

Authors' contribution/
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 A. Study design/
 Zaplanowanie badań
 B. Data collection/
 Zebranie danych
 C. Statistical analysis/
 Analiza statystyczna
 D. Data interpretation/
 Interpretacja danych/
 E. Manuscript preparation/
 Przygotowanie tekstu
 F. Literature search/
 Opracowanie
 piśmiennictwa
 G. Funds collection/
 Pozyskanie funduszy

DOMINANTS OF STRUCTURAL CHANGES IN THE ECONOMY OF UKRAINE: REGIONAL DIMENSION

DOMINANTY ZMIAN STRUKTURALNYCH W UKRAIŃSKIEJ GOSPODARCE: WYMIAR REGIONALNY

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Citation: Ishchuk, S. (2025). Dominants of structural changes in the economy of ukraine: regional dimension / Dominanty zmian strukturalnych w ukraińskiej gospodarce: wymiar regionalny/ *Economic and Regional Studies / Studia Ekonomiczne i Regionalne*, 18(2), 126-138 <https://doi.org/10.2478/ers-2025-0011>

ORIGINAL ARTICLE

JEL code: O10,R10

Submitted:

February 2024

Accepted:

May 2025

Tables: 3

Figures: 5

References: 14

ORYGINALNY ARTYKUŁ NAUKOWY

Klasyfikacja JEL: O10,R10

Zgłoszony:

lutu 2024

Zaakceptowany:

maj 2025

Tabele: 3

Rysunki: 5

Literatura: 14

Abstract

Subject and purpose of the work: Russian armed aggression sharply slowed down the socio-economic development of Ukraine, causing colossal loss of human capital, productive and non-productive assets, and disruption of logistics and economic ties. Under the influence of these losses and destruction, the Ukrainian economy underwent significant changes. The purpose of the article is to assess the determinants of the structural and spatial transformation of the economy of Ukraine in a regional context.

Materials and methods: The information base of the study was official data from the State Statistics Service of Ukraine. During the study, methods of trend analysis of indicators of the volume of sold products, gross added value, output, employment, and labor productivity in the context of basic types of economic activity and regions of Ukraine were applied. The justification of the determinants of the structural and spatial transformation of the Ukrainian economy was based on methods of comparative analysis, data systematization, and scientific abstraction.

Results: Based on the analysis of the values of the gross domestic product indicator of Ukraine, structural changes in the national economy were diagnosed during 2021-2023. Vectors of development of basic types of economic activity, in particular, industry, agriculture, trade, and construction, were established in comparison with the losses incurred in the conditions of a full-scale war. The emphasis was on the positive transformation of the structure of output of industrial and, in particular, metallurgical products in Ukraine. Changes in the export potential of the domestic processing industry by production were analyzed. Changes in the economic specialization of the regions of Ukraine were determined by the criterion of the share of basic types of economic activity in gross value added.

An assessment of the results of the functioning of the economies of the regions was carried out by indicators of the volume of products sold, output, employment, and labor productivity.

Conclusions: Despite significant losses and destruction as a result of a full-scale war, the economy of Ukraine is gradually recovering. All basic types of economic activity demonstrate positive development dynamics. The restoration of the industrial sector of the Ukrainian economy is taking place mainly through increasing the production of defense products, which stimulated the accelerated development of all segments of mechanical engineering. The prospects for further development of the Ukrainian economy lie in the plane of neo-industrialization.

Key words: sold products, gross value added, industry, agriculture, trade, transformation

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Journal included in: SCOPUS; AgEcon Search; AGRO; Arianta; Baidu Scholar; BazEkon; Cabell's Journalytics; CABI; CNKI Scholar; CNPIEC – cnLINKer; Dimensions; DOAJ; EBSCO; ERIH PLUS; ExLibris; Google Scholar; Index Copernicus International; J-Gate; JournalTOCs; KESLI-NDSL; MIAR; MyScienceWork; Naver Academic; Naviga (Softweco); Po-lish Ministry of Science and Higher Education; QOAM; ReadCube, Research Papers in Economics (RePEc); SCILIT; Scite; Semantic Scholar; Sherpa/RoMEO; TDNet; Ulrich's Periodicals Directory/ulrichsweb; WanFang Data; WorldCat (OCLC); X-MOL

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Streszczenie

Przedmiot i cel pracy: Rosyjska agresja zbrojna gwałtownie spowolniła rozwój społeczno-gospodarczy Ukrainy, powodując kolosalne straty w kapitale ludzkim, majątku produkcyjnym i nieprodukcyjnym oraz zakłócenia logistyki i powiązań gospodarczych. Pod wpływem tych strat i zniszczeń ukraińska gospodarka przeszła znaczące zmiany. Celem artykułu jest ocena czynników determinujących strukturalną i przestrzenną transformację gospodarki Ukrainy w kontekście regionalnym.

Materiały i metody: Podstawą informacyjną badania były oficjalne dane Państwowej Służby Statystycznej Ukrainy. Podczas badania zastosowano metody analizy trendów wskaźników wielkości sprzedanych produktów, wartości dodanej brutto, produkcji, zatrudnienia i wydajności pracy w kontekście podstawowych rodzajów działalności gospodarczej i regionów Ukrainy. Uzasadnienie uwarunkowań transformacji strukturalnej i przestrzennej ukraińskiej gospodarki oparto na metodach analizy porównawczej, systematyzacji danych i abstrakcji naukowej.

Wyniki: Na podstawie analizy wartości wskaźnika produktu krajowego brutto Ukrainy zdiagnozowano zmiany strukturalne w gospodarce narodowej w latach 2021-2023. Ustalono wektory rozwoju podstawowych rodzajów działalności gospodarczej, w szczególności przemysłu, rolnictwa, handlu i budownictwa, w porównaniu ze stratami poniesionymi w warunkach wojny na pełną skalę. Nacisk położono na pozytywną transformację struktury produkcji wyrobów przemysłowych, a w szczególności metalurgicznych w Ukrainie. Przeanalizowano zmiany potencjału eksportowego krajowego przemysłu przetwórczego według produkcji. Zmiany w specjalizacji gospodarczej regionów Ukrainy określono na podstawie kryterium udziału podstawowych rodzajów działalności gospodarczej w wartości dodanej brutto.

Ocenę wyników funkcjonowania gospodarek regionów przeprowadzono za pomocą wskaźników wielkości sprzedanych produktów, produkcji, zatrudnienia i wydajności pracy.

Wnioski: Pomimo znacznych strat i zniszczeń w wyniku wojny na pełną skalę, gospodarka Ukrainy stopniowo się odbudowuje. Wszystkie podstawowe rodzaje działalności gospodarczej wykazują pozytywną dynamikę rozwoju. Odbudowa sektora przemysłowego ukraińskiej gospodarki odbywa się głównie poprzez zwiększenie produkcji wyrobów obronnych, co pobudziło przyspieszony rozwój wszystkich segmentów inżynierii mechanicznej. Perspektywy dalszego rozwoju ukraińskiej gospodarki leżą w płaszczyźnie neoindustrializacji.

