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### ASSESSMENT OF THE TAX SYSTEM UNDER CONDITIONS OF SUSTAINABLE DEVELOPMENT

**Purpose.** To evaluate the socio-economic determinants of tax-system sustainability within the Sustainable Development Goals framework for 28 European Union countries and Ukraine in 2023–2024.

**Methodology.** A cross-country dataset of nine independent indicators was compiled for 28 national economies. Factor analysis was applied to identify latent drivers of tax-system sustainability, followed by cluster analysis to group countries by similar profiles and to assess the stability of country positions over time. A comparative assessment focused on Ukraine, where martial law remains in force.

**Findings.** A four-factor structure was established: (F1) resource load and environmental consequences; (F2) economic structure and tax burden; (F3) socio-economic tension; (F4) economic well-being. Factors F1, F2, and F4 are positively associated with the sustainability of national tax systems, whereas F3 acts in the opposite direction. Countries exhibit marked heterogeneity across factors; cluster membership remained largely stable between 2023 and 2024, with Portugal as the sole reclassification. The factor-based assessment (FI) revealed country-specific risks and priorities for fiscal adjustment. The Ukraine–EU comparison demonstrated consistent patterns within the assigned clusters, considering the dynamics of actual factor values.

**Originality.** The study operationalizes tax-system sustainability through an integrated four-factor construct that jointly captures environmental pressure, fiscal-structural characteristics, social stress, and economic well-being, and tests cluster stability on a recent EU–Ukraine panel.

**Practical value.** The results provide a transparent diagnostic for risk-sensitive tax-policy design aligned with sustainable development. They support the identification of targeted measures and sequencing of reforms; for Ukraine, they inform adaptive fiscal decisions under martial law and during economic recovery.

**Keywords:** *taxes, tax policy, sustainable development, security, threats, governance, financial resources*

**Introduction.** The aggravation of global problems of humanity has led to the understanding of the need to systematically overcome them and radically change the imperatives and values of further development. The existing problems of environmental deterioration, acceleration of the pace of climate change, poverty of a significant part of the world's population, and limited resources and opportunities to ensure economic growth have led to an understanding of the need for radical changes in the philosophy of existence and economic

management. Gradually, as an alternative to the consumer approach to production and consumption, the global concept of sustainable development is being implemented in society, which considers the interests of both present and future generations. The three pillars of the concept of sustainable development – economic, environmental, and social – have already ensured the transformation of values, views, and approaches to the management of socio-economic systems in most countries of the world in recent years. New approaches are replacing traditional ones, with strategic priorities that include environmental friendliness, safety, climate tolerance, inclusiveness for all population categories, and equal rights and opportunities across all socio-econom-

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ic spheres. At the same time, such transformations are large-scale, systemic, complex, and long-term and require appropriate resources and time to obtain the expected results. A critical condition for implementing the initiatives of the concept of sustainable development is the full, stable, and constant provision of financial resources. The lack of financial resources is the primary limiting factor that hinders the processes of transformational change, ultimately slowing the increase in the sustainability of national economic systems.

Achieving sustainable development goals requires the creation of sustainable financial systems that provide “healthy” finance for the national economy based on long-term fiscal stability. Historically, taxes and mandatory payments have become the primary financial source of the state’s performance of its key functions: social protection, security, health care, infrastructure development, science and education, regulation of the development of territories, industries, and types of economic activity. Taxes can act as an inhibitor or driver of the development of investment and innovation activities and business activity, an instrument of state financial and budgetary policy, and a means of ensuring macroeconomic development and growth. Taxes have a close structural and logical connection with the key indicators of the state of economic development: GDP, the level of income of the population, the balance of the state budget, public debt, and others, which determine the level of well-being and quality of life of the country’s population. Taxes form the financial potential of the country’s socio-economic development, affect the rate of economic growth, and the competitiveness of the national economy.

Taxes, together with grants and other state revenues, are a source of financial support for the sustainable development of countries. They can help reduce inclusive gaps and improve the quality of life of countries’ populations [1].

In recent years, scientists have drawn attention to the problem of instability of financial systems, particularly in the field of taxes, which significantly hinders the possibility of solving social, economic, and environmental problems of social development [2, 3]. In this regard, developing a mechanism to provide sustainable and sufficient tax sources of financial resources necessary to achieve the Sustainable Development Goals is relevant.

**Literature review.** Achieving the goals and objectives of sustainable development of national economies requires appropriate financial support. Taxes have traditionally become the primary source of the state’s financial resources. Under the conditions of transition of national economies to the principles of sustainable development, the need for financial resources is growing simultaneously with the emergence of additional risks for both the state and taxpayers. The tax system, as part of the public administration’s financial system, has a profound impact on the achievements and implementation of programs aimed at societal and economic development. In terms of their functional content, taxes have a social purpose and are recognized as an important tool of the state management mechanism for the redistribution of society’s income in favour of the production of public goods and services [4].

Taxes, as a means of generating state revenues and tools to encourage the implementation of sustainable growth

strategies by business, bring the country closer to the desired results in terms of solving acute problems of climate change, ecology, and well-being of the population [5].

In recent years, attention to the processes and mechanisms of taxation has been growing significantly. Scientists have found a close positive relationship between corporate tax rates and sustainable development goals [6].

Kanbur R., et al. prove that taxes are one of the most influential government regulators that can help a country achieve sustainable development goals [7]. To do this, governments need to study the impact of each type of tax and take measures to optimize the tax system, considering national priorities of sustainable development (environmental issues, education, social protection, etc.). The key criteria for tax compliance with the Sustainable Development Goals of scientists are efficiency, fairness, and simplicity. The importance of taxes as the primary source of fundraising for the development of all areas of the country, improving the standard of living of the population, and achieving the Sustainable Development Goals is also proven in their research by Samour A., et al. [8].

According to the results of research by Heimberger P., there are trends in reducing corporate tax rates in the world with a simultaneous increase in the corporate tax base [9]. According to Asen E., corporate tax rates in European countries are lower than in many regions of the world, which also affects the ability to achieve sustainable development goals [10]. Along with this, the regulatory impact of corporate tax rates on economic growth is debatable and complex, and the results of research by Kawano L. and Slemrod J. demonstrate a negative relationship between the corporate tax multiplier and the value of GDP [11]. Heimberger P. believes that there should be no long-term impact of taxes on economic growth [9]. This is due to the negative impact of the increase in tax rates on the sustainable incomes of taxpayers (households and businesses). Complex and large-scale tasks of sustainable development, which have been implemented at the level of national economies, require significant volumes of tax flows. At the same time, the transformational transition of business to the principles and tools of the “green” and sustainable economy requires a significant amount of financial investments, is long-term and risky, and reduces the level of return on capital in the short term. All these factors must be levelled by the influence of stabilizing tools that provide businesses with incentives and drivers for the transition to the principles of sustainable development. One of these instruments can be a tax instrument, represented by a wide range of forms, rates, methods of taxation, and tax preferences.

Taxes and the tax system, under the conditions of orientation of the public administration mechanism towards the implementation of sustainable development tasks, should acquire signs of transparency, openness, and accountability. Such characteristics, according to Diaz-Sarachaga J., et al., will contribute to the formation of a conscious, active society and the development of social responsibility both in institutional management bodies and in taxpayers [12].

According to Jahnsen K. and Pomerleau K., taxes are necessary for governments to implement environmental and social investments in practice [13]. The lack

of tax revenues is the main reason for insufficient investment in socio-economic and environmental spheres, which is an inhibiting factor in achieving the country's sustainable development goals [14].

Among the leading indicators analysed by scientists when identifying the impact of taxes on the degree and ability to achieve the Sustainable Development Goals, the following are most often used: corporate tax rate (CTR), personal income tax rate (PIT), sales tax rate (STR), and aggregate effective tax rate (ETR). The higher the rates of these taxes, the greater the financial potential of governments to achieve the Sustainable Development Goals – the number of investments in education, science, healthcare, food security, environmental protection, construction of social facilities, etc.

The corporate tax also has a significant impact on the formation of public finances. However, scientists note that the rapid growth of its rates poses significant risks to business transformation into the shadow economy, as well as the transfer of the tax burden to consumers or the company's personnel, thereby interfering with the achievement of sustainable development goals. The main task of the government under such conditions is to stimulate the development of socially responsible business behaviour and tax incentives for the introduction of sustainable and socially responsible business practices in corporations [15].

The Goods and Services Tax (GST) can contribute to the achievement of sustainable development goals by encouraging buyers to consume more responsibly and businesses to switch to greener production models [8].

