Modeling the Process of Efficient Use of Domestic Investment in the Country's Economy

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Abstract: **This article describes the scientific basis for the effective use of domestic investment potential in the country's economy, provides a methodology for econometric assessment of domestic investment, predicts future investment and offers recommendations for effective use of domestic investment. In this research was used data for 2005–2019 years as an improved form of the Cobb-Douglas production function by J. Tinbergen on the basis of relative growth values relative to the base year of 2004. By authors have been taken into account the effect of t-periods on the impact of scientific and technological progress on economic growth at the g level and expressed it as follows.**

Keywords: Investment, domestic investment, investment models, Cobb-Douglas model, investment efficiency, efficient use of domestic investment in the country.

I. INTRODUCTION

Investments are a necessary condition and source of economic growth of any country, its comprehensive development. Accordingly, in order to ensure the balanced development of various sectors of the economy, to take into account the socio-economic potential of the regions, as well as to increase local employment, the country annually develops and implements investment programs and regional investment programs. This allows the volume of investment in the economy to grow significantly from year to year and give positive results through the growth of national production.

II. LITERATURE REVIEW

Issue of statistics of competition of small business and private entrepreneurs assessment methods were studied by Odilov R.[6], the empirical research on causal relationship between export and foreign investments in the economy of Uzbekistan based on granger test were made by Mustafakulov, S. I.[7], econometric model of production capacity usage of textile enterprises in Uzbekistan were researched by Tursunov B.O. [8,9,13], Modernization and intensification of agriculture in the republic of Uzbekistan were investigated by Yuldashev, N. K., Nabokov, V. I., Nekrasov, K. V. [10,11], evaluation of textile and clothing industry clustering capabilities in Uzbekistan were made by scientists as well as Ergashxodjaeva, S. J., Kyvyakin [12], Features Of Investment In Mutual Fund and The factors effecting net actives of investment funds were studied by economists Burkhanov A. U., Hudoykulov H. H. [14,15] and et.al.

The issues of effective use of investments in the country's economy have been studied in depth by economists.

Russian scientist A. According to Damodaran, the experience of advanced foreign countries in investing in the country's economy shows that the priority is to equip production not with "heavy" technological lines, but with "short" and "flexible" production lines that can quickly adapt to market demand. Investments are not directed to cities with large industrial centers, but to areas with available raw materials and labor resources [1].

V.A.Kharitonov and A.O.Alekseev emphasize the need for business entities to work in the field of investment and innovation in a coordinated, purposeful manner as a condition for successful development of the country's economy [2].

G.I.According to Ivanov, investing in regions of the country with high economic potential and rich in natural resources will increase the revenues of local budgets and provide opportunities for sustainable development of the regions. Such a policy is effective from both an economic and a social point of view. Therefore, the main task for the regions is to increase their investment opportunities, effective use of existing domestic potential in this area [3].

Chinese scientist F. Xiaolan analyzes the impact of increasing the country's innovation potential on productivity. According to his research, domestic investment has a significant positive impact on overall innovation potential. However, this effect depends on the absorption potential of the host national economy and the availability of factors that provide innovation [4].

Romanian scholars have argued that foreign companies entering the country's national economy take into account regional specifics in their investment strategies. [5] According to their research, investors see the Romanian regions as 2 separate economic regions. The main factors in attracting investment in the first region are the availability of new markets, skilled labor and infrastructure opportunities. The second region attracted investors with its low prices.

In our opinion, domestic investment potential consists of free funds of the population, enterprises and organizations in the country, and the state should develop a system that stimulates the process of investing these funds in the economy and increase domestic investment in the economy through its implementation.

III. RESEARCH METHODOLOGY

R.Solou, one of the scientists who conducted research on mathematical modeling of domestic investment in the country's economy, removed the equality limit on the size of indicators in which the factors of production are the same.

It is a production function $(a + b) = 1$ improved in appearance and expressed as follows:

$$Y = A \times K^a \times L^b \quad (1)$$

$(a + b) = 1$ when, this function becomes a Cobb-Douglas production function with all its shortcomings. If (a + b)> 1, then the production function adequately describes the relationship between factors and production results in the context of economic development in which production results grow faster than in the case of factors of production. If (a + b) <1, then the production function adequately describes the relationship between factors and production outcomes as production outcomes grow more slowly than in the case of economic regression.