Słowa kluczowe: produkty sprzedane, wartość dodana brutto, przemysł, rolnictwo, handel, transformacja

Introduction

Over the past decade, the national economy has been in a state of permanent turbulence caused by Russian armed aggression. The losses from the occupation of parts of Donetsk and Luhansk regions and the Autonomous Republic of Crimea in 2014 were estimated at 98.8 bill USD, which is 88.1% of GDP. This amounted to 88.1% of Ukraine's GDP in 2017 (Aslund, 2018). Since the beginning of the full-scale invasion, the total amount of indirect losses (i.e., losses of revenues in various sectors of the economy and additional costs associated with the war) that have been and will be incurred by Ukraine is estimated at 1.164 trill USD (in the form of revenue) or the actual and projected losses of revenues in various sectors of the economy are estimated at 1.164 trill USD (in the form of revenue) or more than 385 bill USD (in the form of value added) (Kyiv School of Economics, 2024). Thus, the actual and projected losses of value added are almost in twice as high as Ukraine's GDP in 2021. The largest amounts of indirect losses in the form of revenue are in the productive sectors, namely trade (450.5 bill USD), industry, including construction and services (410 bill USD), and agriculture (83.1 bill USD). Before the great war, these sectors accounted for more than 50% of Ukraine's GDP. Accordingly, the study of key trends in the functioning of these sectors of the national economy, in particular in the regional context, is extremely relevant, primarily in view of the need to assess the potential for their recovery and determine the prospects for further development.

Analysis of recent research and publications

The urgent issues of the functioning of the national economy in the context of a full-scale war and the prospects for its further recovery and development are a key topic of research by many domestic scholars, in particular, representatives of the National Academy of Sciences of Ukraine. Thus, a conceptual and practical plan for the reconstructive post-war recovery of the Ukrainian economy is presented in (NAN Ukrainy, DU "Instytut ekonomiky ta prohnozuvannia NAN Ukrainy", 2022). The issues of state support for the post-war development of priority industries that are of strategic importance for the sustainable development of the economy and the defense capability of the state are discussed in (Lunina et al., 2023). The possibilities of post-war restoration of the scientific, technical and innovation spheres of Ukraine in the

context of stimulating economic development and ensuring progressive structural changes in the economy, as well as directions for improving approaches to assessing the effectiveness of innovation activities are considered in (Yehorov, Kindzerskyi, 2023). In (Kisterskyi, 2023), the main strategic principles of post-war reconstruction of Ukraine are identified and analyzed. The author substantiates the need to create a specific recovery program agreed with donor countries, which will allow Ukraine not only to rebuild on European principles, but also to gain membership in Euro-Atlantic structures. The author outlines the contours of such a program and ways to implement it. In (Zablods, 2024), a methodological approach to determining the socio-economic performance and efficiency of the life of territorial communities in wartime is proposed. The problems and prospects for the development of Ukrainian agriculture in wartime are widely covered in (Ishchuk, 2024).

Objective

At present, an important issue of scientific research is the formation of an analytical platform for updating regional strategies for socio-economic development until 2027. Given this, the purpose of the article is to assess the determinants of the structural and spatial transformation of the economy of Ukraine in a regional.

Results of the study

The full-scale war has caused the significant transformations in Ukraine's economy, a clear manifestation of which was the change in the structure of GDP towards a significant (3.6 in times during 2022-2023) increase in the share of public administration and defense (Figure 1).

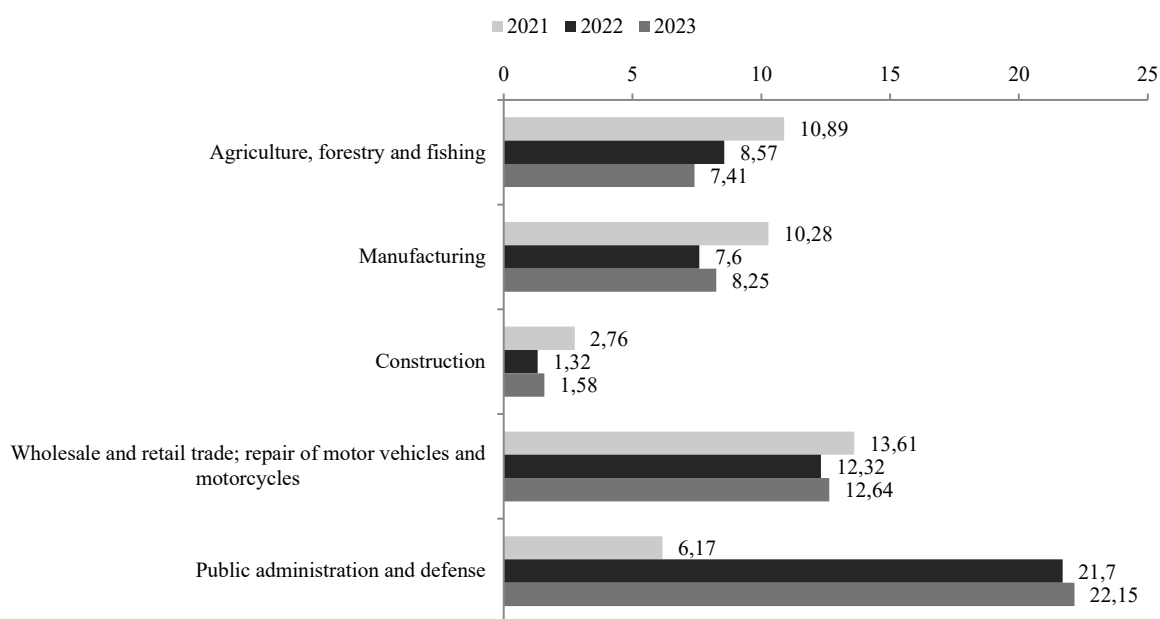


Figure 1. The share of basic R&D in GDP of Ukraine, %

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024f) (access: 09/02/2025).

The volume of GDP (in actual prices) accounted for by this type of economic activity (TEA) increased 4.3 in times compared to 2021 and amounted to 144.8051 mill UAH in 2023, which is 1.75 in times higher than the volume of GDP generated in wholesale and retail trade, which was the leader in Ukraine in terms of this indicator before the great war. In 2021, agriculture accounted for more than 17% of the employed population in Ukraine and 10.89% of GDP. That is, before the full-scale war, this economic activity was the

second largest contributor to Ukrainian economy after trade, but by the end of 2023 it was only the fourth. Such structural changes are explained by a significant deterioration in the dynamics of agricultural GDP in actual prices (-18.4% in 2022-2023) compared to other TEAs, in particular, manufacturing (-3.8%), trade (+11.3%), and the public administration and defense (+430.4%). In 2023, the highest GDP growth rates among productive TEAs were demonstrated by the construction (+24.6%) and manufacturing (+13.8%), which experienced the largest decline in 2022 (Figure 2).

