# The role of efficiency in the economic growth quality generation and manifestation processes

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## Արդյունավետության դերը տնտեսական աճի որակի ձևավորման և դրսևորման գործընթացներում

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**Ամփոփագիր.** Ժամանակակից տնտեսագիտությունը շարունակում է ուսումնասիրել ազգային տնտեսությունների արդյունավետությունը՝ սկսած դրա դերից և դրսևորումներից մինչև դրա գնահատումը, մոդելավորումը և բարելավման հնարավորությունների ու մեխանիզմների բացահայտումը: Ըստ էության՝ մակրոմակարդակում թվարկված խնդիրների լուծման համար անհրաժեշտ է արդյունավետությունը դիտարկել տնտեսական աճի համատեքստում, ընդ որում, աճի որակի համատեքստում, քանզի աճի վերջնանպատակը հասարակության բարեկեցության բարելավումն է: Մյուս կողմից որակյալ տնտեսական աճն ինքնին ենթադրում է արդյունավետության ամենատարբեր դրսևորումները: Սույն ուսումնասիրության հիմնական նպատակը տնտեսական աճի տարբեր փուլերում արդյունավետության դերի վերհանումն է, որն իրականացվել է մի կողմից ընդհանուր գործոնային արտադրողականության և աշխատուժի արտադրողականության ցուցանիշների միջոցով, մյուս կողմից՝ բարեկեցության համաթվի և երջանկության համաթվերի, գլոբալ մրցունակության և շուկայի կենտրոնացվածության ինդեքսների, ինչպես նաև Ջինի գործակցի միջոցով: Նշված ցուցանիշներն ընտրվել են տնտեսական աճի որակի ձևավորման և դրսևորման գործընթացներում դրանց կարևորությունից ելնելով: Աշխատանքում անդրադարձ է կատարվում վերոնշյալ՝ արդյունավետություն նկարագրող ցուցանիշներին, դրանց գնահատման մեթոդներին և դինամիկային ՀՀ-ում ու աշխարհում՝ որպես արդյունավետության դերի ուսումնասիրություն տնտեսական աճի որակի ձևավորման գործընթացում: Իսկ արդեն աճի որակի դրսևորման համատեքստում արդյունավետության դերի կարևորությունը փաստում են դրա և որակի դրսևորումները նկարագրող ցուցանիշների միջև առկա բարձր կորելացիաները, մասնավորապես՝ առավել ընդգծված կապ է գրանցվել արդյունավետություն-բարեկեցություն և արդյունավետություն-մրցունակության զույգերի պարագայում:
**Հանգուցաբառեր՝** տնտեսական աճի որակ, աճի ձևավորում, աճի դրսևորում, արդյունավետություն, ընդհանուր գործոնային արտադրողականություն:

## Роль эффективности в процессе формирования и проявления качества экономического роста

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**Аннотация.** Современная экономика продолжает изучать эффективность национальных экономик, начиная от ее роли и проявлений и заканчивая ее оценкой, моделированием и выявлением возможностей и механизмов улучшения. Для решения перечисленных задач, перечисленных на макроуровне, необходимо рассматривать эффективность в контексте экономического роста, причем в контексте качества роста, ибо конечная цель роста - улучшение благосостояния общества. С другой стороны, качественный экономический рост сам по себе предполагает самые разные проявления эффективности. Основной целью данного исследования является выявление роли эффективности на разных этапах экономического роста, которая проводилась, с одной стороны, через показатели общей факторной производительности и производительности труда, с другой - через индексов благосостояния, счастья, глобальной конкурентоспособности и рыночной концентрации, а также через коэффициент Джини. Указанные показатели были выбраны исходя из их важности в процессах формирования и проявления качества экономического роста. В данной работе затрагиваются вышеуказанные показатели эффективности, методы и динамика их оценки в Республике Армении и в мире как изучение роли эффективности в процессе формирования качества экономического роста. А уже в контексте проявления качества роста важность роли эффективности свидетельствует о высокой корреляции между её показателями и

показателями, описывающими проявления качества, в частности, были отмечены наиболее выраженные связи между парами эффективность- благосостояние и эффективность-конкурентоспособность.
**Ключевые слова:** качество экономического роста, генерация роста, проявление роста, эффективность, совокупная факторная производительность.

