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Structural Transformation in EU Economies: a Possible Development Path for Ukraine

Abstract: The aim of the article is to assess the structural and spatial transformation of the economies of European countries (and primarily Poland) after their accession to the EU in terms of the value of their experience for Ukraine. To achieve this goal, the scientific basis of economic growth was investigated; an analysis of the spatial differentiation of the socio-economic development of individual EU countries was carried out; an assessment of the structure of the gross added value of the Polish economy and its regions in terms of types of economic activity; the localization coefficient of the economy of Polish voivodeships was calculated; and the level of labour productivity in key economic sectors of Polish voivodeships was determined. The research results revealed patterns of structural and spatial transformation for individual EU countries under the influence of economic globalization and the strengthening of European integration. It was empirically proven that such transformations can be concentrated on agriculture and several low-tech and low-efficiency segments of industry along with the service sector. Methodological and organizational errors were identified in overcoming imbalances in socio-economic development. The results of the study substantiated conclusions for Ukraine on avoiding the risks of ineffective economic development, based on the experience of Poland and other EU countries.

Keywords: economy; structure; spatial transformation; regions; development; gross added value; labour productivity

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Introduction

Russia's full-scale armed aggression against Ukraine has dramatically changed the architecture of global geopolitical space. This war has significantly transformed socio-economic processes and social relations, while shifting the vectors of development and the poles of business activity. Transformations in the Ukrainian economy have been reflected

in the structure of the gross domestic product. The share of public administration and defence in this structure has been increased 3.6 times (up by 22.15% in 2023) and has sharply limited opportunities for social and local development, but the Ukrainian economy is gradually recovering (Ishchuk, 2024). Thus, after a GDP drop of 28.8% in the first year of the full-scale war, in 2023 a growth of 5.3% was achieved. According to preliminary data, in 2024 Ukraine's GDP grew by 3.6%. However, further progress for the Ukrainian economy is impossible without optimizing the structure of basic activities in the direction of increasing technological and innovative production, increasing added value, employment, wages and ultimately social standards of living. In the context of strengthening European integration, and Ukraine's prospective membership of the EU, the experience of the latter's member states in building national economies is gaining particular importance.

Structural and spatial transformation as a way of developing and improving the efficiency of socio-economic systems is one of the most relevant areas of research for theorists and practitioners. The successful experience of growth in East Asian countries, which is based on the transfer of human capital from agriculture to production, and then to the service sector, and which all developed countries have undergone, is widely described in Nayya (2019). The impact of structural changes on labour productivity in various sectors of the EU economy is substantiated in Duernecker & Sanchez-Martinez (2023). In Stöllinger (2016) the presence of a nonlinear relationship between structural changes in the economy and integration into global value chains in EU countries is proven. Regional disparities in socio-economic development in European countries under the influence of the structural transformation of the economy are described in Capello & Cerisola (2023). The manifestations of increased economic specialization in highly developed regions of the EU countries are proven in Imbs, Montenegro & Wacziarg (2012). Changes in the spatial transformation of the economies, in particular of Poland, under the influence of financial influences from EU structural funds in regional programs are considered in Gurgul & Lach (2019). The causes and consequences of regional socio-economic disparities in Germany are described in detail in Heinisch, Holtemöller & Schult (2021). A study of gravitational effects or Perrault poles using the example of regions from Ukraine and Poland was conducted in Wisła & Nowosad (2020).

The results of the study of issues of economic transformation, which are highlighted in the studies considered and in others, are significant and relevant. At the same time, such problematic aspects in the transformation of the economies, primarily Poland, after their accession to the EU in terms of the value of their experience for Ukraine, require a much broader consideration. In addition, in modern conditions of the functioning of socio-economic systems, fundamental theories of economic development and spatial transformation can and should be rethought, updated and supplemented in accordance with the latest challenges and global changes.

The aim of the article is to assess this structural and spatial transformation. To achieve this goal, a number of tasks were undertaken: the scientific basis of economic growth was investigated; the spatial differentiation of socio-economic development of individual EU countries was analysed; the structure of gross value added (GVA) for the Polish economy and its regions was assessed by economic sector; the specialization (or localization) coefficient of the economy of Polish voivodeships was calculated; the level of labour productivity in key economic sectors of Polish voivodeships was determined; and conclusions

for Ukraine were substantiated based on the assessments of the structural and spatial transformation of the Polish economy after accession to the EU.

Methodology and research data. The assessment of the structural and spatial transformation of the Polish economy (as the main object of research) took place in three stages.

