ECONOMIC IMPLICATIONS OF FOOD CONSUMPTION BEHAVIOR CHANGES IN ROMANIA DURING THE COVID-19 PANDEMIC

**Marius CONSTANTIN[1], Silviu Ionuţ BEIA[2], Mihai DINU[1],
Simona Roxana PĂTĂRLĂGEANU[1], Radu PETRARIU[1], Mădălina Elena DEACONU[1]**

[1]Bucharest University of Economic Studies, 6 Romana Square, District 1, 010374, Bucharest, Romania, E-mails: marius.constantin@eam.ase.ro (M.C.), mihai.dinu@eam.ase.ro (M.D.), rpatarlageanu@eam.ase.ro (S.R.P.), radu.petrariu@rei.ase.ro (R.P.), deaconuelena17@stud.ase.ro (M.E.D.)
[2]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd., District 1, 011464, Bucharest, Romania, Email: beiaionut@yahoo.com.

Corresponding author: marius.constantin@eam.ase.ro

Abstract

Besides the sanitary crisis, the COVID-19 pandemic has caused socio-economic downturn globally. Among the affected economic sectors, the agriculture and food sectors were no exception. In the context of on-going market transformations in Romania, the national demand of agri-food products rushed the links involved in the agri-food value chains to adapt to sudden consumption behavioral changes. The objective of this research was to explore food consumption and expenditure changes in Romania in relation with the pandemic and tap into the economic implications. Data used in this research were taken over from the Romanian National Institute of Statistics and were processed in a manner that allowed the average dynamics index to be in the spotlight of this research. Results show market pressure, especially at the beginning of the second quarter of 2020 and a peak of the food expenditure increase in the first quarter of 2021.

Key words: food consumption patterns, food expenditure dynamics, market transformation, food waste

INTRODUCTION

Since March 2020 [20], "the COVID-19 pandemic has become a major global concern and challenge for humanity, with direct socio-economic implications, including on the agri-food sector, which has been under additional pressure due to this crisis" [1]. Managing agri-food chains had already been challenging [3], especially if considering the sustainability factor and the transition to the circular economy [9, 10, 15–17]. On top of that, the emergence of the COVID-19 pandemic has caused additional pressure on the global agri-food value chain links and has brought even more significant issues on successfully ensuring food security globally [12, 14, 19].

As far as Romania is concerned, the COVID-19 pandemic has caught the dairy sector in a tight market spot, despite the fact that a trend was noticed, characterized by the preference towards sustainable dairy products, delivered by consumers who value the natural capital and strive to empower the circular economy through their 'green' consumption behavior [6]. Regarding the vegetables chain, during the early stages of the COVID-19 pandemic, consumers changed their purchasing manner using internet for ordering online fresh vegetables achieved by local producers [8]. Regarding bakery products, "a number of 718 Romanians manifested a strong reliance on purchasing cheap white-flour bakery products for their regular diet during the early stages of the COVID-19 pandemic" [13]. Other researchers pointed out that different samples of Romanians proceeded to buy more local and sustainable brands during the early stages of the COVID-19 pandemic [2]. In this case we may discuss about subjective norms and behavioral control which shaped the attitudes to sustainable products belonging sometimes to local brands. Another study [7] shows that the COVID-19 pandemic has brought disruption among Generation Z, with respect to their consumer

behavior, especially if considering their eagerness for using digital platforms for purchasing food products online.

The scientific literature is not rich on papers covering the topic of the COVID-19 pandemic's impact on the consumption and expenditure on agri-food products. Some results pointed out price changes in relation with the COVID-19 pandemic [5], as well as changes in relevant indicators or indices like turnover and production price indices [11]. However, the dynamics concerning consumption and expenditure on agri-food products has not been yet explored.

The objective of this research was to analyze froma quantitatively point of view the food consumption and expenditure in Romania in a comparatively manner, using the data specific to the period before the COVID-19 pandemic and in the period marked by the COVID-19 pandemic. The expected results were destined to help decision-makers to better understand market feed-back to food supply chain crises, such as the one caused by the COVID-19 pandemic.

MATERIALS AND METHODS

In this research paper, time series specific to the consumption and expenditure on food in Romania have been accessed and taken over from the TEMPO Online Database of the Romanian National Institute of Statistics [18] and were concatenated in Table 1.