Under conditions of limitation, efficiency has become one of the most important terms in scientific circles, and not only. Moreover, it is used in almost all spheres, attributed to different processes, evaluated by different approaches and methods, interpreted from different angles.

Economics also has its problems to be solved within the framework of the concept of efficiency, both at micro and macro levels. Apparently, free competition, which exists at both levels, first of all presupposes high efficiency in terms of enduring competition and maintaining a stable position in the market. When talking about competitive advantages, there is an automatic need to refer to efficiency, in particular, to those aspects, due to the effective organization, implementation and control of which it is possible to put forward one's own trump card in the market.

The efforts of the Economic Cooperation and Development Organization are very valuable from both theoretical and methodological points of view. The main goals of their work include an accessible guide provision to productivity measurement for those involved in constructing and interpreting productivity measures, in particular statistical offices, other relevant government agencies and productivity researchers, and also identifying the characteristics of performance evaluation criteria, referring to a coherent framework linking economic theory and the theory of combined numbers [**26**, p. 7].

The concept is quite diverse, the reasons for its emergence are sometimes unnoticed, and the manifestations are unpredictable. Efficiency implies expansion, on the other hand, cost reduction. Adding to these the possible negative environmental, social and psychological consequences of growth, as well as the problems of its stability and uncertainty, it turns out that we deal with a phenomenon that has a versatile characteristic, which separately, by stages, and coherently accompanies economic growth at all stages of its evolution. Therefore, there are different manifestations of effectiveness. The main purpose of this work is to identify the role of efficiency at different stages of economic growth.

With regard to economic growth and efficiency, there is a need to move to the qualitative plane of economic growth, since, on the one hand, production efficiency is not an end in itself and, in the end, is aimed at improving the welfare of society, and on the other hand, qualitative economic growth itself presupposes all the forms of efficiency manifestations. For example, the extent to which growth reduces poverty depends on the degree to which the poor participate in the growth process and share in its proceeds. Thus, both the pace and pattern of growth matter for reducing poverty [**12**, p. 2]. And the macro manifestations of efficiency in this case are the ratio of the poor population to the share of income in economic growth, on the other hand, the inclusive manifestations of growth.

Comparison of living standards across countries is most often based on per capita gross domestic product (GDP) expressed in monetary terms. However, this indicator reflects very little of the income distribution issues within the country and, at the same time, does not provide information on non-monetary factors, which may play a significant role in determining the quality of life of a particular population [**29**].

On the other hand, it is well known that high economic growth is the goal of all countries as an indicator of the success of the economic development of the country. However, its publication in different reports and statistical summaries is less important than poverty reduction and income redistribution and [**10**], especially in the conditions of quite active experiments on the assessment of the growth quality by the modern economy and its examination interpretations. According to Easterlin paradox of happiness-income, happiness at a certain point in time is directly different from income, but over time, starting from a certain point, happiness does not increase as the income of the earth increases [**7**]. The most striking contradiction is China where, despite a fourfold multiplication in two decades in real GDP per capita from a low initial level, life satisfaction has not improved [**8**]. And the latest research prove that improved environmental and social outcomes are possible even as the growth rate declines to zero [**17**].

The development of the high-quality economic growth idea is also interconnected with the formation of various areas of the economy. In this context, behavioral economics is very meaningful and even necessary within the modern social sciences framework, which, in addition to numerous features and pursuing goals, is aimed at ultimately ensuring better economic growth, taking as a starting point the inefficient behavior of people. Using empirical tools, behavioral economists have shown rather that people have psychological biases,

limited cognitive resources, and care about other values such as fairness, all of which might undermine their utility maximization behavior [**22**]. Thus, the scientific community began to propose various theories, approaches, to discuss their impact on people's quality of life, and consequently on the quality of growth as well. Some approaches are based on the idea of one mindset, for example, the Nudge theory, others are based on the principle of different mindset, for example, inspirational labs [**4**].

