WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Analysis of the Impact of Unemployment on the Financial Security of Uzbekistan

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DOI: https://doi.org/10.55248/gengpi.5.0324.0751

ANNOTATION.

The article provides a comprehensive analysis of the impact of the unemployment rate on the financial security of the Republic of Uzbekistan. Using statistical research data from recent years, key trends in the labor market have been identified and their impact on economic stability and social well-being of the country's citizens has been assessed. The paper uses methods of econometric analysis to identify direct and indirect links between unemployment and employment rates on one of the main indicators of financial security, such as both GDP.

Keywords: financial security, unemployment rate, employment rate, the labor market, GDP.

Analyzing the impact of unemployment on financial security is a complex, multifaceted task that affects not only the economy of the country as a whole, but also the well-being of each of its citizens. In this context, financial security encompasses the stability of the national economy, the standard of living of the population, as well as the ability of the State to support social programs and ensure economic development in the face of potential external and internal shocks.

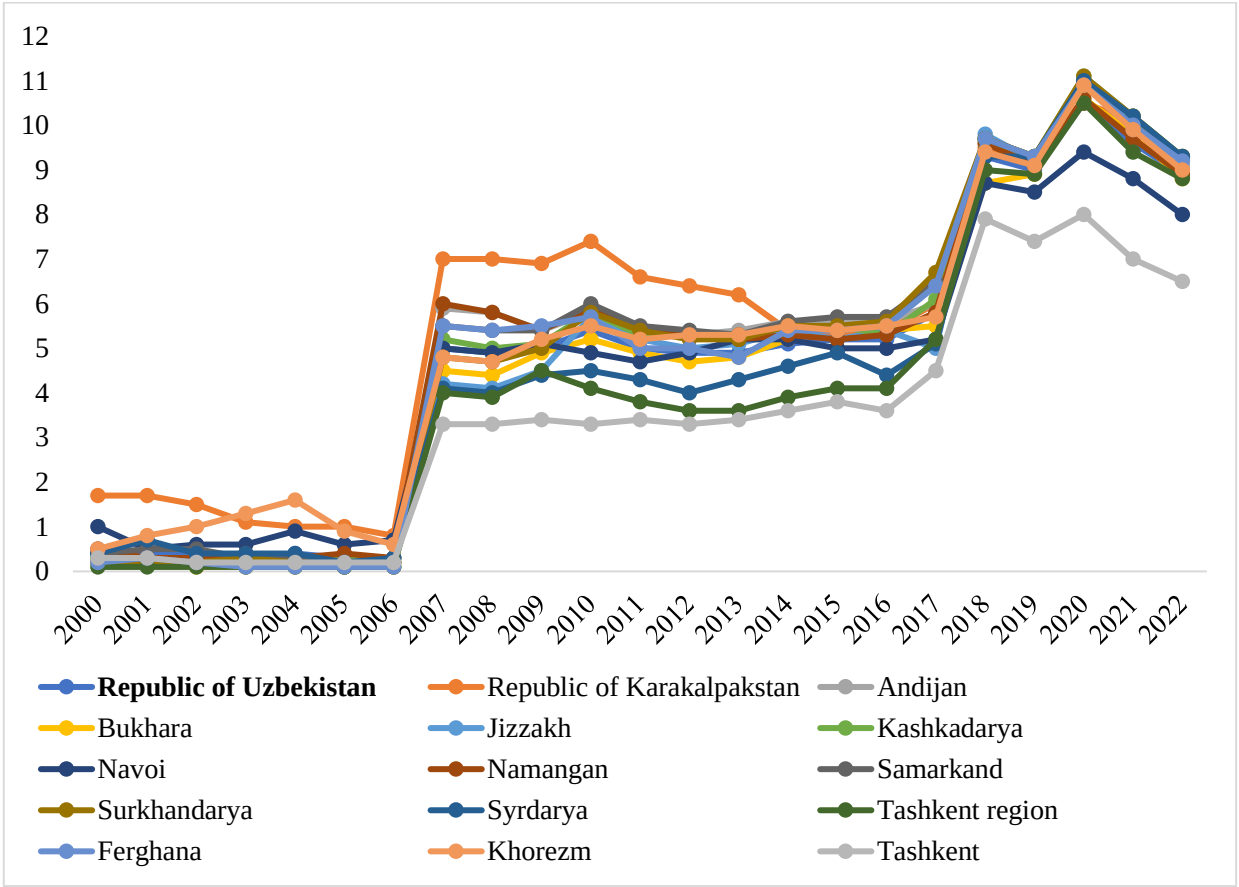

Figure 1 – Unemployment rate in Uzbekistan for 2000-2022, as a percentage (According to the Ministry of Employment and Poverty Reduction)

