Food inflation and vulnerable households in Slovakia

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Summary
Since mid-2021, the European Union has experienced a significant increase in consumer prices, including food, primarily due to the COVID-19 pandemic and war conflict in Ukraine. This rise in prices has impacted consumers, businesses, and the state, leading to a decline in the population's purchasing power. The article provides a detailed analysis of household food expenditures in Slovakia for 2019–2021, with data sourced from the Household Budget Survey. It highlights how various consumer groups are affected differently by these rising costs, with a particular focus on food prices, the increase of which has potentially led to a reduction in food security. Between 2019 and 2021, the food expenditures in Slovakia were, on average, 231 EUR per month per household and 89 EUR per person. Notably, food and housing combined represented almost half of an average household's total expenditures, with a higher proportion of spending in low-income households. It is observed that households led by a single unemployed parent with at least one child under 25 are the most vulnerable to food inflation, followed by single disabled parents with a child under 25. The article suggests that these groups should be the primary focus for state-provided income support.

Keywords
food expenditures; households; food inflation; Slovakia

In 2020, the imposed restrictions to fight the spread of COVID-19 blocked the outflow channels of agricultural products, hindered deliveries of necessary production inputs, destroyed production cycles, and undermined production capacity in food supply chains globally. Barriers to the mobility of labour across borders and within countries caused severe labour shortages. Fruit and vegetable markets suffered due to the closures of restaurants, and growers had to switch their deliveries from hospitality to retail. The pandemic had a strong impact on the HoReCa (hotel, restaurant, catering) sector, particularly restaurants. The food processing industry faced a challenge to adjust to market shocks and mobility constraints. COVID-19 affected both food availability and prices globally [1].

As soon as the pandemic subsided and countries relaxed coronavirus restrictions, the global food supply chains were hit by Russia's military attack on Ukraine. The war inflated food prices worldwide, which were already the highest in the last ten years. Over the 2019–2021 period, Russia and Ukraine combined accounted for 12 % of global agricultural trade on a kilocalorie basis, with a market share of 34 % for wheat, 26 % for barley, 17 % for maize, and 75 % for sunflower oil [2]. There was a specific concern about rising fertiliser and feed prices caused by the surge in energy prices and the negative development of global agricultural productivity and supply [3].

It is presupposed, that the COVID-19 pandemic and the war in Ukraine were the main reasons behind the global rise of the prices, in particular food inflation. The prices of goods and services in the European Union (EU) and globally began to rise in the summer of 2021.

Food inflation in EU member states reached higher levels than overall price inflation. On average, for the entire EU, the annual food price

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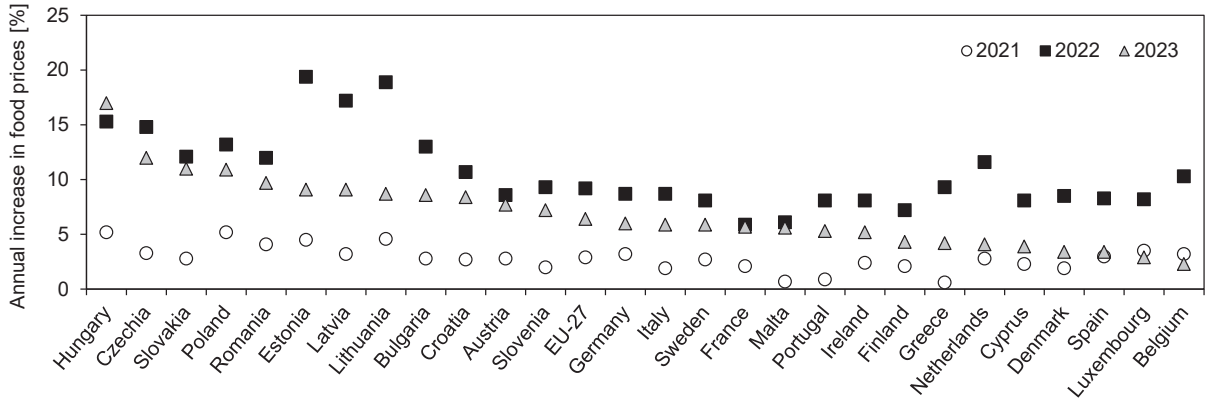


