ANALYSIS OF THE DEVELOPMENT OF INDUSTRIAL PRODUCTION AND RESOURCES OF PRIMARY ENERGY IN 2017

Prof. Constantin ANGHELACHE PhD *(actincon@yahoo.com)*
Bucharest University of Economic Studies / „Artifex" University of Bucharest
Assoc. prof. Mădălina-Gabriela ANGHEL PhD *(madalinagabriela_anghel@yahoo.com)*
„Artifex" University of Bucharest
Maria MIREA PhD Student *(mirea_maria@yahoo.com)*
Bucharest University of Economic Studies
Radu STOICA Ph.D Student *(radustoica68@yahoo.com)*
Bucharest University of Economic Studies

Abstract

Industry continues to have the highest share of gross domestic product growth. Romania had a process of industrialization that broke in 1990, talking about a regressive process of deindustrialisation. On this background, industrial production in Romania has decreased if we compare with pre-1990 periods.

In other news, the new market conditions introduced in Romania, as well as the development of domestic or foreign investments, have, over the last period of time, led to a re-industrialization process.

However, EU directives foresee increased industrialization in all member countries. Romania is one of those countries that have to increase their concerns in the field of industrial development.

We can state other aspects regarding the development of some branches specific to the industrial development capacity that Romania has had or that it seeks to regain.

Participation in major projects in the field of industry can only be achieved through two possibilities. Either through participation in some areas of activity in which commercial companies, mainly Romania, have a special capacity towards other states, or by financing some projects in the industrial field, which is an extra-community form in a certain way. I say this because the European Union allocates not subsidies but supports the development of major industrial projects in Europe and this is ensured through funding.

In this regard, we can talk about the fact that some countries are participating in the major projects and others remain from outside and are tormented in small projects or national projects which, in competition with the great capital underlying the development of the industrialized countries' fad or have low chances.

The authors analyzed the data provided by the National Institute of Statistics and existing data on the evolution of industrial production at EUROSTAT, and an analysis of the evolution of the extractive industry compared to the processing industry was made, but a number of issues regarding the development of energy were also taken into consideration. The data are presented in gross series or seasonally adjusted series.

An analysis was also carried out on the primary energy resources available to Romania with an emphasis on domestic production and import production to ensure the need for primary energy resources.

Keywords: *industry, energy, production, domain, energy source*

JEL Classification: L71, O13

Introduction

Industrial production as well as primary energy resources are very important elements in ensuring the development of activity in this field.

For starters, the article, based on the study, expresses a series of assessments regarding the evolution of industrial production in 2017 compared to the previous year. It compares the data obtained in December with the previous month, but also a comparison of the results obtained in 2017 with similar time periods of the previous year, 2016. I say similar because we are considering here both the months, the quarters, until we get full data analysis for the whole year.

We find that industrial production increased by 8.2% on average, but compared to November, in December we had a 14.8% increase in production and 7.9% compared to the same month of the previous year, and data adjusted seasonally by 12.2%. Here is a first appreciation in this area.

Regarding the evolution of the manufacturing and extractive industries, we find that the processing industry is growing in the extractive industry. Of course, the mining industry has diminished its activity due to the fact that a number of resources have exhausted and the growth in this field may be the most contributing exploration research to attract new resources into the economic circuit.

An analysis of primary energy resources is then made, which in the year 207 compared to the previous year, increased. The main primary energy resources have grown and it is also noticed that imports have also grown positively, meaning that a more rational way to identify and increase primary energy resources is required.

In the case of energy resources, the analysis is based on the amount of net coal exploited, the amount of extracted or imported crude oil, the natural gas used, the hydroelectric, nuclear or import energy, as well as imported petroleum products.

From the interpretation of the data provided by the National Institute of Statistics, we find an increase in these resources, which could be more consistent in order to ensure the necessary electricity. Thus, from the presentation of the electricity balance, we find that in some areas, in 2017 compared to 2016, there were deficits that have to be recovered, so that the economy operates at normal parameters.

Literature review

Anghelache, Anghel, Lilea, Burea and Avram (2017) analyzed aspects related to the Strategy adopted by the European Union on the development of industry, trade and services. Anghelache (2010) studied the evolution of service production in Romania. Anghelache (2010) presented elements related to environmental risk and its management. Anghelache (1999-2017) carried out a broad research of Romania's socio-economic evolution and its results. Beelen et al. (2009) studied aspects of pollution in the European Union. Bozbas (2008) studies European Union policy on alternative fuels production. Farole, Rodríguez-Pose and Storper (2011) analyzes cohesion policy in the European Union. Kahn and Mansur (2013) studies the correlation between local energy prices and the geographical concentration of jobs. Vehlow, Bergfeldt, Visser and Wilén (2007) analyzes the European Union waste management strategy. Wilting and Vringer (2009) conducted a study on the use of carbon and land from the perspective of the manufacturer and the consumer.

