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ASSESSMENT OF NATIONAL ECONOMIC SECURITY OF UKRAINE

ABSTRACT

The purpose of the article is to build an assessing model for national economic security and to assess the national economic security of Ukraine during 2019–2021.

The concept of national economic security is examined. Its relationship with the concept of state economic security is disclosed. Existing approaches to assess the economic security of the state are reviewed. Using epistemological contextualism by P. Unger for assessing national economic security is demonstrated and justified. Using index-based and indicator-based methods for this purpose is substantiated. Sources of provisioning national economic security are justified, serving as the basis for selecting indicators for assessing national economic security. Requirements for indicators to assess national economic security are suggested. For each of the identified sources of provisioning national economic security, a set of indicators is proposed, and for each such indicator, its selection is justified. The assessment time period is substantiated to eliminate the distorting influence of military actions against Ukraine on the assessment results. The qualitative interpretation of the values of each selected indicator is justified. Based on the calculated values of the proposed indicators for 2019–2021, visual linear profiles of Ukraine's national economic security have been constructed.

Keywords: national economic security, assessment, index method, indicator method, sources of national economic security provisioning, indicator, linear profile

JEL Classification: B22, C13 C43, C82, H56

INTRODUCTION

Security is the most important concept in public life that relates to any object throughout its existence. The category of "security" is multi-faceted, marking a complex socio-political phenomenon as it accumulates diverse life activities, accumulated historical experience, preferences, and the culture of the individual, society, and state (Korzh, 2019). In general terms, security is considered the condition of any object in which it is able to maintain its integrity, functioning, and purpose by resisting negative changes in its state, operation, and development that may arise through the realization of various threats to the object (various phenomena, processes, trends etc. in the external and internal environment of the object). The diversity of the category "security" has led to its research in various contexts: conceptual (ontological and epistemological foundations of security), valuable (philosophy of security, culture of security, etc.), and practical (reflection of needs and conditions of life for an individual, society, state, etc.).

The complexity of the category "security" and its research in a practical context has led to the consideration of various types of security (national, state, public), which are related to the category of "security" as specific and general. Derivatives of national security include numerous types such as "economic security", "information security (cybersecurity)", "environmental security", "food security", etc. Such types of security are categorized into separate subsets depending on the object of security, the sphere of social relations, and the types of practical activities of state authorities (Hurkovskiy & Sydor, 2021).

The concept of "national security," according to M. Hurkovskiy and M. Sydor (2021), is a dynamic rather than a static phenomenon. Therefore, the significance of providing its derivatives changes depending on specific situations, under different circumstances, etc.

However, the importance of national economic security remains almost constant all the time. National economic security as a derivative of national security is a complex economic-legal category with a complicated internal structure, multi-vector nature, and multi-source support. The essence of this category in this research is revealed based on the definition by O. M. Martyn (2013), in the following way: the state of the economy of some country that provides external independence of the state, relentless and stable development of all spheres in public life, internal stability, satisfaction of the economic interests of the state, and dignified social protection of its citizens.

The concept of "national economic security" is related to the notion of "state economic security". However, they cannot be considered identical in scope and content. The category of "national economic security" is broader and more comprehensive in content, while the definition of the concept of "state economic security" primarily focuses on countering emergence, active development, and implementation of external and internal threats to the socio-economic system of the state through specific measures taken by the government to protect the state economy.

Providing national economic security alongside other types of national security is the most important task of the state, as noted by the English philosopher T. Hobbes as far back as 1651 (Hobbes, 2015, P. 130). National economic security and state economic security are combined by the necessity of their provision, directions, mechanisms, and ways which are based on assessments of these two types of security. Assessments of national economic security and state economic security are the result of their assessment, which, like evaluating any object, is subject-based and subjective.

Assessing national economic security should be based on the main postulates and concepts of evaluation theory. Concepts of evaluation theory are used in research of objective and subjective reality in many social sciences because one can use such evaluations (of phenomena, processes, results, trends, situations, etc.) as an important component of the basis for making management decisions of various scales and natures. The postulates and concepts of assessment theory explain obtaining reliable assessments of various objects (state, results of functioning, development, processes, etc.) based on identified regularities, formulated principles, and logic of assessing processes using available data. Concepts of the assessment theory as a component of statistics — inferential statistics (Ibe, 2014) — reveal proceduralization of assessing values of the parameters for the assessed object based on sample data. This means using statistical methods to make grounded assumptions about object assessments based on information obtained from a specific sample, formulating conclusions (or inferences) regarding the researched phenomenon (situation, trend) and dynamics of its development.

Evaluating national economic security within the framework of the assessment theory requires operationalizing concepts of the theory to the specific features of an assessed object and the theoretical assessment construction formed by a researcher.

LITERATURE REVIEW

Operationalization of the concepts of the assessment theory is an important component of the modern scientific system — economic security studies. The concepts of such economic security studies in various aspects are aimed to provide functioning and development of a social and economic system of a state (at macro-, meso-, and micro-levels). Decisions and actions regarding such security should be based, including on the results of the assessment of a selected object. National economic security or state economic security is such an object at the macro level.

Evaluation (or estimetological concept) has been the subject of numerous research in economic security studies since its formation by Ukrainian and foreign scientists. Researching these results has led to the following conclusions. Concerning evaluating economic security at the macro level the functional approach nowadays is the mostly wide-spread one. This approach has been applied in assessing the economic security of the state in the form of Methodological recommendations for calculating the level of economic security of Ukraine, approved by the Order of the Ministry of Economic Development and Trade of Ukraine from 29.10.2013 No. 1277 (Metodychni rekomendatsii, 2013). This legal act has the status of a subordinate regulatory legal act (i.e., mandatory for the official defining the level of economic security of Ukraine). According to the functional approach, the complex concept of "economic security of a state" is decomposed into a number of functional components: production, demographic, energy, foreign economic, innovation-investment, macroeconomic, food, social, and financial (Metodychni rekomendatsii, 2013). The functional components as local parts specify the economic security of a state and establish local priorities and guidelines for its strengthening.

