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*Ishchuk S. O.*

## TRANSFORMATION OF UKRAINE’S ECONOMY DURING WAR: KEY TRENDS

State Institution “Institute of Regional Studies named after E. Dolishnyi National Academy of Sciences of Ukraine”, Lviv, Ukraine

The Great War caused significant transformations in the economy of Ukraine, which was reflected in the structure of the gross domestic product. The increase in the share of public administration and defense in this structure by 3.6 times (up to 22.15% in 2023) has sharply limited the opportunities for social and local development, but the national economy is gradually recovering. The purpose of the article is to evaluate the key transformations in the economy of Ukraine and its regions in the conditions of a full-scale war. Based on the analysis of the trend of indicators of the functioning of the construction sector, it was determined that new residential construction is gradually concentrated in the regions of the Carpathian region (Zakarpattia, Ivano-Frankivsk, and Chernivtsi), and Lviv has become its center. The transformation of the structure of new construction in terms of residential and non-residential was noted in favor of the latter - its share in Ukraine increased by 7.6 percentage points compared to 2021, while the situation in completed construction is the opposite - the share of housing increased by 6.1 percentage points. According to the results of the assessment of the values of the indicator of the volume of industrial products sold, positive dynamics of the recovery of most industries were revealed and emphasis was placed on the transformation of the structure of the domestic processing industry in the direction of increasing the share of high-tech industries in it, in particular, machine building. The problems of the Ukrainian agricultural sector are diagnosed in the context of direct and indirect losses incurred as a result of Russian armed aggression. The trends of changes in the values of the index of agricultural products of crop production and livestock production in Ukraine in a regional section were determined. On the basis of the results of the structural and dynamic assessment of the size of the sown areas of agricultural crops in the regions during the Great War, it was established that the decrease in the volume of crop production in Ukraine is closely correlated with the loss of sown areas. It was revealed that the concentration of domestic export potential is gradually shifting to the western and central regions. The transformation of the structure of foreign economic operations in Ukraine was noted, in particular, in the direction of increasing the tendency to dominate the export of low-tech goods, while the import of high-tech goods. The latter is explained by the growing needs of the domestic defense-industrial complex in the appropriate nomenclature of machine-building products.

**Keywords:** economy, transformation, war, development, dynamics, construction, industry, agriculture, export, import.

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**Transformation of Ukraine’s economy during war: key trends**

### ***Introduction and statement of the problem***

Russia's full-scale armed aggression against Ukraine dramatically changed the architecture of the world geopolitical space. This war significantly transformed socio-economic processes and social relations, shifted the vectors of development and the poles of business activity. Some of these structural and spatial transformations are temporary and will gradually weaken during the post-war reconstruction of the Ukrainian economy, while others, on the contrary, will significantly strengthen. The war caused significant destruction (catastrophic in some regions) of energy facilities, industrial and social infrastructure, assets of enterprises of various types of economic activity. However, under the condition of effective state management, well-founded strategic development priorities and rational recovery criteria (priority of national security and technological self-sufficiency), Ukraine has every chance to return and increase its human, industrial and scientific potential, becoming one of the economic and political leaders in Europe.

### ***Analysis of research and publications***

Urgent issues of the functioning of the Ukrainian economy in the conditions of a full-scale war and the prospects for its further recovery and development are the key research topics of many domestic scientists, in particular, representatives of the National Academy of Sciences. Thus, the conceptual-practical plan of reconstructive post-war economic recovery of Ukraine is presented in [1]. The issue of state support for the post-war development of priority industries, which are of strategic importance for the sustainable development of the economy and the state's defense capability, is disclosed in [2]. Possibilities of the post-war restoration of the scientific, technical and innovative spheres of Ukraine in the context of stimulating the processes of economic development and ensuring progressive structural changes in the economy, as well as directions for improving approaches to evaluating the effectiveness of innovative activities are considered in [3], [4] defined and analyzed the main strategic principles of the post-war reconstruction of Ukraine. The need to create a specific recovery program agreed with the donor countries is substantiated, which will allow Ukraine not only to rebuild on European principles, but also to gain membership in Euro-Atlantic structures. Outlines of such a program and ways of its implementation are outlined. In [5], the vectors were established and the amount of changes in the dynamics of Ukraine's foreign economic operations in wartime conditions, which caused a decrease in the ratio of commodity exports to imports,

was calculated; the export specialization of the regions of Ukraine by main commodity groups is determined; the key trends in the formation and development of domestic export potential are described. In [6], three basic scenarios of the development of domestic export potential in the war and post-war periods are substantiated; emphasis is placed on socio-economic risks from the implementation of an export-oriented development model in Ukraine.

### ***The purpose of the article and the presentation of the main material***

The purpose of the article is to assess the key trends in the development of the economy of Ukraine and its regions in the conditions of a full-scale war.

After falling by 28.8% in the first year of full-scale war, the national economy grew by 5.3% in 2023. However, the difference between real and nominal GDP remained negative (-15.6%). The structure of Ukraine's GDP (in actual prices) during the analyzed period underwent changes, in particular, in the direction of a significant (3.6 times) increase in the share of state administration in it (Table 1). The value of the services provided by these foreign trade enterprises (in actual prices) increased 4.3 times over the past two years and, according to the results of 2023, amounted to UAH 1,448,051 million, which was 1.75 times higher than the volume of GDP created in wholesale and retail trade which before the war was the leader in Ukraine in terms of this indicator.

In 2023, construction (+24.6%), which suffered the biggest losses in the previous year, showed the highest recovery rates. However, despite the growth of GDP created in the construction sector, the total area of residential and non-residential buildings at the start of construction in Ukraine in 2023 decreased by 23.2% (or by 2135047 m<sup>2</sup>), and in the period from 2021 – by 62.7 % (or on 11884553 m<sup>2</sup>). According to available official statistical data, during the two years of the war, the volume of new construction decreased the most in Dnipropetrovsk (-77.1%), Kyiv (-63.3%), Odesa (-89.5%), Poltava (-62.5 %), Ternopil (-62.6%) and Kharkiv (-81.6%) regions, and even more so in the city of Kyiv (-90.9%) (Table 2).

