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AGRI-FOOD CHAIN IN ROMANIA – VULNERABILITIES AND RESILIENCE TO SHOCKS IN THE CRISIS CONTEXT INDUCED BY COVID-19 PANDEMIC

ABSTRACT

Recent evidence of the global impact of the Covid-19 pandemic has signaled unprecedented disruptions to food systems as a result of successive shocks to all segments of the food chain. In this context, the study addresses the analysis of the agri-food value chain in Romania and of the main sectoral economic and financial indicators. The results highlight imbalances and dysfunctions – i.e. the food supply chain is weakened by the highly fragmented agricultural sector; atomized processing & manufacturing enterprises and the economic and social fragility of small enterprises; low added value of the food industry compared to agriculture; chronic deficit of external performance – which require public and private efforts to increase the resilience of the agri-food sector.

Key words: agri-food sector, covidemia, resilience, value chain.

JEL Classification: L6, O1, F15.

1. INTRODUCTION

The Covid-19 pandemic caused a sudden and deep recession around the world. Although been all EU Member States, were affected the magnitude of the impact as well as the pace and strength of the recovery have significantly different impacts from one region to another (EC, 2021). Recent evidence has shown that food systems are vulnerable to shocks such as the covidemia-induced health crisis, requiring risk assessments, measures to manage disruptions and dysfunctions in the agri-food chain, with policy implications needed to increase the resilience of the agri-food economy (Laborde *et al.*, 2020; Swinnen and McDermott, 2020). Specifically, investigations on the profile of the agro-food manufacturing industry across the EU member states to highlight the changes in performance (Mattas *et al.*, 2020), should serve diagnose and adequate measures towards market integration and economic resilience of the agri-food sector.

The food industry sector differs from other industries in several respects: the sector is mostly composed of SMEs; the products are very diverse and often the production methods are based on the traditional system, rather than on technology;

SMEs often lack resources, qualified staff and time for research and innovation – however, medium-sized enterprises, are more innovative, adopt new technologies faster, but are less often involved in research and development activities, because of limited resources; the food industry sector has a responsibility to produce safe and preferably healthy food.

Additional aspects that marks vulnerabilities of the Romanian agri-food manufacturing sector is that hundreds of operators have closed and face the danger of closing their activities because they have to comply with EU food safety requirements and poor re-technologizes. The consequences of the global economic and financial situation are also felt by this industry. Some foreign investors are about to give up their business in Romania or have already done so, looking for countries with a lighter tax regime and lower production costs, a first result being the dismissal of employee (FSIA, 2013).

In this context, the study comprises investigations upon the socio-economic situation pre-covidemia existing in the agri-food sectors in Romania, with the aim to identify fragilities, dysfunctions, deficiencies in the agri-food chain, which cause or accentuate vulnerabilities in crisis conditions and functioning imbalances.

2. MATERIAL AND METHOD

The study approaches the analysis of the agri-food value chain in Romania and the main economic and financial sectoral indicators, based on assessments on the structure and value-added of the food supply chain, distribution of processing activities, the economic and social potential of enterprises, as well as the balance structure of international agri-food trade. An analysis on the structure of value added in food agri-food processing sector, comparisons with agriculture and relative to the EU average have been also undertaken. The main source of statistical information was the Tempo-online database of National Institute of Statistics and Eurostat.

3. RESULTS AND DISCUSSIONS

3.1. MAIN CHARACTERISTICS AND POLICY IMPLICATIONS

Apart from other economic sectors, the agricultural sector is characterized by inelastic demand and supply, thus being more exposed to market shocks, as a variation in demand or supply can have a significant impact on prices. Thus, a small decrease in demand, or a slight increase in supply, can lead to drastic decreases in prices and, ultimately, in revenues (high volatility of revenues).

This situation may be aggravated by delays in the production process in agriculture, which reduce market supply, with production responses to market prices being objectively relatively slow compared to other sectors – leading to volatility in the face of price uncertainties, for example, when there is too much production in farmers' stocks.

The coronavirus pandemic induces unprecedented confrontations for the EU agri-food sector, which must respond and adapt effectively to new circumstances, supported by measures taken by the European Commission (EC, 2020). As a result of social isolation measures implemented in the EU and around the world, food demand has changed rapidly since the beginning of the crisis.

The reaction of consumers to accumulate supplies, as well as the closure of food service activities to the population (HORECA) have a direct impact on agri-food producers. Therefore, in the context of domestic and border health restrictions, while, the demand has increased for some staple foods, such as pasta, rice, flour, as well as home-preserved fruits and vegetables, due to the increase in household consumption of food with high value, such as quality meats, wines and specialty cheeses, usually characterized by high external demand, significant decreases in consumption were observed.

Labor is the main economic resource vulnerable to the necessary confinement decisions imposed by the pandemic. The effects in the agri-food supply chain are felt directly in the links of food services to the population due to declining consumer demand and in medium and large enterprises, which employ most of the staff, but also in small enterprises that already have a degree of risk due to efficiency issues.

Agriculture together with the food industry are strategic sectors in which the main concern is to maintain the level of security of domestic production capacity, in order to prevent the generation of short-circuit effects and the spread of losses throughout the value chain, which affects the population's supply and food availability. Support is needed through an appropriate public policy, which is directly involved in providing the necessary logistics and infrastructure in the field of production collection and storage, in encouraging the food industry, including the EU funds (Dăianu, 2016).

