

**Sh. Abbasova,***PhD (Economics),*

ORCID 0000-0003-3402-6041,

e-mail: sh.abbas@mail.ru,

**T. Orujova,***PhD (Economics),**Baku State University, Baku, Azerbaijan,***M. Orujova,***PhD (Economics),**UNEC, Baku, Azerbaijan*

## ECOLOGICAL APPROACH TO ASSESSING THE SUSTAINABILITY OF ECONOMIC GROWTH

At present, the world community, realizing the real threat of a global environmental catastrophe, has come to a common opinion on the issue of developing a concept for its further development both on a global and national scale. This concept has become the concept of sustainable development. Sustainable development is the achievement of such economic growth that will preserve the environment for the current and future generations. The most difficult problem of the transition to sustainable development is finding the optimal ways and means of combining the tasks of economic development and ensuring the environmental security of human life. As many experts in this field have emphasized, the main obstacle to sustainable development lies in the contradiction between the market nature of economic processes and the non-market nature of actions to protect the environment.

In connection with the transition of most countries of the world to a sustainable type of development, the question arose about how to assess Azerbaijan's progress in this direction and what macroeconomic indicators to use to analyze the sustainability of the country's economic growth. The existence of various formulations to characterize sustainable growth has led to the need to use various methods for assessing sustainability. Conditionally, these methods can be divided into several groups. One group evaluates sustainability based on the Lyapunov theory, which represents the development in the form of a trajectory of a dynamic system described as a system of differential equations [1]. The sustainability of a dynamic system means the stability of the equilibrium position. To assess the stability, statistical methods were used, such as the law of large numbers, the essence of which is that with an increase in the number of tests, the average values tend to some constants, as well as comparative statistical analysis in which the main macroeconomic indicators are compared with boundary data. It is necessary to note the role of optimal control methods for assessing stability [2]. What these models have in common is the choice of the quality criterion and the reliability of the

model. The next group of assessment of the sustainability of economic growth is associated with the wide use of various indices and indicators of sustainability, and also integral criteria [3].

According to the methodology developed by the UN Commission on Sustainable Development and the World Bank research, it is proposed to divide sustainability indicators, into economic, social and environmental ones [4]. If we consider these indicators separately, it will be difficult to make a correct conclusion about the level sustainability of the economy as a whole. In each group, a stability check is performed, then the results are combined using an integral criterion, the value of which must meet certain requirements.

Along with indicators, indexes are being developed and applied in practice [5]. An index is an aggregated or weighted indicator based on several other indicators or data.

The problems of aggregating diverse indicators into a single index were considered in the Commission's report UN on Sustainable Development. The construction of an aggregated indicator would allow us to determine the degree of sustainability of economic development. This aggregated criteria can be represented as a kind of analog of the main macroeconomic indicator which are now often used to measure the success of economic development, economic welfare. For example, macroeconomic indicators such as gross domestic product (GDP) or national income (NI) do not reflect the contribution of natural and human capital to the national wealth of a country. Therefore, these indicators cannot objectively assess the quality of development and do not at all indicate the high welfare of the country. Much depends on how the country achieves these high results. Leading international organizations and many countries have come to the conclusion that the gross domestic product does not reflect the true economic realities. Economic growth can mask environmental and social degradation and come at the expense of exploitation and depletion of natural resources. The disadvantage of this measure of

economic development is that it does not take into account the goods and services associated with natural and human capital. And thus the real level of economic development is distorted.

One of the ways to bridge the gap between economic growth and improved welfare is to improve the quality of the national accounts system by incorporating human and natural capital. Countries that derive much of their income from natural resources cannot sustain economic growth by replacing the accumulation of physical capital with a deterioration in the quality of natural capital, for example, most of Azerbaijan's economic growth depends on the oil sector. In order to give an adequate picture of the development of the economy, some authors proposed to adjust macroeconomic indicators by the amount of depletion of natural capital, i.e. by the amount of reduction of natural resources reserves.

In 1993, the statistics division of the UN Secretariat proposed a system of environmental and economic accounting (SEEA), the purpose of which is to take into account the environmental factor in national statistics [6].

