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ТРИСЕКТОРНА СТРУКТУРА ЗАЙНЯТОСТІ ТА ЕКОНОМІЧНОГО РОЗВИТКУ: ПОРІВНЯЛЬНИЙ АНАЛІЗ ПОЛЬЩІ ТА УКРАЇНИ ЗА 1990–2013 РОКИ

На основі теорії трьох секторів економіки зроблено порівняльний аналіз Польщі та України у розвитку промисловості, сільського господарства і сфери послуг та структури зайнятості у цих трьох секторах. Доведено, що тенденції розвитку галузей та зайнятості, сформульовані в теорії трьох секторів, підтверджуються економіками Польщі та України. Частка аграрного сектора у загальній зайнятості знижується в обох країнах, частка сектора послуг зростає, частка промислового сектора стабільна. Разом із тим темпи скорочення частки аграрного сектора вищі у Польщі, ніж в Україні, і протилежна спрямованість для сектора послуг, який показує більш швидкі темпи зростання в Україні. Трисекторна структура зайнятості в Польщі відрізняється від української. Частка аграрного сектора в загальній зайнятості в Україні значно вища, ніж у Польщі, в той час як частка промислового сектора значно вища у Польщі, ніж в Україні. Сектор послуг має високу відносну вагомість в Україні, що може бути пов'язано з повільнішими темпами зростання промислового розвитку. В обох країнах продуктивність праці у сільському господарстві нижча ніж у промисловості та секторі послуг. Модернізація економічної структури (зменшення частки сільсько-господарського сектора та збільшення частки сектора послуг) повинна збільшити середню продуктивність праці в економіці.

Ключові слова: промисловість, сільське господарство, сфера послуг, структури зайнятості, продуктивність праці.

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THE THREE-SECTOR EMPLOYMENT STRUCTURE AND ECONOMIC DEVELOPMENT: A COMPARATIVE ANALYSIS OF POLAND AND UKRAINE IN THE YEARS 1990–2013

The purpose of this study is to determine regularities in the development of sectors and transformations of the three-sector employment structure in the light of the theory of three sectors of the economy and to determine the trend of development of the three sectors of the economy in Ukraine and Poland in the period of systemic transition.

According to the theory of the three sectors of the economy there are regularities in the process of economic development involving the decline in the relative importance of the agricul-

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tural sector, the service sector gains in importance, the relative importance of the industrial sector increases, stabilizes and then declines. Analyses show that the regularities in the development of the sectors formulated in the theory of the three sectors of the economy are supported by economies of Poland and Ukraine. The share of the agricultural sector tends to decrease. The process is stronger in Poland than in Ukraine, and it is the opposite in the case of the service sector which shows a stronger upward trend in Ukraine. Moreover, the three-sector employment structure in Poland, formed in recent years, is slightly different than in Ukraine. The share of the agricultural sector in total employment in Ukraine is much higher than in Poland, while the share of the industrial sector is significantly higher in Poland than in Ukraine. The service sector has a surprisingly higher relative importance in Ukraine, which may be due to the slower rate of growth of industrial development in this country in recent years.

К е у в о р д с: industry, agriculture, services sector, employment patterns, labor productivity.

1. Introduction

The economic development of countries is reflected not only in the growth rates of gross domestic product per capita, but also in the structural transformation of the economy. These transformations represent changes in the nature of the economy and in the role of particular activities of the economy. The changes take place, inter alia, in the three-sector structure of the economy, including the three-sector employment structure. The theoretical basis for the analysis of changes in the employment structure is comprised in the three-sector theory of economy put forward by A. Fisher, C. Clark, and J. Fourastié, who have identified the agricultural sector, the industrial sector, and the service sector within various areas of economic activity, as the basis of their analyses. They have designated in this way an important direction of the analysis of structural transformations in the process of economic development.

The purpose of this paper is to determine regularities in the development of sectors and transformations of the three-sector employment structure in the light of the theory of three sectors of the economy and to determine the trends of development of the three sectors of the economy in Ukraine and Poland in the period of systemic transition.

The structure of this paper is as follows. Section 2 presents the basic ideas of the theory of three sectors of the economy determining regularities in the development of the agricultural, industrial, and service sectors. Section 3 examines changes in the three-sector structure of the economy in Poland and Ukraine, in particular in a comparative perspective of both countries. The last section presents conclusions.

