



## ECONOMETRIC STUDY OF INDICATORS OF DEVELOPMENT OF SMALL BUSINESS IN THE REPUBLIC OF UZBEKISTAN

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### **Abstract**

The article examines the development of the service sector in the Republic of Uzbekistan and the factors affecting tax revenues to the state budget. Based on data for 2010–2024, a multiple econometric model is developed using the ordinary least squares method. The results show that the number of service sector entities, employment, and credit volumes have a positive impact on tax revenues, while inflation has a negative effect. The model is statistically significant and can be used for forecasting and improving fiscal policy.

***Keywords:** services area, budget tax revenues, econometric modeling, multifactorial analysis, correlation analysis, forecasting, inflation, employment*

### **INTRODUCTION**

The development of the world economy shows that today the services sector has become one of the leading sectors. This sector is developing at a high rate compared to industry and agriculture, directly affecting the economic stability, employment and well-being of the country. The services sector covers important sectors such as education, health care, transport, tourism, trade, finance and Information Technology, and plays an important role in improving the quality of life of the population and diversifying the economy.



In Uzbekistan, in recent years, special attention has been paid to the development of the services sector, support of private entrepreneurship and the introduction of digital technologies. In assessing the dynamics and effectiveness of the development of this industry, statistics are important, which make it possible to determine changes in the volume of services, share in GDP, employment, investments and financial incentives.

However, statistical analysis cannot fully reveal causal links between factors. Therefore, it is necessary to use econometric modeling in determining the main factors affecting the development of the service sector and assessing their impact on the outcome indicators. This approach provides a scientific and practical basis for forecasting the size of taxes on the budget, optimizing tax-budget policies, and developing strategies for sustainable economic growth[1].

In turn, the services sector is also of great importance in replenishing the Republican budget. In 2024, the share of the services sector in the Republican GDP in Uzbekistan was about 47.9 percent. And the number of employment in the services sector was 7,931.8 thousand people.

The goal set in the study is to determine the size of taxes paid to the budget by the service sector in the Republic and the factors affecting this indicator, as well as econometric modeling. In turn, it is important to study the factors affecting the volume of taxes paid to the budget by the services sector and to construct multi-factor econometric models.

Based on the research objective, the following factors were selected for the multi-factor econometric model: as the resulting factor, the tax paid to the budget by the service sector, billion. sum (Y), and the influencing factors are the number of facilities in the services sector, unit (X1), number of people employed in the services sector, thousand people (X2), volume of net taxes on products (at current prices, per annum), billion. sum (X3), the volume of loans allocated to the field of services,



billion. sum (X4), benefits to the services sector, billion. sum (X5) and inflation rate, % (X6).

Data participating in econometric modeling was obtained from 2010-2024.

The initial analysis begins with a descriptive statistic of the factors included in the multifactorial econometric model. Descriptive statistics is a set of statistical methods used to analyze a set of data, briefly, accurately and systematically describe their main characteristics.

The results of descriptive statistics conducted in the Republic on factors affecting the volume of taxes paid to the budget in the services sector are presented in Table 17 below (since the units of measurement of the factors included in the multi - factor econometric model are different, they were brought to a single unit of measurement by logarithming their values).

Skewness is an asymmetry coefficient that, when equal to zero, denotes the normal distribution as well as the symmetry of the distribution. If this coefficient is quite different from 0, then the distribution is asymmetric (i.e., not symmetric).

From the table data, the values of the mean (mean), median (median), maximum and minimum values (maximum, minimum) of each factor can be seen. In addition the standard deviation of each factor (std. dev. (Standard Deviation) - the standard deviation coefficient indicates how far each variable deviates from the mean) values are given.

If the asymmetry coefficient is greater than 0, i.e. positive, then the graph of the normal distribution on the studied factor is pushed to the right. When less than 0, i.e. negative, it is pushed to the left of the graph of the normal distribution on the studied factor[3].