National governments use all taxes levied in the national economy to cover the costs of healthcare, medical research, and social protection of the population, which is also a means of achieving the Sustainable Development Goals [16]. Other scholars also add to these public services the development of human capital and education financing [17], the financial provision of such public services, security, the development of science, and environmental protection [18], which are also crucial for achieving the Sustainable Development Goals.

Analysing the level of these tax rates, Halim A. and Rahman M. conclude that there is a significant impact of the tax system on the degree of achievement of the Sustainable Development Goals of the BRIC and CIVETS countries [6]. For example, an increase in the income tax rate (PIT) by 1 % ensures an increase in the achievement of the Sustainable Development Goals by 0.114 %, and an increase in the corporate tax rate (CTR) by 1 % ensures 0.019 % in the achievement of the Sustainable Development Goals.

Peterson T. and Bair Z. also confirm that a progressive personal income tax system contributes to the achievement of the country's SDGs, promotes equitable redistribution of income, and reduces population inequality [19]. Along with this, scientists note that the results of the impact of various types of taxes on the achievement of the Sustainable Development Goals are determined by the specific economic conditions of countries, their financial and resource potential, and require further alternative assessments due to the scale and complexity of the Sustainable Development Goals [20, 21]. At the same time, to support the flow of private investment, it is necessary to implement specific incen-

tive measures, including the application of tax preferences (taking into account the problem of double costs [22]), corporate governance tools [23], monetary instruments [24], considering the goals of sustainable development and the phases of reproduction cycles [25]. The issues of employment, income, and the decline in the actual population, especially men and children, which scientists have already drawn attention to [26], remain problematic. Thus, today, the issue of the impact of tax instruments on ensuring sustainable economic development in most countries remains the subject of academic and practical discussions.

**Purpose.** The article aims to evaluate the socio-economic determinants of tax-system sustainability within the Sustainable Development Goals framework for 28 European Union countries and Ukraine in 2023–2024. The main objectives of the scientific research are: 1) determining the set of features and criteria of a sustainable tax system; 2) assessment of the current state of the tax system of Ukraine in the context of solving sustainable development problems; 3) identification of key threats that the national tax system forms to achieve the country's SDGs.

**Methodology.** When writing the article, the following methods of economic research were used: monographic method – in the processing of scientific sources and review of thematic literature; abstract-logical method – in substantiating the features of a stable tax system and its key criteria, in formulating conclusions to the study; methods of analysis and synthesis – in determining the totality of risks and threats of the modern tax system of Ukraine; economic and statistical methods – in the calculation of fundamental tax indicators and assessment of the level of fiscal security of the national economy.

The study collected and used data on quantitative and qualitative indicators of tax revenues for 27 EU countries, indicators of social production (GDP), as well as relevant data for Ukraine, the source of which was the Ministry of Finance. Considering the significant dependence of taxes on other macroeconomic indicators, the analysis collected and used data on the total volume of tax revenues in Ukraine, the level of tax gaps and its ratio to GDP, the size of external public debt and its ratio to the population and GDP of the country. The study used data from a retrospective analysis for 2004–2022, which made it possible to identify key trends in taxation and its relationship with the financial potential for achieving the country's sustainable development goals. Macroeconomic and tax indicators were identified as the main variables in factor modelling, resulting in the substantiation of the system of factors influencing the stability of the tax system of the analysed countries. The conclusions and assumptions obtained from studying the actual values of the factors of influence (Fi) were verified through cluster analysis, enabling the determination of the features of the positioning of the analysed countries by factors of the tax system in the context of sustainable development.

**Results.** Tax policy is a core instrument of public administration for mobilizing resources. Embedding SDGs in national strategies creates new requirements and criteria for tax policy, whose success shapes socio-economic and environmental progress. Contemporary governance therefore calls for aligning taxation with

broader initiatives that raise the sustainability of economies and society. The European Commission defines a sustainable taxation system as tax instruments and legal measures that advance sustainability across economic, social, environmental, and institutional dimensions and serve current and future generations [27]. Environmental taxation is only one element: sustainable systems must deploy a wide toolkit – fiscal, distributive, regulatory, incentive, and control functions – to influence taxpayer behaviour. In the transition to a sustainable economy, primacy of the fiscal function alone is insufficient; policy should emphasize incentives that motivate voluntary support for sustainable measures. While state oversight and legislation are necessary, SDG outcomes also depend on coordinated efforts by government, business, and consumers. Public administration thus has a special role in designing effective drivers that reorient business and consumer behaviour toward SDG-aligned criteria; key features are summarized in Fig. 1.

Tax indicators are critical for assessing the sustainability of the tax system and its contribution to SDG achievement. They should be comparable nationally and internationally; diagnose weaknesses that constrain progress; track advances toward sustainability goals; identify the incentive levers and instruments required by the economy and business; and operate as clear, universal, and transparent communication tools for stakeholders.

Assessment of indicators of the sustainability of the tax system allows for a comprehensive assessment and identification of problematic aspects in financial support for the achievement of the country's sustainable development goals. The analysis of the leading indicators of the sustainability of the tax system provides information in the following context: 1) the actual state and comparison of the level of sustainability of the national tax system with other countries; 2) assessment of tax gaps and search for alternative sources of their coverage; 3) assessment of progress towards achieving the state of sustainability of the tax system and its capabilities for the implementation of national sustainable development goals; 4) search for tax drivers and incentives to intensify tax revenues to the consolidated budget without creating obstacles to investment and innovation activity of business; 5) increasing the level of transparency of the national tax system and trust in it on the part of taxpayers.

Among the leading indicators of the actual level of sustainability of the tax system of Ukraine and the assessment of the financial potential of the state in achieving the Sustainable Development Goals, three key indicators were chosen: the share of taxes in the value of GDP, the

size of tax gaps about the country's GDP, the general level of tax burden, and the overall effective tax rate.

According to the research results, the share of taxes in the value of GDP is significantly lower than the average for EU countries. It is 25.9 % (Fig. 2). In the countries of the European Union, the average share of taxes in the value of GDP is 41.2 % and has been relatively stable over the past five years [28, 29].

In Ukraine, the share of taxes in GDP is also determined by a constant value; in particular, this indicator did not turn out to be significantly dependent on the consequences of the military conflict that began in 2022. The reason for this situation was the simultaneous reduction of both the volume of tax revenues to the consolidated budget of the country and the reduction in the volume of social production, which is measured by the gross domestic product.

The degree of achievement of the Sustainable Development Goals is determined by the financial potential of the state at the macro level of management and the volume of financial resources of sustainable business entities at the micro level of economic management. For the economy of Ukraine during the entire period of its independent existence, one of the most acute problems remains the problem of large-scale tax gaps between the goals and plans for the development of the national economy and the real possibilities of their actual financing. The level of tax gaps serves as one of the most informative indicators of the sustainability of the tax system and the sufficiency of incoming tax flows of the state to achieve the goals of sustainable development at the macro level of management.

The calculations carried out show that the actual level of tax gaps in the tax system of Ukraine in recent years has been characterized by a moderate value, within the range of 3 % and about 5 % in 2010, 2014, and 2020. The tax system of any country is quite sensitive to a wide range of factors that have different natural origins. A significant challenge to the sustainability of the country's tax system in 2014 was political events, and in 2020, the consequences of the global COVID-19 pandemic. In 2022, as a result of the military conflict, the consolidated budget-to-GDP deficit was 16.3 %.