The economic security of a state by functional components is described using 130 primary single indicators, which are presented in statistical data or obtained based on the results of respondent surveys. Primary single indicators describe various aspects of the state of each functional component. The integral sub-indices based on the results of standardization and aggregation of primary single indicators and using their defined weights are calculated for the functional components

of economic security of a state. The integral sub-indices are quasi-quantitative by their nature, as they are not the result of direct measurement, but the result of normalization and aggregation operations. The integral index of the state economic security consists of 9 average-weighted integral sub-indices of the mentioned components of the state economic security.

In numerous operations with primary single indicators (standardization and convolution), the subjective nature of weighting coefficients (for primary single indicators and integral sub-indices) reduces the level of trust in assessments of a state's economic security. After all, its intermediate assessments allow only, at their best, determining the location of the problem – some functional component. Investigation of the causes of the problem in the form of threats to some functional components, determining the dynamics of their development is beyond the scope of the mentioned Methodological recommendations.

Further suggestions in the field of assessing state economic security are largely aimed at improving the mentioned methodological recommendations (Metodychni rekomendatsii, 2013) to some extent:

- applying the multiplicative form of the integral index, when weighting coefficients are calculated on the basis of the main components' method (Shchodo vdoskonalennia metodolohii, 2013);
- the fundamental change in indicators for assessing a country's economic security state (application of aggregate independent or integrated indicators) (Prykhodko & Yehorova, 2017, p. 52–57);
- express assessment of the country's economic security using adapted (Prykhodko & Yehorova, 2017) partial indicators, the values of which determine the level of economic security (critical, unsatisfactory, satisfactory, high) (Zubko, 2022);
- assessing the economic security of a state based on the components of the Global Competitiveness Index (Varenyk, 2016).

Thus, approaches to assess the economic security of a state and methods that objectify the concepts of these approaches are numerous. However, scientific research on assessing national economic security is significantly more limited, possibly because of considering the concepts "national economic security" and "economic security of the state" as synonyms over a long period of time. Of course, there are no fundamental differences between these concepts, but it is also incorrect to consider them synonymous in total. Some concepts as parts of methodological approaches on determining the level of a state's economic security can be applied in assessing national economic security. However, original scientific research is required to assess national economic security in some aspects.

AIMS AND OBJECTIVES

The purpose of the article is to build a specific model to assess national economic security and to assess Ukraine's national economic security with its operationalization using data of 2019–2021.

METHODS

Assessing national economic security was conducted by mutually applying concepts of epistemological contextualism and a componential (or atomic) approach. Epistemological contextualism, based on the contextualism by P. Unger (Unger, 1984), allowed choosing a component-based approach to assess economic security, forming components of assessment, and selecting indicators that most fully describe their condition. According to epistemological contextualism, the answer to any question in research is given relative to a set of assumptions accepted by a researcher. A choice of such assumptions is not determined objectively (Dobronravova, Sydorenko & Chuiko, 2018, p.181), (Zahvoiska & Peliukh, 2019). The component (or atomic) approach involves decomposing a researched object (system, process, phenomenon, trend, etc.) by distinguishing individual small and relatively independent components based on their homogeneity, followed by their description using some indicators. There have been examples of using this approach in economic security studies already, for example (Kudrina & Ivchenko, 2024).

There have been used index and indicator methods in calculating and presenting indicators for assessing Ukraine's national economic security. The index method allows comparing some single components of Ukraine's national economic security in dynamics by converting selected indicators into certain common unity — indexes. Relying on indicators' indexes builds a basis for tracking the consistent change in Ukraine's national economic security. It is precisely the combination of indexes, combined in a certain form, that provides an understanding of the dynamics of Ukraine's national economic security. Along with the index method, there is also the indicator method used in this research. The indicator method involves comparing the indices of Ukraine's national economic security with their threshold value. The minimum threshold value of the indices,

i.e., their indicator by nature, is 1.0. Deviations near 1.0 in either direction indicate dynamics of the condition of national economic security. The number of indicators is quite big and, therefore, they require some generalization.

Calculation of the composite index of national economic security, which is the most common way of summarizing individual indicators in economic security studies, is not considered in the conducted research for the following reasons: the need to determine the essentially subjective significance of each individual indicator using their weighting coefficients, which are established mostly through expert assessment; the integrated indicator of national economic security itself has a limited scope of application, and it is suitable for informational purposes only. Deployment of the integrated indicator is required while analyzing national economic security. That is why the answers to the causes of its condition require an analysis of primary or group complex indicators.

A graphical method was used in the conducted research to generalize the index values of components of national economic security and to visualize their dynamics. Such a graphical method involves building and interpreting linear profiles.

RESULTS

National economic security in the context of internal economic policy and including the national economy of Ukraine to the global economic system is considered as the country's ability to implement an established policy for the national economy's stable development. Such ability is provided using several sources. The source of national economic security is considered as its component, the state of which is determined by the results of some processes, as a result of which a certain situation in the socio-economic system of a state has arisen (or may arise). The sources of national economic security are closely interrelated, and as a result, they are mutually influential.

Sources of national economic security that decisively determine the state of Ukraine's national economic security, according to the authors, are shown in Figure 1.

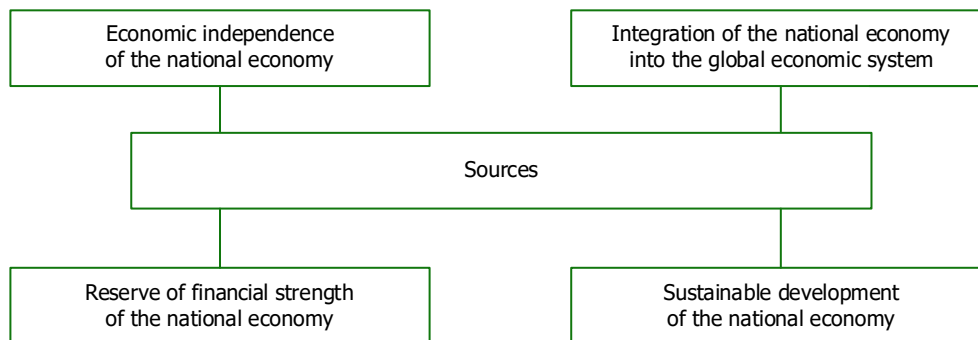


Figure 1. Sources of national economic security provisioning.