Fig. 1. Annual rate of change in food prices [4].

inflation in July 2023 (12.4 %) was more than double compared to the overall inflation (6.1 %). In Slovakia, food inflation in July 2023 (16.5 %) was 1.6 times higher than the overall inflation (10.3 %). Food inflation in 2021–2023 was one of the highest in the history of the EU and it was observed in all EU member states (Fig. 1) [4].

In Slovakia, food price inflation contributes 26.3 % of overall inflation, the average in 27 countries of EU (EU-27) is 17.3 %. It is 13.2 % in Germany, 12.1 % in Austria, 26.3 % in Latvia and 30.6 % in Romania. Increasing food prices have stronger effects on household welfare in Slovakia than in richer countries like Germany or Austria. This is the case because, based on the available statistics, the average Slovak household spends a higher share of its income on food than its German counterpart (Fig. 2) [4].

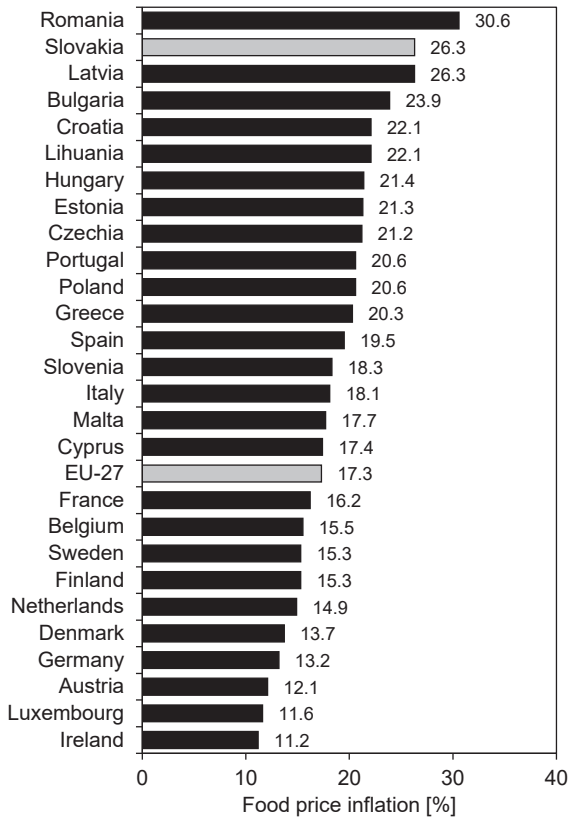


Fig. 2. Weights of food and non-alcoholic beverages in Harmonised index of consumer prices in 2023 [4].

Food price inflation received a lot of attention by analysts and policy makers due to the significant impact of rising food prices and declining real incomes on consumer welfare [5]. High inflation reduced the purchasing power of the average monthly wage in Slovakia by 5 % in the first quarter of 2023, resulting in the largest annual drop in real wages in the last 22 years. The decline in real wages causes economic hardship for consumers, reduces the purchasing power of income, and endangers specifically vulnerable groups.

Food price inflation differs between the EU member states despite the common market, same policies and shared currency [6]. Member states react differently to price shocks. The pass-through of the price shocks from world to domestic markets and from agricultural commodities to food prices can have significant implications on income distribution and welfare implications for farmers and consumers. These make the issue of food price inflation and price transmission very relevant from the economic policy perspective [7].

The rate of food price inflation depends on the structure of food supply chains. More competitive and open retail or food processing sectors tend to process the supply or demand shocks better and keep food price inflation relatively low [6]. Price shocks are differently transmitted from the world to domestic markets and from primary producers

to consumers, depending on many factors. Studies show that price inflation and reactions of markets to shocks depend on menu costs, information asymmetries, stock management by companies, government interventions, market power, the economy of scale, intertemporal optimisation, structure of demand for food and agricultural inputs, share of expenditures on food relative to total household expenditures and others [8–21].