The system of ecological and economic accounting consists of several large blocks. In the first block, flows related to nature exploitation and environmental activities are highlighted. The second block describes the interactions between the natural environment and the economy in natural units. The third block discusses different approaches to the estimation of estimated costs using natural assets. The fourth block concerns the extended interpretation of the sphere of production in macroeconomic analysis. As a starting point in the development of the system of environmental and economic accounting, the method of inter-industry balance sheet and non-financial assets account is used. Environmental and economic accounting addresses the inclusion of natural capital in the national wealth, along with capital produced by human labor, and also provides an opportunity to assess environmental costs (depletion and impact on the quality of natural resources).

The system of environmental and economic accounting provides sample opportunities for macroeconomic analysis, in particular:

- wide statistical characterization of the state and changes of the environment;
- estimating of environmental processes and factors influencing them;
- obtaining one generalizing indicator, namely, the so-called environmentally "clean" national product or "eco-logical national product".

In the green accounts included environmental costs, the evaluation of the use and pollution of subsoil, soil, water, air, forests, etc. At the moment the difficulty of constructing a system of environmental accounts is that not all positions being statistics, as well as in translation of natural form into money. The disadvantage of this approach is that it is difficult to make comparisons between accounts in different units

of measurement, which is necessary when analyzing priorities or choices. One of the approaches to assess the sustainability of socio-economic development is the calculation of the indicator "Adjusted net savings" (Genuine saving) developed by English scientists D. Pearce and J. Atkinson. In the future, the practical implementation of this indicator was carried out by World Bank specialists K. Hamilton, D. Dixon, and others [7]. This indicator determines the level of welfare of the country. "Adjusted net savings" is the rate of accumulation of national savings after due consideration of the depletion of natural resources and damage from environmental pollution [8].

The concept of "Adjusted net savings" is closely related to the attempt of a new approach to measuring the national wealth of countries. The World Bank has calculated the values of natural, produced (physical or artificial) and social capital, as well as their share in the total national wealth of the country [9; 10]. Thus, the share of natural capital in the national wealth on average for more than 100 countries of the world is 2-40%, the share of human capital – 40-80%. In addition, in developed countries, the share of natural capital in national wealth on average does not exceed 10%, while the share of human capital is more than 70%. For many countries with low per capita incomes, the share of the agricultural component in natural capital is 80%, while in high-income countries this figure does not exceed 40%. Since 2000, the World Bank calculates annually for the whole world the indicator of "Adjusted net savings" as % of GNI (gross national income).

Indicator of "Adjusted net savings (GS – genuine savings)" is calculated according to the following formula:

$$GS = (GDS - CFC) + EDE - DPNR - DMGE,$$

where GDS is gross domestic savings;

CFC – the indicator characterizing the depreciation of produced assets;

EDE – education costs;

DPNR – the indicator of the depletion of natural resources;

DMGE – the indicator characterizing the amount of damage caused by environmental pollution.

Gross domestic savings GDS is a statistical indicator that is calculated as the difference between gross domestic product and total private and public consumption.

Depletion is estimated as the difference between world prices and the cost of production of a resource, multiplied by its physical quantity produced. Energy depletion includes crude oil, natural gas, and coal.

Damage from greenhouse gas emissions is calculated as the actual amount of emissions multiplied by the social cost of the emission unit.

The cost of education is considered as an additional contribution to the sustainability of development, this indicator takes into account investment in human capital. This indicator is very important because it shows the need to compensate for the depletion of

natural capital by increasing investment in human and physical capital. In general, the UN experts consider the costs per person as an investment that ultimately ensures the growth of national wealth.