Economic independence of the national economy is considered as the country's autonomy in establishing its economic status, state managing of national resources, the ability to use national competitive advantages to provide equal participation in international trade, and the ability to provide economic security in the conditions of international division of labour (Kireev, 2009).

The involvement of the national economy in the global economic system reflects the state's participation in international cooperation and the measure of its openness. Such involvement means free movement of goods, capital, human resources, knowledge, and technology, leading to a country's economic growth. However, at the same time, integration of the national economy into the global economic system necessitates determining directions for the development of the national economy in the context of trends in the global economy, stimulating the overall economic growth of the country etc.

Sustainability of the national economic development means the overall growth and improvement of the country's economic system based on the creation and commercialization of various types of innovations (technical, technological, organizational, managerial). Moreover, such sustainability implies its transition through planned and controlled changes in the system to a qualitatively new state, in which new possibilities, qualities, and characteristics emerge within the system, enabling the country to solve economic and social tasks at a fundamentally new level.

The reserve of the financial strength of the national economy describes the country's reserves of various types to stabilize the economy, protect its currency, and support financial stability in case of adverse circumstances (like an economic crisis, a pandemic, etc.) in the country. It acts as a buffer against external shocks and helps to ensure the government meets its

financial obligations. The reserve of financial strength is the result of the functioning of the national economy's reserve system, the purpose of which is to form reserves of the state that are sufficient in volume and liquidity and to maintain them in a proper condition.

According to the accepted logic, the condition of national economic security directly depends on the ability of the mentioned sources to provide it. That fact defines the need for systematic research of their state. For a quantitative description of the state of sources that provide national economic security a set of indicators has been formed. The number of indicators for describing each source of national economic security is not big, because increasing the number of indicators does not always rise the accuracy of measuring the researched phenomenon. Correspondence of chosen indicators to the object of assessment and the selected assessing methods are much more important. The reliability of the conclusions based on the results of indicator values analysis depends on the accuracy of their description. Therefore, a number of requirements have been formulated for the indicators that describe the state of sources providing national economic security:

The selection of indicators is determined by both the goals of the research and the purpose of assessing national economic security, i.e., their further usage, user queries, and the content of the methodology or evaluation model being developed (evaluation targeting rule). This rule is based on the usage of epistemological contextualism concepts, which recognize the legitimacy of existence for different positions regarding the phenomena under study and forbid the universality of the research approach.

The number of indicators should be relatively small because it is well-known that increasing the number of indicators complicates the interpretation and analysis of assessment results, however, it does not always clarify the description of the researched phenomenon or object.

Priority should be given to quantitative indicators that are the result of calculation operations with absolute indicators, which, in turn, are the result of direct measurement. It is well-known that absolute indicators are not very informative. Moreover, some economic indicators are influenced by price dynamics that can be eliminated, however, this requires calculating indicators for the current period at constant prices, which is difficult when constructing large statistical series.

The indicators should reflect the dynamics of the condition of national economic security sources.

Interpretation of the obtained indicators' values should be unambiguous.

The indicators should be representative. They should reproduce the main characteristics of the studied phenomenon.

Based on the considered requirements, the state of sources for providing national economic security was assessed using dynamics indicators for their absolute or relative values (indices) taking into account such dynamics sign (Table 1).

Table 1. Purpose of indicators for assessing the state of national economic security sources.		
Source of national economic security	Indicator	Purpose of the indicator
1. Economic independence of a national economy	1.1 The ratio of export to import	It characterizes the balance of trade in goods and services
	1.2 The country's total national debt, % of GDP	It characterizes all obligations that the state has to foreign and domestic creditors (citizens, businesses, and financial institutions of the country) and the financial stability of the country
	1.3 The share of loss-making enterprises in their total number, %	It characterizes the efficiency of economic activity and the financial condition of businesses in a country
	1.4 The share of gross accumulation of fixed capital, % of GDP	It characterizes the portion of a country's GDP that is spent on increasing fixed capital (production assets, machinery, equipment, etc.), the level of investment in production development, and support for economic growth
2. Integration of a national economy into the global economic system	2.1 Export of goods and services, % of GDP	It characterizes the volume of sales of goods and services outside the country to generate profit and increase currency reserves, thereby enhancing the country's presence in the global market
	2.2 Import of goods and services, % of GDP	It characterizes the volume of goods and services that the country imports from abroad to use and consume in its economy, and in this way, the role of the country in international trade
	2.3 Foreign Direct Investment (FDI) (excluding reinvestment of earnings), % of GDP	It characterizes long-term investments by non-resident companies into the economy of a state
	2.4 Round-tripping investment, % of GDP	It characterizes reinvestments of capital in a home country through round-tripping investments (residents sending funds abroad, which then return to their country in the form of foreign direct investments)

(continued on next page)

Table 1. Continued.

