

# Macroeconomic Trends and Patterns of Sustainable Economic Growth and its Quality

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## Article Info

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**Abstract:** One of the most important long-term goals of the economic policies of developed and developing countries is to ensure economic growth, improve its quality and balance. The ideas that have existed over the past decades about the sustainability of economic growth and a balanced approach to human, social, natural and physical dimensions have undergone profound changes. As the study showed, there is no consensus on what is central and that there are different interpretations of "quality of economic growth". This concept includes key aspects that shape the process of economic growth. The analysis showed that the leading ones are those aspects that directly affect growth, and at the same time strengthen the impact of improving the quality of economic growth on the stability of the economy. These include distribution of opportunities, economic sustainability of the environment, global risk management, and production and management issues. Each of these factors acquires a more capacious content and interpretation. Economic growth is understood to mean an increase in production capital, i.e. created for a certain period of goods and services.

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## 1. Introduction

The quality of economic growth is understood to mean its characteristic, which is associated with an increase in the degree of balance of investments in the main components (factors) of economic growth - physical, human and natural capital based on equal opportunities in access to development resources from all economic entities, lowering the level of market imbalances and distortions. Improving the quality of development is usually accompanied by an improvement in the use of growth factors<sup>1</sup>.

On the other hand, the meaning of the concept of the quality of economic growth is quite clear, just as the meaning of the concept of quality

of goods is clear. It is clear that the rate of economic growth can be arbitrarily large, however, at the same time, the real level of provision of the population with material and spiritual benefits may even decrease, while super-high growth, which overstrain the economy and the population, can lead to a political and economic collapse in the future. So, it is quite clear that the quality of economic growth is not directly related to its quantitative parameters, and in some situations the relationship between quantity and quality may be negative.

Of course, for a strict definition of the concept of the quality of economic growth, a criterion is needed by which the quality of growth will be evaluated. Thus, the most important factors determining the quality of economic growth in Uzbekistan should be considered

<sup>1</sup> W. Thomas et al. Quality of growth. The World Bank. "The World", Moscow 2001.

beneficial effects of economic growth that satisfy a certain criterion. At the same time, in order to build estimates, it is advisable to take into account directly the part of the growth in income currently consumed by the population, and not postponed for the future.

Earlier, the quality of economic growth in some official and unofficial sources began to be indirectly interpreted as some of the desired structural properties of economic growth, for example: without slowing down the growth rate in the oil and gas sector, ensuring the growth of other sectors, etc. Still, this is the definition of growth through growth, i.e. - a tautological definition and, most importantly, again, saying almost nothing about the goals of economic growth inherent in a social state.

It is advisable to assess the quality of economic growth by developing a system of fairly simple and clear indicators characterizing the achievement of levels of consumption, quality of life, human and social capital in comparison with the rates and proportions of economic growth. Observation of such indicators in dynamics will give an idea of the quality of economic growth over a certain period. An integral indicator of the quality of economic growth is also possible.

Most economists associate quality economic growth with more sophisticated factors of production and technology. Such growth is carried out not by increasing the volume of resource costs, but by increasing their return. It is based on scientific and technological progress, raising the level of education and qualification of workers, increasing mobility and improving the distribution of resources, improving production and personnel management, etc., that is, everything that allows to qualitatively improve both the factors of production and the process of using them.

Taking into account the priorities of the development of the world community in the third millennium, noted in the UN reports - the fight

against poverty, improving the quality of the environment, the transition to sustainable development - the goal is aimed at quality socio-economic development.

In this regard, the ratio of the quantity and quality of economic growth is very relevant. For these purposes, you can use the system of indicators of sustainable development.

When developing indicators, difficulty arises due to their large number. This complicates their use in the process of governing the country; therefore, it is necessary to rank indicators according to their priority. Such selection was carried out in most known cases of their development. So, in 2001, the UN Commission on Sustainable Development more than halved the number of indicators (initially more than 130). The European Union offers 11 basic environmental indicators.

Many countries follow a similar path. For example, in the USA, 400 indicators were selected according to the main criteria, and during the subsequent selection according to additional criteria, their number was reduced to 40; seven core indicators highlighted in the UK; The CIS has proposed five key indicators for Central Asian countries.

The ranking of priority problems with which an attempt was made to assess the quality of economic growth for Uzbekistan as a whole, all problems are iced into three groups - economic, social and environmental. This approach is more applicable for the analysis of the socio - economic level of development. In our case, instead of problems, the main factors (aspects) of economic growth are identified with an appropriate set of indicators.

Based on the developed criteria for selecting indicators of the quality of economic growth, the following factors were selected that determine the quality of economic for Uzbekistan:

- the economic growth;
- income income, salary

retail sales  
-production (real sector, services)  
-inflation  
-exchange rate  
budget indicators  
-work  
-capital  
-NTP

The set of factors and indicators reflecting them can change over time and depending on the tasks of the current and future periods. The developed indicator systems can be used in any country as a tool for assessing the quality of economic growth, the efficiency of environmental management, the welfare of the population and the sustainability of development in general.