Research methodology, data, results and discussions

Industrial production and primary energy resources play an important role in Romania's economic development. At present, industry continues to be the main branch contributing to the formation of the Gross Domestic Product.

Despite the fact that after 1990, the industry was practically dismantled by inefficient privatizations, the abandonment of some sectors (the production of tractors, trucks or bearings) and the lack of any domestic investment. It remains to focus on attracting foreign direct investment, the use of community funds and participation in major industrial projects within the European Union. In this study we focused on the analysis of the industrial evolution in 2017, the turnover in this field, the new orders in the manufacturing industry and the evolution of the primary energy resources.

To facilitate the understanding of the aspects of the study, we present some methodological elements specific to the issues addressed, used by the National Institute of Statistics. Thus, the data source is Industrial Products and Services of the Monthly Statistical Survey on Industry Short-Term Indicators (IND TS), in accordance with European Council Regulation no. 1165/1998,

Regulation of the Council and of the European Parliament no. 1158/2005 and European Commission Regulation no. 1503/2006 on short-term statistics. The data were obtained from the type of sampling used, and the sample extraction process is that of the random randomized layered survey without return within each stratum, where the stratification variables are the economic activity and the enterprise size class according to number of employees.

The Industrial Production Index is an index of outputs or a production volume index that aims to identify changes in production volume. These indices measure the evolution on total, sections (mining and quarrying, manufacturing and supply of electricity and heat, gas, hot water and air conditioning).

In addition to the gross indices of industrial production, monthly and working-day adjusted indexes and seasonality are calculated on a monthly basis using the regression method, a method recommended by the European regulations on short-term indicators (Council Regulation 1165/1998). The series adjusted by the number of working days was obtained by removing these effects from the gross series using correction coefficients, based on the regression model used (additive or multiplicative). Establishing the regression models used for each series is done at the beginning of each year and involves recalculating the adjusted series calculated in the previous year (recalculation due to changes in adopted models, the number of regressions used, and the number of observations available). The adjustment of aggregate levels was achieved by the direct method which involves direct adjustment of the aggregate series.

As for the turnover in industry, the data source is the turnover (CA) chapter of the monthly statistical survey on short-term indicators in industry, in line with EU regulations. Turnover provides a picture of the sales trend, the objective of this indicator being to show the evolution of goods and services for sale. Turnover represents the total revenue recorded by the enterprise during the reference period arising from both its main business and its secondary activities, less rebates, draws and other discounts to customers. Subsidies received from public authorities or EU institutions are included in turnover. Turnover does not include excise and revenue from the sale or transfer of fixed assets. Similarly, the calculation of new orders for industrial products is made. The data source for the production of electricity from classical (including biomass) and hydro power plants is the Monthly Statistical Survey on Short-Term Indicators in Industry and the Monthly Statistical Survey on Electricity Production in accordance with European Union regulations. The production of electricity from wind power plants and photovoltaic solar plants is provided by C.N. TRANSELECTRICA S.A. For nuclear heat, primary energy represents the energy of the fissionable material corresponding to the produced output.

The balance of electricity is based on production and consumption data in the economy, as well as those provided by C.N. TRANSELECTRICA S.A. and electricity distribution companies on electricity consumption for public lighting, population consumption and technological consumption in networks and stations.

