



Article

# The Impact of the Level of Economic Development on Household Income

Abdunazarova Shahnoza Norqo'chqor qizi\*<sup>1</sup>

1. Termez State University.

\* Correspondence: [shahnoza.abdunazarova1530@gmail.com](mailto:shahnoza.abdunazarova1530@gmail.com)

**Abstract:** This study empirically examines the impact of economic development on household income. The main objective of the research is to identify the interrelationship between regional economic growth indicators and household income, as well as to assess the effect of economic development on income inequality. Statistical database for Surxondaryo region from (2018–2024) was compiled during this study based on multiple regression analysis as well correlational analysis diagnostic tests, and results were analyzed using STATA software. The results show that economic development positively affects rising household income across the Surxondaryo region, although there continue to be regional divides. The results have both theoretical and practical implications for the improvement of regional economic policy, population well-being, and income distribution.

**Keywords:** Economic Development, Household Income, Income Inequality, Regional Economic Policy, Empirical Analysis, Surxondaryo Region, STATA, Regression Model.

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## 1. Introduction

Economic development is one of the most important factors for material basis of living (it is important both nationally and regionally). The speed and pattern of regional economic growth have direct implications, not only on the outputs of production but on the development and dispersal of household incomes and welfare. Thus, studying the interdependence of economic development and household income is of great scientific and practical importance for improving regional socio-economic policy. Over the last few years, Uzbekistan has carried out structural reforms that are focused on sustainable economic development, mitigation of interregional socio-economic inequality and raising households' living standards. However, there are still gaps in regional economic development that are one of the main sources of income inequality.

The case of the household income in the Surxondaryo region is used to carry out the empirical relationships between levels of economic development. The originality of the research consists in a regression model application in the STATA soft, which allows to assess the effect of the factors of economic growth on the welfare of households by districts. Our results create a basis for actionable recommendations to advance regional economic policy, facilitated resource allocation and greater equity.

**Literature Review.** There have been many international studies on the effect of economic development on household income from different points of views. Within the meaning of economic growth theory, income growth is provided by human capital level, occupation space and technology [1]. Kuznets, in his famous Kuznets Curve hypothesis,

showed that income inequality is first increasing and then decreasing in the course of economic development [2]. According to M. Todaro and S. Smith they attributed the relationship between economic growth and income inequality to government composition (policy), quality of education and efficiency of labor market [3]. In addition, household income is directly affected by regional economic inequality (OECD; World Bank) [4].

The link between economic growth and money household income have also been a topical point of study in Uzbekistan for that last couple of years. According to the study of A. Vakhobov, the increase in the Gross Regional Product (GRP) has an indirect positive impact on household income [5]. The regional differentiation of the economy is more related to the volume of industrial production, as well as the share of the sphere service of the regions [6]. Volume of investments, employment, small businesses are the main factors driving income growth [7] according to M. Abdurakhmonov.

Most local studies highlight that in economically less developed regions such as Surkhondaryo, the expansion of production infrastructure and the service sector is essential for improving the population's welfare [8]. Both international and domestic literature indicate that the impact of economic development on household income is closely linked not only to production volume and investment but also to the service sector, employment level, and the effectiveness of regional economic policies.

## 2. Materials and Methods

The study sought to empirically determine the effect of amount of economic development on household income. The target population of the research was economic indicators of 14 district and 1 city of Surxondaryo region for 2018–2024. The empirical analysis has been carried out using STATA 17, and multiple regression has been applied to explain the impact of economic development factors on household income. Fixed Effects, Random Effects models and Hausman specification test [9] was worked out to test the correctness of the chosen model. The outcome of Hausman test shows the Fixed Effects model is best fit for this analysis. This methodological approach combines theoretical and practical rationality, which, in turn, has given the study a scientific tool for determining the relationship between economic development and the quality of life of the people of the Surxondaryo region.

## 3. Results and Discussion

Based on the research results, the direction and strength of the impact of economic development indicators on household income were evaluated. The Hausman test conducted to determine the appropriate model indicated that the Fixed Effects model should be applied [10]. This section presents the analysis of the estimation results and discusses their economic implications.