The significance of measuring GS for sustainable development policies is quite clear: consistently negative rates of this indicator show the formation of an anti-sustainable type of development and should inevitably lead to a deterioration in welfare. Calculations based on these methodologies for individual countries showed a huge discrepancy between traditional economic indicators and environmentally adjusted ones. Thus, for many countries of the world, the situation is relevant when the formal economic growth is environmental degradation, and environmental correction can lead to a significant reduction in traditional economic indicators up to negative values of their growth, which indicates their unstable growth. In other words, if the country's economy has high growth of GDP, then "Adjusted net savings" can reflect the opposite trend and indicate the main component of degradation. All these are typical signs of "anti-stable" trends in the development of national economies. For Azerbaijan, the indicator of "Adjusted net savings" is important because it shows the need to compensate for the depletion of natural capital by increasing investment in human and physical capital, as well as transferring part of the benefits from the sale of non-renewable natural resources to increase renewable natural capital. According to the 2008 World Bank report, which reflected the situation in 2006 in some post-Soviet republics, such as Azerbaijan, Kazakhstan, Kyrgyzstan, Russia and Estonia, and in several other African and Latin American countries, this indicator was negative [4]. Thus, the highest negative value of the studied indicator after African countries was achieved in Azerbaijan (39.7%) and Kazakhstan (-33.2%). In Russia, it is (-13.8%), Estonia - (-20.9), and in Kyrgyzstan, although also negative, it is close to zero (-2.3%) of the GNI. This indicates show that economic growth in these countries is driven by natural resources. Against this background, the situation of the growth of environmental intensity, resource intensity, specific pollution, environmental degradation of the structure of

the economy is extremely dangerous for the future of these countries. This type of development cannot be considered sustainable; sooner or later, depletion of the nonrenewable part of natural capital and exhaustion of the assimilation potential of the environment will come.

Indeed, the oil sector plays a leading role in the economy of Azerbaijan. During the transition period, it was oil resources that attracted large foreign investments into the economy. The revenues received from oil helped to improve the material and technical base of the entire economy, solve important social problems, reduce poverty and, in General, improve the standard of living of the population. But the global economic crisis that began in 2008 showed the vulnerability and dependence of our economy on world oil prices. The fall in world oil prices has led to a sharp decline in economic growth and reduced income. In these conditions, there is a danger of the so-called "Dutch disease", one of the main symptoms of which is the concentration of investment in the oil sector, unequal development of regions. All this has forced the government to take a course on economic diversification, the main goal of which is to achieve independence of the country's economy from oil resources and sustainable development of the non-oil sector of the economy. Therefore, a new development strategy was adopted, the essence of which is to direct oil revenues to the development of the non-oil sector. Beginning from 2011, the shares of the oil and non-oil sectors in the total gross domestic product (GDP) have been equal. Since this period, there has been a stability growth trend in the non-oil sector. The main directions of development of this sector in Azerbaijan are agriculture, tourism, information and communication technologies, construction, transport, services, tourism, and energy. The government is successfully pursuing a strategy to transform "black gold" into human capital and use oil revenues to develop a competitive economy that is independent of these revenues in the future. The direction of oil revenues to the non-oil sector has led to serious success in the development of this industry. All this is reflected in the indicator of "Adjusted net savings", table shows the values of this indicator from the World Bank report for 2018 for some countries [5].

Table

Indicators of "Adjusted net savings"

Country	Adjusted net savings, % of GNI	Country	Adjusted net savings, % of GNI
Angola	-23.2	Singapore	35.7
Congo Rep.	-40	USA	5.9
Azerbaijan	9.5	United Kingdom	4.1
Kazakhstan	7.9	Germany	14.3
Russia	8.4	Бельгия	14.1
Estonia	14.8	Latvia	4.0
Kyrgyzstan	6.9	China	19.9

The table shows that in developed countries, the indicator of "Adjusted net savings" is positive. In the former Soviet republics, including Azerbaijan, the value

of this indicator went from negative to positive. And only in some African countries (Angola, Congo) is still negative.

All these changes indicate a well-chosen strategy that determines the direction of oil profits to diversify the economy. As a result of this strategy has been a steady growth in construction, tourism, agriculture, transport and information spheres, as well as in the field of communication technologies. Today, the non-oil

sector products produced in Azerbaijan are competitive and exported to various regions.

Thus, the use of oil and gas revenues has allowed our country to create a strong competitive economy independent of these revenues, thereby achieving sustainable economic growth.