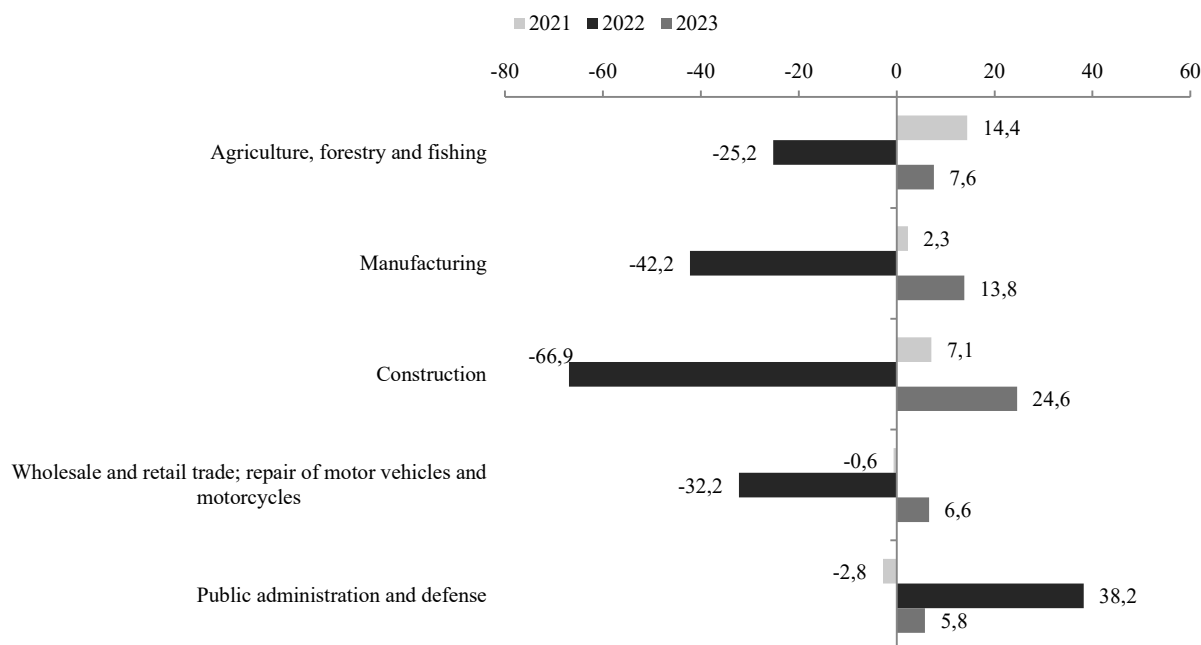


Figure 2. GDP growth/decline rate of basic GDP, %

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024f) (access: 09/01/2025).

The gradual recovery of Ukrainian economy is evidenced, in particular, by the increase in the volume of products sold in 2023 by 23.32% (Figure 3).

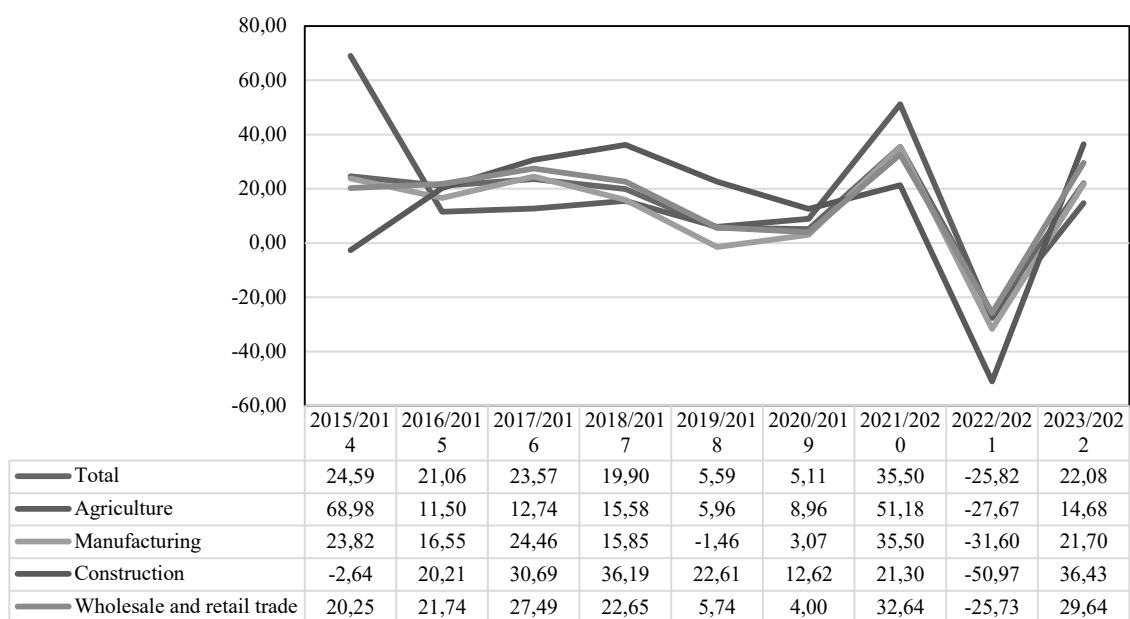


Figure 3. The growth rate of sold products in Ukraine, %

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024d) (access: 09/01/2025).

In value terms, the volume of sales in actual prices amounted to 90.56% of the value of 2021, in which the highest growth rate of sales in the economy as a whole (+35.5%) and especially in the agriculture, forestry and fisheries (+51.18%) was achieved during the analyzed period (since 2014). However, by the end of 2023, the volume of sales of this type of economic activity amounted to only 82.95% of the pre-war level, which was the result of significant losses caused by Russian armed aggression. Thus, as of 01.07.2024, indirect financial losses of Ukrainian agriculture are estimated at 83 bill USD (Kyiv School of Economics, 2024). The largest share of these losses (46.5 bill USD) is due to the reduction in crop production, which accounts for more than 80% of the structure of domestic agricultural production. In addition, the amount of direct losses from the loss of assets, in particular, the destruction of the Kharkhov dam, partial or complete destruction of storage facilities, fisheries and aquaculture, perennial crops, forced slaughter of livestock, as well as destruction and theft of production resources and products is estimated at 10.3 bill USD.

In the structure of sales of the business entities by TEA in Ukraine, the largest share (~40%) is invariably occupied by such economic activities as wholesale and retail trade, repair of motor vehicles and motorcycles. As a result of the full-scale war, indirect financial losses of domestic trade amounted to almost 525 bill USD (Kyiv School of Economics, 2024). These losses are associated, in particular, with the outflow of a significant part of the population abroad, the changes in the volume and structure of consumption, and disruption of supply chains. However, despite the enormous losses, in 2023, the volume of sales of this type of export-import activity increased by 30%. At the same time, the index of physical volume of wholesale trade turnover amounted to 103.7%, the index of physical volume of retail trade turnover (which includes data on the retail turnover of enterprises (legal entities and individual entrepreneurs) whose main economic activity is retail trade) – 117.0%, and the index of physical volume of retail trade turnover of retailers (legal entities) – 113.4%. Compared to 2021, the retail trade turnover in Ukraine increased by 28.5%, while the wholesale turnover of wholesale trade enterprises (legal entities) increased by only 0.14%. In the first half of 2024, the index of physical volume of retail trade turnover averaged 115.4%, and the index of physical volume of retail trade turnover of retailers (legal entities) was 119.6%. The higher dynamics of latter index indicates, among other things, the active development of retail in Ukraine.

