

THE INFLUENCE OF MONETARY AND FISCAL FACTORS ON ECONOMIC GROWTH OF UZBEKISTAN

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***Abstract.** This article examines the impact of monetary and fiscal factors on Uzbekistan's economic reality. Using statistical data for 2000–2024, a multivariate logarithmic model was constructed, the adequacy of which and the statistical significance of its parameters were tested using auxiliary criteria. The elasticity coefficient for each factor was calculated, the impact of each on GDP was determined, and conclusions were drawn regarding monetary and fiscal policy and sustainable economic growth.*

***Keywords:** Monetary and fiscal factors, multivariate logarithmic model, model adequacy and statistical significance of parameters, elasticity coefficient.*

ВЛИЯНИЕ ДЕНЕЖНО-ФИСКАЛЬНЫХ ФАКТОРОВ НА ЭКОНОМИЧЕСКИЙ РОСТ УЗБЕКИСТАНА

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Аннотация: В данной статье рассматривается влияние денежно-кредитных и фискальных факторов на экономическую реальность Узбекистана. На основе статистических данных за 2000–2024 годы построена многомерная логарифмическая модель, адекватность которой и статистическая значимость ее параметров проверены с использованием вспомогательных критериев. Рассчитан коэффициент эластичности для каждого фактора, определено влияние каждого на ВВП, сделаны выводы относительно денежно-кредитной и фискальной политики и устойчивого экономического роста.

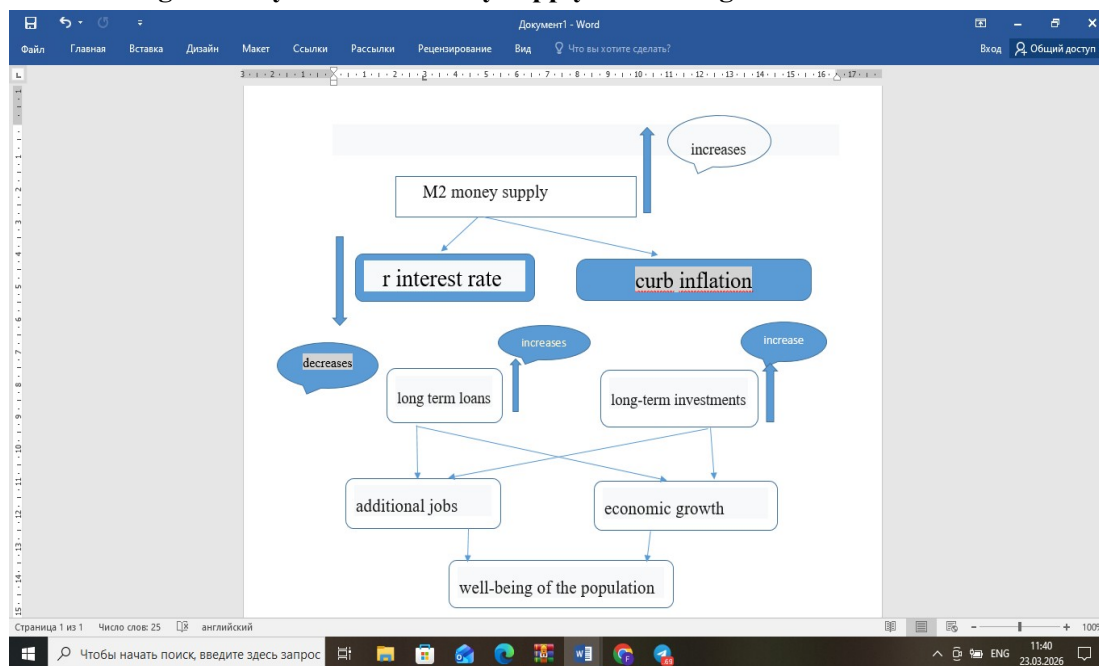
Ключевые слова: Денежно-кредитные и фискальные факторы, многомерная логарифмическая модель, адекватность модели и статистическая значимость параметров, коэффициент эластичности.

