THE EVOLUTION OF INDUSTRIAL AND AGRICULTURAL PRODUCTION UNDER THE IMPACT OF CRISES

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Abstract

Industry and agriculture still remain the main branches of the national economy, which ensure the formation and growth of the gross domestic product, industry, through the large volume of activity, and agriculture, through its content, which ensures the plant and animal food of the population.

In this article, the authors aimed to analyze the evolution of production in the two branches of the national economy, with reference to the effect that the current crises have on economic growth as a whole and in particular on the production of the two fields.

To carry out this analysis, a large volume of data provided by the National Institute of Statistics and Eurostat was used, highlighting the significant aspects that had an effect, starting from 2019, on industrial production and agricultural production.

We used indicators, indices, graphic representations, tables all synthesized and correlated with the evolution during this period. Also, some statistical-econometric models were used through which some indicators were analyzed in close correlation with other statistical-economic variables to highlight how industrial and agricultural production evolved during this period of time.

At the same time, we also used some data that refer to current crises (the COVID 19 pandemic, the economic-financial crisis, the energy crisis, the food crisis, etc.).

Key words: *economic branches, agriculture, industry, crises, developments.*

JEL classification: E20, Q20

Introduction

In this article, *The evolution of industrial and agricultural production under the impact of crises*, we started from the definition of industrial and agricultural production, trying to highlight the contribution that industry has to the formation and growth of the gross domestic product.

It is important to state that the industry was and remains the main branch, with a major contribution to the formation and modification of the gross domestic product. I said the change in the gross domestic product because under the effect of the crises that I mentioned there are also decreases, i.e. changes in the indicators of industrial production.

We referred to the extractive industry and the manufacturing industry, showing that during these crises a whole series of industrial fields reduced their activity, some were even stopped or, finally, there was no longer a rigorous rhythm in which they to produce for the domestic market and the foreign market.

Next, we analyzed the issue of exports of industrial products, finding that the pandemic had a negative effect in the field of international trade as well.

In this area, it is true that imports and exports also increased, but in a much larger volume imports increased, which means that part of what is produced in the country is capitalized through foreign exchange in order to pay for imports.

Next, we focused on the presentation of data, both in tabular form and in the form of graphs, more easily interpretable, clearly showing that the current crises have a particular effect on the entire economy.

Here, for example, in the field of agricultural production, the increase in the price of energy caused the price of agricultural products to increase at the producer, then in the procurement chain, and finally in the marketing chain. All this will not stop soon considering the fact that this energy crisis correlated with the food crisis is also due to the armed conflict in Ukraine.

It is easy to understand that the great powers will find a way to align their own interests with the world market. Thus, the exports of natural gas and oil from the Russian Federation were replaced for the states of the European Union, with the exports of liquefied gas from the United States.

A thorough price study reveals that these liquefied gases are much more expensive and affect even the most developed economies.

In the context of the article, it is clear that these crises had and have an impact on the entire economy, but especially on industry, which will no longer benefit from special orders from abroad, but also on agriculture, which, not benefiting from more substantial subsidies, will produce more a little more expensive.

All of them will affect the standard of living of the population which will suffer due to prices and the effect of inflation which, at the end of October, is 15.3%. Also, according to some forecasts of the National Bank, it follows that inflation will continue to increase in the two months remaining from 2022, but also in 2023. The only positive prediction is that in 2024 it will be possible to reach an inflation under 10, i.e. with a single digit.

