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O.V. Pyroh
Lviv Polytechnic National University,
Department of Management and International Business

ANALYZING THE ECONOMIC DEVELOPMENT DYNAMICS OF THE NATIONAL ECONOMY OF UKRAINE

The article presents research results of the current trends in the economic development of the national economy of Ukraine on the basis of statistic and economic analysis, identifies its characteristics in terms of macro- and mezo-levels and determines the factors of development under conditions of post-industrial society, using the R. Solow model of economic growth and the Cobb-Douglas production function.

Key words: economic development, national economy, post-industrial society, Ukraine, gross national product, regional aspect, gross regional product, asymmetry.

О.В. Пирог
Національний університет "Львівська політехніка",
кафедра менеджменту і міжнародного підприємництва

АНАЛІЗУВАННЯ ДИНАМІКИ ЕКОНОМІЧНОГО РОЗВИТКУ НАЦІОНАЛЬНОГО ГОСПОДАРСТВА УКРАЇНИ

Наведено результати дослідження сучасних тенденцій економічного розвитку національного господарства України на основі статистичного та економічного аналізу, встановлено його особливості на макро- та мезорівнях і визначено фактори розвитку з використанням моделі економічного зростання Р. Солоу та виробничої функції Кобба-Дугласа, в умовах постіндустріального суспільства.

Ключові слова: економічний розвиток, національне господарство, постіндустріальне суспільство, Україна, валовий внутрішній продукт, регіональний аспект, валовий регіональний продукт, асиметрія.

Problem statement

In terms of postindustrialization, global changes of world economy and global uncertainty, key objective of economic development of national economy becomes an opportunity of sustainable development, which can be achieved through efficient governance under optimal economic, innovation, investment, and social conditions. It has been established that instability and chaos of the national economy is observed during a shift of social paradigm alongside with structural and technological transformations.

The countries with post-industrial societies (USA, Japan, Germany, France) tend to have chaotic development in the modern period (2000–2012) and during the period 1970–1979, while in other periods (1960–1969, 1980–1989, 1990–1999) they have trends of sustainable development. In the countries with industrial societies (Poland, Romania, Ukraine), trends of average level of stability and instability prevail (1960–1969, 1980–1989, 1990–1999, 2000–2012), and only during 1970–1979 trends of stability were observed. Countries with pre-industrial societies mainly are characterized by unstable and chaotic tendencies. Note that the global financial crisis influenced ambiguously on the development of national economies around the world. During the 2000–2012 period, countries with post-industrial societies had chaotic development, while countries with pre-industrial societies had sustainable development with

growth rates in the 3 – 4 times higher than the countries with post-industrial societies. Countries with industrial societies in this period developed on average stable level.

The national economy of postindustrial society is characterized by stable development of intensive factors. Among the set of factors, the intensive factors (investment, innovation) have priority to ensure stable development of national economy in terms of postindustrial society.

Analysis of recent research and publications

Problems of economic development on macro- and meso- levels in the context of current economic conditions are studied by both Ukrainian and foreign scientists: V. Geyets, O. Amosha, Z.Gerasymchuk, B. Danylyshyn, M. Kizim, I. Manzurov, A. Revenko, A. Chukhno, S. Glazyev, A. Granberg, Y. Zaytzev, S. Menshykov, Y. Orekhov, A. Plyakin and others. At the same time, questions of definition of methodological and applied principles of establishing current trends of economic development of the national economy of Ukraine and identification of its characteristics in terms of macro- and meso-levels and determination of development factors in a post-industrial society should be clarified. Therefore, there was an objective demand for research of trajectory, features and asymmetry of economic development. Analysis of both macrolevel and mesolevel is necessary due to that macrolevel describes Ukraine economy in whole and accumulated tendencies of development in the country. While mesolevel describes each region and allows to set regional characteristics of each of them, to identify the differences of macrolevel trends across the country, and to find asymmetries in economic development of the country.

Objectives

The aim of article is to establish the current trends of economic development of the Ukrainian national economy, to identify its characteristics in terms of macrolevel and mesolevel and to determine factors of development in post-industrial society.