At the same time, as the analysis showed, the structure of tax revenues of the Ukrainian economy in 2022–2023 underwent drastic changes that were not typical in the pre-war period. If during 2010–2021 the share of funds received for the formation of the State Budget of Ukraine from foreign countries and organizations did not exceed 1.5–2.5 % in the structure of state

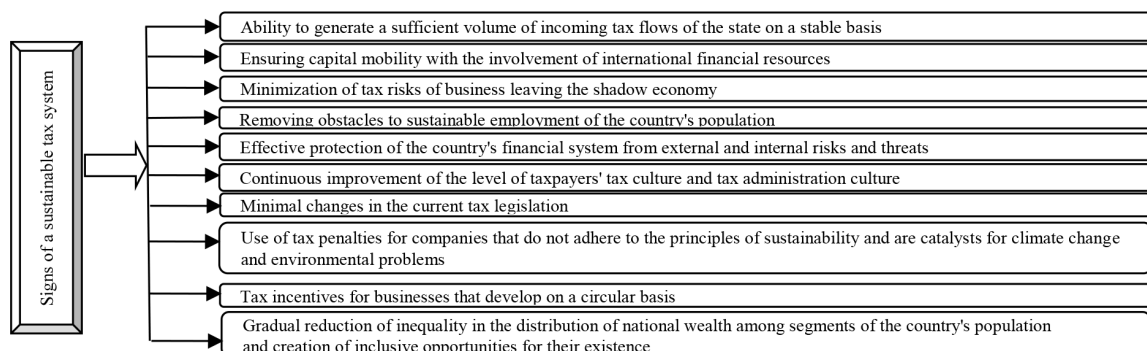


Fig. 1. Signs of a sustainable tax system to achieve the goals of sustainable development of the national economy

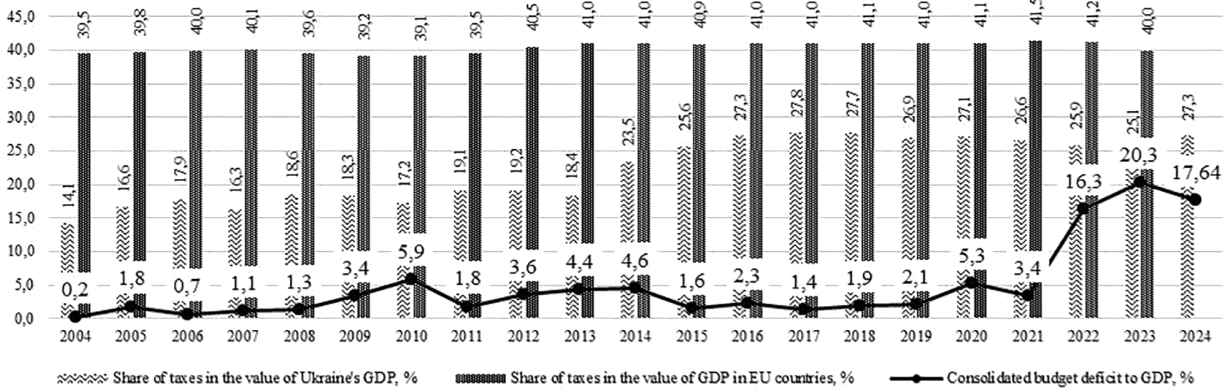


Fig. 2. Share of taxes in the value of GDP in Ukraine and EU countries

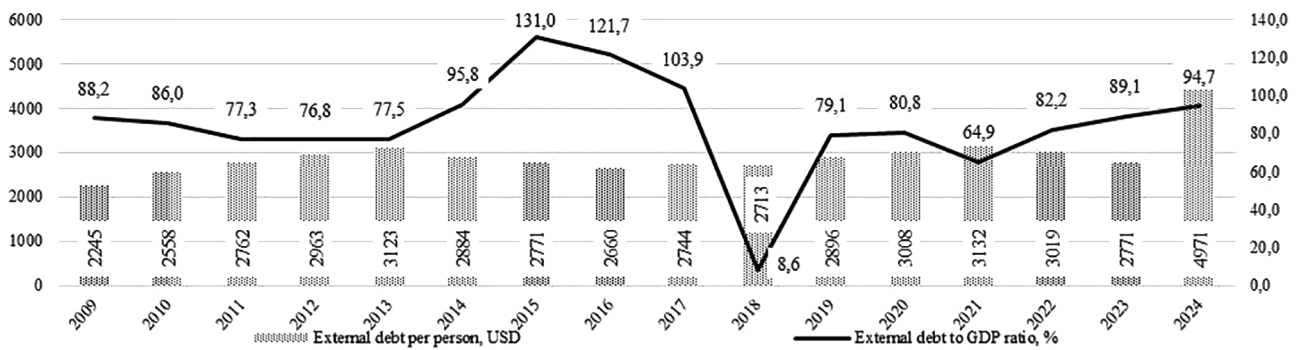


Fig. 3. Dynamics of Ukraine's gross external debt

revenues, then in 2022 this figure increased to 26.9 %. Accordingly, the share of taxes, as the primary source of financing the socio-economic development of Ukraine, decreased from 80 to 53 %. A sharp change in the ratio of tax and non-tax revenues of state trust funds poses potential risks to the stability of the tax system. It presents a significant threat to the financial security of the national economy. The existence of significant tax gaps between the goals of the country's economic development and the tax sources of their financial support, which has taken place in the economy of Ukraine over the past thirty years, has catalysed the processes of state borrowing from international financial and credit institutions. The growth of external lending on an unprecedented scale, in the context of unstable economic growth rates, posed significant threats to the country's foreign economic security and heightened the risks of losing economic and political sovereignty. As demonstrated by the results of the analysis (Fig. 3), the level of external financial indebtedness of Ukraine, which arose as a result of the lack of tax payments, as of the end of 2022, amounted to 3019 thousand US dollars. Per inhabitant of the country (according to the maximum permissible normative indicator in the amount of no more than USD 200 per person). The level of debt to GDP simultaneously amounted to 82.3 % (with the recommended maximum value of this indicator of 25 %) [28].

The totality of these tax risks affecting the sustainable functioning of Ukraine's tax system is complemented by an increase in the level of tax burden. As a current (litmus) indicator of the stability of the national tax system, it is advisable to choose the level of tax burden, which at the macroeconomic level of management is determined by the ratio of tax volumes to the value of

GDP. The actual level of the tax burden on labour in 2022 amounted to 17.6 % (an increase of 4.3 % over the past five years), the level of the tax burden on capital – 5.8 % (an increase of 0.7 %), the level of the total tax burden on the national economy – 40 % (an increase of 2.5 %). The high level of the tax burden is one of the key threats to the sustainability of the tax system of Ukraine.

Thus, the results of the conducted research made it possible to identify the main risks for achieving a sustainable state of the tax system of Ukraine, which will have an adverse effect in the long term. Among them should be highlighted:

- 1) slowdown in economic growth and low share of taxes in GDP;
- 2) the presence of significant tax gaps, which over the past thirty years have significantly limited the financial potential of the national economy to solve acute socio-economic and environmental problems and achieve SDGs;
- 3) suboptimal structure of tax revenues, a decrease in the level of concentration of taxes in the structure of the country's incomes, and at the same time an unreasonably high level of dependence of the financial system on external sources, which turn into the prominent credit donors of government expenditures;
- 4) trends in the growth of the total tax burden on the national economy;
- 5) deepening of the negative consequences of these trends as a result of the military conflict.

The sustainability threats to Ukraine's tax system are amplified by administrative frictions. Key issues include frequent legislative changes (payment procedures, reporting forms, removal of SME preferences); tighter regulatory pressure (demands, audits); the system's fis-

cal predominance; high compliance time; technical hurdles to VAT refunds; more disputes over penalties; heavy reliance on indirect taxes; and an insufficient tax culture among both taxpayers and officials.

These factors stimulate shadow schemes. A sustainable system must be transparent, open, fair, inclusive, and firmly rule-based, fostering a “white” economy and minimizing noncompliance. In 2022, Ukraine’s shadow economy reached 36 % (+4 pp vs. 2021) [25]. The most problematic sectors were fuels and lubricants, alcohol and tobacco, and transparent employment practices.

To assess the factors influencing the sustainability of the tax system in European countries, a system of indicators has been developed, which takes into account the following requirements:

1. Validity, i.e., in order to maintain compliance with the purpose of the study, the indicators must adequately reflect the sustainability of the tax system, and not only individual fiscal or macroeconomic characteristics. In practice, it can take into account not only the level of tax burden, but also the stability of revenues, the degree of adaptation to shocks, and the transparency of administration.

2. Comprehensiveness, which provides the ability to cover various aspects of sustainability (economic (fiscal stability, debt burden), social (perception of taxes by society), institutional (efficiency of tax authorities), environmental cross-section (the role of environmental taxes)), which will entail the completeness of the assessment.

3. Comparability in the context of universality for different countries, since indicators should be selected so that it is possible to compare different European countries, and have access to primary statistics.

4. Dynamism, which provides the ability to track the necessary statistical data over time. It is imperative that for most indicators the dynamics for several years are available for analysing trends, because the formation of tax systems is a strategic task, which, as a rule, takes place in stages, and can prove its effectiveness only in the long term.

5. Availability and reliability of data. Indicators should be based on reliable sources, such as Eurostat, OECD, IMF, State Statistics Service, etc. Such a system of indicators does not include indicators for which there are significant gaps in the data or the calculation of which has already lost its relevance in the methodological sense.

6. Simplicity and clarity of interpretation, which is especially important when evaluating for managerial or political decisions. When using complex composite indices as initial data, it determines the understanding of their transparent methodology.