According to the data provided in Figure 1, in the early 2000s, the unemployment rate in the Republic of Uzbekistan was relatively low, amounting to less than 0.5%. However, since 2007, there has been a sharp jump to values of about 5%, which may be due to changes in the calculation methodology, economic changes in the country or the influence of external factors. A significant increase in the unemployment rate occurred in 2018, when the indicator reached 9,3%, and peaked in 2020 (10,5%), which is probably due to the economic consequences of the COVID-19 pandemic. It is also noticeable that in 2022 the unemployment rate fell to 8,9%, which indicates the beginning of economic recovery after the pandemic.

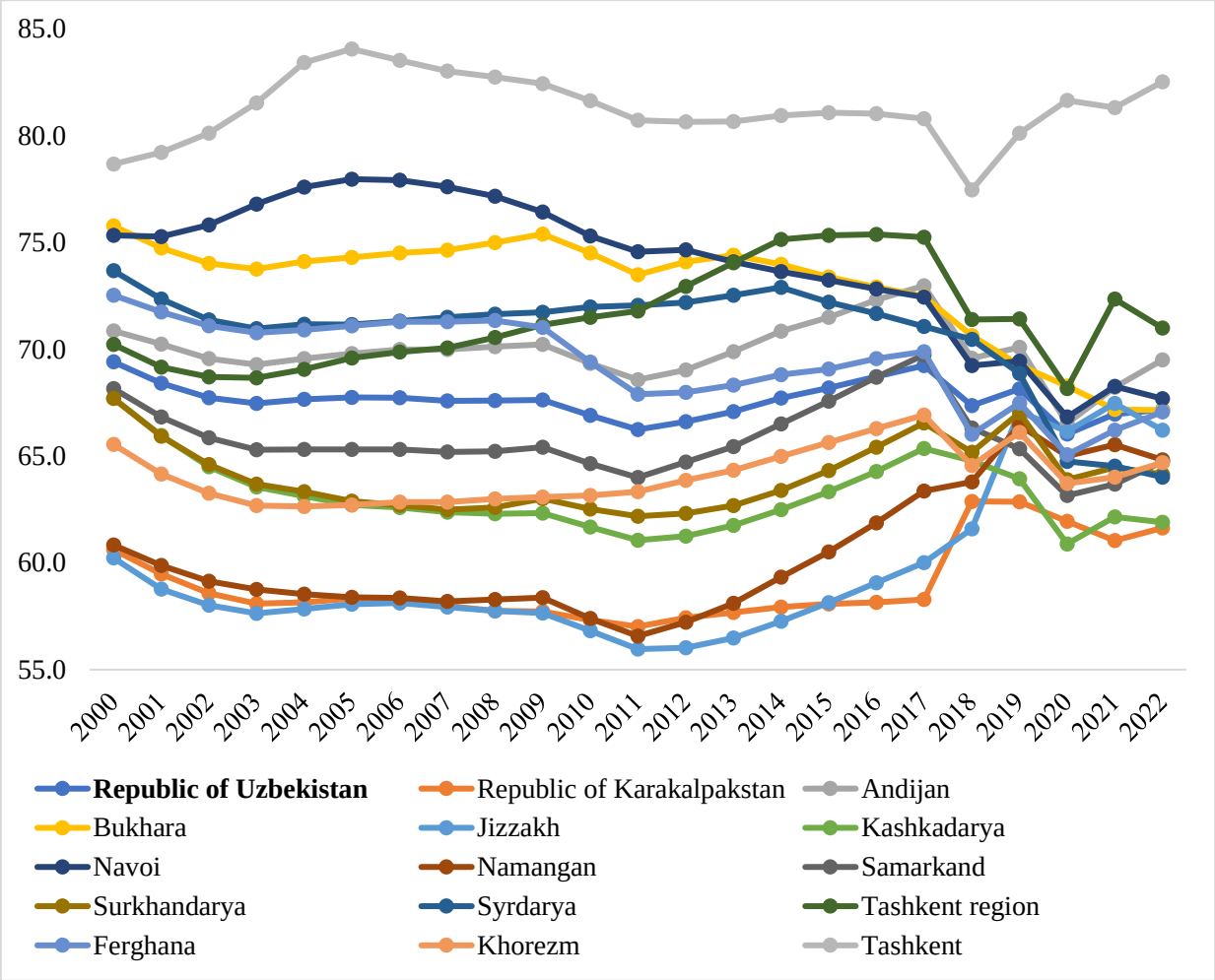

Figure 2 – Employment rate (ratio of the employed population to the working age population) in Uzbekistan for the period 2000-2022, as a percentage (According to the Ministry of Employment and Poverty Reduction)