The criterion of economic growth, being an objective category, also acts as one of the forms of expression of production relations. Its specificity lies in the fact that, being conscious, it acts as the most important premise for the development of economic policy, the system of planned and reported indicators of the country's economy as a whole and its individual links. In this sense, the criterion of economic growth acts as one of the moments of the state's economic strategy.

Recently, many researchers have been talking about the role of quality institutions. Recent studies have shown <sup>2</sup>, that the higher the quality of state institutions, the more effective the quality of economic growth. Recently, in conditions of unstable external conditions and recurring crises, many economists have come to the conclusion that the importance and strengthening of state institutions is a factor in macroeconomic stability and a guarantee of the effective development of the national economy.

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<sup>2</sup> S.V. Chapel "How to increase the efficiency of economic policy: an empirical analysis of state-owned institutions" // Journal of Economics, No. 7, Moscow 2009.

Achieving stable and effective economic growth requires the development of criteria for quality economic growth. Under the criterion of qualitative economic growth, we can understand the definition of the relationship between the results of economic growth and social needs, to what extent economic growth ensures the achievement of the goal of the economy and in what historical periods.

At the same time, it is important to learn how to evaluate the effectiveness of economic growth, i.e. know at what expense it is carried out and how do the costs of its maintenance relate to the results.

So, there are two essentially different approaches to assessing economic growth, between which there are objective contradictions that can be resolved by reaching a certain compromise (based on a choice of priorities). We are talking about criteria for the maximum scale and quality level of the economy, which are associated with possible alternative options for ensuring proportional development. A number of objective circumstances associated with the resource, lag and structural aspects of the latter create the prerequisites for the different directions of the influence of these criteria on the structure of the economy and its dynamics.

## 2. Analysis and results

In world economic science, dissatisfaction with the analysis methodology towards the ongoing economic processes began to manifest itself. One manifestation of such dissatisfaction is the search for an economic approach to the interpretation presented in macroeconomic models.

So with respect to production functions, we can say that the advantage of the analysis of macroeconomic processes using this methodology can be attributed to the fact that the use of this model is multifactorial, but it is convenient to build, and the results are logically interpreted.

Also, the advantages of choosing this model include the fact that the model allows you to solve multiple problems of optimizing the economy, allows you to maneuver in choosing a macroeconomic policy, and an important advantage is the availability of existing statistical information. The disadvantages of the methodology include the limitation of analysis from external factors.

Rethinking the production function from the standpoint of developing a macroeconomic policy strategy allows us to raise a number of topical issues that are very significant for the modern economy of Uzbekistan. Among these problems are: the degree to which the share of factors of production in the total income that this factor contributes to this income is consistent. Thus, the problem of economic justice in the distribution of income is advanced on a strictly scientific basis. Another urgent problem is the socio-economic consequences of the process of substitution of production factors, as well as the correspondence of the qualitative characteristics of one production factor to the qualitative characteristics of another factor. It is also very relevant to study the processes of changes in these qualitative characteristics and the impact of these changes on the quantitative parameters of the production function.

The solution of these problems allows you to specify the economic relations between labor and capital, and scientific and technological progress, important factors of production in any economy. A macroeconomic interpretation of the production function means a comparison of various quantitative economic relations as forms of manifestation of economic relations.

In foreign economic literature, the development of the production function problem has been recognized by many scientists as the importance of a solution for analyzing the qualitative factors of macroeconomic growth.

In foreign economic literature, the development of the production function problem has been recognized by many scientists as the importance of a solution for analyzing the qualitative factors of macroeconomic growth. The Cobb-Douglas production function took on a classic form; most of the subsequent economists, one way or another, started from it. The most famous are the work of the production function of R. Solow, K. Arrow, J. Kendrick. A significant contribution to the development of the production function problem was made by D.A. Chernikov, N.P. Gibo.

The basis for decomposing growth into components most often is the Cobb-Douglas production function with constant returns to scale. As a rule, with such a specification of the model, the main factor of economic growth is the remainder, not explained by the model - total factor productivity (TFP). Consequently, differences between countries in the magnitude of overall factor productivity explain cross-country differences in growth rates (see, for example, Easterly, Levine (2001)). However, these differences are also explained by stylized facts (Waggo (1997)). Therefore, they themselves should be due to differences between countries in the value of TFP.

However, empirical studies of growth can be based not only on neoclassical models<sup>3</sup>. If the premise of a constant return on the scale of the production function on which such models are based does not correspond to reality, then

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<sup>3</sup> Note: The remainder explaining the growth in the neoclassical model is not explained by the model, and there is no clear interpretation of it (the remainder was called both "progress in knowledge", and "general factor productivity", and the measure of our ignorance"). As a rule, it is identified with technological progress, and the main conclusion of neoclassical growth models is that in the long run economic growth is explained by exogenous (that is, not explained by the model) technological progress.

conclusions about the magnitude of its coefficients can be called into question. For example, if a production function has increasing returns to scale, then factor-wide productivity, calculated on the basis of a neoclassical production function, will be overestimated. That is, with a different specification of the model, differences between countries in growth rates will be explained not by aggregate factor productivity, but by differences in returns from factors of production.