Source of national economic security	Indicator	Purpose of the indicator
3. Sustainable development of a national economy	3.1 Dynamics of GDP, %	It describes the state of a national economy in a general manner
	3.2 GDP per capita dynamics, %	It characterizes a level of a country socio-economic development and its dynamics
	3.3 The share of exports of goods using high and medium-high technology in the total volume of goods exports, %	It characterizes the overall technological level of a country, complexity and diversification of goods that the country exports
	3.4 Knowledge intensity of Ukraine's GDP, % of GDP	It characterizes a country's expenditures on research and development across all sources
4. Reserve of the financial strength of a national economy	4.1 Official international (gold and foreign exchange) reserves, monetary units	It characterizes a country's ability to stabilize the exchange rate and ensure the country's economic security
	4.2 Refinancing rate, %	It characterizes a country's ability to regulate the money market and inflation, serving as a benchmark for money and credit market participants regarding the cost of attracted and placed financial resources
	4.3 Level of inflation, %	It reflects the increase in the overall level of prices for goods and services over a certain period of time, reducing the purchasing power of money
	4.4 Unemployment rate (the share of unemployed people in the economically active population), %	It characterizes the specific weight of working-age people who are unemployed because of some reasons and are seeking employment

Regarding the indicators from Table 1, it should be noted that they are diverse in nature, economic dimensions, and objects of quantitative description. The indicators are mostly relative, with only a few of them being absolute. As a result, these indicators provide the opportunity to build a systematic disaggregated assessment of national economic security by sources of its provision.

To transform indicators into a comparative and generalized form, the index method was applied. It allowed using chain indices of indicators. Characteristics of indices for indicators that describe the state of national economic security sources are considered in Table 2. A simulator indicator and a stimulator indicator are distinguished in economic analysis, depending on the nature of the impact of some indicator on others. One can use these indicators in analyzing the influence of various economic factors on a particular object (system, phenomenon, factor, process, etc.) in the economy as a whole. Despite the similarity of names, the simulator indicator and the stimulator indicator are different in essence, and they have different purposes. The indicator simulator indicates that increasing its value leads to the growth of other economic indicators. For example, increasing investments can lead to growth in production and employment. Growing of indicator-stimulator increases some indicators while simultaneously decreasing others. For example, raising prices on products can increase a company's profit, but also lead to decreasing consumer purchasing ability.

The vast majority of the analyzed indices includes synthetic indicators, but there are also individual stimulus indicators.

Table 2. Characteristic of indicators' indices for the state of national economic security sources.

Source of national economic security	Index	Character of indices	Index indicators
1. Economic independence of a national economy	The ratio of export to import	simulant	≥ 1
	The country's total national debt, % of GDP	stimulant	≤ 1
	The share of loss-making enterprises in their total number, %	stimulant	≤ 1
	The share of gross accumulation of fixed capital, % of GDP	simulant	≥ 1
2. Integration of a national economy into the global economic system	Export of goods and services, % of GDP	simulant	≥ 1
	Import of goods and services, % of GDP	stimulant	$= 1$
	Foreign Direct Investment (FDI) (excluding reinvestment of earnings), % of GDP	simulant	≥ 1
	Round-tripping investment, % of GDP	simulant	≥ 1
3. Sustainable development of a national economy	Dynamics of GDP, %	simulant	>1
	GDP per capita dynamics, %	simulant	>1
	The share of exports of goods using high and medium-high technology in the total volume of goods exports, %	simulant	≥ 1
	Knowledge intensity of Ukraine's GDP, % of GDP	simulant	≥ 1
4. Reserve of the financial strength of a national economy	Official international (gold and foreign exchange) reserves, monetary units	simulant	≥ 1
	Refinancing rate, %	stimulant	≤ 1
	Level of inflation, %	stimulant	≤ 1
	Unemployment rate (the share of unemployed people in the economically active population), %	stimulant	≤ 1

In order to verify ideas for assessing national economic security using dynamics of selected indicators' indices during 2019–2021, i.e., in pre-war years (Table 3), the state of sources of its provision was evaluated. There are some reasons that substantiate the chosen period for assessing the state of national economic security of Ukraine:

1. It is obvious that the war against Ukraine made a huge impact on the national economic security of Ukraine, so it is useful to research the state of national economic security before the active military actions during 2019–2021 as the basis for future comparisons and further to research the state of national economic security during and after finalizing such active military actions. It will allow defining analytically and quantitatively proven changes concerning the state of national economic security of Ukraine, comparing such states in some moments of time and making some conclusions by separate sources of national economic security of Ukraine.
2. Because of the provided due to war period restrictions on access to some statistical and official indicators, and sensitive economic information for 2022–2024 in Ukraine, there is a lack of analytical data to calculate and assess the state of national economic security sources of Ukraine for 2023–2024. Such information will be available further, maybe in the postwar period; therefore, it will be possible to continue such research and to calculate the mentioned indexes for the last years with their comparison by time period and sources of national economic security of Ukraine.

Because of the considered reasons, taking into account the period of 2019–2021 can be considered as the first part of more complicated and wider research on the economic security of Ukraine during the pre-war, war and postwar periods in Ukraine; so pre-war period of 2019–2021 is relevant for the research in such considered context.

Verification of proposals based on data since the beginning of the war against Ukraine is meaningless as the situation is non-standard, which obviously requires other methodological approaches to assessment.

According to the proposed methodology for assessing the state of national economic security sources, the dynamics of the suggested indicators should be consistently increasing for simulator indicators and steadily decreasing for stimulant indicators. Based on this dynamic of the suggested indicators, there are reasons to assert the strengthening of the national economic security of the country. However, it is necessary to take into account values of absolute or relative indicators that form the basis for calculating the indices while analyzing indicators of the state of sources. The values of absolute or relative indicators allow specifying changes in significance in the state of sources of national economic security and expand its understanding.

Table 3. Indexes of indicators of the state of national economic security sources of Ukraine for 2019–2021.

