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3 ECONOMIC COMPONENT OF THE SECURITY OF THE EU COUNTRIES AND UKRAINE

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ABSTRACT

The analysis of existing approaches regarding the essence and content of the concept of «economic security» for complex systems was carried out, on the basis of which indicators for assessing the level of economic security were determined: Labour transitions by employment status, Arrears from 2003 onwards, Inability to face unexpected financial expenses (EU countries); The Global Competitiveness Index (EU countries, Ukraine); integral indicator of the level of economic security (Ukraine).

The methodological tools for the study of the economic security of the EU countries and Ukraine have been determined. It is proved that the economic security of a system at any level of the hierarchy is characterized by a significant number of indicators that complicate its analysis and evaluation. In order to fully take into account the impact of all indicators involved in the study, without significant loss of information, it is advisable to use the procedures of multivariate statistical analysis to assess the level of economic security. Using the taxonomy method, an integral indicator of the economic security of the EU countries was calculated, which makes it possible to assert the existence of disproportions between countries regarding the state of economic security. A matrix of transitions of the EU countries between the states of economic security of the pre-Covid and Covid-periods has been constructed. The economic security profiles of the EU countries and Ukraine were built according to the data of 2019, which made it possible to determine the high level (Netherlands and Sweden) and the lowest (Greece). An attempt was made to determine the threat of losses of the EU countries from military operations on the territory of Ukraine.

KEYWORDS

Economic security, indicators of economic security, integral indicator, European Union, taxonomic analysis, Global Competitiveness Index, threats.

3.1 ECONOMIC COMPONENT OF SECURITY AND INDICATORS OF ITS DETERMINATION

Features of the modern development of the national economy, volatility, dynamism and multidimensionality of the economic environment determine the growing relevance of the issue of national economic security. Economic security is an important component of national security, its foundation and material basis.

The views on the essence of economic security of foreign and domestic scientists are ambiguous. Yes, if Buzan, B. understands economic security as such a state of the economy, when the economic well-being of the participants in the relevant social relations, the stability of the domestic market of a given country, although it depends on the action of external factors, the negative impact of the latter is neutralized by the reserves of the enterprise, which allows it to be preserved stability [1], then Morgenthan, H. J. – such a state of the economy in which the state, on the one hand, guarantees individuals certain, including economic, security, and on the other hand, is a source of threats to them [2], Maul, H. W. – the absence of threats to the economy emanating from uncontrolled political processes [3]. An important contribution to the definition of the term «economic security» was made by US scientists Olvey, L. D. Golden, J. R., and Kelly, R. C., for the first time in 1984 gave an interpretation of this concept in the book «The Economics of State Security» [4].

The study of the understanding of economic security in terms of the ability to withstand destabilizing factors of various types is carried out in the context of the following areas: «catastrophe theory»; «risk theory»; «conflict theory» [5] (**Fig. 3.1**).

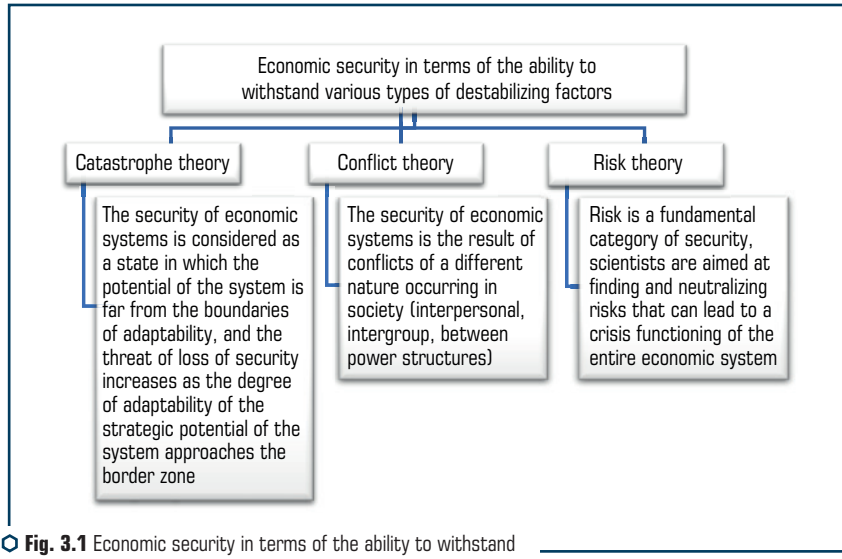

Fig. 3.1 Economic security in terms of the ability to withstand various types of destabilizing factors

According to the provisions of the system approach, the state of the system is determined by a variety of indicators (indicators). But due to the ambiguity of the definition of the content of the economic security of economic systems of even one level, the definition and unification of a group of indicators is problematic. There are attempts at the level of each country to approve certain recommendations on the composition of indicators and the methodological basis for determining

the integral indicator of economic security, which complicates the process of comparative analysis between different subjects. There are many different scientific approaches to the formation of a list of indicators for determining economic security and methodological tools for its research, which differ from each other depending on the author's presentation of the content of economic security and possession of the relevant research tools.

The depth and content of the study of economic security at the country level also depends on the type of country (**Table 3.1**).

● **Table 3.1** Comparative profile of the economic component of the national security strategies of developed and developing countries [6]

Criteria	Developed countries	Developing countries
Basic normative and program-strategic document regulating national security		
National Security Law	Canada, Norway	China, Mexico, Ukraine
National Security Strategy	USA, UK, Poland, Japan, Australia	Brazil, Ukraine, Singapore, Egypt, UAE
Other documents in the absence of law and strategy (doctrines, white papers, etc.)	Switzerland, Germany, France, Italy, Israel	India
The degree of consideration of the economic component in the program and strategic documents regulating national security		
Taken into account at the level of determining national economic interests and recognizing economic security as an integral component of national security	Canada, UK, Switzerland, Norway, Germany, France, Italy, Poland, Australia, Israel	China, Singapore, Ukraine, russia, UAE, Brazil, Mexico, India
A separate economic security strategy has been developed or is planned to be developed	USA, Japan	
Strategic goal of managing economic security		
Emphasis on the internal component	Poland	Mexico, Egypt
Balanced provision of internal and external economic security	Canada, Switzerland, Norway, Germany, France, Japan, Australia, Israel	Ukraine, India, Singapore, UAE
Achieving the status of a regional leader or spreading regional influence	Italy	China, Brazil
Achieving global leadership status or spreading global influence	USA, UK	
The main threats to economic security according to the program and strategic documents		
Predominantly endogenous threats	Italy	Egypt
Predominantly exogenous threats	USA, Canada, UK, Switzerland, Norway, Germany, France, Poland, Japan, Australia, Israel	China, Singapore, Ukraine, UAE, Brazil, Mexico, India

A comparative description of approaches to ensuring economic security in European countries [7] indicates that countries have their own idea of economic security and methods for ensuring it, aimed at achieving national, public interests, or at the sustainability of economic development, or at the independence of the national economy from the external market. The author [8] rightly noted that the common characteristic and basis of the presented systems of economic security in different countries is the legal framework for the regulation of domestic and foreign economic operations, including the participation of foreign capital in the national economy, as well as institutional support for the protection of national economic interests. in the context of international integration. Protection of national interests in the aspect of ensuring the economic security of the country is especially relevant in the context of active European integration processes [9].