In times of crisis, solidarity is essential for the single market to function according to the principles on which it is based. Measures are needed within the EU institutions to take into account the reality in the Member States and to encourage public policies, both at national and EC level. In this context, the new CAP after 2020 needs to adapt the legal framework to provide financial support and incentives to support the priorities of EU agri-food industry, to be a common policy, to promote competitive and market-oriented but more sustainable agriculture. Investments in research and innovation, knowledge transfer and collaboration between all stakeholders, including industry, are the foundation for their realization.

A strong agricultural sector is vital for the European food industry to remain a major supplier of high quality and safe agricultural and food products in a highly competitive international environment and to contribute to global food security, along with efforts to support a sustainable agri-food economy and the value growth in the food chain. In this perspective, the CAP should promote and support a sustainable agricultural sector involved in food security and safety efforts, among the main specific objectives including improving farmers' position in the food value chain, continuing the EU's overall priorities for the future of food and agriculture, provided for in the food security policy (EC, 2011; EC, 2017).

3.2. SITUATION OF THE AGRI-FOOD PROCESSING SECTOR

Agri-food manufacturing industry is an important sector for the Romanian economy, having a contribution of 5.1% in the gross value added (GVA, at the cost of production factors) of the national economy, while agriculture provides 4.8%, both sectors placed above EU28 average weights of 2% and 1.6% respectively (Table 1).

With an amount of 9.4 billion Euro current prices, in 2018, the Romanian GVA achieved in agri-food industry shared 25% of the national manufacturing industry and 3.2% of the GVA in the EU28 manufacturing industry.

In Romania's agriculture worked 142561 employees, in 2018, but had a decreasing trend in the last 5 years, while in the agri-food industry were employed 183858 persons, with a slight growth trend during the same period of time – *average number of employees, by activity sectors according to the provisions of GD 1260/2011 regarding the activity sectors established according to Law 62/2011 (NIS – TEMPO online).*

Table 1

Gross value added in Romania and the EU28 – total economy, agriculture, manufacturing and agri-food* industry, 2010–2018 (billion Euros)

		2010	2011	2012	2013	2014	2015	2016	2017	2018
Total**	EU28	11530	11853	12093	12193	12615	13292	13401	13771	14203
	Romania	112	116	117	127	133	141	153	170	185
Agriculture***	EU28	191	206	206	214	215	215	214	236	234
	Romania	6.3	8.3	6.2	7.7	7.1	6.7	6.9	8.1	8.9
Manufacturing industry	EU28	1767	1853	1858	1870	1950	2114	2157	2214	2272
	Romania	28.8	32.8	26.5	29.3	31.6	31.4	34.3	37.4	38.3
Food, beverages and tobacco ind.	EU28	234	236	243	248	256	269	272	274	:
	Romania	7.0	7.5	7.0	7.4	6.9	7.3	7.5	8.9	9.4

Note: European Union with 28 countries (2013–2020); *Food, beverage and tobacco; Total NACE economic activities; ***Agriculture, forestry and fishing.

Source: Processing of Eurostat statistics – National accounts aggregates by industry.

The most recent available data indicate an increase of 1.8 percent in the production of the Romanian food industry, from January and February 2020, compared to the evolution of the same period of the previous year, while with the manufacturing industry indicates a slower growth rate and manufacturing beverages and tobacco, slight decrease indicated by the production indices, of 92% over the same period (table 2).

Table 2

Indices of industrial production in Romania, by NACE Rev.2 activities – manufacturing industry and agri-food industries

	Jan. 2005	2018	2019	Jan. 2019 – Febr. 2019	Jan. 2020 – Febr. 2020
Manufacturing industry	50.4	118.5	116.1	110.2	108.1
Food industry	51.6	113.8	115.9	101.9	103.8
Manufacture of beverages	59.5	114.5	113.6	86.2	92.4
Manufacture of tobacco prod.	48.0	85.0	83.9	84.9	91.7

Source: NIS - TEMPO online: *Industrial production indices – monthly, by industry activities, NACE Rev.2, Industry activities NACE Rev.2 – total, sections and divisions, Large industrial groups, Raw series, 2015 = 100.*

At the same time, comparing to the manufacturing industry, where there have been slight increases, labor productivity in the agri-food industry has been declining in all branches in the first months of 2020, against the similar period in 2019, much more pronounced in the tobacco industry (Table 3).

