

Food consumption patterns and trends in response to inflationary pressures

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Abstract: Food prices have increased significantly in Hungary over the past year due to rising inflation. Price changes are crucial in shaping consumer behaviour and purchasing decisions. Supply chain disruptions, rising energy prices and extreme weather conditions have also had an adverse impact on prices. Another factor in the unfavourable situation was the distorting effect of the “price cap” (a government-imposed ceiling on the price of certain products) applied in Hungary. Based on an extensive and representative survey conducted during the autumn of 2022, this study presents the examination of trends in the food purchasing habits of the above 18 years of age population of a county of Hungary. The findings have confirmed a decrease in both supermarket visits and the level of consumption of fresh products including vegetables, fruits, dairy products, and baked goods due to high inflation and rising food costs. Additionally, there has been a noticeable shift towards shopping at discount supermarkets, accompanied by a decline in both bulk and small purchases. As spending on food has increased by over 40%, consumers are increasingly mindful of their spending.

Keywords: food price increase; inflation; business performance; product group

1. Introduction and research questions

According to Gfk (2022), changes in consumer behaviour are mostly determined by inflation these days. The types of goods or services consumed have a fundamental role in driving changes in consumption behaviour (Koos et al., 2017). Food price inflation not only affects macroeconomic stability, but also impacts consumers, particularly because a significant portion of their income is allocated to food consumption (Samal et al., 2022).

In an analysis of the relationship between supply and demand, economists find that an increase in prices leads to a decrease in demand. However, due to the individual choices of consumers, actual practices may differ. As Reketye (1997, pp. 26-27) explains, the Adjustment Level Theory suggests that an individual’s behaviour is determined by their adjustment to three stimuli: the immediate stimulus (e.g. price), the background stimulus (e.g. the internal reference price), and the internal stimulus (e.g. the individual’s psychological makeup). The reference price is defined by Hofmeister-Tóth (2003, p. 172) as the consumer’s expectation of how much they will pay for the product or service. Recently, a distortion of the internal reference price has been observed in the purchase of food, as prices of these products have increased significantly. This phenomenon is also known as “inflation fatigue” and has led to new patterns in consumer behaviour (IRi, 2022).

Food price transparency was the focus of the EU TRANSFOP project, which examined primarily food chain structures, market concentration, the abuse of unequal bargaining power and its impact on price transmission (Lloyd et al., 2013). Data from Hungarian Central Statistical Office [KSH] show that in December 2022, the price of food had increased by 44.8% on a year earlier, while costs had also risen for household energy (55.5%), durable goods (13.6%), fuels (27%) and services (9.5%) (KSH, 2023a). Schnepf (2013) highlights the substantial volatility of agricultural commodity prices in comparison to retail or ready-to-eat food prices. “Food is a large expense for the poor” (Headey & Hirvonen, 2023). According to Gerlaci and Bókay (2022), food price increases are caused by a combination of external factors (such as energy and commodity price rises, supply chain disruptions, and weather

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conditions) and internal factors (including exchange rate movements, changes in tax rules, wage increases and pricing dynamics).

Rising energy prices lead to higher transportation and production costs in the food industry and thus to higher consumer prices. At the same time, rising commodity prices affect spending on food raw materials, which has a noticeable impact on the cost of processed food. In addition, supply chain disruptions, such as pandemics, natural disasters or strikes, can limit food supplies, which leads to shortages and results in price escalation. Finally, meteorological issues provide some variability in annual food production, which causes food shortages under unfavourable conditions and thus contributes to price increases.

Exchange rate fluctuations, especially in countries dependent on imports, have a significant impact on food prices. At the same time, changes in tax regulations, including increases in excise taxes on certain foods, have a direct and amplifying effect on food prices. Rising wages in agriculture and food processing increase overhead costs, which producers can offset through price adjustments. In addition, price dynamics and the extent of competition in the market are important determinants of food price trends. In highly competitive markets, producers are often cautious about raising prices, while in less competitive markets they have more extensive opportunities in setting prices.

According to Medve (2023a), who analyses the factors causing an increase in food prices in Hungary in 2022, the most responsible determinants are the following: week Hungarian Forint (70%), wrong economy policy (65%), rising energy prices (64%), EU sanctions (38%) and retailers' pricing methods (31%).