Integral indicators describing the quality of economic growth, which have been actively proposed by the professional literature in the last decade with different approaches, mostly refer to the social aspect of the measured object, in other words, the manifestations of the economic growth quality. However, we believe that the qualitative side of economic growth should be considered in the process of its formation as well, in particular through macroeconomic various indicators. The following circumstances emphasize its importance in the current context:

- the need to engage the potential of the economy in the context of assessing the quality of growth. Trends in potential change can have a major impact on growth expectations and planning,
- real growths in branches of the economy. the parallels drown between their contribution to economic growth and the qualitative effects of economic growth can put under magnifier and observe GDP production problems in the country, properly direct economic incentives and actions aimed at ensuring quality growth,
- Consideration of investments in human capital. It will give an opportunity to reveal the rational contribution of expenditures on education and R&D to improving the well-being of society, which is an integral part of growth in the modern world,
- efficiency of production factors and management decisions. The processes of resource use and their distribution are characterized not only by the effectiveness of the production factors, but also by their distribution and direction, which are obvious indicators for describing the possibilities of improving the manifestations of growth quality,

Thus, we have identified two main processes that characterize the evolution of economic growth: the formation and manifestation of the growth quality. Of course, in this context, one can single out another link that provides a causal relationship between them, i.e. the current economic policy, which efficiency also needs to be evaluated, but it is object for separate thorough study.

At the macro level, each country puts forward and applies its own solution to the problem of organizing efficient production. It is no coincidence that the study of economic growth has been reinvigorated by new developments in theory and empirical findings that suggest growth is in the sphere of policy. This new literature, referred to as endogenous growth theory, helps to explain movements in long-term growth and why some countries grow faster than others [**11**, p. 25]. After the formation of the theory, the ancient neoclassical theory of growth of Solow and Swann was ousted from academic research. Endogenous growth theory starts by accepting one of the main implications of neoclassical theory, namely that in the long run the main underlying determinant of economic growth is the long-run growth rate of total factor productivity (TFP). Where it differs from neoclassical theory is in maintaining that the rate of technological progress depends on economic forces, and can be influenced by economic policy. Technological progress comes from innovations - new products, new processes and new markets that allow us to satisfy our material wants in ways that had never been thought of. Some innovations come from the application of fundamental science, and in that sense they depend on the rate of scientific progress. [**15**, p. 3].

Over the past decade, various attempts have been made to produce a measure of the quality of growth or a nation's well-being to capture the multidimensional concept, which is represented by many separate indicators. Variants of such measures have taken three different approaches, namely dashboards, frameworks, and composite indices. Since the United Nations Development Programme's seminal work on its Human Development Index in 1990, composite indices have been widely used. This multidimensionality approach is suitable "to shift the focus of development economics from national income accounting to people-centered policies", including intergenerational aspects of development by giving weight on dimensions other than GDP growth [**18**, p. 2]. Accordingly, in order to assess the quality of growth, economists and sociologists at the first stage set themselves the task of forming and formulating a system of indicators underlying the phenomenon. According to the same logic, in the future we will outline those indicators that play a fundamental role in the manifestation of the quality of economic growth, we will touch on the relationship between them and efficiency. However, before that, let's turn to the role of efficiency in the process of forming the quality of growth.

First of all, let us look at the role of efficiency in the actual economic growth, in particular, the separate factor productivity and total factor productivity. In macroeconomics, empirical observations of GDP production are usually made in the context of production function. In fact, it is a metaphorical tool [**20**]. It is a mathematical expression that describes the input-output process, which use was initially driven mainly by attempts to take account of economic growth. The production function is the basis of the attempt to answer the questions posed by the modern growth theory, e.g. what factors are the reasons for the observed economic growth?

In the classical production function, the result according to a certain law depends on labor force, capital stock and TFP. Labor productivity can be assessed both by directly determined values and by relative indicators as well, such as GDP per employed or per hour, as well as by other related indicators, a wide selection of which the International Labor Organization publishes systematically. The efficiency of the organization of GDP production can also be described by capital stock per labor unit. The dynamics of these indicators in the Republic of Armenia (RA) and in the world are presented in figures 1-3. As we can notice in them, the indicators of the RA are lower than the corresponding world ones, in particular, the GDP per capita in Armenia in 1991 was almost twice lower than in the world, although in 2020 this indicator of the country is almost equal to the one in the world. The picture is much different in the case of capital stock per labour unit. In some years, the index of Armenia is even three times lower than the world one. The most positive fact about the growth rates of the labor force of the country is the GDP per hour, according to which the indicator of Armenia is already higher in 2017-2021, although at least in the previous 7 years it was relatively low.