From the Table 1 data below, it can be seen that only the following factors  $\ln X_3$  have a negative asymmetry coefficient, while the “left node” of their distribution graph is longer than the “right node” and the coefficients of the



remaining ( $\ln Y$ ,  $\ln X_1$ ,  $\ln X_2$ ,  $\ln X_4$ ,  $\ln X_5$ , and  $\ln X_6$ ) factors have taken positive values, these factors indicate that the “right node” of

**Table 1**

***Descriptive statistics results[2]***

	$\ln Y$	$\ln X_1$	$\ln X_2$	$\ln X_3$	$\ln X_4$	$\ln X_5$	$\ln X_6$
Mean	8.742748	12.30841	8.802586	10.27163	9.556702	9.231240	9.474000
Median	8.428271	12.16112	8.808683	10.45714	9.165916	8.986795	8.800000
Maximum	10.87849	12.88102	8.978635	11.12673	11.02359	10.75996	15.20000
Minimum	7.122110	11.89934	8.677763	9.155208	8.286616	8.168176	5.600000
Std. Dev.	1.224178	0.346866	0.078509	0.657416	0.958910	0.907913	3.310502
Skewness	0.374832	0.363357	0.461487	- 0.267722	0.282908	0.489285	0.503297
Kurtosis	1.863634	1.566214	3.003740	1.626953	1.543446	1.767531	1.880368
Jarque-Bera	1.158327	1.614910	0.532435	1.357474	1.526060	1.547862	1.416755
Probability	0.560367	0.445992	0.766273	0.507257	0.466251	0.461197	0.492443



Sum	131.1412	184.6262	132.0388	154.0745	143.3505	138.4686	142.1100
SumSq. Dev.	20.98056	1.684426	0.086291	6.050741	12.87312	11.54028	153.4320
Observati ons	15	15	15	15	15	15	15

Graphs of distribution functions of all factors are shown in Figure 3 below. From Figure 1 it can be seen that all factors included in the multi-factor econometric model obey the law of normal distribution. From the theoretical values of the normal distribution graph, the calculated distribution graphs of the factors are located asymmetrically, that is, pushed.