7. Stability and sensitivity, which is provided by the formation of such a system, which is quite resistant to short-term fluctuations, but also sensitive to systemic changes (reforms, crises, changes in the structure of the economy).

8. Materiality of indicators and their groups for sustainable development management based on tax policy tools.

9. Meaningful comparability of indicators included in the economic and mathematical model, which is provided in the procedure of factor analysis itself, which allows the use of initial data expressed in different units of measurement.

10. The ability to predict the levels of changes in factors that can act as indicators of sustainable development, based on which it is advisable to substantiate measures to improve the tax system of countries in the European (cluster) structure in general and the national economy of a particular country in particular.

Taking into account the above, Table 1 presents a system of indicators that formed the initial data for factor modelling, and their convention in this model.

To obtain the final data in the article, the statistical analysis package STATISTICA, version 6.0 was used. The given indicators were selected based on the studied literature sources devoted to the analysed problems, considering the specifics of the socio-economic and organizational environment, as well as the purpose of the study. The availability of information was also taken into account. Thus, the summary of information on all selected statistical indicators for 2023–2024 led to the formation of a sample of 28 countries (27 EU countries and Ukraine) and a reduction of indicators to 9. As can be seen from Table 1, the composition of indicators reflects the organizational, economic, and socio-environmental aspects of the formation of tax bases in the national economy at the present stage of sustainable development.

To improve the quality of factor allocation and increase the factor load of components, the “Varimax normalized” rotation method was used in the study. This approach is aimed at maximizing the variance between factors, which significantly simplifies their description, especially when analysing complex economic systems.

Table 2 shows the quantitative expression of primary indicators for 2023–2024, which were formed using official statistical sources of the Eurostat, European Commission, World Bank, TMF Group, the Center for Economic Strategy, the State Statistics Service of Ukraine and the other sources.

To determine the optimal number of factors in this study, a number of criteria were used: cumulative percentage (should be more than 75 %), Kaiser criterion (factors with an eigenvalue over and a graph of Cattell’s eigenvalues (graph of “rocky scree” to the breaking point).

Taking into account the observance of these criteria, Table 3 presents the values of the contribution of individual factors to the overall variability of the population,

Table 1

Composition of initial indicators for assessing the country’s tax system in the context of sustainable development

Indicator	Model Symbol
Share of tax revenues in GDP, %	X1
Population, thousand persons	X2
CO <sub>2</sub> emissions, million tons per year	X3
Global Business Complexity Index (GBCI, Score)	X4
Manufacturing (value added in GDP, %)	X5
Crime Index (Score)	X6
Services (value added in GDP, %)	X7
Unemployment rate (%)	X8
Gross national income (GNI), \$ per capita	X9

Table 2

Initial data for factor analysis by country

No.	Country	Aug. 2023										Aug. 2024									
		X1	X2	X3	X4	X5	X6	X7	X8	X9	X1	X2	X3	X4	X5	X6	X7	X8	X9		
		Share of tax revenues in GDP, %	Population, thousand persons	CO <sub>2</sub> emissions, million tons/year	Global Business Complexity Index (GBCI, Score)	Manufacturing (Value added in GDP, %)	Crime Index (Score)	Services (Value added in GDP, %)	Unemployment rate (%)	Gross national income (GNI), per capita	Share of tax revenues in GDP, %	Population, thousand persons	CO <sub>2</sub> emissions, million tons/year	Global Business Complexity Index (GBCI, Score)	Manufacturing (Value added in GDP, %)	Crime Index (Score)	Services (Value added in GDP, %)	Unemployment rate (%)	Gross national income (GNI), per capita		
1	Belgium	44.8	11,712.9	84.31	13	11.25	54.60	71.1	5.508	54,580	50.0	11,900.1	106.4	14	15.7	48.9	69.9	5.6	54,840		
2	Bulgaria	29.9	6,795.8	39.79	55	11	41.9	62.5	4.295	14,280	36.7	6,437.4	53.4	43	16.8	39.7	64.1	4.3	15,320		
3	Czech Republic	34.1	10,809.7	90.51	65	20.02	26.10	59.67	2.593	27,370	40.8	10,909.5	105.9	69	22.1	26.9	61.0	2.8	29,140		
4	Denmark	44.1	5,948.1	26.77	77	15.96	26.50	64.42	5.142	73,340	45.8	5,992.7	31.1	77	14.2	26.0	69.1	6.4	73,790		
5	Germany	40.3	84,548.2	582.95	25	18.54	43.20	63.69	3.045	54,800	47.0	83,577.1	681.8	36	18.4	43.8	63.1	3.5	54,960		
6	Estonia	34.0	1,360.6	11.44	0	11.91	24.70	64.54	6.345	27,620	35.9	1,370.0 <sup>2</sup>	10.7	51	15.6	23.0	68.0	7.6	28,700		
7	Ireland	22.7	5,255	32.48	57	29.44	53.60	60.88	4.34	78,970	25.1	5,439.9	45.9	54	41.5	45.6	40.7	4.4	77,920		
8	Greece	40.7	10,242.9	51.67	2	8.73	53.50	68.64	10.997	22,590	47.5	10,409.5	63.4	1	11.9	54.7	70.8	9.5	23,030		
9	Spain	37.0	47,911.6	217.26	41	10.89	53.00	68.66	12.144	32,830	44.9	49,078.0	240.6	15	12.3	48.9	70.3	10.9	33,410		
10	France	45.6	66,438.8	282.43	1	9.73	56.90	69.66	7.323	45,180	52.4	68,635.9	308.5	2	11.3	55.6	70.6	7.6	45,180		
11	Croatia	37.3	3,896	17.46	20	12.12	32.30	59.07	6.063	20,590	46.6	3,874.4	21.1	17	15.5	26.4	64.9	4.6	22,080		
12	Italy	41.7	59,499.5	305.49	8	15.37	61.70	64.96	7.618	37,920	47.8	58,934.2	329.6	8	17.4	47.6	65.3	5.8	38,290		
13	Cyprus	38.8	1,344.9	7.18	56	4.35	2.00	76.65	5.964	32,960	44.7	979.9	7.6	62	7.0	30.3	79.8	5.7	32,980		
14	Latvia	33.4	1,882.4	6.55	0	11.27	38.50	61.56	6.534	22,630	40.2	1,856.9	7.1	44	15.7	37.2	65.4	6.5	21,970		
15	Lithuania	32.4	2,854.1	13.11	0	14.58	38.30	63.09	6.962	25,080	44.8	2,890.7	14.8	50	17.4	32.5	65.2	6.8	26,950		
16	Luxembourg	42.8	665.1	7.01	66	3.53	28.70	80.6	5.188	83,980	43.0	682.0	7.9	64	6.6	28.4	78.1	5.4	91,470		
17	Hungary	35.1	9,686.5	43.83	28	17.14	34.80	57.56	4.126	19,670	43.1	9,539.5	55.0	23	17.5	34.7	61.5	4.6	20,690		
18	Malta	27.1	532.9	1.68	69	6.16	9.00	80.6	3.125	34,750	36.9	574.3	1.9	68	8.1	38.1	77.5	2.5	34,660		
19	Netherlands	39.1	18,124.8	122.87	75	10.84	22.80	69.65	3.561	62,540	46.2	18,044.0	142.4	74	12.2	27.2	68.9	3.6	62,840		
20	Austria	43.5	9,130.4	58.82	34	15.87	26.90	63.26	5.243	55,030	49.5	9,197.2	72.9	32	17.4	29.1	64.1	5.7	54,160		
21	Poland	36.0	38,762.8	286.91	12	16.76	28.20	57.51	2.905	19,900	40.4	36,497.5	314.0	18	18.1	30.5	59.5	3.0	21,560		
22	Portugal	37.6	10,430.7	36.17	38	11.87	54.60	66.76	6.491	26,150	46.7	10,749.6	45.7	25	14.2	32.3	68.8	6.6	26,620		
23	Romania	27.0	19,118.5	70.77	24	12.62	49.60	60.73	5.595	16,660	33.8	19,036.4	82.9	20	16.7	49.6	60.6	5.6	17,600		
24	Slovenia	36.9	2,118.4	12.08	32	19.59	21.80	57.75	3.627	30,860	42.9	2,130.9	13.8	31	21.5	22.2	60.3	3.4	31,640		
25	Slovakia	35.5	5,518.1	34.86	29	20.74	30.60	56.38	5.84	22,790	35.8	5,419.5	36.9	27	20.8	31.0	59.9	5.0	23,900		
26	Finland	42.7	5,601.2	32.27	50	14.93	55.7	61.37	7.155	53,230	51.7	5,636.0	40.1	55	16.4	26.0	65.0	7.7	51,710		
27	Sweden	42.3	10,551.5	35.39	39	14.19	46.6	65.22	7.587	60,480	42.2	10,587.7	40.1	42	13.6	49.2	67.6	8.0	58,820		
28	Ukraine	32.4	37,732.8	136.2	17	8.25	48.6	61.35	2.5	4,950	54.1	37,860.2	101.3	24	7.1	48.8	60.0	14.3	5,389.5		