At the first stage, the structure of the GVA of the Polish economy and its regions was calculated by economic sector for 2003 and 2021. The task at this stage was to reflect the current state of the structure of the economy of Polish regions by the GVA indicator, as well as to identify the relevant structural changes that had occurred during 2003–2021. To identify structural changes, the structure of the GVA of the Polish economy and its regions for 2021 was compared with the corresponding indicators for 2003. For example, the shares of agriculture, industry, processing industry and other types of economic activity in the GVA of the Masovian Voivodeship in 2003 and 2021 were determined and the relevant analytical conclusions were made. The research period is not accidental, as it reflects the structure of the economies of the regions of Poland before it joined the EU, and then after 17 years of being in this union. The structure of the GVA was analysed in terms of key types of economic activity (according to the GUS classification): agriculture, industry, manufacturing, construction, the service sector in general, and in terms of its trade and financial segment and of other services. The calculation of the GVA structure was carried out by dividing the GVA for each of the analysed types of economic activity by the GVA for the country as a whole. The calculation of the structure of the economy of a region (voivodeship) was carried out by dividing the GVA for each of the analysed types of economic activity by the GVA for the studied region. At the same stage of the research, the regional structure of the Polish economy was analysed in terms of the eight types already mentioned. The task at this stage of the research was to assess the state and structural changes that occurred during 2003–2021 in key economic sectors in terms of region. In other words, changes in the shares of voivodeships in the GVA were studied. For example, the shares of the Masovian Voivodeship in the GVA of agriculture, industry, processing industry and other types of economic activity for 2003 and 2021 were analysed. Thus, the calculation of the region's share in the GVA in these types was carried out by dividing the GVA of a certain type in a particular region by the GVA of this type in the country as a whole.

At the second stage, the economic specialization of the regions of Poland was assessed by economic sector. For this, the coefficient of economic specialization was applied, calculated according to Formula 1:

$$SK = \frac{\frac{GVATEA}{GVAR}}{\frac{GVATEA}{GVAC}} \quad , (f1)$$

where:
SK – regional specialization coefficient,
$GVATEA$ – Gross value added of the type of economic activity,
$GVAR$ – Gross value added of the region,
$GVAC$ – Country's gross value added.

The main task of this stage was to reflect the state and changes in the spatial economic specialization of the country's regions in terms of the studied types of economic activity.

At the third stage, an analysis of labour productivity in Poland and its regions in terms of economic sector for 2003 and 2021 was carried out. Labour productivity was calculated as the ratio of GVA to the number of employees in an economic sector for a region and the country. In other words, labour productivity is an indicator of GVA per employee. The tasks of this stage were:

- identifying differences in labour productivity between the analysed types of economic activity of Poland and its regions in 2003–2021;
- explaining the identified changes in labour productivity in the analysed types of economic activity of Poland and its regions by comparing the dynamics of the numerator and denominator of the labour productivity indicator, i.e. comparing the growth rate/decrease in GVA with the growth rate/decrease in the number of employees of the region and country;
- determining the ratio of labour productivity of regions in terms of types of economic activity to the corresponding national indicators. For example, comparing labour productivity in agriculture, industry and other sectors for the Masovian Voivodeship with similar indicators for Poland;
- determining the ratio of the labour productivity of regions in terms of types of economic activity to the corresponding indicators of the leading region (Masovian Voivodeship). For example, comparing labour productivity in agriculture, industry and other types of economic activity of the Subcarpathian Voivodeship with similar indicators for the Masovian Voivodeship (the leading region according to these indicators).

The main source of information was GUS data and the results of previous research on the relevant topic.

The justification for the consequences of the structural and spatial transformation of the Polish economy was based on the methods of comparative analysis, data systematization and scientific abstraction.

Research results

In economic theory, there are three schools of economic growth (classical, neoclassical and neo-Schumpeterian), which are based on the doctrine that the key to a country's development is the spatial transformation of its economy in terms of economic sector. The main difference between the theoretical approaches of these schools is the different attitude to the importance of the role of sectors in spatial transformation and economic development. Representatives of the classical school argue that a country's economic development in the medium or long term is associated with the transition from agriculture to industry, and subsequently to the service sector. The factor of economic growth in such a transformation is the difference between the sectors of the economy in labour productivity, profitability, wages and employment growth potential. It is believed that industry, unlike agriculture, has a higher labour productivity and return on capital. At the same time, productivity in the service sector is higher than in industry. It follows that the essence of the spatial transformation of the economy is the movement of human capital from sectors with low labour productivity, wages and relatively limited employment potential, to sectors with a higher level of these socio-economic indicators.

The neoclassical school, on the contrary, pays much less attention to differences in the efficiency of economic sectors. This school is based on Solow convergence models

(traditional and supplemented by endogenous models based on profit growth) and models based on market imperfections. These models do not take into account the process of inter-sectoral redistribution of economic activity or spatial economic transformations. This is explained by the fact that the Solow growth model (Solow RM 1956) assumes that economic development occurs at the expense of savings, and accumulation of physical and human capital. According to the approaches of the neoclassical school, spatial economic development occurs through maintaining balanced relations between production and investment, and consumption and employment, as well as between elements of space (countries, regions, territories, agglomerations, etc.). Instead, much less attention is paid to the technological structure of the economy of space (Bazhal, 2017).

