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# METHODOLOGICAL DIRECTIONS FOR THE REGULATION OF INVESTMENTS IN MACROECONOMIC PROCESSES

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**Abstract:**

The article describes the directions for the regulation of investment processes, the scientific-methodical approach of macroeconomic regulation of investment processes and the methodological aspects of macroeconomic regulation of investment processes in ensuring sustainable economic growth.

**Keywords:** investment, investment process, macroeconomic regulation, unemployment, inflation, economic growth, tax-budget policy, currency policy, price formation policy, supply and demand policy, employment policy.

## INTRODUCTION

The investment policy is not only the main means of state regulation in the economy of the world countries, but also a strategic direction of ongoing changes and a unique reform ideology. Internationally, the COVID-19 crisis has led to a sharp decline in direct investment. Global investment flows amounted to 1.54 trillion dollars in 2020, which represents a 40% decrease compared to 2019 [1]. Increasing the flow of investments makes it necessary to conduct a reasonable macroeconomic policy to attract them to the economy of the country.

Special attention is being paid to research in the direction of improving the methodological basis of attracting investments to the world economy, ensuring the proportionality of the investments made by economic sectors, achieving energy savings in the process of production and household consumption, and increasing the level of housing provision per capita. Consequently, by further increasing the scale of investments, there will be opportunities to improve the living standards of the population in the country, create new jobs, increase the rate of economic growth, widely implement innovative ideas and technologies, and create a competitive environment in the economy.

## MATERIALS AND METHODS

Comprehensive reforms in Uzbekistan are being implemented to improve the macroeconomic regulation of investment processes through the reduction of state capital investments, quotas, licensing, ownership of control packages, demand stimulation and other similar means. In the future, further improvement of the investment environment will remain the priority of the state macroeconomic policy. In particular, in the medium and long-term perspectives of the socio-economic development of the country, specific tasks in this field are defined.

"Until 2026, with the introduction of the mechanism of public-private partnership in Uzbekistan with foreign investors, the total cost of 15 billion in the fields of agriculture, textiles, energy, transport, health care, education, infrastructure development and road construction. It is planned to implement more than 200 projects worth $ [2]".

In the context of modernization of the economy, it should be noted that strategic attention to economic growth requires attracting large amounts of foreign capital and investments in the real sector of the economy at the expense of domestic savings. Basically, we need to define the object: the elements of the investment object, their specific characteristics and methods of operation, controlled and uncontrollable parameters, interrelationships of the object elements in the material-material flow and the characteristics of these relationships, the structure and dynamics of the results achieved as a result of the activity based on the determination and modeling analysis of the structure of the object and its activity dynamics, X - investment entry, R - saving or internal investment, Y - return of investment are approached on the basis of the following conditions:

$$X \rightarrow [R] \rightarrow Y$$

If there is some similarity between two objects, one of these objects can be contrasted as the original and the other as the model. If the economic object accepted as an investment is considered as a variable with input x(t) in vector form and output y(t) in vector form, it is possible to conduct active experiments on it and predict what changes in input will result in output.

The mathematical model of the characteristics of investment processes that we want to study is given using formulas and equations based on letters, numbers, mathematical symbols and is called the mathematical model of investment attractiveness. The dynamic model of investment processes is a structural

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functional model. Because the structure and function of the investment will be recorded in it.

Macroeconomic processes cover all sectors of the national economy, and major macroeconomic problems, such as high unemployment, inflation, and economic growth. The only reason for the emergence of such problems is the unstable development of the economy. The mentioned problems can arise through the economic policy, fiscal and monetary policy conducted by the state.

## RESULTS AND DISCUSSIONS

Financial investments are more common in countries with developed free market infrastructure, especially in countries where the distribution of capital across sectors through the stock market is important. In addition, the main place in the structure of financial investments of developed countries is occupied by private investments.

Studies show that using the correlation-regression method is appropriate to study the connection of factors affecting investment processes in the macroeconomic regulation of the economy in the context of modernization. This can include the following designations:

$Y$ — macroeconomic regulation of investment processes;

$YX_1$ — tax-budget policy;

$X_2$ — currency policy;

$X_3$ — pricing policy;

$X_4$ — supply and demand policy;

$X_5$ — employment policy.

By placing these designations in place of the arguments in the formula given by the "Exel" program, the connection ratios between the selected factors are determined in an economic-mathematical way. The following table presents a correlational analysis [3] of the connection of factors influencing investment processes in macroeconomic regulation in the context of economic modernization:

**Correlation analysis of factors affecting the macroeconomic regulation of investment processes**

| | Y | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ |
|---|---|---|---|---|---|---|
| **Y** | 1 | | | | | |
| **$X_1$** | 0,867594 | 1 | | | | |
| **$X_2$** | 0,836587 | 0,503251 | 1 | | | |
| **$X_3$** | 0,678216 | 0,730325 | 0,656401 | 1 | | |
| **$X_4$** | 0,872231 | 0,534051 | 0,672545 | 0,575552 | 1 | |
| **$X_5$** | 0,620232 | 0,653023 | 0,652141 | 0,461252 | 0,723612 | 1 |

*Source: Developed by author based on research.*

As can be seen from the above, there is a connection between macroeconomic regulation of investment processes and budget-tax policy (0.867594). It should be noted separately that the state intervenes in the country's economy by increasing or decreasing budget expenditures (state expenditures and transfer payments). It indicates that the principle of the main reformer of the state is in practice. The correlation between macroeconomic regulation of investment processes and currency policy is equal to 0.836587, which indicates that there is a tighter connection between the two relations, and in turn, stability in currency policy leads to an increase in capital investment.