Households with lower incomes tend to have a higher share of food expenditures [22]. This is due to a relatively low income elasticity of demand for food. As incomes rise, the demand for food becomes less price-elastic and vice versa, more price-elastic with declining incomes [23].

As a result of long-run rising real incomes and declining real food prices, the share of European household expenditures on food has been steadily declining over the years. However, international food prices have recently risen. High food prices increase the income of farmers (who are relatively poor in most developed countries) but increase the cost of food for consumers and create serious difficulties, especially for vulnerable, low-income households [24]. Declining real incomes increase relative income constraints on food consumption and diet composition choices [25].

In Slovakia, incomes rose after its accession into the EU in 2004, changing the food consumption patterns. The food security situation improved and was correlated with the declining share of food expenditures on total household expenditures.

Results from the analysis of demand for food by different household subsamples in Slovakia demonstrate considerable heterogeneity in demand responses to price and income changes. As expected, there is higher sensitivity and volatility of responses in the rural and low-income household subsamples than in urban and high-income subsamples [25].

Before the inflation increase in 2021, consumer prices in Slovakia were at 89.7 % of the EU-27 average. Lower consumer prices were consistently observed in the Czechia, Hungary, and Poland (Tab. 1) [26]. As for food prices, Slovakia reached 95.5 % of the EU-27 food price level in 2021.

Some segments of the population are more vulnerable to an increase in food prices. The most vulnerable groups have a high share of food expenditures on total expenditures/income.

This article analyses the structure and dynamics of food expenditures of Slovak households in the period of 2019–2021 with the aim of identifying households most vulnerable to rising food prices. Using microdata from the Household Budget Survey (HBS) [27], the average monthly food expenditures and their distribution by different household types were quantified. Additionally, income support measures implemented by the Slovak government in response to COVID-19 and the war in Ukraine was examined, evaluating whether these measures effectively targeted vulnerable households.

Tab. 1. Total price level and price level of food and non-alcoholic beverages [26].

	Price level [%]	
	Total	Food and non-alcoholic beverages
Ireland	143.8	119.5
Denmark	143.1	120.2
Luxemburg	136.4	125.4
Sweden	129.7	118.0
Finland	126.7	113.8
Netherland	116.1	98.2
Belgium	113.1	105.8
France	112.0	110.2
Austria	110.8	107.5
Germany	107.8	104.6
EU-27	**105.9**	**104.8**
Italy	100.6	105.9
Spain	97.4	98.0
Cyprus	90.6	109.7
Portugal	89.8	101.6
Slovakia	**89.7**	**95.5**
Slovenia	88.0	100.4
Greece	87.8	106.6
Malta	87.7	117.2
Estonia	86.9	98.0
Latvia	79.9	97.6
Czechia	79.1	89.7
Lithuania	71.8	88.7
Croatia	71.4	97.7
Hungary	68.3	85.5
Poland	60.0	72.7
Bulgaria	55.6	79.9
Romania	54.9	69.7

MATERIALS AND METHODS

In this paper, the descriptive statistics approach on the data from the HBS in Slovakia was used [27]. HBS data are commonly used to analyse social policies and quality of life, define weights for the consumer price index, and estimate household consumption in national accounts. The database comprises three annual rounds from 2019 to

2021 and was chosen for this research based on the availability of data. The data from the same period were used by the Slovak government to prepare policies to help vulnerable households with food inflation after the beginning of the ongoing geopolitical conflict in 2022. The survey provides detailed information on household expenditures on food and non-food products and services, categorised into 12 basic categories according to the Classification of Individual Consumption According to Purpose (COICOP) index. The data also included detailed information about the quantities consumed by each household, its location and size, as well as individual characteristics of household members, such as age, education, economic status, and marital status. The database consists of 4 633 households, each assigned a weight based on the representativeness of the base set. Information on household expenditures is collected over a one-month interval by the Statistical Office of the Slovak Republic.

