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Savluk S.
Doctor of Economics,
Associate Professor at the Banking Department,
Kyiv National Trade and Economy University, Ukraine;
e-mail: smsavluk@gmail.com; ORCID ID: 0000-0002-4709-6607
Arzhevitin S.
Doctor of Economics,
Professor at the Banking and Insurance department
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: arzhevitin.s.m@gmail.com; ORCID ID: 0000-0002-4419-8868

GDP AND ALTERNATIVE INDICATORS FOR ASSESSING THE LEVEL OF COUNTRY'S DEVELOPMENT

Abstract. Usually the GDP volume measures the level of any economy development, but other indicators of a country welfare are underestimated. Some countries issued government bonds with interests payments tackled to GDP rates of growth. Emission of such bonds usually not taking into account the wave shape of GDP growth curve. After shock slide down of economy, usually high rates of growth are observed. Despite the fact that the economy may not have recovered even pre-crisis level, but payments on such bonds should be exercised. This situation takes place in the modern world economic space, when the economies of countries as a result of the «coronavirus crisis» can demonstrate a rapid decline with further significant growth. At the same time, it is almost impossible to predict both the duration and depth of decline and growth of economies.

In addition, the set of some ratios for the some economy parameters estimations is based on GDP level. Among them monetization and credit saturation of economy. However, they may not reflect the real level of fiscal potential of the country due to stock market capacity, technological progress, cryptocurrency development, shadow part of economy, social stability, environment protection and other factors.

Groupes of scientists try to invent new indicators, which may correct GDP weaknesses or, at least, help to create more realistic and more comprehensive picture of a country socio-economic development. The purpose of the article is to study the indicator of GDP and other indicators, that may objectively determine the level of a country development.

Based on the analysis of the IMF data on 264 countries over 10 years, the lack of correlation between the level of monetization and creditization of GDP and its dynamics was reviled, although such dependence should have been direct. This gave us the opportunity to assume that the GDP indicator does not fully characterize the development and socio-economic state of the country. It contains components that have no direct connection with the development of the economy. At the same time, the modern economic development acquires qualitative features to replace the quantitative characteristics on which the GDP calculation is based. Such qualitative aspects of development include digitization of societies, ecology, social security, product quality, not its quantity. They must be taken into account when determining the socio-economic level of development of countries.

***Keywords*:** GDP, GDP warrants, monetization, crediting of economy, shadow economy, Happiness Report.

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Савлук С. М.
доктор економічних наук, доцент кафедри банківської справи,
Київський національний торговельно-економічний університет, Україна;
e-mail: smsavluk@gmail.com; ORCID ID: 0000-0002-4709-6607

Аржевітін С. М.
доктор економічних наук,
професор кафедри банківської справи і страхування
Київський національний економічний університет
імені Вадима Гетьмана»,Україна;
e-mail: arzhevitin.s.m@gmail.com;ORCIDID: 0000-0002-4419-8868

ВВП ТА АЛЬТЕРНАТИВНІ ІНДИКАТОРИ ОЦІНКИ РІВНЯ РОЗВИТКУ КРАЇНИ

Анотація. Зазвичай обсяг ВВП вимірює рівень розвитку будь-якої економіки, але інші показники добробуту країни іноді недооцінюються. Деякі країни випустили державні облігації з виплатами процентів залежно від темпів зростання ВВП. Випуск таких облігацій зазвичай не враховує хвильовидну форму кривої зростання ВВП. Після шокового падіння економіки зазвичай спостерігаються високі темпи зростання. Попри те, що економіка може не відновилася навіть до кризового рівня, але виплати за такими облігаціями повинні здійснюватися. Така ситуація склалась у сучасному світовому економічному просторі, коли економіки країн унаслідок «коронавірусної кризи» можуть демонструвати стрімке зниження з подальшим значним зростанням. При цьому передбачити як тривалість, так і глибину зниження та зростання економік практично неможливо.

Крім того, набір деяких показників для оцінки певних параметрів економіки базується на рівні ВВП. Серед них показники монетизації та насичення економіки кредитами. Однак вони можуть не відображати реальний рівень фіскального потенціалу країни за рахунок фондового ринку, технологічного прогресу, розвитку криптовалют, тіньової частини економіки, рівня соціальної стабільності, захисту навколишнього середовища та інших факторів.