In 2013, a new version of the Guidelines for calculating the level of economic security of Ukraine was approved in Ukraine, in which the following components of economic security are defined: production, demographic, energy, foreign economic, investment and innovation, macroeconomic, food, social, financial security [10]. The proposed methodological recommendations involve the calculation of an integral indicator of the level of economic security.

We agree with the team of scientists [11], who among the main shortcomings of the proposed approach, scientists distinguish: a significant correlation of indicators, which is unacceptable when using additive convolution; significant discrepancies in the weights of the indicators used; the proposed approach to determining the integral indicator (weighted average additive convolution) cannot reflect the possible non-linear nature of the processes affecting economic security; implicit logic for selecting characteristics and grouping them into categories [11]. The results of the analysis made it possible [11] to testify to the existence of a close relationship between the indicators of economic security and sustainable development and suggest using the concepts and approaches adopted in the theory of sustainable development when assessing economic security.

The same opinion is shared by Gapeeva, O. who takes into account the main indicators of achieving the global goals of sustainable development when calculating the integral index of countries' security [6]. The scientist [6] distinguishes between the economic, social and environmental components of the country's security, while for the economic component 24 indicators are defined in blocks: macroeconomic, foreign trade, investment and innovation, financial.

Among representatives of the scientific community, there is a statement that the main indicator characterizing the level of economic security, subject to its increase, is the index of economic competitiveness (Global Competitiveness Index), which really allows you to avoid the previously mentioned uncertainty in the understanding of the category «economic security» and conduct a comparative analysis of different economic systems.

The Global Competitiveness Index 4.0 assesses the microeconomic and macroeconomic foundations of national competitiveness, which is defined as the set of institutions, policies, and factors that determine the level of productivity of a country [12].

In the scientific work [13], it is proposed to use international indices and ratings that characterize the country's security in the economic, political, social and spiritual fields as unified indicators

of the country's economic security: The Global Competitiveness Index; Index of Economic Freedom; The Global Enabling Trade Index; The Sustainable Society Index; KOF Index of Globalization; Human Development Index; World Happiness; Doing Business; The Worldwide Governance Indicators; The Democracy Index; Corruption Perceptions Index, etc. The disadvantage of this approach is the presence of «similar» indicators (calculated from the same initial data), in order to prevent such multicollinearity, the team of authors [13] carried out a correlation analysis of the selected indicators: only those indicators were selected, the correlation coefficient between which does not exceed 0.7, because correlation coefficient greater than 0.7, the relationship between the indicators on the Chaddock scale can be assessed as high [13].

According to the information published on the website European Statistics (Eurostat) [14], it can be concluded that economic security is assessed precisely from the point of view of ensuring the quality of life of the population of the EU countries. In the section «Economic Security» there are 3 indicators:

– labour transitions by employment status (Wealth);

– arrears (mortgage or rent, utility bills or hire purchase) from 2003 onwards (Debt);

– inability to face unexpected financial expenses (Income Security).

So, the practical part of the presented study of the country's economic security will be based on the approaches discussed above: Labor transitions by employment status, Arrears from 2003 onwards, Inability to face unexpected financial expenses (EU countries); The Global Competitiveness Index (EU countries, Ukraine); integral indicator of the level of economic security (Ukraine).

3.2 METHODOLOGICAL TOOLS FOR THE STUDY OF ECONOMIC SECURITY

An analysis of theoretical sources of approaches to assessing the level of economic security of the national economy led to the conclusion that, in general, models for assessing the level of economic security have additive or multiplicative forms, and qualitative and quantitative methods are used to assess the economic security of systems at different levels of the hierarchy [5]. However, despite the fact that qualitative methods are widely used to analyze economic security, their application will bring the greatest effect only in combination with quantitative methods.

To assess the level of economic security of economic systems of different levels of the hierarchy, the following approaches are mainly used:

1. Formation of an integral indicator of the level of economic security and assessment.

2. Estimation of economic growth rates and dynamics of their change.

3. Methods of peer review, which serve to describe the quantitative and qualitative features of the studied actions.

4. Monitoring of the main socio-economic indicators and their comparison with the limit values.

5. Formation of generalizing characteristics.

6. Study of the impact of threats.

As noted above, the economic security of a system at any level of the hierarchy is characterized by a significant number of indicators that complicate its analysis and assessment. In order to fully take into account the impact of all indicators involved in the study, without significant loss of information, it is advisable to use the procedures of multivariate statistical analysis to assess the level of economic security.

At the stage of formation of an integral indicator of economic security, we propose to apply the taxonomy method, which has positively characterized itself in previous studies [15]. The main purpose of using the taxonomy method is to build a generalized assessment of a complex object or process. The taxonomic indicator is calculated according to the classical taxonomic analysis algorithm, which contains the following steps:

– formation of a matrix of observations;
– standardization of the values of the elements of the matrix of observations;
– identification of the reference vector;
– determination of the distance between individual observations and the reference vector;
– calculation of the taxonomic coefficient of development.

The taxonomy method can be started from the stage of determining the reference vector; for stimulants, the maximum value of the standardized indicator; for destimulators – the minimum value.

The distance between individual observations and the reference vector (C_{i0}) is calculated by the formula:

$$C_{i0} = \sqrt{\sum_{i=1}^{m} \left(Z_{ij} - Z_{0j}\right)^2}. \qquad (5.1)$$

The taxonomic coefficient of economic security (K_i) is calculated according to the scheme shown in **Fig. 3.2**.

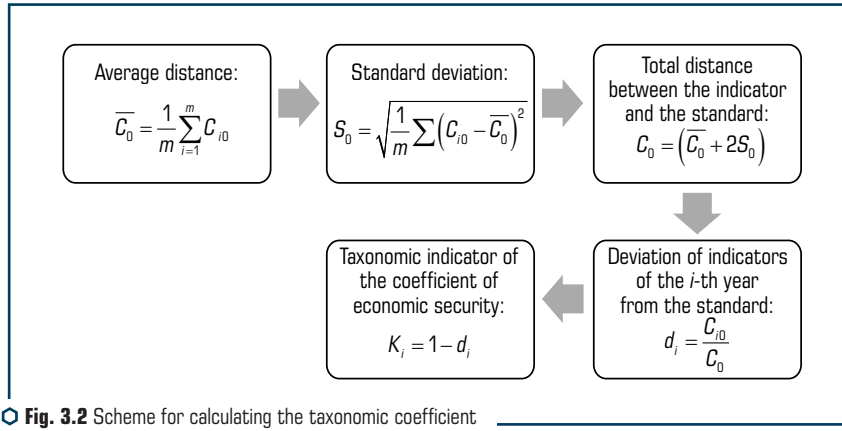

Fig. 3.2 Scheme for calculating the taxonomic coefficient of economic security (K_i)

The integral indicator of economic security for different options ranges from 0 to 1, therefore, such characteristics of the level of economic security are proposed that meet the criteria approved in [10] (**Table 3.2**).

