

Panic Buying in Hungary During Covid-19 Pandemic

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SUMMARY

The study examines buyers' behavior in Hungary during COVID -19 pandemic based on a non-representative online questionnaire that was carried out during the time of lockdown in Hungary in March 2020. We would like to find out whether there was really accumulation of goods, and if so, which product ranges were involved. How did the outbreak of COVID-19 change shopping behavior? In which direction did it move and could retail trade react to the unexpected, rapid challenge of going online? Can the respondents be identified with the traditional buying behaviour pattern and can it be typified with it? In our study we provide an overview of the anomalies detected in the Hungarian "panic buying" concerning shopping frequency, spending and product avoidance. First, we introduce the main behavioral patterns of shoppers during the "panic buying period" in Hungary, then we draft different types of customers. Second, we highlight some statistically significant relations with regional aspects. Here connections are identified between shopping frequency, spending, stock piling and the places of residency of the surveyed people. Third, we categorised customers into five groups with cluster analysis. The main cluster forming differences are the altered sense of well-being and the attitude differences in stock piling.

Keywords: COVID-19, Panic Buying, Hungary, Spatial differences, Customer Behavior

Journal of Economic Literature (JEL) classification: M31

DOI: <http://doi.org/10.18096/TMP.2021.02.06>

THE AIM AND METHODOLOGY OF RESEARCH

The aim of our research is to investigate the impact of the COVID-19 pandemic on buying behavior, with reference to shopping frequency, spending, accumulation, and shop preference. Our research is based on a data survey in March 2020, when 450 people were involved in online data collection during the lockdown period in Hungary.

We wanted to find answers to the following questions:

- What characterizes panic buying in the first wave of COVID-19?

- How did buyers react to the unexpected, new circumstances, how did their buying behavior change?

- What groups of buyers can be identified and what are the basic features that distinguish them?

For the online questionnaire, we used the Google Forms platform; and we used Microsoft Excel, IBM SPSS 22.0 software for data cleansing and analysis, descriptive statistics, cross-tabulation analysis, and cluster analysis.

CRISIS AND CONSUMPTION

By now, it can be stated that various crises are inherent in market economies. These crises differ significantly in their causes, stakeholders, size, duration, predictability, and so on. (Koos, 2017).

One of the characteristic features of crises is that, due to the combination of many factors, they significantly influence consumers and the development of consumer and shopper behavior. Their various effects on consumption and purchases have been studied in a number of countries and using various approaches during the various crises of recent decades, e.g. Shama (1978), Ang et al. 2000), Alimen & Bayraktaroglu (2011), Alonso et al. (2017). Koos and co-authors modelled the impact of crises on consumption and incorporated it into a unified system (Koos et al. 2017).

Based on their model, the crisis situation we examined (the effect of COVID-19 on purchasing and consumption) can be classified as a natural crisis, containing both unpredictable, tangible and intangible elements, where the whole process of consumption (buying, storing, using the products) was significantly affected by the series of restrictive measures imposed due to COVID-19 and, obviously, by their impact on customer behavior.

As Bourdieu (1984) pointed out, individual responses to individual crises depend on a number of factors: some of these have been found to be the economic situation (Lekakis 2015), the individual's abilities, social network embeddedness (Hall & Lamont 2013), and individual practices of consumers (Smyczek & Glowik 2011; Kaytaz & Gul 2014). For the above reasons, our study aims to show how and to what extent the consumption and shopping patterns of each customer group differed during the early COVID-19 crisis.

THE EFFECT OF COVID-19 ON BUYERS AND SHOPPING

The spread of the COVID-19 pandemic is not only a health challenge in some countries/regions (Kincses & Tóth 2020), but also has a serious social, economic and business impact (Naeem 2021). From among the wide-ranging economic aspects, we will focus on the purchase and consumption aspects. The first panic purchases due to the dynamic spread of COVID-19 have been analyzed from several aspects in the international literature (Tyagi et al. 2020) (Sharma & Sharma 2020) so in our study we will focus on introducing and analyzing Hungarian consumer behaviour and regional aspects of it.

Before presenting the most important results of our empirical research, we provide a synthesis of relevant consumer behavior research that forms the theoretical framework of our topic. Because research on purchasing/consumer behavior is very extensive (Kardes et al. 2011), and there are many social science narratives on the topic (marketing, consumption sociology, and consumption psychology all thematize purchase and consumption as well as buyer and consumer) (Jansson-Boyd, 2010; Wänke, 2009), we will analyze only the effect of COVID-19 on purchases and customer behavior.

In order to do this, firstly, we need to clarify the conceptual differences and connections between purchasing and consumption, and secondly, we outline a system of different factors influencing purchases (Graves 2013; Töröcsik 2018). In this system of factors, we will place the effect of COVID-19, which transformed purchases dramatically in a very short term, as well as the (re)emergence of “panic buying”, a phenomenon that has not been experienced in developed countries for decades in this form.