The relationship between growth rates and macroeconomic indicators is as follows:

$$y = k \times a + l \times b \quad (2)$$

where k is the average annual growth rate of capital; a is the coefficient of elasticity of capital production; l is the average annual growth rate of labor; b is the coefficient of elasticity of labor-intensive production.

Another scientist who improved the production function of Cobb-Douglas was J. Tinbergen, who proposed to take into account the effect of scientific and technological progress on economic change as an independent variable. To this end, he supplemented the number of factors in the original Cobb-Douglas formula with an additional factor to the natural logarithmic basis of e for the power of g.

In this case, the production function form is as follows:

$$Y = A \times K^m \times L^{(1-m)} \times e^g \quad (3)$$

The value of the g level indicates the impact of scientific and technological progress on economic growth.

The relationship between growth rates and macroeconomic indicators is as follows:

$$y = k \times m + l \times (1 - m) + g \quad (4)$$

where k is the average annual growth rate of capital; m is the coefficient of elasticity of production on capital; l is the average annual growth rate of labor; (1 - m) is the coefficient of elasticity of production volume for labor; g is a coefficient that reflects the growth of production results under the influence of scientific and technological progress [6].

IV. ANALYSIS AND RESULTS

We used the 2005–2019 data as an improved form of the Cobb-Douglas production function by J. Tinbergen on the basis of relative growth values relative to the base year of 2004. We took into account the effect of t-periods on the impact of scientific and technological progress on economic growth at the g level and expressed it as follows:

$$Y = A \times K^m \times L^{(1-m)} \times e^{g \cdot t} \quad (5)$$

It can be seen from this equation that the relationship between production, the two costs, and scientific and technological progress is nonlinear. However, this model can be modified linearly by natural logarithm:

$$LnY = LnA + \alpha \cdot LnK + \beta \cdot LnL + g \cdot t \cdot Lne \quad (6)$$

$$= B + \alpha LnK + \beta LnL + \omega \cdot t, \text{ бунда } B = LnA \text{ ва } g = \omega \quad (7)$$

Thus, the parameters of the written model B, a, b and ō are linear and therefore it is a linear regression model. It should be noted that Y and K, L were nonlinear in the variables, but after natural logarithmization, these variables became linear. In short, Equation (7) is a lag-lag, two-sided lag, or lag-line model.

Table 1: Regression analysis

Dependent Variable: LNB_Y_				
Method: Least Squares				
Date: 02/01/21 Time: 11:36				
Sample: 2005 2019				
Included observations: 15				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNB_L_	0.496243	0.722205	0.687122	0.5062
LNB_K_	-0.355759	0.149570	-2.378543	0.0366
T	0.261719	0.068119	3.842063	0.0027
C	-0.160853	0.081833	-1.965621	0.0751
R-squared	0.986331	Mean dependent var		1.560762
Adjusted R-squared	0.982603	S.D. dependent var		1.017689
S.E. of regression	0.134232	Akaike info criterion		-0.955313
Sum squared resid	0.198201	Schwarz criterion		-0.766500
Log likelihood	11.16485	Hannan-Quinn criter.		-0.957325
F-statistic	264.5733	Durbin-Watson stat		1.464638
Prob(F-statistic)	0.000000			

Based on the data, regression analysis was performed based on the EViews 9 application package. From Table 1, when increasing the value of S, ie the constant to the level e, was equal to 0.8514, and on the basis of equation (7) the following model was formed:

$$Y = 0{,}8514 \times K^{-0{,}3557} \times L^{0{,}4962} \times e^{0{,}2617 \cdot t} \quad (8)$$

Analyzing the structured production model, a + b = 0.14 and the approximation coefficient was 9%. In this case, in the economic conditions of production regression, production results are growing more slowly than the growth of factors of production and production efficiency is low. According to Equation 8 a = -0.3557 <b = 0.4962 , indicates that the equipment and tools used in production are obsolete.