Різні вчені намагаються розробити нові показники, які можуть виправити слабкі місця показника ВВП або принаймні допомогти створити більш реалістичну і більш комплексну картину соціально-економічного розвитку країни. Метою статті є вивчення показника ВВП та інших показників, які можуть об'єктивно визначати рівень розвитку країни.

У ході проведеного аналізу даних МВФ щодо 264-х країн за 10 років була встановлена відсутність зв'язку між рівнем монетизації і кредитизації ВВП та його динамікою, хоча така залежність повинна була б бути прямою. Це дало можливість припустити, що індикатор ВВП не повною мірою характеризує розвиток і соціально-економічний стан країн. Він містить складові, які не мають прямого зв'язку з розвитком економіки. Водночас економічний розвиток набуває якісних ознак на заміну кількісних характеристик, на яких базується розрахунок ВВП. До таких якісних аспектів розвитку слід віднести діджиталізацію суспільств, екологію, соціальну захищеність, якість продукції, а не її кількість. Їх потрібно врахувати при визначенні соціально-економічного рівня розвитку країн.

Ключові слова: ВВП, ВВП-варранти, монетизація, кредитизація економіки, тіньова економіка, Звіт про благополуччя.

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Introduction. Assessment of the general state of any country economy, trends in its development and comparison with the economy level of other countries have long been in the focus of attention of both scientists and economists-practitioners. Usually they use GDP indicator, which reflects the volume of production of the different branches of national economy. This is universal indicator, but the problem has become especially relevant for Ukraine, which issued in 2015—2016 the so-called GDP warrants of 3.24 billion US dollars to cover part of the public debt. According to these warrants, Ukraine has committed to pay part of its GDP in the horizon of 2019—2038 for a year in which GDP growth exceeds 3% [1]. Payments on such bonds are «tied» to the dynamics of GDP of the issuing country. In practice, such bonds were first issued by Costa Rica, Bulgaria, Bosnia and Herzegovina, Argentina and Greece. The focus of our study is not the bonds themselves

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and payments on them above countries, but their anchor — GDP and its dynamics. Here, GDP is determined as a single, universal and most accurate measure of well-being of the country, and its dynamics is an assessment of the intensity of economic development of the country.

At the same time, there is a problem, if the economy has fallen by 6—7% or more in a year, as it really can be with Ukraine's economy in 2020 as a result of the pandemic, and then grows by 3.5% for two years, the country will have to pay part of GDP warrants, although it will not reach pre-crisis level. According to the Ministry of Finance of Ukraine, payments on GDP warrants in 2021 could reach 40 million US dollars and with moderate GDP growth by 2040 could potentially exceed 22 billion US dollars [2]. Therefore, Ukraine bought back some of these bonds in 2020. However, the key question in our study is whether the indicator of GDP and the method of its calculation are unique and «sinless» for assessing the potential of the country's economy and living standards of its citizens.

Analysis of recent research and problem statement. Many studies of the problem are devoted to the theoretical aspects of the issuance and maintenance of GDP warrants [3—7]. They mainly substantiate the expediency of issuing such bonds and provide proposals and options for calculating their yield in order to establish the most objective level for investors. However, they do not question the GDP indicator as a universal measure of economic development of countries and do not consider the methodology of its calculation. The issues of determining the essence of the GDP indicator and the methodology of its calculation are considered in the many publications [8—13]. At the same time, most modern authors adhere to the interpretation of GDP adopted in IMF publications as a measure of the monetary value of final goods and services produced in the country over a period, which are purchased by end users [14]. In some cases, other indicators are added to GDP when assessing the level of the economy, but GDP plays a key role. In particular, V. Bazylevych points out that «Economic growth is the development of the national economy over a period of time, measured by the absolute growth of gross domestic product (GDP), gross national product (GNP) and national income (NI)» [15]. Thus, most authors and international institutions consider GDP to be a key measure of economic development and the level of well-being of any country. This study is called to investigate this problem.

Methodology and research methods. The methodology of research assumes that no one indicator can properly estimate the level of economic development. In order to reveal the set of parameters which measure the level of economic development, the multidimensional factor analysis was used. Comparison and correlation methods of analyses give the background for conclusions that increasing monetization and crediting do not inject economic growth and some other indicators may truly describe the level of countries' socio-economic development.