2. Basic theorems of the three-sector theory of the economy

Changes in the structure of employment are inherent in any dynamic economy. This also applies to sector structures, associated with areas of economic activity. In a dynamic and growing economy certain activities gaining importance, while others are shrinking which in result is reflected in the changes in employment in these areas, leading eventually to a change in the structure of employment.

Changes in the sectoral structure of employment are subject to different impacts. The nature of the determinants depends to a large extent on the time horizon of the analysis. We can identify the long-term determinants related to the long-term trends of the development of the economy and the medium- and short-term determinants related to cyclical development of the economy. Due to the subject of this study we focus here on the long-term determinants which are grounded on the theory of the three-sector economy.

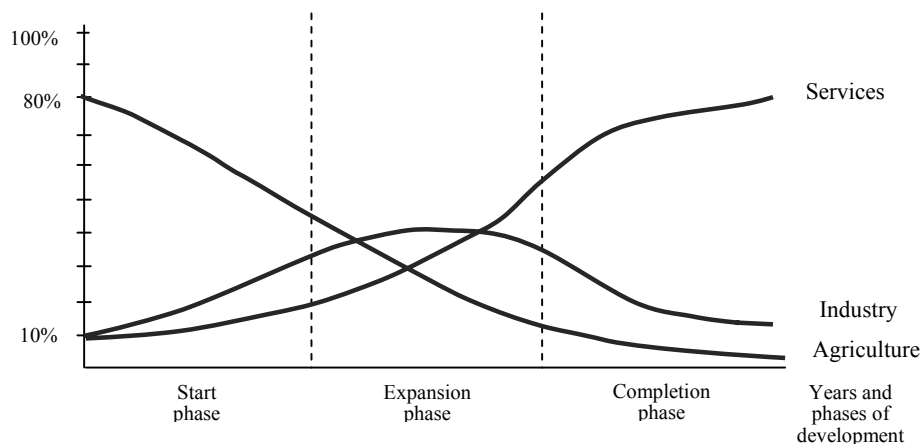


Figure 1. Evolution of transformation of the three-sector employment structure as presented by J. Fourastié

Source: Fourastié (1954), pp. 126–128.

The authors of the theory of the three-sector the economy, A. Fisher, C. Clark, and J. Fourastié, have identified three sectors in the economy: agricultural, industrial, and service, and emphasized the long-term regularities of their development [see. Kwiatkowski (1980), p. 59 et seq.]. According to their approach, along with the economic growth the share of the agricultural sector (i.e., the primary sector) in total employment tends to decline, the share of the industrial sector (the secondary sector) tends to increase, stabilizes and then declines, and the share of the service sector (the tertiary sector) in total employment continuously tends to increase [Fisher (1945), p.56; Clark, (1957), pp. 492 and Fourastié (1954), pp. 126–137]. As a result of these trends the changes take place in the three-sector employment structure involving the shift of the centre of economy’s activity in the process of development from the agricultural sector trough the industrial sector and to the service sector (see Fig.1).

Fourastié divided the process of economic development into three phases of development: traditional civilizations, transitional period and tertiary civilization (Fourastié (1954), p. 127). The stage of the transitional period, the most important from the point of view of the intensity of structural transformations began in the developed countries in the early nineteenth century. In the first phase of this stage, i.e., in the start phase, the industrial sector is rapidly developing and the agricultural sector tends to decline. According to Fourastié, in the US this phase of development lasted until about 1920 (Fourastié (1954), p.133). In the second phase of the transitional period, i.e., in the expansion phase, the employment in the industrial sector becomes stable at a high level. The US and UK economies were in this phase in the 1950s (Fourastié (1954), p.137). However, in the completion stage, i.e., in the third phase of the transitional period stage, the downward trend in the share of the industrial sector begins, coupled with a rapidly growing share of the service sector and a further downward trend of the share of the agricultural sector. According to Fourastié, the upward trend of the share of the service sector in this development phase is particularly intensified because in this phase the service sector absorbs not only labour released in the primary sector, but that in the secondary sector as well (Fourastié (1954), pp.133–137).

The literature emphasizes two factors determining changes in the sectoral structure of employment, namely:

- changes in the structure of demand for products (including services)
- diversified dynamics of technological progress in particular sectors and sections.