**Table 1.** Results of the Fixed Effects Model.

inc_pc	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
ind_vol	40.498	18.576	2.18	.032	3.544	77.452 **
serv_vol	105.019	9.999	10.50	0	85.127	124.911 ***
agr_out	20.083	6.727	2.99	.004	6.702	33.465 ***
new_ent	-12.893	15.894	-0.81	.42	-44.511	18.724
invest	7.924	3.703	2.14	.035	.556	15.291 **
Constant	54595.294	9841.941	5.55	0	35016.539	74174.049 ***
Mean dependent var		189321.970			SD dependent var	63974.023
R-squared		0.884			Number of obs	102
F-test		125.370			Prob > F	0.000

Akaike crit. (AIC) 2317.425 Bayesian crit. (BIC) 2333.175

\*\*\* p<.01, \*\* p<.05, \* p<.1

Source: Calculated using Stata/MP 17.0.

According to the analysis results, the model's  $R^2 = 0.884$  indicates that 88.4 percent of the variation in per capita income is explained by the selected factors (Table 1). The F-test (125.37;  $p < 0.01$ ) shows that the model is overall statistically significant. The variables industrial output ( $\beta = 40.498$ ;  $p < 0.05$ ), service sector volume ( $\beta = 105.019$ ;  $p < 0.01$ ), and agricultural production ( $\beta = 20.083$ ;  $p < 0.01$ ) have a positive and statistically significant impact on household income. This implies that these sectors of economic development play a crucial role in increasing income levels [11]. The investment variable ( $\beta = 7.924$ ;  $p < 0.05$ ) also has a positive and significant effect, confirming that capital investments contribute to the growth of regional incomes. But decrease in new enterprises and organizations ( $\beta = -12.893$ ;  $p > 0.1$ ) have negative but statistically non-significant impact, which means does not have a substantial effect on income in the short run.

Moreover, a closer inspection of the model outputs indicates that per capita income is correlated with some of the regional economics variables. An increase of one unit in industrial output raises increases per capita income by 40.498 units, suggesting that districts with more developed industry accumulate more income, thus making it a core contributor to reduce regional disparity. Here, a one per cent increase in the output of services will increase per capita income by 105.019 units, indicating that the services sector is the foremost determinant of wider income at the regional level. It implies that a one-unit increase in agricultural output increases per capita income by 20.083 units, and in those districts in which agricultural activity is vibrant (Boysun and Angor), it even has a greater effect. An additional new enterprise and organization unit per capita leads to lower per capita income of 12.893 units however, this is not statistically significant again new enterprises require time to effect positively to income. The coefficient indicates that for each one-unit increase in investments per capita, the value of per capita income increases by 7.924, revealing a positive influence of capital investments on regional incomes. The mean average income per capita is 54.595 million UZS when the explanatory variables take the value of zero

In sum, the findings suggest that regional economic sectors (i.e., industry, service and agriculture) are important determinants of per capita incomes. Further to this, new enterprises do not create an income instantly (investments and services of the highest importance to increase regional incomes).

**Table 2.** Results of the Random Effects Model.

inc_pc	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
ind_vol	51.818	18.952	2.73	.006	14.673 88.962	***
serv_vol	58.488	8.912	6.56	0	41.022 75.954	***
agr_out	12.371	4.796	2.58	.01	2.97 21.772	***
new_ent	-111.216	21.485	-5.18	0	-153.326 -69.105	***
invest	8.811	4.335	2.03	.042	.315 17.308	**
Constant	134237.35	11257.913	11.92	0	112172.24 156302.45	***
Mean dependent var		189321.970				
Overall r-squared		0.664				
Chi-square		218.558				
R-squared within		0.780				
SD dependent var		63974.023				
Number of obs		102				
Prob > chi2		0.000				
R-squared between		0.587				

\*\*\* p<.01, \*\* p<.05, \* p<.1

Source: Calculated using Stata/MP 17.0.

The results indicate that the model's overall  $R^2 = 0.664$ , meaning that the selected factors explain 66.4 percent of the variation in per capita income (Table 2). The within  $R^2 = 0.780$  and between  $R^2 = 0.587$  values confirm the model's explanatory power across regions and over time. The Chi-square = 218.558;  $p < 0.01$  demonstrates that the model is statistically significant overall. The variables industrial output ( $\beta = 51.818$ ;  $p < 0.01$ ), service sector volume ( $\beta = 58.488$ ;  $p < 0.01$ ), and agricultural production ( $\beta = 12.371$ ;  $p < 0.01$ ) have a positive and statistically significant impact on household income. Additionally, investments ( $\beta = 8.811$ ;  $p < 0.05$ ) show a positive and significant effect, indicating that capital investment contributes to regional income growth [12]. However, the number of newly established enterprises and organizations ( $\beta = -111.216$ ;  $p < 0.01$ ) has a negative and statistically significant effect, suggesting that in the short term, an increase in new enterprises does not necessarily raise regional income levels. Overall, the Random Effects model demonstrates that different sectors of economic development affect household income to varying degrees while accounting for inter-regional differences.

