_9(SBPE_{GRP}) + 38,65$$

4. Jizzakh region:

$$Y_{X_i}(LPP_R) = -0,56X_6(UR_R) - 0,42X_9(SBPE_{GRP}) + 54,49$$

5. Kashkadarya region:

$$Y_{X_i}(LPP_R) = -1,83X_6(UR_R) + 0,17X_8(D_R) - 0,21X_9(SBPE_{GRP}) + 28,71$$

6. Navoi region:

$$Y_{X_i}(LPP_R) = 0,10X_4(TIPC_R) + 0,89X_5(ER_R) - 1,05X_6(UR_R) - 0,13X_9(SBPE_{GRP}) - 50,95$$

7. Namangan region:

$$\ln Y_{X_i}(LPP_R) = -1,53\ln X_5(ER_R) - 2,08\ln X_9(SBPE_{GRP}) + 18,08$$

8. Samarkand region:

$$Y_{(X_{t-2})_i}(LPP_R) = -0,47(X_{t-2})_1(PC_R) - 0,71(X_{t-2})_6(UR_R) - 0,4(X_{t-2})_9(SBPE_{GRP}) + 94,53$$

9. Surkhandarya region:

$$Y_{X_i}(LPP_R) = -1,37X_6(UR_R) - 0,33X_9(SBPE_{GRP}) + 55,08$$

10. Syrdarya region:

$$Y_{X_i}(LPP_R) = -6,96X_2(PGR_R) + 0,13X_4(TIPC_R) - 0,63X_6(UR_R) - 0,29X_9(SBPE_{GRP}) - 735,2$$

11. Tashkent region:

$$Y_{X_i}(LPP_R) = 0,08X_4(TIPC_R) - 1,39X_5(ER_R) - 1,17X_6(UR_R) + 108,14$$

12. Fergana region:

$$Y_{X_i}(LPP_R) = 0,46X_6(UR_R) - 0,09X_8(D_R) - 0,67X_9(SBPE_{GRP}) + 62,58$$

13. Khorezm region:

$$Y_{X_i}(LPP_R) = -2,74X_2(PGR_R) - 0,87X_5(ER_R) - 0,55X_6(UR_R) - 0,61X_9(SBPE_{GRP}) + 399,58$$

14. Tashkent city:

$$\ln Y_{X_i}(LPP_R) = 2,79\ln X_1(PC_R) - 1,3\ln X_4(TIPC_R) - 0,18\ln X_6(UR_R) - 6,72\ln X_9(SBPE_{GRP}) + 20,93$$

As a result of the above research, the factors affecting the level of poverty in Khorezm region, such as "population growth rate", "employment rate", "unemployment rate" and "the share of small business and private entrepreneurship in GDP" are statistically reliable.

## CONCLUSION

The share of public spending on social protection in GDP averaged 1.5% between 2005 and 2020, with a range of 1.4%. If we look at the history of developed countries, they had such high rates during the development period. It is advisable to introduce this experience in our country. country by one unit leads to a decrease in the employment rate of the low-income population by 0.674 units, while the remaining factor is when the signs do not change.

In the Republic of Karakalpakstan, Khorezm and Syrdarya regions, when the population growth rate increased by one unit, the level of poverty decreased by 5.36, 2.74 and 6.96 units, respectively.

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