The price cap in force in Hungary has also contributed to increased prices. According to Balatoni (2022), the price cap on food products affected 2.4% of the total basket of goods and triggered market mechanisms that led to an increase in the prices of other products. A study by the National Bank of Hungary [MNB] (2022, s. 2) found that (1) the rate of food price inflation was the highest in the European Union at that time, (2) the price caps solely addressed the prices of directly affected products, resulted in notable price increases for substitute products, and (3) the rise in the price of domestically processed food was notably steep, primarily due to low productivity and intense competition. Meanwhile, the depreciation of the exchange rate was swiftly built into import prices. The country's limited reliance on food imports helps ensure that there are no chronic shortages of vital food items that cannot be substituted by locally produced alternatives (Mezei & Gombkötő, 2022). The government has repeatedly extended the price cap on food up to 31 July 2023. Mázsár (2023) explains that, according to Parragh, a price freeze can be phased out with the least harm when food price inflation reaches its peak. A Hungarian agricultural economist, György Raskó, attributes high food inflation to the weakness of the Hungarian forint, because the Hungarian food market is open and features intense competition in the retail sector, with independent multinational companies accounting for over 50% of sales of food and chemicals (Kálmán, 2023). In its most recent inflation report, the MNB (2023, s. 3) announced that, according to January 2023 data, the rate of food inflation had ceased to accelerate, as shown by KSH data, food inflation stood at 44.0% in January 2023.

The question may arise as to what changes will set in in consumer behaviour as a result of rising food prices and how long these new habits will last. The path to a consumer decision is an iterative process that includes evaluating different options, comparing their attributes, and ultimately making a choice that best satisfies needs (Court et al., 2009). According to Dhar (2022), behavioural changes in response to inflation are very different. These are summarised below. There are consumers who

- look for discount products. This can substantially change the range of products purchased, as different products are on sale in different shops at different times;
- opt for own-brand products. These products are cheaper substitutes for their branded products. As inflation rises, so does demand for own-brand products;
- postpone the purchase of certain products;
- buy smaller quantities;
- buy larger quantities because they think they can get the goods cheaper in larger supplies.

According to Tileva (2023), during a period of inflation consumers switch to cheaper alternatives and stop spending on products they do not consider essential. Stockpiling or

hoarding is most typical in the case of storable products (Stening, 2022). “Consumers are adapting behaviours: eating even more often at home, trading down to cheaper products, and shopping at retailers they perceive are doing better at managing prices.” (Buss & Wallner, 2022). However, food and chemicals are not the first purchases consumers will not make (Tisza, 2022).

The pattern of consumer behaviour in response to a new situation varies widely and is strongly shaped by the unique preferences and individual perspectives of consumers. Consumers adapt to rising prices by choosing cheaper products and buying from those retailers who offer prices they perceive as cheaper (Ipsos, 2022). As a result, in an effort to increase sales, retailers use various sales promotion tools (Glazier, 2022). In their study, Sikos et al. (2022) emphasise that currently the success of businesses depends on the extent to and on the speed at which retailers are able to adapt to market changes both within their own industry and across other markets.

This study gives an in-depth glimpse into the changes of consumer food buying habits through formulating responses to the following research questions:

- Q1: How have the preferred modes of transports for shopping changed?
- Q2: How have consumers' shopping preferences for food, cleaning products and household products changed?
- Q3: How has the frequency of bulk purchases and smaller grocery purchases changed?
- Q4: How has the frequency of purchases changed in relation to the eight most important product groups (vegetables/fruits, dairy products, meat, spirits, sweets and desserts, non-perishable foods, bakery products, clothing)?
- Q5: How much more do households spend on food compared to their food expenses before the drastic price increase?
- Q6: To what extent is prudent (frugal) shopping behaviour typical of the population in the current situation?

2. Impact of inflation on food purchases: A review of the Hungarian data

Below, changes in consumer behaviour are examined concerning each research question. The analysis is based on the relevant Hungarian and international literature. In certain instances, observable changes in habits can be seen to further strengthen, whereas in other cases a contrasting trend is starting to emerge. To clarify the causal relationships, a concise overview of the research questions is provided, and the observed trends are outlined based on our expectations.

Q1: How have the consumers' preferred modes of transport for shopping changed?

In an economic crisis, transport choices may change. As some social groups may find it challenging to bear the financial burden of car ownership (e.g., fuel, maintenance, motorway tolls and insurance), this may lead to a decrease in car usage. In Hungary, turnover at petrol stations decreased by 29.3% in March 2023 on a year earlier (KSH, 2023b).