Methodical bases of research are methods of analysis and synthesis, statistical analysis and correlation and regression analysis.

In the analysis of current state of economic development, during which the characteristics of regional growth and its differences from the national trends will be established, macroeconomic indicator - Gross Regional Product (GRP) will be used, which reflects the dynamics and scope of structural changes in the economy of regions of Ukraine.

The information base of the study was the official statistical data on Ukraine and regions for the 2001 – 2012 period [1–6].

Materials

The economic development of Ukraine is characterized by stable trends of economic growth for the most regions of country (tab. 1). The Gross Regional Product of Ukraine during the 2001 – 2012 period increased in 7.9 times. Among the regions of Ukraine the maximum GRP growth for the studied period was registered in Kyiv (in 10.8 times) and Dnipropetrovsk (in 9 times) regions, the minimum – in the Sumy region (6 times). Despite the economic growth in all regions of Ukraine in 2001 – 2012's, their rates of growth and dynamics are different.

Table 1

The growth rate of Gross Domestic Product by region of Ukraine for the period 2001 – 2012, in % to previous year

Region	Year										Ratio 2012 to 2001
	2001	2004	2005	2006	2007	2008	2009	2010	2011	2012	
1	2	3	4	5	6	7	8	9	10	11	12
Ukraine	113.6	112.1	102.7	107.3	107.9	102.3	85.2	104.1	105.2	108.1	7.9
Autonomous Republic of Crimea	108.9	108.5	104.0	106.7	109.0	106.6	90.7	103.4	100.0	116.5	8.1
Vinnytsia	108.1	111.9	105.3	106.2	103.4	105.1	90.1	103.0	105.1	113.5	6.5
Volyn	118.4	119.0	103.7	103.5	112.1	106.1	86.0	100.2	102.5	113.4	6.9
Dnipropetrovsk	112.8	111.0	107.3	108.0	105.3	97.3	83.5	105.8	103.8	105.7	9.0

Table 1 Continued

1	2	3	4	5	6	7	8	9	10	11	12
Donetsk	111.8	110.8	97.1	108.3	104.6	97.1	81.6	111.1	111.7	106.1	7.4
Zhytomyr	106.4	115.6	101.1	103.6	105.1	104.2	88.9	112.8	101.5	113.3	7.8
Zakarpattia	110.6	106.4	98.5	106.6	108.2	103.9	82.1	107.7	103.4	118.6	7.6
Zaporizhia	110.1	115.6	104.6	106.1	108.5	101.3	78.9	103.2	102.3	110.7	6.8
Ivano-Frankivsk	107.9	107.6	105.9	102.5	100.8	97.5	89.3	100.5	107.9	120.7	8.2
Kyiv	103.6	109.8	107.3	108.8	105.9	104.4	89.2	105.1	109.7	117.8	10.8
Kirovohrad	120.9	118.9	102.4	105.1	97.9	113.7	85.8	105.7	106.6	110.1	6.9
Luhansk	118.9	108.2	100.3	104.3	105.2	98.9	86.7	102.3	108.3	102.7	7.8
Lviv	111.1	105.2	98.1	108.3	105.8	100.7	88.3	102.3	106.2	118.9	8.4
Mykolaiv	119.3	118.1	100.1	107.1	99.5	106.9	92.5	103.2	101.2	105.7	6.7
Odesa	112.3	108.1	99.6	103.5	106.3	111.9	86.8	102.4	100.4	105.3	6.7
Poltava	116.3	116.7	99.2	108.2	105.8	94.9	86.8	109.5	100.1	108.3	8.5
Rivne	109.4	113.1	102.1	106.9	104.5	99.5	86.5	106.8	103.7	112.9	6.8
Sumy	108.9	105.9	104.4	103.4	103.4	103.6	88.7	98.9	106.5	108.8	6.0
Ternopil	108.2	106.4	102.5	110.3	108.3	105.1	94.5	100.4	109.5	110.2	7.6
Kharkiv	117.9	112.2	104.8	107.5	107.2	102.1	86.3	101.7	105.7	107.0	7.8
Kherson	118.0	111.2	99.2	104.0	100.4	109.8	93.0	101.8	102.8	104.9	6.4
Khmelnytskyi	112.3	112.7	103.9	104.2	104.0	99.9	90.6	100.0	106.7	114.9	7.2
Cherkasy	106.6	116.9	107.0	105.6	106.5	114.9	85.5	105.9	103.9	115.7	8.7
Chernivtsi	113.4	109.3	101.5	105.5	108.3	105.4	88.6	100.3	103.3	110.0	7.0
Chernihiv	110.5	110.0	100.1	103.4	106.5	102.3	89.6	100.0	106.3	113.1	6.9
City of Kyiv	121.4	116.8	105.8	110.7	119.7	104.4	81.7	101.4	104.3	123.2	8.8
City of Sevastopol	116.6	107.0	100.9	116.3	106.6	106.9	89.6	106.4	100.0	105.7	8.2