Literature review

Many authors have focused their attention over time on the two sectors of activity, the agricultural and the industrial. Thus, Anghelache C. (2019) analyzed the evolution of the industry in Romania, in an international context. Anghelache, Samson and Stoica (2020) studied the main elements of the European Union's strategy in the agricultural sector. Bezemer and Headey (2008) tried to identify the measures that can be taken to develop agriculture. Fleurbaey (2009) tried to identify measures of social well-being. Grand D., Le Brun Ch., Vidil R., Wagner F (2016) analyzed the development of the electrical industry in the context of the evolution of the industry in general. Hansen et al. (2013) conducted a study that revealed the negative effect of forestry in some areas. Islam (2011) conducted a comparative study on various incentives to drive agricultural development. Lee D., Shin H., Stulz R. (2016) Conducted and published studies on international industry development. Lowder, Bertini and Croppenstedt (2017) presented data and insights into the evolution of agriculture. Mina-Raiu, L., Bucura, I.A., Raiu, C.V (2021) presents the results of a case study carried out within the Romanian Ministry of Education and Research, with an emphasis on identifying the level of knowledge and use of Quality Management methods and tools Totals in the institution, using the Japanese model. Mogues, Fan and Benin (2015) studied the role of public investment in agriculture. Raiu, C., Mina-Raiu, L. (2022) shows that Romania, in the context of religious life, is one of the countries that opted for the harshest measures to restrict religious life since the beginning of the pandemic. Quamrul and Michalopoulos (2015) analyzed how climate volatility influences agricultural activity.

Methodology, data, results and discussion

- The indices of industrial production reflect a permanent increase compared to similar periods in previous years, being influenced by the restructuring of the extractive sector, as well as the decrease production that determined the recording of a slower pace in the manufacturing industry.

The growth rates in the industry decreased and were different, so that, compared to a growth recorded by the manufacturing industry, it is necessary to emphasize the decrease recorded by the extractive industry and

the electricity and thermal energy, gas and water sector, recording , however, increases in some categories such as durable goods industry, capital goods industry, intermediate goods industry, consumer goods industry.

It should be noted that these other activities or branches had small shares in the total industrial activity in our country.

Reductions were recorded in a number of branches, such as: the production of textiles, clothing, leather and footwear, rubber and plastic products, the manufacture of construction materials and other non-metallic mineral products and machinery and equipment.

Value indices of industry turnover (gross series)

Table 1

	APRIL 2022 in % in relation to:		***01.01-30.05.2022/ 01.01-30.05.2021 -%-***
	MARCH 2022	**APRIL 2021**	
Industry - total	**89,4**	**120,0**	***124,8***
- by sections:			
Extractive industry	**87,2**	**234,0**	***243,9***
Manufacturing	**89,5**	**117,0**	***121,6***
- on the large industrial groups:			
Intermediate goods industry	88,1	121,6	*131,4*
Capital goods industry	87,4	108,9	*110,9*
Durable goods industry	80,8	100,9	*113,3*
Industry of goods for current use	98,8	121,5	*120,9*
Energy industry	*87,6*	*192,4*	*196,0*

Source: National Institute of Statistics. Data processed by the authors.

Orders from the manufacturing industry for export have been drastically reduced. The turnover in industry decreased, and the prices of industrial products increased.

Industrial production prices increased by 8.6 percentage points in January 2022 compared to December 2021.

In April 2022 new orders from the manufacturing industry as a whole (domestic market and foreign market), decreased in nominal terms compared to March by 10.7%, and compared to April 2021 they increased by 13%. In the first five months of 2022, compared to the same period in 2021, new orders in the manufacturing industry increased by 20%.

The first three categories, textile products, clothing and leather goods and footwear, carried out their production, recording a tempering rhythm, which will be able to have effects in future periods as well.

The industry, as a whole, remained in a positive position, in the sense that it has a constant increase in its contribution to GDP.

The privatization process will be able to lead, in the following periods, to new decreases, both in the pace and volume of production of some branches, and in the total contribution that the industry can have to the achievement of GDP, through the gross added value achieved.

Labor productivity per wage earner in industry followed an upward but slow course.

In 2016, primary energy resources increased. Since the outbreak of the COVID 19 crisis, the rate of increase in primary energy prices has moderated, even having some periods of decline.

The evolution of industrial production represents the sector that positively marked the evolution process.

This characteristic is specific to the manufacturing industry which, through its overwhelming share in the total industry production, determined the same trajectory of the entire industrial production. This, despite the fact that the production of electricity and thermal energy follows a practically opposite trend, and that of the extractive industry registers a flat evolution.