Before we set the place of panic buying in the system of consumer behavior, we have to clarify the differences between shopping and consumption, emphasizing the fact that we examine the effects of COVID-19 in the short term, from the context of shopping and we do not deal with the long-term effect of COVID-19 and how it changes consumption and consumer behavior. As *Table 1* shows, shopping is a prompt, stimulus-based, action-oriented social phenomenon, influenced by current trends; as opposed to consumption, which can be interpreted in a long-term, trend-based time frame, is planned and is based on consumer needs and wants.

Based on the above, we can state that the changes caused by the COVID-19 pandemic in March 2020 mainly affected purchases and their characteristics in the short term, and the analysis of long-term effects will become possible only later – after the pandemic is over. The data of the HCSO (Hungarian Central Statistical Office) indicates that the total retail turnover decreased by 12.3% in Hungary and by 32.7% in Budapest (excluding the rest of Hungary) in March 2020 compared to the same period of the previous year (HCSO, Weekly Monitor, 2021).

Purchasing behavior (similar to consumer behavior) is influenced by several macro-environmental factors (trends, economic, social situation) and individual characteristics (individual nature of decision making factors, lifestyle, etc.), but the conditions of a purchase are the current situation of the buyer (involvement) (Trommsdorff 2002), which are influenced by both the circumstances of the purchase and the situational effects in the store (Töröcsik 2007).

Table 1

Main differences between consumption and shopping

Features	Consumption	Shopping
duration	long	immediate
framework	aptitudes	stimuli, situational effects
	wants	action
starting point	plans	facts
reaction to trends	trends, counter-trends, megatrends	latest trends

Source: Töröcsik 2018

Many of the large number of influencing factors have a continuous or situational effect, while other factors have an occasional or even one-off effect. One-time/short-term/occasional effects include Black Friday-type promotions, holiday opening hours, available inventory (out of stock), product recalls, and more impact on customer behavior. The effect of COVID-19 on purchases falls into this

category, i.e., it is a negative, external factor influencing purchases that (hopefully) generated a one-time panic purchase response among the population.

From these examples, we can see that one-off, short-term factors can have positive or negative impacts that affect purchases differently (Table 2).

Table 2

The effect of positive and negative one-off factors on purchasing behaviour

	Positive	Negative
Product range	wide, FMCG, durables	mainly FMCG, special items
Place of purchase	mostly the well-known, usual channels	channel preferences change
Shopping period	lengthens	shortens, rationalises
Price effects	stagnating, decreasing prices (promotions)	stagnating or increasing prices
Communication	stimulates purchases	rationalises purchases
Examples	Black Friday, holiday opening hours	product withdrawal, COVID-19 panic buying

Source: own edition

Positive and negative factors differ in many categories. In the first case (positive factors) the product range concerned covers almost all product categories (e.g., Black Friday), while product withdrawals or panic buying are limited to one product or product range (e.g., customers focus primarily on food, detergents and vitamins during panic buying). The place of purchase also appears differently in the two categories. Positive factors (e.g., holiday opening hours) do not change the shop preference, while negative factors (panic buying) can lead to a significant change in shop preference. We will later support this by empirical data.

The purchases themselves take place differently due to the positive and the negative factors. While the positive effects can make shoppers spend longer time in the store, the negative ones can shorten it, some of the buyers also rationalised their purchases during the panic buying period based as the results of our research shows. Prices are also affected differently by positive and negative factors. In the

case of Black Friday or holiday promotions, we can experience a decrease in prices, while in the case of panic buying, the typical trend is more increasing (e.g., hand sanitizer, mask prices).

Commercial communication is also different. In the case of positive factors, the goal is to encourage purchases, thereby increasing the volume of sales, while in the case of negative factors (both during product withdrawals and panic buying), the goal of communication is providing information and supporting decision making.

International research indicates that the pandemic may have a long-term effect on shopping behaviour because of technological innovations, altered shopping patterns and changed labour-leisure relations (Sheth 2020). Puttaiah et al. (2020) identified five driving forces in the altered shopping behaviour: Increased digital adoption, Change in mobility patterns, Change in purchasing behaviour, increased awareness of health and changes in interpersonal behavior.

Summarized the above-mentioned factors, we can state that all dimensions of shopping behavior have changed globally from the start of the pandemic. McKinsey & Company reported that even in Japan 30% of customers have tried new shopping behavior, and this ratio is much higher in other countries, e.g. in the USA 73%, in the UK 63% and in India 96% (McKinsey, 2020). Islam et al. (2020) reached similar conclusions in their international comparative research.