The impact of changes in the structure of demand for products on the changes in the structure of employment takes place according to the following sequence. The changes in the structure of demand result in the corresponding changes in the structure of production, and the latter entail, in turn, changes in the demand for labour and employment. This approach is consistent with Keynesian understanding of economic processes and has been emphasized in the three-sector theory of the economy.

The three-sector theory of the economy claims that the three-sector employment structure depends on the structure of consumer demand [Fisher (1933), p. 9; Clark (1957), p. 493; Fourastié (1954), pp. 84–115]. According to the authors of this theory, the consumer demand is formed in the process of economic development in accordance with the regularity involving the existence of a certain sequence of satisfying consumer needs and the occurrence of tendencies to satisfy demand. In their view, the growth in demand for products of primary sector is slowing down quite quickly along with economic development, then the demand for products of this sector is satisfied and the relative importance of this demand declines [Fisher (1945), p. 57]. In contrast, the demand for products of the secondary sector is slightly different. Initially, the relative importance of the demand for the products of this sector is growing, and the income elasticity of demand for these products is high. However, along with the economic development, the income elasticity of demand for products of the industrial sector begins to decline and there appear signs of saturation of demand [Clark (1957), p. 493]. In the case of services, along with economic development the demand shows continuing upward trend, with no signs of its saturation [Fourastié (1954), p. 86].

Although the above approach is not without some doubts (especially with regard to the issues of the saturation of demand), it does highlight the relationship of employment and demand for products (including services) and without doubt it includes reasonable elements and has gained recognition on the grounds of fundamental trends of economic theory.

Another factor determining the changes in the sectoral structure of employment is technological progress. The importance of this factor in shaping the size of employment in the various sectors of the economy was highlighted in neoclassical economics, and especially in the neoclassical theory of economic growth, as well as in the theory of the three sectors of the economy, developed in particular, by J. Fourastié.

J. Fourastié based his concept of the impact of technological progress on employment in the three sectors of the economy on the idea that technical progress is crowding out labour from production. In his opinion, technical progress leads to an increase in labour productivity, resulting in reduced demand for labour [Fourastié (1954), pp. 47–48]. The rate of technical progress in the various sectors of the economy, however, is not the same, therefore the increase in labour productivity and the scale of employment displacement process are diverse in these sectors. According to Fourastié, the rate of technical progress in the primary sector (agriculture) is moderate, strong in the secondary sector (industry), and weak or non-existent in the tertiary sector (services) [Fourastié (1954), pp. 47–48]. As a result of different rates of technological progress and labour productivity the intensity of labour displacement processes varies in individual sectors, resulting in changes in the sectoral structure of employment.

Recognition of the role of technological progress in the development of employment structures by J. Fourastié raises different questions. On one hand, it seems advisable to highlight the diverse effects of technical progress on employment in different sectors, but on the other hand, this approach is also criticised. In particular, the argument about the lack of technological progress in the services sector is difficult to accept in the present context, when electronics and informatics are introduced into many services, especially in banking, communications, telecommunications, education, and health care.

One should also note the rather narrow recognition of technical progress by J. Fourastié. He stressed the so-called process technical progress, expressed in the implementation of innovative



solutions which change the proportion between the factors of production used and which crowd out workforce from production. However, he did not take into account the so-called product technical progress, involving the development and implementation of new products. It is this product technical progress, that involves the creation of new needs and new products, which is of some importance, especially in explaining changes in sectoral employment structures, which can boost these areas of manufacture which use high skills and latest technology.

3. Trends in the development of sectors and in the changes in the three-sector structure in Ukraine and Poland

Let us consider whether the trends of structural changes outlined in the second section are supported by statistical data for Poland and Ukraine in the years 1990-2013. This period is long enough so that the regularities of changes in the three-sector economic structure should become apparent, although it would be advisable to take an even longer period into account. However, the beginning of systemic transformation into a market economy is a factor limiting the extension of this period. We conventionally assume that the transformation began in 1990. The data from the World Bank resources were used, since they allow for a more accurate comparative analysis. Due to the availability of information, the time range was set for the years 1990–2013.

Let us start by looking at the analysis of trends in gross domestic product per capita, the most commonly used indicator for demonstrating changes in the level of economic development.