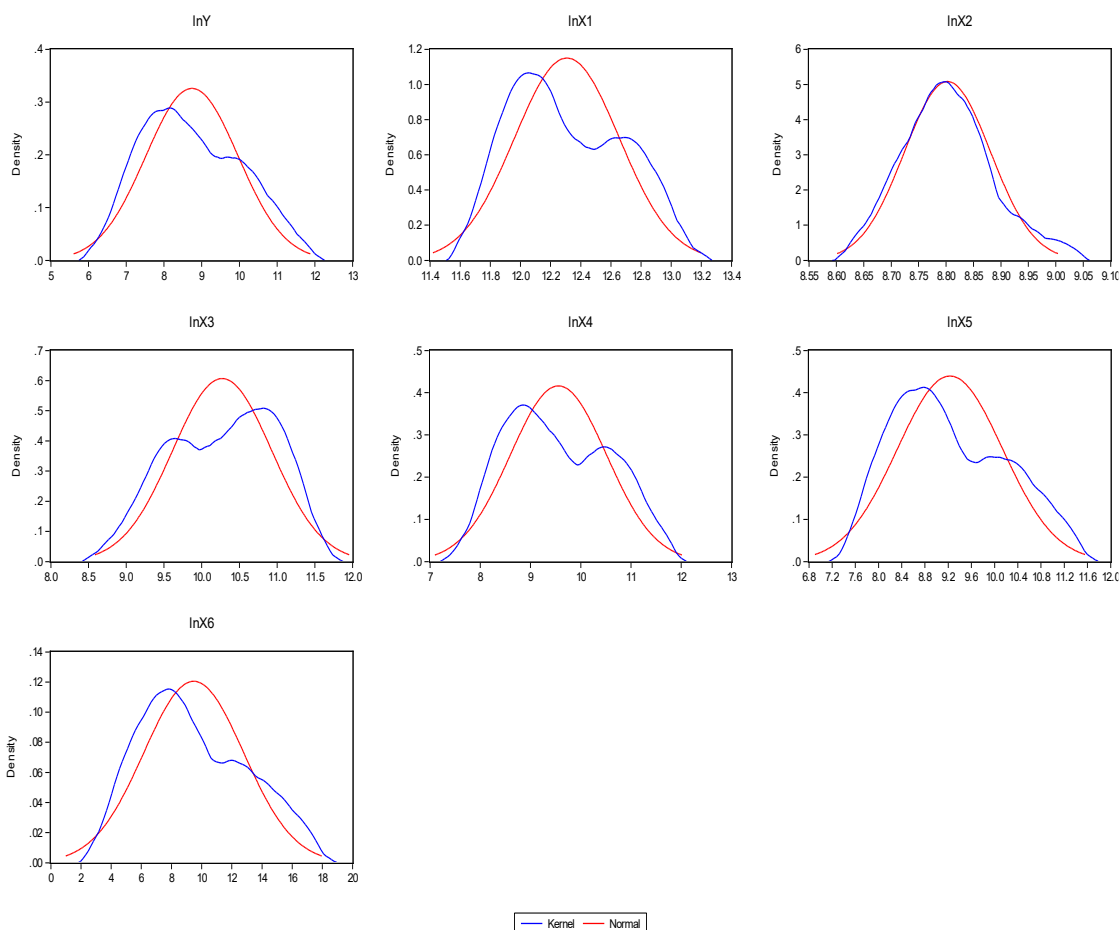
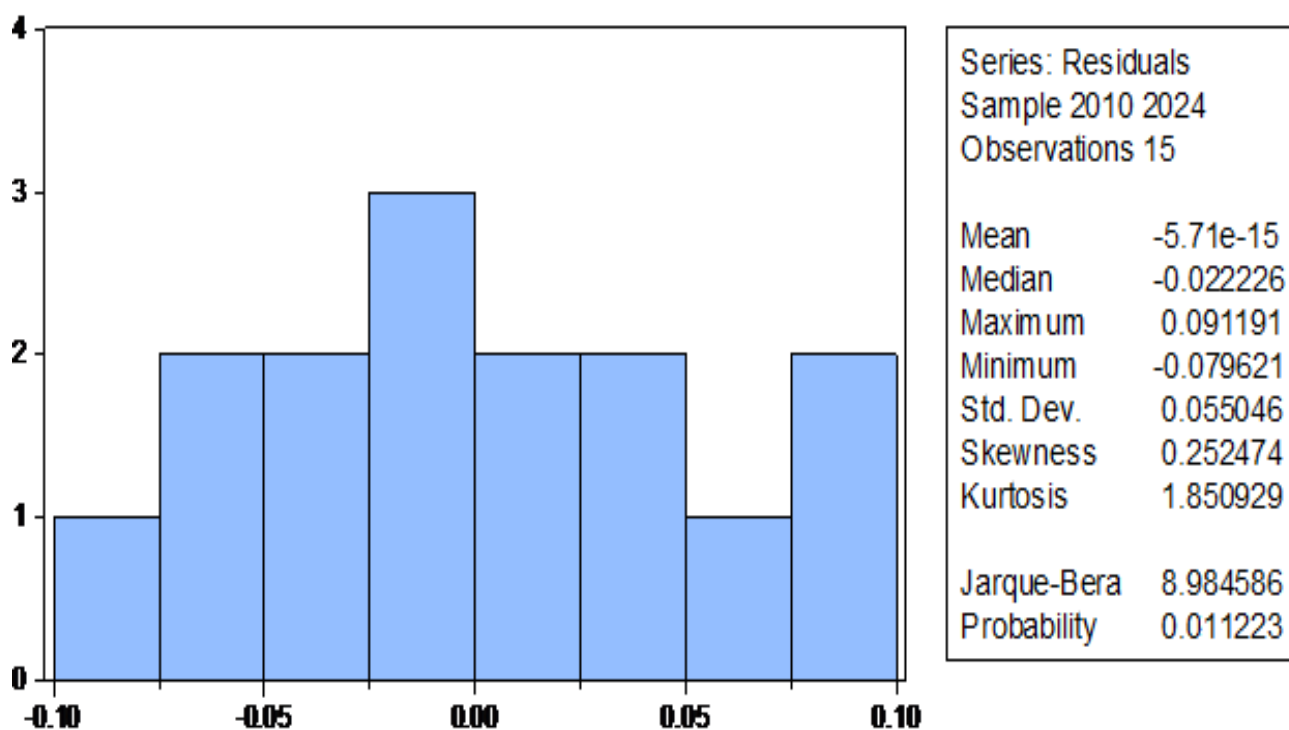