Having clarified the theoretical context of the impact of the COVID-19 crisis on purchases, in the following sections we discuss our own research findings.

CHARACTERISTICS OF THE RESEARCH SAMPLE

After the registration of the first case of the COVID-19 pandemic in Hungary on March 4, the Hungarian Government declared a state of emergency on March 11, which marked the entry into force of the special legal order. One of the biggest challenges in the research was how to assess the change in customer behavior during the development of COVID-19 and what impact it would have on the development of the retail model. Given that neither the world nor the Hungarian retail trade has faced a similar phenomenon lately, it has been difficult to predict changes in customer behavior.

The great advantage of online questionnaires in this case is the rapid deployment and availability of

a large number of potential respondents, although it does not ensure the representativeness of the sample. (Babbie, 2015; Ghuhari & Grønhaug, 2011). With this in mind, we opted for an online questionnaire. Our empirical research deals with the effects of this first period on retail, the survey was conducted between March 22 and March 29, 2020, the sample size we obtained was N = 450 people. Google Forms was used for the questionnaire, and it was published on a social media platform (Facebook).

In the anonymous questionnaire, we asked about the demographic characteristics and consumption habits of the respondents. Our survey based on simple sampling cannot be considered representative; within the sample there is a predominance of those with higher education, they account for 70.2% of the sample.

The sample provides only limited information on Hungarian citizens with a low level of education, as they were not open to respond, while consumers with a BA/MA degree were happy to respond, so our sample provides insight into changes in the shopping habits of those with a tertiary education (*Table 3*). Within the sample, the proportion of women predominates (76.8%) and the number of residents of Budapest is also significant at about 40.9%. In terms of age structure, the 21-30 age group (28.6%) and 31-40 age group (28%) has almost the same weight within the sample. The proportion of respondents working from home (47.7%) is also significant, suggesting a remarkable change in employment patterns and that the traditional work schedule is changing.

Table 3
Main data of respondents

Variables	Categories	%	Variables	Categories	%
Gender	male	23.2	Place of residence	capital	40.9
	female	76.8		bigger towns (over 40,000 inhabitants)	24.2
Age	under 20 years	0.4		small towns (under 40,000 inhabitants)	14.1
	21-30 years	28.4		villages	20.8
	31-40 years	28.0	Work	works at workplace	19.3
	41-50 years	21.7		works in home office	47.7
	51-65 years	14.8		studies from home	7.8
	over 65 years	6.7		works in voluntary quarantine	5.3
Education	primary school	0.2		temporarily does not work	8.3
	vocational training	2.7		lost his/her job	2.3
	secondary school	26.9	retired	0.9	
	BSc, BA	30.2	other	8.4	
	MSc, MA	40.0			

Source: own research

The survey showed that only 19.3% of respondents were working in their actual workplace. This can be considered a large proportion of the

respondents, considering that we collected the data in the 2nd and 3rd week of the crisis. The proportion of unemployed and temporarily unemployed people

exceeds 10% of the total workforce in both the sample and today (April 2020), which means 376,000 people since the beginning of the COVID-19 pandemic (Lajó, 2020).