Table 3.2 Characteristics of the economic security of the regions according to the integral indicator I_{tax}

Scale	State
0–0.2	critical level of economic security
0.2–0.4	dangerous level of economic security
0.4–0.6	unsatisfactory level of security
0.6–0.8	satisfactory level of security
0.8–1	optimal level of economic security

The practical application of multidimensional statistical methods for studying the economic security of regions is carried out using the appropriate modules of the STATISTICA 10.0 software product.

The algorithm for studying the economic security of the EU countries and Ukraine consists of the following stages: analysis of the integral indicator of the level of economic security of Ukraine, calculated according to [10]; assessment of the level of economic security of the EU countries according to the taxonomic indicator; analysis of The Global Competitiveness Index of Ukraine and EU countries; construction of profiles of economic security of research objects.

3.3 STUDY OF THE ECONOMIC INDICATORS OF THE SECURITY OF THE EU COUNTRIES AND UKRAINE BEFORE THE WAR

The state of development of the Ukrainian economy over the past decade did not allow ensuring national economic interests. During 2012–2020, the state of economic security was assessed as unsatisfactory, approaching a dangerous level (**Fig. 3.3**).

According to the calculations of the Ministry of Economy of Ukraine, carried out in accordance with the Methodological recommendations for calculating the level of economic security of Ukraine [10], the average value of the level of economic security for this period was 46 percent – an unsatisfactory level of economic security.

The economic security of the 27 EU countries will be assessed according to Labour transitions by employment status (LTES); Arrears (mortgage or rent, utility bills or hire purchase) from 2003 onwards (A); Inability to face unexpected financial expenses (IFUFE) for the period 2012–2020, some of the information is presented in **Table 3.3**.

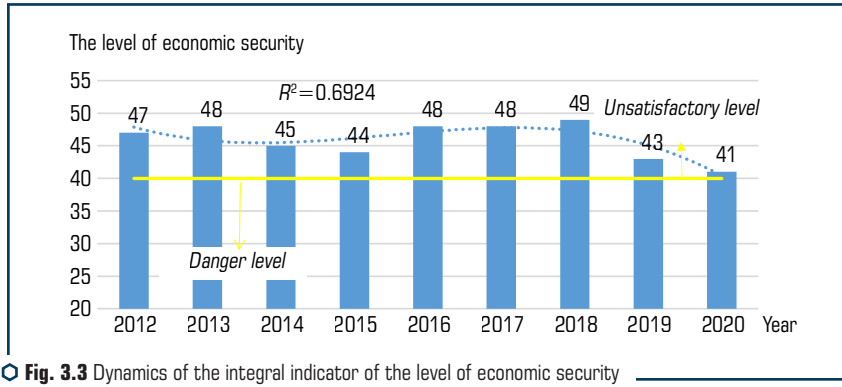

Fig. 3.3 Dynamics of the integral indicator of the level of economic security of Ukraine, calculated for [10], 2012–2020

It should be noted that the presented indicators are destimulators, i.e. the lower the indicator value, the better the score; therefore should strive to reduce.

According to the EU as a whole, the value of Labor transitions by employment status (Transition to unemployment) during 2020 increased by 28 % to 3.2 %. The lowest value was recorded during the period 2018–2020 Romania (0.02 – 2020), the highest value – Spain (7.8 – 2020, which is 39 % higher than the value of the previous period) (**Fig. 3.4**).

The value of Arrears (mortgage or rent, utility bills or hire purchases) from 2003 onwards in the EU as a whole by the end of 2020 is 8.8 %, during the entire study period it significantly exceeds the average value of Greece (A_{max}=36.9 %, which is less than the value of the previous year by 4.5 percentage points); the lowest value is recorded by Czechia (2020 – 3 %). Consequently, there is a significant range between the minimum and maximum values (Δ_{2018}=40 percentage points, Δ_{2019}=38.6 percentage points, Δ_{2020}=33.9 percentage points), which indicates the existence of regional disparities in terms of the state of economic security and the quality of life of the population of the EU countries.

As of the end of 2020, the Inability to face unexpected financial expenses value for the EU as a whole is 32.5 %, which is 2.5 percentage points higher than the value of the previous year. The lowest value of the indicator among the EU countries was recorded in Malta (2020 – 16.3 %, which is 1.2 points more than in 2019); the highest value is observed in the following countries: 2018 – Latvia (55.3 %), 2019 – Croatia (51.7 %), 2020 – Greece (50.7 %). That is, certain improvements in the situation can be witnessed, as evidenced by the decrease in disproportions between the EU countries (Δ_{2018}=41.4 percentage points, Δ_{2019}=36.6 percentage points, Δ_{2020}=34.4 percentage points).

To assess the economic security of the EU countries, taking into account the values of all three indicators using the taxonomy method (**Fig. 3.4**), the taxonomy coefficient was calculated – an integral indicator of the economic security of the EU countries (**Table 3.4**).

