

STATISTICAL METHODS FOR DIAGNOSING THE LEVEL OF UKRAINE'S ECONOMIC SECURITY IN THE CONTEXT OF FORMULATING STRATEGIC PRIORITIES OF PUBLIC ADMINISTRATION POLICY

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Abstract. The full-scale armed aggression of the Russian Federation against Ukraine has significantly weakened the mechanisms for protecting the state's sovereignty and national interests, resulting in a sharp decline in the country's economic security. This situation necessitates the development of a comprehensive set of effective measures aimed at strengthening Ukraine's defense capabilities, ensuring macroeconomic and socio-political stability, and promoting socio-economic development. The purpose of this article is to explore the potential application of modern statistical methods for diagnosing the level of Ukraine's economic security and to substantiate strategic priorities for its enhancement under martial law conditions. The methodological framework of the research includes general scientific and specialized methods of economic analysis, such as systems analysis, statistical analysis, synthesis, abstraction, classification, comparison, factor analysis, correlation-regression analysis, generalization, systematization, and graphical methods. The article defines the essence of Ukraine's economic security and analyzes the key risks and threats to its provision. It outlines optimal statistical methods for diagnosing the country's economic security under the special legal regime of martial law. Factor analysis and correlation-regression analysis are proposed as the most suitable statistical tools for this purpose. The study identifies current challenges in assessing the state of Ukraine's economic security and emphasizes the need to improve evaluation mechanisms. Analytical research is conducted on the dynamics of Ukraine's economic security during the period 2022 – 2024, revealing the most significant threats, namely: (1) intensifying inflationary pressures and an inflation rate increase to 126.6%; (2) a sharp decline in GDP to – 25.5%; (3) a rise in the state budget deficit to – 20.39%; and (4) a deterioration in the foreign trade balance to – 20.90%. The article identifies key strategic priorities of public policy aimed at ensuring Ukraine's economic security, including: (1) diversification of foreign economic activity and stimulation of export growth; (2) implementation of tax incentives, guarantees, and preferences to boost domestic investment; (3) enhancement of energy autonomy through renewable energy sources; and (4) development of a permanent monitoring system for economic security based on statistical modeling.

Keywords: statistics, statistical methods, national security, economic security, diagnostic methods, economic security indicators, strategy for ensuring economic security, risks, threats, public administration policy.

JEL Classification: C38; H56; O11; P44

Formulas: 1; **fig.:** 5; **table:** 0; **bibl.:** 24

Introduction. The devastating impact of the Russian-Ukrainian war on Ukraine's economy necessitates continuous monitoring of destabilizing factors, risks, and threats, as well as their influence on the functioning of the economic, social, and political spheres. In this context, the protection of national interests has shifted to the forefront and now represents a top priority in the implementation of state policy. Ensuring an adequate level of Ukraine's economic security under such conditions is an extremely complex task that requires the development of a comprehensive set of targeted measures, considering modern geopolitical realities and the specific circumstances of functioning in the context of full-scale military aggression.

The exacerbation of economic security challenges under martial law has a detrimental effect on Ukraine's financial system, further destabilizing it, amplifying threats to critical infrastructure, diminishing investment attractiveness, and reducing the country's resource potential. It is evident that addressing these issues demands effective instruments for ensuring economic security, improvement of existing evaluation mechanisms, and the development of a long-term system of strategic reinforcement.

A particularly critical issue today is the diagnosis of Ukraine's economic security level, as statistical assessments of relevant indicators and metrics are carried out inconsistently and often exclude data from regions temporarily occupied by the aggressor state or affected by active combat. Within this context, the application of statistical methods for evaluating economic security emerges as both well-justified and highly appropriate. These methods enable the analysis of the current state of the economy, identification of change dynamics, and detection of structural patterns. Moreover, statistical tools are valuable for shaping adaptive strategies to counter threats to Ukraine's economic security and for identifying critical thresholds and indicator limits.

This underscores the urgency and significance of researching statistical methods for diagnosing the level of economic security in Ukraine, particularly in the context of forming strategic priorities for national security under martial law. The subject demands further in-depth study and the development of robust analytical approaches.