During the pandemic many people switched from public transport to cars to avoid exposure to crowds (Jakopáncz, 2021). A study by a Hungarian bank (K&H, 2021) shows that 44% of the people aged 30 to 59 switched from public transport to cars. Naturally, the study also covered income levels and revealed that 47% of high and middle income earners and 34% of lower income earners chose to drive (K&H, 2021). Indeed, the car is not the only alternative to public transport, walking or cycling are also viable options. Car usage and alternative modes of transport could actually replace public transport, as passenger kilometres for local and long-distance travel decreased by 31% in 2021 year on year (KSH, 2020). PwC's 2020 study confirms this, as it has been found that on some services operated by the Budapest Transport Centre passenger numbers has decreased by 90% (Perger et al., 2020).

According to Continental's Mobility Study 2021, the coronavirus has permanently changed people's mobility habits (Continental, 2021). We assume that the increased desire to travel by car, prompted by the coronavirus, has been further influenced by the significant

rise in fuel prices. In this study we expect to see an increase in the use of public transport and alternative modes of transport. To save money and cut down on expenses, public transport, which is cheaper than driving, could become more appealing. For shorter journeys, the popularity of cycling and walking might increase compared to using public transport.

Q2: How have consumers' shopping preferences for food, cleaning products, and household products changed?

The online sale of food, cleaning products, vitamins, medicines, and other FMCG (Fast Moving Consumer Goods) increased significantly during the pandemic (GKID, 2020). Interestingly, studies on consumer behaviour during that period predicted that consumers would continue to make these types of purchases after the pandemic emergency was over (Moneta & Sinclair, 2020; Perger et al., 2020). However, this growth did not last. According to GKID (2023), expert Norbert Madar explains the reasons as follows: As for 2022, e-retailers were sceptical initially, anticipating a recovery after the hyper-inflation during different waves of the pandemic. However, inflation and the impact of both global and Hungarian economic factors ended up strengthening them, leading to a natural process of reorganisation in the course of adaptation (Gulyás, 2023).

In his research, Soós (2020) showed a significant correlation between the place of purchase and the place of residence, age, and education. In Spain, consumers continued to shop at their preferred shops during the pandemic (Laguna et al., 2020), their shop preference did not change. A study conducted during the pandemic by Keller and Huszka (2021) found that respondents increasingly preferred discount stores. We believe there is a similarity between the situation then and now: economic instability impacted people's livelihoods and discretionary spending capabilities in both periods. Many people's jobs were affected by the insecurity due to the pandemic: some may have had reduced work hours, leading to a decrease in the amount of money they could spend. Food price increase had already started during the pandemic. This was due to the disruption of the supply chain and a decrease in supply due to panic buying. According to Szűcs and Kovács (2023), in the current situation, the location of shopping is not expected to change, nor will rising prices increase purchases in local markets; rather a growing demand for discount stores is expected. As discount chains offer a cheaper alternative, an increase is likely in the sale of their own-brand products.

Q3: How has the frequency of bulk purchases and smaller grocery purchases changed?

During the pandemic, food hoarding was observed, which caused people to shop as infrequently as possible. According to Keller and Huszka (2021), this consumer behaviour was most characteristic of families with children and of the elderly. Molnár et al. (2022) studied food purchasing habits during the pandemic in Slovakia and Hungary and found that people went shopping less often but bought larger quantities in 25.6% of the cases. Young people tend to be more spontaneous and their unplanned food purchases give them the opportunity to adjust their choices based on their immediate needs and desires or to experiment with new products.

According to Szűcs and Kovács (2023), food stockpiling is not typical at the moment, which is explained by the fact that it does not eliminate the effects of inflation. When the price level decreases, it will be possible to buy more products for the same amount of money in the future. It seems likely that as people have become more prudent in their purchases, they have also improved their pre-purchase planning. This has resulted in reduced frequency of food shopping, as was the case during the pandemic. However, the volume of purchases has probably decreased due to the impact of high prices.

Q4: How has the frequency of purchases changed in relation to the eight most important product groups (vegetables/fruits, dairy products, meat, spirits, sweets and desserts, non-perishable foods, bakery products, clothing)?