The third (neo-Schumpeterian) school, like the neoclassical one, does not link economic development and spatial transformation with the characteristics of economic sectors as much. Instead, it is based on Schumpeter's theory of innovative development, which is based on the notion that spatial socio-economic development is achieved through the development and implementation of innovations, inventions and innovative entrepreneurship. According to the neo-Schumpeterian theory, effective balancing of the economy and promotion of labour productivity, promoted by the neoclassical school, will eventually lead to crises of overproduction. This can be avoided thanks to evolutionary innovative leaps in the form of technological revolutions (Freeman, 1982). Innovative technologies should change the functionality of production, thus neo-Schumpeterian theories justify the importance of the innovative restructuring of the economy.

These schools of economic theory, for the most part reflecting the evolutionary stages of economic growth of individual countries, are based on empirical studies that reflect the patterns between economic development and the main factors that ensured it. Undoubtedly, the key ideas of each of these schools have not lost their relevance today, to a certain extent they can be applied or taken into account when developing appropriate strategies and forecasting economic development for the regions of Ukraine. However, the considered theoretical approaches do not take into account such an important (or even decisive) factor as the globalization of the economy and the processes associated with it, in particular, market monopolization, the deepening of production specialization, the spread of offshore tolling operations – outsourcing. Under the influence of these and other processes, a radical change in the model of spatial transformation of the economy and its efficiency may occur.

It should also be taken into account that there are countries in which, under the influence of many factors, transformational changes in the economy occur in the direction of the development of agriculture and raw material industries, and not the development of industry and, in particular, its high-tech and high-margin segments. In addition, under the conditions of involving modern technologies and innovations, labour productivity, economic efficiency, wages and employment in agriculture can theoretically approach the level of industry. At the same time, the service sector can be divided into segments with different levels of innovation and technology. Trade and the IT sector, for example, belong to the service sector, but their socio-economic indicators of activity, innovation and technology can differ radically. All this indicates that in modern conditions of the functioning of socio-economic systems, fundamental theories of economic development and spatial transformations can and should be rethought, updated and supplemented, in accordance with the latest challenges and global changes.

In practice, the results of the structural and spatial transformation of the economy often do not coincide with the corresponding basic theories. Thus, the redistribution of economic activity, which has been observed since the 1970s in favour of the service sector, has had a significant negative impact on the growth of aggregate productivity in most European countries. The slowdown in the growth rate of aggregate productivity (which is considered a key driver of economic growth) is currently one of the most acute economic problems facing many developed countries (Duernecker, Sanchez-Martinez, 2022). The process of structural change is a tangible brake on overall productivity growth, as it leads to the redistribution of economic activity from sectors with high productivity growth rates (such as agriculture and industry) to the service sector, which is characterized by relatively low growth rates. The service sector is heterogeneous in terms of labour productivity and accordingly, the reallocation in this area towards sectors with stagnant productivity plays a key role in fixing the slowdown in growth of the economic system.

As argued by Duernecker & Sanchez-Martinez (2022), the impact of structural changes in the economy on the dynamics of labour productivity in EU countries is very diverse and ranges from relatively small (0.1 pp) in Portugal and Sweden to significant (0.8 pp) in Spain. It is predicted that sectoral changes in the economies of various EU countries over the next 10 years will lead to a significant slowdown in average annual productivity growth by approximately 0.16 pp. The projected dynamics of productivity decline range from values close to zero (in Belgium and the Netherlands) to 0.99 pp in Ireland. Future changes are explained by the very low (0.3% per year) growth in labour productivity in the service sector compared to agriculture (+2.2%) and industry (+1.6%). Any shift in economic activity towards the service sector will have a serious negative impact on aggregate growth and its structure will change significantly towards those segments with stagnant productivity. As a result, the growth of stagnant the service sector in the EU, which occurs at the expense of progressive segments, implies a significant slowdown in aggregate productivity growth. The greatest slowdown in positive labour productivity is projected in the new EU countries. This is explained by the fact that although the productivity growth rates in these countries are still higher than in the rest of the EU, they are experiencing deeper processes of structural transformation of their economies, the result of which is the expansion of segments of the service sector with a lower level of productivity.

The results of an empirical study conducted over the period 1995–2011, which aimed to identify the relationship between structural changes in the economy and integration into global value chains (GVC) in EU countries, proved a nonlinear relationship between these two phenomena (Stöllinger, 2016). Members of the production core (Central European countries) benefit from participation in GVCs (based on the position of spatial and structural changes in their economies in the direction of industrial development), while in other EU member states, participation in GVCs accelerates the process of deindustrialization. The spatial unevenness of the impact of the structural transformation of an economy on the dynamics of labour productivity is manifested not only at the macro- but also at the meso-level. In particular, under the influence of economic globalization in EU countries since 2008, interregional differences in the dynamics of labour productivity, employment, wages and other socio-economic indicators are increasing. Regional inequality stimulates the spread of two different types of model of strategic economic behaviour. Thus, rich, developed regions prefer socio-economic integration

and openness, while conservative nationalist views dominate in poor agricultural less developed regions (Capello, Cerisola, 2023). As a result, in developed countries, industry specialization is characterized by an almost uniform geographical distribution, which contributes to regional economic convergence. As developed regions become internationally integrated, their economies function according to the global model of comparative advantage (Imbs, Montenegro, Wacziarg, 2012). On the other hand, developing countries have limited opportunities to diversify their economies, given that their regions integrate mostly only with each other, and their specialization is limited by regional comparative advantages.