Literature Review. The issue of ensuring Ukraine's economic security under wartime conditions is widely discussed in academic literature, primarily from the perspectives of defining its essence, calculating its level, and identifying effective mechanisms for its protection both now and in the future. Particular emphasis is placed on the analysis and monitoring of actual and potential threats to economic security using a system of quantitative and qualitative indicators. However, the use of statistical methods in diagnosing the level of Ukraine's economic security remains underexplored in this context.

Substantial contributions in the field have been made by experts at the National Institute for Strategic Studies, including Y. Bazyluk, R. Vlasenko, and O. Vlasiuk (Bazyluk et al., 2025), who define Ukraine's economic security as the capacity of the financial and socio-economic systems to resist internal and external threats and risks. N. Denysenko (Denysenko, 2024) interprets economic security as a component of national security, emphasizing its role in ensuring protection, resource availability, and

favorable conditions at a specific point in time through deliberate and targeted activities by economic agents.

Researchers such as O. Podra, M. Vinichuk, O. Almarashdi, N. Halaiko, and O. Stolyarenko (Podra et al., 2021), as well as N. Mykhalytska, M. Veresklya, and M. Vinichuk (Mykhalytska et al., 2019), argue that Ukraine's economic security should be understood as a state in which the national economy is protected from internal and external threats, sustainable development is ensured, societal needs are met, and conditions are created to prevent and counteract destabilizing factors.

On the other hand, scholars such as I. Kîrdei (Kîrdei, 2019) and A. Behm (Behm, 2017) emphasize the complexity of ensuring economic security in the face of globalization and geopolitical challenges, which introduce new vulnerabilities and threats to the financial, socio-political, and social systems. These scholars highlight the unpredictable nature of globalization and geopolitical shifts, which blur national borders, expand international financial systems, and increase the involvement of global actors in addressing localized security concerns.

M. Toft and A. Duursma (Toft & Duursma, 2018) share a similar perspective, asserting that a state's economic security significantly declines amid escalating risks and threats, and that its reinforcement depends heavily on national policy responses to destabilizing influences. According to them, state security policy plays a dominant role in the overall system of economic security, and its effectiveness reflects the country's stability and economic growth. Other studies (Kopytko et al., 2022) further note that economic security correlates directly with financial stability within the country.

In their works, N. Nosan (Nosan, 2019) and V. Khaustova and N. Trushkina (Khaustova & Trushkina, 2025) address the assessment of Ukraine's economic security, pointing out that the current methodology for calculating economic security—defined by the official *Methodological Recommendations for Calculating the Level of Economic Security of Ukraine* (2013)—is flawed and in need of revision. These researchers propose using international indices and ratings as part of the diagnostic process. While this approach has merit, we argue that the objectivity of such assessments is questionable due to the challenges of data collection in wartime conditions, especially in occupied territories, which renders accurate calculation of index-based indicators nearly impossible.

Instead, we advocate for the broader use of statistical instruments in assessing economic security. These tools allow for more reliable indicator calculations, the incorporation of error margins, and dynamic trend analysis. Furthermore, statistical methods are capable of generating forecasts and scenario-based development models for both the short and long term. Our previous research (Kopytko et al., 2022; Vinichuk, 2024; Kopytko & Vinichuk, 2025) has confirmed the validity of applying economic-statistical methods to diagnose economic security levels and to evaluate the influence of risks and threats over time.

G. Iefimova, A. Labartkava, and O. Pashchenko (Iefimova et al., 2020) argue that economic security diagnostics should be conducted at the regional level to account for local development features and to streamline the formulation of region-specific security enhancement strategies. This viewpoint is supported by O. Parshyna, N.

Nebaba, M. Korneiev, O. Stakhiv, and S. Vesnin (Parshyna et al., 2025), who propose strategic priorities such as the rapid reconstruction of damaged infrastructure, the attraction of international aid and investment, the intensification of innovation and technological development, reforms in education and workforce retraining, and the provision of comprehensive support for regional development. Such initiatives would not only accelerate sustainable growth and recovery but also restore national potential and strengthen the economic defense of Ukraine's national interests.