In dynamic series, economic analysis is often done by calculating their logarithms. There are several reasons for this. First, many economic indicators, including investment in food production, have approximately exponential growth rates, meaning that growth rates over time are very close to each other. The logarithms of such series show approximate linear growth rates, while the linear functions have convenient mathematical properties. Second, the standard error of the logarithms of many economic indicators is proportional to the value accepted and therefore does not change over time.

Table 2: Regression analysis

Dependent Variable: K_T_				
Method: Least Squares				
Date: 02/03/21 Time: 08:55				
Sample: 2006 2019				
Included observations: 14				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

K_T_1_	1.534267	0.092939	16.50836	0.0000
C	-54.79938	97.78015	-0.560435	0.5855
R-squared	0.957825	Mean dependent var		1014.340
Adjusted R-squared	0.954310	S.D. dependent var		1282.344
S.E. of regression	274.1040	Akaike info criterion		14.19646
Sum squared resid	901596.3	Schwarz criterion		14.28775
Log likelihood	-97.37519	Hannan-Quinn criter.		14.18801
F-statistic	272.5259	Durbin-Watson stat		1.766833
Prob(F-statistic)	0.000000			

The autoregression model can be in multiple orders, depending on the number of lags used. The first-order autoregression or AR (1) model looks like this:

$$K_t = \beta_0 + \beta_1 K_{t-1} + u_t \quad (9)$$

Based on the data in Table 2, we express the AR (1) model of the variable K using the values in Table 1 as follows:

$$K_t = -54.79938 + 1.534267 \cdot K_{t-1} \quad (10)$$

Based on the constructed AR (1) model, the forecast value of the K variable in 2020 is 6846,297. Equation (10) gives RMSE = 253.77 and MAPE = 26.48. We use the AR (2) model to forecast the value of investment in product production in 2021. If we calculate it using the ECC method, the result expressed in Table 3 is obtained. The result of this regression shows that while the value of the variable K is affected by the previous year's value, the value of the previous two years is negatively affected, but this effect is not statistically significant. If we calculate his forecast,

$$\mathrm{K_t} = -27.11953 + 1.662644 \cdot \mathrm{K_{t-1}} - 0.245489 \quad (11)$$

that is, we forecast on the basis of the probability that in 2020 it will reach 5155.104 billion soums and in 2021 - 7461.67 billion soums. In the AR (2) model, RMSE = 251.93 and MAPE = 20.98. This value does not differ from the AR (1) model.

Table 3: Regression analysis

Dependent Variable: K_T_				
Method: Least Squares				
Date: 01/04/21 Time: 09:12				
Sample: 2006 2019				
Included observations: 14				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
K_T_1_	1.662644	0.333809	4.980822	0.0004
K_T_2_	-0.245489	0.611150	-0.401683	0.6956
C	-27.11953	122.5883	-0.221224	0.8290
R-squared	0.958434	Mean dependent var		1014.340
Adjusted R-squared	0.950877	S.D. dependent var		1282.344
S.E. of regression	284.2155	Akaike info criterion		14.32475
Sum squared resid	888562.8	Schwarz criterion		14.46169
Log likelihood	-97.27326	Hannan-Quinn criter.		14.31208
F-statistic	126.8205	Durbin-Watson stat		1.800948
Prob(F-statistic)	0.000000			

Like the K variable, we constructed and predicted the AR variable AR (1) and AR (2) based on the above sequence. Hence, according to this model, the role of investment in the development of the country's economy in the future will remain high.

V. CONCLUSIONS AND SUGGESTIONS

The development and effective implementation of the strategy for the development of the economy of

Uzbekistan requires, first of all, a thorough development of a medium-term investment policy strategy.

In our opinion, the following measures should be taken to increase the efficiency of the use of domestic sources of investment financing and investment resources in our country:

- expanding their investment opportunities by strengthening the financial condition of enterprises on the basis of increasing the volume and improving the quality of production;
- formation of an effective mechanism for the development of regional investment strategies, which will be the basis for the integrated development of the regions, and the elimination of existing disparities in the level of interregional investment efficiency;
- organization of widespread use of modern financial market instruments in the active involvement of the population in production;
- development of market institutions (investment agency, investment bureau, engineering company) that help attract investment, registration of investment enterprises, overcoming difficulties in attracting specialists, etc.

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