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Peculiarities of Econometric Modeling of Living Standards in Uzbekistan

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Abstract

In this work, the factors affecting the income and standard of living of the population were studied, and the influence of these factors was assessed by statistical methods.

Keywords: *statistics, standard of living of the population, indicators, multivariate statistical analysis.*

Introduction

One of the main goals to be achieved in the framework of large-scale reforms in all spheres of Uzbekistan is to improve the living standards and quality of life of the population and ensure sustainable development of the social sphere. It is known from the experience of socio-economic development of the world that the country's economy is based on objective laws of its development, existing economic opportunities, and well-designed economic policy based on the specific lifestyle, thinking, national values and traditions, economic needs of the people living in this country.

From the first days of independence, the socio-economic development of our country has been determined in all respects, the deep and true reflection of the vital interests of our people is the result of their work.

At present, one of the most important issues is the study of the indicators that determine the living standards of the population in statistical methods, the assessment of the factors affecting them through statistical parameters.

The new development strategy of Uzbekistan for 2022-2026 also serves as a basis for ensuring the continuity and continuity of reforms, prioritizing human values and interests, and is one of the forces that directly affect living standards. Implementation of a separate state program on radical reform of water resources management and water conservation, aimed at conserving clean drinking water, water resources, provided for in the Millennium Development Goals, at least doubling the incomes of various segments of the population, in particular, "Income of farmers and farmers"; In particular, to increase the level of drinking water supply to 87% by 2026, to upgrade sewage systems in 32 major cities and 155 district centers”[1]. These tasks require the statistical assessment of factors that increase incomes and living standards in the regions, the development of a system of statistical indicators, the development of econometric models of economic development strategies and the improvement of the scientific and methodological framework for forecasting.

We know that in assessing the living standards of the population, according to the recommendations of the United Nations, there is a system of indicators that summarizes 12 different indicators, the main task of which is the statistical analysis of these indicators.

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Literature review

It is known that there are more than a hundred indicators that affect the living standards of the population. Numerous studies have been conducted in this regard; in particular, a study by Kashif Mansoor found that the main factor influencing the living standards of the population is the minimum monthly rate. According to him, the minimum wage has a positive impact on the growth of total income of the population, reducing unemployment. To confirm the hypothesis, a model of India's minimum wage and total income of the population in 1997 and 2017 was developed [2].

Based on his scientific research, Edward Anderson studied the living standards of the population of Latin American countries, East and Central Asia and Africa and identified the most important indicators. According to him, the following indicators have a strong impact on living standards:

- ✓ consumer price index;
- ✓ academic year;
- ✓ level of corruption;
- ✓ tax policy;
- ✓ social security of the state;
- ✓ Development of a market economy.

These figures represent the change in the Gini coefficient in the states [3].

Research by K.L. Diana has proven that the standard of living of the population depends not only on the minimum wage, but also on the income of the population. In addition, data-driven models from African countries have shown that clean drinking water, electricity, natural gas, internet speeds, and rural and urban livelihoods have a stronger impact [4].

Research methodology

We use econometric modeling of living standards based on the Panel model, using the above hypotheses and many other scientific studies to fully and comprehensively study and model the living standards of the population. In this case, we use the methods of panel analysis.

The panel model is formed based on the panel data, i.e. the data constructed through the intersecting and time series forms this list.

Panel analysis is a widely used statistical method widely used in the social sciences and econometrics, in which data are involved in two different dimensions (cross sectional / times series). Data are collected from the same social groups over a period of time, and then regression is performed on these two dimensions. Multidimensional analysis is an econometric method in which data are collected in more than two dimensions (i.e., third, fourth, and other observations are added in addition to time and individuals).

The appearance of a typical regression model of panel research is represented as follows: Yit=a+bxit+it (1), here y-dependent variable, x-independent variable, coefficients a and b, i and t individuals and time indices. The error in this analysis is very significant. The error determines whether we have a fixed effect or a random effect. The it variable effect model must vary randomly across the i and t indices, which makes the fixed effect model similar to the one-dimensional imaginary variable model. Random effects the change in the it random i and t indices requires special processing in the error dispersion matrix.