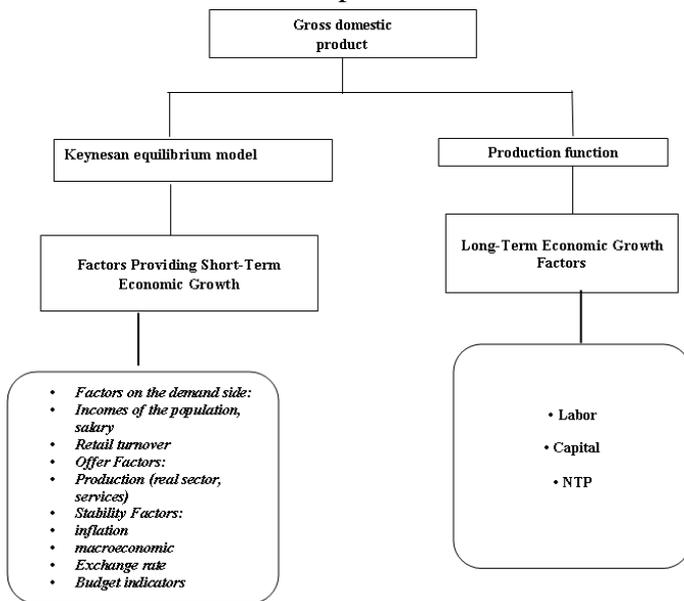


Figure 1. A simplified model for the analysis of factors providing high-quality short-term and long-term economic growth in the Keynesian short-term segment <sup>4</sup>.

But the drawback of these models is that the model has limitations that do not cover many factors, for example, the influence of the outside world, changes in the structure of the economy, social and political changes, etc.

Short-term models are usually more flexible, allowing you to include a large number of factors that influence and ensure high-quality economic growth. The disadvantage of such models is that explanatory factors are difficult to predict for a longer period of time. In this

<sup>4</sup> Compiled by the author

connection, the development of a model that would complement each other is gaining importance.

The development of such a model will allow you to quickly respond to

changes taking place both in the national economy and taking into account the ongoing changes on the part of the outside world, which will allow us to reach the level of stable qualitative economic growth in the national economy.

To create such a model, it is necessary to determine the conditions and factors for achieving high-quality economic growth. As can be seen from Scheme 1, under the factors that determine economic growth in the short term, we can consider the classical idea based on Keynes's theory of the model of aggregate supply and aggregate demand.

The prerequisites of the neoclassical model are the following factors (see Barro, Sala-i-Martin (2001); Solow (1956)):

1. There is a single (composite) product - release. That is, output and income are the same.
2. Part of the output at each given time is consumed, the remainder is saved and invested. Investments are equal to savings.
3. The capital stock is an accumulated composite product. The net capital gain is equal to the difference between the invested part of the output and annually disposed capital.
4. Issue is produced using two factors of production - capital and labor (services provided by households).
5. The classic Cobb-Douglass production function has the following form:

$$Y = f(K, L)(1)$$

Where Y is the issue; K is capital; L is labor. The return on the scale of the production function is decreasing for each factor of production and constant for both factors, that is, an increase in the use of both factors leads to an increase in output by the same amount:

$$nY = f(nK, nL)(2)$$

The most convenient function for analysis that satisfies these assumptions is the Cobb-Douglas production function (with constant returns to scale). It has the form:

$$Y = AK^aL^{1-a}(3)$$

where A is a parameter characterizing the level of technology; a is a coefficient characterizing the contribution of capital growth to output growth; (1 - a) - the contribution of labor. That is, a and (1 - a) are fractions of factors.

Graphically, this function can be represented as follows:

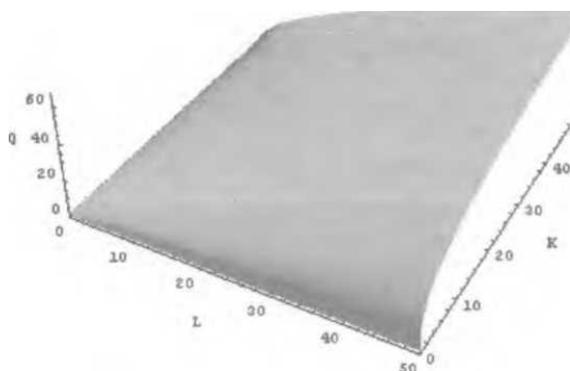


Fig. 2. The classic form of the production function of Cobb - Douglass <sup>5</sup>

If the sum of the exponents (b + c) is equal to one, then the Cobb-Douglas function is linearly homogeneous, that is, it demonstrates a constant return when the scale of production changes. If the sum of the exponents is greater than unity, then the function reflects increasing returns, and if it is less than unity, it decreases. The isoquant corresponding to the Cobb-Douglas function will be convex and "smooth".