The situation is similar in the Donetsk, Zaporizhzhia, Luhansk, Mykolaiv, Sumy, Kherson and Chernihiv regions, for which the DSSU does not publish data. During 2022–2023, the decrease in the total area of buildings at the start of construction in the named regions exceeded the average value of the indicator in Ukraine (-62.7%). At the same time, in the Zhytomyr and Ivano-Frankivsk regions, there was a significant increase in the volume of new

construction during the specified period – by 38.9% and 67.2%, respectively. In 2023, Vinnytsia (+54.8%), Zakarpattia (+54.7%) and Chernivtsi (+136.4%) oblasts also demonstrated an increase in this indicator. The consequence of such dynamics was significant changes in the regional structure of new construction.

In particular, during 2022–2023, the growth of the shares of the named regions in this structure was from 2.34 pp. (Chernivetsk region) to 6.67 percent (Ivano-Frankivsk region) while the share of the city of Kyiv, on the contrary, decreased by 13.8 p.p. and now is only 4.48%.

Table 1

**Dynamics and structure of Ukraine’s GDP, %**

Indicator/Type of economic activity	Change in GDP volume (percentage to the corresponding period of the previous year)			Share of type of economic activity in GDP		
	2021*	2022**	2023**	2021	2022	2023
	Gross domestic product	3.4	-28.8	5.3	100	100
Agriculture, forestry and fisheries	14.4	-25.2	7.6	10.89	8.57	7.41
Mining and quarrying	1.2	-33.2	-1.9	6.44	4.39	4.02
Processing industry	2.3	-42.2	13.8	10.28	7.6	8.25
Supply of electricity, gas, steam and air conditioning	0.6	-32.5	-1.8	3.32	4.39	4.73
Water supply; sewage treatment with waste	1.7	-23.2	1.8	0.35	0.31	0.26
Construction	7.1	-66.9	24.6	2.76	1.32	1.58
Wholesale and retail trade; repair of motor vehicles and motorcycles	-0.6	-32.2	6.6	13.61	12.32	12.64
Transport, warehousing, postal and courier activities	3.3	-40.5	5.6	5.42	4.33	4.34
Temporary accommodation and catering	12.7	-47.1	9	0.9	0.57	0.59
Information and telecommunications	6.5	-26	12.9	4.69	3.95	3.98
Financial and insurance activities	14.2	-11.2	-8.3	2.97	2.98	2.38
Real estate transactions	6	-38.8	10.6	5.77	4.51	4.88
Professional, scientific and technical activity	3.7	-46.2	-1	2.89	1.9	1.99
Activities in the field of administrative and auxiliary services	3.3	-35.3	3.4	1.25	1.03	0.97
Public administration and defense; compulsory social insurance	-2.8	38.2	5.8	6.17	21.7	22.15
Education	1.2	-8.2	-3.6	4.31	4.25	3.53
Health care and provision of social assistance	5.5	-13.3	4.1	2.47	2.87	2.64
Arts, sports, entertainment and recreation	4.5	-17.1	-4.4	0.59	0.5	0.45
Provision of other types of services	0.6	-28.6	6	0.86	0.81	0.8

Note: \*in constant 2016 prices; \*\* in constant 2021 prices

Source: built according to [7]

Despite a 40.3% reduction in new construction in the Lviv region over the two years of the war, this region in 2023 accounted for 19.8% of the total area of buildings at the start of construction. This is the highest structural indicator in Ukraine after the Kyiv region (27.84% in 2022). In general, it can be stated that the vectors of new construction have shifted to the western (Transcarpathian, Ivano-Frankivsk, and Chernivtsi regions) and central (Vinnytsia and Zhytomyr regions) regions. At the same time, it should be emphasized that in the named regions (except

Zhytomyr region), as well as in Lviv, Odesa, Kharkiv and Khmelnytskyi regions and in the city of Kyiv, the structure of new construction was dominated by residential buildings (Table 3). On the other hand, in the northern and eastern regions (especially in the Kyiv region), the tendency to increase the share of non-residential buildings in this structure is increasing. Such processes are explained by the influence of both security factors and the need for construction for the needs of the defense industry.