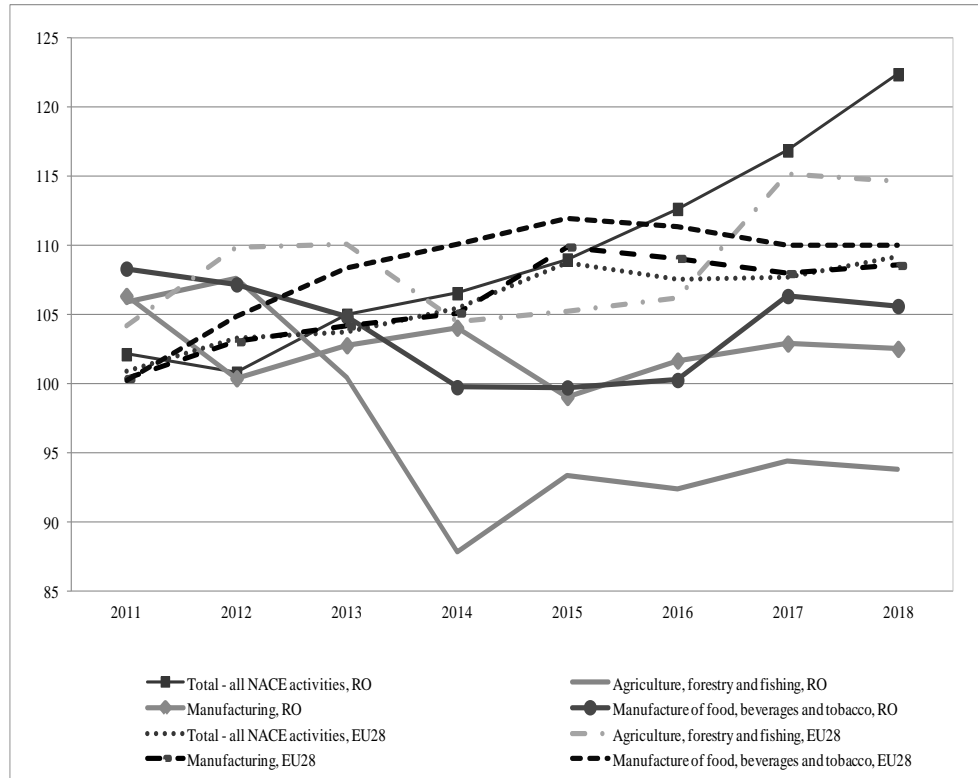
However, evolution of real value added indices in Romania's agriculture (default deflator, 2010 = 100, Euro) shows a continuous downward trend following 2014, as well as a fluctuating evolution, with a slight decrease in the food industry divergent developments as compares to upward direction of the economy as well as of the similar economic sectors of the EU-28 (Fig. 1).

Table 3

Labor productivity indices in industry (annual averages), by NACE Rev.2 activities – total economy, manufacturing industry and branches of the agri-food industry

	2019	Jan. 2019 – Feb. 2019	Jan. 2020 – Feb. 2020
Total	109,0	105,3	105,0
Manufacturing industry	111,0	104,0	104,8
Food industry	106,3	93,0	97,2
Manufacture of beverages	98,1	75,4	80,1
Manufacture of tobacco prod.	63,1	66,4	65,6

Sursa: NIS-TEMPO online: *Labor productivity indices in industry, by NACE Rev.2 activities, Monthly series, 2015=100.*

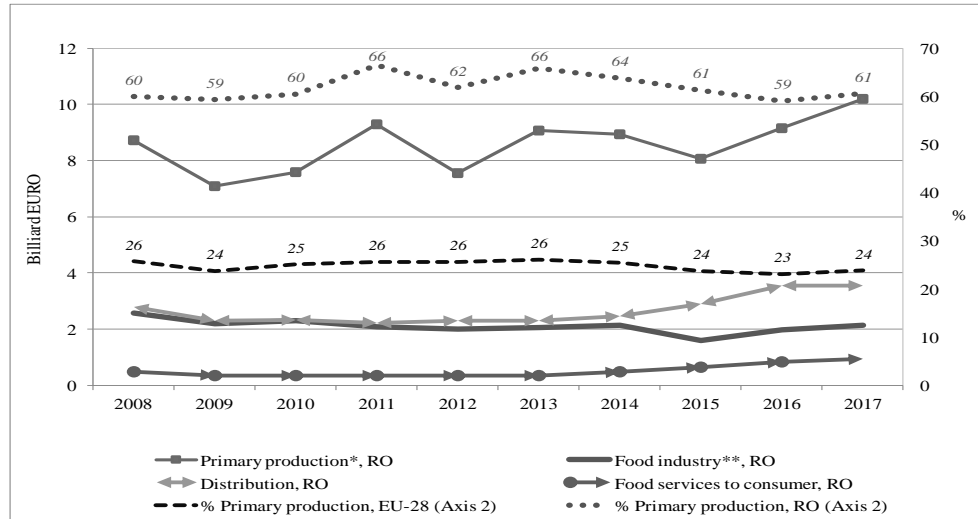


Source: Processing of Eurostat statistics – National accounts aggregates by industry.

Figure 1. Gross value added indices – total economy, agriculture, manufacturing and agri-food industry, in Romania and EU (default deflator, 2010 = 100)

The analysis upon the **distribution of value added in the agri-food chain** indicates certain structural imbalances in Romania and in comparison with the EU-28, revealed by the following results: the high share, of 33.6%, of Romania, in 2017, in the number of enterprises in the EU-28 agri-food chain; the low share, of 13%, of the food industry in the total GVA of Romania's agri-food chain, compared to agriculture, of 61%, in contrast to the EU-28, where the food industry contributes 26% to the total GVA of the agri-food chain, and agriculture, with 24% (Fig. 2).