In Germany, divergence in the socio-economic development of regions, which is manifested in the tendency to concentrate human capital, investment, growth in labour productivity and capital return in key industrial and business centres and agglomerations, is also high, and in some places even higher than in neighbouring Poland. The key factors of regional divergence in Germany are unification with the eastern territories and the decline in economic activity in regions specializing in coal and ore mining. As a result of these, as well as evolutionary and structural factors, the eastern regions of the former GDR are significantly inferior to the regions of the former FRG in terms of the level and dynamics of labour productivity growth, socio-economic development of wages, employment, etc. In particular, the abandonment of coal mining has led to the migration of human capital from the brown coal regions of Germany to other industrially developed countries, regions and reduces the workforce of the former by an average of 10,100 people each year (Heinisch, Holtemöller, Schult, 2021).

Another feature of the German economic system is that 44% of the population live in the south of the country, mainly in large and medium-sized cities. These regions are characterized by a stable labour market and, therefore, the highest level of well-being, life expectancy, wages and infrastructure (Hacker 2024). The eastern regions of Germany, in particular around Berlin, are home to 40% of the country's population, but the share of highly qualified workers in these areas is slightly lower than the national average (10.0% versus 13.5%). A key problem for the western regions of Germany is the loss of heavy industry. At the same time, rural regions, where 16% of the country's population lives, are characterized by migration to medium-sized and large cities. It follows that the greatest economic growth and increase in human capital in Germany is concentrated around industrial agglomerations that specialize in both services (primarily high-tech and financial) and industrial production.

In Romania, after joining the EU, the greatest increase in labour and capital productivity occurred in the metropolitan region, which is the economic and scientific centre of the country. About 27% of the Romanian population lives here, and the highly qualified find work as its attractiveness determines migration within the country. At the same time, about half of the country's population lives in rural areas outside and the share of highly qualified workers is only 3.6%. The old industrial regions of Romania, bordering Moldova and Ukraine where 19% of the population live, are the poorest with many socio-economic problems. The prospects for the development of small-scale agriculture are shrinking in all regions. The transformation processes after the country's accession to the EU have increased internal regional inequality and Romania is one of the EU countries with the highest level of labour emigration. Accordingly, the statistical indicators of socio-economic development of the poorest regions are improving, mainly due to the cash inflows from labour emigrants.

Significant inequality in socio-economic development is traditionally characteristic of the northern and southern regions of Italy. More than 53% of the country's population lives in the north in and around metropolitan areas. This region is characterized by industrial specialization, scientific centres, low unemployment, high labour productivity and a high level and quality of life. On the other hand, southern Italy, whose economy is mainly specialized in agriculture and tourism, suffers from deindustrialization, significant migration, emigration, high unemployment, etc. A significant socio-economic gap between northern and southern Italy has existed since 1861, when the country was politically unified. Numerous Italian and EU programs aimed at socio-economic equalization and the rapprochement of the country's regions have not yielded tangible results.

Regional imbalances caused by historical, geographical and geopolitical factors also exist in Estonia, France, Finland, Spain, Sweden and many other EU countries. However, the greatest strengthening of these regional differences has occurred over the past 30 years. During this period, economic globalization has intensified, accompanied by the expansion of global value chains; increased export activity; monopolization of markets; reorientation of capital from traditional industrial production to the production of science-intensive, innovative, high-tech products, in particular, equipment; automation of production processes; a reduction in the role of the state in the economic development of regions; overcoming inequality to financial incentives; and decentralization. The latter, at best, contributed to the development of social infrastructure (construction of sports and playgrounds, local roads, repair of hospitals and administrative buildings), and not to the creation of new production enterprises, jobs and growth in labour and capital productivity. Under the influence of these processes, a spatial transformation of the economy has taken place in the direction of the development of industrial enterprises of an incomplete cycle, specializing in the provision of production services mainly for transnational corporations, which ultimately deepened the production and economic specialization of these countries and regions. In general, it can be stated that during this period favourable conditions were created for the actualization of Weber's theory of industrial location which emphasized that the key criterion for choosing a territory for industrial activity is cost minimization.