Table 2

## Dynamics and regional structure of the total area of buildings, %

Region	The total area of buildings at the beginning of construction						Total area of accepted buildings					
	Growth rate, %			Structure, %			Growth rate, %			Structure, %		
	2022/2021	2023/2022	2023/2021	2021	2022	2023	2022/2021	2023/2022	2023/2021	2021	2022	2023
Ukraine	-51.43	-23.19	-62.69	100	100	100	-41.38	1.23	-40.66	100	100	100
Vinnitsia	-36.29	54.79	-1.39	2.22	2.92	5.88	-19.15	65.62	33.9	3.65	5.04	8.25
Volynsk	59.35	-55.48	-29.05	1.65	5.42	3.14	-34.67	29.22	-15.59	3.08	3.44	4.39
Dnipropetrovsk	-77.54	1.9	-77.11	5.14	2.38	3.16	-62.72	20.39	-55.12	4.12	2.62	3.12
Donetsk	...	...	...	1.03	...	...	-90.11	...	...	0.65	0.11	...
Zhytomyr	-50.67	181.47	38.85	1.09	1.11	4.07	-48.44	20.13	-38.06	1.72	1.51	1.79
Zakarpattia	-36.29	54.71	-1.43	1.93	2.54	5.11	-30.13	14.73	-19.84	3.46	4.13	4.68
Zaporizhzhia	-75.36	...	...	1.64	0.83	...	-78.38	...	...	0.93	0.34	...
Ivano-Frankivsk	1.16	65.31	67.23	1.91	3.99	8.58	-7.53	7.43	-0.66	3.75	5.91	6.28
Kyivska	-27.69	-49.2	-63.27	18.7	27.84	18.41	-29.08	-5.45	-32.94	16.13	19.51	18.23
Kirovohradsk	-51.85	15.53	-44.37	0.49	0.49	0.73	-24.86	109.35	57.31	0.69	0.88	1.83
Luhansk	...	...	...	0.06	...	...	...	...	...	0.11	...	...
Lviv	-37.99	-3.75	-40.32	12.4	15.83	19.83	-36.76	0.25	-36.6	10.48	11.3	11.19
Mykolayivska	-95.99	...	...	0.84	0.07	...	к/с	к/с	-68.33	1.16	...	0.62
Odesa	-79.45	-49.08	-89.53	9.76	4.13	2.74	-38.86	-39.86	-63.23	8.03	8.38	4.98
Poltava	-48.08	-27.84	-62.54	1.74	1.86	1.75	11.35	-34.78	-27.38	2.07	3.92	2.53
Rivne	-23.2	-34.67	-49.83	1.72	2.71	2.31	-1.45	-12.47	-13.74	2.29	3.84	3.32
Sumy	-67.74	...	...	1.3	0.86	...	-59.43	5.93	-57.02	1.12	0.78	0.81
Ternopilsk	-43.23	-34.04	-62.55	3.13	3.66	3.14	-62.53	38.69	-48.04	3.8	2.43	3.33
Kharkivska	-74.01	-29.34	-81.63	4.69	2.51	2.31	-92.02	327.76	-65.88	5.06	0.69	2.91
Khersonsk	-67.98	...	...	1.1	0.73	...	...	...	...	1.28	...	...
Khmelnitska	-44.76	0.41	-44.53	4.25	4.84	6.32	-29.71	0.31	-29.49	3.22	3.86	3.82
Cherkasy	-44.91	-2.38	-46.22	1.7	1.93	2.45	-44.93	41.77	-21.93	1.73	1.62	2.27
Chernivtsi	-63.53	136.37	-13.8	1.78	1.34	4.12	-44.25	11.45	-37.87	2.82	2.68	2.95
Chernihivska	-52.21	...	...	1.4	1.37	...	-5.09	-45.8	-48.56	1.19	1.92	1.03
Kyiv	-71.88	-67.54	-90.87	18.31	10.6	4.48	-51.44	-21.09	-61.68	17.46	14.46	11.28

Source: built according to [7]

The situation with the completion of construction in 2023 has improved somewhat, however, as a result of the two years of war, the area of buildings put into operation in Ukraine has decreased by 40.7%. During 2022–2023, only Vinnitsia and Kirovohrad regions achieved an increase in the values of this indicator: by 33.9% and 57.3%, respectively (see Table 2). The structure of completed construction is dominated by residential buildings, the share of which increased in almost all regions (see Table 3). At the same time, it is necessary to highlight the Kirovohrad region, in which the non-residential segment among the buildings put into operation reached 81.7% in 2023

(against 50.6% in 2021). More than 33% of completed buildings were non-residential also in Zhytomyr, Mykolaiv, Odesa, Ternopil and Khmelnytskyi regions.

Summarizing the key trends in the development of the construction sector in Ukraine over the past two years, it can be stated that the negative trends in indicators (decrease in the area of new construction and put into operation) were characteristic not only for regions of hostilities or close to them, but even for most of the western regions. First of all, this applies to Ternopil, where the rate of construction decline exceeded the average value of the indicator in Ukraine, but also to Volyn, Lviv, and Rivne regions.

The second FDI in terms of recovery rates (+13.8%) in 2023 was the processing industry. Accordingly, the share of this key sector of the economy in the GDP of Ukraine increased by 0.65 percentage points (up to 8.25% against 10.28% in 2021) (see Table 1). The volume of sold products of the processing industry in 2023 increased by 21.6% and amounted to 83.2% of the level of 2021 (Table 4). Growth was

demonstrated by all production, except for light industry (−56.3%), production of coke and oil refining products (−17.4%) and metallurgy (5.2%). The gradual recovery of industrial processing was a consequence of the stabilization of the activities of a significant number of enterprises, the completion of relocation processes, the formation of new logistics connections and the establishment of system production.

Table 3

**The structure of the total areas of buildings in terms of residential (R) and non-residential (NR) at the beginning of construction and put into operation, %**