Total expenditures include all non-investment expenses only and they are classified into 12 COICOP categories:

1. Food and non-alcoholic beverages.
2. Alcoholic beverages, tobacco, and narcotics.
3. Clothing and footwear.
4. Housing, water, electricity, gas, and other fuels.
5. Furniture, household equipment, and routine maintenance of the house.
6. Health.
7. Transport.
8. Communications.
9. Recreation and culture.
10. Education.
11. Restaurants and hotels.
12. Miscellaneous goods and services.

Total expenditures therefore do not include repayments of mortgage, consumer, and other loans. Current HBS data for Slovakia do not include information on incomes. Thus, we cannot compute the share of food expenditures on household income and we replace household income by household total expenditures.

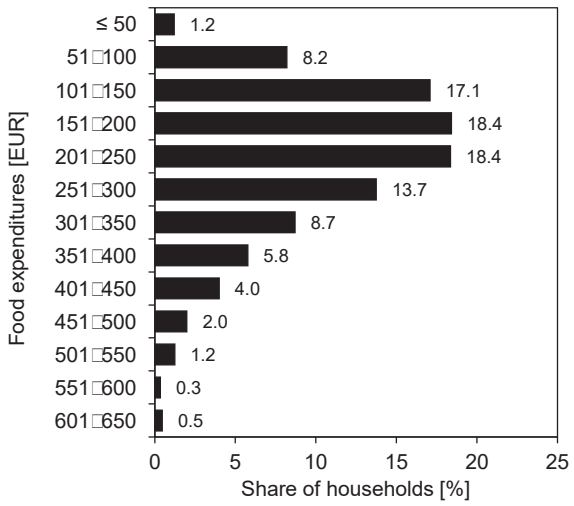


Fig. 3. Distribution of households by expenditures on food [27].

Statistics calculated using weights to maintain representativeness.

RESULTS AND DISCUSSION

Based on the statistical data, in the 2019–2021 survey period, the average monthly household food expenditures in Slovakia were 231 EUR. 36.8 % of households had monthly food expenditures ranging from 151 EUR to 250 EUR. The 10 % of households with the lowest food expenditures spent up to 102 EUR per month on food, while the 10 % of households with the highest food expenditures spent 384 EUR and more per month on food (Fig. 3) [27].

Food expenditures in Slovakia vary significantly across different types of households (Fig. 4) [27]. A household consisting of an employed couple with at least one child under the age of 25 had average monthly food expenditures of 278 EUR (median 262 EUR). In contrast, the lowest food expenditures were in single-member pensioner households (average 122 EUR, median 113 EUR). A household with 7 or more members had average monthly food expenditures of 316 EUR (median 217 EUR), while a household with 5 to 6 members had average monthly food expenditures of 308 EUR (median 292 EUR). It should be noted, that the last two above mentioned cases of families of more than 5 members are relatively rare.

In Slovakia, the average monthly household food expenditures per capita in 2019–2021 were 89 EUR. The largest proportion of households (29.9 %) had total monthly food expenditures per capita of 51–75 EUR. The 10 % of households with the lowest total food expenditures per capita had expenses up to 41 EUR per month, while the 10 % of households with the highest food expenditures had monthly expenses per capita of 146 EUR or more (Fig. 5A) [27].

Adjusted for the equivalent household size according to the OECD, the average monthly household food expenditures in Slovakia were 108 EUR. The largest proportion of households (23.2 %) had total monthly food expenditures