Figure 1 shows the trends in gross domestic product per capita in purchasing power parity in Poland in the years 1990–2013.

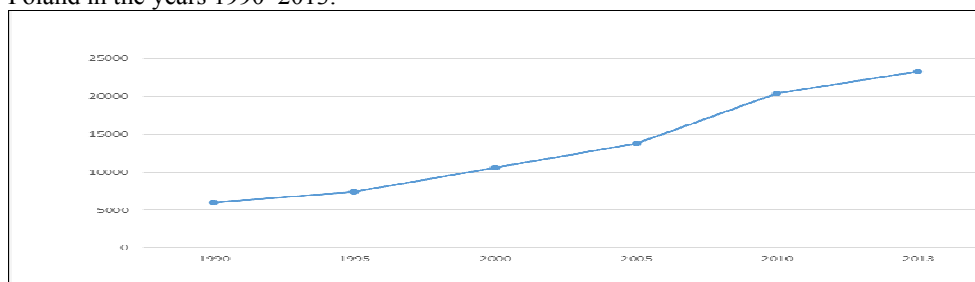


Chart 1. Gross domestic product per capita in purchasing power in Poland in the years 1990–2013 (in current international dollars)

Source: <http://data.worldbank.org/country/poland>

The data in Chart 1 confirm that the Polish economy is expanding, raises its level of economic development, as evidenced by more than fourfold increase in GDP per capita in the period under study.

Chart 2 shows the trends in real value added in the three analysed sectors of the Polish economy (in fixed prices of 2005). While analysing these trends it can be observed that all three sectors are growing, though not at the same pace. The agricultural sector exhibited the weakest upward trend (an increase of 18% in the period 1992–2010), while the industrial sector exhibited the strongest upward trend (an increase of 164% over the period), which is characteristic of the two sectors. The theory of the three sectors indicates that such relationship between growth rates in industrial sector and services are typical for a country at a medium level of development.

Varied dynamics of value added in the three sectors are reflected in changes in the value added by sectors. The relevant data in this regard for the years 1990–2010 are shown in Table 1. The table shows that the share of the agricultural sector in the value added decreased in the period by more than 5 percentage points, the share of the industrial sector fell by almost 19 percentage

points, while the share of the service sector increased by more than 23 percentage points. It is worth noting that the strongest changes in the three-sector structure took place in the first decade of the transition period, while in the second decade these changes were noticeably weaker.

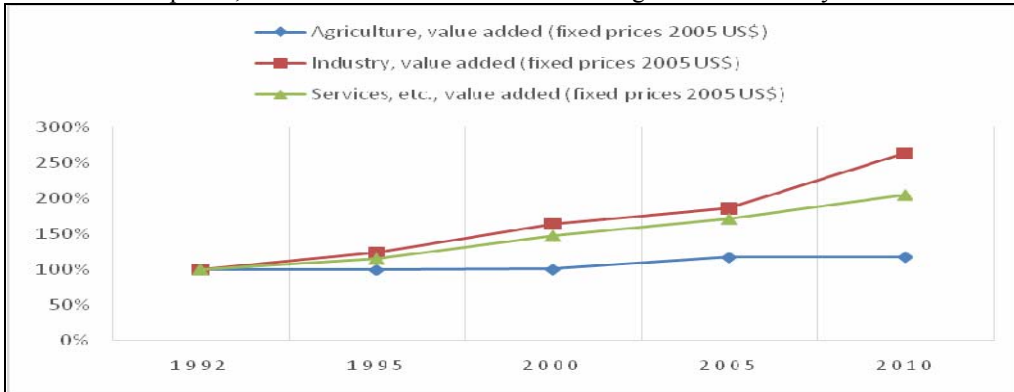


Chart 2. Development trends of value added in the three sectors of the economy in Poland in the years 1992–2010 (in fixed prices US dollars of 2005) (1992=100)

Source: <http://data.worldbank.org/country/poland>

Table 1

Three-sector structure of value added in Poland in the years 1990–2010 (in % of national value-added)

Year	Agriculture sector	Industrial sector	Service sector
1990	8.26	50.11	41.63
1995	8.01	35.16	56.83
2000	4.96	31.71	63.33
2005	4.53	30.71	64.76
2010	3.54	31.63	64.83

Source: <http://data.worldbank.org/country/poland>

Chart 3 provides information of shares of the three sectors in total employment in Poland.