Analyzing the data presented in Figure 2 on the level of employment of the working-age population in Uzbekistan during the period from 2000 to 2022, several critically important trends can be identified that reflect the dynamics of economic development and the state of the labor market in the country and by region.

During the analyzed period, the employment rate in the Republic of Uzbekistan fluctuates, starting from 69,4% in 2000, decreasing to 67,2% by 2022. These data indicate a dynamic where there is a noticeable general trend towards a decrease in employment, especially in the period from 2019 to 2020, which is most likely due to the impact of the COVID-19 pandemic on the economy and the labor market. It can be seen that by 2022 there is a slight recovery in the level of employment of the population.

To assess the impact of economic indicators of the labor market on financial security, in this case as the volume of GDP at current prices, the following indicators were selected and they were assigned a symbol:

1) Employment rate, % (x_1);

2) Unemployment rate, % (x_2);

3) GDP, billion US dollars (y).

Table 1 – Economic indicators of the labor market of Uzbekistan

Year	Employment rate, in %	Unemployment rate, in %	GDP (current, in billions of US dollars)
2000	69,41	0,39	13,76
2001	68,42	0,41	11,40
2002	67,74	0,37	9,69
2003	67,47	0,33	10,13
2004	67,67	0,35	12,03
2005	67,75	0,27	14,31
2006	67,74	0,24	17,33
2007	67,59	4,99	22,31
2008	67,61	4,89	29,55
2009	67,64	5,04	33,69
2010	66,91	5,40	49,77
2011	66,24	5,00	60,18
2012	66,61	4,90	67,52
2013	67,09	4,86	73,18
2014	67,72	5,09	80,85
2015	68,19	5,15	86,20
2016	68,73	5,16	86,14
2017	69,24	5,80	62,08
2018	67,40	9,30	52,87
2019	68,14	9,00	60,28
2020	66,04	10,50	60,22
2021	66,97	9,62	69,60
2022	67,18	8,86	80,39

First, we find the Pearson correlation coefficients, which reflect the degree of linear dependence between the two data sets Table 2.

Table 2 – Pearson correlation coefficients

	y	x_1	x_2
y	1	-0,19794	0,73490
x_1	-0,19794	1	-0,38578
x_2	0,73490	-0,38578	1

The correlation coefficient is a key statistical indicator that plays a central role in assessing the degree of relationship between two variables. Its value can vary in the range from -1 to +1, where values approaching the extreme points of this range indicate a different degree of correlation.

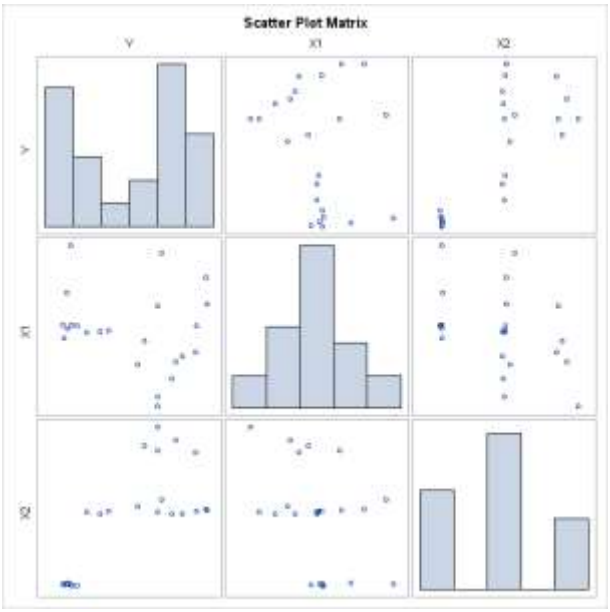

Figure 3 – Matrix of data spread diagrams

Figure 3 shows a matrix of scatter diagrams, which is a key visualization tool for multidisciplinary data analysis. This visual tool allows you to visually explore and interpret the relationships between different variables in the dataset under study. In the matrix structure, each scatter plot represents a unique combination of a pair of variables, demonstrating how they relate to each other.