Region	At the beginning of construction						Put into operation					
	2021		2022		2023		2021		2022		2023	
	R	RN	R	RN	R	RN	R	RN	R	RN	R	RN
Ukraine	67.1	32.9	72.4	27.6	59.5	40.5	69.8	30.2	74	26	75.9	24.1
Vinnitsia	50.9	49.1	48.4	51.6	55.5	44.5	61.1	38.9	83.6	16.4	82.2	17.8
Volynsk	57.3	42.7	85.2	14.8	46.5	53.5	67.6	32.4	83.2	16.8	74.2	25.8
Dnipropetrovsk	69.9	30.1	71.1	28.9	52	48	55.4	44.6	72.2	27.8	77.5	22.5
Donetsk	24.5	75.5	...	...	...	...	45.1	54.9	35	65	...	...
Zhytomyr	54.9	45.1	68.4	31.6	23	77	69.7	30.3	81.2	18.8	64.3	35.7
Zakarpattia	57.5	42.5	61.1	38.9	70.9	29.1	73.3	26.7	78	22	80.1	19.9
Zaporizhzhia	61.9	38.1	89.7	10.3	...	...	40.4	59.6	58.2	41.8	...	...
Ivano-Frankivsk	67.4	32.6	55.7	44.3	77.3	22.7	82.9	17.1	86.9	13.1	86.2	13.8
Kyivska	78.6	21.4	72.9	27.1	47.3	52.7	77.3	22.7	77.8	22.2	78.3	21.7
Kirovohradsk	33.9	66.1	5.7	94.3	4.7	95.3	49.4	50.6	40.5	59.5	18.3	81.7
Luhansk	27	73	...	...	...	...	38.1	61.9	...	...	...	...
Lviv	47.2	52.8	69.5	30.5	62.1	37.9	70.6	29.4	66.4	33.6	70.7	29.3
Mykolayivska	39.9	60.1	26.1	73.9	...	...	31.2	68.8	...	...	55.4	44.6
Odesa	62.7	37.3	69.8	30.2	62.2	37.8	79	21	86.3	13.7	60.9	39.1
Poltava	49.5	50.5	42.3	57.7	46.1	53.9	47.1	52.9	62.6	37.4	57.7	42.3
Rivne	52.9	47.1	77.7	22.3	38.4	61.6	72.3	27.7	66.2	33.8	71.8	28.2
Sumy	40.5	59.5	77.6	22.4	...	...	64.6	35.4	56.2	43.8	66.2	33.8
Ternopilsk	54.5	45.5	76.9	23.1	49.5	50.5	82.9	17.1	78.4	21.6	66.9	33.1
Kharkivska	78.9	21.1	92.7	7.3	80.3	19.7	72.8	27.2	65	35	92.1	7.9
Khersonsk	33.7	66.3	16.1	83.9	...	...	42.7	57.3	...	...	...	...
Khmelnyska	68.7	31.3	74.3	25.7	70.1	29.9	64.8	35.2	76.3	23.7	62.1	37.9
Cherkasy	62.4	37.6	78.3	21.7	64.1	35.9	61.9	38.1	60	40	75.5	24.5
Chernivtsi	74.5	25.5	48.7	51.3	77.4	22.6	80.9	19.1	85.7	14.3	82.1	17.9
Chernihivska	59.8	40.2	80.3	19.7	...	...	49.4	50.6	55.7	44.3	71.2	28.8
Kyiv	5.8	4.2	0	0	4.5	0.5	8.6	1.4	5.4	4.6	2.5	0.5

Source: built according to [7]

The metallurgical industry experienced the biggest decline during the two years of the war. In particular, a 60.3% reduction in the volume of products sold during 2022–2023 led to a 2.3-fold decrease in the share of this basic segment in the structure of Ukrainian industry. Domestic metallurgy has traditionally been and remains export-oriented, but the war has somewhat changed the situation. So, if in 2021 metallurgical enterprises exported about 70% of the total volume of

products sold, then in 2023 the value of this indicator decreased to 46%. This was the result of a radical disruption of maritime logistics, despite the fact that the “grain corridor” partially became a “metal corridor” as well. The decrease in demand for metal in the world also adds to the problems, as a result of which sales are reduced not only at domestic metallurgists. For example, in Poland, steel production fell by 9.7% last November.

Table 4

## Realized industrial products in Ukraine, %

Type of industrial activity	Growth rate, %			Share in industry, %		
	2022/2021	2023/2022	2023/2021	2021	2022	2023
Processing industry	-31.5	21.6	-16.8	61.3	53.6	56
Production of food products, beverages and tobacco products	-11.9	22.7	7.5	18.9	21.3	22.4
Textile production, production of clothes, leather, leather products and other materials	8.5	-56.3	-52.5	0.8	1.1	1.3
Production of wood products, paper production and printing activities	-11.8	11.2	-1.8	3.3	3.7	3.5
Production of coke and oil refining products	-45.3	-17.4	-54.8	2.9	2	1.4
Production of chemicals and chemical products	-43	10.7	-36.8	2.9	2.1	2
Production of basic pharmaceutical products and pharmaceutical preparations	-15.3	26.9	7.4	1.4	1.5	1.6
Production of rubber and plastic products	-18.6	27.2	2.6	1.9	2	2.2
Production of other non-metallic mineral products	-49.6	52.6	-22.9	3.8	2.4	3.2
Metallurgical production	-57.9	-5.2	-60.3	16	8.6	7
Production of finished metal products, except for machines and equipment	-24	64.5	26.1	1.8	1.8	2.5
Production of computers, electronic and optical products	-35.2	91.2	36.7	0.4	0.3	0.6
Production of electrical equipment	-31.7	36.1	-6.8	1.1	1	1.2
Production of machines and equipment, not classified in other groups	-47.1	22.3	-35.3	2	1.3	1.4
Production of motor vehicles, trailers and semi-trailers	9.2	44.1	57.6	0.9	1.3	1.6
Production of other vehicles	-10.4	71.2	55.3	1.3	1.4	2.1
Production of furniture	-22.1	33.3	4.2	0.8	0.8	0.9
Production of other products	-9.6	42.9	27.9	0.2	0.2	0.3
Repair and installation of machines and equipment	-36.6	34.7	-14.5	0.9	0.7	0.8

Source: built according to [7]

Another segment of domestic metallurgy – the production of finished metal products – showed significant growth (+64.5%) in 2023. As a result, the volume of industrial products sold by metalworking enterprises reached 126.1% of the level of 2021, and the share of production of finished metal products in the structure of metallurgical production was 26.62% (against 10.26% in 2021). The growth of this production was directly caused by the great war, since a significant part of these products is an integral part of the country's defense system. In general, the recovery of the industrial sector of Ukraine's economy is primarily due to the increase in the production of defense products. The constant increase in the needs of the defense industry stimulated the accelerated development of all segments of mechanical engineering, and most of all – the production of computers, electronic and optical products (+36.7% compared to 2021), the production of motor vehicles, trailers and semi-trailers (+57.6%) and production of other vehicles (+55.3%). The latter includes the production of

military vehicles (code according to Type of economic activity 30.4). Such trends provide certain grounds for optimistic forecasts regarding the structural transformation (in the medium and long term) of the industrial sector of the national economy in the direction of increasing the share of high-tech industries, primarily mechanical engineering.