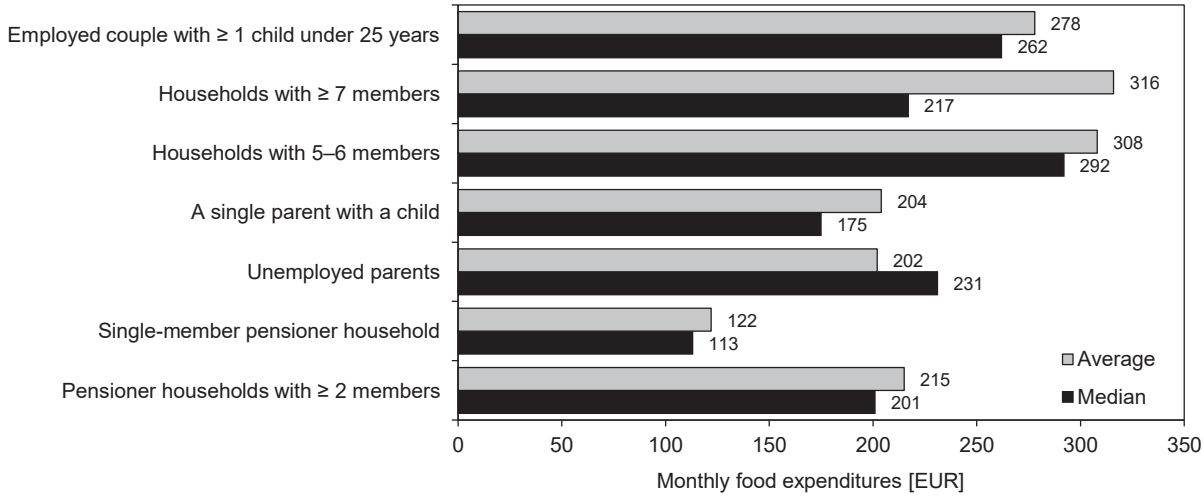


Fig. 4. Total monthly food expenditures of different household groups in Slovakia [27].

Statistics calculated using weights to maintain representativeness.

per equivalent capita of between 76 EUR to 100 EUR. The 10 % of households with the lowest total food expenditures per equivalent capita had expenses up to 54 EUR per month, while the 10 % of households with the highest food expenditures had monthly expenses per equivalent capita of 171 EUR or more (Fig. 5B) [27].

Household type plays a large role in determining monthly food expenditures per capita (Fig. 6) [27]. In the 2019–2021 period, single-member pensioner households spent the most per capita on food monthly (on average 122 EUR, median 113 EUR). In contrast, households with 7 or more members spent the least per capita on food monthly (on average 42 EUR, median 31 EUR).

The largest proportion of total expenditures by Slovak households is allocated to food and housing. The expenditures of an average household in Slovakia on food and non-alcoholic beverages in the years 2019–2021 represented 25.4 % of total expenditures. The share of expenditures on housing, water, and energy amounted to 24.2 %. Together, these two items constituted almost half of the total expenditures of an average household.

The share of expenditures on food and housing is higher for households with lower total expendi-