Table 1. The consumption and expenditure on food in Romania before (Quarter #1 2018 – Quarter #1 of 2020) and during the COVID-19 pandemic (Quarter #2 of 2020 – Quarter #1 of 2021), per product, year and quarter

Product	Unit of measure	Year 2018				Year 2019				Year 2020				2021
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Bread and bakery products	RON*	27.88	28.83	28.74	30.63	30.60	32.02	31.90	33.61	33.57	33.66	35.14	36.17	36.10
	kg**	7.792	7.988	8.354	8.046	7.716	7.886	8.179	7.922	7.772	7.394	7.819	7.53	7.203
Milk	RON*	17.16	17.07	16.79	18.51	18.63	17.92	17.93	19.24	19.81	19.13	19.68	21.05	22.25
	litres**	5.55	5.55	5.72	5.70	5.50	5.51	5.50	5.57	4.05	3.68	3.87	3.81	5.465
Cheese and cream	RON*	18.17	21.13	22.07	20.84	20.15	22.34	23.60	22.05	22.81	26.30	27.07	26.51	27.52
	kg**	1.4	1.567	1.628	1.485	1.45	1.545	1.609	1.496	1.485	1.506	1.598	1.521	1.601
Eggs	RON*	5.6	4.93	4.17	4.89	4.88	4.73	4.3	5.03	5.2	5.19	4.88	6.06	5.99
	pieces**	12.12	14.71	14.04	12.88	12.80	14.67	13.95	13.17	13.37	14.49	14.13	13.90	14.007
Fruits	RON*	16.4	16.47	13.65	16.82	16.61	17.06	14.93	18.83	20.5	22.86	18.79	23.66	23.83
	kg**	3.94	3.51	4.30	4.37	4.20	3.54	3.99	4.28	4.335	3.674	4.151	4.73	4.449
Potatoes	RON*	3.19	4.1	3.98	4.47	5.63	6.9	5.27	5.79	6.14	6.43	4.66	4.72	4.64
	kg**	3.04	2.92	3.06	3.05	3.02	2.74	2.89	2.93	2.93	2.69	2.877	2.999	3.042
Fresh meat	RON*	52.52	64.24	61.08	68.12	56.91	68.17	65.37	73.28	67.34	79.01	77.66	88.92	79.87
	kg**	7.005	7.82	10.036	7.547	7.006	7.544	9.793	7.993	6.987	7.418	9.554	8.102	7.547
Chocolate, sweets	RON*	3.59	3.41	3.32	4.87	3.76	3.89	3.33	5.24	4.11	4.08	3.71	5.85	5.2
	kg**	0.197	0.187	0.171	0.231	0.196	0.194	0.167	0.243	0.207	0.198	0.174	0.245	0.224
Alcoholic drinks	RON*	7.74	10.39	11.16	11.57	9.36	11.34	11.80	13.07	10.01	12.44	13.05	13.04	11.84
	litres**	2.341	2.761	2.912	2.668	2.522	2.732	2.731	2.732	2.437	2.677	2.804	2.596	2.516

* Represents the total monthly average per person expenditure, expressed in RON (local currency) for the purchase of food
** Represents the total monthly average consumption of agri-food products, quantities expressed in kilograms (kg), litres (l) and pieces (p)
Source: Authors' data concatenation based on the TEMPO online database (Raw data source: Romanian National Institute of Statistics, 2021).

Average dynamics indices with fixed base were calculated, according to the formula [4]:

$$\text{Average dynamics index} = \sqrt[4]{\prod_{t=2021}^{2016} I_{ijt}/t} - 1$$

where:

I_{ij} = average dynamics index for quarter "i", agri-food product "j";

$I_{ij/t-1}$ = average dynamics index for quarter "i", agri-food product "j", year "t" (2021 or 2020, based on data availability), reported to fixed base year (2016).

The purpose of calculating the average dynamics index per quarter and type of agri-food product was to explore the pandemic's impact of the consumption and expenditure on food in Romania, during various stages of the pandemic (Q2 = pandemic outbreak results).

RESULTS AND DISCUSSIONS

Table 2 was elaborated with two purposes: (a) to identify major food consumption behavior changes and trends during the analyzed period (Q1 of 2016 – Q1 of 2021), while considering different consumption patterns throughout the year (hence, the quarter analysisi); (b) to identify major food expenditure behavior changes and trends. Consequently, the average dynamics index was calculated based on the quarterly relative change results, per agri-food product, considering the year 2016 as the fixed base.