In summary, the issue of diagnosing Ukraine's economic security is especially relevant today, having been significantly exacerbated by war, geopolitical shifts, and globalization. As a result, existing national-level assessment mechanisms are ineffective and must be revised. Given the lack of reliable data for accurate calculations, there is an urgent need to apply statistical tools for diagnosing Ukraine's economic security. This area of research requires deeper exploration and further methodological development.

Aims. The purpose of this article is to explore the potential application of modern statistical methods for diagnosing the level of economic security in Ukraine and to substantiate strategic priorities for ensuring it under martial law conditions.

Methodology. The methodological framework of this study includes general scientific and specialized methods of economic analysis. In particular, systems analysis, synthesis, and abstraction are applied to define the essence of Ukraine's economic security, identify its main threats, and outline strategic vectors for its reinforcement. Statistical analysis, classification, comparative analysis, factor analysis, correlation-regression analysis, and graphical methods form the core of the empirical part of the research and are used to visually present the obtained results. Generalization and systematization methods were employed to formulate the research results and derive conclusions.

The informational base of the study comprises statistical reports from the Ministry of Finance of Ukraine, the State Statistics Service of Ukraine, the Ministry of Economy of Ukraine, as well as reports from international and domestic organizations.

Results. Ensuring Ukraine's economic security during wartime is an extremely challenging task, further complicated by the emergence of new threats and dangers. In this context, the achievement of national defense objectives, stimulation of economic growth under uncertainty, and the provision of social progress through balanced social policy within the limits of the state's financial capacity have gained primary importance in the economic security system. It is evident that the strategic vectors for ensuring Ukraine's economic security have shifted significantly during the full-scale invasion and are now highly dependent on the reconfiguration of international economic relations. Accordingly, the threats to Ukraine's economic security have also transformed, driven by the destructive consequences of war: damage to infrastructure and production facilities, shortage of skilled labor, deepening macroeconomic imbalances, and increased instability risks.

Another factor contributing to Ukraine's strategic uncertainty in the security domain is the absence of clear, legally defined mechanisms for assessing and compensating for losses, which are essential for shaping the main directions of

economic recovery. Under such conditions, achieving a sufficient level of economic security cannot guarantee resilience to external and internal threats, nor the capacity for self-sustainability and long-term development.

During wartime, assessing Ukraine's economic security becomes critically important, as tracking indicator dynamics enables timely responses to emerging threats and facilitates the development of effective policy solutions for their prevention and mitigation. However, Ukraine currently faces significant challenges in evaluating the level of economic security, largely due to limited access to data required for accurate calculations. As a result, there is a clear need for alternative methods of estimating key economic security parameters.

Theoretical research on this issue indicates that statistical methods are among the most effective tools for analyzing trends in Ukraine's economic security under present-day conditions. Therefore, this study aims to explore the application of modern statistical approaches for diagnosing the level of economic security in Ukraine and substantiating strategic priorities for its safeguarding amid martial law.

The analysis of the main trends and dynamics in Ukraine's economic security between 2017 and 2024 (Figure 1) reveals a significant decline in the country's security level over the analyzed period. Notably, the composite index of economic security reached a critically low level during the war years of 2022–2024, decreasing from 47% in the pre-war year of 2021 to just 35.2% in 2024. This indicates serious deficiencies in Ukraine's current mechanisms for protecting national interests in the economic domain.