Note: compiled and calculated by the authors according to data [1–6]

During the studied period, dynamics of Ukrainian GDP mostly remains positive but unstable. However, the growth rate of Gross Regional Product by region of Ukraine indicate that dynamics of growth is stable for the most of the country. At the same time, the limits of growth are constantly changing, not constant and varies greatly from year to year. Due to differentiation of regional growth rates, the growth trajectory of Gross Regional Product of Ukraine forms broad stream that changes its direction with uneven density (tab.2).

Table 2

Characteristics of growth of Gross Regional Product by regions of Ukraine in the period 2001 – 2012

Index	Year										
	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012
The highest rate, %	21.4	17.1	19.0	7.3	16.3	19.7	14.9	-5.5	12.8	11.7	23.2
The lowest rate, %	3.6	1.3	5.2	-2.9	2.5	-2.1	-5.1	-21.1	-1.1	0.0	2.7
The width of the stream (percentage points)	17.8	15.8	13.8	10.2	13.8	21.8	20.0	15.6	13.9	11.7	20.5
Average rate, %	12.6	6.2	11.6	2.5	6.5	5.9	3.9	-12.5	3.8	4.6	11.5
Range between the highest and average rates (percentage points)	8.8	10.9	7.4	4.8	9.8	13.8	11.0	7.0	9.0	7.1	11.7

Note: calculated according to data [1–6]

The growth rate stream has great width between regions of Ukraine: from 10.2 percentage points in 2005 to 21.8 percentage points in 2007. If we compare the width of the stream in 2012 to 2001, we could argue that during the studied period there was a reduction of stream by 2.7 percentage points, which may indicate stability and homogeneity of economic growth of the regions of Ukraine. The average growth rate of Gross Regional Product for 2001 – 2012 was not constant and it varied each year, from 2.5 % in 2005 to 12.6 % in 2001 and – 12.5 % in 2009.

During the studied period, diffusion of economic growth among regions of Ukraine manifested through constantly increasing number of regions with growing rates of Gross Regional Product (fig. 1).