Before the full-scale war, agriculture was the second economic activity (foreign trade) in terms of contribution to the Ukrainian economy after trade, however, according to the results of 2023, it became only the fourth (see Table 1). Such structural changes are explained by a significant deterioration in the dynamics of agricultural production during 2022–2023 (-18.4% of GDP in actual prices), compared to other foreign trade, in particular, processing industry (-3.8%), trade (+11.3%) and state administration (+430.4%).

The war caused enormous damage to the agriculture of Ukraine. As of July 1, 2024 indirect financial losses of Ukrainian agriculture are estimated

at 83 billion dollars USA [8]. At the same time, the amount of direct damages from the loss of assets, in particular, the destruction of the Kakhovskaya dam, the partial or complete destruction of storage facilities, fisheries and aquaculture, perennial crops, the forced slaughter of livestock, as well as the destruction and theft of production resources and products is estimated at 10.3 billion dollars USA [9].

According to the Food and Agriculture Organization of the United Nations (FAO), 25% of the rural population of Ukraine, employed in the agricultural sector, stopped their activities or reduced production due to the war and in the region’s most dependent on agriculture, this share reaches 40% [10]. However, despite these and other problems caused by the full-scale war, the “broken” (fall-rise) trend of

agricultural production in Ukraine has maintained its trend. That is, after the agricultural production index decreased by 25% in 2022 (in particular, crop production by 28%), in 2023 its value increased by 11.1% (crop production by 13.9%) (Fig.1). It is worth noting that in the analyzed period, a violation of the identified trend was observed only in 2015 and 2020. The reasons for the downward trend of the agricultural production index in the mentioned years were the disruption of economic ties (due to russian aggression) and the reduction of business activity (due to the COVID-19 pandemic). Also, the fall in the results of the agricultural sector in these years was deepened under the influence of a decrease in yields, especially of key agricultural crops, that is, cereals (by 6% and 13.4%, respectively) and sunflower (by 21.1% in 2020).

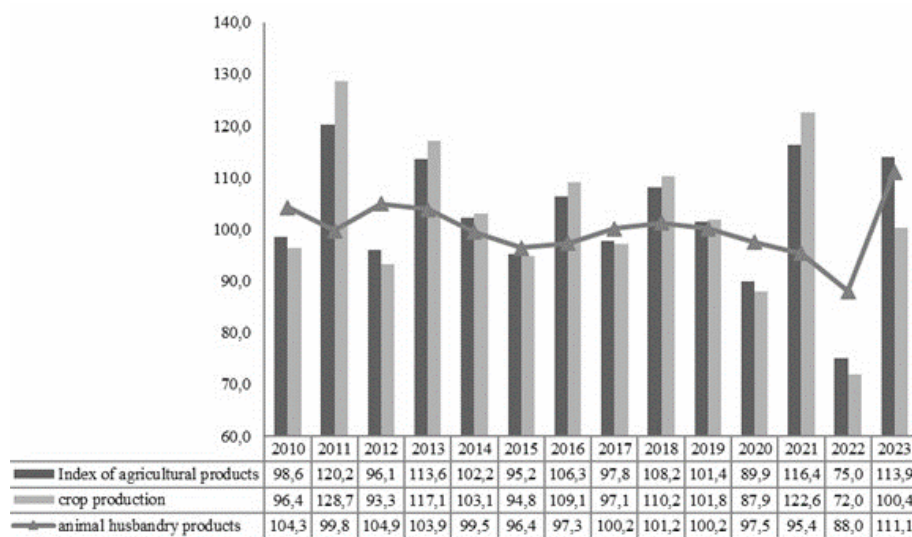


Fig. 1. Indices of agricultural products in Ukraine, %

Source: built according to [7]

In 2023, the growth of the index of agricultural products took place in all regions, except Zaporizhzhia, Luhansk, Sumy, and Kherson regions. However, despite the recovery of positive dynamics of agricultural production in Ukraine, its volume (at constant 2021 prices) was only 83% of the 2021 level. Insignificant (0.7%–5.1%) increase in the production of the agricultural sector was achieved only in 5 oblasts of the western region (Zakarpattia, Ivano-Frankivsk, Lviv, Rivne and Ternopil), as well as in Poltava.

The basic segment of Ukrainian agriculture – crop production (which accounts for more than 80% of the structure of agricultural production) – in 2023 demonstrated positive dynamics of recovery,

especially in Vinnytsia (+28.5%), Kyiv (+29.6%), Mykolaiv (+34.4%) and Odesa (+25.6%) regions. But as a result of the two years of the great war, the decrease in the volume of crop production in Ukraine (at constant 2021 prices) amounted to 18.2%. A significant drop in the crop production index is, among other things, associated with the loss of planted areas, which decreased by 20.2% during 2022–2023. In a regional breakdown, the regions of active hostilities and those adjacent to them naturally suffered the greatest losses. These are, first of all, the Kherson, Zaporizhzhya, Luhansk, Donetsk, Kharkiv and Mykolaiv regions, where the decrease in the area of agricultural crops was 23.4%–95.8% (Table 5).