INTRODUCTION

In a market economy, the role of the state in regulating the economy is of great importance, especially under conditions of global crises. This role gradually decreases over time. The participation of the state in economic regulation declines in the course of development. In regulating the economy, the state mainly applies two policies: monetary and fiscal policy. The application of monetary or credit policy is carried out through regulating the money supply, interest rates, and bank reserves. In fiscal policy, budgetary and tax instruments are widely used.

The analysis showed that the monetary policy of the Central Bank has had a certain impact on ensuring and regulating economic growth in our republic. The money supply and the rate of economic growth changed in a corresponding manner, and as a result economic stability was ensured. Research has shown that an increase in the money supply, all other factors being unchanged, reduces the interest rate and, in turn, increases the investment activity of enterprises, production entities, and the population; new jobs are created, the volume of goods and services produced, that is, GDP, increases, and economic growth occurs. Of course, this process takes place when the money supply is within normal limits.

Figure 1. Dynamics of money supply and GDP growth in Uzbekistan



The conduct of an alternative monetary policy ensures stable economic growth; however, excessive tightening may lead to a decline in investment activity in the economy. Conversely, unjustified easing and a sharp increase in lending volumes, along with stimulating consumer and investment demand, may also cause a sharp rise in the inflation rate. That threshold or point was identified in our study with the help of econometric models.

Moreover, it should be emphasized that monetary policy alone cannot be the main source of a stable increase in a country's economic potential. In the long run, the main factors ensuring economic growth are continuous structural reforms aimed at improving the competitive environment in the economy, increasing labor productivity and energy efficiency, developing infrastructure, strengthening the domestic and external competitiveness of the economy, and facilitating the establishment and operation of businesses. Therefore, one of the main instruments of budget and tax policy — government expenditures — was included in our models as a variable, and its effect on economic growth was determined.

The article provides an in-depth analysis of the relationships among the main indicators of monetary and fiscal policy that ensure stable economic growth (money supply, M2), gross domestic product (GDP) growth, inflation, and government expenditures, as well as the main factors affecting economic growth.

LITERATURE REVIEW

The initial theoretical issues of economic stability were studied by F. Quesnay, J.B. Say, A. Marshall, J.M. Keynes, Samuelson, and F. Hayek; later, in modeling real economic growth, they were studied by the authors of modern models such as R. Solow, Harrod-Domar, Cobb-Douglas, and many other foreign scholars.

In general, two categories of views of scholars can be distinguished in this regard: according to the Keynesians, monetary policy has no effect or only a small effect on economic growth, whereas the monetarists, on the contrary, recognize a linear, direct relationship between the monetary sector and the real sector [the money-supply-led growth hypothesis].

Pastpipatkul & T. Ko (2025) present an empirical analysis for Thailand: The Efficacy of Monetary and Fiscal Policies on Economic Growth. Chinnakum (2025) analyzes monetary and fiscal policy in China: Empirical Analysis of Economic Impact of Monetary Policy. Rasool, Rahman & Khan (2024) examine Pakistan empirically: The Impact of Monetary and Fiscal Policy on Economic Growth: A Case Study of Pakistan.

According to many economists, an effective and active monetary policy serves to ensure stable economic growth by restraining prices and inflation. However, according to empirical studies, these relationships differ from country to country.

RESEARCH METHODOLOGY

The research methodology is based on applying correlation and regression analysis methods to time-series data, constructing econometric models using the Stata software package, and analyzing them. As a database, time series of macroeconomic indicators for 2000–2024 were taken, and these data were collected from the websites of the World Bank, the Asian Development Bank, and from the reports of the Statistics Committee of the Republic of Uzbekistan.

The main factors adopted were money supply (M2), government expenditures (Gov), GDP, and inflation (CPI). Using these variables, nonlinear econometric models were constructed and their correlation matrix was analyzed in order to determine the relationship, or long-term equilibrium, among money supply (M2), government expenditures (Gov), and GDP.

The Gauss-Markov conditions were tested for the constructed model, and forecasting was carried out using ARIMA(p,d,q). The ARIMA(p,d,q) model was selected taking into account the statistical significance of the parameters, sigma, log likelihood, and the Akaike and Bayes criteria. GDP for 2026–2030 was forecast using the ARIMA(2,3,1) model. The ARDL model was used to determine the short- and long-term effects of the factors in the implementation of fiscal and monetary policy by the state.