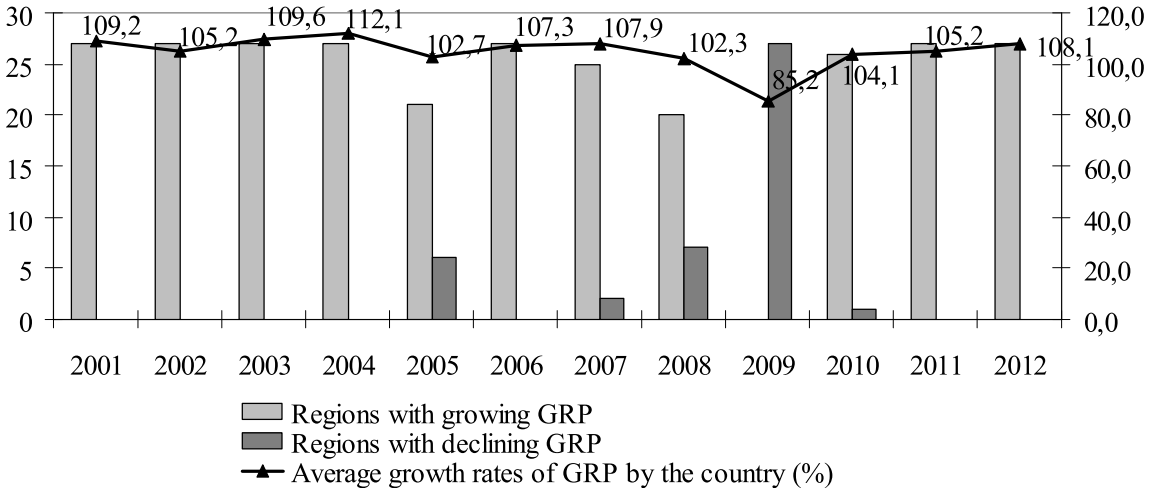

Fig. 1. Ratio of regions with growing growth rates to regions with declining growth rates of Gross Regional Product in Ukraine for the period 2001 – 2012

Note: compiled and calculated according to data [1–6]

For the 2001 – 2004, 2006 and 2011 – 2012 years, all regions of Ukraine positively influenced on the growth of the national economy. The negative impact of the global financial crisis was already felt in 2008, when seven from the 27 regions of the country had decline of the rates of Gross Regional Product, the full impact of the crisis Ukraine experienced in 2009, when all regions of Ukraine were in recession. However, in 2010, almost all regions of Ukraine, with exception of the Sumy region, renewed economic growth.

There is no obvious leader among the regions in terms of growth rate of Gross Regional Product. The most often top four regions with the highest rates of growth during 2001 – 2012 are Kyiv, Kirovohrad, Mykolaiv and Cherkasy regions, occupying the first positions. The list of regions with the lowest growth or decrease of Gross Regional Product includes Ivano-Frankivsk, Sumy and Chernihiv regions. By examining more trends of growth rate of Gross Regional Product of the region, the leader of one year can fall to last place in the next year, due to instability in the economic growth and the asymmetry of growth rate of Gross Regional Product.

To determine the growth rates of Gross Regional Product, which characterize the most of the regions of Ukraine during the studied period, it is necessary to build a variation-dynamic table (tab. 3).

Table 3

Variation-dynamic table of changes of the growth rates of Gross Regional Product in the regions of Ukraine for 2001 – 2012

Ranges of the growth rates of Gross Regional Product, %	Year										Number of regions in the range (units)	Proportion of the regions in the range, %
	2001	2004	2005	2006	2007	2008	2009	2010	2011	2012		
< 79.9	-	-	-	-	-	-	1		-	-	1	0.31
80.0 – 89.9	-	-	-	-	-	-	20		-	-	20	6.17
90.0 – 99.9	-	-	6	-	2	7	6	1	-	-	22	6.79
100.0 – 104.9	1	-	15	9	7	9	-	16	15	2	90	27.78
105.0 – 109.9	7	11	6	15	16	8	-	8	11	8	116	35.80
110.0 – 114.9	10	8	-	2	1	3	-	2	1	10	46	14.20
115.0 – 119.9	7	8	-	1	1	-	-	-	-	5	25	7.72
> 120.0	2	-	-	-	-	-	-	-	-	2	4	1.23
Total	27	27	27	27	27	27	27	27	27	27	324	100.00

Note: calculated according to data [1–6]

According to table 3, economic growth rates within the 105.0 – 109.9 % range during the whole studied period are typical for majority of the regions (116 regions of 324 observations with share of 35.8 %). In addition to mentioned growth rates, the regions of Ukraine were characterized by growth rates within the 100.0 – 104.9 % range (90 of 324 observations with share of 27.78 %). During 2001 – 2012, the growth rates of Gross Regional Product within the 110.0 – 119.9 % range are typical for 71 regions (with share of 21.92 %), and four regions were characterized by growth rates over 120.0 %. For 43 regions of 324 observations with share of 13.27 %, growth rates of Gross Regional Product within the 78.0 – 99.9 % range are typical.