Source	Indexes	Years		
		2019	2020	2021
1. Economic independence of the national economy	The ratio of export to import	1,0	1,158	1,0
	The country's total national debt, % of GDP	0,826	1,209	0,804
	The share of loss-making enterprises in their total number, %	1,011	1,1	0,934
	The share of gross accumulation of fixed capital, % of GDP	0,994	0,761	0,985
2. Integration of the national economy into the global economic system	Export of goods and services, % of GDP	0,911	0,947	1,044
	Import of goods and services, % of GDP	0,911	0,818	1,045
	Foreign Direct Investment (FDI) (excluding reinvestment of earnings), % of GDP	1,296	0,163	5,246
	Round-tripping investment, % of GDP	1,765	1,471	1,348
3. Sustainable development of the national economy	Dynamics of GDP, %	0,981	0,902	1,234
	GDP per capita dynamics, %	1,183	1,016	1,288
	The share of exports of goods using high and medium-high technology in the total volume of goods exports, %	0,965	1,0	0,890
	Knowledge intensity of Ukraine's GDP, % of GDP	0,915	0,953	0,707
4. Reserve of the financial strength of the national economy	Official international (gold and foreign exchange) reserves, monetary units	1,215	1,151	1,062
	Refinancing rate, %	0,964	0,442	1,043
	Level of inflation, %	1,041	1,05	1,21
	Unemployment rate (the share of unemployed people in the economically active population), %	0,945	1,151	1,040

Based on the data analysis in Table 3, the following conclusions and generalizations regarding the state of sources for providing the national economic security of Ukraine in the pre-war years are appropriate.

The identified indices' dynamics provide grounds to assert the instability of the state of sources for providing national economic security in Ukraine. After all, the indexes' dynamics of the majority of indicators are unstable, and broken, with alternating positive and regressive dynamics of the considered indices during the analyzed period.

So, the economic independence of the national economy cannot be considered a reliable source of providing Ukraine's national economic security in the analyzed period. The dynamics of the trade balance indices during the analyzed period indicate the actual stability of the volume of Ukraine's foreign trade operations.

The dynamics of the total state debt index at the end of the year (as a percentage of GDP), which is supposed to be decreasing, is not stable. Although Ukraine's total state debt compared to other countries is relatively low: on 31.12.2019 – 50.3% of GDP, on 31.12.2020 – 60.8% of GDP, on 31.12.2021 – 48.9% of GDP (Derzhavnyi borh, 2024). However, even such a size of the total state debt provides arguments for concluding the financial vulnerability of Ukraine, which existed in the analyzed period. Moreover, external debt predominates in Ukraine's total state debt (debt to other countries, international economic organizations, and other entities) traditionally in recent years, with government debt dominating external debt, despite the small amount of guaranteed debt.

Dynamics of the index of loss-making enterprises share in their total number is also unstable: growth of the index in 2019–2020 was followed by its decreasing in 2021. This is despite the fact that the share of loss-making enterprises in their total number is significant: it was 26.0% in 2019, 28.6% — in 2020, and 26.7% — in 2021 (Pytoma vaha pidpriemstv, 2022). The significant share of loss-making enterprises in their total number is a result of several factors, among which the following should be noted:

- so-called "natural unprofitability" of enterprises, caused by insufficient experience in the entrepreneurial activities of their owners, mistakes in choosing the type of economic activity, weak economic training of managers (owners), miscalculations in business planning, and high competition in the selected segment (or niche) of the market;
- concealing profits by enterprises (shadow activities) as a result of so-called tax optimization;
- unfavourable business conditions in Ukraine, particularly the high level of state regulation of entrepreneurial activities, leading to losses even for previously successful enterprises;
- existence of economic corruption, against which not every company is able to resist.

The dynamics of the index of gross capital accumulation share in GDP is decreasing in the analyzed period. Considering that its values are low (2019 – 0.176%, 2020 – 13.4%, 2021 – 13.2%), there are arguments to conclude a gradual decrease in investment in production development and support of Ukraine's economic growth (Pokaznyk 8.1.2. Chastka, 2022). Reducing investments for these goals does not strengthen the economic independence of the national economy exactly and does not enhance national economic security clearly.

Table 3 data does not provide grounds for the conclusion about the presence of Ukraine's national economy in the world economic system. Even if the dynamics of the export index of goods and services should be interpreted positively, the dynamics of the import index of goods and services are unlikely to obtain such an assessment. Moreover, imports into Ukraine chronically have exceeded exports, with a difference of nearly 6% of GDP over the last 15 years. Dynamics of import significantly outpaced dynamics of export: during the years 2005–2021, the balance of trade was negative (excluding 2005 with a value of +0.8% of GDP), reaching its peak in 2016 (-8.6% of GDP) (Eksport ta import Ukrainy, 2024).

A negative trade balance in the last decade has led to a currency outflow from Ukraine, which did not make a clear positive impact on national economic security clearly. Therefore, the rather lively dynamics of the round-tripping investment index cannot be considered absolutely and unquestionably positive, despite increasing its share in the total volume of foreign direct investment: 2019 – 34.6%, 2020 – 50.9%, 2021 – 68.5% (Otsinka obsiahiv priamykh inozemnykh investytsii, 2024). The dynamics of round-tripping investment can be evaluated from two sides: first, as an improvement of the business environment in Ukraine that makes reinvestment of capital (in fact, returning previously exported funds in the form of foreign direct investments) economically viable in Ukraine, and, second, as the absence of ability (or economic impracticality) to invest funds previously directed abroad by residents into the economy of other countries. The positivity of the Foreign Direct Investment (FDI) index dynamics (excluding reinvestment of earnings) is quite conditional. This is because their volume decreased to USD 452 million in 2020 and increased to USD 2371 million in 2021.

Based on the dynamics of indicators' indices the state of national economy development stability cannot be considered a strong and reliable source of providing national economic security: the dynamics of Ukraine's GDP index as a whole for the first two years of the study period has been regressive in general. Moreover, significant positivity of the GDP per capita index's dynamics in 2021 was provided not only by the growth of GDP but also by the ongoing population decrease in Ukraine in recent years because of various reasons (mostly of an economic nature).