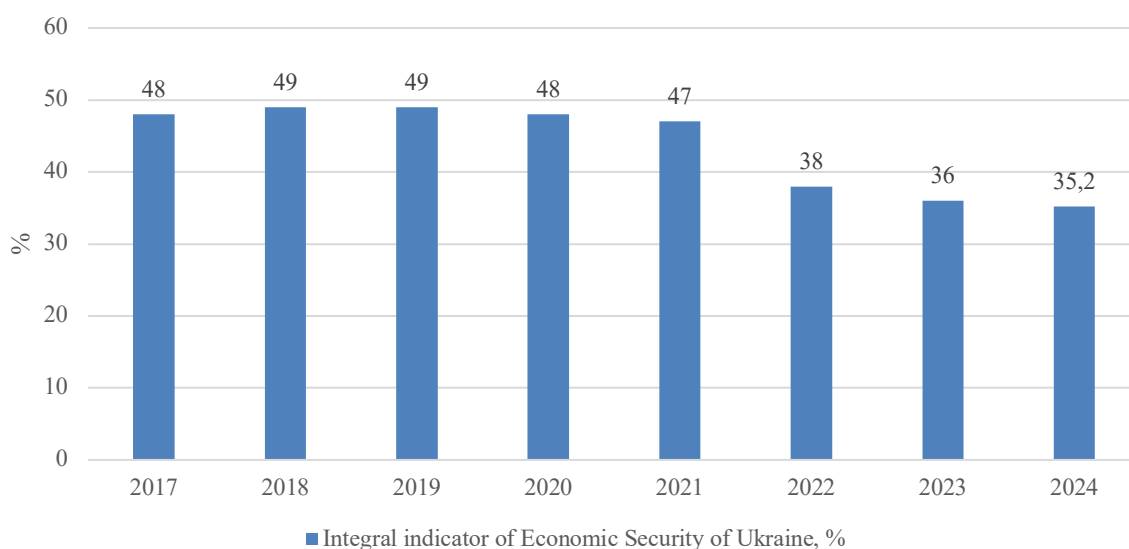


Figure 1. Status and Dynamics of Changes in Ukraine's Economic Security Level, 2017–2024, %

Calculated based on: Ministry of Economy of Ukraine's response to the request dated 27.09.2021 regarding the integral index of Ukraine's economic security, 2021; Ministry of Economy of Ukraine's response to the request dated 28.11.2024 regarding the integral index of Ukraine's economic security, 2024; Ukraine's Economic Security Index, 2024; Strategic Planning and Macroeconomic Forecasting, 2025.

Experts from the National Institute for Strategic Studies of Ukraine have identified the most significant threats to the country's economic security under wartime

conditions. These include rising inflation, a sharp decline in GDP, increased public budget deficit, and a negative trade balance. These factors have been the primary contributors to the decline in the integral economic security index during the war period.

A thorough analysis of each of these threats enables the assessment of their respective impacts on Ukraine's economic security. In particular, the study of the Consumer Price Index (CPI) dynamics between 2017 and 2024 (Figure 2) supports this conclusion. The data confirm that Ukraine experienced a critical spike in inflation in 2022, with the CPI reaching 126.6%.

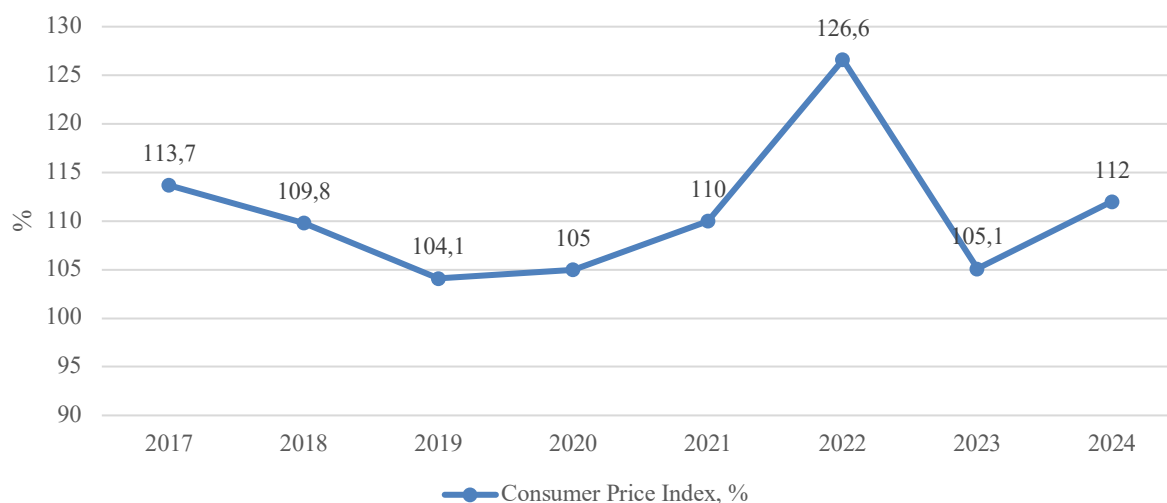


Figure 2. Status and Dynamics of the Consumer Price Index in Ukraine, 2017–2024, %

Calculated based on: Inflation Index in Ukraine, 2017–2024.

