

Improving Public Finance Management in Uzbekistan: An ARDL Analysis of the Impact of GDP, Inflation, and Unemployment on the Budget Deficit.

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**ИНФОРМАЦИЯ О
СТАТЬЕ**

**ИСТОРИЯ
СТАТЬИ:**

Received: 25.09.2026

Revised: 26.09.2026

Accepted: 27.09.2026

**КЛЮЧЕВЫЕ
СЛОВА:**

*Public Finance
Management; Budget
Deficit; Gross Domestic
Product (GDP); Inflation;
Unemployment; ARDL
Model; Macroeconomic
Determinants; Uzbekistan.*

АННОТАЦИЯ:

Effective public finance management is one of the essential components that may guarantee long-term economic growth and budgetary sustainability. In recent years, Uzbekistan has taken a number of steps to improve fiscal transparency, improve budget management, and ensure macroeconomic stability. The research paper uses the Autoregressive Distributed Lag (ARDL) method to analyze the economic growth (GDP), inflation, and unemployment rate affect to the budget deficit of Uzbekistan between 2001 and 2024 years. The acquired empirical results demonstrate that the GDP has the statistically significant negative influence on the budget deficit implying that the expansion of the economy undermines the fiscal sustainability. The budget deficit is positively and statistically significant impacted by the rates of unemployment and inflation. The study's results provide helpful recommendations for improving public finance management and ensuring Uzbekistan's long-term fiscal success. tashkil etishga imkon berishini ko'rsatadi.

Literature Review

Budget deficit and its volatility is one of the most debated issues among policy makers and researchers in the developing world. The literature review is full of the discussion of the macroeconomic variables effect to budget deficit around the world. The findings of a study conducted by Safdar and Padda (2017) using the Dickey-Fuller (ADF) unit-root test and Vector Auto Regressive Model to investigate the influence of macroeconomic factors in influencing budget deficit dynamics in Pakistan from 1984 to 2014. Long-run estimations suggest that inflation has a beneficial influence on the budget deficit, whereas GDP per capita output initially has no impact. Agnello L. and Sousa R. (2009) used a system-GMM estimator

for linear dynamic panel data models to empirically evaluate the economic origins of 125 nations' budget deficits. The findings demonstrate that rising inflation has a considerable impact on the budget deficit. Javid A. et al. (2011) compare ASEAN and South-Asian nations using the GMM approach to investigate the influence of economic and political factors on budget deficit for four South-Asian and five ASEAN countries from 1984 to 2010. According to the report, high inflation and income levels suggest a significant budget imbalance. Bayar A. and Smeets B. (2009) conducted an empirical analysis of the economic determinants influencing budget deficits in 15 European Union nations from 1971 to 2006 using the Multiple empirical methodologies, including Panel Corrected Standard Errors (PCSE) and fixed effect models. The findings show that the impact of unemployment rate and GDP growth rate variables are positively related to budget deficits. Murwirapachena et al. (2013) identified the economic variables that influence the budget deficit of South-Africa for the period 1980-2010 years using the Vector Error Correction Model (VECM). The results revealed that all the determinants which are unemployment, economic growth have a positive impact on budget deficits.

Methodology

This research paper uses the quantitative method to examine the impact of macroeconomic variables to budget deficit in Uzbekistan covering the period from 2001 to 2024 years for empirical analysis. The World Bank and Asian Development Bank are the sources of the secondary data. This study investigates the relationship between the budget deficit of GDP (dependent variable) and other macroeconomic indicators such as Gross Domestic Product (GDP), Inflation and Unemployment rate. The GDP was transformed into the natural logarithm (log_gdp) in order to improve the statistical properties of the data and reduce the potential heteroscedasticity problem in the regression part.

The Economic model was estimated to investigate the link between variables:

$$BUDEF = \beta_0 + \beta_1 \ln GDP + \beta_2 INF + \beta_3 UNEMP + \varepsilon$$

Table 1. Variables description

Type	Variables	Description	Sources
Dependent	Budget deficit	Budget surplus/deficit of GDP	Asian Development Bank Organization
Independent	Log_GDP per capital	GDP per capita, PPP (current international \$)	World Bank
	Inflation	Inflation, GDP deflator (annual %)	World Bank
	Unemployment rate	Unemployment , total (% of total labor force)	World Bank

The table 2 of descriptive statistics demonstrate sufficient variation among the variables, supporting the use of ARDL method to econometric analysis in this research paper. A total of 24 annual observations were collected for the Uzbekistan over the period 2001–2024. The mean values represent the average level of variables over the research period, whereas the standard deviation indicates the degree of variation around the mean.