Research results. The modern term GDP, as an indicator of economic development and material well-being of the nation, began to be actively used since the report of Simon Kuznets (Simon Kuznets) to the US Congress in 1934. After the Bretton Woods Conference in 1944, it became a universal tool for assessing the level of the economy with a very similar calculation methodology for different countries. But he also criticized this measure of national wealth, which considers only the quantitative rather than the qualitative side of economic development and does not determine the reliability of the basis for long-term development of society. Other experts with the following arguments have expanded criticism of the GDP indicator: it does not reflect the level of health care and environmental protection (pollution), as well as the level of economic recovery (waste recycling). It does not consider non-market relations: barter, domestic production, as well as the quality of goods, the emergence of new products, technologies and their development. It does not consider the stratification of society, as a result of which some people may become poorer with GDP growth, and others get rich even with its decline, as, for example, is happened in the world against the background of the coronavirus crisis.

The approach to determine the volume of GDP by countries raise question. In terms of GDP in 2019, the top five countries are quite predictable (*Table 1*), but countries such as Bangladesh, Colombia, Venezuela, Vietnam may not be surprisingly ahead of Ukraine, but they have left behind countries such as the Czech Republic, Portugal, Hungary and many other countries with a higher

standard of living. This indicates certain problems with the methodology of estimating GDP and converting it into a single measure — the US dollar.

Table 1

The largest countries in terms of GDP in 2019

Rating	Country	**GDP,** million US dollars
1	USA	21,427,700
2	China	14,342,903
3	Japan	5,081,770
4	Germany	3,845,630
5	India	2,875,142

Source: [16].

Popular in the economic environment are the relative indicators to the level of GDP: monetization of GDP, credit of GDP, public debt relative to GDP and others. The first two indicators reflect the saturation of the economy with money supply. As an example, we can cite China, which at 165% of the ratio of loans to GDP (Q1 2019) showed a fairly high rate of development (6,1% in 2019) with a huge scale of economy. However, for comparison, at 100% level of credit to GDP, Chile does not have such a GDP growth rate (only 1,1%). However, China is interested not only in this. Its lending to GDP rate is almost equal to the level of its GDP monetization rate with «broad» money (*Table 2*).

Table 2

Monetization and crediting of GDP in 2019 by individual countries

Country	Broad Money / GDP, %	Loans / GDP, %
Hong Kong	400	223
Japan	254	111
China	197	165
USA	93	52
Poland	69	51
Slovak Rpb	68	63
Ukraine	36	23

Source: [17].

Following the data in *Table 2*, we can calculate the ratio of loans to money supply. As of December 31, 2019, in China it was 84%, while in the US 56% and Japan 44%. The Chinese financial and banking system has managed to direct almost every yuan to lend to the economy, which neither Hong Kong and Japan with the highest level of monetization, nor the United States with the largest GDP can boast. The extraordinary financial situation has developed in Hong Kong, where with the world's largest monetization of GDP as well as lending, only every second Hong Kong dollar enters the economy through credit. Probably the rest of the money supply, as in Japan and USA, serves the stock market, and at the present stage also the cryptocurrency market. Unlike credit, such money can spill out of the crypto-stock market at any time with a difficult to predict outcome. However, the economies of these countries are highly developed, and Hong Kong and Japan are also export-oriented, so they are unlikely to face significant shocks. The coefficient of transformation of money supply into loans in Poland is also quite high — 74% with a fairly high rate of economic development: GDP growth in 2019 was 4,1%.

In Ukraine, this indicator is only 64%. This means that significant amounts of money remain outside the banks and are also used for current needs, including budget expenditures. At the same time, banks are not able to fully realize their potential as credit intermediaries, primarily due to the lack of inexpensive long-term resources and significant credit risks. Ukraine has the largest level of non-performing loans in the world, which is more than 50% of their volume, while in China it is only 1,8%. That is, both quantitative and qualitative indicators of GDP lending in Ukraine at the end of 2019 were quite low. Therefore, for developing countries that do not have a stable stock market, the most effective is the monetization of the economy through its lending, of course, on the principles of targeted use, return, collateral and other basic principles of effective credit policy.

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In order to estimate whether monetization and crediting economy really help accelerating economic growth we calculate correlation ratio between these ratios and rates of GDP growth. For this exercise we use World bank data [17]. First, we calculate correlation ratio for the period 2010—2019 years for 264 countries and regions. Correlation between monetization level and GDP rates was (-)0,0481 and between crediting and GDP rates was (-)0,1020. We detailed analyses, taking only one year — 2010 and correlation between crediting and GDP rates was still negative (-)0,2239. We calculate such ratio for one country, — Grate Britain, for the period 1960—2019 and it was still negative (-)0,2565. That generates several conclusions:

- effectiveness of monetization and crediting for economy development is very low. Most countries do not use such levers for economic growth and extra analyses to reveal reasons of such situation should be done;
- probably monetization and crediting of economy create other effect than GDP growth and GDP indicator does not reflects comprehensively socio-economic potential of a country. It can be unemployment level, purchases power potential, social stability and others.