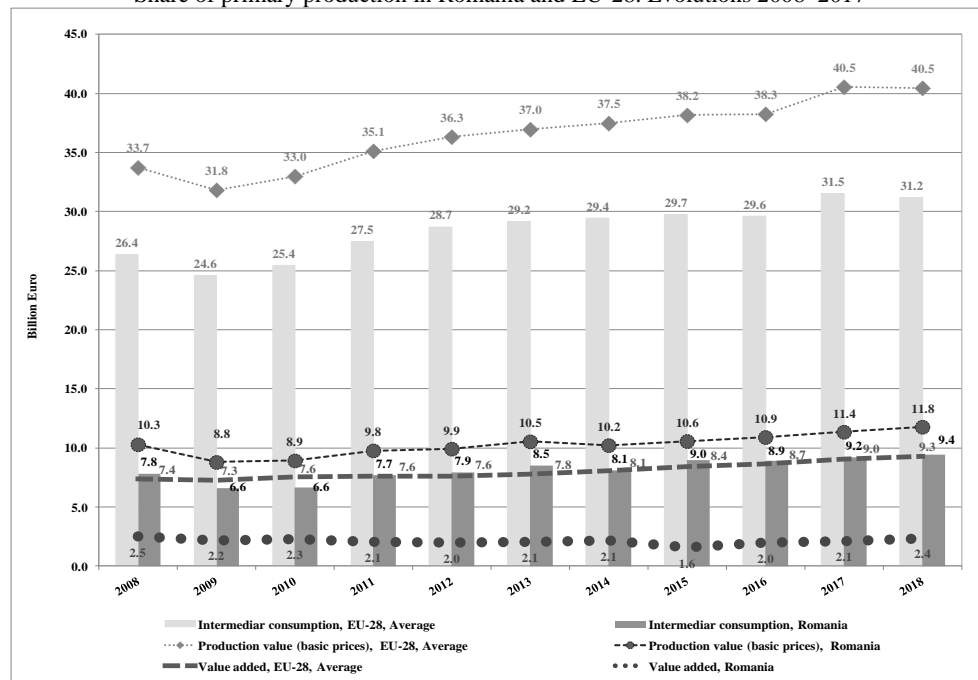
As shown in graph 3, the production of agri-food industry growth, from 10.3 billion Euro, in 2008, to 11.8 billion Euro, in 2018, resulted from the increase of the intermediary consumption, from 7.8 billion €, to 9.4 billion in the same period of time, with an average annual rate of 2%, while the value added of agri-food industry decreased by an annual rate of -0.6%, from 2.5 billion Euro, to 2.3 billion Euro.



*agriculture; **food products, including beverages

Source: Estimates and processing of data from Eurostat – EAA and SBS.

Figure 2. GVA structure in the agri-food supply chain, in Romania; Share of primary production in Romania and EU-28. Evolutions 2008–2017



Source: Estimates, processing of data from Eurostat – National accounts aggregates by industry

Figure 3. Structure of the production value in the agri-food industry – Romania and EU28 – Evolution 2008–2018

Investigations upon the production value structure of the agri-food industry, in 2008, resulted an average of 77% share of the intermediate consumption in the period of time 2008–2013, that increased to 82% in average during 2014–2018, while the value added achieved in agri-food industry, accounting for 24% of the production value, in 2008, but decreased to 18%, in the same periods of time.

According to estimates, in the agri-food industry, in Romania, the ratio between the intermediate consumption (at factor cost) and the value added (in basic prices) was 4.5 in average in the period of time 2014–2018, above the EU-28 average level of 3.5. As well, in Romania, it was stressed an upward trend of the input / output ratio when comparing to the average of 3.5 in 2008-2013.

3.3. ECONOMIC AND FINANCIAL ACTIVITY OF ENTERPRISES IN FOOD CHAIN

Food and beverages manufacturing industry include 9.8 thousand enterprises, in 2018, employing over 181 thousand persons and achieve a turnover of 59.6 billion lei, of which, enterprises in the food industry achieve 81% of the turnover amounting to 46.6 billion Lei, and in the beverage manufacturing sector, 12.9 billion Lei (table 4).

Micro-enterprises (0–9 pers.) predominate, in number, in the food and beverage industry (71%), followed by small enterprises (10–49 pers.), with 22% of units and 26% of total staff. Together, micro and small enterprises absorb 32% of the labour force in food industry (including beverages).

Table 4

Active enterprises in the food and beverage manufacturing industry, average number of employees and turnover, by activities, 2015–2018

NACE Rev.2	2015			2016			2017			2018		
	No. enterprises	No. persons	Turnover (mill. Lei)	No. enterprises	No. persons	Turnover (mill. Lei)	No. enterprises	No. persons	Turnover (mill. Lei)	No. enterprises	No. persons	Turnover (mill. Lei)
Meat and prod.	801	43194	12708	800	43080	13020	814	43165	14231	841	43649	15204
Fish and prod.	35	1279	419	31	1343	472	31	1328	495	34	1306	488
Fruits and vegetables	400	6891	2701	442	6112	2511	509	6310	2662	654	6610	2805
Oils and fats	140	3533	4530	130	3356	4495	124	3165	4592	128	3087	4950
Dairy products	525	13363	4454	496	13553	4836	524	13407	5130	562	13283	5620
Milling	716	9955	3308	681	9440	3036	632	8799	2880	593	8232	3153
Bakery, pastry	4789	67618	7167	4709	68760	7794	4961	70494	8328	5349	70642	9094
Food preps.	639	13374	5779	677	13745	5663	741	14184	5683	958	14380	5351
Beverages	677	18613	10700	677	19729	11419	676	20048	11948	686	19975	12960

Source: NIS-TEMPO online

Most enterprises are functioning in: bakery subsector, with a number of 4789 units in 2015, increased to 5349 units in 2018; in meat processing, rising from 801 to 841 units; as well in milling subsector, although decreased from 716 units to 593 in the mentioned period of time; there was observed an increasing number of units in feed preparations activities due to a greater demand, and in fruit & vegetables processing sectors which had the greatest expansion, from 400 units in 2015, to 654 units in 2018.