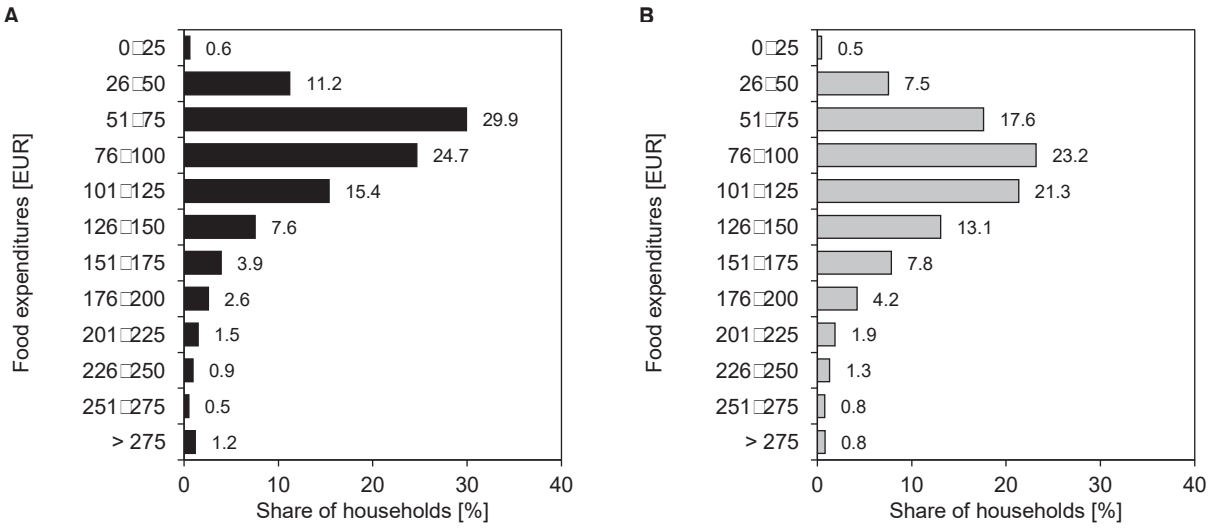


Fig. 5. Distribution of households by the size of monthly expenditures per capita on food [27].

A – per capita, B – per equivalent capita.

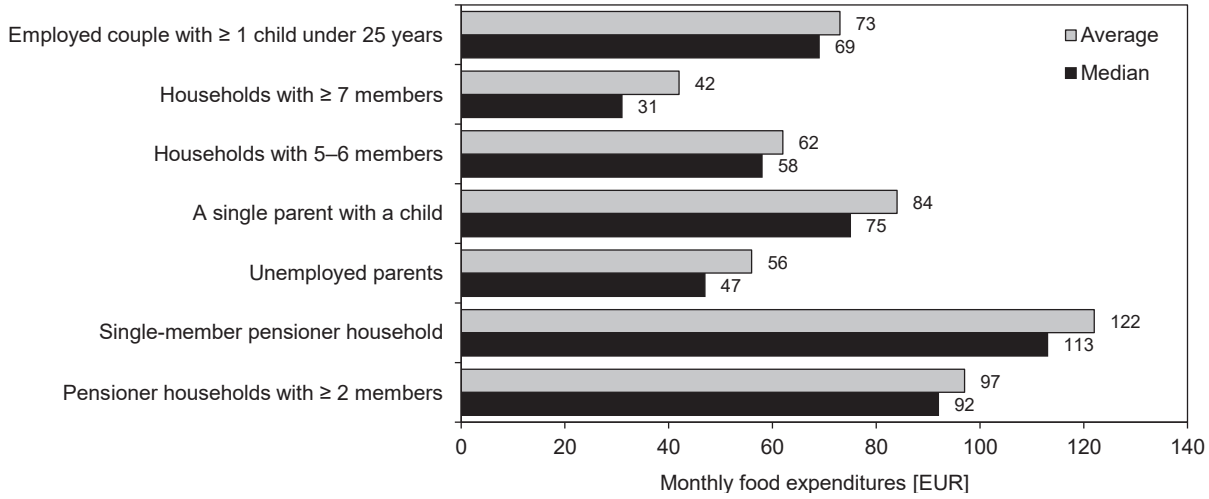


Fig. 6. Monthly food expenditures per capita of selected household [27].

tures (incomes). The 10 % of households with the lowest expenditures allocated as much as 61.3 % of their budget to food and housing combined (food 28.4 % and housing 32.9 %). In contrast, the 10 % of households with the highest expenditures spent only 16.6 % on food and 18.2 % on housing (together 34.8 %) (Tab. 2) [27].

In contrast to the EU-27, Slovakia has an increasing share of expenditures on food. These accounted for an average of 22.8 % of total consumer spending in Slovakia in 2021, while in the EU-27, the average was approximately 18 %. In 2023, the share of food expenditures in Slovakia increased to 26.3 %, while in the EU it decreased to 17.3 %. The Tab. 3 compares the share of food expenditures in total expenditures across EU countries [4]. Expenditures on food had varying proportions in total expenditures among different types of households in Slovakia (Fig. 7) [27]. 3.4 % of households had a share of food expenditures

Tab. 2. Household expenditure structure in Slovakia [27].

