

**ANALYSIS OF ECONOMIC GROWTH OF INDUSTRIAL PRODUCTION IN
UKRAINE AND PROBLEMS OF ITS SUPPORT**

MATVEJCIUK Liudmyla,

Doctor of Sciences in Public Administration, PhD
of Economic Sciences, docent,

Ivan Ohienko Kamianets-Podilsky National University, Ukraine

e-mail: sla.kpnu@gmail.com

ORCID ID <https://orcid.org/0000-0002-2989-6002>

SOLOVYOV Oleksiy,

postgraduate student

Poltava State Agrarian Academy

e-mail: solovevan136@gmail.com

ORCID: <http://orcid.org/0000-0001-9565-0919>

***Abstrac.** The author of the article substantiates that the formation of a modern economy involves achieving sustainable economic growth. Given the exceptional role of industry in the economy of Ukraine and the negative trends of its development in recent years, the scientific problem solved in this study is statistical and economic analysis of all sectors of industrial production in order to clarify their condition and make recommendations to increase competitiveness. Thus, this study further developed the economic analysis of the dynamics of industries based on the methods of general theory of statistics and financial mathematics, which in contrast to existing allows for cross-sectoral comparisons to determine competitiveness factors and centers of economic growth.*

***Key Words:** economic growth, industrial production, indices of industrial production, social production.*

JEL Classification: O011, O014, O019, O020

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1. Introduction

The formation of a modern economy involves achieving sustainable economic growth. Stimulating economic growth, maintaining its pace at a stable and optimal level is one of the most important long-term goals of economic policy of the government of any country in recent decades. The negative factors that exist in Ukraine today - deep disparities, reduced production, inflation and unemployment, declining living standards, etc. - significantly delay the formation of an effective economic system and its ability to self-regulate. In this context, finding sources of economic growth and accelerating it becomes a priority.

2. Analysis of recent researches and publications

The constant scientific interest in the problem of ensuring the competitiveness of industries is caused by their significant impact on the economy of Ukraine as a whole. Attention to this issue in their work was paid by such domestic scientists as: Ivanov Y.B., Kyzym M.O., Klimenko Y.L., Matyushenko I.Y., Obolentseva L.V., Pushkarchuk I.M., Romusik Y.B and others [1-5]. Thus, according to 2013-2018, the share of industrial production in total output changed from 48,7% to 45,1%. However, despite its reduction by – 3,6%, industrial enterprises today continue to play a crucial role in the economic development of the state.

3. The main objectives.

Given the exceptional role of industry in the economy of Ukraine and the negative trends of its development in recent years, a scientific problem that needs to be addressed in this study is a statistical and economic analysis of the dynamics of all sectors of industrial production to clarify their condition and make recommendations to increase competitiveness.

4. Research results

The methods of the general theory of statistics were used to study the structure of the studied phenomenon and the analysis of time series, as well as financial mathematics to eliminate the inflation factor while bringing the cost indicators to the level of the base year.

According to the current classifier of economic activities, NACE-2010 [6], industries include:

- mining and quarrying;
- processing industry;
- supply of electricity, gas, steam and air conditioning;
- water supply, sewerage and waste management.

Including 2018, the bodies of the State Statistical Reporting published information on the state and development of industry in Ukraine according to the above list of industries.

However, as of mid-2020, a significant amount of public statistical reporting, covering the period up to and including 2019, did not contain information on the results of management of water supply, sewerage and waste management [7]. At the methodological level, this complicates the analysis of the dynamics of industrial production and interpretation of its results, as there is a change in the base of comparison. Therefore, this feature of statistical accounting must be taken into account in further research.

As of the beginning of 2019, the largest share in the industry was the products of the processing industry – 72.3%; mining – 15.1%; electricity, gas and steam supply – 11.4%; water supply and drainage – 1.3%. The magnitude of the corresponding structural shifts was estimated by the coefficient of average linear growth of particles, which during 2013-2018 was 0.85%. This means that in recent years, industrial production in Ukraine has had an almost stable structure that has hardly changed over time.

Special attention needs to be paid to the processing industry, the share of which in 2018 was the highest. Its most influential components were the food industry, metallurgy, mechanical engineering and the production of non-metallic mineral products, as evidenced by figure 1.