In addition to economic integration, in particular international integration, EU structural funds have a significant impact on the spatial transformation of regional economies (especially in Eastern European countries). However, this type of financial injection into the economies of regions does not always contribute to their socio-economic equalization or convergence. Thus, after Poland joined the EU, the central region of this country – the Masovian Voivodeship – was the only one where not only a rapid increase in labour productivity was achieved, but also a constant increase in capital profitability (Gurgul, Lach 2019). On the other hand, in almost all other regions of Poland, capital return and labour productivity were not only lower than in the central region, but in some voivodeships they even decreased. In addition, after Poland joined the EU, labour productivity in the central region grew at a much higher rate than in other regions.

Thus, it can be stated that EU structural funds were a statistically significant factor in the evolution of regional patterns of technological progress in Poland and led to a strengthening of the bimodality model in the distribution of capital and labour productivity. The strongest stimulating effect of EU structural funds on labour and capital productivity was observed in the central region of Poland. In the remaining regions, the impact of these funds on the evolution of regional patterns of technological progress was

much weaker. In terms of convergence, Poland's accession to the EU contributed to the emergence of such a trend in Polish voivodeships in terms of capital productivity, but divergence in terms of labour productivity. It follows that economic integration and EU structural funds stimulate the development of those regions that have greater production, technological, scientific and human potential. As a result, this leads to a strengthening of the centres, but a weakening of the peripheries of economic growth.

The economic spatial development of the regions of Poland and Ukraine is based on similar fundamental trends and features. Thus, in Ukraine (as in Poland) the centres of economic growth are the capital and its surrounding areas, as well as traditionally industrial regions (Dnipropetrovsk, Donetsk, Zaporizhia, Poltava, Kharkiv regions) which specialize in mining, the metallurgical industry and mechanical engineering. This is explained by the presence in these regions of significant human, technological and scientific capital, as well as natural resources and developed industrial infrastructure. On the other hand, the southern and western regions of Ukraine are economically less developed.

Over the past three decades, the economic gap between more and less industrially developed regions of Ukraine in terms of labour productivity and capital efficiency has only increased. However, it is worth paying attention to the following feature: in both Poland and Ukraine, gravitational effects or Perrault poles are traced from industrial centres to the periphery, that is, from regions with higher labour productivity to regions with a lower level and slower growth rates of this indicator, as well as between the eastern voivodeships of Poland and the western regions of Ukraine (Wisła, Novosad (ed.), 2020). Given the significant similarity of these two neighbouring countries in many socio-economic indicators, it is relevant for Ukraine (especially in the context of approaching EU membership) to study the European integration experience of Poland.

More than two-thirds of Poland's economy is in the service sector, which includes trade, transport, financial and insurance activities, etc. Since joining the EU (May 1, 2004), the economic system has undergone certain transformations in the direction of increased industrialization. Thus, during the years 2004–2021, the share of industry, in particular, processing, increased in the structure of GVA for Poland and all its regions without exception (MDS 2024). On the other hand, the shares of the service sector and agriculture decreased (except for Lublin, Lubuskie, Mazowiecki and Podłaskie Voivodeships). The identified changes in the GVA are relatively minor and do not exceed five percentage points, with the exception of Lower Silesia, Lubuskie and Opole Voivodeships. However, it is appropriate to emphasize here that structural transformations usually occur rather slowly in stable developed economies.

Poland (as well as Ukraine) is characterized by significant unevenness of spatial economic development which has not been overcome but, on the contrary, has increased during the period of EU membership. In particular, in 2021, the Masovian Voivodeship accounted for 22.6% (against 17.4% in 2003) of GVA of agriculture, 15.6% (against 14.9%) of industry, 20.6% (against 15.7%) of construction, 25.7% (against 22.9%) of the service sector. In four voivodeships (Wielkopolska, Mazovia, Lower Silesia and Silesia), more than 50% of the GVA of Polish industry, construction and services, as well as more than 40% of the GVA of agriculture, are produced.

The results of the calculation of the coefficient of specialization (or localization) of the economy of the Polish voivodeships in terms of the main sectors showed a certain spatial transformation of the Polish economy during the analysed period. Thus, the number of voivodeships in which the service sector (in general) was one of the directions

of economic specialization decreased 1.6 times from 13 to 8 (Table 1). The reduction of such specialization concerned primarily financial and insurance activities and real estate market services. It is appropriate to pay attention to the fact that the highest (with a growing tendency) indicator of localization of the financial segment of services is characteristic of the economy of Mazovian Voivodeship, which is the undisputed leader among the regions of Poland. Instead, the Kuyavian-Pomeranian and Świętokrzyskie voivodeships strengthened their traditionally agricultural specialization, and even more so the Lublin and Podlaskie Voivodeships. At the same time, the Lower Silesia, Silesia and Opole voivodeships remain the most industrial in Poland.