Table 3

Contribution of the obtained factors to the total variance

Factor	Eigenvalue	Total variance, %	Cumulative eigenvalue	Cumulative variance, %
F1	2.671	29.682	2.671	29.682
F2	2.105	23.388	4.776	53.070
F3	1.610	17.883	6.386	70.953
F4	1.098	12.205	7.484	83.158

Table 4

The value of factor loads of the components of the model

Indicator	Factor			
	F1	F2	F3	F4
X1	0.287	<b>0.760</b>	-0.318	0.540
X2	<b>0.953</b>	-0.007	-0.200	0.007
X3	<b>0.982</b>	0.063	-0.036	0.054
X4	-0.294	-0.091	0.631	0.422
X5	0.050	0.953	0.076	0.145
X6	0.282	0.281	<b>-0.765</b>	0.113
X7	-0.025	-0.860	0.113	0.335
X8	-0.092	-0.271	<b>-0.847</b>	-0.012
X9	-0.006	0.022	0.128	<b>0.956</b>

demonstrating the level of explanation of variational indicators and factor values obtained during modelling.

As evidenced by the data in Table 3, the obtained factors are significant, since their numbers are greater than 1. The most considerable weighted contribution is made by the first factor, explaining 29.68 % of the variability of the population, and all four factors explain 83.16 % of the total variance of the sample indicators. All this indicates that the factor analysis carried out on the specified set of indicators made it possible to present at the level of 83.16 % of the commonality the initial variables that reflect the stability of the tax system of the national economy selected for country studies for the period 2023–2024, with four independent variables (FI).

Considering the above recommendations for this criterion, the fracture occurs at component 4, and from component 5 onwards, there is an intersection of boundary one and the existing visual alignment of this graph.

Thus, four factors remain in the model, describing more than 83 % of the variance. For further economic interpretation of the obtained factors, the article should consider the values of their weight coefficients (factor loads), which are given in Table 4.

Loads determine the components of the factors, the values of which exceed 0.7, since they are essentially a correlation coefficient between the corresponding indicators.

Analysis of the value of factor loads given in Table 4, allows us to draw the following conclusions.

The first factor, with loads of 0.953 and 0.983, respectively, includes the following indicators: population size (X2) and CO<sub>2</sub> emissions (X3).

Taking the study's aim into account, grouping population size and CO<sub>2</sub> emissions under Factor 1 has a clear economic rationale: both variables load highly and positively, indicating a shared, directly proportional influ-

ence on tax-system sustainability. The linkage is intuitive – larger populations raise resource use, energy demand, and economic output, which in turn elevates emissions. CO<sub>2</sub> volume signals environmental load and reflects industrialization, energy intensity, and ecological impact. Their co-location within one factor suggests common drivers such as overall economic activity, urbanization, and energy policy.

For tax policy, larger populations require flexible systems to fund social spending, infrastructure, and environmental programs. In highly urbanized EU economies, tax design often includes “green” instruments (environmental fees, emissions levies). Rising emissions trigger pollution taxes (e.g., carbon pricing, fuel excises) alongside incentives (tax rebates) to accelerate clean-technology adoption. Ukraine faces greater hurdles due to underdeveloped environmental tax mechanisms; recent war-related soil and air pollution heightens the urgency to align tax tools with environmental and development goals.

Within sustainable development, the shared impact of population and CO<sub>2</sub> emissions involves:

1. Energy efficiency: policies that shift consumption toward cleaner energy.
2. Program financing: earmarking green-tax revenues for infrastructure and restoration.
3. Social equity: protecting vulnerable groups when tightening environmental standards.

Their joint loading in one factor confirms a tight demographic–environmental linkage that shapes sustainable tax policy, creating both challenges and opportunities for green reforms and for balancing growth with ecological resilience. This factor (F1) thus captures resource load and environmental consequences of activity, reflecting the country's demographic and ecological profile for living conditions and business.

The second factor comprises three indicators: the share of tax revenues in GDP (X1, load 0.760), manufacturing value added as a share of GDP (X5, load 0.953), and services value added as a share of GDP (X7, load -0.860). Two positive and one negative load define its net effect on tax-system sustainability. Collectively, these variables capture the economy's structure and the role of taxes in GDP formation: higher X1 reflects greater fiscal weight; stronger X5 signals an industry-led economy that often provides steadier revenues but faces environmental and modernization pressures; the negative X7 indicates that where services expand, manufacturing's share – and the salience of taxes in GDP – tend to be lower, prompting different designs (e.g., VAT on services).

The opposing signs on X5 and X7 reveal a structural trade-off: a higher manufacturing share (positive) marks an industrial base, while a negative relation with services may indicate a transition economy whose service sector has not fully matured. Overall, F2 maps the production – services balance and shows how tax policy is embedded within that structure.

As for the nature of the impact of F2 on tax policy in general, the following aspects are scientifically interesting:

1. Distribution of the tax burden. Productive sectors are more directly taxable (profits and income of enterprises). The service sector is often dependent on indirect taxes (VAT and other consumption taxes).

2. Sustainability of tax revenues. In countries with a strong manufacturing sector, revenues are more stable but vulnerable to global economic crises. In developed service economies, revenues are more diversified but more challenging to administer.

3. Features of implementation. For countries with dominance of production (Ukraine, some Eastern European countries), incentives for innovation and “green” production are important. In particular, in the agricultural sector. For countries with a developed service sector, a balance between social services and private initiatives is important.

Taking into account the indicators and their specified content, the F2 factor can be described as an economic structure and tax burden, which allows taking into account the role of taxes, production, and services, which determines the impact of the structure of GDP (production and services) on the tax system.

The third factor comprises two indicators – the crime index (X6, load  $-0.765$ ) and the unemployment rate (X8, load  $-0.847$ ) – both reflecting a country’s socio-economic conditions. The crime index captures the overall criminogenic environment, often rooted in economic instability, social issues, and inequality. Unemployment signals labour-market slack and challenges to restoring human capital; in Ukraine, this has intensified due to the war. Negative loads on both variables indicate a mutually reinforcing dynamic: rising unemployment fosters instability and can increase crime (e.g., petty theft, illegal activity, tax evasion), while high crime deters investment and jobs.

These pressures undermine the tax system and sustainable development by shrinking revenues (fewer employed taxpayers) and raising spending on law enforcement, justice, and social programs. Effective tax policy should fund employment and rehabilitation programs to curb crime. Elevated unemployment and crime hinder SDGs – decent work and reduced inequality – risking self-reinforcing socio-economic cycles. Hence, F3 is interpreted as socio-economic tension, highlighting security and systemic risk.

The fourth factor contains one indicator – GNI per capita (X9, load  $0.956$ ) – interpreted as economic well-being. Higher GNI per capita strengthens household and business capacity and supports sustainable development:

- reflects aggregate income and the economy’s ability to finance public (including environmental and social) programs;
- shapes the tax base and revenue potential, enabling inclusive systems (e.g., progressive taxation) and green or social reforms; lower GNI is often associated with regressive burdens and inequality.

As a sustainability proxy, higher GNI correlates with better access to education, healthcare, and social guarantees.

Accordingly, F4 captures economic well-being as a driver of strategic transformation, sustainability, competitiveness, and the state’s capacity to finance development and maintain living standards.

Thus, the composition of significant indicators of four factors, obtained based on the results of factor analysis based on statistical data from 28 countries, allows us to draw the following generalizing conclusions:

The conditions for the formation and level of sustainability of the country’s tax system for the analysed period are determined by the following components: resource load and environmental consequences of activities (F1), economic structure and tax burden (F2); socio-economic tension in the country (F3); economic well-being (F4).

Most of the loads of the identified factors on the indicators (Table 3) have a positive sign (X1, X2, X3, X4, X5, X9), which indicates the presence of a high direct proportional direction of the action of the identified components to ensure the stability of the country’s tax system. Such indicators serve as stimulators for adjusting tax bases, considering the Sustainable Development Goals, as their growth will ultimately have a positive impact on the outcome. The obtained indicators with a negative load value (X6, X7, and X8) are, on the contrary, disincentives for such constancy, i.e., when they increase, the state of the phenomenon under study will worsen.