Table 5

## Dynamics and regional structure of sown areas of agricultural crops in Ukraine\*

Region	Structure, %				Structural changes, p.p.			Growth rate, %		
	2014	2021	2022	2023	2022–2021	2023–2022	2023–2021	2022/2021	2023/2022	2023/2021
Ukraine	100	100	100	100	0	0	0	-18.11	-2.55	-20.2
Vinnitsia	5.94	5.72	6.97	7.17	1.25	0.2	1.45	-0.15	0.18	0.03
Volynsk	1.96	2.18	2.62	2.6	0.44	-0.02	0.42	-1.48	-3.2	-4.63
Dnipropetrovsk	7.15	6.94	8.3	8.3	1.36	0	1.36	-2.05	-2.63	-4.63
Donetsk	4.89	3.67	1.67	1.34	-2	-0.33	-2.33	-62.71	-22.11	-70.96
Zhytomyr	3.06	4.08	4.87	4.6	0.79	-0.27	0.52	-2.15	-8.06	-10.03
Zakarpattia	0.7	0.62	0.79	0.74	0.17	-0.05	0.12	5.15	-9.32	-4.64
Zaporizhzhia	5.97	5.98	2.61	1.2	-3.37	-1.41	-4.78	-64.28	-55.31	-84.04
Ivano-Frankivsk	1.38	1.34	1.66	1.65	0.32	-0.01	0.31	1.41	-3.04	-1.67
Kyivska	4.24	4.27	5.09	5.18	0.82	0.09	0.91	-2.26	-0.99	-3.23
Kirovohradsk	6.14	5.99	7.35	7.56	1.36	0.21	1.57	0.47	0.27	0.74
Luhansk	3.1	3.05	0.83	0.69	-2.22	-0.14	-2.36	-77.87	-18.75	-82.02
Lviv	2.31	2.51	3.19	3.28	0.68	0.09	0.77	3.96	0.15	4.11
Mykolayivska	5.74	5.62	5.56	5.4	-0.06	-0.16	-0.22	-19.07	-5.35	-23.4
Odesa	6.79	6.49	7.9	8.18	1.41	0.28	1.69	-0.31	0.91	0.6
Poltava	6.31	6.09	7.39	7.61	1.3	0.22	1.52	-0.6	0.28	-0.32
Rivne	1.99	2.21	2.66	2.77	0.45	0.11	0.56	-1.34	1.38	0.02
Sumy	4	4.24	4.88	4.71	0.64	-0.17	0.47	-5.88	-5.9	-11.43
Ternopilsk	2.95	2.97	3.64	3.73	0.67	0.09	0.76	0.35	-0.22	0.13
Kharkivska	6.34	6.43	4.48	5.51	-1.95	1.03	-0.92	-42.97	19.92	-31.61
Khersonsk	5.25	5.21	0.56	0.28	-4.65	-0.28	-4.93	-91.12	-52.34	-95.77
Khmelnytska	4.12	4.24	5.2	5.3	0.96	0.1	1.06	0.32	-0.69	-0.37
Cherkasy	4.41	4.29	5.19	5.34	0.9	0.15	1.05	-1.1	0.38	-0.73
Chernivtsi	1.12	1.08	1.32	1.36	0.24	0.04	0.28	0.42	0.29	0.71
Chernihivska	4.15	4.77	5.26	5.54	0.49	0.28	0.77	-9.7	2.57	-7.38

\*The data are given without taking into account the territories temporarily occupied by the Russian Federation and part of the territories where hostilities are (were) taking place

Source: built according to [7]

The reduction of agricultural production (together with metallurgical production) caused a drop in the volume of domestic commodity exports during 2022–2023 by a total of 46.84%. Among the regions of Ukraine, the economy of Dnipropetrovsk (61.4%), Donetsk (-97.2%), Zaporizhzhya (-69.3%), Luhansk (-99.8%), Mykolaiv (-71.1%), Poltava (-55.1%), Kharkiv (-56.8%) and Kherson (-94.8%) regions. Instead, three regions, in particular Vinnitsia, Odesa, and Cherkasy, during this period increased the volume of commodity exports by 29.8%, 5.9%, and 38.1%, respectively. It is worth noting that in 2023 there was a significant decrease in export activity in six oblasts of the western region, which in 2022 achieved (along with Vinnitsia, Odesa, and Cherkasy) an increase in commodity exports (Fig. 2a). At the same time, the volume of the latter from the Ivano-Frankivsk region decreased by a total of 47.1% during the war, although this decline slowed to 10% in 2023.

As a result of the described dynamics of indicators, there were noticeable changes in the regional structure of domestic commodity exports. Thus, active hostilities led to a decrease in the share of Donetsk region in this structure to 0.6% (against 10.3% in 2021), Dnipropetrovsk region to 13% (against 17.9%), Zaporizhzhia region to 4% (against 7%), Mykolaivska – up to 2.8% (against 5.1%). On the other hand, the shares of Vinnitsia (up to 4.7%), Kyiv (up to 5.1%), and Cherkasy (up to 3.4%) oblasts, as well as all oblasts of the western region, increased in the regional structure of exports of goods from Ukraine during 2022–2023. except for Ivano-Frankivsk), and the most – Lviv (up to 7.1%). The latter in terms of share in the regional structure of commodity exports in 2023 took third place after the city of Kyiv (26%) and Dnipropetrovsk region (13%). Hence, it can be argued that the concentration of domestic export potential is gradually shifting to the western and central regions.



In contrast to exports, during 2023, commodity imports to Ukraine increased by 14.9%. Fourteen regions showed an increase in this indicator (Fig. 2b). 44% of imports fell on the city of Kyiv (against 42.6% in 2021), and another 23.2% – on three oblasts: Dnipropetrovsk, Kyiv and Lviv. The share of the latter in the regional structure of commodity imports (9.1%) became the highest after the city of Kyiv.

According to the data of the State Customs Service [11], in 2023, 65% of the total volume of imports into Ukraine fell on: machines, equipment

and transport (US\$ 19.8 billion); products of the chemical industry (US\$ 11 billion); fuel and energy products (10.3 billion US dollars). At the same time, almost 80% of Ukrainian commodity exports were formed by: food products (21.8 billion US dollars); metals and products from them (3.9 billion US dollars); machines, equipment and transport (US\$ 2.9 billion). Thus, it can be stated that the tendency to dominate the import of high-tech goods in Ukraine has deepened. Thus, in particular, the import of machine-building products it is 6.83 times higher than its exports.