	Average	10 % of households with the lowest expenditures	Median	10 % of households with the highest expenditures
Total expenditure [EUR]				
Household monthly	980	441	887	1 563
Household monthly per person	380	196	273	983
Share of expenditure [%]				
Food and non-alcoholic beverages	25.4	28.4	28.0	16.6
Alcoholic beverages, tobacco and narcotics	3.3	3.2	3.2	2.8
Clothing and footwear	4.3	3.9	4.2	3.9
Housing, water, electricity, gas and other fuels	24.2	32.9	27.2	18.2
Furnishings, household equipment and routine household maintenance	5.4	3.3	4.3	8.5
Health	3.4	3.2	3.3	3.0
Transport	7.2	3.1	4.7	18.6
Communications	6.2	7.5	7.0	4.0
Recreation and culture	4.3	3.1	3.3	6.0
Education	0.4	0.2	0.3	0.4
Restaurants and hotels	5.6	2.6	4.4	7.4
Miscellaneous goods and services	10.3	8.7	9.9	10.7

Statistics calculated using weights to maintain representativeness.

Tab. 3. Share of expenditures on food in total expenditures in EU countries [4].

	Expenditure [%]		
	2021	2022	2023
EU-27	**18.0**	**17.4**	**17.3**
Belgium	18.1	16.9	15.5
Bulgaria	24.0	22.7	23.9
Czechia	20.9	20.4	21.2
Denmark	14.9	14.5	13.7
Germany	12.8	12.7	13.2
Estonia	22.1	20.9	21.3
Ireland	14.9	12.1	11.2
Greece	22.5	21.0	20.3
Spain	22.8	22.1	19.5
France	17.8	16.6	16.2
Croatia	22.1	21.7	22.1
Italy	20.6	19.5	18.1
Cyprus	17.7	15.6	17.4
Latvia	26.0	25.9	26.3
Lithuania	20.6	20.7	22.1
Luxemburg	13.8	12.6	11.6
Hungary	23.6	22.1	21.4
Malta	18.1	17.9	17.7
Netherland	16.1	15.4	14.9
Austria	13.0	13.3	12.1
Poland	18.6	18.4	20.6
Portugal	22.0	21.7	20.6
Romania	30.4	29.6	30.6
Slovenia	17.8	17.6	18.3
Slovakia	**22.8**	**23.0**	**26.3**
Finland	15.9	15.4	15.3
Sweden	16.5	15.4	15.3

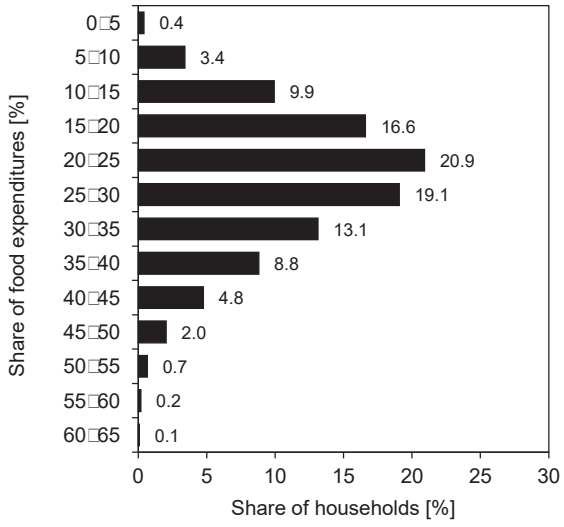


Fig. 7. Share of expenditures on food in total household expenditures in Slovakia [27].

from 5 % to 10 % of total expenditures. 20.9 % of households had a share of food expenditures from 20 % to 25 % of total expenditures.

10 % of households allocated more than 38.2 % of total expenditures to food expenditures. We analysed these (approximately 185 000) Slovak households to characterise the most vulnerable group to rising food prices (Fig. 8) [27].

Tab. 4 provides a detailed view of household groups vulnerable to rising food prices. Food inflation poses the highest threat to the households of a single unemployed parent with at least one child under the age of 25, with as much as 85 % of all such households falling into the endangered category [27]. The rise in food prices also significantly threatened single parents – disabled with at least one child under the age of 25, with up to 59.9 % of such households being considered at risk. Generally, a household where the reference person is disabled falls among the endangered types of households. In absolute terms, a childless household with a pensioner has the largest representation among the households at risk due to rising prices.