The sharp rise in inflation poses a significant threat to Ukraine's economic security. It leads to a decline in the population's purchasing power, resulting in the depreciation of real incomes, increased social tensions, and a lower standard of living. Furthermore, intensified inflationary pressures contribute to the depreciation of the national currency, encourage dollarization of the economy, and undermine the effectiveness of monetary policy. Amid these challenges, the country also faces worsening conditions for investment attractiveness and capital outflows.

Closely linked to rising inflation is the decline in Ukraine's gross domestic product (GDP), which has primarily occurred due to war-related factors — particularly the widespread destruction of industrial capacities. This has significantly reduced the level of economic security through falling budget revenues and diminished investment activity, as well as the contraction of business operations. The analyzed data on the state and dynamics of Ukraine's GDP in 2017–2024 (Figure 3) confirm serious challenges in financing critical sectors such as security and defense, education, and healthcare. Moreover, under these conditions, the risks of unemployment, rising social instability, and large-scale population migration have sharply increased.

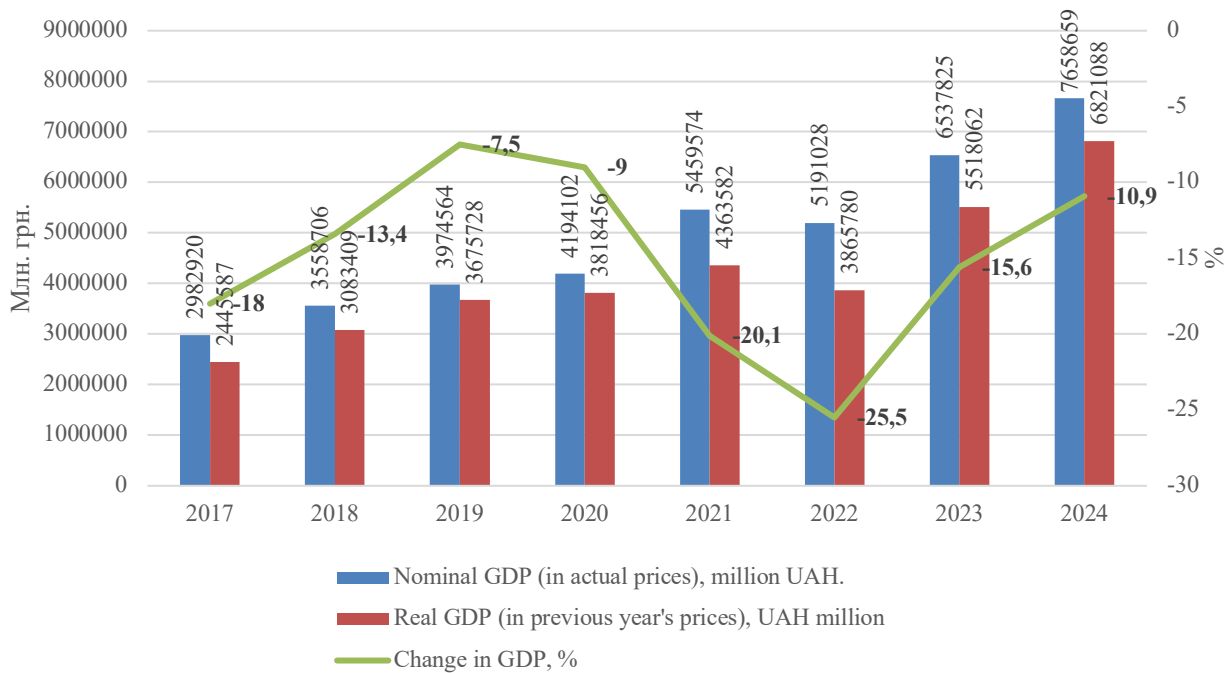


Figure 3. Status and Dynamics of Ukraine's GDP, 2017–2024, %

Calculated based on: Gross Domestic Product (GDP) of Ukraine, 2017–2024.