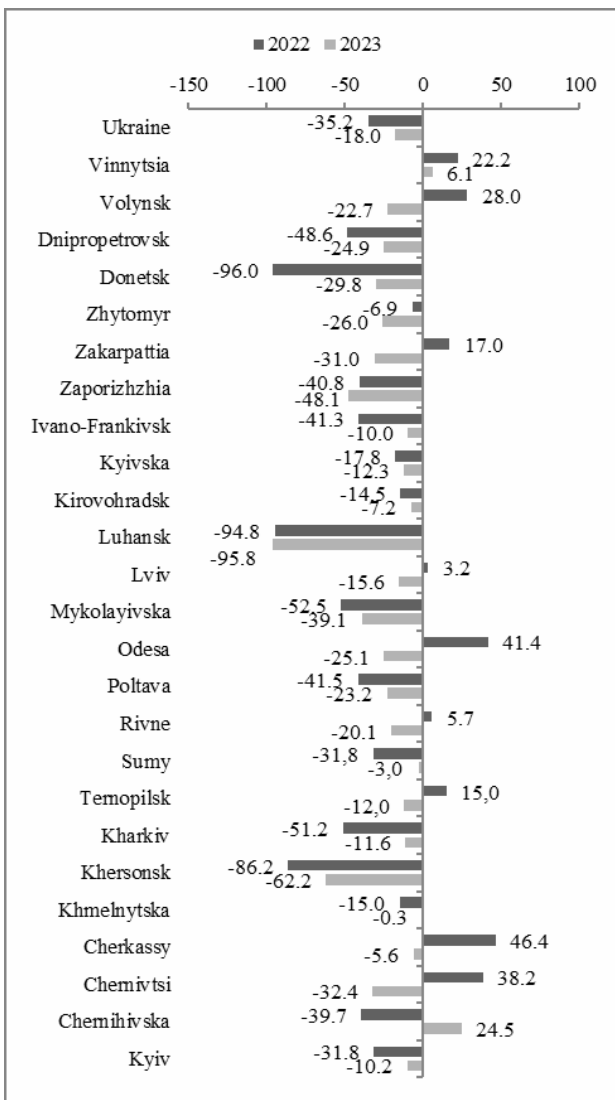


Fig. 2a. Increase in commodity exports in 2022 and 2023, %

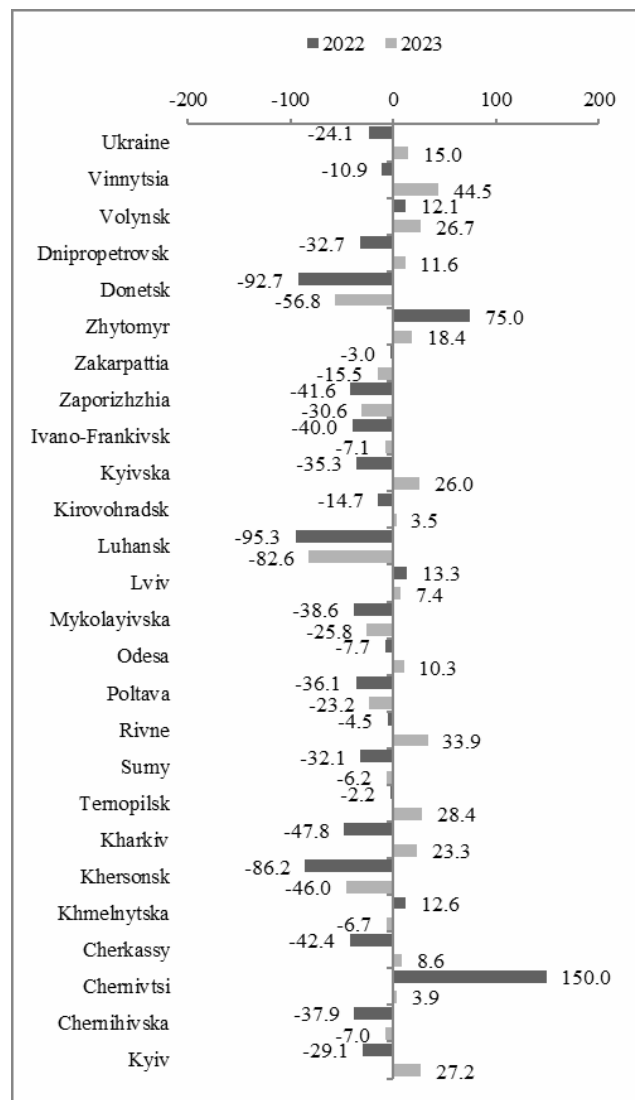


Fig. 2b. Increase in commodity imports in 2022 and 2023, %

Source: built according to [7]

### Conclusions

The national economy is gradually recovering after falling by almost a third in the first year of full-scale war. However, the difference between real and nominal GDP remains negative. Construction, which suffered the greatest losses in the first year of the war, demonstrates the highest rates of recovery. However, despite the growth of GDP created in the construction sector, the total area of residential and non-residential buildings at the start of construction in Ukraine for 2023 decreased by 23.2% and for the period from 2021 – by 62.7%. The vectors of new construction shifted to the western and central regions, which are dominated by housing construction. On the other hand, in the northern and eastern regions (especially in the Kyiv region), the tendency to increase the share of non-residential buildings in the structure of buildings is increasing. Such processes are explained by the influence of both security factors and the need for construction for the needs of the defense industry.

The processing industry is the second foreign exchange industry in terms of recovery rates. The constant increase in the needs of the defense industry stimulated the accelerated development of all segments of machine building, and most of all – the production of computers, electronic and optical products, the production of motor vehicles, trailers and semi-trailers, and the production of other vehicles. The continuation of this positive trend will contribute to the structural transformation of the industrial sector of the national economy in the direction of increasing the share of high-tech industries in it.

Problems of the development of Ukrainian agriculture (direct and indirect losses due to the war, reduction of cultivated areas, unstable dynamics of yield and specialization of agricultural production) over the past two years have somewhat changed the spatial architecture of this sector of the national economy. In particular, the shares of Donetsk, Zaporizhzhya, Luhansk, Mykolaiv, Kharkiv and Kherson regions decreased in the regional structure of agricultural production. At the same time, the traditional leaders of the domestic agrarian sphere – Vinnytsia, Dnipropetrovsk, Kyiv, Kirovohrad, Poltava, Khmelnytsky and Cherkasy oblasts – significantly increased their agricultural production potential.