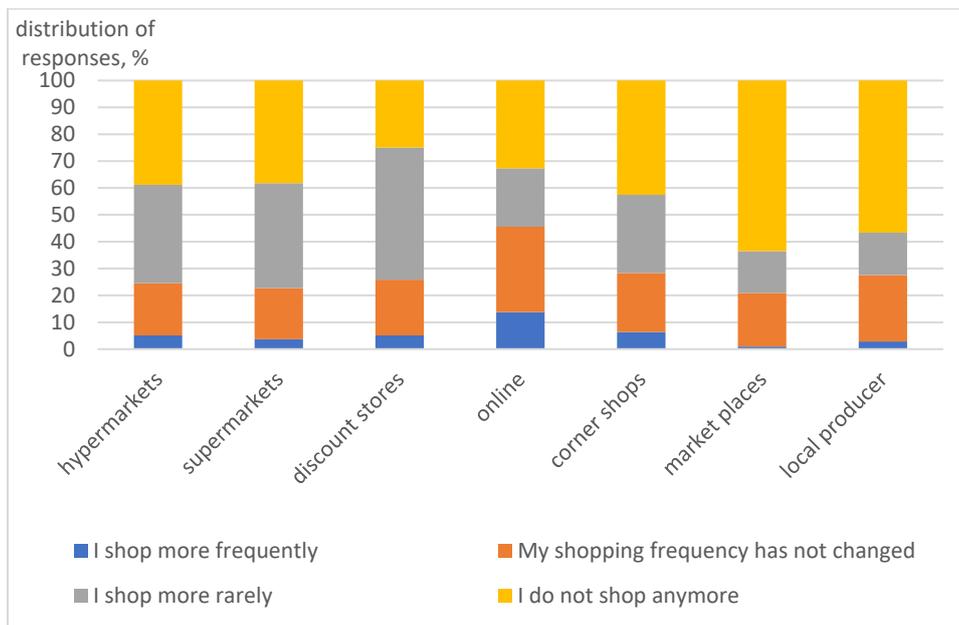
CHANGES IN CUSTOMER BEHAVIOR AT THE BEGINNING OF COVID-19

The *Act CII of 2014 on prohibition of work on Sundays in the retail sector* introduced on March 15, 2015 had created unfavorable conditions for the food retail sector before the outbreak of COVID-19 pandemic. The ban was revoked on April 12, 2016. By 2020 the sector had partly recovered. At that time, another blow to the network was the outbreak of the pandemic. We examined this period at the end of March partly in the food retail network in terms of customer habits using the questionnaire. Shoppers were asked where, and how often, they “currently” buy food in each type of store. The answers we received showed a fear of the virus and a panic, as indicated by the fact that shoppers preferred contactless shopping techniques, so that online purchases – among frequent purchases – increased

from the previous 6.3% to 13.8% (to compare the before-COVID to the panic buying period, see *Figure 1*).

In the new situation, online shopping was more than double the proportion of hypermarkets and supermarkets in the category of “*frequent shopping*”. The biggest losses were those selling in traditional markets and local producers, where the proportion of “frequent buyers” almost completely disappeared and the proportion of “no longer buyers” within the category increased significantly, to 63.5% for markets and to 56.6% for local producers.

This is partly explained by the fact that face-to-face sales are more prevalent in these forms of sales and that, in the meantime, customers have become more and more conscious of their shopping. The situation of producers was somewhat helped by joining online sales, but there was no guarantee at all that if a farmer traded online, his/her business would be successful. It can also be a “dead end” for the farmer, as the lack of online marketing experience and preparedness makes it extremely risky. We must state that in the case of hypermarkets, supermarkets and discount stores, having a self-service system already in place helped the units to operate more efficiently.

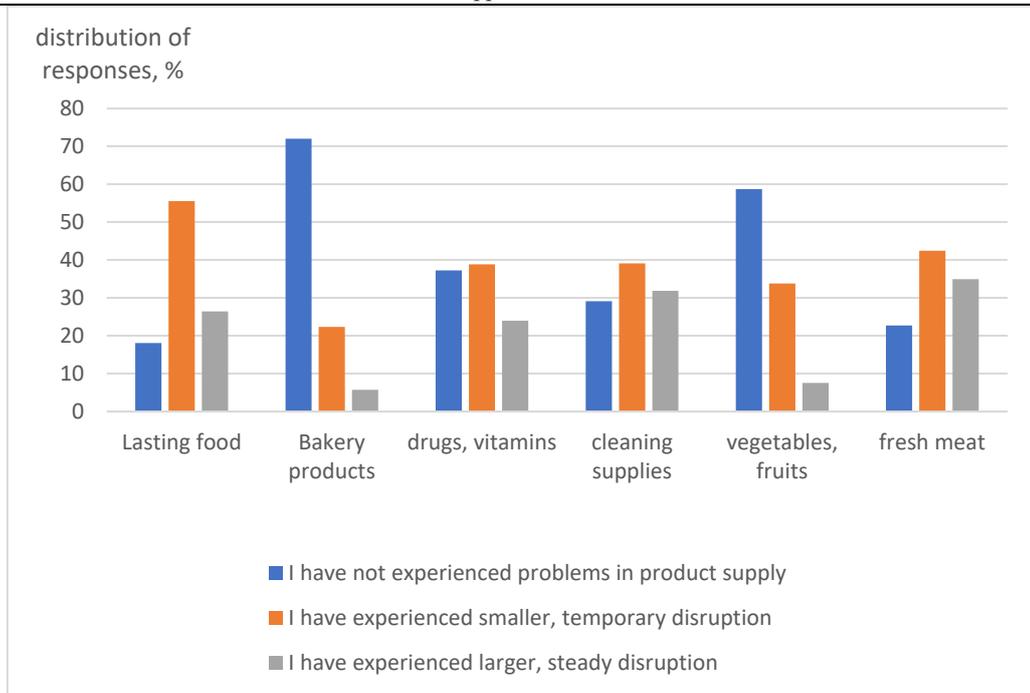


Source: own research

Figure 1. Where and how often respondents bought food after the outbreak of the virus

For some forms of retail, especially for market traders and local producers, the impact of the COVID-19 pandemic on turnover (*Figure 1*) was already noticeable in the short term. This was only

compounded by the fact that the pandemic caused a sudden “panic buying”, the direct consequence of which was a major supply disruption.