The variables used for analysis are aligned equally horizontally and vertically of the matrix, creating a coordinate system in which the intersection of a row and a column forms a cell with a scatter diagram for the pair of variables under study. This allows scientists and analysts to effectively compare data, identifying relationships, correlations, and possible anomalies such as outliers or agglomerations of data points.

On the main diagonal of the matrix, where the variable meets itself, histograms or distribution densities for each of the variables under consideration are traditionally presented. This is important for understanding the overall distribution structure of each variable in the dataset, helping to determine, for example, whether the data has a normal distribution or whether there are skew and asymmetry.

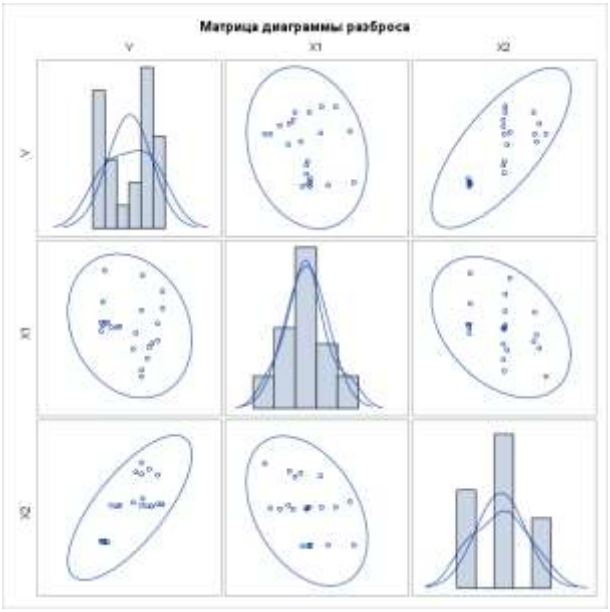

Figure 4 – Matrix of the scatter diagram

Using the collected data (Table 4), an attempt was made to develop a linear regression model using visual programming in the SAS system for academic organizations, such as universities and research institutes, and when the data set was introduced into the system, the following results were obtained:

Table 3 – Data analysis of variance (1)

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	58439	29220	78,18	<0,0001
Error	21	7848,62841	373,74421		
Uncorrected Total	23	66288			

Table 3 shows the results of the analysis of variance, where the model contains two sources of variation (DF - degrees of freedom), and the error includes 21 degrees of freedom, which indicates the number of observations minus the number of estimated parameters.

The sum of the squares reflects the total variability of the data, divided between the model (58439) and the error (7848,62841). A higher sum of squares for the model indicates that the model has a significant influence on explaining the variation of the dependent variable.

The average square is an indicator of the variation per one unit of the degree of freedom. The values of the mean square for the model (29220) significantly exceed the same values for the error (373,74421), which indicates the significance of the model.

The F value (78,18) and the P value (<0,0001) indicate the statistical significance of the model. A small P-value indicates that the observed differences are unlikely to be explained by random fluctuations, that is, the model has a significant effect on the dependent variable.

Table 4 – Data analysis of variance (2)

Root MSE	19,33247	**R-Square**	0,8816
Dependent Mean	46,23826	**Adj R-Sq**	0,8703
Coeff Var	41,81054		

Table 4 provides additional metrics for the quality of the model. The root MSE (19,33247) shows the standard deviation of the model residuals from the original data, which gives an idea of the overall accuracy of the model.

The R-squared (0,8816) and adjusted R-squared (0,8703) reflect the percentage of variation explained by the model from the total variation of the dependent variable. These high values indicate that the model explains this data set well.

The dependent average value (46,23826) represents the average value of the variable under study, and the Efficiency coefficient (41,81054) may reflect the overall effectiveness of the model in the context of the study.

The SAS system provides an assessment of the parameters in the form of a table immediately with the values of the t and t-test, which can be used to determine the statistical significance of the coefficients table 5.