If we analyze the dynamics of capital intensity of GDP growth (ICOR coefficient) in recent years, then we can draw similar conclusions. Its values (4-6 in 2001-2009) are also far from world standards (for example, in South Korea,

in the reaction of GDP growth to a decrease in the value of fixed capital occurred in 2000. This was the last year in the development of the economy of Uzbekistan, when the GDP growth rate showed a negative value. But even in this period, the rate of decline in GDP did not exceed the rate of decline in investment:

$$\frac{(BBП2001 - BBП2000)}{BBП2000} \gg 0,5, \\ a \frac{(ИНВ2001 - ИНВ2000)}{ИНВ2000} \sim 0,6$$

In accordance with the revealed interconnections, we can say that the first sign of the end of the economic decline in 2000 was an increase in investment demand. These events initiated the process of anticipatory retirement of capacities, and the emerging need to replace retirement funds stimulated the demand for capital, which led to increased investment activity (table 1).

After 2000 GDP and investment growth rates were stable and amounted to:

$$\frac{(BBП2008-BBП2007)}{BBП2007} * 0,3, \\ \frac{(ИНВ.2008-ИНВ2007)}{ИНВ2007} \sim 0,5.$$

The interaction of the effects of the multiplier-accelerator revealed for the economy becomes a real prerequisite for the activation of investment activity in Uzbekistan as a whole.

<sup>5</sup> According to the materials of the website "Forecasting" <http://www.nateconom.ru/category/prognozirovanie-2/> "Production functions as a forecasting tool" May 2008

**Table 1**  
**Dynamics of ICOR by industry for 2001-2008**

	2001	2002	2003	2004	2005	2006	2007	2008
<b>Industry,</b>	15,6	10,0	6,6	6,7	3,7	6,2	4,1	4,8
<b>Total</b>	-0,8	-28,3	4,9	6,4	3,0	-7,5	5,8	21,5
<b>Fuel and energy complex</b>	0,0	0,0	-0,2	0,0	-0,1	0,4	0,1	-0,1
<b>metallurgy</b>	28,2	-5,4	5,4	6,4	-14,8	12,3	2,8	2,0
<b>Chemical and petrochemical</b>	-4,0	6,1	-10,8	0,4	0,4	0,4	0,4	0,6
<b>Engineering and metalworking</b>	-2,1	2,3	-1,3	-1,5	1,1	2,4	6,0	2,7
<b>PSM</b>	-1,7	9,4	19,8	-27,8	30,7	3,2	20,6	1,1
<b>Easy</b>	0,6	2,6	9,4	-10,3	2,0	3,6	1,1	2,2
<b>Food</b>	-3,4	4,8	9,4	-20,3	17,1	4,5	1,4	1,1

**Source:** State Statistics Committee of the Republic of Uzbekistan.

The development of a scenario model that would provide analysis and cover all areas of economic activity, as well as allow to develop scenario options for the forecast for the short and long term for developing strategies and macroeconomic policies, is one of the important tasks in many countries. To analyze and build a short-term model, quarterly growth rates were used compared to the corresponding quarter of the previous year. The use of such series can reduce the influence of the seasonality factor. Another advantage of this approach is that the quarterly series by the corresponding period go to the average annual estimates for all indicators and sources of economic growth. This approach allows combining the short-term model with the long-term model at the lowest cost since the latter used annual growth rates. Annual growth is easier to predict and get more accurate estimates of the forecast.

The methodology of the valuation model was based on the combination of demand and supply factors in the equations, as well as macroeconomic stability factors. This approach allows you to take into account the maximum

number of factors, as well as to take into account the state of equilibrium between producers and consumers.

Creating a model assumes that all indicators should be normally distributed, adjusted for seasonality and stationary.

For this, appropriate tests for the normal distribution were carried out, as well as adjusted for seasonality, i.e. indicators are cleaned from the seasonality factor. As mentioned above, an important condition for obtaining reliable estimates is the ADF test, which allows you to evaluate the stationarity of the series or to bring them to this form, since only stationary series allows you to obtain reliable, effective and unbiased estimates, on the basis of which we can talk about the correctness of the selected model, and in the subsequent reliable forecast.

Based on the econometric results obtained, it can be said that most of the series are stationary (see table 2.), with the exception of the GDP deflator, which could not be brought to a stationary form. However, in order to verify the reliability of this factor, it is necessary to conduct a cointegration test, which allows talking about

the stationarity of the series even if the inflation rate is not stationary separately, but comes to this form when analyzed with the economic growth indicator. Such a test showed the presence of

cointegration between the series of GDP and the GDP deflator; therefore, it is possible to characterize the obtained coefficient estimates as reliable.