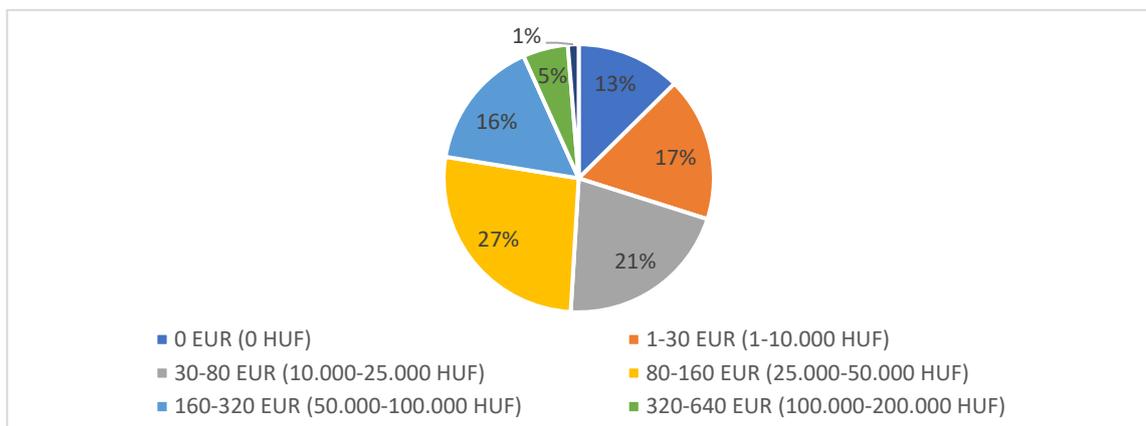
Source: own research

Figure 2. The degree of supply disruption for each product category

Supply disruptions did not occur equally in all product categories of retail (Figure 2). Storable foods (sugar, flour, canned food) and fresh meat were the most affected by supply disruptions, as well as cleaning products. This is partly understandable, as customers mostly wanted to ensure their self-supply from this product range. As the frequent use of cleaning products was considered important in the fight against the pandemic, an attempt was made to accumulate significant amounts of this.

In the case of medicines and vitamins, consumers perceived moderate supply problems, though pharmacies adapted flexibly with the help of manufacturers and wholesalers, providing monthly or three-month quantities when dispensing

medicines, so interruptions in this area were rare. In the fresh baked goods and cold cuts category, the majority of the respondents barely experienced a major supply disruption due to the relatively stable position of traditional off-line food retail and the rise in online sales. According to a GKI [Economic Research Co.] survey, “between April and June 2020, about HUF 188 billion worth of purchases were made on the domestic on-line market, which is 34% higher than in the same period of 2019, in the DIY (home-garden-DIY) commercial segment”. In practice, to able to provide continuous supply has increased the importance of multi-channel sales during the lockdown period.



Source: own research

Figure 3. Amount spent on stockpiling by respondents

Among the respondents, the amount of the additional costs spent on stockpiling depends on both socio-economic and psychological factors: e.g.,

income situation, level of fear, size and structure of households, etc. Our questionnaire research on the level of expenditures related to “panic shopping”

confirmed that the COVID-19 pandemic had a significant impact on the entire Hungarian retail sector. Based on the sample, it can be stated that about 13% of the respondents did not accumulate stocks of goods at all during the critical period. One of the reasons for this may be that this group did not have a significant reserve of food or did not see the need for stockpiling (see later).

The fact that the value of the shopping cart did not even reach 100 EUR in the case of 38% of the respondents indicates that their income is low. Only 22% of the respondents started major stockpiling, this stratum already has a significant financial reserve and was able to prepare for a possible supply disruption. Of course, a further 78% of the respondents also had a significant fear of supply disruptions, but as they were much less well off, they could barely form a reserve, yet they also made purchases to increase their home reserves (Figure 3).

During the survey period, the largest proportion of those who formed stockpiles aimed to buy enough

food supply for two or three weeks. Longer than a month or even longer reserves are planned only by 19.1% of the respondents. And a small group of respondents (6.8%) barely accumulated anything, they formed only a one- to three-day reserve, and one of the reasons for their low accumulation was their weak purchasing power.

We also asked the respondents what they did not buy during the examined period (Figure 4). From the answers it was clear that mainly those products were mentioned which were unpackaged (bread 48.8%, fruits and vegetables 15.4%, fresh meat 17.3% and craft food 50.4%) and products which are dispensable in the short and medium term (clothes and footwear 64.2%).

For companies manufacturing clothing and footwear products, online sales have been a break out point, as overall those who had income and demand during the quarantine period also preferred online sales and seem to prefer to do so in the future instead of buying in traditional stores.