Table 5 - Parameter estimates

Variable	Label	DF	Parameter	Standard Error	t Value	Pr > |t|
X_1	X1	1	0,26932	0,10167	2,65	0,0150
X_2	X2	1	6,08946	1,21352	5,02	<0,0001

As a result, a linear regression model was developed using visual programming in the SAS system for academic organizations, such as universities and research institutes, and when the data set was introduced into the system, the following results were obtained:

$Y=0,26932x_1-6,08946x_2$

The positive value of the parameter estimate (0,26932) for the variable x_1 indicates that there is a direct relationship between x_1 and the studied dependent variable: an increase in x_1 by one unit implies an increase in the dependent variable by 0,26932 units on average, all other things being equal.

A relatively small standard error (0,10167) indicates the adequacy and accuracy of the parameter estimation.

The t value (2,65) and the P value (0,0150) indicate that the variable x_1 has a statistically significant effect on the dependent variable (at a significance level of 0,05).

For variable x_2, a significantly higher parameter estimate (6,08946) indicates a stronger influence of this variable on the dependent variable compared to x_1. The coefficient shows that an increase in x_2 by one unit corresponds to an increase in the dependent variable by 6,08946 units.

The standard error of the estimate (1,21352) is greater than that of x1, but is still quite small relative to the value of the estimate itself, which confirms the reliability of the parameter estimate.

The value of t and Pr > |t|, a significantly high value of t (5,02) and a very small P-value (<0,0001) certainly indicate the statistical significance of the influence of variable x_2 on the dependent variable.

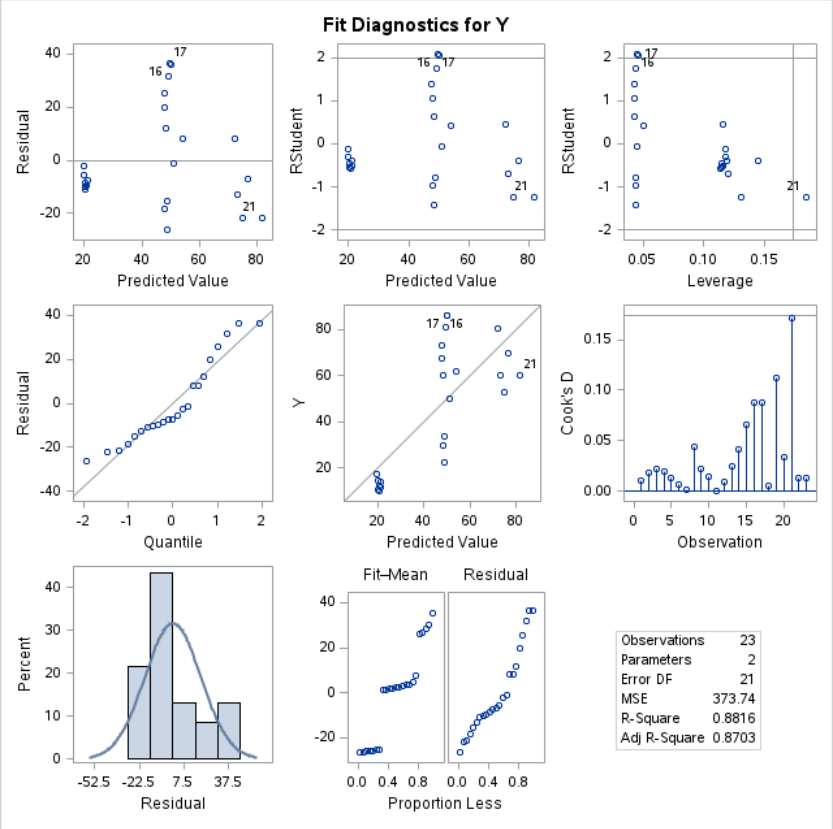

Figure 5 – Diagnosis of compliance for Y

Figure 5 shows a set of diagnostic graphs used to analyze the quality of statistical model selection, where Y is a dependent variable.

In conclusion, the analysis of the relationship between unemployment and employment with the financial security of Uzbekistan, it should be emphasized that sustainable economic development and financial stability of the country are closely linked to the state of the labor market. The study showed that high unemployment and low employment negatively affect economic growth, increase social tensions and increase financial risks for the state, thereby undermining the foundation of Uzbekistan's financial security.

The findings of the study confirm the need for active actions on the part of government agencies and the private sector to form a stable and dynamic economy capable of ensuring a high level of employment and minimizing the risks of unemployment. This, in turn, will contribute to strengthening Uzbekistan's financial security, stable socio-economic development and improving the quality of life of the population.

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