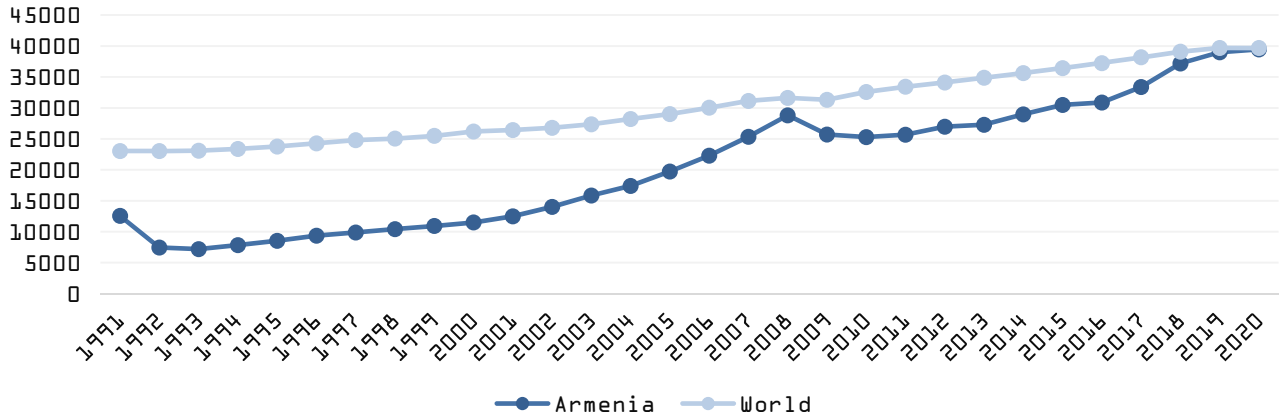


**Figure 1.** *GDP per person employed (constant 2017 PPP $)* [**33**]

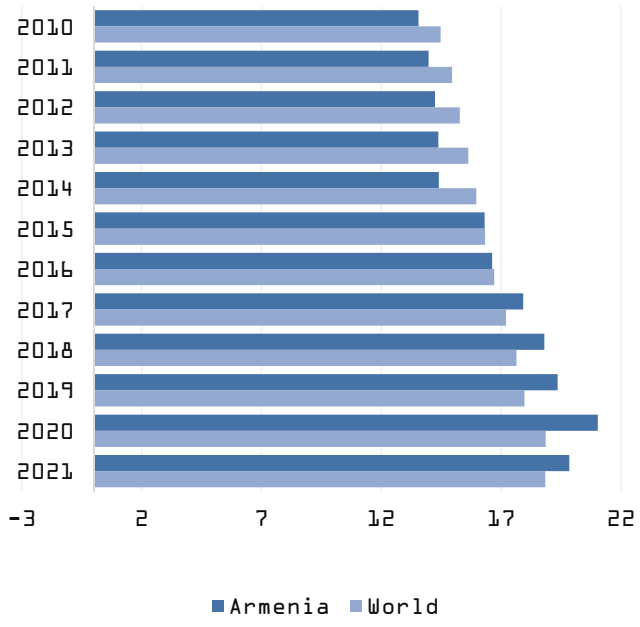


**Figure 2.** *Output per hour worked (GDP constant 2017 international $ at PPP)* [**16**]

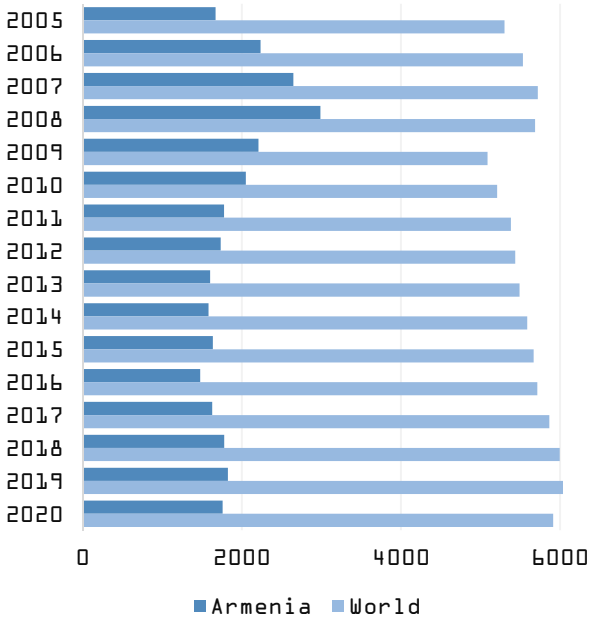


**Figure 3.** *Gross fixed capital formation per labour unit (constant 2015 US$)* [**36**; **37**]

Approaches to assessing the efficiency of the country's GDP production are different, one of which is the residual method. Based on the logic of the production function, it is the combination of factors other than the direct participation of labor and capital inputs in the output that is known as TFP. It includes not only the productivity of individual factors, but also the additional value generated through the effective organization of production and technology. The authors sometimes single out some of the factors included in the production function, such as human capital [**1**] and R&D [**21**]. The contributions of the relevant factors to economic growth presented in Figure 4 indicate how large the share of TFP in the formation of the RA GDP is. The contribution of capital stock to economic growth has been almost zero for more than 10 years, and over the past 20 years it has averaged 2.18%. During 2000-2020, the contribution of the labor force was mainly negative, with an average of -0.79%. Both economic growth and recessions in the country mainly cause TFP, contributing to an average of 4.59%. It means that it was the change in the TFP that caused the cracks in Armenia's GDP for the most part.