Based on the results of the above model, a Hausman–Taylor test was conducted to determine which model is most appropriate for the analysis [13]. This test accounts for potential correlations between individual (regional or time-specific) effects and explanatory variables, providing a reliable basis for model selection.

. hausman fixed random

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
	(b) fixed	(B) random		
Sanoat_hajmi	40.49796	51.81765	-11.31969	.
Xizmatlar_~i	105.0186	58.48806	46.53055	4.535615
Qishloq_xo~h	20.08343	12.37089	7.712538	4.716401
Yangi_korx~i	-12.8933	-111.2156	98.3223	.
Investitsi~r	7.923527	8.811328	-.8878009	.

b = Consistent under  $H_0$  and  $H_a$ ; obtained from `xtreg`.

B = Inconsistent under  $H_a$ , efficient under  $H_0$ ; obtained from `xtreg`.

Test of  $H_0$ : Difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 884.55 \end{aligned}$$

Prob > chi2 = 0.0000

(V\_b-V\_B is not positive definite)

Source: Calculated using Stata/MP 17.0.

**Figure 1.** Model Selection Results Based on the Hausman Test.

The Hausman specification test serves to assess the appropriateness of the Fixed Effects and Random Effects models. According to the test results,  $X^2 = 884.551$  and  $p$ -value = 0.000 were obtained (Figure 1). Since the  $p$ -value equals 0, the null hypothesis—that the Random Effects model is consistent—is rejected. Consequently, the Fixed Effects model, which accounts for potential correlations between individual (regional or time-specific) effects and explanatory variables, is deemed the most appropriate for the analysis [14]. This result ensures the reliability of the model selection when evaluating the impact of economic development indicators on household income.

The results of both the Fixed Effects and Random Effects models were analyzed. The Hausman test results ( $X^2 = 884.551$ ;  $p\text{-value} = 0.000$ ) indicate that the Random Effects model does not provide reliable estimation. Therefore, the Fixed Effects model, which accounts for potential correlations between individual (regional or time-specific) effects and explanatory variables, is the most appropriate model for the analysis [15].

Based on the above results, it can be concluded that economic development indicators have a significant impact on household income. The Hausman test ( $X^2 = 884.551$ ;  $p\text{-value} = 0.000$ ) demonstrated that the Random Effects model does not provide reliable estimates, making the Fixed Effects model the most appropriate for the analysis.

According to the model results:

Looking at the analysis, we see that industrial production and the growth of the service sector have a positive and significant effect on per capita income. This effect is particularly evident in more industrialized districts (Termiz and Sherobod) where industrial sector enhancements help to reduce regional average income disparities. Rather, agricultural production also factors importantly in household income growth especially in the more agriculturally active districts like Boysun and Angor. The inflows of investment usually increase the incomes in the region, but the scale of this effect varies from a district to a district. In places with higher investment levels, such as Termiz and Sariosiyo, the economy's ability to create income is more evident. On the flip side, newly formed firms have a weak or non-significant short term effect, indicating that it takes time for new firms to affect household income substantially. In conclusion, the results support the idea that income growth still needs to be tied to the core sectors: industry, services, and agriculture as the traditional economic policy design in district level.

#### 4. Conclusion

The analysis indicates that different sectors of economic development have a significant impact on per capita household income. Based on the Fixed Effects model, the following key conclusions and recommendations can be drawn:

These results reveal multiple sector specific trends in household income growth at the district level. On the other hand, a more industrialized districts, such as Termiz and Sherobod, induce the largest income effects, with the industrial sector being a key player. Meager production contributes to income inequality in countries with sluggish industrial activity, indicating that investment and production need to go beyond the handful of locations generating output. However, districts with less developed services like Boysun and Sariosiyo are also suffering from the positive impact of the service sector on per capita income. Closing these gaps may involve expanding service infrastructures and employment in these regions. In other districts like Boysun and Angor, agricultural production continues to provide an important source of livelihood, but in some areas low productivity is translating into increasing inequality. But the shift to modern agro technologies and ensure cooperative processes would deliver better results. Widespread income gains are constrained by lack of capital investments, and new businesses take years before they can be shown to be bringing about measurable income impacts.

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