Szajki (2023) examined the trend in consumer behaviour in the Visegrád Four in the following product categories: sweets, soft drinks, medicines, pet foods and coffee. The survey revealed that Hungarians made the most significant cuts in their spending during the last

quarter of 2022 either by switching to cheaper brands or reducing the purchases of these products. In its survey to determine the Self-care Index, OTP Bank points to two main features in consumer behaviour: (1) accumulation of larger quantities of foods with longer shelf-life and (2) starting to grow one's own vegetables and fruits (Tóth, 2023).

Szűcs and Kovács (2023) found that people in lower income brackets reduced their consumption of fruit and meat. It has also been reported that due to inflation, less money was spent on clothing (Ormós, 2023).

Q5: How much more do households spend on food compared to their food expenses before the drastic price increase?

A substantial increase in food prices was already evident during the coronavirus pandemic, and this escalation was further exacerbated by the rise in inflation. Consequently, it is now expected to impact all customer groups. This is also confirmed by OTP Bank's Self-care Index, which shows that consumers certainly feel the impact of price increases particularly in food prices, energy prices, as well as fuel and transport prices (Tóth, 2023). According to Medve (2023b), "38 percent of Hungarian households spend 21 to 40 percent of their income on food products.". According to Szász (2002), Hungarians spent HUF 50,000–80,000 more on food in 2022 than a year earlier. Compared to March of the previous year, retail shop sales in March 2023 decreased by 13.1% (KSH, 2023b). Although people buy fewer products, they spend more money.

Q6: To what extent is prudent (frugal) shopping behaviour typical of the population in the current situation?

Inflation affects consumer confidence and spending habits (J.P.Morgan, 2022). In our estimate, the conscious planning of food purchases already started during the pandemic, and it was driven by both reduced shopping frequency and the price increases during that period. OTP Bank's Self-care Index clearly shows that the population started to think more prudently and plan their finances in advance (OTP Bank, 2022). Inflation decreases food waste (Veselá et al., 2023). The average value of the basket decreased and demand for lower-priced substitute products increased (Gulyás, 2023). As a consequence of "inflation fatigue", new patterns of behaviour are emerging and consumers are proactive in deciding where and how to shop, what to buy and at what price to purchase goods (Iri, 2022).

3. Primary research method and sample composition

To further explore the research questions, a questionnaire survey was conducted. The population of this research was defined as inhabitants above 18 years of age in the Miskolc District (N), which includes 186,234 people. Since no sampling frame had been specified, a non-random procedure called quota sampling was used. After data adjustment, our final sample size (n) was 402 people, including brackets that were representative of gender (male; female) and age categories (18–29 years; 30–39 years, 40–49 years; 50–59 years; 60–69 years; over 69 years), as a result of weighting by two criteria for accurately matching the internal proportions of the sample. Overall, valid conclusions can be drawn from the sample concerning the population: this is done with a reliability of 95% and a maximum error of +/- 4.88 percentage points. (In our questionnaire survey, the response rate was 28%.) The composition of the population as well as the unweighted and weighted samples are summarised in Table 1.

Data were collected between 25 October and 25 November 2022 using an online questionnaire. The questionnaire shows that each of the first five research questions consisted of 2 questions, the first of which asked the respondent to describe their current situation and the second their situation before the outbreak of inflation. Another question belonged to the sixth research question. In addition to these questions, the questionnaire also contained demographic questions.

Table 1. The composition of the population and the sample. *Source: Authors' own*

		Basic population (N=186,234)	Unweighted sample (n=402)	Weighted sample (n=402)
Gender	Male	86,287 (46.3%)	180 (44.8%)	187 (46.4%)
	Female	99,947 (53.7%)	222 (55.2%)	216 (53.6%)
Age categories	18-29 years	29,753 (16.0%)	66 (16.4%)	64 (15.9%)
	30-39 years	28,426 (15.3%)	57 (14.2%)	61 (15.1%)
	40-49 years	35,600 (19.1%)	74 (18.4%)	77 (19.1%)
	50-59 years	30,078 (16.2%)	70 (17.4%)	65 (16.1%)
	60-69 years	31,275 (16.8%)	67 (16.7%)	68 (16.9%)
	Over 69 years	31,102 (16.7%)	68 (16.9%)	68 (16.9%)

Data were collected between 25 October and 25 November 2022 using an online questionnaire. The questionnaire shows that each of the first five research questions consisted of 2 questions, the first of which asked the respondent to describe their current situation and the second their situation before the outbreak of inflation. Another question belonged to the sixth research question. In addition to these questions, the questionnaire also contained demographic questions.