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The panel data regression model differs from the normal time series regression or spatial regression model in that the variables have 2 sub-indices.

yit=α+Xit'β+vit, i=1,…,N; t=1,…,T (2)

Бу ерда *i*- объект рақами (уй хўжалиги, корхона, мамлакат ва бошқ.) *t*-вақт, а-озод ҳад, β-коэффициентлар ветори K*1, Xit'X1,it X2,itX3,it-ўзгарувчиларни тушунтириб берувчи *K*-матрица вектор қатори.

Research methodology

The panel model includes the following econometric models: Pooled OLS estimator (POLSE), First differences estimator (FDE), Fixed effects estimator (FEE), Random effects estimator (REE) [5].

POLS modeli: yit=0+1x1it+2x2it+uit

FDE modeli : ∆yit=0+1∆x1it+2∆x2it+∆uit

FEE modeli: yit-yi=1(x1it-x1i)+2(x2it-x2i)+(uit-ui)

REE modeli: yit-θyi=0+1(x1it-θx1i)+2(x2it-x2i)+(ai-ai)+(uit-ui)

Based on the purpose of the study, we analyzed the total income of the population as the most important indicator determining the living standards of the population and compiled the Panel data influencing the change of this indicator.

Analysis and discussion of results

In particular, 33 indicators affecting the living standards of the population, in particular, the total income of the population in the regions of the country from 2016 to 2021 were compiled by the author on the basis of data from the State Statistics Committee and divided into three groups: key indicators, positive and negative indicators.

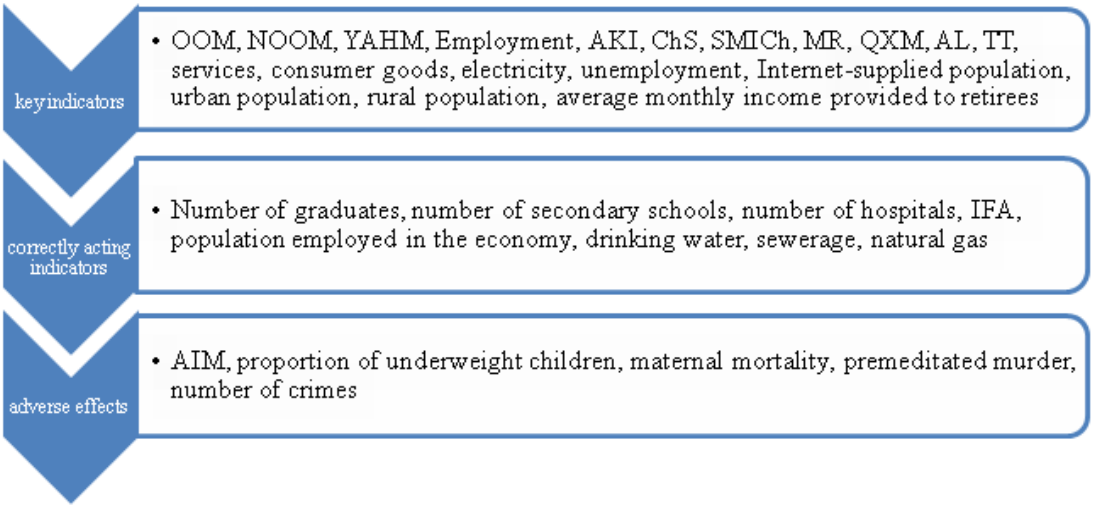

Figure 1. A system of indicators that affect the lifestyle of the population

All indicators are converted to the logarithmic state, and based on their values we develop Panel models using the STATA program.

This table shows the regression coefficients of the panel POLS, FDE, FEE, REE econometric models, for example, in the POLS model, employment is equal to 0.95, ie a one percent increase in employment leads to a 0.95% increase in total income in the regions.

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The study found that the factors that have a strong positive impact on the income of the population are GRP, employment, POOM, retail trade, labor resources and the population. A one percent change in each of these indicators will result in an average 0.50% increase in the total income of the population; for example, a one percent increase in the average monthly wage paid to retirees will affect a 0.38% increase in the total income of the population. This, in turn, will improve the living standards of the population.