As the data show, nominal GDP in Ukraine steadily increased from 2017 to 2021. A sharp decline was observed in 2022 due to the full-scale war, followed by a gradual recovery, with GDP reaching UAH 7,658,659 million in 2024. However, the dynamics of real GDP were notably less optimistic. When examining real GDP trends from 2017 to 2024, a decline is recorded in nearly every analyzed year, with a particularly critical drop in 2022 – down to –25.5%.

Growth in Ukraine's GDP is of paramount importance for ensuring the country's economic security. It enhances solvency and macroeconomic stability, strengthens social protection systems, and creates a favorable environment for attracting investment capital.

Another significant threat to Ukraine's economic security is the growing deficit of the state budget. The trends in this indicator will be illustrated in Figure 4.

As the analyzed data shows, throughout the entire analyzed period, Ukraine has experienced a steady and gradual increase in the state budget deficit indicators. In particular, in 2017, the state budget deficit amounted to –1.6% of GDP and gradually increased to –5.18% of GDP in 2020. In 2021, it was possible to reduce the deficit to –3.63% of GDP; however, in 2022, the state budget deficit of Ukraine reached –17.62% of GDP and further deepened catastrophically to –20.39% of GDP in 2023. In 2024, the situation somewhat improved, with the state budget deficit amounting to –17.74% of GDP. Chronic underfunding of Ukraine's state budget threatens to increase public debt and exacerbate the country's dependence on external creditors, which intensifies macroeconomic instability and reduces the security level of the economic sector.

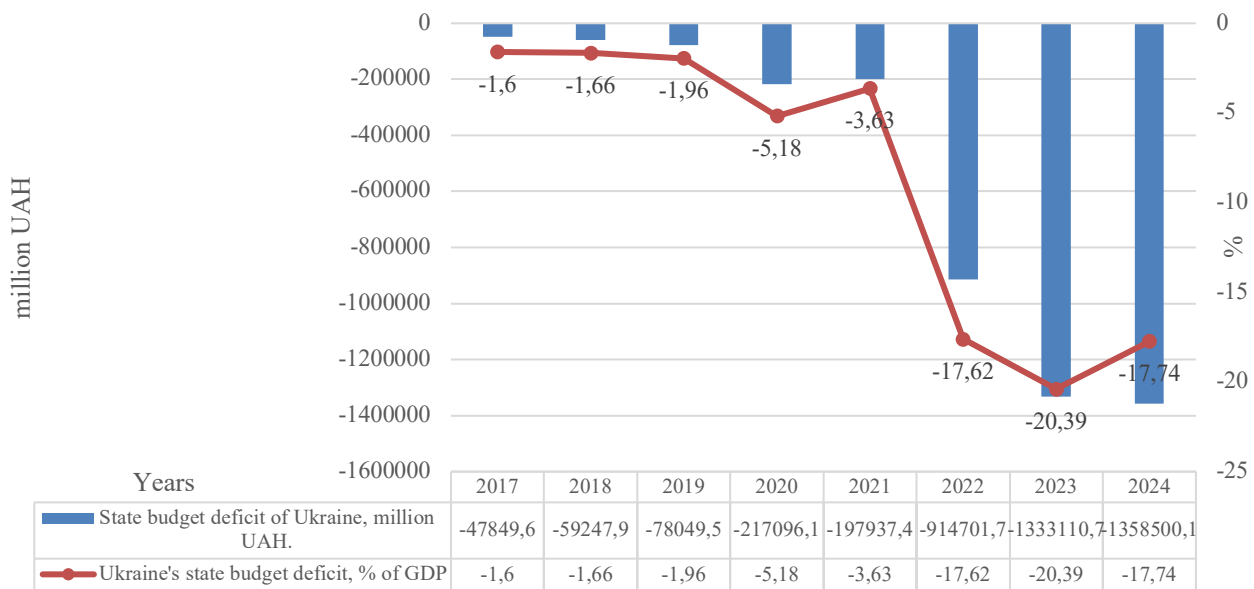


Figure 4. State and Dynamics of the Execution Indicators of the State Budget of Ukraine in 2017–2024, million UAH, %

Calculated based on: (State Budget of Ukraine, 2017–2024)

Another significant threat to Ukraine's economic security is the decline in export volumes, which has worsened due to the blocking of seaports and restricted access to key logistics chains. Research on the state and dynamics of Ukraine's foreign trade balance for 2017–2024 (Figure 5) reveals significant problems related to the dominance of imports over exports. Throughout the analyzed period, Ukraine's foreign trade balance has consistently shown a negative value, indicating instability in foreign economic relations and a breach in the national economy's resilience to global shocks.