The actual values of the factors obtained from the factor analysis results were further presented as input data for cluster analysis. The K-means method was applied, yielding three clusters, as illustrated in the graph of the mean in Fig. 4.

As can be seen from the graph, in the simulation, cluster 1 is described by the highest value of the mean of F1, the lowest value of F3, and intermediate values of F2 and F4. Cluster 2 combines objects in which the average for F2 is significant, for F3 is low, and for others (F1 and F4) has intermediate values. However, in cluster 3, the averages for factors F3 and F4 have the maximum value, while the average values for factors F1 and F2 have the minimum value.

The direct distribution of the analysed countries by clusters, considering the actual values of the influencing factors and their peculiarities in affecting the tax system’s stability, is presented in Table 5.

As can be seen from the above distribution, for the period 2023–2024. Almost all countries maintained a stable positioning in the resulting clusters, despite fluctuations in socio-economic indicators. The exception was Portugal, which in 2023 was part of the second cluster and in 2024 moved to the first. If we analyse the initial indicators, the reasons for Portugal’s transition from cluster 2 to cluster 1 were the consequences of specific

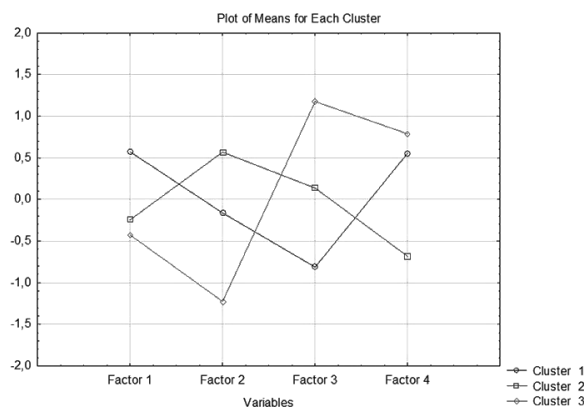


Fig. 4. Graph of the averages for each cluster in the context of factors (Fi)

Distribution of the analysed countries by clusters, considering the levels of actual values of influencing factors

Cluster	Countries that are part of the cluster		Features of the cluster by factors of influence (Fi)
	Aug. 2023	Aug. 2024	
1	Belgium, Germany, Greece, Spain, France, Italy, Austria, Finland, Sweden	Belgium, Germany, Greece, Spain, France, Italy, Austria, <b>Portugal (2024)</b> , Finland, Sweden	The highest level in F1 The lowest level in F2 and F3
2	Bulgaria, Czech Republic, Estonia, Ireland, Croatia, Latvia, Lithuania, Hungary, Poland, <b>Portugal (2023)</b> , Romania, Slovenia, Slovakia, <b>Ukraine</b>	Bulgaria, Czech Republic, Estonia, Ireland, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, Slovakia, <b>Ukraine</b>	The highest level in F2 The lowest level in F1 and F4
3	Denmark, Cyprus, Luxembourg, Malta, Netherlands	Denmark, Cyprus, Luxembourg, Malta, Netherlands	The highest level in F3 and F4 The lowest level in F2 and F1

dynamics simultaneously in several variables: most of the indicators (population, global business complexity index, crime index, unemployment rate, value added of production) increased, except for the share of GDP tax revenues, CO<sub>2</sub> emissions and production value added, which, on the contrary, decreased. In general, the factors of sustainability of the tax system had different intensity and multi-directionality, which in Figs. 5–7 are reflected by the values of factors in the context of countries, respectively.

The results of the analysis of actual values by factors showed that Germany, France, and Italy have the highest results in terms of “resource load and environmental consequences of activities” (F1). Given that the formation of these factors is exclusively from stimulants, this state indicates a high level of dependence on the tax system’s efficiency, which is based on incentives to enhance the environmental friendliness of production and life, as well as to support the tax bases of direct taxation.

The high results in terms of “economic structure and tax burden” (F2) supported by Ireland and Slovakia are a sign of the dependence of the sustainability of the tax system on tax tools to stimulate business development, both in the areas of production and services.

High values of the factor “socio-economic tension in the country” (F3) are present in Malta, Cyprus, and the Netherlands. It should be noted that both components of the factor are disincentives, so such F3 values should be regarded as a reflection of low security and economic risks, both for the population and for business, which is a positive trend in the context of sustainable development.

The maximum actual values of the factor “economic well-being” (F4) were held by Luxembourg and Denmark, which is evidence of the orientation of the tax systems of these countries to ensure a high standard of living.

Ukraine is positioned in the second cluster and has had some positive changes in the past two years. The level of F1 has increased, which in principle is a consequence of the revival of the economy, business recovery, and the availability of practical tax tools of environmental orientation. Although it remains with a negative value, the level of F2 has already improved significantly, which is a consequence of the increase in the share of

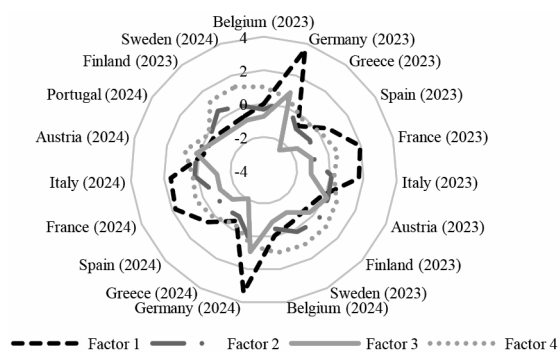


Fig. 5. Actual values of influencing factors in the first cluster by country

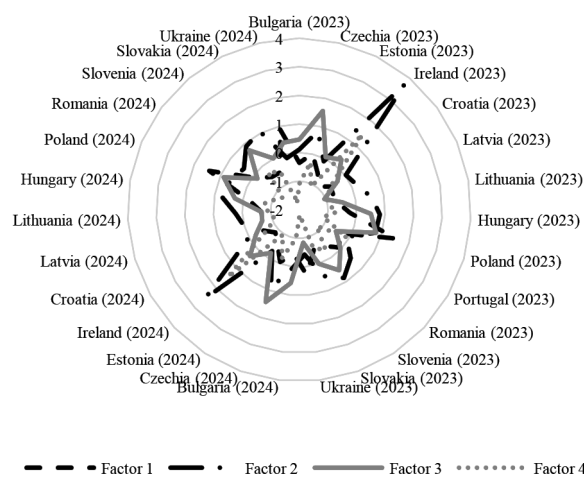


Fig. 6. Actual values of influencing factors in the second cluster by country

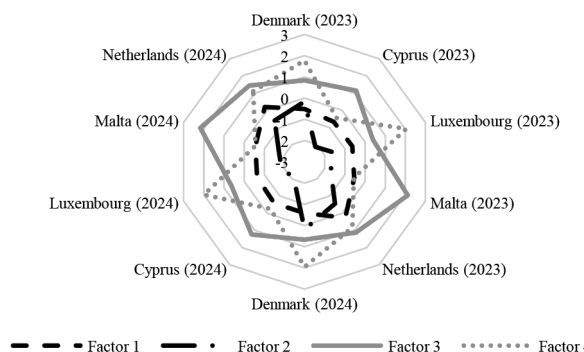


Fig. 7. Actual values of influencing factors in the third cluster by country

manufactured products with high added value, as well as the retention of moderate taxes. High standard of living and security issues due to hostilities, which is also confirmed by the dynamics of F3 and F4. International support, which has its specifics and limitations, is of key importance for stabilization.

The identified problems and risks in the context of sustainable development, considering these factors, should be considered when substantiating the system of mechanisms of organizational and economic support for the sustainability of the tax system of Ukraine and other national economies of the European Union.

In Ukraine today, all dimensions of sustainable development are problematic from the point of view of financial support: economic, environmental, and social. Taxes and the tax system are primarily focused on the performance of the fiscal function and do not provide incentives for intensifying innovation activity and business development. All tax benefits and preferences that took place in the country's economy (associated with the global pandemic and the outbreak of hostilities) have been cancelled due to a large-scale increase in tax gaps. Along with the trend of increasing the tax burden, other mandatory contributions and fees remain difficult for businesses. It is difficult for taxpayers to pay a single social contribution for hired personnel, which adds 22 % of payments to the total level of the tax burden. In recent years, this has become one of the main reasons for the increase in violations of tax and labour legislation by taxpayers and the growth of the shadow economy. At the same time, the existing rates of the single social contribution do not ensure the formation of a sufficient number of financial resources necessary for a decent level of well-being of the final recipients (users of state social guarantees, benefits, and mandatory labour payments at the end of their working life).