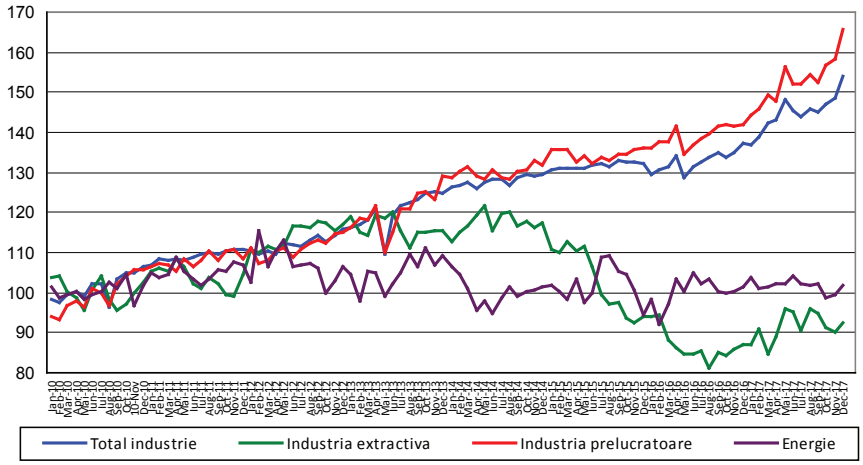
Analysis of industrial production evolution will be done monthly, quarterly and annually, using raw data series or series adjusted by number of working days and seasonality. Thus, in December 2017, industrial output declined by 14.1% as gross series and increased as series adjusted by number of working days and seasonality by 3.7% compared to the previous month. Compared to the corresponding month of the previous year, industrial output increased both as gross series and as series adjusted by number of working days and seasonality, by 7.9% and 12.2%, respectively. In 2017, compared to 2016, industrial production was higher as gross series by 8.2%.

Monthly evolution based on adjusted series is highlighted in the following graph. Data refers to industry, mining, manufacturing and energy.

Monthly evolution of industrial production during January 2010 - December 2017

Chart no. 1

- series adjusted by number of working days and seasonality – 2010=100



Data source: National Institute of Statistics

In December 2017, industrial production (gross series) decreased by 14.1% as a result of the drop in the manufacturing industry (-16.3%).

The production and supply of electricity, heating, gas, hot water and air conditioning and mining increased by 9.0% and 2.5% respectively.

Industrial production, as series adjusted by number of working days and seasonality, was higher by 3.7% compared to the previous month, supported by increases in manufacturing (+ 4.7%), production and supply of electricity and thermal, gas, hot water and air conditioning (+ 2.4%) and extractive industries (+ 2.3%).

Comparing production with the corresponding month of the previous year, industrial production (gross series) increased by 7.9% due to increases in manufacturing (+ 8.9%) and mining and quarrying (+ 5.5%) . The production and supply of electricity and heat, gas, hot water and air conditioning decreased by 0.8%.

Industrial production, adjusted by number of working days and seasonality, increased by 12.2% as a result of increases in manufacturing (+ 16.6%), mining and quarrying (+ 6.1%). Also, the production and supply of electricity / heat, gas, hot water and air conditioning increased (+ 0.2%).

By comparing the results obtained in this branch of the national economy, by 2017, as compared to 2016, we can see that industrial production (gross series) was 8.2% higher, as a result of the increases of the three industrial sectors, namely the manufacturing industry + 8.9%), mining and quarrying (+ 5.9%) and electricity, gas, hot water and air conditioning (+ 1.0%). The indices calculated for these three sectors (mining, manufacturing and energy) are summarized in table no. 1.

Indices of industrial production, total and sections of industry

Table no. 1

- percent –

Industrial Production Index - IPI		December 2017 to		Year 2017/ Year 2016
		November 2017	December 2016	
TOTAL	B	85,9	107,9	108,2
	S	103,7	112,2	-
Extractive industry	B	102,5	105,5	105,9
	S	102,3	106,1	-
Manufacturing industry	B	83,7	108,9	108,9
	S	104,7	116,6	-
Energy	B	109,0	99,2	101,0
	S	102,4	100,2	-

B = gross series; S = series adjusted by number of working days and seasonality

Data source: National Institute of Statistics, Press release no. 38 / 12.02.2018

• Evolution of turnover in industry

Another significant indicator for assessing the evolution of industrial production is turnover. Turnover in industry, total (domestic and foreign market), in nominal terms, increased by 2.2% compared to the previous month and by 20.7% compared to the same month of the previous year. Turnover compares to January 2018, which is compared to December 2017 and January 2017.