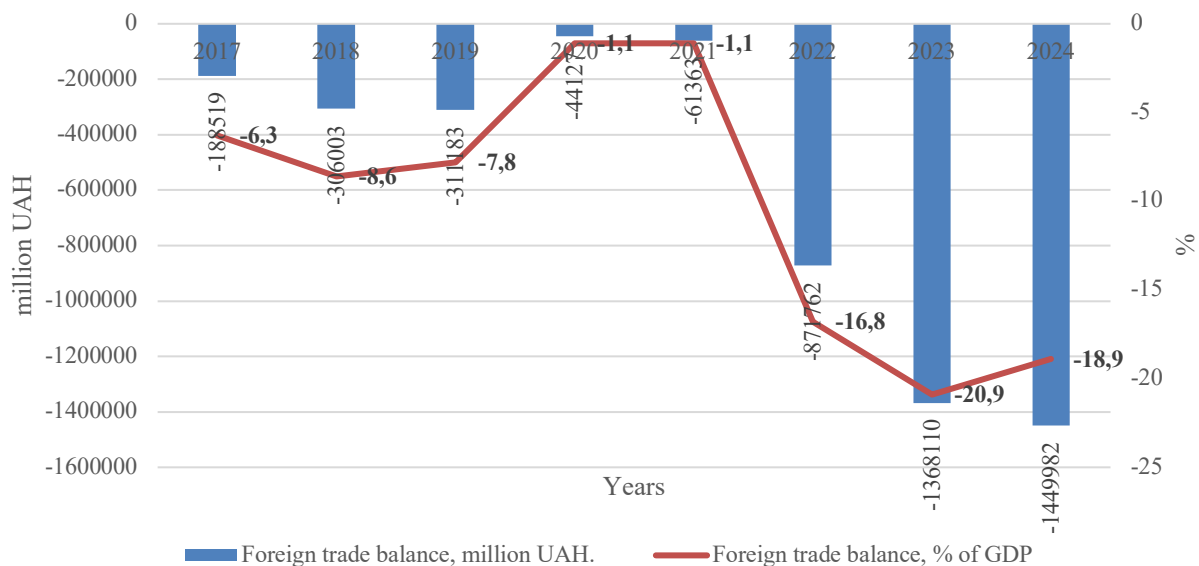


Figure 5. State and Dynamics of the Foreign Trade Balance of Ukraine in 2017–2024, million UAH, %

Calculated based on: (State Budget of Ukraine, 2017–2024)

For a deeper analysis, it is advisable to determine the degree of influence of each analyzed threat on the level of Ukraine's economic security. Necessary calculations should be performed using correlation-regression analysis technology (software Statistica 8.0). When constructing the model, the dependent variable (Y) will be considered as the level of economic security of Ukraine, while the independent (factor) variables influencing this outcome are: the consumer price index (x_1), changes in Ukraine's GDP (x_2), the state budget deficit (x_3), and the foreign trade balance (x_4).

The results of the study are reflected in the model (Equation 1), which confirms the presence of a stochastic dependence between the main parameters. The analysis of the dependent variable (Y – level of economic security of Ukraine) demonstrates its dependence on the factor variables — consumer price index, changes in Ukraine's GDP, state budget deficit, and foreign trade balance.

$$Y = 54,449 - 0,046x_1 - 0,021x_2 + 0,860x_3 + 0,129x_4 \quad (1)$$

where Y – level of economic security of Ukraine; x_1 – consumer price index; x_2 – changes in Ukraine's GDP; x_3 – state budget deficit; x_4 – foreign trade balance.