**Table 2**  
**Stationarity test results using the ADF test**

Indicators	ADF statistics	5% critical value	Specification	
			1 -St defference	Constanta /Trend
GDP	-6.24	-2.94		
Direct taxes	-3.01	-2.93		
GDP deflator	-1.18	-2.94	-	-
Disposable income	-5.26	-3.55		
The salary	-5.13	-3.15		
Turnover	-4.85	-3.05		
Export	-5.35	-3.53		
Import	-6.76	-3.58		
Industrial production	-3.48	-2.06		

**Source:** Calculated by the author based on data from the Ministry of Economy.

After all the tests and adjustments done, several equations were obtained that allowed us to assess the degree of influence on economic growth. In order to obtain elasticity coefficients, all indicators are presented in a logarithmic form. The first equation obtained is as follows:

After all the tests and adjustments done, several equations were obtained that allowed us to assess the degree of influence on economic growth. All obtained models are statistically significant, because checked by statistical criteria: F - Fischer; DW - Darbin Watson; t - Student. In order to obtain elasticity coefficients, all indicators are presented in a logarithmic form. The first equation obtained is as follows:

$$\log(\text{GDP\_SA}) = 3.43 + 0.08 * \log(\text{EX\_SA}) + 0.18 * \log(\text{TAX\_SA}) \quad (1)$$

P-Value, (c.o.) (0.00) (0.00)

$R^2 = 0.42$        $F = 18,31$   $DW = 2.09$

Where GDP\_SA - gross domestic product; EX\_SA - export; TAX\_SA - direct taxes. The end of SA means seasonal adjustment- seasonal adjustment. P-Value - probability of the significance of the coefficient at the level of 99%,

95% and 90%; s.o. - values of standard errors. For example, for the coefficient with the export factor, the confidence level in the obtained coefficient is 99%.

The most sensitive factor influencing the most on GDP is direct taxes, with an elasticity coefficient of 0.18, which means that with an increase of 10%. direct taxes, GDP will increase by an average of about 1.8%.

Regarding the export factor, we can say that with its increase by 10%. The country's economic growth will increase by 1% on average. Together, both of these factors explain the behavior of GDP by 42%, which indicates a rather high explanatory ability of the model.

As mentioned above, factors in the equation were selected so that there were factors of supply and demand, and, if possible, indicators of macroeconomic stability. The obtained second equation meets all these criteria and has the following form:

$$\log(\text{GDP\_SA}) = 1.82 - 0.14 * \log(\text{DefSA}) + 0.30 * \log(\text{DI\_SA}) + 0.31 * \log(\text{Ind\_SA}) \quad (2)$$

P-Value, (c.o.) (0.11) (0.07) (0.01) (0.10)  
 $R^2 = 0.32$      $F = 14,7$      $DW = 2.18$

Where Def\_SA- inflation rate for the GDP deflator; DI\_SA - disposable income of the population; Ind\_SA- industrial production.

Based on equation 2, we can say: the obtained coefficients are significant with a probability of 90%, which is acceptable, and the signs obtained are logical. So, on the basis of the results obtained, it can be said that if inflation increases by 10% in the GDP deflator, the country's economic growth will decrease by 1.4% on average, the disposable income coefficient 0.3 has a positive relationship, they say that with an increase in income by 10% to an increase in GDP by an average of 3%. (on the demand side). An increase on the demand side leads to an increase in supply. As can be seen from the obtained model, a 10% increase in supply by the factor of industrial output has the same proportions as demand, i.e. in this case, the country's GDP will increase by an average of 3.1%. Such a proportion may indicate a certain balance of supply and demand at the moment, which, as mentioned above, is one of the criteria for qualitative economic growth.

In the third equation, an attempt was made to include all factors, however, in this equation, the obtained coefficients for indicators such as the GDP deflator, disposable income, and industrial output did not give a statistically significant relationship. In this connection, in order to take into account the influence of these factors on the economic growth of the republic, an approximation method will be used to obtain forecast estimates. The resulting equation is as follows:

$$\begin{aligned} \log(\text{GDP\_SA}) = & 1.57 + 0.14 \cdot \log(\text{WAGE\_SA}) + \\ & 0.19 \cdot \log(\text{TAX\_SA}) + \\ & 0.17 \cdot \log(\text{EX\_SA}) - 0.08 \cdot \log(\text{IM\_SA}) + \\ & 0.29 \cdot \log(\text{TURN\_SA}) - \\ & -0.04 \cdot \log(\text{INV\_SA}) \end{aligned}$$

P-Value, (c.o.) (0.05) (0.04) (0.0) (0.006) (0.002)

$R^2 = 0.64$      $F = 21,2$      $DW = 1.6$   
 Где WAGE\_SA - зарплата; EX\_SA - экспорт; TAX\_SA - прямые Taxes IM\_SA - import; TIJRN SA - retail turnover; INV\_SA - investments.