The data was analysed using primarily Excel and statistical software program SPSS. In the methods of analysis, we used descriptive statistics (e.g., relative frequency, mean, standard deviation); in the study of transport, we supplemented these with McNemar tests and a non-parametric test for comparing two related nominal variables (proportions in the two samples). (In the analysis of the sixth research question, we performed principal component analysis as a method of data reduction introduced by the analysis of scale reliability (Cronbach's alpha).

4. Primary research findings

The sharp 2022 price increase significantly impacted most people's household expenditure. Although the research focuses on grocery shopping, we cannot ignore addressing the preferred mode of transport for shopping (Q1). Before and after the inflationary surge, the car was the most popular mode of transport for shopping. Public transport came second, walking third and cycling last. The order has not changed, but the internal proportions have. A significant number of residents in the Miskolc District have opted to change their mode of transportation from using a car to other means to get to their shopping destinations. The share of car usage for shopping has dropped by 11.9 percentage points, which can be considered a significant change (McNemar $Z=6.040$, $p<0.001$). In contrast, the share of public transport has increased by 8.7 percentage points (McNemar $Z=-5.013$, $p<0.001$), followed by walking, which shows a 2.5 percentage points decrease (McNemar $Z=-2.5$, $p=0.006$). The likely reason for this change could be attributed to soaring fuel prices. Ever since the implementation of the fuel price cap, there has been a considerable decline in the turnover of petrol stations (Kaszás, 2023). However, bicycle use has not changed significantly (McNemar $Z=-0.577$, $p=0.282$). Based on the above findings, the assumption that the population has been making efforts to reduce their use of the most expensive means of transport (car) and gave preference to cheaper solutions can be confirmed.

In the next question (Q2), developments in shop preferences were analysed with regard to food, cleaning products and household products. Table 2 gives a summary of preferences before and after the inflationary surge, the rate of change and shows the McNemar's test statistics concerning the rate of change. Before the price explosion, the five most popular shops among the residents of Miskolc and its surroundings were Lidl, Tesco, Spar/Interspar, Aldi and Coop. Barely a year later, they are Lidl, Aldi, Auchan, Tesco and Penny Market. It is worth mentioning that Lidl, Aldi and Penny Market are German discount chains that offer lower price levels, which is mainly due to their large-scale sale of own-brand products. Considering the magnitude of the change in shop preferences, Lidl and Aldi are the two biggest "winners": they have increased their customer bases by 12.2 and 6.0 percentage points, respectively.

Table 2. Trends in consumers' shop preferences for food, cleaning products and household products. *Source: Authors' own*

	Before inflation	Currently	Change	McNemar	
				Z	p
Lidl	43.5%	55.7%	12.2%	-4.693	<0.001
Aldi	30.1%	36.1%	6.0%	-2.203	0.014
Auchan	27.4%	27.1%	-0.2%	0.204	0.419
Tesco	35.1%	27.1%	-8.0%	3.266	<0.001
Penny Market	27.1%	24.4%	-2.7%	1.193	0.116
Local small shop / Garage stores	25.6%	24.4%	-1.2%	0.603	0.273
Spar/Interspar	32.3%	21.9%	-10.4%	4.322	<0.001
Coop	29.6%	21.4%	-8.2%	4.032	<0.001
Metro	21.9%	17.7%	-4.2%	1.706	0.044
DM	23.1%	15.9%	-7.2%	3.543	0.014
Rossmann	20.6%	15.2%	-5.5%	3.328	<0.001
Reál	17.9%	12.7%	-5.2%	2.566	0.005
Müller	20.1%	12.4%	-7.7%	3.787	<0.001

In contrast, all other shops report a decline in customer numbers. The largest decline was recorded for Spar/Interspar (down 10.4 percentage points), but similarly significant declines were seen at Coop (8.2 percentage points) and Tesco (8.0 percentage points). No significant change was found in the case of four (types of) shops, including Auchan and Penny Market chains, local small shops and garage stores.

It is important to distinguish between “bulk purchases” and “smaller grocery purchases”. Bulk grocery shopping entails purchasing food, cleaning products, and household items for a weekly, fortnightly, monthly, or even longer period. Smaller grocery purchases, on the other hand, are more frequent purchases of a smaller basket of goods, where the freshness of the food is of paramount importance. Table 3 displays the frequency of these two types of purchases and their respective trends (Q3).