The recovery of the industrial sector of Ukraine's economy is primarily driven by an increase in defense production. The constant growth of defense industry needs has stimulated the accelerated development of the machine-building, primarily the production of computers, electronic and optical products (+61.3% in the first half of 2024), the production of electrical equipment (+21.7%) and the production of other vehicles (+36.3%). The latter includes the production of military vehicles. The result of this positive trend was an increase in the total share of the machine-building production in the structure of sales to 7.1% in 2024 (up from 5.7% in 2021).

The domestic steel industry suffered the largest decline as a result of the full-scale war. In particular, a 60.2% decline in the volume of steel products sold in 2022-2023 led to a more than 2-fold decrease in the share of this basic segment in the structure of Ukraine's industry. In turn, this was a direct consequence of the huge loss of production facilities located in the southeastern regions. Thus, the completely destroyed PJSC Ilyich Iron and Steel Works of Mariupol and PJSC Azovstal Iron and Steel Works in 2021 together accounted for 19.95% of metallurgical products sold in Ukraine. In total, almost 87% of steel products were manufactured in Dnipropetrovsk (35.85%), Donetsk (32.24%) and Zaporizhzhia (18.61%) regions. Accordingly, metallurgy was the main industrial segment in these regions: in 2021, the share of metallurgical products in total industrial sales in Donetsk region was 53.20%, in Zaporizhzhia region – 39.50% and in Dnipropetrovsk region – 34.20%. By the end of 2023, the latter accounted for 46% of the domestic steel industry.

The highest recovery rates (+24.6% of GDP and +36.43% of sales) among all the TEAs in 2023 were demonstrated by construction, which in the first year of the full-scale war experienced the largest drop in GDP (-66.9%). However, despite the growth in GDP and sales in the construction sector, the total area of residential and non-residential buildings at the beginning of construction in Ukraine decreased by 23.2% (or 2135047 m²) in 2023, and by 62.7% (or 11884553 m²) since 2021. The construction also saw the largest reduction in the number of full-time equivalent employees: -42.6% in 2022-2023 (compared to -25.5% on average in Ukraine).

The great war led to a transformation in the structure of new construction in terms of residential and non-residential construction in favor of the latter – in 2023, its share in Ukraine increased by 7.6 percentage points (to 40.5%) compared to 2021, while the situation is the opposite in completed construction – the share of housing increased by 6.1 percentage points (pp.). The growing trend towards an increase in the share of non-residential buildings in new construction (the most notably in frontline regions, especially in Kyiv region) is explained by the influence of both security factors and the need for construction for the defense industry. Instead, residential buildings dominate the structure of completed construction, accounting for 78.45% in September 2024. In the first 9 months of this year, 858.2638 m² of residential and non-residential buildings were commissioned in Ukraine, which is 88.3% of the same indicator for the whole of 2023 and is evidence of positive trends in the functioning of this sector of the national economy.

In addition to structural ones, Russia's full-scale armed aggression has caused significant spatial transformations in Ukraine's economy. Thus, in the structure of sold products in 2022-2023, the share of regions in which active hostilities are (were) conducted and adjacent to them naturally decreased (Table 1).

Table 1. The share of regions in the volume of products (goods, services) sold in Ukraine by economic entities and TEA, %

Region	Total		Agriculture, forestry and fisheries		Processing industry		Construction		Wholesale and retail trade; repair of motor vehicles and motorcycles	
	2021	2023	2021	2023	2021	2023	2021	2023	2021	2023
Vinnitsia	2.18	2.64	6.05	7.64	2.97	4.79	4.79	4.42	1.47	1.85
Volyn	1.79	2.17	1.69	2.02	1.69	2.32	1.07	1.77	2.67	3.11
Dnipropetrovsk	10.96	10.40	4.64	5.35	15.90	17.03	8.41	8.76	10.53	10.97
Donetsk	4.33	0.87	2.01	0.49	10.93	0.40	3.07	0.99	2.70	0.18
Zhytomyr	1.26	1.49	2.84	2.87	1.49	2.59	1.08	1.47	1.15	1.33
Zakarpattia	0.78	0.97	0.45	0.38	0.83	1.50	0.73	1.15	0.72	0.88
Zaporizhzhia	3.23	2.18	3.13	0.70	7.83	5.80	1.55	1.07	1.94	1.52
Ivano-Frankivsk	1.30	1.28	1.21	1.64	2.15	2.00	1.65	2.70	0.91	1.01
Kyiv	5.46	6.49	6.94	9.11	5.69	7.88	8.00	7.77	6.23	7.23
Kirovohrad	1.16	1.31	4.37	5.69	1.31	1.80	0.58	0.62	1.03	1.02
Luhansk	0.44	0.01	1.45	...	0.53	...	0.26	...	0.30	0.00
Lviv	4.48	6.30	3.13	3.79	4.61	7.45	6.10	9.09	4.72	7.15
Mykolaiv	1.81	1.24	3.33	3.58	1.70	1.28	1.44	1.64	2.02	1.19
Odesa	4.40	4.23	3.57	4.11	2.93	2.88	11.84	9.67	5.12	5.14
Poltava	3.08	2.77	6.05	8.27	4.98	3.15	2.43	2.32	1.78	2.20
Rivne	0.94	1.15	1.96	2.16	1.22	1.89	1.41	2.26	0.74	0.90
Sumy	1.20	1.13	4.67	5.11	1.66	2.03	0.77	0.80	0.84	0.57
Ternopil	1.00	1.20	3.20	4.74	0.95	1.42	1.20	1.12	0.78	0.86
Kharkiv	4.61	3.74	4.87	3.88	5.80	5.08	4.75	3.65	4.61	3.53
Kherson	0.91	0.08	3.45	...	0.95	...	0.59	...	0.68	0.03
Khmelnitskyi	1.36	1.48	4.95	6.71	1.53	2.14	2.33	1.65	0.98	0.89
Cherkasy	2.37	2.52	5.09	7.06	2.83	4.27	1.54	1.92	1.76	2.03
Chernivtsi	0.50	0.73	0.58	0.64	0.36	0.74	0.49	0.68	0.55	0.91
Chernihiv	2.04	1.06	17.17	6.46	1.98	1.40	1.03	1.26	0.76	0.45

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024d) (access: 09/01/2025).

In particular, the share of Donetsk region in this structure decreased by 5 in times. Kherson region – by more than 11 in times. and Luhansk region – by 44 in times. Such structural changes were caused by a drop in the volume of products sold in regions over analyzed period by 81.72%, 91.90% and 98.72% (Figure 4).