Decreasing the research intensity of Ukraine's GDP can be considered an extremely negative trend in the national economy's sustainable development. Research intensity characterizes expenditures on research and development from all sources. Ukraine has been traditionally considered a country with significant innovation potential. However, the research intensity of the GDP in Ukraine is not just low, but rather it is depressingly low: 0.43% of GDP – in 2019, 0.41% of GDP – in 2020, and 0.29% of GDP – in 2021. Moreover, the decrease of the research intensity of the GDP in Ukraine has been constant since 2013 when this indicator was at 0.70% of GDP (Pysarenko, Kuranda, et al, 2023, p. 24). The indicator of GDP scientific intensity in Ukraine looks very unimpressive compared to the same indicator for EU-27 countries, where the share of research and development expenditures was 2.26% of GDP in 2021 (OECD. Gross domestic spending, 2021). The scientific intensity of GDP in Ukraine is almost seven times lower than the average value of the same indicator in EU countries, even without comparing the most developed countries with GDP scientific intensity of 3% and higher, for example, Israel — 5.56%, South Korea — 4.93%, USA — 3.46%, Japan — 3.30% (Pysarenko, Kuranda, et al, 2023, p. 24).

Based on the considered facts, Ukraine's main competitors in the global economy are countries that are not developers of new technologies or products with high added value. The largest share (about 80%) was represented by funds from organizations in the entrepreneurial sector in the structure of funds from domestic customers during the analyzed period (Pysarenko, Kuranda, et al, 2023, p. 24).

The low level of scientific intensity of GDP in Ukraine has led to a decrease in the share of exports of goods using high and medium-high technology index in overall export of goods (Pokaznyk 8.1.3. Chastka eksportu tovariv, 2022). The level of high-tech products in export is traditionally low in Ukraine (it has been about 5% during the analyzed period), while the same indicator reaches 21% on average globally. For example, it is 65% in Philippines, 41% in Ireland, etc. (Riven vyso-kotekhnolohichnoi produktsii v eksporti, 2024).

The considered data force a sad conclusion either about the outdated assessments of Ukraine's significant innovative potential or about the elementary inability to use it effectively. The following phenomena has been considered already:

- the lack of well-established effective interaction in the sphere of research and commercialization of their results between the state, educational and scientific institutions, and businesses;
- low motivation and inefficient incentivization of innovative enterprises that leads to the outflow of promising scientists and scientific ideas abroad;
- poorly developed and therefore complicated technology transfer;
- focusing the majority of research directly on science as a goal in itself, rather than a basis for the capitalization of manufacturing enterprises;
- low interest of businesses in implementing innovations on the national market, including due to the government's neglect of this aspect of activity and development of domestic enterprises.

It is precisely for these reasons that the national economy of Ukraine is weakly integrated into global value chains. That fact negatively affects the sustainability of its development, which, in turn, has a negative impact on strengthening national economic security.

A reserve of the financial strength of a national economy is an important source of national economic security for every country. However, the indices of dynamics for the indicators selected to describe the state of this source for Ukraine allow asserting the instability of its condition. The dominant share of Ukraine's official reserve assets (international reserves) consists of assets in convertible currencies (securities, currency, and deposits) – over 90% (Zolotovaliutni rezervy Ukrainy, 2024). During the analyzed period Ukraine's official international reserves, although increasing, have shown slower growth rates for each year. Despite the positive character of index indicators, Ukraine's official reserve assets cannot be considered significant in absolute size: for the 31st of December, 2021, they amounted to USD 30,940.95 million (Zolotovaliutni rezervy Ukrainy, 2024). To compare, for the 31st of January, 2021 gold and foreign exchange reserves were USD 157938 million in Poland, USD 164952 million in the Czech Republic, and USD 31748 million in Hungary (Official Reserve Assets, 2024).

The refinancing rate (the key rate of the National Bank of Ukraine) is used as a benchmark for all the participants of money and credit market regarding the cost of attracted and allocated financial resources. Growth of the refinancing rate in Ukraine began in 2014, reaching nearly 30% in 2015. The maximum value of the refinancing rate was 18% in certain periods from 2015 to 2019, and the average refinancing rate did not exceed 8% in 2020–2021 (Oblikova stavka, 2024). However, the refinancing rate in Ukraine remained high enough during the years under study: it was 9% at the end of 2021 (Oblikova stavka, 2024). The interest rate is typically between 4.0% and 4.5% in countries with actively developing economies (Yankovska, Telepnieva & Spivakova, 2021).

The relatively high refinancing rate in Ukraine has led to decreasing production, implementing cost-cutting measures in companies regarding salaries, and increasing unemployment rates, which, in turn, has increased external labour migration of the economically active population. Full statistics concerning external labour migration in Ukraine are absent. There are only some assessments of its scale. Considering that labour emigration mainly involves people of working age, the statistics of numbers concerning external labour migration are striking: according to the most credible assessments, up to 3 million Ukrainian citizens work abroad (Mihratsiia v Ukraini, 2021). The dynamics of the refinancing rate in Ukraine have been accompanied by a positive trend in the inflation rate during the studied years (Tablytsia indeksiv infliatsii, 2024). This fact is quite peculiar, and it could be explained by expectations of GDP growth, increased consumer activity in Ukraine, and budget deficit.

Data in Table 3 are the evidence of a positive trend concerning the inflation index, which has been a traditional characteristic of the Ukrainian economy in the last two decades unfortunately. Therefore, during this period, there has been decreasing in purchasing power of money among the population, decreasing in the employment level, and increasing in production costs for goods and services.

The dynamics of the unemployment rate (the share of unemployed persons in the economically active population) have been positive in Ukraine during the years under study. This fact can be interpreted both positively and negatively. The positive context of this fact means the availability of reserves of economically active population for economic growth and the ability to provide such growth. However, there is a negative context that is linked with decreasing ability of productive employment in the country's economy and increasing external labour migration. The normal unemployment rate is generally considered to be around 4-5%. However, the unemployment rate in Ukraine was almost twice as high during the years under study: 8.6% in 2019, 9.9% in 2020, and 10.3% in 2021 (Riven bezrobittia, 2022).

A significant number of index indicators were considered while analyzing the state of national economic security sources. A visualization of index indicators in the form of a linear profile was used (Figure 2) to structure a sufficiently large array of index indicators, to simplify their perception, and to demonstrate the relationships and interactions of indicators.