Table 3. Trend in bulk purchases and smaller food purchases. *Source: Authors' own*

	Bulk purchases			Smaller food purchases		
	Before Inflation	Currently	Change	Before Inflation	Currently	Change
3-4 times per week	1.7%	1.5%	-0.2%	36.3%	23.9%	-12.4%
1-2 times per week	21.4%	11.2%	-10.2%	42.8%	49.3%	6.5%
Once a fortnight	31.6%	32.8%	1.2%	14.4%	18.2%	3.7%
1-2 times per month	29.9%	33.3%	3.5%	4.5%	6.0%	1.5%
Less often than once a month, because I do not think it's important	5.7%	8.7%	3.0%	1.5%	2.2%	0.7%
Less often than once a month, because I stock up large amounts of products at a time	9.7%	12.4%	2.7%	0.2%	0.5%	0.2%

A decline in bulk purchases is clear: The frequency of bulk purchases of 1-2 times per week has decreased by 10.2 percentage points. The same is true for smaller grocery purchases: the frequency of shopping 3-4 times per week has decreased by 12.4 percentage points. Overall, Hungarians shop less often regardless of whether it is bulk or smaller grocery shopping.

The next question (Q4) targeted the trend in the frequency of purchases in relation to the following eight key product groups: (1) vegetables and fruits, (2) dairy products, (3) meat, (4) spirits, (5) sweets and desserts, (6) non-perishable foods, (7) bakery products, and (8) clothing, as shown in Table 4.

Table 4. Trend in purchase frequency for eight key product groups. Source: Authors' own

	Vegetables/fruits			Dairy products		
	Before Inflation	Currently	Change	Before Inflation	Currently	Change
3-4 times per week	11.2%	5.5%	-5.7%	10.4%	5.2%	-5.2%
1-2 times per week	49.0%	45.5%	-3.5%	55.0%	51.0%	-4.0%
Once a fortnight	23.1%	25.6%	2.5%	21.4%	27.1%	5.7%
1-2 times per month	9.7%	16.2%	6.5%	9.0%	10.0%	1.0%
Less often than once a month, because I do not think it's important	5.0%	4.5%	-0.5%	2.7%	4.7%	2.0%
Less often than once a month, because I accumulate a large amount of products at a time	2.0%	2.5%	0.5%	1.5%	2.2%	0.7%
	Meat			Spirits		
	Before Inflation	Currently	Change	Before Inflation	Currently	Change
3-4 times per week	11.9%	9.7%	-2.2%	9.2%	7.5%	-1.7%
1-2 times per week	43.5%	38.8%	-4.7%	14.4%	14.7%	0.2%
Once a fortnight	25.4%	27.4%	2.0%	24.6%	22.6%	-2.0%
1-2 times per month	13.2%	16.2%	3.0%	19.7%	18.9%	-0.7%
Less often than once a month, because I do not think it's important	2.2%	4.7%	2.5%	24.6%	28.6%	4.0%
Less often than once a month, because I accumulate a large amount of products at a time	3.7%	3.0%	-0.7%	7.5%	7.7%	0.2%
	Sweets and desserts			Non-perishable foods		
	Before Inflation	Currently	Change	Before Inflation	Currently	Change
3-4 times per week	5.2%	4.7%	-0.5%	2.2%	2.2%	0.0%
1-2 times per week	19.9%	11.9%	-8.0%	17.9%	13.7%	-4.2%
Once a fortnight	25.6%	26.4%	0.7%	29.6%	30.1%	0.5%
1-2 times per month	23.4%	25.6%	2.2%	27.4%	27.6%	0.2%
Less often than once a month, because I do not think it's important	21.4%	26.1%	4.7%	12.2%	12.4%	0.2%
Less often than once a month, because I accumulate a large amount of products at a time	4.5%	5.2%	0.7%	10.7%	13.9%	3.2%
	Bakery products			Clothing		
	Before Inflation	Currently	Change	Before Inflation	Currently	Change
3-4 times per week	35.8%	31.6%	-4.2%	2.7%	2.5%	-0.2%
1-2 times per week	34.6%	34.8%	0.2%	4.7%	5.0%	0.2%
Once a fortnight	15.2%	14.4%	-0.7%	14.2%	9.7%	-4.5%
1-2 times per month	8.7%	12.9%	4.2%	19.2%	13.2%	-6.0%
Less often than once a month, because I do not think it's important	4.2%	4.0%	-0.2%	31.8%	31.6%	-0.2%
Less often than once a month, because I accumulate a large amount of products at a time	1.5%	2.2%	0.7%	27.4%	38.1%	10.7%