Based on this equation, we can say that the estimates obtained with a confidence level of 95% for almost all indicators have a high explanatory power of 64%. As an econometric analysis showed, the most sensitive factor to economic growth is retail turnover with an elasticity coefficient of 0.29, in other words, a 10% increase in demand from the population will directly increase economic growth by an average of 2.9%.

The resulting coefficient is approximately equal to disposable income (as one of the possible factors for expanding demand) as in the second equation, which indicates a fairly stable dependence of demand (as well as the reliability of the obtained coefficients and the likelihood of the selected model specification) on the economic activity of a country that has high potential stimulate economic growth.

The interest rate and exchange rate were not reflected in the model, because no statistically significant relationship was obtained for them, which indicates their indirect influence on economic growth.

Also evidence of the correctness of the obtained coefficients is the coefficient obtained for taxes: for example, if in the first equation this coefficient was 0.18, then in this equation it changed upward, only by 0.01, which is an acceptable deviation. The relatively high difference between the obtained export coefficients can be said that perhaps this indicator in the first equation was underestimated, since the import factor was absent in the model.

An illogical sign was obtained for the investment factor, but with a rather high probability of 98%, perhaps this is due to inefficient investment in individual industries.

To achieve a single GDP, as noted above, the approximation method is applied, which will allow to take into account each factor according to the equations taking into account its weight. In order to avoid double counting of factors, two equations 2 and 3 are subject to approximation; it is these equations that carry the maximum information of factors affecting the level of economic growth. In this case, the measure of weights will be the explanatory ability of the equations or R. So, for factors in the second equation, the weight will be 0.32, for the third equation - 0.64. Using this approach avoids errors.

Based on this technique, the contribution of each factor to the GDP growth was calculated (Table

3). Based on the calculation of the contribution of factors to economic growth in 2009, it can be said that during the crisis, the main factor that supported the high economic growth in Uzbekistan was the increase in incomes of the population. This was reflected both through a general increase in incomes and in salary indicators, and as a result, steady demand from the population, expressed through the factor of turnover, which indicates the effectiveness of the adopted anti-crisis program, in which one of the main focuses is to increase incomes. As can be seen from table 3, the factors used in the model explain the behavior of the ongoing economic processes by 78%, 22% account for factors that were not taken into account in the model used.

**Table 3**  
**Calculation of the contribution of factors to economic growth in 2009**

Indicators	Elasticity	Rate of increase	Contribution
The salary	0,14	18,1	20,0
Direct taxes	0,19	4,5	6,8
Export	0,17	2,0	2,7
Import	-0,08	2,0	-1,3
Turnover	0,29	14	31,1
Investments	-0,04	22	-7,0
GDP deflator	-0,14	17,7	-9,8
Disposable income	0,30	20,0	23,7
Industry	0,31	9,0	11,0
<b>Total</b>			<b>78,3</b>
Unaccounted factors			21,7
<b>GDP</b>		<b>8,1</b>	<b>100</b>

Source: calculated by the author based on Goskomstat data.

In general, the developed model is quite stable with reliable coefficients, indicate the creation of a model with which you can develop scenario conditions for the short-term forecast period and make recommendations for macroeconomic policies. The next necessary step is to develop a model for the forecast for the long term.

For the most adequate analysis of the production function, as an economic theory, it is

necessary to ask the question, what exactly is production in its functional aspect. The type of production function will depend on how the concept of production is determined, in the form of a schematic model that describes it, and, accordingly, a logical interpretation of the production function.

To move to the neoclassical model, it is necessary to prologarithm the factors, as can be seen from Fig. 2, the number of people employed

in the economy remained almost at the same level, and its growth lagged behind GDP, possibly due to an excess of the labor factor. Concerning investments, it is possible to divide conditionally into three periods: the period of investment inflow 1995-1999. this period is characterized by the exit of the national economy from the recession

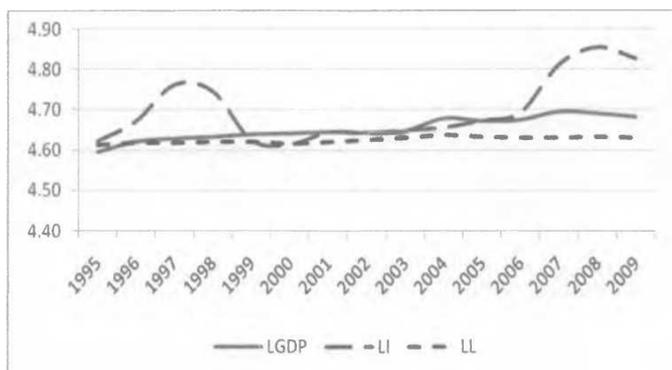


Figure 2. Dynamics of the logarithms of GDP, employment and investment 6

The resulting model of a new type has the following characteristics:

$$\text{Log(GDP)} = -1.07 + 0.08 * \text{log(INV)} + 1.15 * \text{log(Lab(-l))} + 0.02 * \text{log(treiid)} -$$

$$0.91 * \text{MA}(1)$$

$$\text{P-val}(0.53) (0.00) (0.01) (0.00)(0.00)$$

$$\text{R}^2 = 0.95$$

$$\text{DW} = 1.75$$

The resulting equation as a whole satisfies all the criteria for the reliability of estimates. As you can see, the economy of Uzbekistan depends more on labor, less on investment and scientific and technical progress. The high coefficient of elasticity with a labor factor of 1.1–5 percent can be explained not only by the fact that the economy is labor-intensive, but also by the fact that in recent years Uzbekistan has made large investments in human resources, this is the opening of multiple colleges, as well as the