RESULTS AND DISCUSSION

In order to effectively implement monetary and fiscal policy in our country, support sectors of the economy and the population, broadly attract foreign investment, stabilize the prices of goods and services, and effectively use monetary and fiscal policy instruments, we constructed a nonlinear logarithmic multifactor econometric model.

Table 1. Relationships among GDP, Money Supply, Government Expenditures, and Inflation

Years	GDP (billion UZS)	M2 (billion UZS)	Gov (billion UZS)	CPI %
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2000	3,256	396	607	24.9
2001	4,925	612	907	27.4
2002	7,450	793	1,339	27.6
2003	9,844	1,009	1,781	10.3
2004	12,261	1,490	2,133	1.6
2005	15,923	2,300	2,803	6.40
2006	21,125	3,147	3,232	8.7
2007	28,190	4,597	4,400	6.1
2008	38,970	6,511	6,207	7.2
2009	49,376	9,171	7,639	7.8
2010	74,042	13,978	9,871	7.6
2011	96,950	18,498	12,355	7.3
2012	120,242	23,893	15,776	7.2
2013	144,548	29,398	20,422	7.0
2014	177,154	33,778	24,746	6.4
2015	210,183	42,291	30,141	5.5
2016	242,496	52,226	36,117	9.5
2017	302,537	73,223	39,988	13.9
2018	406,649	83,734	57,179	17.5
2019	511,838	90,145	83,861	14.5
2020	580,203	102,476	101,869	11.1
2021	734,043	116,080	165,800	9.9
2022	896,618	189,085	236,692	12.3
2023	1,066,559	212,086	281,097	8.7
2024	1,454,600	277,060	310,926	9.8

As a result of studying the dynamics of macroeconomic indicators (Table 1), we built a matrix of correlation coefficients for the trends of money supply, government expenditures, inflation, and gross domestic product in 2000–2024 (Table 2). Then, we derived multifactor regression equations and obtained the results calculated in the Stata program.

$$\ln(\text{GDP}) = 2.62 + 0.32 \times \ln(\text{Gov}) + 0.60 \times \ln(\text{M2}) - 0.05 \times \ln(\text{INF})$$

Testing the Gauss-Markov Conditions for the Model

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity: $\chi^2(1) = 0.84$, $\text{Prob} > \chi^2 = 0.3590$. Heteroskedasticity $p = 0.2013 > 0.05$, which means there is no heteroskedasticity in the residuals, that is, the variance does not depend on the independent variables.

Skewness $p = 0.4043 > 0.05$ — the residuals are symmetric, that is, there is no noticeable skewness to the left or right. Kurtosis $p = 0.5027 > 0.05$ — the kurtosis of the residuals is close to normal. Total $p = 0.2722 > 0.05$ — according to the overall test, the model is well specified, and no significant model error was detected.

Durbin-Watson d-statistic (4, 25) = 1.210353. Since $d = 1.21 < 2$, there is a possibility of positive autocorrelation in the residuals. At the 5% significance level: $dL \approx 1.10$, $dU \approx 1.65$, thus $1.10 < 1.21 < 1.65$. This interval is considered an inconclusive zone. In such cases, the Breusch-Godfrey test is used.

As can be seen from Figure 3, the growth of the money supply lagged behind GDP growth. The growth of the money supply should at least correspond to the growth of real GDP.

Table 2. Matrix of Correlation Coefficients of Indicators

	GDP	M2	Gov	INF
GDP	1.0000			
M2	0.9978	1.0000		
Gov	0.9861	0.9846	1.0000	
INF	0.0186	0.0310	0.0077	1.0000

The correlation table indicates that, in the short run, the relationship between the inflation rate and gross output is weak, while in the long run the money supply accelerates the rate of economic growth through government expenditures. There is multicollinearity between the money supply and government expenditures. In such cases, instead of a linear model, a nonlinear logarithmic econometric model is used to study the relationship among the indicators. The regression model has the following form:

$$\ln(\text{GDP}) = 2.62 + 0.32 \times \ln(\text{Gov}) + 0.60 \times \ln(\text{M2}) - 0.05 \times \ln(\text{INF})$$

Here, the resulting indicator is gross domestic product as a function, while the variables include the amount of government expenditures, the money supply, and the inflation rate. Thus, if government expenditures are increased by one percent, gross domestic product increases by 0.32 percent, other factors being unchanged. Likewise, if the money supply and the inflation rate are increased by one percent, then, other factors being unchanged, gross output increases by 0.60 percent and decreases by 0.05 percent, respectively. Inflation has a negative effect on economic growth in the short run. The regression analysis obtained in the Stata program shows that the econometric model is adequate and the parameters are statistically significant.