#### References

1. Botasheva, L. S. (2009). Evaluation of sustainable development sectors of the economy of the region.. – *Audit and financial analysis*, 1, pp. 1-5 [in Russian].
2. Daniel, N. (2000). Sustainable development: the methodology of mathematical research. *Bulletin KemSU «Mathematics»*, Issue 4, pp. 5-15.
3. Gurman, V. I. (2003). Simulation of sustainable development in view of innovation processes. *Economics and Mathematical Methods*, 1, pp. 3-11.
4. Indicators of Sustainable Development. UN Department for Policy Coordination and Sustainable Development. December, 1994.
5. David R. Anderson, Dennis J. Sweeney & Thomas A. Williams. *Statistics for Business and Economics*. Revised 13th ed. South-Western (Thomson Learning).
6. Bobylev, S. N., Kiryushin, P. A. and Kudryavtseva, O. V. (Eds.). (2019). *Green economy and sustainable development goals for Russia*. Moscow, Lomonosov Moscow State University, 284 p. [in Russian].
7. Dixon, J., Backes, J., Hamilton, K. et al. (2000). A new view of the richness of peoples. Indicators of environmentally sustainable development. Moscow, Dialogmsu [in Russian].
8. Atkinson, G., Pearce, D. W. (1993). *Measuring Sustainable Development*. *The Globe*, 13.
9. World Development Indicators 2008. *The World Bank*. Retrieved from <https://openknowledge.worldbank.org/handle/10986/11855?locale-attribute=en>.
10. World Development Indicators 2018. *The World Bank*. Retrieved from <https://databank.worldbank.org/source/world-development-indicators>.

#### Аббасова Ш. А., Оруджева Т. В., Оруджева М. Ш. Екологічний підхід щодо оцінки стійкості економічного зростання

У статті розглядаються різні підходи щодо оцінки національного багатства з урахуванням екологічного фактору, а саме існування природних ресурсів і нанесення збитків навколишнього середовища. Описується індикатор істинних збережень, розроблений Всесвітнім банком і щороку розраховується для всіх країн світу. Проведено загальний аналіз даних індикаторів для різних країн, у тому числі для Азербайджану. Відмітний знак цього індикатора до 2008 року показує, що економічний розвиток був пов'язаний з використанням природних ресурсів у нашій країні. Але правильно вибрана стратегія держави, спрямована на досягнення незалежності економіки цих країн від природних ресурсів, привела в подальшій зміні знака істинних збережень у зазначених країнах на позитивний, що свідчить про їх стійкий розвиток, що супроводжується зростанням добробуту.

*Ключові слова:* економічне зростання, стійкість, коректовані чисті збереження, валовий внутрішній продукт, валові внутрішні збереження.

#### Abbasova Sh., Orujova T., Orujova M. Ecological Approach to Assessing the Sustainability of Economic Growth

The article considers various approaches to the assessment of national wealth taking into account the environmental factor, namely, the depletion of natural resources and damage to the environment. It describes the "Adjusted net savings" indicator developed by the world Bank and calculated annually for all countries of the world. A comparative analysis of this indicator was conducted for various countries, including Azerbaijan. The negative sign of this indicator before 2008 shows that economic growth was associated with the depletion of natural resources in our country. But the well-chosen strategy of the governments aimed at achieving independence of the economies of these countries from natural resources, led to a further change in the sign of genuine savings in these countries to a positive one, which indicates their sustainable development, accompanied by an increase in welfare.

*Keywords:* economic growth, sustainability, adjusted net savings, gross domestic product, gross domestic savings.

#### Аббасова Ш. А., Оруджева Т. В., Оруджева М. Ш. Экологический подход к оценке устойчивости экономического роста

В статье рассматриваются различные подходы к оценке национального богатства с учетом экологического фактора, а именно истощения природных ресурсов и нанесения ущерба окружающей среде. Описывается показатель истинных сбережений, разработанный Всемирным банком и рассчитываемый ежегодно для всех стран мира. Проведен сравнительный анализ данного показателя для различных стран, в том числе для Азербайджана. Отрицательный знак этого показателя до 2008 года показывает, что экономический рост был связан с исчерпанием природных ресурсов в нашей стране. Но правильно выбранная стратегия государств, направленная на достижение независимости экономик этих стран от природных ресурсов, привела к дальнейшему изменению знака истинных сбережений в указанных странах на положительный, что свидетельствует об их устойчивом развитии, сопровождаемому ростом благосостояния.

*Ключевые слова:* экономический рост, устойчивость, скорректированные чистые сбережения, валовой внутренний продукт, валовые внутренние сбережения.

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