The stability of the currency value and the balance of the inflation rate stimulate the investor's interest in investing. In order to maintain the stability of the exchange rate, tax or monetary policy is used as a means of eliminating the lack of foreign currency in macroeconomic regulation of investment processes.

The correlation value of 0.678216 between macroeconomic regulation of investment processes and price formation policy has a tighter than average correlation, which, in turn, enables investment. In this case, it is necessary to ensure the steady growth of the economy with sufficient investment and to connect it to the mass of money in circulation. Also, the connection between macroeconomic regulation of investment processes and supply and demand policy (0.872231) is denser than others, which means that every investor should study the supply and demand relationship in the market and invest in projects determined on this basis.

In the past years, the organization of free economic and small industrial zones in our country, including the formation of a strong regulatory legal framework regulating their activities, the creation of a wide system of tax, customs privileges and reliefs that will allow attracting foreign and local investments to the development of free economic and industrial zones

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directed large-scale works have been carried out and these processes are being continued.

Taking into account the available opportunities in the free economic zones and the presence of mineral resources in the area, the annual project capacity of FEZ Angren, which was established on the basis of partnership with foreign companies, is 1.9 mln. sq.m., the production of glazed porcelain stoneware and ceramic tiles was launched. The experience of launching modern enterprises within the FEZ is yielding the expected results. Using such measures of public investment effects, one can see the following econometric specification. First, the impact of public investment on real GDP, the debt-to-GDP ratio, private investment as a share of GDP and the unemployment rate, the impact of public investment on the state of the economy, and the impact of fiscal policy during recessions and expansions.

The statistical method proposed by O.Jorda follows the approach for estimating impulse-response functions using local projections [4]. This approach is a flexible alternative that does not impose the dynamic constraints imposed by vector autoregression (autoregressive distributed lag) specifications and is particularly suitable for estimating nonlinearity in the dynamic response. In this case, the first regression specification is estimated as follows:

$$y_{i,t+k} - y_{i,t} = \propto_i^k + \gamma_t^k + \beta^k FE_{i,t}^k + \varepsilon_{i,t}^k$$

Here:

$y$ – a dependent variable (alternatively, the volume of production, the ratio of public debt to GDP, the ratio of private investments to GDP and the rate of increase in the number of unemployment);

$\propto_i$ – included to control for all time-invariant differences between countries (eg growth rates within countries);

$\gamma_t$ – the effects included to control for global effects such as price changes or global business cycles;

FE is the forecast error of public investment as a share of GDP, calculated as the difference between the actual and forecast lines. The above equation is evaluated for each k=0,….,4,. Impulse-response functions are calculated using the estimated coefficient $\beta^k$, while confidence intervals associated with the estimated impulse-response functions are obtained using the estimated standard errors of the coefficient $\beta^k$ based on cluster-robust standard errors.

In the second specification, the response of the variable of interest may vary according to the state of the economy and the level of efficiency of public investment.

The second regression specification is estimated as follows:

$$y_{i,t+k} - y_{i,t} = \propto_i^k + \gamma_t^k + \beta_1^k G(z_{it}) FE_{i,t}^K + \beta_2^k (1 -$$

$$G(z_{it}) = \frac{\exp(-\gamma z_{it})}{1+\exp(-\gamma z_{it})}, \gamma > 0$$

Here,

Z – an indicator of the state of the economy (or the efficiency level of public investment), normalized to have zero mean and unit variance;

$G(z_{it})$ – the corresponding smooth transition function between countries or the efficiency of public investment.

These analyzes used GDP growth as a measure of the state of the economy. In doing so, investment performance is supported by a survey-based measure of public spending waste from the World Economic Forum's (WEF) Global Competitiveness Report. It is used to analyze recessions and expansions when there are time-bound effects included in the formula to control for global effects $\gamma = 1{,}5$, such as price changes or global business cycles. Determined for the efficiency $\gamma = 1{,}0$ of public investments.

If alternative positive values of Y are used, the results are qualitatively unchanged. The main reasons for determining the state of the economy using GDP growth instead of the output deficit is that the latter is not observable, allowing for quick revisions. The main advantage of such an approach is that it uses more observations to calculate the impulse response functions of only the dependent variables of interest. It also increases the stability and accuracy of assessments. This estimation strategy can also more easily handle the potential correlation of standard errors between countries by clustering at the country level.

In order to determine the causal effect of public investment on output and the debt-to-GDP ratio in the Republic of Uzbekistan, the empirical approach separates unexpected changes in public investment and forecast errors of public investment.

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This methodology eliminates two factors that often confound the causal assessment of the impact of fiscal policy on economic indicators: the use of forecast errors is the "fiscal forecast" problem, and the use of forecast errors reduces the likelihood that calculations reflect the potential endogenous relationship of fiscal policy to the state of the economy.

Even if the risks in public investment are unexpected, they may still respond to the conditions of the business cycle if growth is unexpectedly weak, the strengthening of public projects or, alternatively, if the fiscal space is tight and they are delayed. However, for this to be profitable, such adjustments to public investment should be made quarterly or between years after receiving reports on the state of the economy.

## CONCLUSION

To conclude, this paper estimates two econometric specifications using these measures of unexpected public investment effects. First, an attempt was made to determine the effects of public investment on real GDP, the ratio of debt to GDP, private investment as a share of GDP, and the unemployment rate.

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