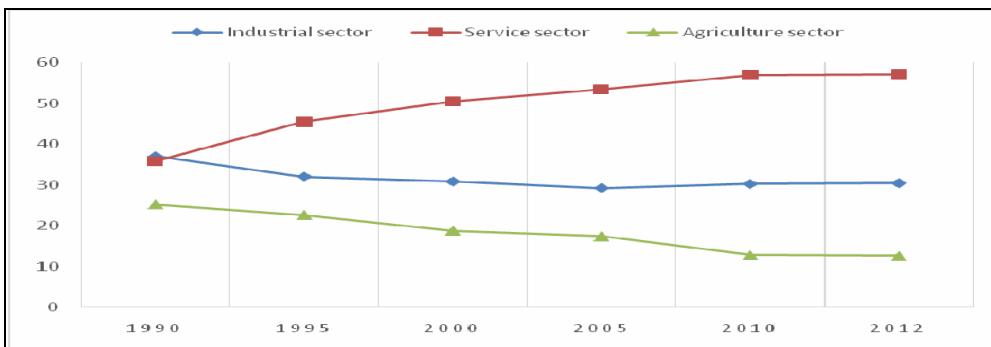


Chart 3. Shares of the three sectors in total employment in Poland in the years 1990–2012 (in %)

Source: <http://data.worldbank.org/country/poland>



While analysing the data in Chart 3 we can see that over the years 1990 to 2012 shares of sectors in total employment changed significantly. There was an increase in the share of the service sector in total employment (an increase of 21 pp in the period from 1992 to 2010) and a decrease in the share of employment in the agricultural sector. In 1990, people working in agriculture accounted for over 20% of total employment, and in 2010 for about 10%. These data suggest that changes in the structure of the three-sector employment in Poland are in line with the regularities of structural changes in the process of economic development.

Interesting conclusions can be drawn from the comparison of shares of individual sectors in the total value added and total employment. In the final years of the period percentage shares of the agricultural sector were significantly higher in the case of shares in total employment than in the total value added, while in the case of industrial and services sectors, the situation was reversed: shares in value added were higher than shares in total employment. This shows that productivity per one employee in the agricultural sector is substantially lower than the labour productivity in the industrial and service sectors, and lower than the average labour productivity in the economy while in the industrial and service sectors, the situation is reversed.

Let us look at current level of economic development and trends of structural changes in Ukraine in the years 1990–2013.

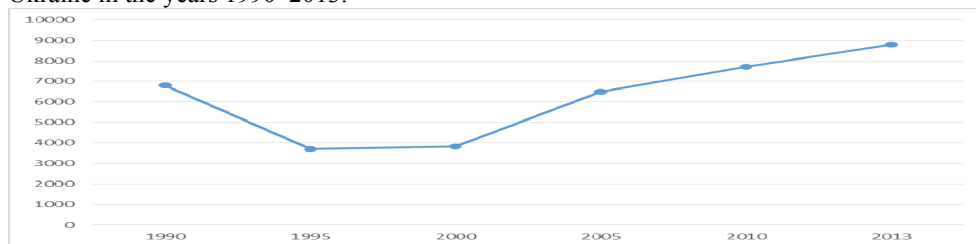


Chart 4. Gross domestic product per capita in purchasing power parity in Ukraine in the years 1990–2013 (in current international dollars)

Source: <http://data.worldbank.org/country/ukraine>

During the period of transformation in the years 1990–1995, Ukraine experienced a steep decline in GDP per capita; GDP growth took place only after 2000, while the level of GDP per capita from 1990 was achieved as late as in 2006. Gross domestic product per capita in the years 1990–2013 in Ukraine increased only by ca. 28%.

Chart 5 shows the trends in real value added in the three sectors of the economy in Ukraine in the years 1992–2010.