By share of Gross Regional Product, regions of Ukraine were divided into three groups: the First Group consists of regions that occupy more than 10 % of the total GRP, the Second Group combines regions that produced GRP ranging from 1 % to 10 %, and the Third Group includes regions where the share of GRP was less than 1 % (fig. 2).

During the 2001 – 2007, the First Group had only two regions of Ukraine – Kyiv and Donetsk regions with share of 29.5 – 31.6 %; since 2008 another industrialized region of Ukraine – Dnipropetrovsk region had joined and then the share of the group increased to 40.14 – 40.74 %. In the 2001–2007 period, the Second Group consisted of 23 regions and since 2008 – 22 region with share of 57.6 %, which decreased by 11.17 percentage points over the period of the study. The Third Group constantly includes two regions of Ukraine – Sevastopol and Chernivtsi regions with a share of 1.5 – 1.7 % during 2001 – 2012.

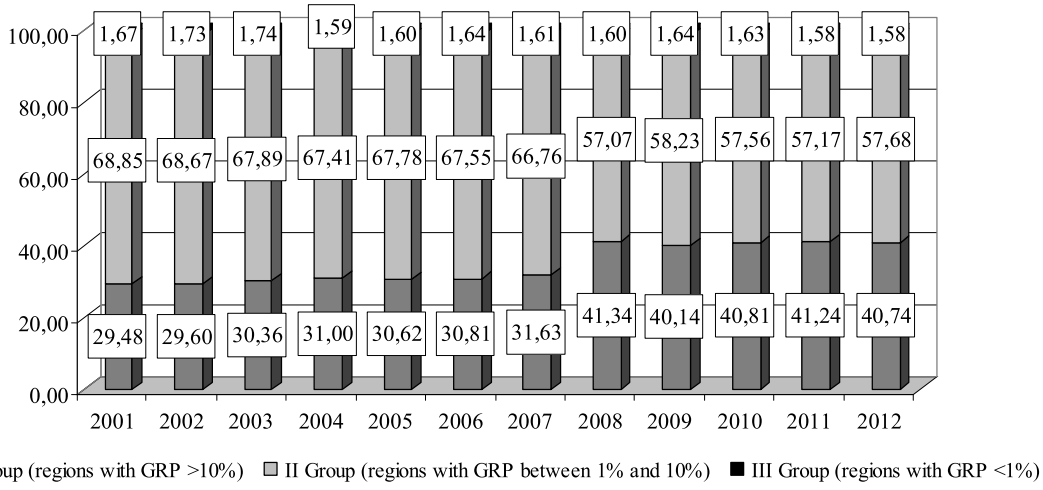

Fig. 2. Grouping of regions of Ukraine by the share of Gross Regional Product in the 2001- 2012

Note: calculated according to data [1-6]

Thus, the asymmetry in economic development has the following features: almost half (40.74 %) of the Gross Regional Product is created by only three regions of Ukraine (Dnipropetrovsk, Donetsk and Kyiv regions), while the other 24 regions of the country are creating the other half of the Gross Regional Product. The peculiarity of economic development of the national economy of Ukraine in regional aspect: high growth rates (more than 110.0 %) do not provide quality development of the region and negatively affect stability of development. Thus, the economic growth of regions-leaders (Dnipropetrovsk, Donetsk and Kyiv region) is at 105.0 – 109.9 % for the most years of the studied period, while economic growth in the regions, that occupy the smallest share of GRP, (Chernivtsi region, City of Sevastopol), are ranging from 88.6 % to 116.6 % during the studied period.

To determine the factors of economic development, it is necessary to carry out an economic assessment, which describes the relations between cost of inputs and gross output of the economic system. In order to solve this problem, we used the model of economic growth of Solow R. [7], which is based on the production function of Cobb-Douglas and takes into account intensive factors of the economic system in a post-industrial society. Analysis of the national economy of Ukraine during 2000 – 2012 should start with the basic assumptions that were made in the mentioned models.