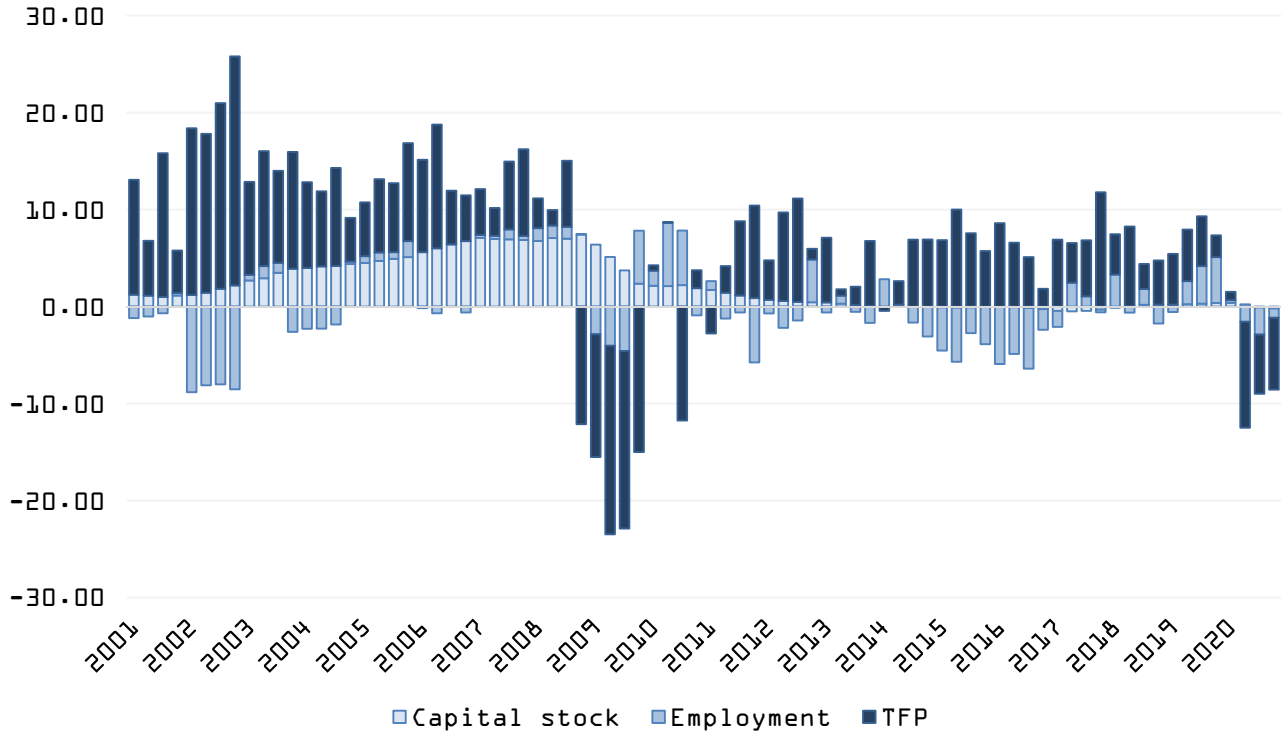


**Figure 4**. *GDP production factors' contributions to economic growth of the RA(%)* [**23**]

On the other hand, the majority of efficiency studies, not just ones referring to GDP production efficiency, are based on parametric methods, such as the stochastic frontier method, or non-parametric ones, such as the Malmquist index [**2**]. They, in turn, include different approaches. They are so diverse that from time to time economists take upon themselves the responsibility to coordinate them, to represent the development and branching of professional literature in this direction, as well as attempts to integrate methods [**24**].

Thus, the role of efficiency in the economic growth quality generation process is primarily acquired through the TFP, and the professional literature has already proposed and continues to propose various methods of its evaluation. In most of developing countries, such as Armenia, efficiency plays a decisive role in economic growth formation. When judging the role of efficiency in the process of the economic growth quality generation, reference is often made to a specific types of efficiency: technical, technological, pure, scale or allocative. Through the latter, many experiments in the professional literature are evaluated not only at the country or world level, but also at the regional [**14**] or micro level. The purpose of efficiency monitoring is also essential - aimed at reducing revenues preserving the same result and increasing output with the same inputs. The decision-making unit, which at the macro level most probably is considered a country, can be characterized as efficient, if given the technological state of affairs and given the input quantities used, it produces the optimal quantities of output. Reversely, a firm can

be called efficient if, given the technological state of affairs and given the output quantities produced, it uses the optimal quantities of input. The meaning of "optimal" determines the meaning of "efficiency" [**3**].