Value indices of new orders in the manufacturing industry (gross series)

Table 2

	APRIL 2022 in % in relation to:		***1.01-30.05.2022/ 1.01-30.05.2021 -%-***
	MARCH 2022	**APRIL 2021**	
Manufacturing sector working on the basis of orders – total	**89,3**	**113,0**	***120,0***
- on the major industrial groups:			
Intermediate goods industry	86,6	114,2	*132,9*
Capital goods industry	91,9	112,7	*112,4*
Durable goods industry	70,6	101,6	*130,2*
Industry of goods for current use	*95,1*	*117,0*	*121,3*

Source: National Institute of Statistics. Data processed by the authors.

Extractive production decreased by 11.4 percentage points in January 2022 compared to December 2021 and energy production decreased by 5.4 percentage points in January 2022 compared to December 2021. Import of primary energy increased by 7.3% in January 2022 versus December 2021.

The data indicate a fluctuating evolution of the production volume compared to previous periods. The decrease is more pronounced in the extractive industry, manufacturing industry and electricity and thermal energy, where decreases were recorded.

The decreases were more pronounced at the level of the large industrial groups structured according to the destination of the products.

I mention the sharp decrease in the production of capital goods and by almost a quarter of the production of intermediate goods. Decreases in imports and exports recorded for intermediate goods will affect production in this sector, which is already confirmed by the decreases recorded.

The biggest decreases recorded, compared to previous years, were in the metallurgical industry.

A similar trend is observed in the case of the production of road transport vehicles, from a relatively small reduction in October to a pronounced decrease in December.

Industrial production prices have increased greatly in the last three years of the crisis.

Industrial production is one of the few sectors showing some revival at the level of the EU and many of the EU member states. This assertion also includes the evolution of Romania's industrial production.

The positive evolution at the EU level is marked by the evolution of industrial production in Germany, France, Italy and other countries, including Ireland, Hungary, Denmark, the Netherlands.

Romania had determined increases in industrial production, as a seasonally adjusted series, a constantly maintained trend.

Seen also from the aspect of distribution by large groups, the growth of industrial production in Romania was more pronounced in the capital goods industry group and significantly lower in the consumer goods industry group.

From the point of view of the increase in industrial production registered in Romania, it can be seen that the production was significantly higher, compared to the corresponding period in previous years. On average, the industry has grown by 3.3% over the past three years.

The September 2010 increase registered by Romania is worth noting, higher compared to all other European states in most of them, with the exception of Poland, Slovenia and the Netherlands, registering significant decreases in some cases.

The situation remains almost the same, the growth recorded by Romania is surpassed only by Poland and the Czech Republic.

These increases by group were offset by decreases in the group of current-use goods and durable goods.

The indices of industrial production show, in total and in the branches of the extractive industry and the manufacturing industry, decreases compared to the first branch.

The manufacturing industry, electricity and thermal energy, gas and water, as major sections on the one hand and the capital goods industry, the intermediate goods industry and the energy industry, with important increases, are responsible for the mentioned increases at the industry level, on the other hand.

Main primary energy resources (thousands of oils equivalent tons)

Table 3

	01.01-30.04.2022			01.01-30.04.2022 compared to 01.01-30.04.2021					
				Differences (±)			- % -		
	Total	Production	Import	Total	Production	Import	Total	Production	Import
Resources – total	**10670,6**	**6006,5**	**4664,1**	**-537,8**	**-257,7**	**-280,1**	**95,2**	**95,9**	**94,3**
of which:									
Net coal	1159,3	939,7	219,6	+84,6	-24,7	+109,3	107,9	97,4	199,1
Oil	3103,6	973,5	2130,1	-683,3	-61,7	-621,6	82,0	94,0	77,4
Usable natural gas	3179,2	2376,4	802,8	-205,6	-153,7	-51,9	93,9	93,9	93,9
Hydropower, wind, solar, nuclear heat, and imported electricity	1945,8	1716,9	228,9	-10,6	-17,6	+7,0	99,5	99,0	103,2
Imported petroleum products	1104,0	_	1104,0	+291,2	_	+291,2	135,8	_	135,8

Source: National Institute of Statistics. Data processed by the authors.

We find that the main primary energy resources in the period 01.01-30.04.2022, totaled 10,670.6 thousand tons of oil equivalent (toe), decreasing by 537.8 thousand toe compared to the same period of the previous year. Domestic production totaled 6,006.5 thousand toe, down by 257.7 thousand toe compared to the period 01.01-30.04.2021. The import was 4,664.1 thousand toe, down by 280.1 thousand toe, compared to the same period of 2021.