The gross output of national economy of the country is determined by the production function (1):

$$Y = f(K, L, T), \quad (1)$$

where Y – gross domestic product (GDP), bn. UAH; K – amount of capital required to produce GDP, bn. UAH; L – real wages of employees, bn. UAH; T – innovative factor that determines the impact of technological progress on gross output (the costs of scientific and technical works (STW), bn. UAH.

To construct the production function for the national economy of Ukraine, the following official statistical data was used: real GDP, real gross fixed investment, real wages of employees and the costs of STW for the period 2000 – 2012. Dependence between selected indicators is confirmed by the coefficient of determination, which equals to 0.999 and is close to 1 and indicates the existence of a close interdependence between parameters for a specified period.

The linear regression equation (2):

$$Y = 2.023L + 0.047K - 4.89T + 32.262. \quad (2)$$

Regression equation (2) shows that increase by 1 UAH of gross fixed capital formation at constant level of real wages of employees and the costs of STW leads to reduction of GDP by 0.047 UAH. Whereas increase of real wages of employees by 1 UAH at constant level of gross fixed capital formation and the costs of STW leads to increase of GDP by 2.023 UAH. Growth of costs of STW by 1 UAH at constant level of gross fixed capital formation and real wages of employees leads to decrease of GDP by 4.895 UAH. Therefore, calculated linear regression model makes it possible to argue that Ukraine's economic growth for 2000 – 2012 was due to extensive factors (changes in labor force), which is typical development of industrial society; while intensive factors (investment and innovation) are typical for the development of post-industrial society and remain insignificant.

R. Solow's production function of model of economic growth of Ukraine, taking into account the real macroeconomic indicators for the period 2000 – 2012, has the general form (3)

$$Y = 0.96L^{1.01}K^{-0.037}T^{-0.056}. \quad (3)$$

The mentioned production function (3) confirms previous regression equation. According R. Solow model, so called the "engine" of economic growth of Ukraine is labor force. This result confirms the statement of V. Dergachova that "... the current policy of remuneration, budgeting and debt service of economy, in fact, "is eating" the very foundation of development – investment, including fixed assets" [8, p. 24].

Thus, during the 2000 – 2012 national economy of Ukraine was developing by the model of industrial society with priority of extensive factors, while determining influence of innovation and investment components, which are typical for post-industrial society, remains low.

Conclusions

According to the results of the research, the following conclusions on the economic development of the national economy of Ukraine for the period 2001 – 2012 can be drawn:

– gross regional product of Ukraine for the period 2001 – 2012 increased by 7.9 times, with the maximum increase of GRP in Kyiv (in 10.8 times) and Dnipropetrovsk (9 times) regions, minimum increase - in Sumy region (6 times);

– majority of regions Ukraine is characterized by economic growth with rates within 105.0 – 109.9 % range throughout the studied period;

– fluctuation range of the growth rate of Gross Regional Product was significant from 78.9 % in 2009 (Zaporozhye region) to 123.2 % in 2012 (City of Kyiv). However, at the end of the studied period economic growth in regions of Ukraine is characterized by stability and uniformity;

– if we compare the growth rate of Gross Regional Product and GRP regional structure, the regions with share more than 10 % of the total GRP (City of Kyiv, Dnipropetrovsk and Donetsk regions) are not always characterized by high growth rates of GRP, i.e. not included to top five regions. High growth rates of GRP does not provide a significant contribution to GRP. It should be noted the range of fluctuations of growth rate is negligible for these regions compared with other regions of Ukraine. Consequently, fluctuations of economic growth in the same limits for an extended period provides stable economic development;

– national economy of Ukraine for the studied period was developing by the model of industrial society with priority of extensive factors.

Prospects for future research

Observed trends of economic development of the national economy of Ukraine are the results of unbalanced and uncoordinated economic policies of development at both the state and regional levels. Thus, the mechanism of effective implementation of policies by public authorities will be the basis of further research; since it affects the subsequent balanced and proportional development of the national economy of Ukraine.

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