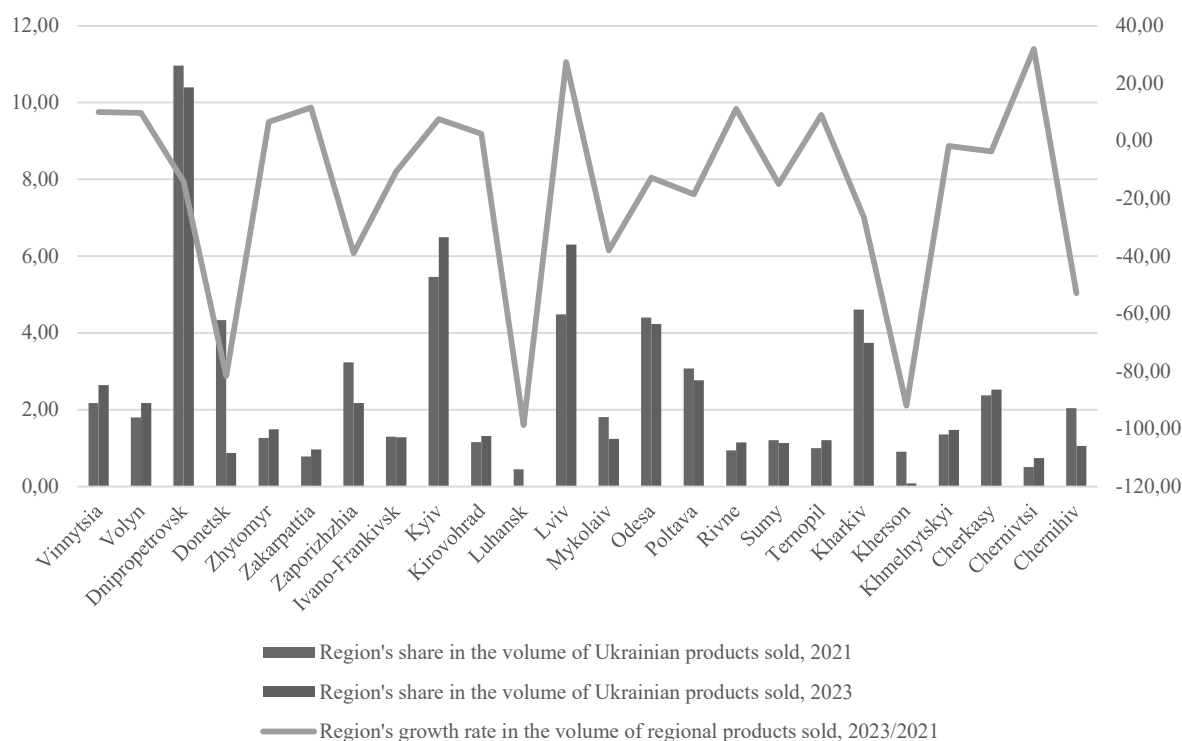


Figure 4. The indicators of the structure and dynamics of sold products in the regions of Ukraine, %

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024c) (access: 09/01/2025).

A significant decrease in this indicator also occurred in Zaporizhzhia (-39.00%). Mykolaiv (-37.95%) and Chernihiv (-52.92%) regions. However, it is worth noting that in 2021, all these regions showed a significant increase in sales (compared to the average in Ukraine), especially Chernihiv region (+124.71%).

In 2022-2023, sales volumes increased only in the regions of Western region (except Ivano-Frankivsk), as well as in Vinnytsia, Zhytomyr, Kyiv and Kirovohrad regions. In Chernivtsi region achieved the highest growth in sales during this period (+31.99%), including +69.48% in manufacturing and +58.79% in trade. In Lviv region was the second fastest growing region (+27.37%), which allowed it to rise to the 3rd position (after Dnipropetrovsk and Kyiv regions) among regions of Ukraine in terms of sales. Also, Lviv region was the only one that showed an increase in total sales in 2022 (+6.04%). Moreover, this region achieved a 27.96% increase in value added, while it decreased by 17.1% in the first year of the war in Ukraine (Table 2). The most significant was the increase in value added in trade (+136.91%), which has become dominant in Lviv region's economy since 2023, outpacing manufacturing industry.

The significant structural transformations that took place in Ukraine's economy under influence of full-scale war have led to changes in the economic specialization of the regions (Table 3).

Table 3. The specialization of the economy of Ukraine's regions (by the share of TEA in value added), %*

Region	Industry				Agriculture				Trade			
	2012	2017	2021	2023	2012	2017	2021	2023	2012	2017	2021	2023
Vinnitsia	18.3	21.4	23.6	33.1	22.4	28.1	29.4	17.6	10.8	8.9	13.2	28.3
Volyn	16.4	15.4	26.4	19.9	16.6	17.2	12.0	4.8	15.3	25.5	36.4	61.4
Dnipropetrovsk	47.3	48.2	59.1	34.8	4.9	7.3	4.6	3.7	12.9	11.4	19.7	41.0
Donetsk	39.9	49.9	69.5	76.4	4.2	7.2	5.1	2.5	16.2	8.0	11.1	8.9
Zhytomyr	22.7	19.0	33.7	40.4	19.2	23.5	24.9	12.3	10.6	10.7	18.1	30.8
Zakarpattia	20.2	15.1	39.2	56.0	14.2	15.2	6.0	3.1	17.4	12.4	18.7	13.2
Zaporizhzhia	43.9	42.4	57.6	41.1	8.5	12.0	10.7	2.7	11.6	10.7	11.9	38.4
Ivano-Frankivsk	30.2	28.0	50.0	41.1	12.2	14.4	9.1	6.8	13.7	11.6	12.1	21.9
Kyiv	18.2	21.5	36.4	35.8	13.5	14.3	13.7	8.6	18.6	16.3	24.3	39.2
Kirovohrad	22.2	19.1	23.9	25.7	23.2	31.3	43.0	31.8	11.5	10.4	16.3	27.1
Luhansk	45.2	23.1	30.4	5.21	6.3	21.3	37.0	...	10.5	6.7	12.0	10.1
Lviv	17.9	22.9	30.0	22.9	9.0	9.6	7.0	2.3	17.7	15.5	29.8	56.2
Mykolaiv	25.7	21.1	26.3	25.0	16.3	21.9	22.8	21.6	12.9	12.5	21.8	34.0
Odesa	13.1	12.5	14.8	14.2	7.4	11.5	9.72	6.6	14.9	14.6	26.4	46.9
Poltava	44.2	54.1	58.9	34.5	14.2	14.3	23.5	13.5	8.0	6.9	...	33.4
Rivne	26.2	24.5	34.7	35.5	17.1	19.9	21.6	5.3	11.1	11.6	15.2	36.3
Sumy	27.3	22.5	30.8	41.8	16.2	26.1	35.7	26.0	15.0	9.7	14.4	14.8
Ternopil	13.6	14.2	28.2	29.9	24.2	28.1	32.4	24.8	12.3	10.6	12.8	19.7
Kharkiv	21.3	31.0	27.0	18.5	8.8	11.1	12.4	4.7	15.3	11.7	26.1	38.7
Kherson	16.0	15.1	30.2	43.2	24.2	33.0	36.3	...	12.1	10.5	14.4	17.3
Khmelnyskyi	20.3	17.5	27.2	38.0	22.1	31.1	37.1	21.9	10.0	10.3	11.3	20.2
Cherkasy	24.3	25.2	22.4	32.6	21.8	21.8	37.5	20.8	12.8	13.9	19.4	32.5
Chernivtsi	9.9	10.7	23.0	19.1	20.2	22.3	8.2	5.0	12.2	13.1	27.6	53.2
Chernihiv	24.9	20.5	14.7	31.0	20.8	28.2	75.2	29.4	11.0	8.8	3.6	18.0

The notes. *Cells in which the value of the indicator (share of TEA in the region's value added) is the highest in the respective year are grayed out

Source: Author's development according to (State Statistics Service of Ukraine, 2024a) (access: 09/01/2025).