Value indices of turnover in industry

Table no. 2

gross series

	January 2018 in % vs :	
	December 2017	January 2017
Industry - total	102,2	120,7
- by sections:		
Extractive industry	82,8	93,3
Manufacturing industry	103,0	121,9
- large industrial groups:		
Intermediate goods industry	108,3	123,2
Capital goods industry	107,3	123,9
Durable goods industry	105,2	114,1
Current use goods industry	91,4	113,2
Energy industry	90,3	119,8

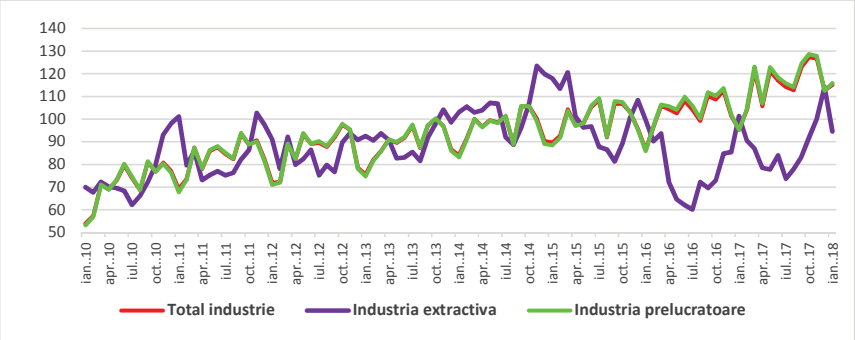
Data source: National Institute of Statistics, Press release no. 64 / 14.03.2018

In chart no. 2 are presented data recorded between January 2010 and January 2018.

Monthly evolution of turnover in industry, by CAEN Rev. 2
- January 2010 - January 2018 -

Chart no. 2

- 2015=100-



Analyzing the data recorded in January 2018 compared to the previous month, it results that the turnover in industry in January 2018 compared to the previous month, on a total increase by 2.2%, as a result of the increase in the manufacturing industry (+3 , 0%). Extractive industry declined by 17.2%.

By major industrial groupings, the intermediate goods industry (+ 8.3%), capital goods industry (+ 7.3%) and durable goods industry (+ 5.2%) recorded increases. Decreases resulted in the energy industry (-9.7%) and the current use goods industry (-8.6%).

Comparing the level of this indicator with that achieved 12 months ago, we find that the turnover in industry in January 2018 as compared to January 2017 increased overall by 20.7% as a result of the increase in manufacturing (+ 21.9%). Extractive industry declined by 6.7%.

Analyzing the data by large industrial groups, the growth of capital goods (+ 23.9%), the intermediate goods industry (+ 23.2%), the energy industry (+ 19.8%), the durable consumer goods industry (+ 14.1%) and the current use goods industry (+ 13.2%).

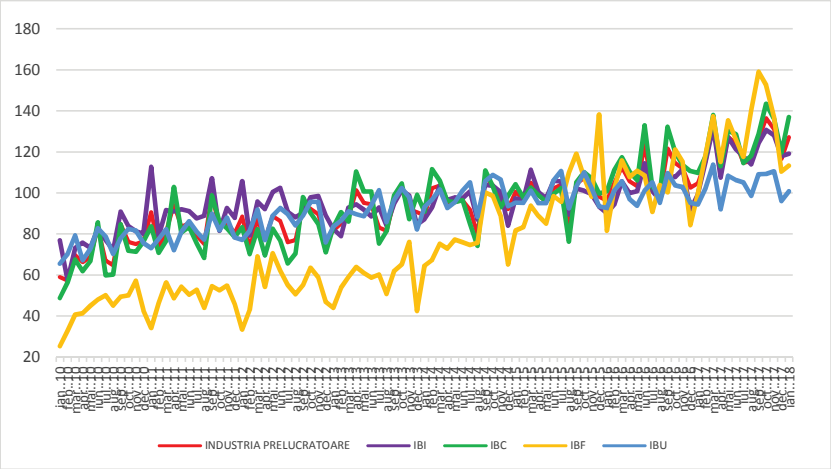
- Analysis of new orders in the manufacturing industry in nominal terms

An important element in the analysis of industrial activity is also the number of new orders in the manufacturing sector that show the cyclicality and continuity of production.

Based on the data provided by the National Institute of Statistics, in January 2018, the new orders in the manufacturing sector, on total (domestic and foreign market), in nominal terms, increased by 9.2% compared to the previous month compared to the corresponding month of the previous year by 21.5%. The data are presented in graphical form, resulting more clearly in the evolution from January 2010 to January 2018.

Monthly evolution of new orders in the manufacturing industry
- January 2010 - January 2018--

Chart no. 3
2015=100



Intermediate Goods Industry (IBI); Capital Goods Industry (IBC); Durable goods industry (IBF); Current use goods industry (IBU).

In table no. 3 the data recording the order value evolution of orders in January 2018 compared to December 2017 and January 2017 are synthesized in the following sectors: intermediate goods industry, capital goods industry, durable goods industry, current use goods industry.