Chart 5. Trends in value added in the three sectors of the economy in Ukraine in the years 1992–2010 (Fixed prices of 2005, US dollars) (1992 = 100)

Source: <http://data.worldbank.org/country/ukraine>

Analysing the data from Chart 5 it can be concluded that in the years 1992 to 2000 the value added decreased sharply in each of the sectors, while the industrial sector exhibited the strongest downward trend (about 60%). It is characteristic that the agricultural sector showed the weakest downward trend in value added, pointing to a low cyclical sensitivity of this sector. The value added demonstrated an upward trend from 2000 on in all sectors, however only the agricultural sector achieved the level it had in 1990. This reflects large structural problems of the economy, especially in the industrial sector.

Now let us look at changes in the structure of the value added by sectors in Ukraine (Table 2).

Table 2

Three-sector structure of the value added in Ukraine in the years 1990-2012 (in % of GDP)

Year	Agriculture sector	Industrial sector	Service sector
1990	25.57	44.57	29.86
1995	15.40	42.68	41.92
2000	17.08	36.32	46.60
2005	10.40	32.35	57.26
2010	8.27	31.34	60.39
2012	9.29	29.25	61.47

Source: <http://data.worldbank.org/country/ukraine>

Table 2 shows that the share of the agricultural sector in value added declined between 1990 to 2012 by more than 16 percentage points, and the share of the industrial sector fell by almost 15 percentage points. It is characteristic that the share of the service sector in the value added increased during the period by more than 31 percentage points. It should be noted that the trends in the three-sector structure of value added in the economy of Ukraine were in line with universal development trends. The share of the sphere of services increased gradually while the role of agriculture declined and the proportion of the value added generated in the industrial sector was relatively stable.

Chart 6 presents data on shares of the three sectors in total employment in Ukraine.

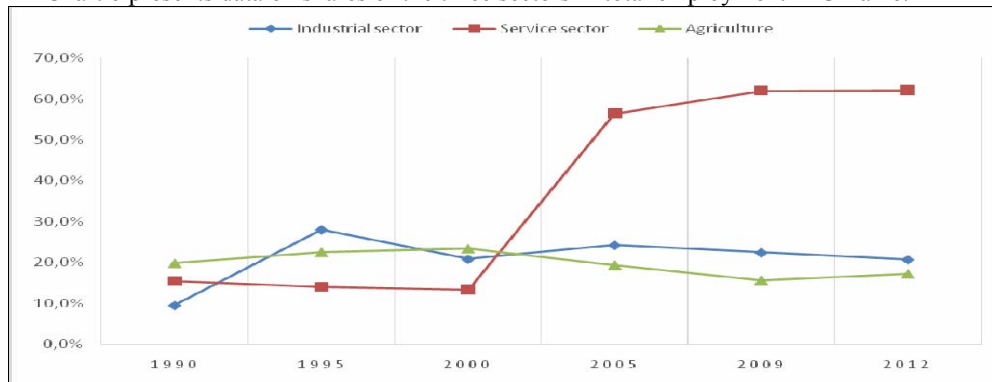


Chart 6. Shares of the three sectors in total employment in Ukraine in the years 1990-2012* (in%)

* Data on the services sector in the year 2005 are not fully comparable with earlier data

Source: <http://data.worldbank.org/country/ukraine>

Analysis of the data in Chart 6 shows that over the years 1990 to 2012 the shares of the three sectors in the total employment changed, while the strongest changes occurred in the second decade of transition. The service sector increased its share in total employment by about 47 percentage points, which was a result of, *inter alia*, the development of a range of modern



services, but was also due to the change in the methodology of calculating employment in services (at the beginning of the 21st century).

Comparing the shares of individual sectors in total value added and total employment in Ukraine, it is clear that in the final years of the period shares of the agricultural sector in total employment were substantially higher than the share of this sector in value added, whereas in the case of the industrial sector, the situation was radically different; the share of this sector in value added was higher than in the case of the share in total employment. This indicates a relatively low labour productivity per one employee in the agricultural sector and a relatively high labour productivity in the industrial sector (higher than the average productivity in the economy). In the case of the service sector the shares in value added and employment were similar, which implies that the level of labour productivity in this sector is similar to the average productivity in the economy.

At the end of the comparative analysis we can compare the structure of the three-sector employment in Poland and Ukraine. Suitable data are presented in Table 3.