Figure -1. Distribution functions of factors



These surges mainly indicate changes in the dynamics of the factors under study. In some years, some factors had a sharp increase, while some did not have significant changes. In the dynamics of certain factors, “anomalous” values are observed. That is, some value of the indicator comes to a certain period, either sharply increased, or sharply decreased. As a result, it affected stationarity in some rows.

The histogram graph of the normal distribution of the resulting factor is shown in Figure 4 below.



**Figure 2. Examination of the resultant factor histogram and its subordination to the law of normal distribution[5]**

The Jak-Bera criterion is used to verify that the resultant factor (Y) obeys the law of normal distribution. The criterion in question is a statistical criterion that examines the observational errors with the normal distribution moments of the third moment (asymmetry) and the fourth moment (excess) to the normal distribution of and .



In particular, it is clear from Figure 4 that the resultant factor obeys the normal distribution. This is being confirmed by the calculated parameters and criteria, i.e. the Jak-Bera calculated coefficient is 8.9846 and its probability (probability) is less than 0.05 (probe=0.0112).

**Table 2**

**Private and even correlation coefficients between factors Matrix[6]**

Covariance Analysis: Ordinary

Date: 09/24/25 Time: 22:29

Sample: 2010 2024

Included observations:15

Correlation

t-Statistic

<b>Probabili ty</b>	<b>Y</b>	<b>X<sub>1</sub></b>	<b>X<sub>2</sub></b>	<b>X<sub>3</sub></b>	<b>X<sub>4</sub></b>	<b>X<sub>5</sub></b>	<b>X<sub>6</sub></b>
<b>Y</b>	1.000000						
<b>X<sub>1</sub></b>	0.820854	1.000000					
	7.872020	-----					
	0.0000	-----					
<b>X<sub>2</sub></b>	0.781373	0.594114	1.000000				
	6.544322	1.662410	-----				
	0.0000	0.1245	-----				