The subsectors that absorb the highest employment in the food industry are those with bakery and pastry activities, 70.6 thousand persons and meat processing, 43.6 thousand persons, followed by manufacturing of beverages, 19.9 thousand persons and preparations food, 14.3 thousand persons employed, at the level of the most recent statistics corresponding to year 2018. The largest number of staff is absorbed by large enterprises (250 pers. and over) (36%), which account for only 1% of the number of enterprises in the sector, but generate the bulk share of gross value added of 60%, followed by medium-sized enterprises (50–249 pers.), with 30% of employees and 22% of gross value added (Table 5). It was observed that out of the total of 2345 million Lei investments, in 2017, half were made by large enterprises and 31% by medium-sized enterprises. By contrast, small enterprises suffered losses, indicated by the negative gross surplus (-5%), while exceeding staff costs by 1.8 times, drawing attention at the economic vulnerability of these units of the food industry.

Table 5

Economic and financial indicators of enterprises in the food industry and beverage manufacturing, by size classes, in 2017

Indicators	UM	Total enterprises, of which:	0-9 pers.	10-19 pers.	20-49 pers.	50-249 pers.	≥ 250 pers.
			(%)	(%)	(%)	(%)	(%)
Number of enterprises	number	9134	71	12	10	6	1
Total staff	pers.	196003	8	11	15	30	36
Employees, average	pers.	181873	9	8	15	30	37
Turnover	mill. lei	57356	4	5	9	26	56
Direct exports	mill. lei	5004	0	3	4	21	71
GVA (at factors cost)	mill. lei	9289	3	4	11	22	60
Staff costs	mill. lei	6821	4	7	11	28	50
Gross operating surplus	mill. lei	2468	1	-5	11	6	88
Net investments	mill. lei	2345	6	4	9	31	50

Source: (INS, 2019a).

In agri-food distribution chain and food services to the population (HORECA) activate a total of 329305 people, in 53727 enterprises, of which 88% are micro-enterprises (0–9 pers.), with a staff of 101833 employees and 10% enterprises small (10-50 pers.), with 50700 employees (table 6). Of these, 138076 persons are employed in wholesale and in retail, in 27314 enterprises of which 92% are micro-enterprises, respectively 6469 agri-food retailers (77%) and 1886 enterprises with distribution of agricultural products (23%).

It was observed that the retail enterprises in markets, stands and kiosks and those outside these locations, registered a commercial addition of 27% – 29% of the turnover, compared to the wholesale enterprises, sharing 11% of the distribution of agricultural products, respectively 17% in the food products and 18% in retail of food, beverages and tobacco products in specialist shops. Most of the sales, sharing 85% of the turnover of the supply chain, amounting 138 billion lei, were made by the enterprises with distribution activities, of which, 87% wholesale of agricultural and food products and 13 % retail sales (Table 7).

Table 6

Economic and financial indicators of enterprises in distribution and food services to the population, by size classes, in 2017

Indicators	UM	Total enterprises, of which:	0-9	10-19	20-49	50-249	≥ 250
			pers.	pers.	pers.	pers.	pers.
			(%)	(%)	(%)	(%)	(%)
Enterprises	number	53727	88	6	4	1	0
Total staff	pers.	329305	31	15	19	20	15
Employees, average	pers.	308521	30	15	20	20	15
Turnover	mill. lei	138155	18	12	15	28	27
Direct exports	mill. lei	8712	1	5	c	c	c
Gross value added (at f. c.)	mill. lei	17010	22	12	c	c	c
Staff costs	mill. lei	9401	21	12	c	c	c
Gross operating surplus	mill. lei	7610	25	13	c	c	c
Net investments	mill. lei	3068	26	14	c	c	c

Note: c – confidential data.

Source: (INS, 2019a).

Table 7

Main economic and financial indicators of the enterprises in agri-food distribution sector and in food services HORECA, in 2017

Indicators	UM	Distribution*		Food services (HORECA)
		Wholesale	Retail	
Number of enterprises	number	8355	18959	26413
Total staff	pers.	86799	51277	191229
Employees, average	pers.	84459	45864	178198
Turnover	mill. lei	102260	15855	20040
Direct exports	mill. lei	8544	149	18
GVA (at factors cost)	mill. lei	7663	2146	7201
Staff costs	mill. lei	3485	1257	4658
Gross operating surplus	mill. lei	4178	889	2542
Net investments	mill. lei	1310	366	1391

* Wholesale, raw agricultural and live animal products and foodstuffs, beverages and tobacco and retail trade, food, beverages and tobacco products, in specialized stores, carried out through stands, kiosks and markets and beyond these locations.

Source: (INS, 2019b).

According to National Institute for Statistics (NIS) available data, the retail enterprises in specialized stores, at the level of the year 2017, registered a negative gross operating surplus (-288 million lei), while the personnel expenses exceeding 2.6 times the gross value added, indicating some efficiency problems of the activity of this segment of the food chain.