For vegetables/fruits, the frequency of purchases has decreased: purchases originally made 3-4 times per week have decreased by 5.7%, while purchases originally made 1-2 times

per month have increased by 6.5%. A similar trend can be observed in the case of dairy products: the only difference is that a decrease in purchases made 3–4 times per week are comparable to the increase in purchases made once every fortnight. There was no change over 5% in the frequency of purchasing either meat or spirits. In these two product categories, the respondents did not report any significant shift. In the product category “sweets and desserts”, the percentage of customers purchasing such products 1–2 times per week has decreased by 8.0%. The primary reason for this is that consumers do not consider these products essential, which makes it easier for them to do without these products. We did not observe any significant changes in the frequency of purchases of non-perishable foods. As much as 13.9% of the respondents claimed to buy non-perishable foods less frequently than once a month because they stockpile large amounts of them each time. Before the sharp inflation rise, this percentage was 10.7%. The change profile of bakery products closely resembles that of the vegetables/fruits category. The percentage of purchases originally made 3–4 times per week has decreased, while the percentage of purchases originally made 1–2 times per month has increased. Clothing, on the other hand, is significantly different from the other product categories: unlike consumable items, clothing is less frequently purchased.

We feel the rise in food prices most prominently when it comes to making payment during shopping. As part of the survey, respondents were asked about the average amount of money spent on food per month by the people living in their household both before and after inflation (Q5). After adjustment of the responses for the exceptionally low and high values, it was found that before the drastic price increase, the average monthly food expenditure per household was almost HUF 71,000 (standard deviation: HUF 31,390), while subsequently it was nearly HUF 102,000 (standard deviation: HUF 48,720). This difference is considerable, close to HUF 31,000, which represents an increase of 43.4% against the pre-inflation period.

To mitigate the effects of the significant cost increase presented above, one approach is prudent (frugal) shopping, which can manifest in various forms (Q6). To further explore this, we prepared nine statements for respondents to evaluate on a seven-point Likert scale as to what extent they agreed with the statements. On the Likert scale 1 denoted “strongly disagree” and 7 represented “strongly agree.” The results are presented in Table 5.

Table 5. Manifestation of prudent (frugal) shopping. Source: Authors’ own

Statements	Average	Standard Deviation
I noticeably pay close attention to what I put in the basket.	5.16	1.52
I look for promotions more often.	5.06	1.61
I am willing to choose a larger package if it is cheaper.	5.04	1.66
I only buy what I really need.	5.04	1.56
Currently, I prefer discount stores (e.g. Aldi, Lidl).	4.9	1.67
Currently, I feel prepared when I go shopping.	4.68	1.50
There are some products I used to buy, but do not buy they now.	4.58	1.67
I prefer to postpone purchases that require higher expenditure.	4.48	1.47
There are products that I have been stockpiling lately.	4.42	1.73

Afterwards a reliability test was conducted to see if the statements could be combined. The Cronbach’s alpha value (0.854) indicates that the statements can be arranged in one dimension. Using a principal component analysis, we combined the statements into a single factor termed as “prudent (frugal) shopping” (KMO=0.876; Bartlett’s test for sphericity: chi-square=1240.372, sf=36, $p < 0.001$; explained total variance=46.7%). We also explored the prevalence of this behaviour across different demographic groups. In order to do so, we conducted a comparison of our factor with all socio-demographic variables: these findings are presented in Table 6.

In terms of gender, women are more prudent (thrifty) in their purchases than men. As far as the type of settlement is concerned, the inhabitants of the county seat (Miskolc) are more prudent than the inhabitants of the surrounding towns. In terms of age, people between 40 and 69 are more prudent (more frugal), while people in their 30s are less careful about their purchases. In terms of education, the more highly educated are clearly more careful in

contrast to those who have only completed primary school, for example. In terms of occupation, students, childcare allowance recipients, and pensioners are more conscious shoppers than manual workers, entrepreneurs and the unemployed. One-person households, single people, divorced people, widowed people, and childless people are also less prudent. Married people with 1 or 2 children, on the other hand, can be considered more responsible. Interestingly, people with 3 or 4 children tend to be less prudent when shopping.