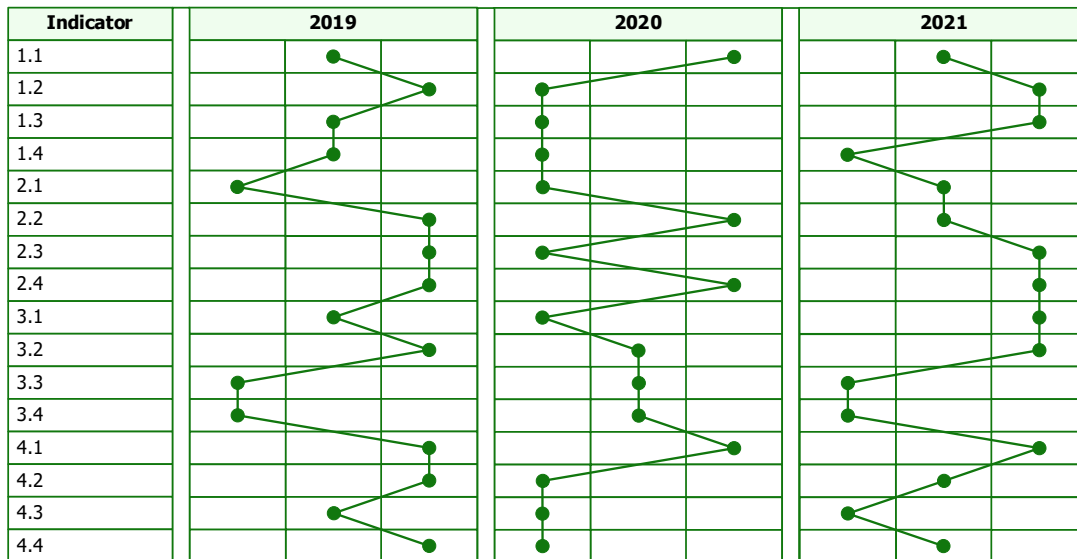


Figure 2. Linear profile of Ukraine's national economic security.

The following comments are appropriate for the constructed linear profiles of national economic security in Figure 2. The numbers of the national economic security status indicators in Figure 2 correspond to the numbering of indicators in Table 1. The indices of indicators are displayed in linear graphs with a certain ϵ , the purpose of which is to determine the threshold of significance for the qualitative interpretation of changes in indicators' indices. On the one hand, it is clear that the indices of any indicator are unlikely to amount to 1.00 exactly. On the other hand, the qualitative interpretation of the indicator's indices, for example, 1.00 and 1.002, is the same: an increase of 0.2% in the indicator reflects the determination of its index's results but does not change the perception of the indicator's dynamics. Similarly, an indicator's index of 1.00 and 0.997 is also the same for the qualitative interpretation, and a decrease of 0.3% in the indicator's index does not affect its perception. It is for these reasons that a certain threshold of significance ϵ is introduced, for which the value of $1 \pm \epsilon$ is interpreted in the same way as the value of 1.0. The value of ϵ for the qualitative interpretation of indicators' indices is set at 5% typically.

Indicators 1.1, 1.2, 2.2, 4.2, 4.3, and 4.4 from Table 1 are stimulants, which caused the reverse order placement on Figure 2 from left to right of their indexes: $\geq 1+\varepsilon$, $1\pm\varepsilon$, $\leq 1-\varepsilon$. Other indicators are simulants, so the indicators of their indexes are arranged from left to right in the following way: $\leq 1-\dot{\varepsilon}$, $1\pm\dot{\varepsilon}$, $\geq 1+\dot{\varepsilon}$.

Even a brief glance at the linear profiles visualizing the change of the indicators' indices for the state of national economic security sources and, consequently, its state is sufficient to assert that Ukraine's national economic security was very fragile in the pre-war years under study.

The state of sources providing national economic security is clearly unstable, unreliable, and volatile. Therefore, it is not surprising that being in such a state, the considered sources were unable to provide a positive trend in strengthening national economic security for Ukraine (even if not very dynamic).

The calculated assessments of Ukraine's national economic security correlate to some extent with the assessments of the state's economic security provided in Section 2 "Assessment of the State of Economic Security: Challenges and Threats" of the Ukraine Economic Security Strategy up to 2025. This section considers that the state of Ukraine's economic security was assessed as unsatisfactory during 2010-2019, with deteriorating indicators in almost all the functional components. According to calculations based on the Methodological Recommendations (Metodychni rekomendatsii, 2013), Ukraine's economic security was in a state of unsatisfactory condition during this period. The average level of economic security was 40% according to the Economic Security Strategy (Pro Stratehiiu, 2021). However, unlike the proposed assessment method for national economic security, the results of assessing economic security based on the Methodological Recommendations require additional analytical review to identify the reasons for its low level. The reasons for national economic security's unsatisfactory state are evident in the proposed assessment method.

It is obvious that the problem of Ukraine's weak national economic security has a systemic nature, as the condition of its sources was influenced by changes of a negative nature in the pre-war years. These changes have occurred in the state of the mentioned sources for many years, including because of the emergence of a set of threats to the economic security of the state. Unfortunately, the Ukrainian state authorities did not pay the necessary attention to such threats. That is why Ukraine's ability to implement the chosen policy for the national economy's stable development should be recognized as a very limited one during the years under study. That was because of the unstable and precarious state of sources of national economic security in Ukraine.

The assessment of Ukraine's national economic security is valuable in itself, represented by the constructed linear profiles, which clearly show the indicators whose dynamics affect national economic security negatively. However, the next logical step should be to suggest some actions and measures for strengthening such national economic security. These actions and measures should encompass both the level of the national economy as a whole and the level of separate industries. The agriculture industry has significant potential among other industries in Ukraine. The state's attention to this sector, the creation of favourable operating conditions, and the economic security of both enterprises in this industry and the agriculture industry as a whole can positively impact Ukraine's national economic security overall.

In particular, within the context of the indicators used to calculate national economic security, strengthening and providing economic security for the agriculture industry and its individual representatives will positively impact the trade balance, the share of gross fixed capital formation in GDP, exports of goods and services as a percentage of GDP, GDP dynamics, and GDP per capita dynamics.