Electricity resources were 22,156.4 million kWh, down by 1,120.5 million kWh compared to the similar period of 2021. The production of thermal power plants was 6,981.6 million kWh, down by 748.2 million kWh. The production of hydropower plants was 4,701.0 million kWh, down by 1,469.5 million kWh, and that of nuclear power plants was 4,026.2 million kWh, up by 134.4 million kWh.

The production of wind power plants in the period 01.01-30.04.2022 was 3,262.5 million kWh, an increase of 820.5 million kWh compared to the same period of the previous year, and the solar energy produced in photovoltaic installations was 523.5 million kWh, up by 61.2 million kWh compared to the corresponding period of 2021.

Total electricity consumption was 18,021.5 million kWh, and total electricity consumption in the economy decreased by 3.9% and public lighting increased by 6.8%. Population consumption decreased by 5.6%. Also, the export of electricity was 2020.0 million kWh, down by 139.6 million kWh.

The indices of industrial production as an adjusted series show a positive trend, although it is limited to relatively modest growth rates at the industry level and, some nevertheless significant, for the sub-branch of electricity and heat, gas and water, respectively, of the goods industry capital.

The value indices of new orders have marked decreases especially in the period 2019 – 2022, due to the crises facing our world economy.

Important increases were recorded in the case of the value index of orders for the group manufacturing of substances and chemical products, the metallurgical industry and the manufacture of road transport vehicles, of which, quite remarkable, the increase recorded for the foreign market, following the well-known evolution of exports of Dacia cars, in Western European countries, mainly in Germany.

Actual product deliveries determined on the basis of turnover indices reflect a trend of uncertainty regarding the ability of the producer to capitalize on the production achieved, on the one hand, and the payment difficulties of the purchasers, on the other.

Labor productivity increased year by year simultaneously with the reduction of the employed population.

• Agricultural production indices. As is known, Romania is one of the countries with the most pronounced agrarian character among the countries of the European Union.

Unfortunately, this does not implicitly mean a corresponding contribution of agriculture to the formation of GDP, a fact that I have already mentioned previously, nor, even more so, a high degree of efficiency, as a level of productivity equally resulting from comparing the sector with other sectors of our economy, as well as, above all, with the yields of various crops and animal species recorded in the rest of the European countries.

The same situation, if not even more accentuated, is also found in the yields of potatoes and rapeseed and of sunflower, the latter not being a significant crop in the other EU member states.

Production indices of the agricultural branch by development regions in 2021 (previous year=100)

Table 4

	Total branch	Plant Sector	Sector Animal	Agricultural services
Total country	**114,3**	**122,2**	**99,8**	**99,3**
North – West	98,5	96,1	102,8	117,4
Center	106,8	112,2	98,8	107,6
North – East	117,3	124,9	105,1	127,4
South – East	152,3	182,5	96,9	111,2
South – Muntenia	120,8	131,4	94,7	123,5
Bucharest – Ilfov	110,2	151,6	72,9	88,2
South – West Oltenia	103,5	104,7	102,2	63,6
West	95,9	95,2	97,1	98,8

Source: National Institute of Statistics. Data processed by the authors.

The value of vegetable production, in 2021 compared to 2020, recorded increases in the South-East development regions (+82.5 percentage points), Bucharest-Ilfov (+51.6 percentage points), South-Muntenia (+31, 4 percentage points), North-East (+24.9 percentage points), Center (+12.2 percentage points) and South-West-Oltenia (+4.7 percentage points); decreases were registered in the West (-4.8 percentage points) and North West (-3.9 percentage points) development regions.

In 2021, compared to 2020, the value of animal production registered increases in the development regions North-East (+5.1 percentage points), North-West (+2.8 percentage points) and South-West Oltenia (+2 ,2 percentage points); and in the other development regions, the value of animal production recorded decreases between 27.1 percentage points and 1.2 percentage points.