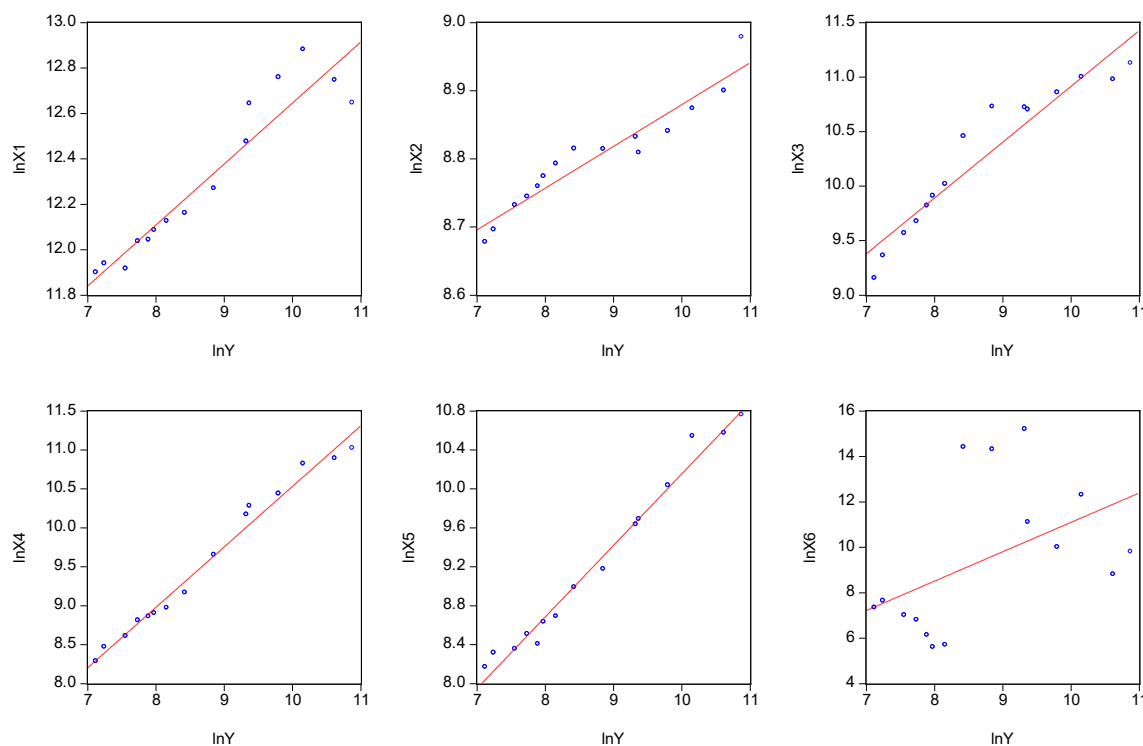
<b>X<sub>3</sub></b>	0.623033	0.584394	0.511994	1.000000			
	4.369555	1.661759	1.593735	-----			
	0.0034	0.1251	0.1587	-----			
<b>X<sub>4</sub></b>	0.749528	0.104805	0.048822	- 0.083045	1.000000		
	6.403323	0.537364	0.249243	- 0.424916	-----		
	0.0030	0.5956	0.8051	0.6744	-----		
<b>X<sub>5</sub></b>	0.605730	0.656019	0.380044	0.399072	0.526410	1.000000	
	4.210880	4.432041	2.095045	2.219252	3.156995	-----	
	0.0031	0.0002	0.0461	0.0354	0.0040	-----	
<b>X<sub>6</sub></b>	- 0.478347	- 0.494522	- 0.437205	0.649668	- 0.516348	0.486640	1.000000
	1.963972	2.051422	1.752758	3.081234	2.173942	2.008471	-----
	0.0713	0.0609	0.1032	0.0088	0.0488	0.0658	-----

In the Republic, the services sector has an average link between the volume of taxes paid to the budget (lnY) and the volume of net taxes on products (at current prices, per annum) (lnX<sub>3</sub>), that is, the coefficient of private correlation between them is 0.6230. In the Republic, the services sector has a strong link between the volume of taxes paid to the budget (lnY) and the volume of loans allocated to the services sector (lnX<sub>4</sub>), since the calculated private correlation coefficient is 0.7495. In the Republic, the services sector has an intermediate link between the size of taxes paid to the budget (lnY) and the benefits granted to the services sector (lnX<sub>5</sub>). The calculated



private correlation coefficient between them is 0.6057. Also in the Republic, the services sector has a reverse sluggish link between the volume of taxes paid to the budget ( $\ln Y$ ) and the inflation rate ( $\ln X_6$ ). The calculated private correlation coefficient between them is -0.4783[7].

When examining the above, i.e. determining the bond densities and shapes between factors, we consider their dotted graphs to determine whether each factor is related to the resultant indicator ( $\ln Y$ ) (Figure 5).