Table 6. Expression of prudent (frugal) shopping. Source: Authors' own

	Significantly higher average	Significantly lower average
Gender	Female (0.15)	Male (-0.18)
Type of settlement	County seat (0.13)	Other city (-0.20)
Age	40–49 years (0.11); 50–59 years (0.11); 60–69 years (0.15)	30–39 years (-0.37)
Education level	College (0.12); PhD (0.29) Student (0.15);	Elementary school (-0.34)
Occupation	Child Care Allowance/Child Care Benefit (0.42); Retired (0.12)	Manual workers (-0.20); Entrepreneur (-0.17); Unemployed (-0.90)
Size of household	-	1 person (-0.11) Single (-0.30);
Marital status	Married (0.12)	Divorced (-0.17); Widowed (-0.27)
Number of children	1 child (0.17); 2 children (0.16)	None (-0.20); 3 children (-0.122); 4 children (-0.39)

5. Concluding thoughts

Finally, we would like to mention that the main objective of our study was to investigate the changes in food purchases due to inflation. In order to achieve this, we formulated six research questions, which we tried to answer on the basis of the literature, on the one hand, and, on the other hand, with the help of a large-scale questionnaire survey, which can be considered representative for the Miskolc District. Based on our primary research we can draw the following conclusions:

- In terms of preferred modes of transport for shopping, the use of cars by people in the Miskolc District has decreased by 11.9 percentage points, while the use of public transport has increased by 8.7 percentage points and walking by 2.5 percentage points.
- The shops preferred by the residents of Miskolc District have changed in relation to food, cleaning products and household products. There was a shift of preference for German discount chains: by 12.2 percentage points in the case of Lidl and 6.0 percentage points in the case of Aldi. This resulted in a decrease of 10.4 percentage points for Spar/Interspar, 8.2 percentage points for Coop and 8.0 percentage points for Tesco.
- The change is also reflected in shopping, as the frequency of bulk purchases originally made 1-2 times per week has decreased by 10.2 percentage points, while the frequency of smaller grocery purchases originally made 3-4 times per week has decreased by 12.4 percentage points.
- Across all product categories, a similar decline was found in the frequency of vegetable/fruit, dairy and bakery purchases. No significant shift was observed for meat and spirits, but we did notice a shift for sweets and desserts. Stocking up is a common practice for non-perishable foods, and also quite extensively so in the case of clothing, which causes consumers to purchase such products very carefully and increasingly less frequently.

- The average monthly food expenditure of the population in the Miskolc District has increased by 43.4% compared to the period before the price increase, reaching a total of HUF 102,000 per household.
- Prudence (frugality) in buying food has increased as people pay more attention to what they buy, at what price they purchase products and where it is worth buying the desired goods. The principal component analysis shows that the following attributes characterise the prudent segment: (1) they reside in the county seat, (2) they fall within the age range of 40 to 69 years, (3) they possess higher levels of education, (4) they may include students, recipients of childcare allowance/child benefit, or pensioners, (5) they are married, and (6) they are raising 1 or 2 children.

Based on the literature and the empirical evidence we have gathered in this research, we would like to propose some solutions to policy makers that can lead to a reduction in food prices:

- Improving food transparency means encouraging participants in the food supply chain to make the processes of food industry and pricing mechanisms more visible. The overall goal is to reduce instances of price manipulation and to lower costs for intermediaries, which ultimately leads to more stable food prices and more acceptable prices for consumers.
- Food waste, which is characterised by the unnecessary throwing away of food, can be addressed by disseminating sustainability guidelines, improving financial literacy, and implementing household education initiatives. Government involvement plays a critical role in implementing these efforts, which are supported by communication campaigns. In addition, it is important to encourage the donation of expired foods to charitable organisations. Such measures serve the dual purpose of minimising waste and improving the efficiency of the food distribution network, thereby helping to reduce food prices.
- Community agriculture initiatives that foster collaboration between local communities and farmers to improve food production and supply are important. These activities empower communities to grow food in neighbouring areas and provide them with direct access to fresh, sustainable food. Community agriculture not only strengthens local food security, but also serves as a means to lower food prices by reducing the cost of intermediaries and by decreasing reliance on long supply chains.

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