Thus, in 2023. the number of regions dominated by industry (in terms of share in value added) increased to 15 (as in 2012). It is worth noting the return to industrial specialization of the economies of Zhytomyr, Zakarpattia and Chernihiv regions, as well as the transition to it in Vinnytsia, Ternopil, Kherson and Khmelnytsk regions. Instead, the traditionally "industrial" Dnipropetrovsk, Lviv and Kharkiv regions have become "commercial". In general, the list of number of regions with the highest value added in trade increased to 7 (compared to 2 in 2012 and 2017). At the same time, only Kirovohrad region retained its agricultural specialization, while in 2021 there were 10 such regions. However, it is necessary to emphasize growing trend towards diversification of regional economic development: in 2023, even in the traditionally "agrarian" Kirovohrad region, the difference between shares of basic TEA in value added did not exceed 10 pp. A similar situation was observed in Mykolaiv, Ternopil, Khmelnytsk, Cherkasy and Chernihiv regions.

The weakening of agricultural specialization of the regions, i.e. the reduction of value added generated by these TEAs, was a direct consequence of the huge losses (a direct and indirect) of Ukrainian farmers during the great war. First of all. this applies to Kherson region, which temporarily lost more than 95% of its crop acreage. At the same time, it should be emphasized that agriculture, compared to other analyzed TEAs, saw the smallest reduction in the number of employees in full-time equivalent in 2022-2023 (-22.06%). However, in 2023. this negative trend continued in the agricultural sector of all regions (except Mykolaiv), while in the manufacturing industry, employment increased slightly in 3 regions (Volyn, Ivano-Frankivsk and Rivne), in construction – in 4 regions (Vinnytsia, Volyn, Kirovohrad and Cherkasy), and in trade – in 18 regions.

During 2022-2023, the best correlation between the dynamics of output and employment was demonstrated by Lviv, Volyn and Chernivtsi regions. These regions experienced the largest increase in output with the smallest decrease in the number of employees in full-time equivalent (Figure 5).

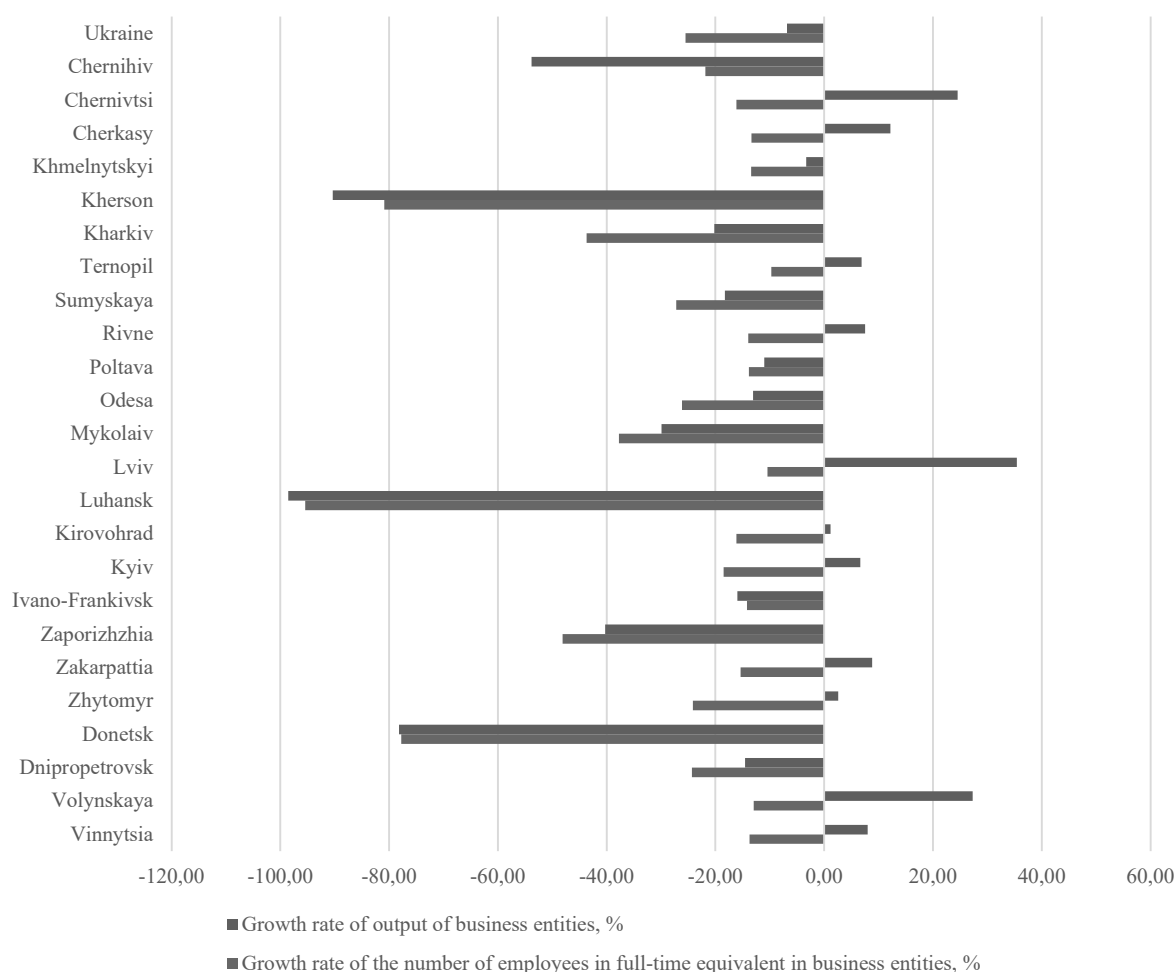


Figure 5. The indicators of output and employment in the regions of Ukraine, %

Source: Author's calculations based on (State Statistics Service of Ukraine, 2024b; State Statistics Service of Ukraine, 2024e) (access: 09/01/2025).

As a result, the level of labor productivity in the economy of these regions increased by 1.5 in times compared to 2021.