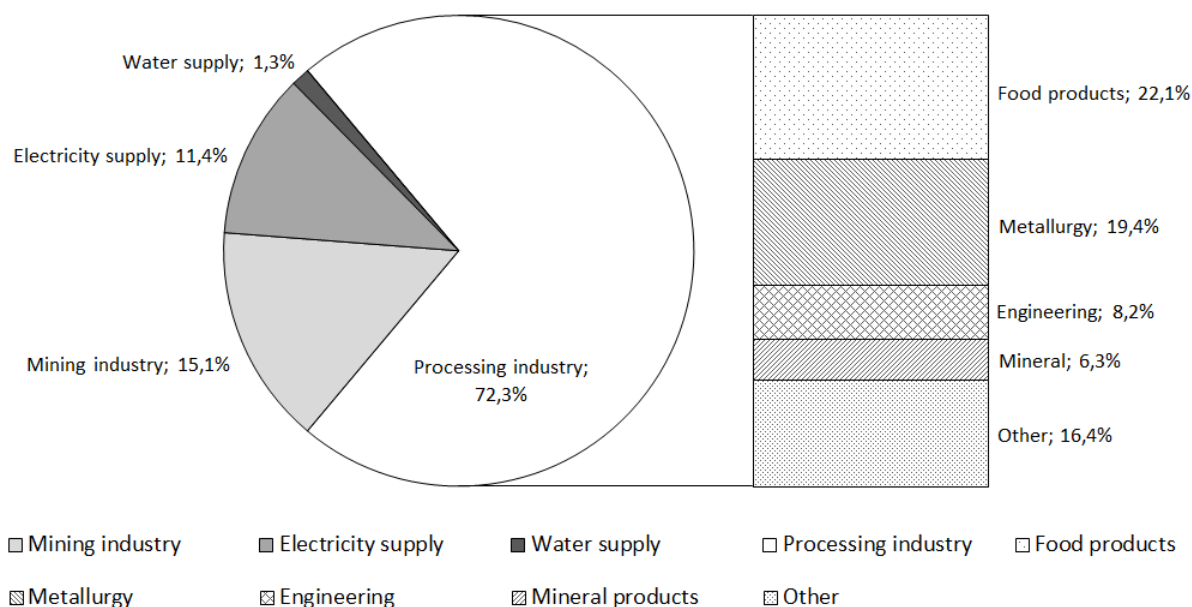


Figure 1: The structure of industrial production according to 2018

The pie chart on the left in figure 1 characterizes the sectoral structure of industrial production. The corresponding histogram on the right shows the composition of the processing industry, other products of which included: textile (1.4%), coke and oil refining (3.8%), chemical (2.8%), pharmaceutical (1.3%), furniture and wood products (7.0%).

The second largest producer is mining and quarrying, which consists of the extraction of hard and brown coal (3.3%), crude oil and natural gas (5.8%), metal ores (5.0%), other minerals and quarrying (1.1%).

Thus, it can be noted that the industry of Ukraine is represented by a wide range of enterprises that meet both the needs of the population in consumer goods and the needs of the real sector of the economy in natural resources and means of production. Given its high impact on the country's GDP, the next stage of the study should be an analysis of the dynamics of key indicators and identify existing trends in their development.

The main indicator that characterizes the state of Ukrainian industry is the annual industry indices of industrial production, calculated by the State Statistics Service according to the methodology in accordance with international standards. In contrast to the volume of output, these indicators no longer contain an inflationary factor, which is positive. The dynamics of the relevant indices during 2013-2019 are given in the Table 1.

Table 1: Indices of industrial production according to 2013-2019,
% to the previous year

Branch	2013	2014	2015	2016	2017	2018	2019
Industry	95,7	89,9	87,7	104,0	101,1	103,0	99,5
1. Mining industry	100,8	86,3	89,8	101,1	96,5	103,4	98,4
1.1 coal mining	97,6	69,5	63,7	105,6	83,2	106,1	96,9
1.2 oil and gas extraction	96,3	98,3	96,9	99,1	101,8	102,5	100,3
1.3 extraction of metal ores	104,6	93,4	92,5	101,2	91,5	104,4	97,1
1.4 extraction of minerals, quarry development	103,0	95,6	86,5	113,3	110,2	101,2	91,6
2. Processing industry	92,7	90,7	86,9	105,6	105,2	102,9	100,9
2.1 food production	95,0	102,5	89,1	107,4	106,3	98,7	103,3
2.2 textile production	94,1	98,6	96,5	107,9	109,7	96,6	92,5
2.3 manufacture of wood products, printing	102,7	96,0	77,4	98,7	108,8	102,2	94,8
2.4 coke production, oil refining	89,2	78,7	82,7	106,8	93,4	106,8	103,1
2.5 production of chemical products	80,7	85,8	81,9	103,2	102,3	115,3	112,9
2.6 pharmaceutical production	111,8	101,9	91,9	110,4	103,6	95,0	103,7
2.7 production of mineral products	97,4	91,2	95,0	111,1	105,3	100,8	106,7
2.8 metallurgical production	94,7	85,5	86,4	105,0	97,4	100,8	98,6
2.9 engineering	86,4	79,4	85,2	101,8	111,7	112,4	97,8
2.10 production of furniture and other products	90,9	93,0	83,0	106,2	111,9	110,4	103,0
3. Supply of electricity, gas, steam	98,9	93,4	87,0	103,1	94,0	103,0	95,6