<sup>6</sup> Source: author's calculations based on data from the State Statistics Committee of the Republic of Uzbekistan.

associated with the breakdown in economic relations; stable investment period 2000-2006; and the third period 007-2009. intensive growth of investment in the economy, associated with both improving conditions for foreign investment and the annual investment program, a record inflow was marked by 2008 at 28%. creation of new workers places The use of high labor leads to investment efficiency.

Table 3.  
Calculation of the TFP parameter for Uzbekistan for the period  
From 1995 to 2009.<sup>30</sup>

Period	Average annual growth rate			TFP Evaluation Options
	GDP	INV	Lab	
1995-1999	2.0	8.5	1.3	-0.18
2000-2006	5.5	4.9	2.3	2.46
2007-2009	8.9	25.3	2.7	3.77

**Note:** calculation by formula 6. Where  $\Delta Y(t) / Y(t)$  is the average annual GDP growth rate;  $\Delta L(t) / L(t)$  is the average annual growth rate of the number of employees;  $\Delta K(t) / K(t)$  is the average annual growth rate of investments.

However, with the strengthening of macroeconomic stability, the creation of new institutional foundations of the market, and the attraction of significant volumes of foreign investment, the necessary prerequisites were created for increasing the efficiency of using factors and sources of economic growth. This was reflected in the growth of the TFP parameter, which moved from negative values to the region of positive estimates, amounting to 2.5%. Over the past three years, the level of overall productivity has increased even more and amounted to 3.8% with an average GDP growth of 8.9%, which indicates a trend towards an increase in the overall efficiency of the national economy.

However, the current trend is not yet sustainable. For certain years of the reporting period, the TFP level was relatively high (1996 -

1997, 2000 - 2001, 2004 and 2007 - 2008, while in other years it fell sharply (2003, 2008). This may be due to that the main contribution to GDP growth in recent years was in the service sector.

The development of an effective strategy for economic development requires the formation of alternative scenarios based on the comprehensive consideration of a number of factors. It is also necessary to take into account the impact of anti-crisis measures on economic growth for the coming year, as well as the impact of measures in the long term.

In this paper, three scenarios are developed and proposed:

- Basic scenario, involving the economic development of the national economy based on prevailing patterns and trends;

- Moderately mobilization scenario, involving a phased gradual development including anti-crisis programs;

- Mobilization (investment) scenario, based on the dynamic development of the economy, where the main factor in economic development is investment, and this scenario takes into account anti-crisis measures.

The forecast for the baseline scenario for inflation on the consumer price index was obtained on the basis of the autoregressive model, which assumes a forecast based on prevailing trends over a historical period of time. The second and third scenarios are expertly based on the conditions and prerequisites for the second and third scenarios, taking into account the effective implementation of anti-crisis measures, and as a consequence, the reduction of inflation to 5-4%, respectively, for the second and third scenarios.

**Table 4**

**Conditions for improving the quality of economic growth of the Republic of Uzbekistan for the period 2012 - 2020 (in% to the corresponding period)\***

	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>WPP</b>	7,5	7,7	7	6,5	7	7	7,5	7	6,8
	8,5	8,7	9	8,2	8,5	8,6	8	8,5	9
	9,2	9,5	10	10,2	10,5	10,5	И	11,5	11,7
<b>IPC</b>	7,8	8	8	8	7,5	7,6	7,5	7,4	7,3
	6,5	6,3	6	5,7	5,5	5,3	5	5,3	5,5
	6,5	6	5,5	5,4	5,3	5	4,8	4,5	4,2
<b>ICR *</b>	0,13	0,13	0,13	0,13	0,13	0,13	0,13	0,14	0,14
	0,15	0,16	0,17	0,18	0,18	0,19	0,20	0,19	0,18
	0,15	0,17	0,18	0,19	0,19	0,20	0,21	0,22	0,24

**Note: CPI forecast based on autoregressive model.**

\* author's calculations as the ratio of the difference between the growth rate of GDP and the CPI to the growth rate of GDP. In the form of a formula, it looks like  $RBI = ((GDP\ growth - CPI\ growth) / GDP\ growth)$ .