Next, we will touch on the role of efficiency in the process of the economic growth quality effects. The manifestations of growth can be considered prime, if they are inclusive, improve the competitiveness of the country, are environmentally friendly and create more favorable conditions for further growth. Let us turn to these aspects, and then try to assess the relationship between the efficiency of GDP production and factors describing growth qualitative effects.

household consumption in the most prosperous areas of today's low-income and middle-income countries is more than twice that of similar households in the lagging areas, compared with high-income countries where this ratio is only 50 percent higher [**13**]. To rectify this reality, various countries and organizations are deliberately developing policies and packages of measures. For example, one of the key innovations of the Europe 2020 strategy for reasonable, sustainable, inclusive growth was to set a new common goal in the fight against poverty and social exclusion, which is to reduce by 25% the number of Europeans living below the national poverty line [**9**].

In order to provide a quantitative rationale for judging income inequality and inclusion in general, it is necessary to evaluate what is often done in the professional literature with the help of the Gini coefficient. The Gini coefficient is an index of inequality based on the comparison of cumulative proportions of the population against cumulative proportions of income they receive, and it ranges between 0 in the case of perfect equality and 1 in the case of perfect inequality [**5**].

Various works on the issues of welfare improvement and unequal income distribution single out certain patterns or make theoretical hypotheses claiming the right to life in practice. The results of the study of Soava et al. confirm the Kuznets hypothesis that income in-equality tends to increase with early economic development and tends to decrease when a country reaches a certain level of development. [**28**] Another example represented Stern et al. in the last century. Summarizing some of the assessments, they note that further development will reduce environmental degradation is dependent on the assumption that world per capita income is normally distributed when in fact median income is far below mean income [**30**].