Therefore, enhancing the economic security of the agriculture industry and its individual representatives will have positive long-term consequences for the economic security of the national economy as a whole. Active development of other industrial sectors in Ukraine (apart from agriculture and the "miltech" sector) is unlikely under the current conditions of functioning Ukrainian enterprises due to the effects of the war, infrastructure destruction, and a lack of investment and human resources.

DISCUSSION

Analysis of current publications concerning the issue of assessing economic security shows that differences of opinion mainly concern such aspects as: choice of approach to assessment; formation of a set of assessment indicators; choice of method for summarizing or generalizing the final assessment results and their presentation format. The aspects remain unchanged. Their content varies depending on the position and scientific beliefs of the researchers. The resolution of existing problems in the field of economic security epistemology is proposed by researchers through different content of the mentioned aspects, which is fully permissible from the perspective of epistemological contextualism of P. Unger (Unger, 1984).

Analysis of the scientific studies results concerning the problem of assessment in economic security studies showed that the sets of indicators for assessment do not differ much in composition. Sometimes differences are observed in the names of indicators. Assessment indicators are mainly statistical by their origin. They are featured in statistical reports, on the official websites of the Ministry of Finance of Ukraine or the National Bank of Ukraine. This fact facilitates obtaining their values greatly, though with some delay. Each researcher considers that the formed set of evaluating indicators describes the state of the researched type of security most fully and from various angles. The researcher believes in such a case that the chosen indicators are highly informative and transparent. However, sets of evaluative indicators differ in their quantity. Sometimes sets of evaluative indicators are vast and extensive. Such vast sets of indicators are aimed at forming a sustainable impression concerning the thoroughness and detail of the description of the economic security evaluated type, on the one hand. On the one hand, vast sets of indicators require long-term calculations and processing of an excessively wide range of data. As a consequence, the result of such calculations may not always be accurate.

Researchers are significantly different in their approaches to assessment and methods of summarizing final assessment results and presenting them. For example, there are component approaches, index assessment indicators, and linear profiles for visual representation of assessment results suggested in the article. Other researchers applied different approaches (constructive, functional ones) and different ways for visually demonstrating evaluation results (most often this evaluation result is an integral indicator) in accordance with the same principles of epistemological contextualism by P. Unger. It should be understood that even the considered component approach to assess national economic security can be used not only with other indicators for assessment but also with different components of its provision.

Thus, reliance on the concepts of epistemological contextualism of P. Unger's epistemology in economic security studies legitimizes the existence of the multiple approaches to assessment, sets of assessing indicators, ways of generalizing final evaluation results, and forms of their presentation, etc. However, the elaboration of these aspects with different content by researchers should be based on their serious and comprehensive justification.

CONCLUSIONS

Thus, the concept of national economic security was examined, and its relationship with the concept of state economic security was demonstrated. An approach to assessing national economic security was proposed. The foundation of this approach is the use of index-based and indicator-based methods, which, unlike the traditionally used functional method for assessing state economic security, offer a range of advantages. The choice of specific indicators used for assessing national economic security was based on the reviewed sources of providing national economic security: economic independence of the national economy, integration of the national economy into the global economic system, the financial strength reserve of the national economy, and sustainable development of the national economy. A generalized conclusion regarding such security is proposed to be formed based on the set of indicators from these sources of providing national economic security. For each of the mentioned sources, a set of quantitative indicators is proposed, and the selection of each indicator is justified. For interpretation in the context of national economic security, it is suggested to consider not merely the quantitative values of these indicators, but their indices, which allows taking into account the dynamic aspect of changes over time.

To assess Ukraine's national economic security, we used data 2019–2021 with the calculation of indices for the proposed indicators. To form a generalized assessment based on the calculated indices for each of the proposed indicators, we built linear profiles, visually reflecting changes in Ukraine's national economic security during the analyzed period and made conclusions based on used linear profiles.

There are some directions for further research according to the obtained results in the article. Such directions can be divided into three steps. First, using the suggested methodology for providing the ability to compare the results of research, an assessment of the national economic security of Ukraine should be provided for the war and postwar period when the necessary primary data are available. Second, it will be useful to compare the state of Ukraine's national economic security in the pre-war, war and postwar period in total and by some sources of national economic security and used indexes. Third, after identifying changes in their structure it will be appropriate to make concepts and suggestions to strengthen some sources of national economic security for Ukraine.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ОЦІНЮВАННЯ НАЦІОНАЛЬНОЇ ЕКОНОМІЧНОЇ БЕЗПЕКИ УКРАЇНИ

Мета дослідження полягає в побудові оцінювальної моделі для оцінювання національної економічної безпеки та оцінці національної економічної безпеки України протягом 2019–2021 рр.

Розглянуто поняття національної економічної безпеки та показано його співвідношення з поняттям економічної безпеки держави. Розглянуто наявні підходи до оцінювання економічної безпеки держави. Показано та обґрунтовано використання епістемологічного контекстуалізму за П. Унгером для оцінювання національної економічної безпеки. Обґрунтовано використання з цією метою індексного та індикаторного методів. Обґрунтовано джерела забезпечення національної економічної безпеки, які послугували основою для вибору показників із метою оцінювання національної економічної безпеки. Сформульовано вимоги щодо показників із метою оцінювання національної економічної безпеки. За кожним із виділених джерел забезпечення національної економічної безпеки запропоновано сукупність індикаторів, і для кожного з таких індикаторів обґрунтовано його вибір. Обґрунтовано період оцінювання з метою відсікання деформуючого впливу воєнних дій проти України на результати оцінювання. Обґрунтовано характер якісної інтерпретації значень кожного з вибраних показників. На підставі розрахованих значень запропонованих показників за 2019–2021 рр. побудовано наочні лінійні профілі національної економічної безпеки України.

Ключові слова: національна економічна безпека, оцінювання, індексний метод, індикаторний метод, джерела забезпечення національної економічної безпеки, показник, лінійний профіль

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