As can be seen from table 1, in recent years, the development of industrial production in Ukraine has been characterized by volatile dynamics and the presence of deep crisis phenomena:

- during 2013-2015, Ukraine experienced an economic downturn, which directly affected the decline in output in all industries without exception. During these years, industrial production decreased by a total of – 24.5%, including due to the temporarily occupied territories;
- from 2016 to 2018, industrial enterprises and the economy as a whole began to recover at a slow pace. As a result, industrial production during this period increased by + 8.3%;
- in 2019, the positive trend of economic growth changed in the opposite direction. As a result, the industry again lost – 0.5% of annual output.

Summarizing the above, in 2019 industrial production in Ukraine was only 81.3% of the level of 2012. The dynamics of development of mining and processing industries, as well as the supply of electricity, gas and steam almost fully met these trends. This clearly confirms the urgency of the

problem of ensuring sustainable economic development based on increasing the competitiveness of the domestic production sector.

The volatile dynamics of the targets does not allow us to estimate their average annual growth rates, as such relative indicators will not reflect the general trend in the short run due to high uncertainty. Therefore, in order to determine those types of economic activity that suffered the most from the recession of 2013-2015, we calculated the total growth rate of industrial production over the entire time interval under study. The results of these calculations are shown in Figure 2.

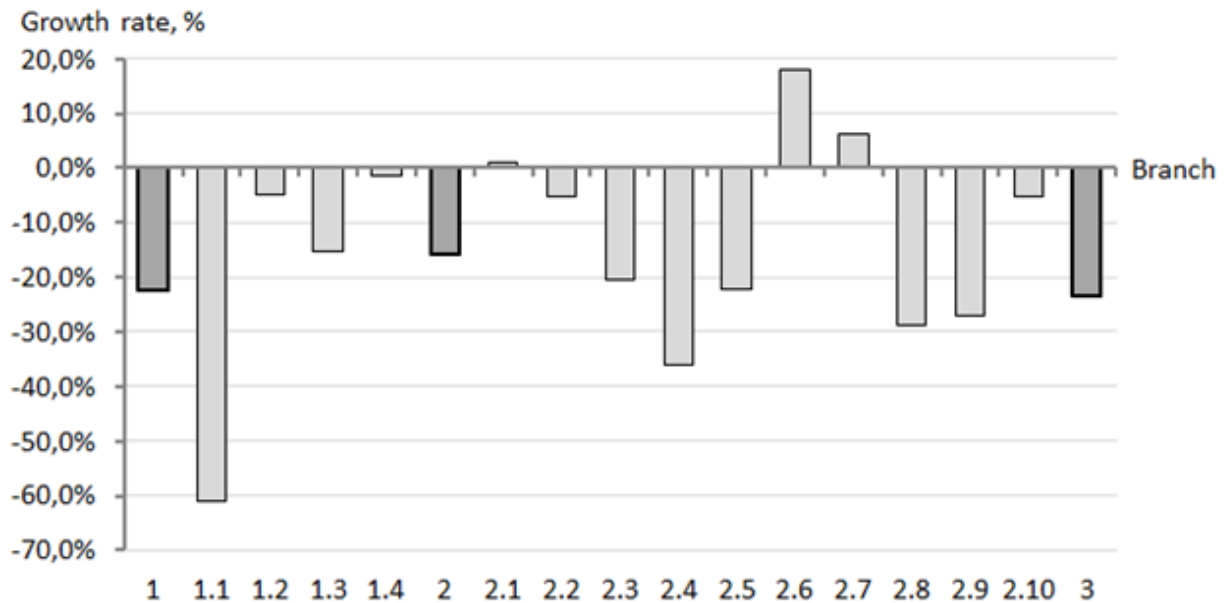


Figure 2: The total growth rate of industrial production during 2013-2019

Designation of types of economic activity on the horizontal axis, figure 2, coincides with the corresponding numbering in table 1. As we can see, the biggest decline took place in the enterprises: mining of hard and brown coal (-61.0%); coke production and oil refining (-36.2%); metallurgy (-28.9%); mechanical engineering (-26.9%); electricity, gas and steam supply (-23.3%); chemical industry (-22.1%) and manufacture of wood and printing products (-20.6%).