Weak positive impacts on consumer goods, electricity, agricultural production, reducing unemployment, improving the Internet, improving the quality of communications, increasing the number of drinking water, natural gas, schools and hospitals will contribute to the overall income and living standards of the population. . For example, a one percent improvement in natural gas, electricity and drinking water in the regions has been found to have an average 0.05% increase in total income and an improvement in living standards.

The models proved that the factors that have a strong negative impact on the total income and living standards of the population are primarily the prices of food and non-food items. A one percent increase in OOM prices will lead to a 0.36% decrease in the total income of the population.

Studies have shown that the weakest negative factors affecting the living standards of the population are underweight children, maternal mortality, the number of crimes in the regions.

During our study, Panel models were once again developed based on the characteristics of the factors that strongly influence the total income and living standards of the population [6].

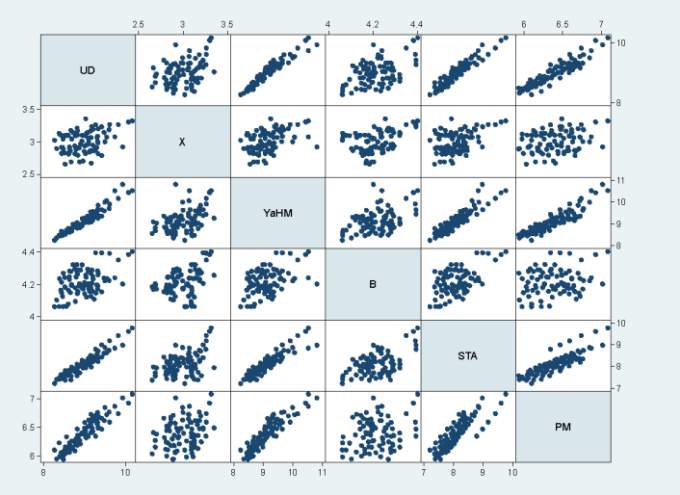

Figure 2. Correlation

As can be seen from Figure 2, there is a strong strong link between the selected factor characters and the resulting character.

Table 1. Economic modeling of the population's lifestyle based on panel models

	Indicators	model POLS	model FDE	model FEE	model REE
1	Services	0.22	0.02	0.02	0.01
2	YaHM	0.30	0.38	0.19	0.20
3	Employment	0.29	0.18	0.34	0.33
4	Retail	0.28	0.11	0.27	0.28
5	POOM	0.41	0.54	0.61	0.58

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When the reliability of these models was tested by Hausman and Breusch Pagan [7] tests, the model parameters and the statistical significance of the models were determined.

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Breusch and Pagan Lagrangian multiplier test for random effects

        UD[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                      UD |    .1657646        .407142
                       e |    .0014066       .0375051
                       u |    .0050529       .0710838
```

Figure 3. Breusch Pagan test results

As a result of our study, the fact that the probability of Breusch Pagan tests is greater than 0.05 confirms the statistical significance of the Panel models.

```
. hausman fixed random

                 ---- Coefficients ----
                 |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                 |    fixed       random       Difference          S.E.
-----------------+------------------------------------------------------------
               X |   .0284514    -.0177788        .0462302        .0252671
            YaHM |   .1998111    .2046099       -.0047988        .0179886
               B |    .344256     .338186          .00607        .0503455
             STA |   .2720585    .2839482       -.0118897        .0975196
              PM |   .6143736    .5881297        .0262439         .138104
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =          4.81
                Prob>chi2 =        0.4400
                (V_b-V_B is not positive definite)
```

Figure 4. Hausman test results

The results of the Hausman test also confirm that all the parameters and statistical significance of the developed POLS, FDE, FEE, REE models are 95% reliable.

Conclusions and suggestions

According to scientific research, the strongest factor influencing the living standards of the population and the total income of the population is the average monthly rate assigned to retirees.

The next strong influencing factor was the employment of the character population. An increase in employment by one percent will lead to an increase in living standards and total income by 0.33%.

The GRP also has a strong impact on the increase in living standards and total income of the population and a one percent increase in this indicator will increase the total income of the population by 0.30%.

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