Source: own research

Figure 4. Products not bought in the first period of COVID-19, March 2020

RESULTS OF CROSS-TABULATION ANALYSES

Having presented the descriptive statistics, we wanted to explore the relationship between some grouping criteria and purchasing behavior during COVID-19 pandemic using the method of cross-tabulation analysis. Our aim was to explore possible differences in the relationship between age, place of residence, education variables, and certain

characteristics of shopping (location, frequency, amount spent on stockpiling).

During the cross-tabulation analyses, the significance of the relationship between the nominal-ordinal and ordinal-ordinal measurement level variables was tested with a chi-square test, while the direction and strength of the relationship was revealed with the Eta test, and with Kendal's tau-b test.

In the following, we show the cross-tabulations of some variables with significant differences and

the values of the associated test statistics, without claiming completeness. Cross-tabulations where no significant difference was found or where the size of some cell values fell below the critical level (5) were excluded from the analysis.

We first examined the dichotomy of the capital region, because in Hungary, in general, significant differences can be detected in the socio-economic characteristics of the 1.7 million, densely populated capital of Budapest and the less densely populated areas outside the capital with lower urban concentration.

The change in the frequency of purchases by urban areas with large population and rural shoppers during the COVID-19 pandemic (March 2020) shows significant differences in almost all business types: hypermarkets, supermarkets, convenience stores, online shopping, markets and purchases from local producers.

The typical pattern, as shown in *Table 4* for online purchases, is that some shoppers in the capital are more likely than expected to shop online compared to rural shoppers, while the actual (observed) value of absolute non-shoppers in the capital is higher than in the countryside.

This discrepancy may be due to the fact that at the time of the lockdown introduced during COVID-19, the amount of online sales (especially for food) started to expand at such an unprecedented rate that online food retailers could no longer meet orders, and a waiting time of 2-3 weeks was not rare. A lot of people worked from home and tried to do their shopping from home, but since the system could not deliver the orders, they were forced to do their shopping in the traditional way instead of shopping online.

Table 4. Cross-tabulation for capital/countryside and online shopping during COVID-19

			Online shopping during COVID-19 pandemic				Total
			shop more frequently	shopping frequency has not changed	shop less frequently	do not shop at all	
capital/ country- side	capital	Count	27	41	31	62	161
		Expected Count	22.1	51.4	34.9	52.5	161.0
	country- side	Count	32	96	62	78	268
		Expected Count	36.9	85.6	58.1	87.5	268.0
Total		Count	59	137	93	140	429
		Expected Count	59.0	137.0	93.0	140.0	429.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.508 ^a	3	.037
Likelihood Ratio	8.534	3	.036
Linear-by-Linear Association	.911	1	.340
N of Valid Cases	429		

0 cells (.0%) have expected count less than 5. The minimum expected count is 22.14.

Source: own research

Next, similarly to the method presented in *Table 4*, we tested the relationship between the age of the respondents, their place of residence, the size of their settlement, and purchase patterns typical of different COVID-19 periods (*Table 5*).

First, we analyzed the relationship between the dichotomous variable of the respondents' place of residence (capital/countryside) and the change in shopping frequencies in hypermarkets, the most popular type of retail outlet in Hungary to date. Based on four attributes – more frequently, shopping frequency has not changed, less frequently and not shopping at all – we identified four groups of buyers. In the questionnaire, we asked about the change in

the frequencies of purchases during the COVID-19 compared to the period before COVID-19 for different types of stores, here – due to space constraints – we present only the results for hypermarkets.

The frequency of shopping in hypermarkets clearly shows that the majority of the respondents do their shopping in hypermarkets less often or do not shop there at all (39%) (to avoid large crowds). However, a difference can be identified between the residents of the capital city and rural respondents, as a significant proportion of the residents of the capital (9.3%) even increased their frequency of shopping in hypermarkets, while in the case of rural people this

value was 2.3%. We also identified a considerable (and significant) difference between less frequent shoppers: 33.8% of capital city residents and 38.4%

of rural residents did their shopping less frequently compared to the period before COVID-19.

Table 5
Results of cross-tabulation significance tests

Chi-square tests	Capital/countryside * Shopping in hypermarkets during COVID-19			Capital/countryside * Amount spent on stockpiling			Settlement size/ supply disruption for fresh meat products			Respondents by age groups * Amount spent on stockpiling			Respondents by age groups * Further stockpiling from durables during COVID-19		
	Value	df	AsympSig.(2-sided)	Value	df	AsympSig.(2-sided)	Value	df	AsympSig.(2-sided)	Value	df	AsympSig.(2-sided)	Value	df	AsympSig.(2-sided)
Pearson Chi-Square	8.508	3	.037	9.079	3	.028	13.478	6	.036	15.365	6	.018	21.335	8	.006
Likelihood Ratio	8.534	3	.036	8.848	3	.031	13.185	6	.040	15.615	6	.016	20.906	8	.007
Linear-by-Linear Association	.911	1	.340	6.425	1	.011	7.476	1	.006	1.466	1	.226	9.802	1	.002
N of Valid Cases	429			448			409			448			440		