Table 3.3 Indicators of economic security of EU countries, 2018–2020

	Labour transitions by employment status			Arrears (mortgage or rent, utility bills or hire purchase) from 2003 onwards			Inability to face unexpected financial expenses		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
European Union – 27 countries	2.5	2.5	3.2	8.9	8.2	8.8	32.2	30.9	32.5
Austria	2.8	3.3	4.2	4.9	4.3	5.3	20.1	18.5	17.6
Belgium	1.4	1.5	2.1	6.1	5.5	5.6	24.5	25.3	23.3
Bulgaria	3.3	2.7	4.0	31.9	29.3	23.6	32.1	36.5	43.5
Croatia	3.7	3.2	5.5	18.6	15.7	14.2	52.9	51.7	48.9
Cyprus	3.7	3.8	4.6	21.6	17.6	14.7	49.5	47.5	44.6
Czech Republic	1.2	1.1	1.2	3.0	2.8	3.0	23.7	21.8	19.6
Denmark	2.7	2.6	3.5	8.7	7.3	7.7	25.2	22.9	22.7
Estonia	2.4	2.3	4.0	8.0	8.5	6.0	34.7	31.4	30.5
Finland	2.6	2.5	2.3	10.7	10.5	10.0	27.2	26.4	25.4
France	3.1	3.3	3.6	9.1	8.4	8.9	31.4	30.6	30.4
Germany	1.0	1.4	1.3	4.6	3.7	5.2	28.1	26.0	37.7
Greece	4.7	4.3	5.3	43.0	41.4	36.9	50.4	47.8	50.7
Hungary	2.0	2.4	2.2	12.8	11.2	11.6	33.3	33.0	35.7
Ireland	1.8	2.7	2.6	11.2	11.9	13.9	37.3	38.0	33.7
Italy	3.0	2.4	3.5	6.0	5.9	6.8	35.1	33.8	32.3
Latvia	4.2	4.2	5.8	13.8	9.9	9.7	55.3	49.8	45.6
Lithuania	3.4	3.3	4.0	10.3	8.2	7.1	48.8	46.8	41.8
Luxembourg	2.3	2.3	2.7	–	–	4.9	19.7	16.7	22.5
Malta	0.3	0.5	1.2	8.1	7.8	7.0	13.9	15.1	16.3
Netherlands	1.5	1.5	1.8	3.8	4.0	3.2	21.5	21.9	19.1
Poland	1.9	1.6	2.5	7.7	7.4	5.5	31.7	29.3	25.7
Portugal	3.3	3.2	6.0	6.6	5.8	5.4	34.7	33.0	30.8
Romania	0.1	0.1	0.2	16.5	15.4	14.8	45.9	44.3	47.3
Slovakia	–	1.1	1.7	9.9	10.2	6.7	31.5	30.0	26.1
Slovenia	2.8	2.2	2.7	13.6	12.2	10.3	33.1	33.0	29.6
Spain	6.2	5.6	7.8	9.4	8.1	13.5	35.9	33.9	35.4
Sweden	1.1	1.8	2.7	4.7	4.8	4.9	20.2	20.5	19.8

Source: compiled by the authors based on data [14]

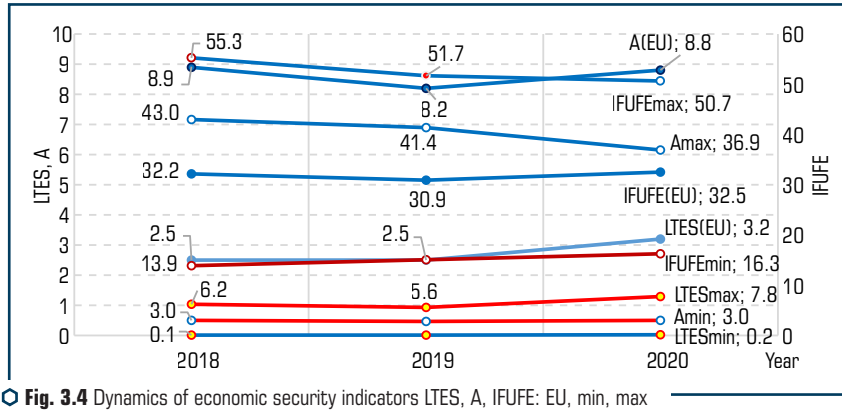

Fig. 3.4 Dynamics of economic security indicators LTES, A, IFUFE: EU, min, max

Table 3.4 Dynamics of the taxonomic indicator of the economic security of the EU countries (calculated according to the indicators LTES, A, IFUFE), 2012–2020

EU countries	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020/2018	2020/2012
1	2	3	4	5	6	7	8	9	10	11	12
Austria	0.94	0.93	0.91	0.92	0.92	0.88	0.85	0.89	0.88	103.7 %	94 %
Belgium	0.90	0.92	0.92	0.88	0.88	0.80	0.77	0.75	0.81	106.1 %	90 %
Bulgaria	0.11	0.12	0.28	0.22	0.12	0.07	0.28	0.21	0.16	58.7 %	151 %
Croatia	0.13	0.15	0.15	0.16	0.15	0.14	0.11	0.10	0.15	134.3 %	116 %
Cyprus	0.34	0.26	0.16	0.13	0.17	0.21	0.15	0.18	0.25	163.9 %	72 %
Czech Republic	0.65	0.66	0.65	0.71	0.78	0.76	0.79	0.84	0.92	115.6 %	141 %
Denmark	0.86	0.88	0.84	0.87	0.91	0.81	0.73	0.78	0.79	108.6 %	91 %
Estonia	0.58	0.63	0.66	0.69	0.76	0.59	0.55	0.60	0.63	116.0 %	108 %
Finland	0.84	0.85	0.84	0.81	0.78	0.70	0.67	0.68	0.72	106.5 %	85 %
France	0.77	0.77	0.76	0.75	0.76	0.70	0.60	0.61	0.62	102.3 %	80 %
Germany	0.79	0.80	0.79	0.81	0.82	0.74	0.70	0.75	0.47	68.0 %	60 %
Greece	0.35	0.20	0.12	0.01	0.00	0.00	0.00	0.00	0.00	–	0 %
Hungary	0.05	0.04	0.00	0.03	0.34	0.61	0.54	0.54	0.48	88.9 %	950 %
Ireland	0.35	0.37	0.35	0.41	0.47	0.46	0.48	0.43	0.50	104.1 %	142 %
Italy	0.62	0.64	0.65	0.60	0.59	0.56	0.54	0.56	0.59	108.5 %	96 %
Latvia	0.08	0.15	0.15	0.24	0.20	0.12	0.09	0.18	0.25	271.3 %	325 %
Lithuania	0.34	0.39	0.41	0.40	0.35	0.32	0.24	0.26	0.36	148.2 %	107 %
Luxembourg	0.92	0.94	0.93	0.93	0.94	0.90	0.77	0.81	0.83	107.7 %	90 %
Malta	0.87	0.87	0.81	0.88	0.88	0.93	0.89	0.88	0.90	100.8 %	104 %

● **Continuation of Table 3.4**

1	2	3	4	5	6	7	8	9	10	11	12
Netherlands	0.97	0.94	0.93	0.93	0.95	0.90	0.84	0.84	0.92	110.2 %	95 %
Poland	0.43	0.48	0.49	0.59	0.64	0.60	0.61	0.65	0.76	124.0 %	176 %
Portugal	0.71	0.60	0.60	0.61	0.63	0.58	0.55	0.58	0.61	111.8 %	86 %
Romania	0.30	0.32	0.37	0.38	0.28	0.24	0.27	0.27	0.19	71.2 %	64 %
Slovakia	0.74	0.69	0.68	0.70	0.66	0.62	0.60	0.62	0.74	124.1 %	100 %
Slovenia	0.51	0.50	0.47	0.51	0.51	0.52	0.53	0.53	0.62	117.0 %	123 %
Spain	0.60	0.61	0.58	0.61	0.61	0.56	0.50	0.53	0.44	87.3 %	72 %
Sweden	0.94	0.95	0.95	0.96	0.96	0.91	0.86	0.86	0.89	102.8 %	94 %
AVERAGE	0.58	0.58	0.57	0.58	0.59	0.56	0.54	0.55	0.57	106.7 %	99 %
Max	0.97	0.95	0.95	0.96	0.96	0.93	0.89	0.89	0.92	103.2 %	95 %
Min	0.05	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	–	0 %

The data in **Table 3.4** indicate the presence of disproportions between countries regarding the state of economic security, which is defined as the difference between the maximum and minimum values. The worst state of economic security among the EU countries at the end of 2020 was recorded in Greece (0 points), deterioration has been observed since 2015 and is characterized as a critical level of economic security (**Fig. 3.5**).