Particular attention needs to be paid to the analysis of the structure of GDP to answer the question of whether the real GDP indicator is the only measure of economic development of the country. The structure of Ukrainian GDP includes such components as financial and insurance activities, real estate transactions, activities in the field of administrative and support services, public administration and defense, taxes on products. And although they generated 31,5% of Ukraine's annual GDP in 2019, they can hardly be attributed to indicators of economic development and rising living standards. For example, in the financial sector, GDP includes net interest income, which means that significant volumes and high rates on government bonds in the portfolios of financial intermediaries «ensure» GDP growth, even compensating for declines in material production. Thus, in 2019, with industry falling by 1,8%, GDP grew by 3,3%. The same applies to government spending and other «impurities» of GDP. These shortcomings of GDP are largely devoid of such an indicator of «temperature» of the economy as the index of production of basic industries, namely industry, agriculture, transport, trade and construction. The National bank of Ukraine cites a decrease in this indicator in December 2019 to December 2018 by 2,0%, which generally correlates with the downward trend of the industry. State Statistics Committee of Ukraine, as well as other government agencies do not use this figure in their economic decisions, although it is much more accurately reflects the «warming» of the economy and could be a better anchor to determine many ratios, the same monetization or public debt than GDP.

The issue of the shadow economy, which is not part of GDP, deserves special attention. In the study «Shadow economies around the world: what have we learned in the last 20 years?» the authors studied the shadow economies of 158 countries for the period 1991—2015, using their own methodology [18]. They determined that the average level of the shadow economy in the world during this period was 31,9% of officially recognized GDP. At the same time, the highest levels of the shadow economy were in Bolivia and Zimbabwe, respectively 62,3% and 60,6% of GDP. The lowest levels were in Austria — 8,9% and Switzerland — 7,2% of GDP. In Ukraine, the average level of the shadow economy over these 25 years was 44,8%, but in some years reached 57,0%. In Poland the average level of shadow economy in this period was 25,1% with the peak on 30,2%. In order to more comprehensively assess the level of economic development and compare the economies of different countries, it seems appropriate to add to the legal GDP and shadow GDP, calculated according to a single methodology. Such an approach could be useful in identifying ways to de-shadow the economy and build up legal GDP.

In the statistics of Western countries actively use a number of indicators that reflect real trends in the economy and make it possible to more objectively compare the economies of different countries. For example, it is an indicator of purchasing power parity, which is calculated by comparing the value of the same consumer baskets in different countries, taking into account the exchange rate. Moreover, economists advise to adjust the nominal GDP of countries to this PPP index. In the report published by the IMF for 2019 on GDP per capita adjusted for the PPP index,

the absolute leaders were three countries with a rate of more than 100 thousand US dollars per year (*Table 3*).

Table 3

GDP per capita, adjusted for the PPP index, thousand US dollars

№	Country	2018	2019
1	Macau (China)	135.0	129.1
2	Luxembourg	116.8	121.3
3	Singapore	100.1	101.4
44	Poland	31.9	34.4
45	Slovak Rpb	32.5	34.1
99	Ukraine	12.6	13.3

Source: [19].

It is possible to see with the naked eye that the leaders of prosperity are small countries, that are the financial centers of their regions and it is interesting to see whether Luxembourg will overtake Macau in the near future. As for Ukraine, it ranked 99th in the ranking of more than 200 countries and individual territories, behind such countries as Suriname, Barbados, Lebanon and its neighbors: Russia, Belarus and even Moldova. An important fact is that in 1990 Ukraine ranked 54th in this ranking and was only 2 positions behind Russia. Ukraine's sad example shows how it is possible to destroy the already existing economic potential.

Some experts from different countries have been trying to consider the shortcomings and modify GDP indicator since its appearance. For example, in 2009, a group of experts created by French President Nicolas Sarkozy proposed to consider in the methodology of GDP indicator the level of medicine, environment protection, employment, physical and economic security and political freedom. Even earlier and even deeper in this matter went the Kingdom of Bhutan, which in 2008 in its Constitution enshrined the important goal of ensuring Gross National Happiness (GNH). Since 2012, the World Happiness Report has been published annually under the auspices of the United Nations. Of course, such mixing of ratios is mathematically possible, but it does not make enough economic sense. The welfare report for 2020 gave 1st place to Finland, although it ranked 22nd in terms of GDP but has very high social support level and healthy life expectancy. Ukraine ranked 123rd out of 156, although it was 95th in terms of GDP per capita (differ to *Table 4* due to set of countries and territories), but 148th in terms of corruption, dropped it in the overall ranking.