The activities of food services provided to the population (HORECA) are dominated by restaurants (52% of staff, 50% of turnover and 43% of net investments) achieved a turnover of 20 billion lei, of which a quarter generated by **micro-enterprises**, respectively, sharing 15% of the turnover of the agri-food supply chain to Romania's population (Table 8).

Table 8

Structure of HORECA services by main economic and financial indicators of enterprises, 2017

Indicators	No. enterpr.	Staff	Staff expenses (mill. lei)	Turnover (mill. lei)	Gross value added (mill. lei)	Net investments (mill. lei)
Hotels	2403	42228	1293.5	4930.5	2473.5	441.2
Pensions	1995	4625	74.5	437.5	165.7	41.3
Campsites, camps	81	283	5.2	28.2	10.4	1.6
Other lodgings	1595	5282	98.0	560.2	236.0	188.8
Restaurants	9903	99646	2293.6	10089.3	2980.4	598.8
Catering activities	1278	11611	306.8	1318.2	526.9	42.5
Bars and other beverage services	9158	27554	586.4	2675.8	807.5	76.3

Source: Processing of data from NIS – TEMPO online

The **territorial distribution** of agri-food processing units – which numbered in 2014 a total of 9184 units, according to NIS, decreased to 9134, in 2017 – indicates an imbalance of activities between regions, a prevalence of small enterprises (92% units with up to 50 employees) and a high degree of dispersion in bakery products that occupy 52% of the units with the status of micro-enterprises, followed by the meat, milling and beverage processing units (9% each).

The highest degree of concentration is represented by the processing units in the tobacco, fish and oil industries. After EU accession, the number of food business operators decreased by about 13% because of inability to adapt to EU standards and lack of viability of the raw material supply chain. Only since 2017 it can be noticed an increase that exceeds the level of 2009.

Against the background of the international context created by the financial crisis that slowed down the orientation of foreign investors towards Romania, in the period 2009–2011, the investment rate had a substantial decrease; the decreasing trend of investments in the agri-food industry continued in the next

period, while increasing business loans and interest rates and accumulation of losses (PNDR, 2016).

3.4. AGRI-FOOD PROCESSING CAPABILITIES

During the pre-accession period, Romania registered a decline in the processing capacity of agricultural products caused by to the breakdown of the integrated food chains and by high costs of compliance with European food safety and quality standards. A greater impact was in the meat and dairy industry where the standards were the most severe (PNDR, 2016).

Since 2007, new units in line with the requirements of the Community market have been set up by accessing EAFRD funds.

The total number of units of food of animal origin, accredited for intra-Community trade, has increased by 69%, from 2015 to 2017, from a number of 1745 to 3240 enterprises and currently, by 2020, there are 4583 units (Table 9).

In 2013, out of the total processing units (531 in number) for red meat, poultry, milk and dairy products and eggs, that have been subjected to a transition period (until 2016) for meeting food safety standards, only a percentage of 12.2 % had concluded a financing contract for investments necessary to meet the standards (Table 10).

Table 9

Food establishments of animal origin approved for intra-EU trade, by activity

Activities		No. units, 2017	No. units, 2020	Activities		No. units, 2017	No. units, 2020
General activities	re-wrapping establishments	125	212	Collection centers	milk	893	776
	cold storage	417	693		fats, gelatin, collagen	9	7
Slaughter house	poultry	39	46		fish	48	56
	farmed game	3	3	Re-wrapping establishments	milk	8	13
	domestic ungulates	167	205		eggs	131	142
Cutting plants	poultry	107	164		domestic ungulates	170	199
	wild game	15	21				
	domestic ungulates	268	358				

Source: Processing of data provided by the National Sanitary Veterinary and Food Safety Authority (www.ansvsa.ro).

Table 10

Number of processing units of animal products for intra-EU trade, by activities

Activities / Year	Processing establishments (number)								
	Meat processing (minced, preparations and mechanically separated)	Meat products	Fish	Meat of game	Animal fat and lard	Milk	Eggs	Frog legs and snails	Treated stomachs, bladders and intestines
2017	268	258	46	9	15	175	7	6	56
2020	862	276	68	14	35	160	58	7	74

Source: Processing of data from National Sanitary Veterinary and Food Safety Authority (www.ansvsa.ro).

Romania disposes of an **authorized storage capacity** of 26.3 million tons for agricultural products, in 1404 silos (12.6 million tons), as well as 4515 warehouses and depots (13.7 million tons), operated by 5247 economic operators (Table 11).

Table 11

Storage capacity for agricultural products and number of operators, 2019

Authorized storage capacity (thou. tones)	out of:		Operators, total (number)	Operators with storage facilities, (number)	Out of:	
	Silos (thou. tones)	Warehouses / deposits (thou. tones)			Silos (number)	Warehouses / deposits (number)
26366	12664.8	13701	5274	5247	1404	4515

Source: Processing of data provided by MADR (<https://www.madr.ro/lista-spatii-autorizate-pentru-depozitarea-produselor-agricole.html>).

The **territorial distribution of storage spaces**, according to the number of operators and operating capacities, at the level of 2019, indicates a concentration of 50% of the total storage capacity and 37% of the spaces, in 6 counties, respectively, Timiș (3567 thousand tons in 490 spaces), Constanța (3567 thousand tons, in 295 spaces), followed by Călărași, Ialomița, Teleorman and Arad, with 7% -5% of the total authorized storage capacity of the country.