The issue of environmental tax rates remains debatable and poses challenges for the economy. Even though environmental tax rates in Ukraine are growing annually, they remain much lower than in the EU countries and do not significantly burden their payers. The stimulating and controlling functions of the environmental tax, which do not contribute to the achievement of sustainable development goals in the ecological plane, are also ineffective. These problems, both current and future, will be the most challenging and require simultaneous consideration of the three components of sustainable development (Fig. 8).

One of the most rational proposals for improving the current legislation in the direction of increasing the level of sustainability in the economic and social dimension

is the proposal for the introduction of a progressive system of personal income taxation, differentiated by the size of taxpayers' wages. Today, Ukraine has a personal income tax rate of 18 %. According to the authors, it was expedient to draft laws submitted for consideration by legislative bodies, according to which rates are differentiated as follows: 9 % – income up to 5 minimum wages (\$ 1,050 per month), 18 % – income of individuals in the range of \$ 1,052–2,100 per month), 25 % – income of taxpayers exceeding \$ 2,100 per month. Accordingly, the scale of the single social contribution is differentiated: 11, 22, 29 %. The increase in environmental tax rates for all types of emissions of harmful substances into the air and water resources, by classes of hazardous substances and the growth of the scale of their maximum permissible concentration, by categories of waste, is extremely overdue.

Such instruments of sustainable tax policy of the government should be used simultaneously with systemic measures aimed at shaping and stimulating socially responsible behaviour of all taxpayers, the population of the country, and the tax culture of state regulatory bodies. Achieving the Sustainable Development Goals is a complex and lengthy process, the effects and results of which are manifested in the long term. At the same time, in order to achieve the planned objectives of sustainable development at the first stage – in 2023, it is already necessary to ensure the formation of appropriate financial potential at all levels of economic management: at the level of national governance, management of local communities, non-levels of business management and management of consumer behaviour of the country's population.

**Conclusions.** Achieving the Sustainable Development Goals requires the creation of sustainable taxation systems capable of guaranteeing the necessary amount of their financial support. Taxes have always been a traditional financial instrument for accumulating cash flows necessary for the state to perform its inherent functions. These functions of public administration are actively transformed by the strategic guidelines for the sustainable development of national economies: environmental friendliness, climate neutrality, social development, and inclusive protection of all categories of the population, improving the level of well-being and quality of life. With the spread of the priorities of the concept of sustainable development, new requirements have appeared for tax systems, which should ensure sufficient, sustainable, and stable revenues of financial resources that are necessary for the implementation of the national tasks of sustainable development of the country.

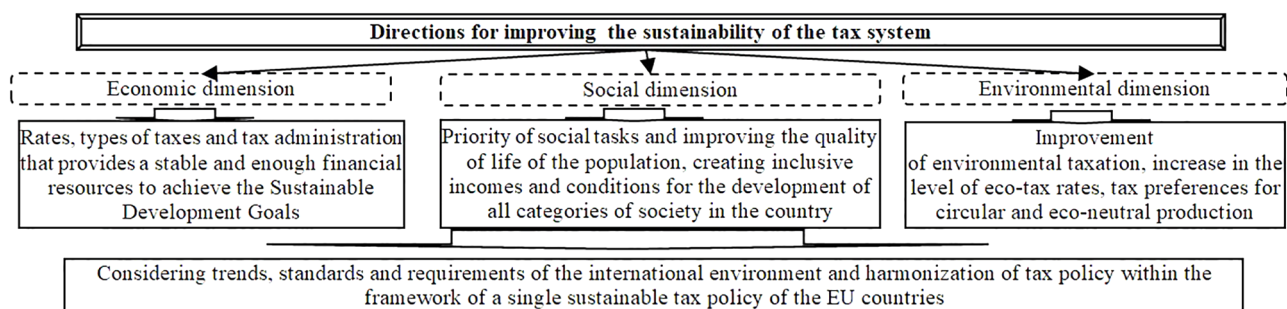


Fig. 8. Directions for increasing the level of sustainability of the tax system

Taxes are becoming a sustainable instrument in state fiscal policy and should serve as drivers of socially responsible behaviour among taxpayers. The research has made it possible to identify the main features of the stable tax system. They include: the ability to generate a sufficient volume of incoming tax flows of the state; minimization of risks of the development of the shadow economy; elimination of obstacles to employment; increasing the level of protection of the system against external and internal risks and threats; minimization of changes in tax legislation; tough sanctions for environmental violations and contributing to climate change; inclusiveness in the distribution of national wealth among the country's population.

Assessment of indicators of the sustainability of the tax system of Ukraine showed a low share of taxes in the value of GDP (25.9 %) compared to the EU countries (41.2 %). In addition, the presence of significant tax gaps was revealed, which became the main reason for the violation of the permissible proportions of the ratio of the state budget deficit to GDP (more than 16 %). The structure of budget revenues in Ukraine has undergone significant changes, resulting in a decrease in the share of tax revenues from 80 to 53 %. Alternative sources of state financial resources are sustainable international lending and assistance from world financial institutions. This significantly reduced the level of sustainability of the tax system of Ukraine. In addition, because of these trends, the degree of external debt of the government has significantly increased, to 82.2 % of GDP. The results of the analysis showed a high level of the aggregate tax burden on the national economy – about 40 %. Such trends have revealed a low level of actual sustainability in Ukraine's national tax system, indicating its inability to implement the Sustainable Development Goals financially.

The assessment of the current state and problems of the tax system of Ukraine made it possible to determine the main criteria for its sustainability: transparency, openness, fairness, inclusiveness, minimization of tax legislative changes and compliance with existing norms, minimization of risks of the spread of the shadow economy, strategic priority of three dimensions of sustainable development: environmental, social, economic in the implementation of regulatory and redistributive functions. The key strategic directions for increasing the level of sustainability of the tax system of Ukraine were identified as optimization of the level of tax burden, the size of personal income tax rates and environmental tax, the use of effective drivers for stimulating social responsibility of taxpayers and increasing the level of tax culture of all participants in the taxation process.

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#### References.

1. Perevozova, I., Malynka, O., Nitsenko, V., Kryshchal, H., Kostyuk, V., & Mishchenko, V. (2023). Analysis of Trends in Mortgage Lending in the Agricultural Sector of Ukraine. *Journal of Risk and Financial Management*, 16, 255. <https://doi.org/10.3390/jrfm16050255>
2. Mardan, M., & Stimmelmayer, M. (2020). Tax competition between developed, emerging, and developing countries—Same but different? *Journal of Development Economics*, 146, 102491. <https://doi.org/10.1016/j.jdevco.2020.102491>