The average dynamics indices corresponding to quarter 1 show that bread & bakery products (2.307) and milk (2.392) were the two types of food that registered the most quarterly abrupt change (above the value of 2) from the perspective of monthly nominal food expenditure. However, the greatest expenditure increase (Q1 2021 reported to Q1 2016) was observed in the case of cheese and cream (97%), from 13.97 RON for 1.275 kilograms to 27.52 RON for 1.601 kilograms (average monthly nominal consumption of cheese and cream in Romania). The average dynamics index corresponding to the quantities of food consumed registered significantly lower scores (below 1) if compared to those of the expenditure. Moreover, the average dynamics indices for bread & bakery products and milk express a trend specific to the consumption reduction, in contrast with the rest of the analyzed food products.

Table 2. Average dynamics index with fixed base (year 2016)

Product	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
	Expenditure	Quantities	Expenditure	Quantities	Expenditure	Quantities	Expenditure	Quantities
Bread & bakery products	2.307*	0.604**	1.341*	0.979*	1.352*	1.080*	1.297*	0.871*
Milk	2.392*	0.846**	1.706*	1.960**	1.794*	2.282**	1.772*	1.529**
Cheese and cream	1.555*	0.775*	1.469*	1.150*	1.443*	1.112*	1.384*	1.122*
Eggs	1.617*	0.681*	1.380*	1.189*	1.418*	2.521*	1.539*	2.090*
Fruits	1.686*	0.745*	1.485*	1.051*	1.692*	1.472*	1.015*	2.957*
Potatoes	1.445*	0.403*	1.511*	1.280*	1.543*	1.520*	1.465*	1.157*
Fresh meat	1.629*	0.711*	1.528*	2.032**	1.616*	3.528**	1.330*	3.567**
Chocolate, sweets	1.684*	0.769*	4.133*	1.194**	3.607*	2.340**	3.733*	2.072**
Alcoholic drinks	1.732*	0.440*	1.487*	1.194**	1.675*	2.340**	1.489*	2.072**

*Trend: Increase of expenditure / consumption (quantities); ** Trend: Decrease of expenditure / consumption (quantities)
Source: Authors' own computation.

The greatest average dynamics indices resulted in the case of chocolate and sweets, with a peak specific to quarter 2 (4.133), followed by quarter 4 (3.733) and quarter 3 (3.607). This hints at market transformation: Romanian consumers tend to purchase less chocolate and sweets (as supported by the consumption average dynamics indices from quarters 2 – 4), but at a higher price (as supported by the expenditure average dynamics indices. The causes could be multiple: consumers have shifted their preference toward chocolate and sweets of better quality or even produced in a sustainable manner.

Fresh meat registered the most abrupt consumption behavior change in quarter 4 (decrease marked by the average dynamics

index of 3.567). In the same quarter, the fruits category registered the greatest quarterly average dynamics index (increase, 2.957), with the most insignificant expenditure dynamics index tracked (increase, 1.015). The quarterly food expenditure and consumption relative changes (fixed base = year 2016) were graphically represented in Figure 1, per food product and year. Moreover, the intervals corresponding to the expenditure and consumption relative changes were calculated and included in Table 3.

Fig.1. The quarterly food expenditure and consumption relative changes in Romania (fixed base = year 2016)
Source: Authors' own computation and visual representation.

Table 3. The intervals of expenditure and consumption relative changes, per quarter (fixed base = year 2016)

Product	Quarter 1				Quarter 2				Quarter 3				Quarter 4			
	Expenditure		Consumption		Expenditure		Consumption		Expenditure		Consumption		Expenditure		Consumption	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Bread and bakery products	1%	41%	-13%	-2%	15%	49%	8%	12%	15%	52%	7%	14%	16%	45%	1%	7%
Milk	1%	42%	-33%	-5%	4%	31%	-7%	1%	4%	38%	-5%	1%	4%	35%	-9%	-2%
Cheese and cream	17%	97%	9%	26%	14%	67%	8%	19%	15%	63%	9%	16%	20%	72%	10%	16%
Eggs	11%	73%	-3%	12%	11%	40%	10%	19%	9%	35%	0%	8%	7%	37%	-2%	4%
Fruits	11%	87%	2%	15%	10%	49%	1%	3%	6%	51%	1%	4%	26%	57%	0%	8%
Potatoes	-3%	87%	-7%	0%	10%	54%	2%	10%	10%	58%	-1%	4%	14%	65%	3%	11%
Fresh meat	13%	92%	3%	13%	5%	26%	-36%	-2%	5%	36%	-31%	2%	12%	39%	-32%	1%
Chocolate, sweets	9%	72%	7%	22%	0%	70%	-7%	1%	0%	71%	-3%	3%	0%	70%	-6%	0%
Alcoholic drinks	9%	84%	-2%	6%	12%	60%	-7%	1%	7%	56%	-3%	3%	16%	79%	-6%	0%

Source: Authors' own calculations.