Source: own research

Another example of a capital-rural dichotomy is the differences in home stockpiling identified during the COVID-19 period. We examined the difference between the amounts spent by people in the capital and in the countryside on the accumulation of surplus stocks. The amounts spent on stockpiling were organized into four categories: 0 HUF – nothing was spent on stockpiling, 1-25,000 HUF (1-80 EUR) was spent on stockpiling, 25,001-100,000 HUF (80-330 EUR) was spent on stockpiling, and more than 100,000 HUF (over EUR 330) was spent on stockpiling. There is a clearly identifiable difference in the amounts spent on stockpiling in the two regions: those living in the capital spent more on accumulating security stocks than expected, while those living in rural areas spent less. 10.7% of those living in the capital spent more than EUR 330 on it, compared to 4.3% in rural areas. But even in the EUR 80-330 category, there is a similar difference in favor of the capital: 46.4% vs. 40.7%. The proportion of those who did not spend at all on stockpiling is 10.7% in the case of people living in the capital city, while it is 13.6% in the case of the rural population.

The phenomenon may be due to a combination of several factors: higher discretionary incomes in the capital, bigger stocks in the countryside accumulated in the past, and varying degrees of fear of the lockdown and getting infected may all influence these disparities.

Supply disruptions – temporary stock shortages for many product groups (e.g., meat, cold cuts, bakery products, detergents) – were observed during the period of restrictions related to COVID-19 (especially in the first half of the period). According to the place of residence, the respondents were divided into four categories: those living in the capital, large cities, small towns, and villages. Supply disruptions were classified into three groups:

no disruptions at all, minor, temporary disruptions, and large, permanent disruptions. In the following only the results in the field of fresh meat are presented.

Shoppers in the capital experienced (perceived) a much stronger and more persistent stock shortage in stores than those living in rural towns and villages: 44.9% of people living in the capital experienced a significant, long lasting supply disruption in the meat product group compared to 29% of people living in big cities, 27.6% of people living in smaller towns, and 31% of the villagers. The reason for this can be traced back to several factors: stockpiling is less characteristic of the metropolitan way of life in the capital today, therefore before/during the COVID-19 stockpiling fever, they had less home reserve stocks than the rural households. Country lifestyle – living in detached houses – provides more opportunities/space for stockpiling, so with larger stockpiles at home and stockpiling under COVID-19 it was easier to “get through” the critical period, so rural people (both in cities and villages) perceived the temporary stock shortage as less significant and less lasting than people in the capital.

In addition to the place of residence, we also explored a link between the age of the respondents and the COVID-19 panic buying. Different age groups (under 30, 30-49, and over 50) responded slightly differently to the challenges posed by COVID-19. Younger people reacted somewhat more extremely to COVID-19 than expected because they either did not spend at all (18.8%) or spent very large amounts (above EUR 320) (7.8%) on stockpiling. These values are 8.2% and 3.1%, respectively, for older customers over the age of 50. Older people (over 50) spent more than expected on buying additional products: 46.4% spent up to EUR 80, while 42.3% spent up to EUR 320) while these values for young people are 40.6% and 32.8%. This

difference is significant. The total amount spent on stockpiling is divided between several product groups. The accumulation time frame of the different product groups is quite different, mainly due to the nature and shelf life of the products. In our research we examined 10 different product groups (storable goods (e.g. flour), bread, dairy products, cold cuts, fresh meat, detergent, mineral water, etc.)

In *Table 6*, we examined the accumulation pattern of items that can be stored for a long time in the age groups already presented above. The results show that different age groups accumulated storable goods to different degrees (these goods – flour, rice, salt, etc. – can be converted into finished meals by further cooking/baking). While young people did not stockpile at a much higher rate than expected (40.6%), or a much smaller proportion of them accumulated storable goods for a long time (longer than a month) (16.4%), the elderly (50+) did not stockpile in a much smaller proportion than expected (22.6%), or they accumulated stock enough for a

month or more in a much larger proportion than expected (24.7%) . Overall, therefore, it can be concluded that the nature of stockpiling depends not only on the place of residence but also on age.

In addition to the cross-tabulation analyses presented above, we used the cluster analysis method to analyze customer behavior. Among the clustering methods, two methods were used: Ward Linkage and K-mean methods. First, we explored the number of emerging clusters using a non-hierarchical clustering procedure, and then, using a hierarchical clustering procedure, we sorted the respondents into 5 cluster groups. The results obtained were subjected to a significance test, and the results of the ANOVA F test were continuously examined (*Table 6*).