3.5. TRENDS IN THE SUBSECTORS OF FOOD INDUSTRY

The highest **value of industrial production** in Romania, cumulating 8.8 billion Euros in 2018, was achieved in the meat industry (44% of food production), supplying a production of 3.8 billion Euros (Table 12). However, in foreign trade, the performance of the meat industry subsector shows a major imbalance, by registering a trade deficit of -695 million Euros, which is, following sugar industry

with -770 million Euros, the deepest among the food manufacturing industry subsectors. Bakery products and those in the milk processing subsector added another third of the food production, amounting 1.4 billion Euros and 1.04 billion Euros, respectively. In contrast, processing and preservation of fish has the lowest share in food production (0.9%).

Meat products have the greatest importance for Romanian consumers, occupying 38.7% of the **estimated consumption** (DC) for the year 2018, with an increasing trend compared to the previous year, followed by bakery and flour products, 14.2%, dairy products and eggs 12%, sugar products, 10.7%. At the same time, however, products with increased nutritional value, such as fruits and vegetables have a low share in consumption, with fish products on the last place.

Food imports had a share of 39% in Romania's estimated consumption, of 11.8 billion Euros, in 2018, slightly higher than the previous year (38%). Also, domestic production was deficient in covering a significant part of basic foodstuffs. With the highest absorption of domestic consumption of imported food, being: products from the sugar industry, 77%; processing and preservation of fruits and vegetables, 70%; fish processing and preservation, 63%; manufacture of oils and fats, 57% and feed preparations, 54%.

Romania **exported food industry products** worth 1.7 billion Euros in 2018, representing 45.6% of Romania's total agri-food exports (47%, on average, in the period 2012–2018), while imports, amounting to 4.6 billion Euros, were almost 3 times higher (Table 12).

Table 13 shows important changes in the structure of Romania's agri-food **exports, so that agricultural products had a continuous decreasing trend**, from 51.7% in 2012 to 26.7% in 2017. In the same period, the tobacco processing sector experienced a revival in exports, from 5.6% to 22.5%, but beverages stagnated, accounting for only 5.1% of agri-food exports.

Low degree of export diversification – The most important export value was registered in the subsector *meat production, processing and preservation*, with a major share in the agri-food export of 30%, followed by the *manufacture of oils and fats*, the two subsectors cumulating 52.8% of the total export of the food industry of Romania.

At the same time, imports from the meat industrialization subsector, with a value of 1.2 billion Euros, predominate as well in imports, followed by sugar products, which absorbed 976.5 million Euros from imports. The two sectors account for 47.1% of food industry imports. The lowest earning from exports were from the subsectors *fish processing and preservation*, 0.3% and *manufacture of milling products*, 3.6%.

Chronically deficient foreign agri-food trade – Romania's foreign trade balance systematically registered a deficit in all food groups, which deepened after accession (Rusali, 2019). In 2018, the food deficit reached –2.9 billion Euro.

The manufacture of oils and fats was the only subsector that accumulated a positive trade balance in 2018, amounting to 7 million Euros and in which there was a tendency to restore the trade balance (Table 12).

Table 12

Production, foreign trade and estimated consumption of foodstuff, by NACE groups of the manufacturing industry – C10, in the time period 2017–2018

Activity / Indicators	Production		Import		Export		Balance		DC	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
	mill. Euro	mil. Euro	mill. Euro	mil. Euro	mill. Euro	mill. Euro	mill. Euro	mill. Euro	mill. Euro	mill. Euro
Meat and prod.	3766	3864	1077	1209	485	514	-592	-695	4358	4559
Fish and prod.	72	81	114	127	5.6	5.2	-108	-121	181	203
Fruits & vegetables	223	260	341	340	120	113	-221	-227	444	487
Oils and fats	608	688	368	385	327	392	-41	7	649	680
Dairy products	981	1041	485	515	117	137	-368	-378	1348	1419
Milling products	355	375	203	222	59	62	-144	-160	498	535
Bakery, pastry	1460	1483	306	343	132	152	-174	-191	1634	1674
Sugar and prod.	673	492	930	977	207	207	-723	-770	1396	1261
Feed preparations	560	579	454	527	139	134	-315	-393	875	971
Food industry, total	8699	8863	4277	4643	1592	1717	-2685	-2926	11383	11790

Source: Estimates based on data provided by Eurostat - Sold production, exports and imports by PRODCOM list (NACE Rev. 2) - annual data.

Table 13

Structure of exports of agricultural and food products, to Intra-EU and Extra-EU – Share in total agri-food trade, Romania, 2012–2017 (%)

Specification		2012	2013	2014	2015	2016	2017	Variation 2016-2017
Agriculture*	Intra-UE	27.3	24.9	21.8	21.9	16.8	17.0	0.2
	Extra- UE	24.4	15.8	14.9	9.1	11.6	9.8	-1.8
	Total	51.7	40.7	36.7	31.0	28.4	26.7	-1.7
Food industry	Intra- UE	32.8	42.2	40.2	42.9	36.4	36.2	-0.3
	Extra- UE	5.6	8.0	10.7	10.6	9.5	9.5	0.0
	Total	38.5	50.1	50.8	53.5	45.9	45.6	-0.3
Beverages manufacturing	Intra- UE	3.0	3.2	3.2	3.0	3.2	3.9	0.6
	Extra- UE	1.3	1.3	1.0	1.6	1.4	1.3	-0.1
	Total	4.2	4.5	4.2	4.6	4.6	5.1	0.5
Tobacco processing	Intra- UE	4.7	3.9	6.7	8.9	19.4	19.2	-0.3
	Extra- UE	0.9	0.8	1.6	1.9	1.6	3.3	1.7
	Total	5.6	4.7	8.3	10.9	21.0	22.5	1.5

* Agriculture, hunting and fishing.