According to 2020 data, in addition to Greece, such countries as Croatia (0.15), Bulgaria (0.16), Romania (0.19) are also characterized by a critical state of economic security. The dangerous level of economic security is defined in the following countries: Cyprus (0.25), Latvia (0.25), Lithuania (0.36), in addition, in 2018 Cyprus and Latvia improved their results. Despite the fact that Lithuania also belonged to this group of economic security in 2018, however, there is a significant improvement in the indicator, which approaches the threshold value of the unsatisfactory state of economic security (0.4).

The group of countries with an unsatisfactory state of economic security includes: Spain (0.44), Hungary (0.48), Ireland (0.50), Italy (0.59); but if Ireland and Italy improved the value of the integral indicator by the end of 2020, then in Spain and Hungary they are deteriorating. According to the results of 2020, Germany joined this group, the integral indicator of which deteriorated significantly (0.47 – 2020, 0.7 – 2018).

In relation to 2018, in 2020 such countries as Slovenia (0.53 – 2018 0.62 – 2020), Estonia (0.55 – 2018, 0.72 – 2020), Portugal (0.55 – 2018, 0.61 – 2020), Slovakia (0.598 – 2018, 0.74 – 2020). In addition, France (0.62), Finland (0.72), Poland (0.76), Denmark (0.79) during 2018–2020 are also characterized by a satisfactory state of economic security with a positive trend towards an increase in the integral indicator.

Consequently, as of the end of 2020, 15 EU countries (56 %) are characterized by an optimal or satisfactory state of economic security, most countries have an integral indicator value above its average (**Fig. 3.5**).

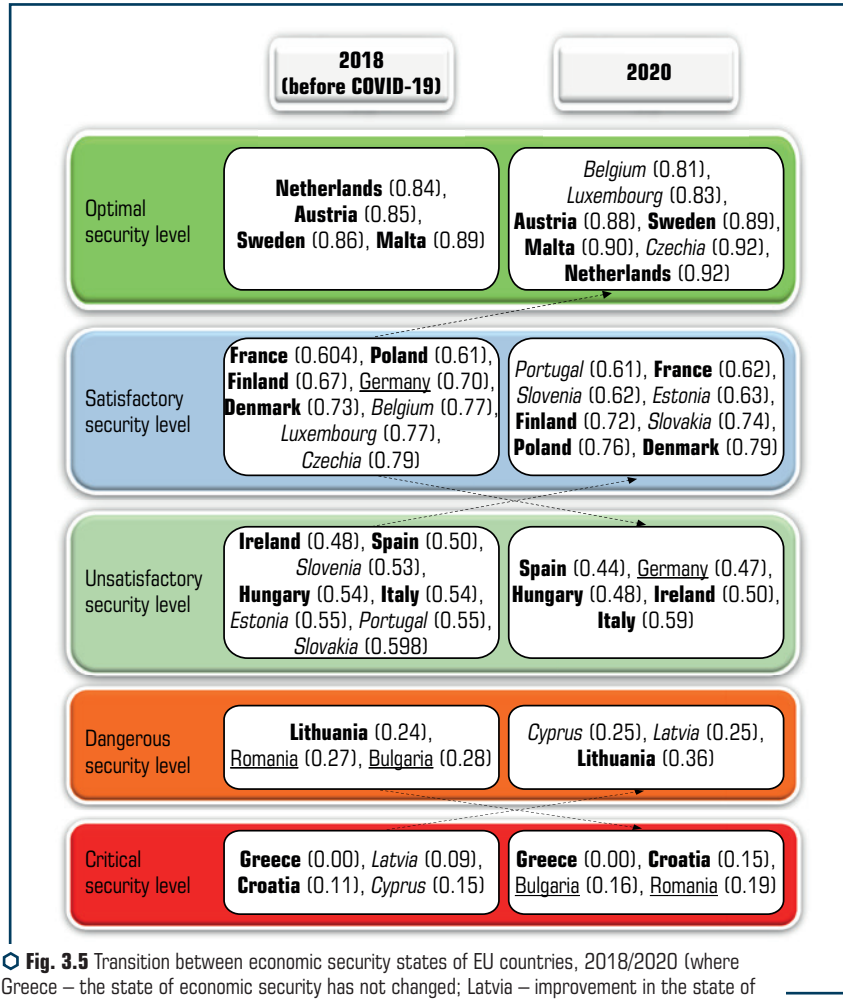

Fig. 3.5 Transition between economic security states of EU countries, 2018/2020 (where Greece – the state of economic security has not changed; Latvia – improvement in the state of economic security, transition to a higher level; Bulgaria – deterioration in the state of economic security, transition to a lower level)

The next stage of the study of economic security, we determined the assessment of the level of economic security of the EU countries and Ukraine in terms of The Global Competitiveness Index (GCI), which will give us the opportunity to compare the EU countries and Ukraine. The dynamics of The Global Competitiveness Index and the rating of the EU countries and Ukraine for 2017–2019 are presented in **Fig. 3.6**.