In order to make the growth quality assessment system complex, it is necessary to include not only objective indicators but also subjective ones in the process of its evaluation, as sometimes the published statistics do not always transparently describe the situation in the country. In this context, it is appropriate to cite a separate field of economics - the economics of happiness, which is based on people's subjective reports. The Economics of happiness provides a complementary yet radically different approach to studying human well-being. Typically, subjective well-being measures include positive and negative feelings (e.g., momentary experiences of happiness or stress), life evaluations (e.g., life satisfaction), and feelings of having a life purpose [**25**].

When listing the effects of the economic growth quality, it is necessary to assess not only its social aspects, but also the preconditions that are formed as a result of the manifestations of previous periods, that is, through the effective structure of current growth greater growth opportunities can be designed. In the macroeconomic context, this phenomenon describes the country's competitiveness. Economic growth leads to the improvement of trade openness [**27**], countries with higher level of trade openness have better opportunities to exploit technological innovations, which also determines a faster pace of their economic growth. [**6**]. On the other hand, trade openness allows the dissemination of knowledge and human skills [**38**], which also expands the opportunities for further economic growth, creating a synergy.

Thus, we have identified several characteristics of the growth quality effects, the high level of which allows us to consider the manifestations of growth superlative. According to these characteristics we have highlighted the following indicators: prosperity index, Life Ladder score (which forms the Happiness index), Global Competitiveness Index, Herfindal-Hirschman (HH) market concentration index, Gini coefficient. The correlations between the above and the indicators describing the GDP production efficiency are presented in Tables 1-3.

**Table 1.** *Correlation coefficients between manifestations of economic growth and TFP*[9] [**19, 23**, **31**, **32**, **34**, **35**]

| | **TFP** |
|---|---|
| Prosperity index | 0.8082 |
| Life Ladder (Happiness index) | 0.7404 |
| Global Competitiveness Index | 0.8161 |
| HH Market concentration index | 0.7408 |
| Gini index | 0.3723 |

[9] All these and subsequent tables were compiled by the author, calculations – due to the statistical software Stata.

**Table 2.** *Correlation coefficients between manifestations of economic growth and GDP per employed* [**19**, **31**, **32**, **33**, **34**, **35**]

| | **GDP per employed** |
|---|---|
| Prosperity index | 0.5592 |
| Life Ladder (Happiness index) | 0.7549 |
| Global Competitiveness Index | 0.8754 |
| HH Market concentration index | 0.6776 |
| Gini index | 0.5701 |

**Table 3.** *Correlation coefficients between manifestations of economic growth and GDP per hour worked* [**16**, **19**, **31**, **32**, **34**, **35**]

| | **GDP per hour worked** |
|---|---|
| Life Ladder (Happiness index) | 0.8599 |
| Prosperity index | 0.4669 |
| Global Competitiveness Index | 0.6005 |
| HH Market concentration index | 0.3745 |
| Gini index | 0.4471 |

Note that the indicators are highly correlated, i.e. there is a linear relationship between them. On average, the highest correlations were recorded in the case of TFP, which recorded a relatively more conspicuous relationship with the prosperity and global competitiveness indices, and the lowest with TFP was the Gini coefficient. GDP per employed has a relatively stronger linear relationship with indicators describing competitiveness and happiness, minimum - to prosperity. On average, GDP per hour worked has a relatively weaker relationship with growth quality effect indicators: in positive terms, the relationship with the prosperity index is more noticeable, and the relationship with the market concentration indicator is relatively weak.

Leaving aside the important link between the processes of quality generation and manifestation, the current policy, which is the subject of a separate study, we summarize the current study conducted with the following statements.

- Modern economics tends to assess not just the economic growth, but the quality of it.
- When assessing the quality of growth, it is necessary not to limit the scope of the study only to social indicators, but also to the macroeconomic fundamental factors that determine the growth quality generation process.
- The processes of formation and manifestation of the growth quality at each stage are accompanied by efficiency manifestations, for the evaluation of which there are already various approaches and indicators.
- In the process of growth formation, efficiency appears in the form of TFP, which is the main factor causing economic growth and declines in the GDP of the RA.
- The role of GDP production efficiency in the growth qualitative effects is quite large, which is evidenced by the high correlation between them.

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