In Lviv region consistently demonstrates the highest labor productivity in agriculture (2850.7 thousand UAH per person in 2023). A labor productivity here is calculated as the ratio of the volume of output to the number of employees in the equivalent of full-time employment in a business entities. So Ternopil, Khmelnytsk, Sumy and Volyn regions are also among the leaders in terms of this indicator (Table 4). At the same time, in the manufacturing industry, the labor productivity indicator in 2023 was significantly increased by Vinnytsia (1.6 in times compared to 2021), Kyiv (1.5 in times), Cherkasy (1.4 in times) and Dnipro (1.3 in times) regions. However, while in the first three regions the increase in productivity in industrial processing was the result of a significant increase in output with a relatively small reduction in the number of full-time equivalent employees, in Dnipro region the reduction was 31.8% (compared to 2021). But even despite the negative employment dynamics, the level of labor productivity in manufacturing industry of Dnipro region (3443.9 thousand UAH per person) in 2023 was the highest not only among the regions of Ukraine, but also among the analyzed TEAs. However, it would be noted here that in Donetsk region in 2021, the value of this indicator was 4370.6 thousand UAH per person.

Conclusions

The functioning in the unprecedentedly difficult geopolitical and socio-civilization conditions in which Ukraine has been for more than 10 years, and which have critically escalated after February 24, 2022, the national economy continues to develop. Two of its main export-oriented sectors (the agriculture and metallurgy), which suffered huge losses as a result of Russia's full-scale invasion, are once again showing positive trends in the production indicators. Thus, in 2023, all the regions except Zaporizhzhia, Luhansk, Sumy regions and Kherson region increased agricultural production, in particular, crop production, Kharkiv, Kyiv, Mykolaiv and Odesa regions should be singled out as having achieved high rates of recovery of their agricultural potential.

Despite enormous losses (direct and indirect), first of all Ukraine's trade sector, especially retail, is actively developing. It consistently occupies the largest share (~40%) in the structure of sales of business entities. This TEA demonstrates positive trends not only in terms of output, value added, and wages, but also in the number of employees in full-time equivalent. This is primarily due to accelerated development of retail, as well as the growth of e-commerce. As a result, wholesale and retail trade has become dominant in the value added structure of seven regions, three of which (Dnipro, Lviv and Kharkiv) were traditionally "industrial" before the great war.

Summarizing the key trends in the development of the construction sector in Ukraine in 2022-2023, it can be said that new residential construction is gradually concentrated in the regions of the Carpathian region (Zakarpattia, Ivano-Frankivsk and Chernivtsi), with Lviv region becoming its center. The increase in residential construction in region, in turn, will contribute to the development of infrastructure, including tourism, recreation and the other related TEAs. A business activity in the construction sector is gradually increasing, and the war has resulted in the renovation of housing, industrial and social infrastructure, and production facilities, all in accordance with new technical construction standards, including safety standards.

The recovery of Ukraine's industrial sector is being driven mainly by an increase in defense production. The constant growth of defense industry needs has stimulated the accelerated development of all segments of machine building, the most notably the production of computers, electronic and optical products, motor vehicles, trailers and semi-trailers, and other vehicles. The latter includes the production of military vehicles. In turn, the opening of the Office of Defense Innovation in Kyiv laid the foundation for deeper strategic cooperation in research and development between Ukraine and EU and will facilitate the gradual integration of the Ukrainian defense industry into the European defense technology and industrial base, as well as EU defense equipment market. These facts create the basis for optimistic forecasts of structural transformation (in the medium and long term) of the industrial sector of the national economy towards an increase in the share of high-tech industries, especially machine building. This will allow Ukraine to restore and further increase its industrial and, in particular, defense potential on a new technological basis.

Despite significant military risks. Ukraine remains very attractive for foreign investment, especially in the defense sector. In the near future, it will be able to play the role of a regional production hub in Eastern Europe.

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Table 2. The rate of growth of added value at production costs of economic entities in the regions of Ukraine, %

Region	Total			Agriculture, forestry and fisheries			Processing industry			Construction			Wholesale and retail trade; repair of motor vehicles and motorcycles		
	2021/ 2020	2022/ 2021	2023/ 2022	2021/ 2020	2022/ 2021	2023/ 2022	2021/ 2020	2022/ 2021	2023/ 2022	2021/ 2020	2022/ 2021	2023/ 2022	2021/ 2020	2022/ 2021	2023/ 2022
Ukraine	41.09	-17.10	21.60	96.00	-47.24	-11.45	36.52	-38.75	39.10	35.80	-46.57	19.50	24.07	23.81	34.93
Vinnitsia	63.10	-18.77	31.07	92.50	-25.08	-14.91	36.78	11.78	36.65	208.02	-70.42	138.40	21.73	47.59	54.54
Volyn	16.41	-0.88	62.69	57.04	-16.83	-22.34	27.13	-1.21	21.54	8.30	-25.83	48.40	0.99	21.44	124.40
Dnipropetrovsk	53.68	-37.44	20.65	75.68	-30.18	-13.84	68.62	-67.35	69.05	16.47	-49.09	20.73	10.62	21.80	28.90
Donetsk	48.25	-65.03	-8.81	38.69	-77.29	-31.06	76.93	-93.31	-73.11	-6.18	-74.65	-0.66	43.95	-67.73	-20.39
Zhytomyr	15.58	-5.03	16.78	26.67	-14.31	-36.18	4.76	-4.97	67.20	7.90	2.35	-18.30	10.26	31.89	42.77
Zakarpattia	3.81	9.28	13.45	41.27	...	...	2.92	16.40	37.66	29.92	-9.84	-5.82	-14.51	18.00	-25.85
Zaporizhzhia	64.26	-43.39	-10.25	59.01	-69.74	-57.44	109.88	-52.61	-13.45	16.52	-31.04	-27.37	18.17	24.07	32.12
Ivano-Frankivsk	32.62	-15.30	7.14	40.38	-26.64	-7.34	68.41	-52.23	19.13	49.92	-3.69	2.56	-20.04	47.33	11.08
Kyiv	14.27	-22.38	37.14	49.53	-36.74	6.42	29.70	-23.80	62.98	5.76	-48.16	35.47	-13.31	24.69	37.44
Kirovohrad	37.52	-11.77	7.35	79.41	-11.63	-20.54	4.59	9.87	10.15	23.64	-42.14	54.85	-1.26	19.30	31.87
Luhansk	16.41	-84.23	-83.99	113.27	...	...	-3.42	-99.02	...	-11.50	...	...	-8.76	-83.77	-86.62
Lviv	29.86	27.96	26.91	38.02	-36.36	-15.61	24.48	6.84	23.47	26.97	-25.23	11.01	18.45	136.91	29.07
Mykolaiv	16.64	-49.14	46.90	70.72	-35.02	9.19	-0.77	-58.85	69.50	10.32	-49.72	38.70	7.77	-50.98	138.21
Odesa	28.69	-15.48	27.66	477.78	-28.77	3.31	-8.68	-14.39	18.19	57.98	-66.00	37.23	14.60	38.29	38.75
Poltava	6.11	-1.19	12.84	45.94	-32.41	-4.99	15.66	-35.40	43.61	22.31	-11.15	-3.34	-123.07	-1118.76	29.75
Rivne	22.10	-5.50	8.40	93.41	-14.24	-70.55	6.99	-11.93	43.80	16.76	-7.76	-6.83	1.24	61.20	51.26
Sumy	9.06	-29.52	17.83	-6.32	-32.48	-10.21	22.73	-27.78	43.88	2.01	-35.51	9.83	29.56	-42.28	47.87
Ternopil	23.55	-5.84	16.63	46.67	-29.38	18.87	13.27	-2.83	30.29	49.75	-39.12	6.30	-6.17	24.10	36.07
Kharkiv	23.58	-27.76	36.73	22.65	-47.85	-28.29	12.02	-45.94	38.77	38.72	...	...	21.69	17.59	24.80
Kherson	47.21	-58.63	-70.88	106.83	...	...	42.85	-53.83	...	10.83	-71.36	...	33.00	-22.98	-81.23
Khmelnitskyi	27.39	-17.00	9.26	56.50	-25.69	-27.88	9.47	-24.78	80.02	84.91	-61.96	4.16	-11.65	49.93	8.36
Cherkasy	32.56	12.09	14.93	73.13	-14.61	-16.23	-7.49	31.48	32.97	31.06	-44.92	126.93	28.61	39.85	54.21
Chernivtsi	41.19	17.44	16.39	27.19	16.73	-28.67	-0.72	-6.48	27.41	-12.65	-38.02	28.29	134.55	103.50	29.21
Chernihiv	284.69	-78.01	-0.30	597.82	-88.07	-28.29	171.96	-69.86	30.78	9.11	-22.00	11.84	14.34	7.27	2.08