Industries that maintained output at a constant level or with the lowest losses during 2013-2019 include: oil and gas extraction (-4.9%), other minerals and quarrying (-1.4%); food industry (+1.0%); textile production (-5.3%) and other products (-5.2%).

Only enterprises producing pharmaceutical (+18.0%) and non-metallic mineral products (+6.2%) had an overall positive trend. However, due to their low share, they did not have a significant impact on the combined industry performance.

Thus, given this situation, the beginning of a new decline in industrial production in 2019, after a short period of growth causes in the expert community reasonable estimates of the possibility of further recession. That is why it is necessary to conduct a more detailed analysis of the dynamics of industrial production indices during 2019. In table 2 shows the quarterly data of the cumulative total for these indices.

The data in table 2 allow us to determine the time period and types of economic activity with the largest reduction in production in relative terms:

- during the first quarter, industry as a whole was characterized by a constant volume of output. This result was achieved due to the fact that the reduction in the supply of electricity, gas and steam by - 6.7% was offset by the corresponding growth of the extractive industry by + 2.6% and the processing industry by + 0.8%;

- in the second quarter, total industrial output increased by + 1.4% compared to the first quarter. Moreover, all industries, table 2, increased production, which is positive;
- the third quarter was characterized by a slowdown in economic growth to a stable level. The exception was the extractive industry, which saw a decrease in production by – 1.9%;
- in the fourth quarter there was a sharp decline in industrial production by -1.7%, as a result of which, according to the results of all 2019, there was a negative dynamics of the target. The leaders in the reduction of business activity for this period were: mining of metal ores (-4.3%) and coal (-4.1%); metallurgical production (-3.3%); electricity and gas supply (-2.4%). At the same time, in some areas of activity there was an economic recovery: the production of chemical products increased by +4.0%; coke and oil refining - by +3.2%; manufacture of wood products and printing - by +1.6%.

Table 2. Cumulative indices of industrial products according to 2019 at the end of each quarter,%

Branch	I quarter	I-II quarter	I-III quarter	I-IV quarter
Industry	99,9	101,3	101,2	99,5
1. Mining industry	102,6	102,9	101,0	98,4
1.1 coal mining	108,6	105,0	101,0	96,9
1.2 oil and gas extraction	104,8	104,2	101,7	100,3
1.3 extraction of metal ores	98,4	101,5	101,4	97,1
1.4 extraction of minerals, quarry development	93,2	94,1	91,5	91,6
2. Processing industry	100,8	101,8	102,1	100,9
2.1 food production	104,9	105,2	105,4	103,3
2.2 textile production	89,7	91,6	92,3	92,5
2.3 manufacture of wood products, printing	89,6	91,5	93,2	94,8
2.4 coke production, oil refining	101,8	101,1	99,9	103,1
2.5 production of chemical products	92,4	105,0	108,9	112,9
2.6 pharmaceutical production	108,4	108,0	104,9	103,7
2.7 production of mineral products	112,8	107,3	107,4	106,7
2.8 metallurgical production	102,4	103,4	101,9	98,6
2.9 engineering	96,3	97,0	98,5	97,8
2.10 production of furniture and other products	98,0	101,4	104,5	103,0
3. Supply of electricity, gas, steam	93,3	97,0	98,0	95,6

In annual terms, the largest decrease was in mining and quarrying (-8.4%), as well as in textile production (-7.5%). At the same time, the largest increase was observed in the production of chemical (+12.9%) and non-metallic mineral products (+6.7%).

Given the trends that took place during 2013-2019 in industrial production, the problem of efficient use of resources, in particular, labor, comes to the fore. The protracted demographic and socio-economic crisis has led to a rapid decline in Ukraine's population. The number of able-bodied people, some of whom are migrant workers in CIS countries, is correspondingly declining.