During the cluster analysis, we tried to include several variables, and finally identified the variables that proved to be significant in the ANOVA test. Using the results of this, we used a total of 13 variables to develop the set of variables that gave the input variables of the cluster analysis.

Table 6
ANOVA test results

	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
In your opinion to what extent did your everyday life change in the period of rapid spread of COVID-19 (March 2020)	86.374	4	.753	386	114.682	.000
How much has your well-being changed in the last month?	103.123	4	.968	386	106.540	.000
Changes in shopping conditions	13.958	4	.531	386	26.292	.000
Shopping in hypermarkets during COVID-19	10.359	4	.690	386	15.009	.000
Shopping in markets during COVID-19	5.234	4	.650	386	8.052	.000
Further stockpiling storable goods during COVID-19	174.897	4	.586	386	298.228	.000
Further stockpiling fresh meat during COVID-19	59.855	4	1.134	386	52.793	.000
Changes in the financial situation of the household	2.380	4	.493	386	4.825	.001
Supply problems with cleaning supplies	2.902	4	.580	386	5.001	.001

Source: own research

Table 7 shows the typical values of each variable (final cluster centers) for each cluster. Characteristic differences between the individual clusters were

identified in the response to the situation, the change in well-being, as well as the frequency of shopping and the practice of stockpiling.

Table 7
Final cluster centers

Variables	Cluster numbers				
	1	2	3	4	5
Day life change in the period of rapid spread of COVID-19 (March 2020)	5	2	6	4	5
How much has your well-being changed in the last month?	2	2	5	3	5
Changes in shopping conditions	3.8	3.3	4.6	3.8	4.1
Shopping in hypermarkets during COVID-19	3	2	3	3	3
Shopping in markets during COVID-19	4	3	4	3	3
Stockpiling storable goods during COVID-19	1	0	3	3	0
Stockpiling fresh meat during COVID-19	1	0	2	2	1
Changes in the financial situation of the household	3	3	3	3	3
Supply problems with cleaning supplies	2	2	2	2	2
Number of Cases in each Cluster	52	34	116	98	91

Source: own research

Based on the above, the characteristics of customers classified into five different clusters can be described along two main dimensions: first on the basis of their “well-being” and secondly on the basis of their characteristics related to “stockpiling” (Table 8).

The first group consists of people feeling “Feeling unwell (in their general attitude), stockpiling in small quantities”. They are characterized by fear of the effects of the pandemic and, accordingly, carry out panic buying, only in small quantities.

The second group includes those who feel “Slightly unwell, not stockpiling”. They have responded the least to the COVID-19 crisis, which is also reflected in their purchases: they do not accumulate, they do not shop more often, that is, they do not “panic”.

The third group included people feeling “Very unwell, stockpiling in large quantities”. They felt very bad, i.e. did “panic”, and their well-being deteriorated significantly, and their purchase expenditure increased in direct proportion with it, i.e. they stockpiled to a greater extent (compared to the other clusters).

The fourth cluster includes customers “Feeling unwell, stockpiling in large quantities”. They are the ones who moderately worried about the situation, but stockpiled large amount of extra stock during the first wave (March 2020).

The fifth cluster consists of the group of feeling “Very unwell, stockpiling only in small quantities”. These are people who are very worried (similarly to cluster 3) and whose general feelings changed considerably into a negative direction during the panic buying period (this is the difference compared to cluster 1).

Table 8
Clusters and their main characteristics

Cluster no.	Name of cluster	Cluster symbol
1	Feeling unwell, stockpiling in small quantities	 
2	Slightly unwell, not stockpiling	 
3	Very unwell, stockpiling in large quantities	 
4	Feeling unwell, stockpiling in large quantities	 
5	Very unwell, stockpiling only in small quantities	 

Source: own research

CONCLUSION

The outbreak of the COVID-19 pandemic in Hungary resulted in a similar stockpiling fever as in any other country in the world. The 450 potential consumers we surveyed during the pandemic preferred online shopping to shopping in brick-and-mortar shops. This attitude may remain even in the period after the decrease of the pandemic.

Among the buyers, there was a clear distinction between panic buyers who felt very unwell, who had stockpiled large amounts of food, and a group of

buyers who, although feeling unwell, did not accumulate food reserves, probably partly due to financial reasons. During the first month of the pandemic, Hungarian consumers reported that they did not purchase a range of products that were unnecessary for them in the short or even medium term (e.g. clothing, shoes, and handmade products). Product accumulation was more pronounced on the part of the residents in the capital in almost the entire retail segment compared to residents of other areas. Supply disruptions were perceived more by buyers in the capital than by respondents in smaller towns or rural areas.

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ⁱⁱ <https://24.hu/fn/uzleti-tippek/2020/07/30/online-kereskedelem-koronavirus-rekord-forgalom/>