One of the key indicators of efficiency and, at the same time, a stimulator of structural and spatial changes in the economic system, is labour productivity, which in this study was determined by dividing the volume of GDP by the number of employees. The results of the calculations proved that in Poland labour productivity in terms of the main economic sectors is different. Thus, the highest value of this indicator (in the analysed years 2003 and 2021) was characteristic of financial and insurance activities, real estate market services, and lowest for agriculture.

However, we note that in 2003 labour productivity in the first of the mentioned type was 22 times higher than in agriculture, while in 2021 this predominance had decreased to nine times (361 000 zlotys against 39 800).

Polish agriculture is characterized by large regional differences between levels of labour productivity. Thus, the gap between the leader in terms of this indicator (West Pomeranian Voivodeship) and the lowest (Subcarpathian Voivodeship) in 2021 was 5.3 times (against 9.6 times in 2003). On the other hand, a completely different situation was observed in industry where the gap between Masovian Voivodeship (the leader in terms of labour productivity in this sector) and Subcarpathian Voivodeship (the least) in 2021 was 1.7 times (compared to 1.4 times in 2003). At the same time, in the service sector, in general, the gap between the values of the labour productivity indicator in the leading region (Masovian Voivodeship) and the lowest (Warmian-Masurian Voivodeship) in the analysed years was invariably 1.4 times. It follows from this that during the analysed period (after joining the EU) in Poland's agriculture, differences between regions in terms of labour productivity tended to decrease, but remained very significant, while in industry to a slight increase, and in the service sector they were stable and relatively small. Thus, it is possible to state the presence of significant spatial divergence in the Polish economy.

The revealed trends are explained by the different dynamics of the values of the labour productivity indicator in different types of economic activity and in the regions of Poland. Thus, among the types considered, the highest growth in labour productivity in 2021, compared to 2003, occurred in agriculture (by 4.3 times), and the lowest in the financial services segment (by 1.8 times). In particular, in agriculture, labour productivity increased the most (by 5.9 times) in the Subcarpathian Voivodeship, and the least (by 3 times) in the Wielkopolska and Lower Silesian Voivodeships. In industry, the range of labour productivity growth across regions ranged from 2.9 times (in the Subcarpathian, Silesian, and Wielkopolska Voivodeships) to 3.6 times (in the Masovian Voivodeship), and in the service sector in general from 2.1 to 2.3 times.

The considered differences between the values and dynamics of labour productivity in terms of types of economic activity and regions of Poland may be due to both the different volume of the created GVA and the different number of workers. According to the results of the assessment of the values of these two indicators, it was found that the increase

in labour productivity by 4.3 times during the years 2003–2021 in agriculture occurred under the influence not only of the increase in GVA (by 172.1%), but also a significant decrease (by 36.4 %) of the number of people working in this sector of the Polish economy. This decrease occurred in all regions and ranged from –21.9% in the West Pomeranian Voivodeship to –51.7% in the Subcarpathian Voivodeship. On the other hand, in other analysed types of economic activity, the increase in labour productivity was accompanied by an increase in the number of employees, in particular, in construction by 36.6%, in the service sector in general by 31.1%, in industry by 6.8%. Higher labour productivity in industry, compared to construction and the service sector, in 2021 can be explained by a significantly lower growth in the number of industrial workers and a relatively higher rate of GVA growth of 238.1% versus 225.4% (in construction) and 195.1% (in the service sector in general).

The results of the conducted research give grounds for asserting that during 2003–2021, a structural transformation of the economy took place in Poland and its regions in the direction of the development of sectors with higher labour productivity, that is, those that provide a higher level of values of the GVA indicator and its dynamics. It is about the transfer of human capital from agriculture to industry (in particular processing), construction and certain segments of the service sector, primarily financial.

At the same time, it should be emphasized that a significant spatial transformation has taken place in the economy of Poland in the direction of deepening the divergence between the central (Masovian) voivodeship, several industrially developed (Wielkopolska, Lower Silesian and Silesian) voivodeships and the rest of the less industrialized. This was a direct consequence of heterogeneous structural economic transformations in the regional section. Thus, in all regions, the magnitude and dynamics of labour productivity indicators, GVA and the number of employees in the economic sectors considered, are different. The main reason for such differences is variation in production specialization, level of consumption, manufacturability, production conditions, etc. For example, in voivodeships with more favourable natural and climatic conditions for farming (Lubuskie, Masovian, Warmian-Masurian, Western Pomeranian and Pomeranian), labour productivity is comparatively higher. Also, the rate of decrease in the number of people working in agriculture is lower in these regions. On the other hand, voivodeships with a higher increase in industrial GVA (Lower Silesia, Wielkopolska, Malopolska and Lubuskie) saw a greater increase in industrial workers.

The identified changes in the Polish economy after its accession to the EU still do not fully correspond to the laws of the classical scientific school. Only the trend of the transition of human capital from agriculture to industry is analytically substantiated. From this it follows that the key factors of structural, and therefore also spatial, transformations in the economy of Poland are the level of technology and innovativeness of production processes, as well as specialization in products with a higher share of GVA. All this contributes to the growth of GVA, labour productivity and is a prerequisite for increasing wages and employment in promising types of economic activity, and therefore also in regions where these are actively developing.