Source: author's development according to (State Statistics Service of Ukraine, 2024a) (access: 09/01/2025).

Table 4. Labor productivity in the regions of Ukraine, thousand UAH/person

Region	Total			Agriculture, forestry and fisheries			Processing industry			Construction			Wholesale and retail trade; repair of motor vehicles and motorcycles		
	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
Ukraine	1456.7	1522.5	1821.0	2118.4	1788.9	2097.7	2041.9	1893.3	2526.3	1851.6	1355.8	2196.5	1154.6	1677.9	1995.1
Vinnitsia	1350.4	1368.7	1690.8	1957.3	1876.1	2143.6	1824.5	2256.5	2923.0	2747.5	1489.3	2473.8	790.8	1078.8	1278.9
Volyn	1084.9	1257.3	1586.8	1849.7	2152.7	2471.2	1479.0	1758.4	1909.3	1155.7	1184.6	1826.5	1064.6	1458.3	2331.7
Dnipropetrovsk	1670.3	1596.1	1887.1	1822.4	1734.9	1834.1	2661.1	2593.1	3443.9	1551.0	1311.3	2327.9	870.5	1173.2	1349.6
Donetsk	1893.2	1519.6	1858.4	1362.7	1010.6	1066.0	4370.6	1743.6	1637.1	1531.1	794.2	1702.4	1025.5	1185.4	1105.9
Zhytomyr	918.5	962.5	1241.9	1542.6	1569.3	1944.6	1027.0	1200.8	1911.5	1387.7	1977.3	2166.3	702.5	857.1	1007.7
Zakarpattia	752.0	812.5	966.6	864.0	...	1660.2	648.8	767.2	1206.0	1128.0	1369.2	1676.5	751.0	946.2	628.6
Zaporizhzhia	1392.4	1579.7	1603.2	1555.1	1343.6	1405.9	2247.6	2503.2	2413.9	1087.4	806.2	1426.4	711.2	1310.9	1579.6
Ivano-Frankivsk	1064.9	927.9	1042.6	1746.2	1992.1	2826.5	2159.0	1497.6	1988.1	1231.3	1411.5	1921.4	534.2	656.7	618.3
Kyiv	1493.5	1426.9	1954.4	1966.3	1455.5	2283.0	2063.4	2005.2	3184.8	1819.3	1146.7	2079.9	1081.7	1552.2	1828.8
Kirovohrad	1074.2	1105.3	1295.6	1758.0	1753.1	1866.4	1532.2	1856.8	2282.4	1057.9	791.4	1253.5	778.3	968.4	1088.6
Luhansk	763.5	1120.0	241.7	1478.5	...	...	1098.9	377.6	...	848.7	...	...	740.1	779.2	280.2
Lviv	1218.4	1528.7	1841.7	2610.5	2520.3	2850.7	1328.5	1587.1	2009.9	1631.4	1577.5	2303.6	1047.9	2185.5	2640.0
Mykolaiv	1224.4	1006.0	1377.8	1956.1	1677.9	2213.5	1666.2	1376.0	2021.4	1339.9	1540.9	2183.7	1048.4	1134.7	1589.6
Odesa	1313.5	1204.9	1545.9	1758.5	1409.1	1877.5	1935.6	1745.6	2341.8	2936.0	1449.6	2678.1	1154.9	1742.2	2180.9
Poltava	1428.8	1356.4	1475.2	1856.6	1722.9	2140.8	2224.6	1553.6	1957.6	1132.7	843.5	1209.6	329.9	1375.2	1245.7
Rivne	829.0	856.5	1036.0	1853.2	1846.4	2061.5	1151.2	1334.0	1758.6	1415.3	1080.7	1906.0	472.7	593.6	775.2
Sumy	1082.9	960.8	1215.4	2314.2	1972.6	2512.9	1223.9	1155.7	1773.0	1007.2	933.1	1500.6	726.2	582.0	616.9
Ternopil	1005.2	1046.2	1190.4	2377.4	2502.7	2819.5	1161.6	1122.6	1617.3	978.8	750.8	966.7	636.9	862.0	874.9
Kharkiv	1132.2	1223.4	1605.5	1927.5	1780.2	1932.4	1324.4	1343.5	1993.8	1541.5	...	1583.1	937.6	1509.2	1699.5
Kherson	1085.3	1110.2	547.3	1797.3	...	...	1651.1	2901.2	...	967.0	927.3	...	844.2	2037.4	676.4
Khmelnitskyi	1131.2	1062.3	1263.6	2424.4	2238.8	2706.6	1420.4	1458.0	1983.1	1601.8	959.9	1121.4	685.2	709.1	705.8
Cherkasy	1321.6	1457.3	1710.9	1805.2	1897.6	2067.9	1958.9	2205.6	2790.2	1227.2	960.1	1924.9	1084.1	1330.6	1588.1
Chernivitsi	757.2	804.9	1124.6	1077.8	1097.2	1861.1	851.3	934.4	1915.7	863.1	677.4	1372.8	782.4	1082.8	1343.4
Chernihiv	2102.0	1025.7	1242.0	6023.4	1740.4	2151.3	1913.6	1406.7	2020.7	1193.8	815.1	1582.5	690.3	801.1	680.6

Source: author's calculations based on (State Statistics Service of Ukraine, 2024b; State Statistics Service of Ukraine, 2024e) (access: 09/01/2025).



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