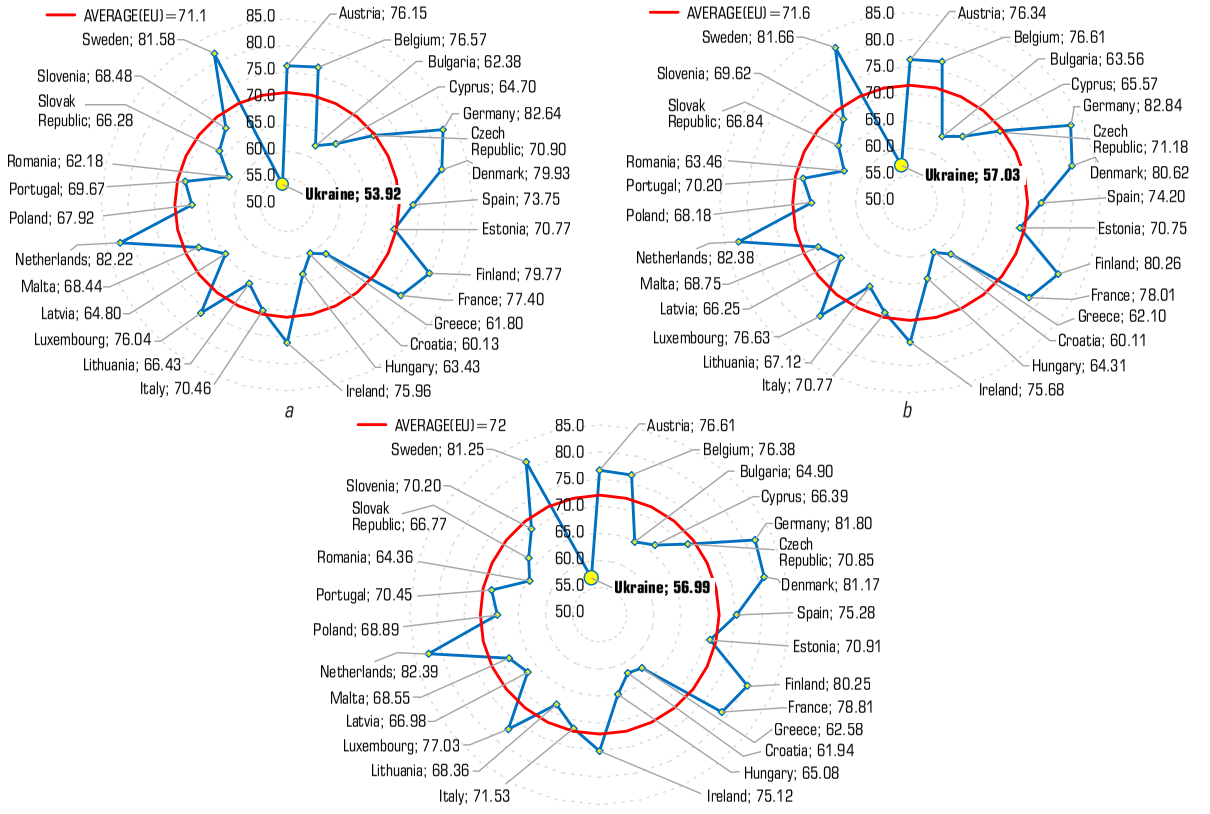

Fig. 3.6 The Global Competitiveness Index of EU countries and Ukraine: *a* – 2017; *b* – 2018; *c* – 2019. *Source: built according to [16]*

Average GCI values according to EU countries for the period 2017–2019 are respectively: 71.1; 71.6; 72. At the end of 2018 and 2019, the lowest GCI value was recorded in Croatia (60.11; 61.94), the highest in the Netherlands (82.93) in 2019 and Germany (82.84) in 2018. According to the results of 2019, 16 EU countries have a GCI value below its average (72): Italy (71.53), Estonia (70.91), Czech Republic (70.85), Portugal (70.45), Slovenia (70.20), Poland (68.89), Malta (68.55), Lithuania (68.35), Latvia (66.98), Slovakia (66.77), Cyprus (66.39), Hungary (65.08), Bulgaria (64.90), Rumania (64.36), Greece (62.58), Croatia (61.94).

The data in **Fig. 3.6** indicate that the level of GCI value of Ukraine for the period 2017–2019 significantly less than its average values according to the data of the EU countries, this is also evidenced by **Fig. 3.7, 3.8**.

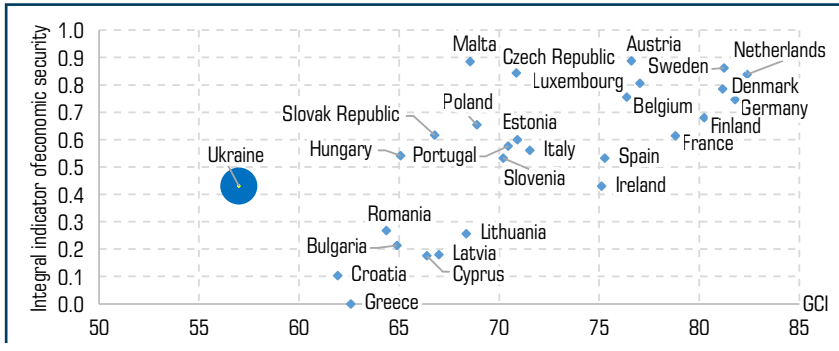

Fig. 3.7 «GCI-Integral indicator of economic security» map

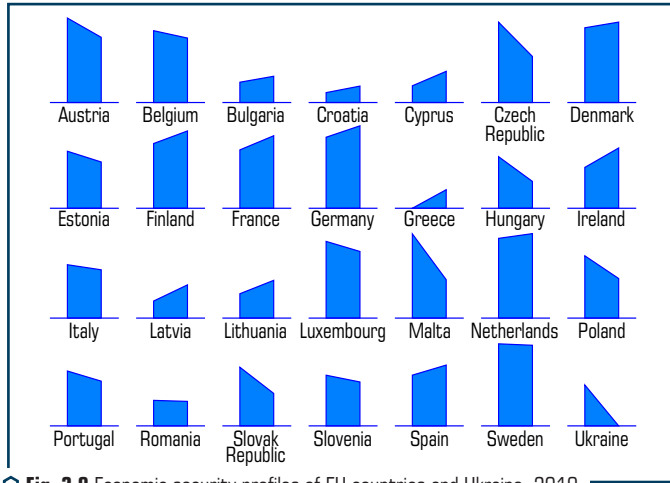

Fig. 3.8 Economic security profiles of EU countries and Ukraine, 2019

On the pictogram of this type, for each country (observation) its own area is depicted, the relative values of the selected variables (Integral indicator, GCI) for each observation are expressed by the heights of the corresponding contour vertices above the level of the profile base line; profiles reflect the levels of economic security in relation to each other for each period. The constructed economic security profiles of the EU countries and Ukraine according to 2019 data allow us to state that the Netherlands and Sweden have the highest level (almost ideal profile configuration); the lowest level is Greece.

3.4 THREATS OF LOSSES OF THE EU COUNTRIES FROM MILITARY OPERATIONS ON THE TERRITORY OF UKRAINE

The EU economy at the beginning of 2022 experienced the simultaneous impact of two groups of global challenges: the need to move to the recovery phase after the peak of the incidence of COVID-19 and the geopolitical consequences of russia's military invasion of the territory of sovereign Ukraine [17]. The sources of the crisis in the form of a social threat to the life of the population (from the first source) and a physical threat to the existence of the people of the country of Central Europe (from the second source) are accompanied by an increase in inflation, an energy and fuel crisis, a shortage of raw materials and food supplied by Ukraine, and as well as the collapse of the financial system of countries with weak economies that have not been restored after the pandemic. The OECD [18] predicted the pace of recovery of the economies of the EU countries to pre-pandemic levels did not materialize, and the forecast of global growth of 4.5 % in 2022 and 3.2 % in 2023 as a result of russia's military aggression in Ukraine already in March 2022 crashed. all these facts are a source of threats to the economic security of the EU countries and the world.