In general, the Polish economy in the EU specializes in the production of agricultural products, and its service sector is oriented towards sectors with a relatively low share of GVA (primarily trade). Under such conditions, the significant outflow of workers from agriculture during 2003–2021 with the highest rate of increase in labour productivity (4.3 times) gives grounds for assuming that the spatial transformation of the economy

Table 1. The coefficient of specialization* of the voivodeships of Poland (in terms of the main types of economic activity)

Voivodeship	Agriculture		Industry		Processing industry		Construction		Everything in the sphere of services		Trade; repair of motor vehicles; transport and storage; residence and nutrition; information and communication		Financial and insurance activities; real estate market services		Other services	
	2003	2021	2003	2021	2003	2021	2003	2021	2003	2021	2003	2021	2003	2W021	2003	2021
Lower Silesia	0.7	0.4	1.2	1.3	1.1	1.3	1.1	0.9	1	0.9	0.9	0.9	0.9	0.9	1	1
Kuyavian-Pomeranian	1.4	1.5	1	1.1	1.2	1.2	1.1	1	1	0.9	1	1	0.9	0.8	1	0.9
Lublin	1.6	2.2	0.8	0.8	0.8	0.8	1	1	1.1	1	1	0.9	1.2	1	1.1	1.1
Lubuske	1	1.2	1	1.2	1.1	1.2	1	0.9	1	0.9	1	0.9	0.9	0.8	1.1	0.9
Lodzinsky	1.2	1.3	1.1	1.1	1.1	1.1	1	0.8	1	1	0.9	0.9	0.9	1.1	1	0.9
Malopolska	0.6	0.4	0.9	0.9	0.9	0.9	1.2	1.2	1	1.1	1	1	1	0.9	1.1	1.1
Masovian	0.9	1	0.7	0.7	0.7	0.7	0.8	0.9	1.1	1.1	1.2	1.2	1.2	1.4	1	1
Opole	1.2	1.2	1.1	1.3	1.1	1.3	1	1.1	0.9	0.9	0.9	0.8	1	0.8	1	1
Subcarpathian	0.5	0.6	1.1	1.2	1.3	1.2	0.9	1	1	0.9	0.9	0.9	1	0.8	1	1
Podlasie	1.9	2.9	0.8	0.9	0.9	0.9	1.1	1	1	1	1	0.9	1.1	0.9	1.1	1.1
Pomeranian	0.7	0.8	1	1	1.1	1.1	1	1.1	1	1	1	1	1	1	1	1
Silesian	0.3	0.3	1.4	1.2	1.1	1.1	1	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Świętokrzyskie	1.6	1.7	0.9	1	1	1	1.4	1.1	1	0.9	0.9	0.9	1	0.8	1	1
Warmian-Masurian	2	2.3	1	1	1.1	1.1	1	0.9	1	0.9	0.9	0.8	1	0.9	1.1	1.1
Greater Poland	1.7	1.3	1.1	1.1	1.3	1.2	1	1	0.9	1	1	1	0.9	0.9	0.9	0.9
Western Pomeranian	1.1	1.2	0.8	0.9	0.8	0.9	1.2	1.2	1	1	1	1	0.9	0.9	1.1	1.1

* The coefficient of specialization (or localization) is calculated by dividing the share of a type of economic activity in the GVA of the region by the share of this type of economic activity in the national GVA

Source: compiled from MDS data (2024)

in Poland and its regions may have a reverse trend in the future to return to the development of segments with the greatest need for human capital, i.e. again to agriculture, as well as to certain segments of industry and low-tech services. Such economic transformations are signs of the "middle income trap" when, for example, indicators of labour productivity, wages in certain types of economic activity in a certain region, increase, but relative to the average value, in the leading region or in other similar countries, decrease or do not change significantly.

During the analysed period, the level of labour productivity in agriculture in the regions, compared to the average value of the indicator in Poland, significantly increased only in the Podlaskie Voivodeship (by 25.3 pp), while in the rest of the regions it remained conditionally stable or decreased. The level of labour productivity in industry slightly increased in five voivodeships (the largest in Lower Silesia – by 10.4 pp and Masovian Voivodeship – by 9.7 pp), construction – in six voivodeships (the highest in Masovian Voivodeship – by 14.9 pp), and in the service sector (in general) – in five voivodeships (the largest in Lubuskie – by 13.2 pp).

At the same time, a comparative analysis of voivodeships by the level of labour productivity with the leading region (Masovian Voivodeship) showed that the tendency to reduce the gap between regions in terms of this indicator is mostly characteristic of trade. On the other hand, in industry (especially processing), construction and agriculture, the lag of the rest of the regions (with the exception of the Lublin, Podkarpackie, and Podlaskie Voivodeships in agriculture) only increased. It follows that after joining the EU, there were no significant qualitative positive spatial changes in the economy in the direction of reducing regional inequality, and strengthening technological and innovative development.