3. Richards, N. U. (2021). Sustainable development goals and taxation in Nigeria. *Commonwealth Law Bulletin*, 47(3), 570-588. <https://doi.org/10.1080/03050718.2020.1818594>
4. Azlan Annuar, H., Isa, K., Ibrahim, S.A., & Solarin, S. A. (2018). Malaysian corporate tax rate and revenue: the application of Ibn Khaldun tax theory. *ISRA International Journal of Islamic Finance*, 10(2), 251-262. <https://doi.org/10.1108/IJIF-07-2017-0011>
5. Rahman, Md. M. (2023). Impact of taxes on the 2030 agenda for sustainable development: Evidence from Organization for Economic Co-operation and Development (OECD) countries. *Regional Sustainability*, 4(3), 235-248. <https://doi.org/10.1016/j.regsus.2023.07.001>
6. Zayed, N. M., Mohamed, I. S., Islam, K. M. A., Perevozova, I., Nitsenko, V., & Morozova, O. (2022). Factors Influencing the Financial Situation and Management of Small and Medium Enterprises. *Journal of Risk and Financial Management*, 15, 554. <https://doi.org/10.3390/jrfm15120554>
7. Kanbur, R., Paukkeri, T., Pirttilä, J., & Tuomala, M. (2017). Optimal taxation and public provision for poverty reduction. *International Tax and Public Finance*, 25(1), 64-98. <https://doi.org/10.1007/s10797-017-9443-6>
8. Samour, A., Shahzad, U., & Mentel, G. (2022). Moving toward sustainable development: Assessing the impacts of taxation and banking development on renewable energy in the UAE. *Renewable Energy*, 200, 706-713. <https://doi.org/10.1016/j.renene.2022.10.020>
9. Heimberger, P. (2021). Corporate Tax Competition: A Meta-Analysis. *European Journal of Political Economy*, 69, 102002. <https://doi.org/10.1016/j.ejpoleco.2021.102002>
10. Asen, E. (2020). *Corporate Tax Rates around the World, 2020*. Tax Foundation. Retrieved from <https://taxfoundation.org/data/all/global/corporate-tax-rates-around-the-world-2020/>
11. Kawano, L., & Slemrod, J. (2015). How do corporate tax bases change when corporate tax rates change? With implications for the tax rate elasticity of corporate tax revenues. *International Tax and Public Finance*, 23(3), 401-433. <https://doi.org/10.1007/s10797-015-9375-y>
12. Diaz-Sarachaga, J. M., Jato-Espino, D., & Castro-Fresno, D. (2018). Is the Sustainable Development Goals (SDG) index an adequate framework to measure the progress of the 2030 Agenda? *Sustainable Development*, 26(6), 663-671. <https://doi.org/10.1002/sd.1735>
13. Jahnsen, K., & Pomerleau, K. (2017). *Corporate Income Tax Rates Around the World, Tax Foundation Fiscal Fact*. 559. Retrieved from <https://files.taxfoundation.org/20170907092820/Tax-Foundation-FF559.pdf>
14. Nitsenko, V., Ivashchenko, A., Radko, V., Sereda, V., Kuzmenko, O., & Dimov, I. (2024). Financial Potential for Expanding the Opportunities of a Small Enterprise Under the Conditions of Sustainable Development. *Financial and Credit Activity Problems of Theory and Practice*, 6(59), 261-272. <https://doi.org/10.55643/fcaptp.6.59.2024.4524>
15. Gechert, S., & Heimberger, P. (2022). Do corporate tax cuts boost economic growth? *European Economic Review*, 147, 104157. <https://doi.org/10.1016/j.euroecorev.2022.104157>
16. Marques, M., Pinho, C., & Montenegro, T. M. (2019). The effect of international income shifting on the link between real investment and corporate taxation. *Journal of International Accounting, Auditing and Taxation*, 36, 100268. <https://doi.org/10.1016/j.intaccaud-tax.2019.100268>
17. Sachs, J., Kroll, C., Lafortune, G., Fuller, G., & Woelm, F. (2021). *Sustainable Development Report 2021*. Cambridge University Press. <https://doi.org/10.1017/9781009106559>
18. Brezhnieva-Yermolenko, O., Hanzhuk, S., Gurzhiy, T., Nitsenko, V., & Mazur, Yu. (2025). Development of the financial monitoring system to increase the level of financial security of Ukraine in the conditions of threats. *Economics of Development*, 24(2), 103-112. <https://doi.org/10.63341/econ/2.2025.103>
19. Peterson, T., & Bair, Z. (2022). United States Tax Rates and Economic Growth. *Sage Open*, 12(3). <https://doi.org/10.1177/21582440221114324>
20. Deb, B. C., Rahman, Md. M., & Rahman, M. S. (2022). The impact of environmental management accounting on environmental and financial performance: empirical evidence from Bangladesh. *Journal of Accounting & Organizational Change*, 19(3), 420-446. <https://doi.org/10.1108/jaoc-11-2021-0157>
21. Rahman, Md. M., & Halim, Md. A. (2022). Does the export-to-import ratio affect environmental sustainability? Evidence from BRICS countries. *Energy & Environment*, 35(2), 904-926. <https://doi.org/10.1177/0958305x221134946>
22. Poluyanenko, N., Kuznetsov, A., Lisickiy, K., Datsenko, S., Naskisko, O., & Rudenko, S. (2020). The Problem of Double Costs in Blockchain Systems. *Advances in Intelligent Systems and Computing*,

- (pp. 640–652). Springer International Publishing. [https://doi.org/10.1007/978-3-030-55506-1\\_57](https://doi.org/10.1007/978-3-030-55506-1_57)
23. Kryukova, I., Zamlinskyi, V., & Vlasenko, T. (2023). Architecture of corporate reporting on the sustainable development of business entities in the agrarian sector as a tool of sustainable agri-management. *Ekonomika APK*, 30(2), 38–48. <https://doi.org/10.32317/2221-1055.202302038>
24. Alekseiivska, H., Bril, M., Kotenok, A., Tomchuk, O., Budiaiev, M., & Popenko, S. (2024). Monetary instruments in addressing economic crises: effectiveness and challenges. *Financial and Credit Activity Problems of Theory and Practice*, 5(58), 9–22. <https://doi.org/10.55643/fcaptop.5.58.2024.4504>
25. Hutorov, A. O., Hutorova, O. O., Lupenko, Y. O., Yermolenko, O. A., & Voronko-Nevidnycha, T. V. (2019). Modelling of the cycle of reproduction process in the agrarian sector of economy (Ukraine). *Espacios*, 40(7), 19.
26. Ivanchenkov, V., Vovk, V., Yermolenko, O., Prusova, G., & Revenko, O. (2024). Innovative factors ensuring strategic changes in sectors of the national economy. *Economics of Development*, 23(4), 20–37. <https://doi.org/10.57111/econ/4.2024.20>
27. Nerudova, D., Janova, J., Hampel, D., Dobranschi, M., & Rozmahel, P. (2019). *Sustainability of the taxation systems in the EU: a proposal of an evaluation model*. Retrieved from <https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5c1f6e730&appId=PPGMS>
28. *MinFin* (2025). Retrieved from <https://index.minfin.com.ua/ua/economy/gdp/>
29. Eurostat (2025). *Main tax aggregates of national accounts*. Retrieved from [https://ec.europa.eu/eurostat/databrowser/view/GOV\\_10A\\_TAXAG\\_custom\\_8238014/bookmark/table?lang=en&bookmarkId=7c81cd0c-9c2f-4d5f-9506-8d480291f076](https://ec.europa.eu/eurostat/databrowser/view/GOV_10A_TAXAG_custom_8238014/bookmark/table?lang=en&bookmarkId=7c81cd0c-9c2f-4d5f-9506-8d480291f076)
30. Ministry of Economy of Ukraine (2022). *Trends of the shadow economy*. Retrieved from <https://www.me.gov.ua/Documents/List?lang=uk-UA&id=e384c5a7-6533-4ab6-b56f-50e5243eb15a&tag=TendentsiiTinovoiEkonomiki>

## Оцінка податкової системи в умовах сталого розвитку

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**Мета.** Оцінити соціально-економічні детермінанти стійкості податкової системи в межах рамки

Цілей сталого розвитку для 28 країн Європейського Союзу й України у 2023–2024 роках.

**Методика.** Був сформований міжкраїновий набір даних із дев'яти незалежних показників для 28 національних економік. Застосовано факторний аналіз для виявлення латентних рушіїв стійкості податкової системи, після чого проведено кластерний аналіз для групування країн за подібними профілями й оцінювання стабільності позицій країн у часі. Порівняльну оцінку зосереджено на Україні, де воєнний стан залишається чинним.

**Результати.** Встановлена чотирифакторна структура: (F1) ресурсне навантаження й екологічні наслідки; (F2) економічна структура й податковий тягар; (F3) соціально-економічна напруга; (F4) економічний добробут. Фактори F1, F2 і F4 позитивно пов'язані зі стійкістю національних податкових систем, тоді як F3 діє у протилежному напрямі. Країни демонструють виразну неоднорідність за факторами; належність до кластерів загалом залишалася стабільною між 2023 і 2024 роками, причому Португалія була єдиним випадком перекласифікації. Оцінювання на основі факторів (F1) виявило країноспецифічні ризики й пріоритети фіскального коригування. Порівняння України та ЄС засвідчило узгоджені закономірності у межах призначених кластерів з урахуванням динаміки фактичних значень факторів.

**Наукова новизна.** Дослідження операціоналізує стійкість податкової системи через інтегрований чотирифакторний конструкт, що спільно охоплює екологічний тиск, фіскально-структурні характеристики, соціальний стрес і економічний добробут, а також перевіряє стабільність кластерів на актуальній панелі ЄС–Україна.

**Практична значимість.** Отримані результати забезпечують прозорий діагностичний інструментарій для чутливого до ризиків проектування податкової політики, узгодженої зі сталим розвитком. Вони підтримують ідентифікацію цільових заходів і послідовності реформ; для України – інформують адаптивні фіскальні рішення в умовах воєнного стану та під час економічного відновлення.

**Ключові слова:** податки, податкова політика, сталий розвиток, безпека, загрози, управління, фінансові ресурси

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