Military operations on the territory of Ukraine will negatively affect, first of all, the economy of the state itself (the OECD experts predict a 30 % drop in GDP in 2022) and the economy of the aggressor country (the OECD experts predict a 30 % drop in GDP in 2022) [19]. Moreover, the consequences of hostilities will not have a local manifestation, but, on the contrary, they will (and already today have) a prolonged negative impact on all economic systems of the countries of Europe and the world, because, despite the fact that Ukraine provides only about 1 % of world GDP (according to the results 2021), it is a key player in the following commodity markets: accounts for about 50 % of global sunflower oil exports; 15 % of world wheat exports; 20 % corn; 15 % barley; mineral fertilizers and 11 % oil [19, 20]. As of April 2022, hostilities covered 10 regions of Ukraine, which accounted for 4 % of sunflower crops, 42 % of corn, 52 % of wheat in 2021 [20]. Disruptions in the supply of plant products such as corn, wheat, and mineral fertilizers from Ukraine could become a catalyst for famine in a number of countries and lead to global food security. Failures in the supply of mineral resources, ferrous and non-ferrous metals threaten a raw material crisis and rising prices for finished products of machine and aircraft building, instrument making, etc.

The EU countries are already feeling the consequences of military aggression on the territory of Ukraine today, and they were primarily reflected in the rise in prices (**Fig. 3.9**). The upward trend in prices for crop products (for wheat (88.43 %) and corn (42.16 %)) is especially threatening, since in the conditions of the disruption of the sowing campaign in the east and in the central part of Ukraine, this may lead in the future to a shortage of traditional EU and the food world. By the end of April 2022, the inflation rate in the EU countries, according to EUROSTAT, was estimated at 7.5 %, and the largest increase in prices was recorded for energy products (an increase of 44.4 %).

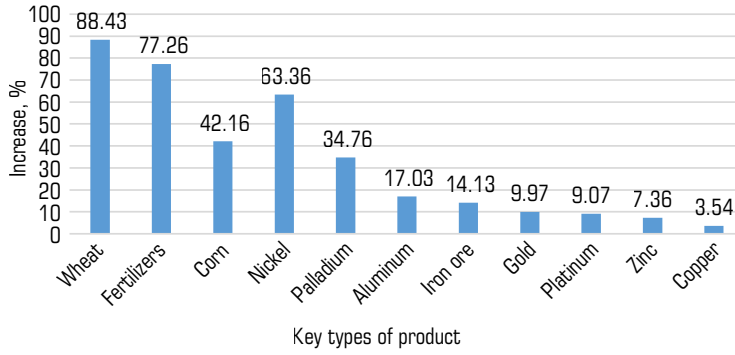

Fig. 3.9 Dynamics of price changes in the EU countries for key types of products and raw materials as a result of military operations on the territory of Ukraine (price increase on February 24 – March 14, 2022) [19]

Since February 24, 2022, the EU has faced one of the biggest emigration crises of World War II (**Fig. 3.10**). Hungary, Moldova, Poland, the Slovak Republic and other countries have become the main centers of forced migration.

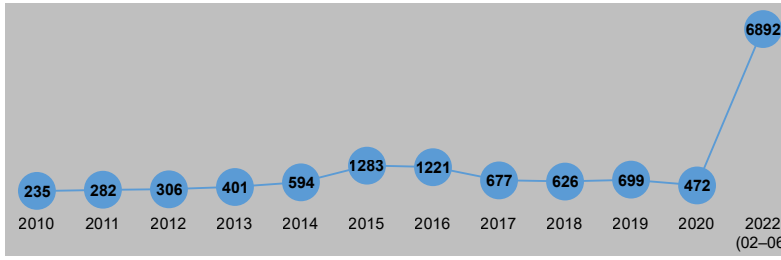

Fig. 3.10 The number of refugees who arrived in the EU countries for 2010–2022 (2022 for the period 24.02–01.06) [21, 22]

Analysts of the world economic forum [17] determined that the result of hostilities on the territory of Ukraine will be the loss of the economies of the EU countries at the level of about 175 billion EUR – or simply more than 1 % of GDP in 2022. Their structure is shown in **Fig. 3.11**.

As can be seen from **Fig. 3.11**, the main sources of losses are the need to ensure the energy independence of the EU countries (estimated at about 75 billion EUR or 43 % of GDP losses) and inflation compensation (estimated at about 50 billion EUR or 29 % of GDP losses). Provided that the conduct of hostilities does not go beyond the territory of sovereign Ukraine, support for the security and defense of the EU countries will cost approximately 20 billion EUR, or 11 % of GDP losses.

Ukraine, as already noted, does not have a significant impact on the size and structure of the EU GDP, however, it is a unique supplier of local resources that form the starting raw material base to support the production activities of strategically important sectors of the economy of the EU countries. The commodity structure of Ukraine's exports and imports to the EU countries (**Table 3.5**) shows that in 2019–2021, the share of exports of goods to the EU countries in its total volume amounted to approximately 41.46–37.82 % and decreased by 2.1 % over the study period, the share of imports of goods from EU countries is 41.14 % – 39.75 % and has decreased by 1.39 % over three years. That is, approximately 1/3 of Ukraine's trade turnover was made up of transactions with EU countries, a significant part of the export of our state in 2019–2021.

In the structure of Ukraine's exports to the EU countries, as of 2021, 20.26 % were exports of ferrous metals and 14.53 % of exports were mineral products (11.24 % were ores, slags and ash). This trend demonstrates the dependence of the economy of our state on the functioning of the mining and metallurgical complex (MMC) and the dependence of the industry of the EU countries on the supply of raw materials and metal products from Ukraine. Military operations on the territory of Ukraine, which make it impossible to fully fulfill contracts for the supply of metallurgical products and raw materials, generate threats not only for core industries, but also for secondary ones, such as the manufacture of cars, aircraft, the production of microchips, etc.