Conclusions, proposals and discussion questions

The results of the research revealed patterns of structural and spatial transformation of countries and regions under the influence of economic globalization and the strengthening of European integration. It has been empirically proven that such a transformation may not occur according to the well-known theoretical approaches of economic science (in particular, classical, neoclassical and neo-Schumpeterian schools), but following the example of Poland and other Eastern European countries it will concentrate on agriculture, several low-tech (with low labour productivity and share of GVA) segments of industry and the service sector. As a result, the economic development of the country and its regions may fall into the "middle income trap," which will ultimately increase the risk of spatial divergence. This means that labour productivity, GVA, wages, and the efficiency of the national and regional economy will grow, but the level of these indicators, compared to neighboring countries or the leading region, will remain unchanged or even decrease.

Based on the study of European experience in overcoming regional socio-economic imbalances, methodological and organizational errors were identified, in particular, giving preference to generalized approaches when choosing types of economic activity and business entity that are provided with financial assistance, without taking into account the effectiveness of their functioning and potential impacts on the socio-economic development of territories. It is proven that the management of spatial development of an economy cannot be based on the principles of supporting weak segments

or enterprises and not even on the selection of leaders, but only on the optimization of all promising opportunities of the region.

Based on the results of the study, conclusions for Ukraine on avoiding the risks of ineffective economic development, based on the experience of Poland and other EU countries, are substantiated.

1. Under the influence of economic globalization and the strengthening of European integration, the spatial transformation of the economy of regions in Ukraine may not take place according to the well-known theoretical approaches of economic science, but following the example of Poland, it will be concentrated on agriculture, certain low-tech (with low labour productivity and share of GVA) segments of industry and services. As a result, the economic development of Ukraine and its regions may fall into the "middle income trap" for decades. This means that labour productivity, GVA, wages and efficiency of the national and regional economy will increase, but the level of these indicators, compared to neighbouring EU countries or the leading region in Ukraine, will remain unchanged or even decrease.
2. Financial infusions from EU structural funds, further economic liberalization and the passive role of the state in the formation and development of strategic, high-tech industries, along with irrational financial decentralization, will increase the gap between the socio-economic development of regions, centres and peripheries, as well as between migration and emigration processes.
3. In Ukraine, following the example of Poland, Italy, Germany, Romania and other EU countries, internal and external regional development programs will not ensure the desired convergence if the state and the business environment do not take real effective measures in the direction of:

– reducing the critically high import dependence of the national economy, primarily in the segment of gross accumulation of fixed capital and, at the same time, increasing the price, technical and innovative competitiveness of the latter on domestic and foreign markets;
– stimulation of in-depth processing of raw materials (agricultural, mining and chemical, wood) and the development of relevant industries;
– strengthening of interregional and intersectoral economic ties within the country;
– reducing the raw material orientation of Ukrainian commodity exports, in particular by not refunding (or reducing the value of) GVA for the export of raw materials, establishing the market level of rent for the use of natural resources, minerals, etc.

Thus, the management of the spatial development of the Ukrainian economy should be based not on the principles of supporting the weak (segments or enterprises) and not even on the selection of leaders, but on the optimization of all promising opportunities for the region. Despite significant military risks, Ukraine remains very attractive for foreign investment, primarily in the defence industry. In the near future, it will be able to play the role of a regional production hub in Eastern Europe. However, the question arises of the ability to foresee real mechanisms for the practical implementation of such offshoring, in particular from the perspective of the development of Ukrainian manufacturing business, since this may boil down to the placement in Ukraine of certain low-tech and low-margin industries in the global business chains of transnational corporations. In the war and post-war periods of rebuilding the national economy, this may be permissible, but on certain (strictly controlled) scales. Accordingly, at the level of state industrial policy, it is necessary to separate the development of individual production of foreign

companies and the development of domestic production in order to avoid previous mistakes and a further deepening of the problems of the Ukrainian processing industry, primarily mechanical engineering. Strategic mechanical engineering production should be developed on the basis of public-private partnership. The state's share in the latter should be dominant, based on the positions of economic and national security.

The development of industry should become a key priority of state policy. No country in the world has been able to achieve the development of the processing industry only within the framework of the free market concept. Accordingly, the new industrial policy in Ukraine should focus on the formation of a wide range of instruments for stimulating processing industries (primarily high-tech) and be systemic. Adherence to such a principle will allow to counteract the further "agrarianization" of the Ukrainian economy, and in turn will contribute to its reconstruction on the basis of new industrialization and technological self-sufficiency.

Accordingly, further research will be aimed at scientifically substantiating priority (according to the criteria of socio-economic efficiency) areas of investment in the reconstructive development of Ukrainian industry.

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