GDP Forecast for 2026–2030

To forecast GDP for 2026–2030, we used the current-price values of GDP for 2000–2025. The results of the forecast analysis using the ARIMA(2,3,1) model are presented in Table 4 below.

Table 4. GDP Forecast for 2026–2030 Using ARIMA(2,3,1) Model

Year	GDP Forecast (billion UZS)
2026	2,437,048
2027	3,179,335
2028	3,951,117

2029	4,906,833
2030	6,005,069

ARDL Model: Long-term Effects

Now, based on the given statistical data, we construct the ARDL model:

$$GDP_t = a + b_1 \cdot GDP_{t-1} + b_2 \cdot M2_t + b_3 \cdot M2_{t-1} + b_4 \cdot GOV_t + b_5 \cdot GOV_{t-1}$$

Based on this model, we find the coefficients of the long-term effect on GDP. The model expressing the long-term effect is:

$$LR_M2 = (b_2 + b_3) / (1 - b_1) \quad LR_GOV = (b_4 + b_5) / (1 - b_1)$$

$$GDP = a / (1 - b_1) + [(b_2 + b_3) / (1 - b_1)] \cdot M2 + [(b_4 + b_5) / (1 - b_1)] \cdot GOV$$

$$GDP = -2114.83 / (1 - 0.87) + [(1.56 + 0.217) / (1 - 0.87)] \cdot M2 + [(-0.49 + 0.48) / (1 - 0.87)] \cdot GOV$$

$$\mathbf{GDP = -16,267.92 + 13.67 \times M2 - 0.076 \times GOV}$$

Thus, in the long run, an increase in the money supply (M2) by one billion soums, other factors being unchanged, increases GDP by 13.67 billion soums, while an increase in government expenditures by one billion UZS leads to a decrease in GDP by 76 million UZS in the long run.

This can be explained as follows: when the money supply increases, banks' liquidity increases, and the population and enterprises have more money on hand, which raises demand and causes GDP to increase. An increase in the money supply causes interest rates to fall and investment to increase, which accelerates economic growth.

The weak but inverse effect of government expenditures on GDP can be explained as follows: if a large share of government expenditures is used for administrative management costs, social transfers, and short-term subsidies, they do not expand production. As a result, they do not make a real contribution to economic growth, and in the long run their effect on GDP may be negative. Another reason is that the public sector cannot allocate economic resources as efficiently as the market mechanism. An increase in government expenditures may increase the budget deficit, which in turn generates inflation and macroeconomic instability and negatively affects long-term economic growth.

CONCLUSION AND RECOMMENDATIONS

1. The analysis showed that the Central Bank's monetary policy has had a certain impact on ensuring and regulating economic growth in the republic. The money supply and the rate of economic growth changed in a corresponding manner, and as a result economic stability was ensured. Research has shown that an increase in the money supply, all other factors being unchanged, reduces the interest rate and, in turn, increases the investment activity of enterprises, production entities, and the population; new jobs are created, the volume of goods and services produced — that is, GDP — increases, and economic growth occurs. Of course, this process takes place when the money supply is within normal limits.

2. When the state implements monetary policy, it ensures the relationship among all macroeconomic indicators and maintains proportionality between them, including increasing employment, the index of price changes for goods and services, the amount of government expenditures on the implementation of social policy, and other factors.

3. In a market economy, the role of the state in regulating the economy is of great importance, especially under conditions of global crises. In regulating the economy, the state

mainly applies two policies: monetary and fiscal policy. The application of monetary or credit policy is carried out through regulating the money supply, interest rates, and bank reserves. In fiscal policy, budgetary and tax instruments are widely used.

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