The value of agricultural services increased in the North-East (+27.4 percentage points), South-Muntenia (+23.5 percentage points), North-West (+17.4 percentage points), South-East (+ 11.2 percentage points) and Center (+7.6 percentage points), in the other development regions registering decreases between 36.4 percentage points and 1.2 percentage points.

Particularly significant are the data on the agricultural potential of the largest agricultural producers in the EU, which of course also includes Romania, viewed from the perspective of the place and weight occupied in the total EU in terms of cultivated areas and production.

Thus, in terms of wheat, Romania occupies the 4th place with a weight of 8.5% in total, totaling together with France, Germany and Poland almost 50% of the total cultivated area in the EU.

In terms of wheat production, however, Romania was only in 7th place, three places lower than the surface, respectively, with a share of 3.7% in total EU wheat production. Together with France, Germany, Great Britain, Poland, Italy and Denmark, the production share reaches over 75%.

The corn culture is more interesting, with Romania occupying the first place in area with a weight of over a quarter (27.4%) in the total area cultivated by the EU member states.

From the point of view of corn production, however, we are in second place, after France, with 13.8%, with a difference, therefore, the share in the cultivated area of more than 50%.

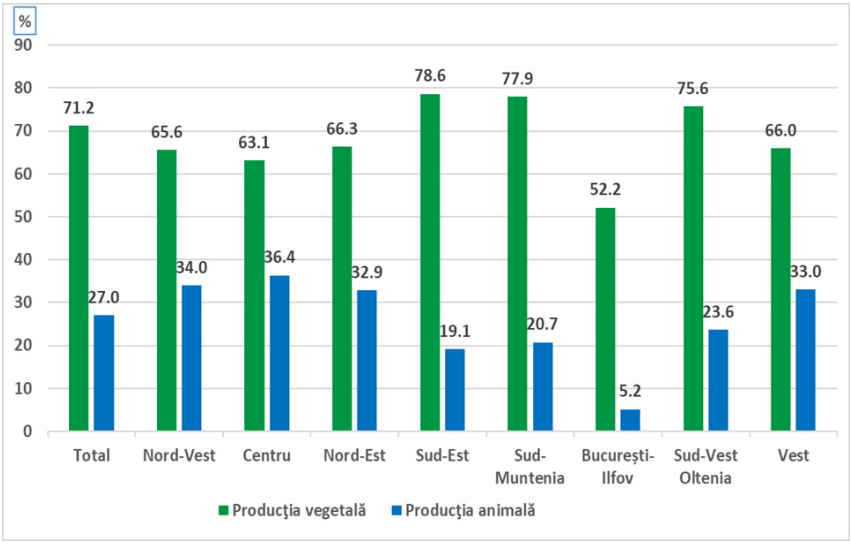
While in 2013 and 2022 harvests recorded record low levels due to the weather factor.

A similar situation can be found with regard to livestock. Where in the past Romania was among the first countries in Europe in terms of cattle, pig, sheep and goat herds, today, with the number of cattle of about 2 million five hundred thousand heads, Romania is surpassed by a little Belgium and significantly by France, Germany, Great Britain, Italy, Spain, Ireland, Poland and the Netherlands.

In pig herds, Romania ranks only 9th after Germany, Spain, France. Only in sheep and goats we remain in the top, in 4th place, after Spain, Great Britain and Greece.

Share of the value of plant and animal production in the value of the production of the agricultural branch, in total and by development regions, in 2021

Graph 1



Source: National Institute of Statistics. Data processed by the authors.

The study of the graph shows that vegetable production has the largest share in the production of the agricultural branch in all the development regions of the country, with values between 63.1% in the Center development region and 78.6% in the South-East development region.

The evolution of the agricultural branch after 2016 expresses a stagnation, following an increase in the same value of vegetable production, with a little less of animal production and with 2.7% of agricultural services, which, however, do not have a significant weight.

The share of vegetable production of 53.5% in 2022 is significantly lower than the average of the years 2006 - 2016. It is worth mentioning that the share of animal production is low compared to the potential of our country in this regard.

Lotting and the lack of any rotations, of quality seeds in all cases, were what determined both low yields and poor quality.