**Figure 3. In the Republic, the services sector forms a link between the volume of taxes paid to the budget and the factors affecting it**

In particular, it can also be said visually in the graphs in Figure 3 that there are true and dense connections between the resultant factor ( $\ln y$ ) and the influencing ( $\ln X_i$ ) factors. Therefore, in the Republic, the services sector meets the requirements for the calculated value and probability of the T-criterion of the conductor, the correlation coefficients between the factors included in the multi-factor econometric model in terms of the volume of taxes paid to the budget ( $\ln Y$ ). This is evidenced by



the fact that in the Republic of the services industry we include all factors in the multi-factor econometric model in terms of the volume of taxes paid to the budget  $(\ln Y)(1)$ .

In general, the multifactorial econometric model has the following appearance:

where  $\ln y$  is the resultant factor, – influencing factors, – random error.

The “least squares method” was used to determine (1) unknown parameters in the multifactorial econometric model. The results are shown in Table 19 below[7].

Using the data of Table 19 below, we fool the analytical view of the multifactorial econometric model in the Republic of the service sector by the volume of taxes paid to the budget  $(\ln Y)$ : (2)

The calculated multifactorial econometric model (2) shows that while the number of facilities in the services sector  $(\ln X1)$  increases by an average of one percent, in the Republic the services sector increases by an average of 0.865 percent in the volume of taxes paid to the budget  $(\ln Y)$ . While the number of people employed in the services sector  $(\ln X2)$  increases by an average of one percent, the volume of taxes paid to the budget  $(\ln Y)$  in the services sector in the Republic increases by an average of 0.363 percent.

A 1% increase in the volume of net taxes on products (in current prices, annual)  $(\ln X3)$  leads to an average increase in the volume of taxes paid to the budget by the service sector in the republic  $(\ln Y)$  by 0.487%. An average 1% increase in the volume of loans allocated to the services sector  $(\ln X4)$  leads to an average 0.669% increase in the volume of taxes paid to the budget by the services sector in the republic  $(\ln Y)$ [8].

An average increase in benefits to the services sector  $(\ln X5)$  by 1 percent, while in the Republic the services sector leads to an increase in the volume of taxes paid to



the budget (lnY) by an average of 0.654 percent. Also, an increase in the inflation rate (lnX6) by an average of 1% leads to a decrease in the volume of taxes paid to the budget (lnY) in the services sector in the Republic by an average of 0.032%[9].

In the Republic, a determination coefficient is used when checking the quality of a multi-factor econometric model (2), compiled by the volume of taxes paid to the budget of the service sector. The determinacy factor indicates how many percent the resultant factor is made up of factors included in the model.

## CONCLUSION

The results of the study confirmed that the services sector in the Republic of Uzbekistan is one of the most important and steadily developing sectors of the economy. The high level of formation of the share of the services sector in the GDP of the Republic, as well as its role in ensuring employment, has shown its direct impact on economic stability and the well-being of the population.

The results of descriptive statistics and correlational analysis, carried out on the basis of statistics obtained from 2010-2024, found that there is a positive and strong relationship between the volume of taxes paid by the services sector to the budget and the number of facilities in the services sector, employment level, loan size and tax benefits. The inflation rate, on the other hand, was characterized as having a negative impact on the resultant figure.

A multi-factor econometric model based on the least squares method was of high statistical importance, with a determination factor of 92.79 percent. This result shows that the main part of the changes in the volume of taxes paid to the budget of the services industry is explained through selected factors. The Fisher and styling criteria confirmed the reliability of the model parameters, while the Darbin–Watson criterion showed that there was no autocorrelation in the residues.



It was also based on the fact that the forecasting capabilities of the model were evaluated through the MARE indicator and determined that it is at a very low level, and this model can be used in the forecasting of the volume of taxes that the service sector will receive in the future.

In general, the results of the study provide a solid basis for the development of scientific and practical recommendations that allow you to effectively use the potential of the services sector by improving tax-budget policies aimed at the development of the services sector, strengthening investment and lending mechanisms, and increasing employment.

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