During the analyzed interval (Q1 2016 – Q1 2021), on average, the monthly nominal expenditure on food increased significantly (69.80% in Q1 2021; fixed base = Q1 2016), while the average food quantities consumed increased only in Q1 2021, not significantly however (7.40% in Q1 2021; decrease of 1% in Q2 2020; decrease of 0.9% in Q3 2020 and another decrease of 1% in Q4 2020; while having the quarters of 2016 as the fixed base). The causes that contributed to the general increase of the average nominal expenditure on food products are multiple: the consumer price index that has reached 115.05% in January 2021 compared to January 2016 [18], a refinement of consumer behavior with respect to the quality of the purchased food products – constantly increasing quality of life determines the occurrence of preferences for premium products, often times produced locally, in an environmentally-friendly manner, products specific to low-carbon foot-prints [17]. Moreover, consumption behavior change has impact on the issue of food waste, a global threat to global sustainability. The culture of consumerism and the low price levels of food act as the mix that can influence consumers to buy too much food, which might not even be needed, only later for consumers to realise and care about the risk of wastage and their contribution to global food wastage. Connecting the analyzed economic results in relation with food waste in Romania represents the premises of future research avenues. Moreover, this quantitative research can be easily replicated and provides the methodological framework for analyzing the impact of a phenomenon on the consumption behavior changes of agri-food products.

CONCLUSIONS

Matching food supply chain with demand and consumer needs delivers continuous market transformation. Under the influence of the COVID-19 pandemic, the Romanian agri-food sector has been under a lot of pressure, especially at the beginning of the second quarter of 2020, with significant market economic effects being felt especially in the first quarter of 2021. In this regard, multiple changes were noticed with respect to food consumption and expenditure in Romania.
Romanian consumers tend to spend more money on food, despite the fact that the consumption (quantity of food) has not changed as dramatically as the expenditure on food did. The most abrupt change was noticed in the case of chocolate and sweets, although the greatest expenditure relative change increase was noticed in the first quarter of 2021 in the case of cheese and cream.
This paper complements the existing literature with an economic perspective on how crises rush market transformations and shape consumer behaviors in various directions.

REFERENCES

[1]Aday, S., Aday, M.S., 2020, Impact of COVID-19 on the Food Supply Chain. Food Quality and Safety, 4, 167–180, doi:10.1093/fqsafe/fyaa024, Accessed on 30 July 2021.

[2]Alexa, L., Apetrei, A., Sapena, J., 2021, The COVID-19 Lockdown Effect on the Intention to Purchase Sustainable Brands. Sustainability, 13, 3241, doi:10.3390/su13063241, Accessed on 30 July 2021.

[3]Andrei, J.V., Chivu, L., Constantin, M., Subić, J., 2021, Economic Aspects of International Agricultural Trade and Possible Threats to Food Security in the EU-27: A Systematic Statistical Approach. In Shifting Patterns of Agricultural Trade: The Protectionism Outbreak and Food Security; Erokhin, V., Tianming, G., Andrei, J.V., Eds.; Springer: Singapore, pp. 229–261, doi.org/10.1007/978-981-16-3260-0_10, Accessed on 10 August 2021.

[4]Anghelache, C., Manole, A., 2012, Dynamic/Chronological (Time) Series. Romanian Statistical Review No. 10/2021.

[5]Bădan, D.-N., Petre, I.L., 2020 The Impact of the Covid-19 Pandemic and the Drought on the Prices of the Main Agricultural Products of Animal Origin in Romania. Economie şi Sociologie (Economy and Sociology), 2, 108–118.

[6]Brumă, I.S., Vasiliu, C.D., Rodino, S., Butu, M., Tanasă, L., Doboş, S., Butu, A., Coca, O., Stefan, G., 2021, The Behavior of Dairy Consumers in Short Food Supply Chains during COVID-19 Pandemic in Suceava Area, Romania. Sustainability, 13, 3072, doi:10.3390/su13063072, Accessed on 30 July 2021.