Table 3

**Three-sector structure of employment in Poland and Ukraine
in 2005-2012 (in % of total employment)**

Year	2005	2010	2012
Agricultural sector			
Poland	17.4	12.9	12.6
Ukraine	19.4	15.6 *	17.2
Industrial sector			
Poland	29.2	30.2	30.4
Ukraine	24.2	22.4 *	20.7
Service sector			
Poland	53.4	56.9	57.0
Ukraine	56.4	62.0 *	62.1

* Data for 2009

Source: <http://data.worldbank.org/country/>

The analysis of the data above shows, first, that the three-sector employment structure has changed in both countries in the same direction. Shares of the agricultural sector in total employment decreased in both countries, and shares of the service sector grew. Shares of the industrial sector were evolving in different directions: they were slightly increasing in Poland, while in Ukraine they were falling. Second, shares of individual sectors in total employment in both countries stood at slightly different levels. The relative importance of the agricultural sector is much higher in Ukraine than in Poland, and the relative importance of the industrial sector is much higher in Poland than in Ukraine. The higher share of the service sector in Ukraine than in Poland is somewhat surprising in the context of per capita GDP indices in both countries, but it may be a result of a lower level of industrialization and the slower rate of economic growth in Ukraine.

In both countries transformations of the three-sector structure of employment were taking place in slightly different macroeconomic conditions. In principle it does not apply to the period before the global crisis, because the average annual GDP growth rate in the years 2003–2008 was 5.1% in Poland and 6.9% in Ukraine. Significant differences in the growth rate of output took place during the global crisis and immediately after it, as in the years 2009–2012, the average rate for Poland was 2.4%, and 5.2% for Ukraine. These differences are not without importance for trends in the total employment in both countries (see Chart 7). As the graph shows, the employment growth rate in the last decade was much stronger in Poland than in Ukraine.

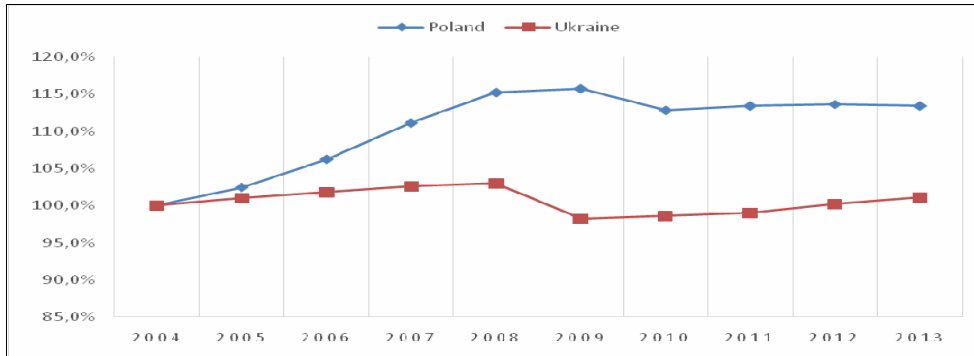


Chart 7. Employment growth rate in Poland and Ukraine in the years 2004-2013 (2004 = 100)

Source: Eurostat's website and the State Statistics Service of Ukraine (www.ukrstat.gov.ua).

4. Conclusions

Several conclusions can be drawn from the above analyses.

First, in both countries the economic growth is taking place during the period under study, GDP per capita shows an upward trend, although the trend was stronger in Poland than in Ukraine.

Second, the regularities in the development of sectors formulated in the three-sector theory of the economy are supported by economies of Poland and Ukraine. The share of the agricultural sector in total employment decreases in both countries, the share of the service sector is growing, while the share of industrial sector, actually, tends to be stable. The share of the agricultural sector tends to decrease although the process is stronger in Poland than in Ukraine, and it is the opposite in the case of the service sector which shows a stronger upward trend in Ukraine.

Thirdly, the three-sector employment structure in Poland, formed in recent years, is different than in Ukraine. The share of the agricultural sector in total employment in Ukraine is much higher than in Poland, while the share of the industrial sector is significantly higher in Poland than in Ukraine. The service sector has a surprisingly higher relative importance in Ukraine, which may be due to the slower rate of growth of industrial development in this country in recent years.

Fourth, in both countries, labour productivity in the agricultural sector is generally lower than in the industrial and service sectors. The modernization of the economic structure (decrease in the share of the agricultural sector and the increase in the share of the service sector) should therefore increase average labour productivity in the economy.

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