Source: Eurostat – Trade by NACE Rev. 2 activity and enterprise size class.

The main groups of food products deficient in foreign trade were those in the meat industry (-695 million Euro) and in the manufacture of sugar products (-770 million Euros) which accumulated 50.1 % of the food trade deficit, in 2018, followed by dairy products (-393 million Euros) and processing of vegetables and fruits (-378 million Euros). Romania's main external destination market for food products is the intra-EU market, which absorbed 36.2% of total agri-food industry exports in 2017, followed by the export of tobacco products, 19.2% and beverages, 3.9% (Table 13).

At the same time, primary agricultural products (agriculture, hunting and fishing) represent 17% of agri-food exports to the intra-EU market and have the highest share of exports of agricultural products on the extra-EU market, 9.8%, close of the share of food exports in the extra-EU market, of 9.5%.

There was observed a trend of reorientation of exports of tobacco products to third markets, in 5 years their share in agri-food trade increasing from 1% to 3.3%.

4. CONCLUSIONS

Agriculture, together with the food industry, are strategic sectors having as main concern to maintain the level of security of domestic production capacity in order to prevent the generation of short-circuit effects and the spread of losses throughout the value chain, affecting food availability and supply to the population.

Although the urgent preventive measures imposed by the health crisis generated by the Covid-19 pandemic and the uncertainties regarding the evolution of the epidemic, still ongoing, simultaneously generated pressure at the level of agricultural producers, food processing and manufacturing sectors, distribution and consumer demand, the effects were uneven by sectors, products and links of the food chain.

The study presented empirical analysis upon the pre-crisis situation and early reactions determined by the pandemic shock on the links of the agri-food value chain in Romania, highlighted by economic and social indicators of enterprises within the available statistics. Results revealed certain vulnerabilities of the agri-food chain, i.e.:

Low value added of the processing sector compared to the primary sector, volatility of agricultural prices, economic and social fragility of small and medium agri-food enterprises, chronic deficit of external performance.

Food supply chain is weakened by the highly fragmented agricultural sector, atomized processing companies and the large share of agricultural products.

Moreover, value added in the agri-food chain shows a decreasing trend and structural imbalances: the low share of value added of the food industry, more than 4 times lower compared to agriculture having a decreasing trend of value added as well; the high share of primary products unbalances the food chain and

weakens competitiveness; high volatility of agricultural prices to producer and importer and asymmetric price transmission (Rusali, 2020); value added in the food industry, substantially outpaced by rising production costs, affects companies' profit margins, investment capacity and sector performance. The structure of the production value in Romania's food industry has been depreciated after 2007, in that the imbalance caused by the decrease of the added value has been accentuated by the increasing of production costs during the last decade.

The chronic deficit of Romania's agri-food trade, with potential systemic risk, requires the revitalization and increase of the productivity in the processing industry, through investments in the modernization of the production and processing capacities of agricultural products.

While the vast majority of food in the world is produced and consumed in the same country, trade in food within and between countries allows for diversification of supply as a measure to reduce vulnerability to food market shocks. Consequently, it is necessary a support focused on those agri-food products for which there is production of diversified raw materials, for the realization of processing capacities but also storage to ensure a capitalization at competitive prices depending on the period, both in the vegetable and animal sectors.

In this sense, there is a great need for investment in production facilities and modern technologies, the development of new products, the application of innovative practices and technologies in dairy industry, in processing of vegetables and potatoes, in meat industry, bakery products, but also in high value-added products, i.e. organic products, products registered in national and European quality schemes (Protected Geographical Indication, Protected Designation of Origin, Traditional Specialties Guaranteed, mountain products). Stimulating these areas will lead to improved productivity, increased competitiveness and sustainability of processors that meet food safety and traceability standards, environmentally certified operators who obtain quality products, and increased market share of domestic high value-added products.

At the same time, large farms that produce for the market in an organized system must be encouraged to process local raw materials, in order to increase competitiveness and revenue. The progress made will balance the need for processing of agricultural products in relation to domestic production capacity with positive effects on the trade balance, especially in the context of a growing market and increased consumer interest in foods with positive effects on health and low environmental impact.

A national long-term financing program for new industrial capacity in the food and beverage processing and manufacturing sector, linked to local consumption needs and territorial balance, could stimulate the prevalence of alternatives to domestic production over imports, but also increasing export opportunities.

The use of local resources and raw materials is also a means of stimulating rural enterprises, providing multiple socio-economic benefits, including with a view to increasing the share of gross value added in the food and agriculture industries.

The post-2020 CAP, together with the new post-covidemia support instruments and the financial instrument for recovery and resilience, needs to have an impact on balancing the food value chain, strengthening the position of farmers and increasing the capitalization of primary products, restoring the functioning of manufacturing agri-food chain segments.

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