Value indices of new orders in gross series manufacturing

Table no. 3
gross series

	January 2018 in % vs :	
	December 2017	January 2017
Manufacturing based on orders - total	109,2	121,5
Intermediate goods industry	101,0	120,1
Capital goods industry	114,5	124,8
Durable goods industry	102,6	114,0
Current use goods industry	105,1	106,9

Data source: National Institute of Statistics, Press release no. 65 / 14.03.2018

From the study of the data presented in table no. 3 shows that new orders from the manufacturing industry were released in January 2018, compared with the previous month, by 9.2%, as a result of the increases in the capital goods industry (+ 14.5%), industry (+ 5.1%), durable goods industry (+ 2.6%) and intermediate goods industry (+ 1.0%).

Comparing the January 2018 and January 2017 results, the increase in new orders in manufacturing in January 2018, compared to the corresponding month of the previous year, increased by 21.5% as a result of increases in the goods industry capital goods (+ 24.8%), intermediate goods industry (+ 20.1%), durable consumer goods industry (+ 14.0%) and general use goods (+ 6.9%).

• Analyzing the evolution of primary energy resources in 2017

According to the data provided by the National Institute of Statistics, in 2017, primary energy resources increased by 3.3% and electricity prices decreased by 3.4% compared to 2016. The main primary energy resources in in 2017, totaled 34291.4 thousand tons of petroleum equivalent (tep) (conventional fuel with a calorific value of 10000 Kcal / kg), increasing by 1101.6 thousand toe versus 2016. The domestic production amounted to 21303.5 thousand toe , increasing by 814.3 thousand toe versus the previous year, and the import was 12987.9 thousand toe.

In table no. 4 the comparative data for the years 2016 and 2017 are presented in absolute and relative figures on the main resources.

Main primary energy resources - provisional data -

Table no. 4

thousand tons of oil equivalent

	Year 2017			2017 compared to 2016					
				Differences (±)			- % -		
	Total	Production	Import	Total	Production	Import	Total	Production	Import
Resources - total	34291,4	21303,5	12987,9	+1101,6	+814,3	+287,3	103,3	104,0	102,3
from which:									
Net charcoal	5164,7	4654,6	510,1	+418,1	+427,8	-9,7	108,8	110,1	98,1
Oil	11175,9	3421,7	7754,2	+130,1	-155,8	+285,9	101,2	95,6	103,8
Natural gas usable	9282,1	8337,7	944,4	+621,7	+850,5	-228,8	107,2	111,4	80,5
Hydroelectric power,	5203,8	4889,5	314,3	-300,9	-308,2	+7,3	94,5	94,1	102,4
nuclear energy and import electricity	2985,8	_	2985,8	+262,2	_	+262,2	109,6	_	109,6

Data source: National Institute of Statistics, Press release no. 37 / 12.02.2018

In 2017, electricity was 67,299.6 million kWh, down 2392.2 million kWh compared to 2016.

Data on electricity production and consumption are presented in table no. 5.

Electricity balance
- provisional data-

Table no. 5

	Year 2017	2017 as compared to 2016	
	Millions kWh	Differences (±) - million kWh -	%
Resources - total	67299,6	-2392,2	96,6
- Production	63645,3	-2476,3	96,3
- in classic thermo-power stations	28088,4	+1520,7	105,7
- in hydropower plants	14755,2	-4942,9	74,9
- in nuclear power stations	11508,9	+223,0	102,0
- in wind power plants	7410,5	+685,3	110,2
- in photovoltaic solar power plants	1882,3	+37,6	102,0
- Import	3654,3	+84,1	102,4
Destinations - total	67299,6	-2392,2	96,6
- Final consumption	54621,0	-219,4	99,6
- in the economy	42622,1	+443,2	101,1
- public lighting	553,0	-41,8	93,0
- population	11445,9	-620,8	94,9
- Technological consumption in networks and stations	6130,6	-133,5	97,9
- Export	6548,0	-2039,3	76,3

Data source: National Institute of Statistics, Press release no. 37 / 12.02.2018

Production in thermal power plants was 28088.4 million kWh, up 1520.7 million kWh (+ 5.7%). Hydroelectric power production was 14755.2 million kWh decreasing by 4942.9 million kWh (-25.1%), and that in nuclear power plants was 11508.9 million kWh, up 223.0 million kWh (+ 2.0%).