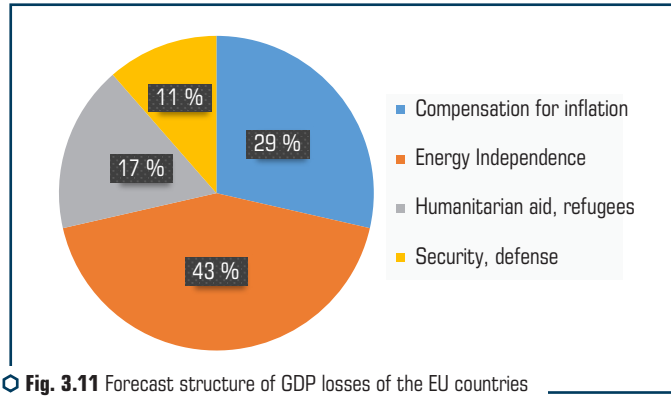

Fig. 3.11 Forecast structure of GDP losses of the EU countries from military operations in Ukraine [23]

Table 3.5 Commodity structure of foreign trade and trade with EU countries in 2019–2021, % [24]

Export of goods					Import of goods				
Product code according to NACE	years			Δ20/19	Product code according to NACE	years			Δ20/19
	2019	2020	2021			2019	2020	2021	
Commodity structure of Ukraine									
Base metals and products made from them:	20.49	18.36	23.49	3.00	Base metals and products made from them:	6.00	5.76	6.00	–
– black metals	17.45	15.63	20.49	3.04	– black metals	2.06	1.91	2.13	0.07
– ferrous metal products	2.08	1.78	1.90	–0.18	– ferrous metal products	1.81	1.51	1.55	–0.26
Mineral products	9.72	10.84	12.36	2.64	Mineral products	21.36	15.89	20.55	–0.81
– ores, slag and ash	7.17	8.99	10.46	3.29	– ores, slag and ash	0.87	0.73	0.51	–0.36
Commodity structure of EU									
Share of exports to EU countries	41.46	37.82	39.36	–2.10	Share of exports to EU countries	41.14	43.91	39.75	–1.39
Base metals and products made from them:	18.30	16.68	23.72	5.42	Base metals and products made from them:	5.30	5.08	5.25	–0.05
– black metals	15.16	13.51	20.26	5.10	– black metals	1.36	1.40	1.35	–0.01
– ferrous metal products	2.12	2.15	2.23	0.11	– ferrous metal products	1.88	1.60	1.69	–0.19
Mineral products	13.00	11.12	14.53	1.53	Mineral products	11.19	8.75	11.19	–
– ores, slag and ash	8.54	7.81	11.24	2.70	– ores, slag and ash	0.04	0.03	0.04	–

The mining and metallurgical complex of Ukraine today is an exporter of 46 % of iron ore to the EU countries. Military operations in Ukraine jeopardize the metallurgical industry of Europe not so much by downtime of their capacities (according to [25] Ukrainian MMC enterprises operate at 50–75 % as of the end of May 2022, preferring the production of current stocks of metal products and raw materials), but by problems with logistical flows (mined seaports, occupation of Ukrainian seaports by russia, russian piracy in the Black Sea, undermining of railways and missile attacks on railway infrastructure).

First of all, among the direct threats to the economic security of the EU countries, one should consider a reduction in the production of metal products (**Table 3.6**).

● **Table 3.6** Changes in the operational performance of the metallurgical enterprises of the MMC of Ukraine as a result of hostilities in Ukraine, million tons [26, 27]

	Cast iron	**Steel**	**Rolled steel**
3 months of 2021 p.	5313	5291	4734
3 months of. 2022 p.	3499	3641	3116
Variation, %	–34.14	–31.19	–34.18
54 thousand jobs, 3.2 % of GDP and about 10 % of exports of goods from Ukraine			

The average reduction in the output of metal products by the main producers from Ukraine is 30 % in the first quarter of 2022 compared to the same period in 2021. This trend exists taking into account the fact that 80 % of the metallurgical enterprises of Ukraine (8 out of 10 plants) are located in three regions: Dnipropetrovsk, Poltava and Zaporizhzhia, that is, in regions that are not a springboard for active hostilities, although it is impossible to call their area of base safe. The threat to economic security also exists taking into account the fact that the cessation of exports of metal raw materials and metal products to the EU countries from Ukraine does not provide for the substitutional possibility of their complete replacement with rolled products from China and metal raw materials from Australia and Brazil. The main reason for the lack of substitution is logistics and the price factor (for example, since the outbreak of hostilities, prices for iron ore (Fe 62 %) in China have increased by almost 15 %, while prices for domestic metal raw materials after rising in early 2022 by 11.7 % stabilized by the end of February, prices for scrap metal from Turkey are growing by 20 % per week since the beginning of the war [26, 27].

The sources of the main threats to economic security for the EU countries from military operations in Ukraine are summarized in **Table 3.7**.

The largest sources of threats to the economic security of the industrial sector of the EU countries listed in the table are, of course, not exhaustive, but they are a representative sample that proves the magnitude of the consequences of russia's continued military aggression against Ukraine.

● **Table 3.7** Sources of the main threats to the economic security of the industrial sector of the EU countries from military operations in Ukraine and their consequences [17, 19, 21, 27]

Sphere of occurrence	Source of economic threats	Threat manifestation	Effects
Steel semi-finished products	Supply disruptions 34 % of EU demand for slabs, 50 % for square billets, 84 % for metallurgy	Shutdown of EU steelmaking capacities, rising prices for metal raw materials (for the increase in the price of billet at the end of February 2022 amounted to 14 %)	Global
Gas production	Reduction by 17.3 % of daily gas production, reduction by 8 % of the production of DM «Ukrgasvydobuvannia», a ban on gas exports from Ukraine	Ecological catastrophe as a result of excessive accumulation of liquefied gas and oil in storage	Local, promising (complication of restoring gas production from mothballed wells)
Shipping	Loss of 420 thousand tons of cargo/day, 1666 containers/day	Disruption of sea deliveries: 135.6 thousand/day of grain; 103.7 thousand tons/day of metal ores; 44.3 thousand tons/day of ferrous metals; 14.2 thousand tons/day of oil; 10.6 thousand tons/day of building materials. The threat of starvation	Global
Rail transportation	An increase in the load on the railway infrastructure; change in the structure of transportation; the capacity of railway stations on the territory of Ukraine and border regions has been reduced; discrepancy between the standards of wagons and tracks of the Ukrainian railway to European standards	Disruptions of 50 % of the supply of goods from the pre-war scale	Local
Railway wheels and wheelsets	Ukraine is a supplier of 70 % of the EU market of railway wheels for freight cars (Interpipe plant)	Lack of opportunities to carry out repair work on the rolling stock of railways; violation of logistics processes in the industry; disruption of EU transport sector transition projects to green energy	Global
Production of noble gases, including neon, krypton and xenon	Ukraine is a supplier of 70 % neon and 40 % krypton to the EU market, the availability of technologies for the manufacture of highly purified gases	Shutdown of mechanical engineering (for example, two Volkswagen plants in Germany) in the EU, lack of gas for the manufacture of chips and microcircuits in the EU and the USA	Global

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