Thus, in 2013 the number of employees throughout the economy of Ukraine was 8279.4 thousand people, and in 2018 – 6959,8 thousand people. Thus, the total reduction in their number over these years was -15.9%. In industry, the number of employees for the same period decreased from 2859,4 thousand people to 2102,5 thousand people, or -26.5%. The largest losses of labor resources, at the level of -50.7%, occurred in the mining industry, including due to the temporarily occupied territories.

Thus, the growth of labor productivity is a necessary condition for maintaining the existing volume of industrial production and increase its competitiveness. Estimated data on its dynamics in 2013-2018 are given in table 3.

Table 3. Dynamics of labor productivity in industry according to 2013-2018

Branch	Labor productivity in 2013, thousand UAH	Growth rate according to data 2013-2018		Growth rate of labor productivity, %
		industrial production	number of employees	
1	2	3	4	5
Industry	434,2	0,854	0,735	+16,1
1. Mining industry	388,0	0,782	0,493	+58,6
1.1 coal mining	242,8	0,413	0,278	+48,5
1.2 oil and gas extraction	652,0	0,985	0,811	+21,5
1.3 extraction of metal ores	866,5	0,835	0,898	-7,0
1.4 extraction of minerals, quarry development	304,8	1,045	0,754	+38,5
2. Processing industry	456,5	0,901	0,795	+13,3
2.1 food production	586,7	1,029	0,817	+26,0
2.2 textile production	109,4	1,088	1,048	+3,8
2.3 manufacture of wood products, printing	350,0	0,815	0,987	-17,4
2.4 coke production, oil refining	1462,6	0,693	0,437	+58,6
2.5 production of chemical products	586,3	0,855	0,647	+32,3
2.6 pharmaceutical production	542,2	1,018	1,073	-5,2
2.7 production of mineral products	366,4	1,022	0,852	+19,9
2.8 metallurgical production	713,6	0,762	0,697	+9,3
2.9 engineering	284,2	0,865	0,721	+20,0
2.10 production of furniture and other products	214,8	1,013	0,925	+9,5
3. Supply of electricity, gas, steam	381,3	0,811	0,727	+11,6

In column (2) of table 3 shows the annual estimated labor productivity in the prices of the basic 2013, per employee. In general, in industry, this figure was 434,2 thousand UAH. and exceeded the average economic level, equal to 313,2 thousand UAH. The lowest labor productivity took place in textile production (109,4 thousand UAH), furniture production (214,8 thousand UAH) and coal mining (242,8 thousand UAH).

Columns (3) - (4) calculate, respectively, the total growth rate of industrial production and the number of employees for the period 2013-2018. The calculations of column (3) are based on the indices of industrial production, table 1, which eliminates the inflation factor. For most types of economic activity, the growth rate of these indicators does not exceed 1, which indicates a decrease in their levels. Moreover, in industry, the rate of loss of quantitative composition of labor resources (-26.5%) far exceeded the rate of decline in production (-14.6%), which led to an increase in productivity by + 16.1%, column (5).

As can be seen from table 3, the rapid reduction in the number of employees is a serious problem not only in industrial production, but also at the level of the whole economy, where this annual increase was -3.4%. The situation is improved only by the fact that the main disposal of labor took place in 2014-2015 due to the temporary occupation of parts of Donetsk and Luhansk regions and the Crimea.

5. Conclusions.

Thus, in Ukraine for a long time remained inefficient structure of social production, aimed at consumption and primary processing of resources. The lack of modern technologies did not allow to obtain high added value through the production of innovative products. Such

an economy is unable to function for a long time in the context of global trade liberalization. The analysis showed that the temporary occupation of the south-eastern territories of Ukraine in 2014-2015 caused significant losses in the extraction of hard and brown coal, production of coke and petroleum products, mechanical engineering, chemical industry, etc. The return to the trajectory of slow economic growth in 2016-2018 was accompanied by a gradual recovery of all industries except mining. However, it proved to be unstable. Artificial government support for domestic producers of industrial goods, including through protectionism, will only preserve the accumulated problems of the real sector of the economy, which does not contribute to the growth of its competitiveness in the long run. Given the lack of sufficient domestic capital investment and the lack of modern technologies, the main way out of this crisis should be free access of foreign investment to the Ukrainian market and the fight against existing monopolies.

No less important is the prospect of a rapid decline in the working population. That is why the growth of labor productivity must occur at a faster pace.

Thus, in this study the economic analysis of the dynamics of industries based on the methods of general theory of statistics and financial mathematics was further developed, which, in contrast to existing ones, allows cross-sectoral comparisons to determine competitiveness factors and centers of economic growth.

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