[7]Bumbac, R., Bobe, M., Procopie, R., Pamfilie, R., Giuşcă, S., Enache, C., 2020, How Zoomers' Eating Habits Should Be Considered in Shaping the Food System for 2030—A Case Study on the Young Generation from Romania. Sustainability, 12, 7390, doi:10.3390/su12187390, Accessed on 30 July 2021.

[8]Butu, A., Brumă, I.S., Tanasă, L., Rodino, S., Vasiliu, C.D., Doboş, S., Butu, M., 2020, The Impact of COVID-19 Crisis upon the Consumer Buying Behavior of Fresh Vegetables Directly from Local Producers. Case Study: The Quarantined Area of Suceava County, Romania. International Journal of Environmental Research and Public Health, 17, 5485, doi:10.3390/ijerph17155485, Accessed on 30 July 2021.

[9]Constantin, M., Strat, G., Deaconu, M.E., Pătărlăgeanu, S.R., 2021, Innovative Agri-Food Value Chain Management Through a Unique Urban Ecosystem. Management Research and Practice, 13, 5–22. http://mrp.ase.ro/no133/f1.pdf, Accessed on 01 September 2021.

[10]Drăgoi, M.C., Popescu, M.-F., Andrei, J.V., Mieilă, M., 2018, Developments of the Circular Economy in Romania under the New Sustainability Paradigm. Economic Computation & Economic Cybernetics Studies & Research, 52(2), pp. 125–138.

[11]Ignat, R., Constantin, M. Short-Term Effects of COVID-19 Pandemic on Agri-Food Value Chains in Romania. In Proceedings of the Proceedings of the 3rd International Conference on Economics and Social Sciences; Bucharest, Romania, 2020; pp. 578–588. https://doi.org/10.2478/9788395815072-058, Accessed on 30 July 2021.

[12]Laborde, D., Martin, W., Swinnen, J., Vos, R., 2020, COVID-19 Risks to Global Food Security. Science, 369, 500–502, doi:10.1126/science.abc4765, Accessed on ????

[13]Lădaru, G.-R., Siminică, M., Diaconeasa, M.C., Ilie, D.M., Dobrotă, C.-E., Motofeanu, M., 2021, Influencing Factors and Social Media Reflections of Bakery Products Consumption in Romania. Sustainability, 13, 3411, doi:10.3390/su13063411, Accessed on 30 July 2021.

[14]Marcuţă, L., Popescu, A., Tindeche, C., Smedescu, D., Marcuţă, A., 2021, Food Security of the European Union and the Influence of COVID-19. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 21(2): 383–392.

[15]Orîndaru, A., Popescu, M.-F., Căescu, Ştefan-C., Botezatu, F., Florescu, M.S., Runceanu-Albu, C.-C., 2021, Leveraging COVID-19 Outbreak for Shaping a More Sustainable Consumer Behavior. Sustainability, 13, 5762, doi:10.3390/su13115762, Accessed on ????

[16]Pătărlăgeanu, S.R., Constantin, M., Strat, G., Deaconu, M.E., 2021, Best Practices of Circular Activities in the Agri-Food Sector from the Netherlands and Romania; ASE Publishing House: Bucharest, Romania; https://www.ceeol.com/search/book-detail?id=949510, Accessed on 30 July 2021.

[17]Petrariu, R., Constantin, M., Dinu, M., Pătărlăgeanu, S.R., Deaconu, M.E., 2021, Water, Energy, Food, Waste Nexus: Between Synergy and Trade-Offs in Romania Based on Entrepreneurship and Economic Performance. Energies, 14, 5172, doi:10.3390/en14165172, Accessed on 25 August 2021.

[18]Romanian National Institute for Statistics, 2021, TEMPO Database, http://statistici.insse.ro:8077/tempo-online/, Accessed on 30 July 2021.

[19]Turcea, V.C., Constantin, M., 2021, Convergence Points in the Literature Concerning the Topics of Food Security and Added Value. In Proceedings of the 7th BASIQ International Conference on New Trends in Sustainable Business and Consumption; Foggia, Italy, 3–5 June 2021; doi: 10.24818/BASIQ/2021/07/024, Accessed on 25 August 2021.

[20]World Health Organization, 2020, WHO Director-General's Opening Remarks at the Media Briefing on COVID-19-11 March 2020.