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
<i>Budget deficit</i>	24	-.1992	3.2854	-5.69	5.38
<i>Log_GDP_p</i>	24	8.6795	.4326	7.9310	9.3825
<i>Inflation</i>	24	21.6008	11.3827	8.93	48.58
<i>Unemployment</i>	24	5.9395	1.8803	4.43	11.28

Table 2. Descriptive Statistics

The below matrix of correlation Table 3 indicates the correlations between all variables in this data. The matrix of correlation is the word used to describe the linear connections between the independent variables in multiple regression analysis. When two variables are almost perfect linear combinations of each other, this is known as collinearity. When a regression model has two or more variables that are substantially associated with both the dependent variable and one another, this is known as multicollinearity (Shrestha, N. 2020). None of the correlation coefficients exceed the commonly accepted threshold of 0.80, indicating that multicollinearity is not a serious concern in this study. However, the strongest relationship is observed between GDP and unemployment (0.7927).

<i>Variables</i>	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>
<i>Budget Deficit</i>	1.0000			
<i>Log_GDP_p</i>	0.0570	1.0000		
<i>Inflation</i>	-0.0389	-0.5504	1.0000	
<i>Unemployment</i>	-0.5153	0.7927	0.6197	1.0000

Table 3. Matrix of correlations

Results and Discussion.

The estimation findings of the impacts of GDP, inflation, and unemployment rate on Uzbekistan's budget deficit from 2001 to 2024 using the ADRL approach are shown in Table 3. An excellent overall model fit is shown by the result section, which is statistically significant with F-statistical = 17.74 and $p = 0.000$ and the $R^2 = 80.67$ explains 80.67% of the variation in the budget deficit. The $\ln GDP$ is negative and statistically significant ($p=0.009$ and Coef = -4.797), suggesting that a rise in GDP is linked to the highest levels of government revenue and improved fiscal performance and sustainability. At the 10% significance level, the inflation is positive and significant ($p = 0.058$ and Coef = -1.702), indicating that greater inflation tends to raise the budget deficit. The unemployment rate shows a significant correlation with the budget deficit (Coeff = -1.702 and $p = 0.013$), but this result deviates from the traditional expectation that a higher unemployment rate would result in a larger fiscal deficit. This may be referring to labor market conditions or country-specific fiscal policies during the sample periods, its close relationship with GDP (0.79) in the correlation matrix part. Overall, the estimated ARDL model suggests that GDP, inflation, and unemployment are major macroeconomic drivers of Uzbekistan's budget deficit.

Variable	Coeff	Std. Error	t-test	p-value
Budget deficit	0.440	0.1476	2.98	0.008***
Log_GDP_p	-4.7970	1.6264	-2.95	0.009***
Inflation	0.079	0.0391	2.03	0.058*
Unemployment	-	0.6105	-2.79	0.013**
Constant	1.7017	17.1971	2.90	0.010**
F-statistics	49.93			
Prob > F	7			
R ²	17.74			
Adjusted R ²	0.000			
	0			
	0.806			
	7			
	0.761			
	2			

Conclusion

The study uses the Autoregressive Distributed Lag (ARDL) model to show how macroeconomic factors affect Uzbekistan's budget deficit from 2001 to 2024. The ADRL

approach is suitable for this research because of the variables' integration at Lag (0) and Lag (1). Among the factors analyzed, economic growth (GDP) has a statistically significant and negative impact on the budget deficit, indicating that economic growth improves the fiscal balance by raising revenue and lowering government spending. The government should enhance employment policy, including job creation and private sector development, and encourage sustainable economic growth through investment and productivity-boosting reforms. Inflation has a statistically significant and positive link with the budget deficit, implying that an increase in the country's general price level may put greater strain on public finances for individuals. However, the unemployment indicator displays a statistically significant negative correlation with the budget deficit; this finding may reflect Uzbekistan's peculiar economic conditions and fiscal management practices during the research period. The conclusion is that the result section emphasizes the necessity of long-term economic development and macroeconomic stability for efficient public finance management in Uzbekistan in the future.

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