The production of wind power plants in 2017 was 7410.5 million kWh, up 685.3 million kWh compared to 2016, and the solar energy produced in photovoltaic plants in this period was 1882.3 million kWh , up 37.6 million kWh compared to 2016.

Final electricity consumption in 2017 was 54621.0 million kWh, 0.4% lower than in 2016; public lighting decreased by 7.0%, and household consumption declined by 5.1%.

Electricity exports were 6548.0 million kWh decreasing by 2039.3 million kWh.

Technological own consumption in networks and stations was 6130.6 million kWh decreasing by 133.5 million kWh.

Conclusion

The main conclusion that emerges from the analysis of industrial production and primary energy resources is that Romania took a small step in 2017 to improve its activity in this main branch of the national economy, which further raises gross domestic product growth .

Both industrial production and electricity resources have increased and it can be appreciated that in the next period, by accessing Community funds, attracting foreign direct investment and the determination of domestic investors to focus on industrial, we can talk about a re-industrialization process.

Romania also needs a re-industrialization process in addition to improving its work in the field of agriculture and services. I say this because, under the newly created conditions in Romania, agriculture, although enjoying extraordinary natural conditions, due to the impossibility of securing agriculture based on the latest conquests of agricultural science and technology (irrigation, fertilization, chemistry, etc.) too much contribution to the formation of gross domestic product.

In parallel, industrial activity is easier to achieve, to ensure the profitability of national and multinational commercial companies in this field.

It is necessary to substantiate and consolidate a stimulating legislative system to attract additional investments from those who have already invested in Romania or to make investments in our country by new consortia and industrial companies.

Also, Romania has to base its work on a number of industrial fields in which it already has expertise and needs to improve in order to be able to participate in the major industrial projects supported by the EU directives financed as such and, a more substantial increase in the share of industrial production in the growth of gross domestic product is ensured.

As far as the primary energy resources are concerned, they have grown shy and, as all the activities within the national economy increase, more rational use of electricity, other energy sources, is required so that Romania, through the internal possibilities that still exist it has, but also through the possibility of accessing some imports of primary energy resources, not to become a policy tributary in this field. I refer, first of all, to imports of natural gas and crude oil, whose prices are directed by the international markets that dominate and control them.

A final conclusion would be that Romania has the potential and possibilities to develop mainly national and multinational trading companies in the field of processing, because domestic and imported natural resources, especially those in the European Union, can contain these activities processing.

References

1. Anghelache, C., Anghel, M.G., Lilea, F.P.C., Burea, D. and Avram, D. (2017). European Union Strategy For Industry, Trade And Services Development. *Romanian Statistical Review, Supplement, 8*, 145-158
2. Anghelache, C. (2010). Production of services. *Romanian Statistical Review Supplement*, 3
3. Anghelache, C. (2010). *Management of the Environment and Environmental Risk*, Metalurgia International, 5, 206-212
4. Anghelache, C. (1999-2017). Colecția de volume *România. Starea economică*, Editura Economică, București
5. Beelen, R. et al. (2009). Mapping of background air pollution at a fine spatial scale across the European Union. *Science of The Total Environment, 407* (6), 1852-1867
6. Bozbas, K. (2008). Biodiesel as an alternative motor fuel: Production and policies in the European Union. *Renewable and Sustainable Energy Reviews, 12* (2), 542-552
7. Farole., T., Rodríguez-Pose, A. and Storper, M. (2011). Cohesion Policy in the European Union: Growth, Geography, Institutions. *Journal of Common Market Studies, 49* (5), 1089–1111
8. Kahn, M. E., and Mansur, E. T. (2013). Do Local Energy Prices and Regulation Affect the Geographic Concentration of Employment?. *Journal of Public Economics*, 101, 105-114
9. Vehlow, J, Bergfeldt, B., Visser, R. and Wilén, C. (2007). European Union waste management strategy and the importance of biogenic waste. *Journal of Material Cycles and Waste Management, 9* (2), 130–139
10. Wilting, H. and Vringer, K. (2009). Carbon and land use accounting from a producer's and a consumer's perspective – an empirical examination covering the world. *Economic Systems Research, 21* (3), 291-310
11. Institutul Național de Statistică, Comunicat nr. 37 / 12.02.2018
12. Institutul Național de Statistică, Comunicat nr. 38 / 12.02.2018
13. Institutul Național de Statistică, Comunicat nr. 64 / 14.03.2018
14. Institutul Național de Statistică, Comunicat nr. 65 / 14.03.2018