Thus, based on the results of the conducted correlation-regression analysis, it was established that there is a strong relationship between the analyzed indicators, as evidenced by the correlation coefficient $R = 0.986$. The statistical significance of the model is confirmed by the Fisher's F-test value $F(4,3) = 25.75$. Therefore, it can be asserted that the growth of Ukraine's economic security level depends on the reduction of the consumer price index (regression coefficient -0.046), and on the reduction of the decline rate and changes in GDP (regression coefficient -0.021).

Regarding the impact of the state budget deficit on economic security, a controversial situation is observed. Specifically, the growth of economic security strongly correlates with an increase in the state budget deficit figures. Since these values are negative, their movement toward zero and into positive territory is considered beneficial. Accordingly, the regression coefficient for this factor is $+0.860$. It is important to note that among all factors, the state budget deficit has the most significant influence on the level of economic security. A similar situation is observed for the negative foreign trade balance, which also has a considerable impact on Ukraine's economic security. The foreign trade balance remained negative throughout the analyzed period, thus increasing economic security is possible only by reducing the gap between exports and imports, i.e., by increasing the trade balance (regression coefficient $+0.129$).

In summary, the empirical research results indicate that ensuring an optimal level of economic security for Ukraine depends on stabilizing the national currency market, supporting exports (particularly of agro-industrial products), and stimulating the development of domestic production.

Discussion. Theoretical and applied research on the use of statistical methods to diagnose Ukraine's economic security level in the context of forming strategic priorities during martial law suggests these methods are appropriate and justified for identifying the impact of threats on the country's economic security. They allow

determining the degree of influence and outlining priority directions for ensuring economic security amid prolonged war with the Russian Federation.

At this stage, ensuring Ukraine's economic security requires changes in state policy to strengthen security aspects. The following strategic vectors are highlighted as the most important:

1. Diversification of foreign economic activity and ensuring export growth.
2. Creation of tax incentives, guarantees, and preferences to activate domestic investments.
3. Development of measures to increase energy autonomy through renewable sources.
4. Formation of a continuous monitoring system for Ukraine's economic security based on statistical modeling.

At the scientific level, there is ongoing debate regarding the feasibility and possibilities of diagnosing and assessing economic security using methods alternative to legislatively regulated ones. However, given the introduction of a special legal regime of martial law in Ukraine, significant problems exist regarding access to reporting data and obtaining it from occupied territories, making traditional calculations impossible since 2022. This highlights the necessity and justification for alternative assessment methods.

The correlation-regression method proved effective in determining the influence of factors such as the consumer price index, GDP changes, state budget deficit, and foreign trade balance on Ukraine's economic security level, as well as in forming a comprehensive picture of the dynamics of these threats. Factor analysis elements revealed the destructive impact of war factors on Ukraine's economic system and security level.

Therefore, proposed statistical diagnostic methods for Ukraine's economic security can be used not only as analytical research tools but also adapted into management decision-making systems in the security domain by government bodies, especially when forming strategic priorities for economic recovery during the post-war period.

Conclusions. The study results confirm that statistical methods play a crucial role in diagnosing Ukraine's economic security, particularly relevant during war and strategic uncertainty when timely identification of destabilizing factors, threats, and risks is essential. These methods reveal relationships and mutual influences among indicators and identify vulnerable areas.

The article identified the most significant threats to Ukraine's economic security as:

1. Intensification of inflationary factors with inflation reaching a critical 126.6%.
2. Sharp GDP decline to -25.5%.
3. Significant and persistent growth of the state budget deficit up to -20.39%.
4. Decline of the foreign trade balance to -20.90%.

There is a clear need to form an effective package of countermeasures against these threats and to revise state policy on economic security. Key strategic vectors for overcoming the crisis and ensuring economic security include diversification of foreign

trade and export growth, creation of tax incentives and investment activation, measures to increase energy autonomy through renewables, and establishing a continuous economic security monitoring system based on statistical models.

The study results may serve as practical tools for managing state economic security by government bodies, analytical centers, and the scientific community in developing measures to strengthen Ukraine's economic security during martial law.

Future research should focus on improving economic security assessment methods by involving artificial intelligence, geoinformation analysis, and machine learning technologies.

Author contributions. The authors contributed equally.

Disclosure statement. The authors do not have any conflict of interest.

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