Of the approximately 4 million holdings, over 98% represent holdings characterized, according to EU standards, as small and very small. They use, in ownership or in other forms, just over 60% of the country's agricultural area, with an average production assessed per farm at less than 8 ESU.

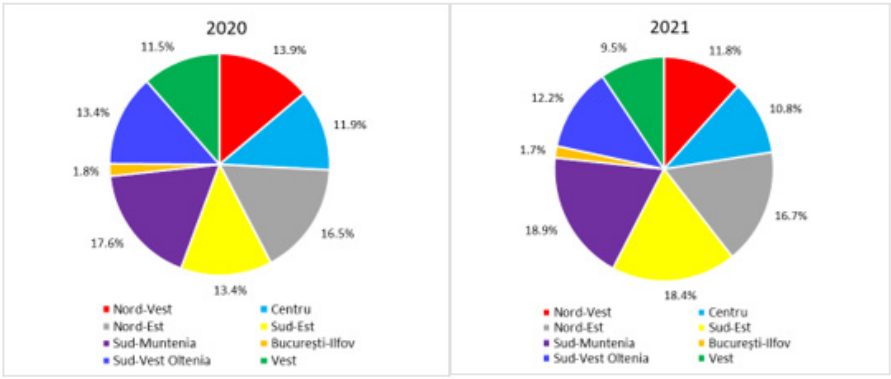
For those who may not be familiar, I remind you that the ESU represents a unit of stable economic size at the European level through a relatively complex process of estimating the value of different agricultural products (vegetable and animal), respectively an ESU is equivalent to 1200 euros.

With a very low number of only 0.1%, large agricultural holdings of more than 40 ESU per unit, generally agricultural holdings with legal personality, own and use more than a quarter of the agricultural area.

The average economic size of an agricultural holding in Romania is approximately 1 ESU, which places us, from this point of view, behind all other member states, this also involving the structure resulting from the grouping of agricultural holdings by size.

The structure of the production value of the agricultural branch by development region

Chart 2



Source: National Institute of Statistics. Data processed by the authors.

In 2021 compared to 2020, the structure of the production value of the agricultural branch recorded the main increases in the Southeast (+5.0 percentage points) and South-Muntenia (+1.3 percentage points) development regions. The most important decreases were registered in the development regions North-West (-2.1 percentage points), West (-2.0 percentage points), South-West Oltenia (-1.2 percentage points) and Center (-1 ,1 percentage points).

In the structure of plant production in 2021, the largest share belongs to the development regions: South-Muntenia (20.7%), South-East (20.3%) and North-East (15.6%), while in the structure of animal production of the same year, the development regions have the largest share: North-East (20.4%),

North-West (14.9%), Center (14.6%) and respectively South - Muntenia (14.5%).

The typology of the Romanian agricultural holding shows a prevalence of the number of agricultural holdings specialized in field crops and in mixed crops, totaling 36-37% within the generic term of plant production, respectively 40% specialized in animal breeding.

Another characteristic of the Romanian agricultural holding is represented by the combined activity of vegetable cultivation and animal breeding, their weight being around 20%.

Conclusions

From the study of this article, the conclusion is clearly drawn that the current crises have a particularly negative effect on the activity of the industry, where the prices of industrial production have increased by 20%, but also on the activity of agriculture.

Given that in the reports of the National Institute of Statistics and Eurostat, energy production is also included in the Industry and energy branch, energy will continue to create big problems for the entire economy.

The need for natural gas and electricity consumption can be moderated, but at the risk of reducing industrial production. Therefore, it is expected that further down the chain, industry and agriculture will supply the domestic market with increasingly expensive food and non-food products.

Studying inflation in September and anticipating October, we find that from one month to the next inflation as a whole increase by 1.3%, affecting food, non-food products and services in an almost similar way.

A certain tempering of the price increase on the structure of the three groups of the CPI (consumer price index), is due to the reduction of consumption and not to the attenuation of the respective prices.

It is necessary that, at least in the case of agriculture, all possible efforts should be made to increase irrigation, soil fertilization and the use of advanced means so that Romania's soil, which is predestined for special productions, gets back into the rhythm of producing moreover, so that in this way what we produce becomes cheaper.

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