As can be seen from table 4, even towards the end of the forecast period, it is impossible to fully talk about improving the quality of economic growth according to the first (base)

scenario. Fulfillment of such a scenario implies huge costs for labor and capital, as well as for the widening gap between the national economy and the rest of the world in terms of scientific and

technical progress. As can be seen from table 3.1. the quality of economic growth is more than twice as good at the beginning of the forecast period for the second (moderate mobilization scenario), but this difference is reduced in 2014 - 2015.

With this dynamic of growth, the possibilities of solving urgent socio-economic problems become very limited. As a result, the scale of gaps in the economy of Uzbekistan - by income differentiation, by the technological state of various sectors of the economy - will remain virtually unchanged. This means that development tasks in the framework of this scenario cannot be solved.

Despite the fact that by historical standards the success of the national

economies are still quite modest compared to developed countries, the achieved result and the level of dynamics allow us to set goals of a fundamentally different plan than in previous years. Development means, first of all, not a deterioration of the basic structural characteristics and quality characteristics of the economy. This, in turn, implies a level of investment and capital renewal at which competitiveness of not only products but also the competitiveness of capital increases.

Only increasing the competitiveness of labor and increasing the competitiveness of capital ensure sustainable development and guarantee the strengthening of long-term competitive advantages in world markets.

The main tool for solving long-term development problems is investment. It is only through investment that you can break resource constraints, structural and technological constraints.

The third accelerated mobilization scenario involves an increase in investment and, as a consequence, an increase in the number of employees. There are many opinions that investments are a source of inflation, but recently, many scientists say that investments lead to a

general level of inflation only in the short term, it is necessary to minimize the gap between the industrial production index and the broad money supply<sup>35</sup>. This study examines the impact of investment on inflation, industry, and economic growth. Calculations using econometric approaches indicate that investments give a negative effect only in the short term, but in the long term the conditions for domestic producers improve, the competitiveness of the economy increases, as well as the attraction of private capital.

Such a situation arises in conditions when, along with the growth of money supply, the investment attractiveness of the domestic market increases, the number of private investors grows. This leads to a redistribution of additional money supply in favor of accumulation, which relatively reduces the pressure on demand for consumer goods and services markets, and leads to a slowdown in inflation with respect to money supply growth.

Therefore, investment growth of up to 135% is possible. Such growth can be explained by the fact that the economy of Uzbekistan is stable in relation to the crisis. In this regard, it is attractive for foreign direct investment, as well as in the growth of public confidence<sup>36</sup>. Recent studies show that investments also do not pose a threat to macroeconomic instability in the long run. Such an increase in investment will contribute to the creation and introduction of new jobs.

Investment growth has an impact on the expansion of the number of employees, which is explained by the fact that investments contribute to the creation of new jobs, the emergence of new services, i.e. contribute to the expansion of demand in the skilled labor market. Therefore, this scenario assumes an increase in the number of employees from 3.8% to 6.5% by the end of the forecast period.

### 3. Conclusion/Recommendations

1. At the factor level of analysis, a qualitative characteristic of economic growth is its use as a criterion for the dynamics and effectiveness of production activities. From the standpoint of the structural economic level, the high quality of the economic growth is ensured by structural diversification, leading to the dominance of high-tech industries, enterprises with a high degree of processing of raw materials and the development of the infrastructure for non-material capital accumulation. The socio-economic aspect of the analysis is determined by the degree of relevance of modern economic growth to the satisfaction of human needs, a measure of which is the presence of conditions for self-actualization of a person in the labor process.

2. A comprehensive study of the problems of economic growth is possible with the integrated use of approaches - reproductive and functional-macroeconomic, which allow us to reflect the relationship of economic growth with other forms of economic dynamics, to subordinate production and growth factors, and also to quantify the contribution of individual factors to economic growth.

3. The main criterion for the quality of economic growth is a characteristic of intensive economic growth and can be expressed by the positive dynamics of the growth of the human development index (HDI), taking into account the use of intensive economic growth factors and ensuring the preservation of natural and environmental factors of vital activity, national security interests.

4. The strategic direction of the formation of a qualitatively new content for the growth of the national economy is the rational use of the resources of the raw materials complex for the construction of a diversified economy that effectively transforms the accumulated fundamental knowledge into the intellectual technologies used to produce new technologically

intensive products and create high value-added services. The true degree of diversification of the domestic economy is still insufficient, which is confirmed by the high dependence of its growth on the price situation on world commodity markets.

5. The proposed growth strategy options using quantitative and qualitative basic factors using the modeling method built on multivariate regression models show the high efficiency of the development model, which involves the identification of strategic guidelines for the growth of quality of life and investment efficiency.

6. The most important component of the aggregated model of economic growth is the production function that links output to the volume of fixed assets or investments, labor costs and, possibly, other factors of production. Single-sector models of this kind are used as a tool used both for forecasting the economy on horizons and for conducting a retrospective analysis of macroeconomic processes. Thus, the aggregated production function can be considered as a tool for both forecasting and retrospective analysis.

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