The reduction in the volumes of agricultural and industrial production, primarily metallurgical, led to a decrease in the domestic export potential. According to the results of 2023, the share of exports of goods and services in the GDP of Ukraine (in actual prices) decreased to 28.6% (against 40.7% in 2021), which was the result of a drop in the volume of commodity exports during the two years of the war

by a total of 46, 84%. The largest losses of export potential naturally occurred in regions where active hostilities are taking place, as well as those adjacent to them. Instead, the concentration of Ukrainian commodity exports is gradually moving to the western and central regions.

Further author's research in this direction will focus on the assessment of prospects for the development of key types of economic activity in the regions of Ukraine in the conditions of post-war recovery.

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## ТРАНСФОРМАЦІЯ ЕКОНОМІКИ УКРАЇНИ ПІД ЧАС ВІЙНИ: КЛЮЧОВІ ТЕНДЕНЦІЇ

*Ішчук С.О.*

Повномасштабна війна спричинила значні трансформації в економіці України, що відобразилося на структурі валового внутрішнього продукту. Збільшення частки державного управління та оборони в цій структурі в 3,6 рази (до 22,15% у 2023 році) різко обмежило можливості для соціального та місцевого розвитку, але національна економіка поступово відновлюється. Мета статті – оцінити ключові трансформації в економіці України та її регіонів в умовах повномасштабної війни. На основі аналізу тенденції показників функціонування будівельного сектора визначено, що нове житлове будівництво поступово концентрується в областях Карпатського регіону (Закарпатській, Івано-Франківській та Чернівецькій), а його центром стало місто Львів. Трансформація структури нового будівництва в розрізі житлової та нежитлової нерухомості відзначена на користь останньої – її частка в Україні зростає на 7,6 п.п. порівняно з 2021 роком, тоді як у завершеному будівництві ситуація протилежна – частка житла збільшилася на 6,1 п.п. За результатами оцінювання значень показника обсягу реалізованої промислової продукції виявлено позитивну динаміку відновлення більшості галузей промисловості та зроблено акцент на трансформації структури вітчизняної переробної промисловості у напрямі збільшення в ній частки високотехнологічних виробництв, зокрема, машинобудування. Проблеми українського аграрного сектору діагностуються в контексті прямих і непрямих втрат, понесених внаслідок російської збройної агресії. Визначено тенденції зміни значень індексу

сільськогосподарської продукції рослинництва та тваринництва в Україні в регіональному розрізі. На основі результатів структурно-динамічного оцінювання розміру посівних площ сільськогосподарських культур у регіонах під час повномасштабної війни встановлено, що зменшення обсягів виробництва продукції рослинництва в Україні тісно корелює з втраченою посівних площ. Виявлено, що концентрація вітчизняного експортного потенціалу поступово змищується в західні та центральні регіони. Відзначено трансформацію структури зовнішньоекономічних операцій в Україні, зокрема, в бік посилення тенденції домінування експорту низькотехнологічних товарів при одночасному зростанні імпорту високотехнологічних. Останнє пояснюється зростанням потреб вітчизняного оборонно-промислового комплексу у відповідній номенклатурі машинобудівної продукції.

**Ключові слова:** економіка, трансформація, війна, розвиток, динаміка, будівництво, промисловість, сільське господарство, експорт, імпорт.

## TRANSFORMATION OF UKRAINE'S ECONOMY DURING WAR: KEY TRENDS

*Ishchuk S. O.\**

State Institution "Institute of Regional Studies named after E. Dolishnyi National Academy of Sciences of Ukraine", Lviv, Ukraine

\*e-mail: [iso.ird@ukr.net](mailto:iso.ird@ukr.net)

Ishchuk S. O. ORCID: <https://orcid.org/0000-0002-3698-9039>

The Great War caused significant transformations in the economy of Ukraine, which was reflected in the structure of the gross domestic product. The increase in the share of public administration and defense in this structure by 3.6 times (up to 22.15% in 2023) has sharply limited the opportunities for social and local development, but the national economy is gradually recovering. The purpose of the article is to evaluate the key transformations in the economy of Ukraine and its regions in the conditions of a full-scale war. Based on the analysis of the trend of indicators of the functioning of the construction sector, it was determined that new residential construction is gradually concentrated in the regions of the Carpathian region (Zakarpattia, Ivano-Frankivsk, and Chernivtsi), and Lviv has become its center. The transformation of the structure of new construction in terms of residential and non-residential was noted in favor of the latter - its share in Ukraine increased by 7.6 percentage points compared to 2021, while the situation in completed construction is the opposite - the share of housing increased by 6.1 percentage points. According to the results of the assessment of the values of the indicator of the volume of industrial products sold, positive dynamics of the recovery of most industries were revealed and emphasis was placed on the transformation of the structure of the domestic processing industry in the direction of increasing the share of high-tech industries in it, in particular, machine building. The problems of the Ukrainian agricultural sector are diagnosed in the context of direct and indirect losses incurred as a result of Russian armed aggression. The trends of changes in the values of the index of agricultural products of crop production and livestock production in Ukraine in a regional section were determined. On the basis of the results of the structural and dynamic assessment of the size of the sown areas of agricultural crops in the regions during the Great War, it was established that the decrease in the volume of crop production in Ukraine is closely correlated with the loss of sown areas. It was revealed that the concentration of domestic export potential is gradually shifting to the western and central regions. The transformation of the structure of foreign economic operations in Ukraine was noted, in particular,

in the direction of increasing the tendency to dominate the export of low-tech goods, while the import of high-tech goods. The latter is explained by the growing needs of the domestic defense-industrial complex in the appropriate nomenclature of machine-building products.

**Keywords:** economy, transformation, war, development, dynamics, construction, industry, agriculture, export, import.

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