Table 4

Score of happiness by countries (in points)

Overall rank	Country or region	Score	GDP per capita	Social support	Healthy life expectancy	Freedom to make life choices	Generosity	Perceptions of corruption
1	Finland	7.809	1.285	1.500	0.961	0.662	0.160	0.478
2	Denmark	7.646	1.327	1.503	0.979	0.665	0.243	0.495
3	Switzerland	7.560	1.391	1.472	1.041	0.629	0.269	0.408
4	Iceland	7.504	1.327	1.548	1.001	0.662	0.362	0.145
37	Slovakia	6.281	1.195	1.424	0.853	0.424	0.117	0.011
43	Poland	6.186	1.169	1.310	0.868	0.558	0.063	0.161
123	Ukraine	4.561	0.780	1.321	0.699	0.319	0.179	0.010

Source. [20].

In order to analyze dependence, the total Happiness score on its core 6 components we provide correlation analyses based on data for 2019 and 2020 years by countries. The tightest relation of total score was with GDP per capita. Correlation ratio is 0,78. Correlation of happiness with Social support (*Fig.*) and Healthy life expectancy is also very tight, 0,76 and 0,77 respectively. With others components correlation is much less.

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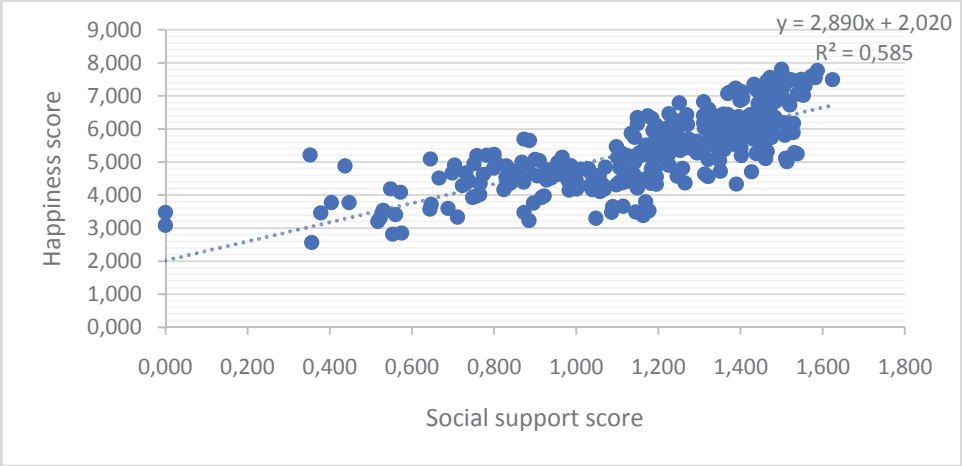

Fig. **Dependence happiness score on social support score**

Also in modern statistics it is possible to find a cluster of indicators that reflect one or another side of the economic life of different countries: the percentage of the population below poverty, national income per capita at comparable prices, income of 20% of the poorest population, per capita electricity consumption, high-tech exports, number of purchased houses, number of purchased cars. Unfortunately, Ukraine is almost not represented in such world statistics, so it is difficult to exercise comparable analyses and generate any conclusions.

Conclusions. Although the GDP indicator is an important but not unique measure of economic development and economic well-being of countries. Its structure reflects the results of both tangible and intangible production in the face of public administration, real estate transactions, financial and banking activities and other areas. On the other hand, it does not consider qualitative characteristics: the emergence of new technologies, environmental, social aspects. Its dynamics, especially in developing countries, can be undulating. Recessions can be replaced by rises and vice versa. Therefore, to tie any payments, and especially external debt, to the dynamics of this indicator is quite risky. The picture of the country's economic potential is more accurately characterized by the production index of basic industries, and if there is a goal to comprehensively assess the level of socio-economic development, it is advisable to use purchasing power parity and take into account unemployment, income of the poorest part of population and others. So, the process of creation new comprehensive indicators that would assess the economic potential and standard of living of the population as objectively as possible should be continued.

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