The high rate of inflation, particularly the rise in food prices during 2021–2023, required a response from governments across the EU. In some member states, value added tax (VAT) rates on food were reduced (Poland, Spain, Romania, Bulgaria, Latvia), while in others, food prices or margins were capped (Hungary, Greece). Additionally, some countries implemented support measures to mitigate the impact of inflation (Germany, Austria, and Slovakia). In Slovakia, various measures were introduced in 2022 and 2023 to mitigate the effects of rising food prices, with total public expenditures amounting to 2.21 billion EUR (i.e. 2.21×10^9 EUR) (Tab. 5) [28]. All measures can be divided into 3 sets:

1. A one-time increase in the system benefit/allowance with a total budget of 0.1 billion EUR.
2. Humanitarian aid subsidies with a total budget of 0.01 billion EUR.
3. Valorization and adjustment of system benefits with a total budget of 2.1 billion EUR.

As followed from the analysis of impacts, the first set of measures was a one-time support with no long-term effect on public expenditures. Five out of 6 measures in this set addressed mainly households vulnerable to food price increase. These measures were focused on households in material need, orphans, adoptive parents, and disability payments. One measure (child allowance) was general for all households with

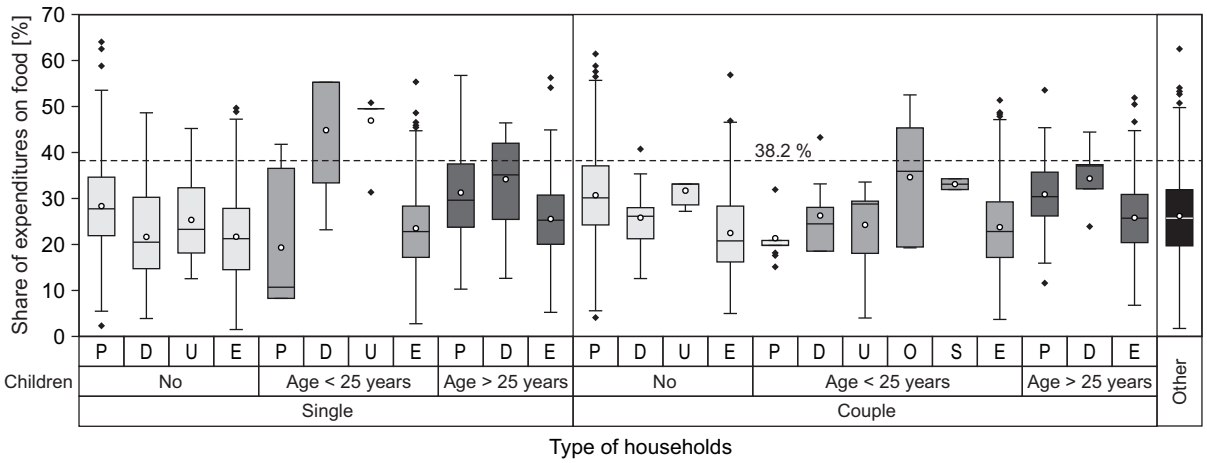


Fig. 8. Household types vulnerable to food price increase [27].

The y-axis represents the ratio between household food expenditures and total household expenditures. The dotted line and the area above in the figure capture the most vulnerable (10 %) of all households, with the highest share (≥ 38.2 %) of food expenditures in total expenditures. The boxes represent the interquartile range (from the 25th percentile to the 75th percentile). The horizontal lines inside the boxes denote the medians, while the hollow dots inside the boxes represent the averages. The vertical "whiskers" indicate the ranges of the data, excluding the outliers. Outliers are represented by the full dots outside the ranges. P – pensioner, D – disabled, U – unemployed, E – employed, S – student, O – other.

Tab. 4. Households vulnerable to food price increase [27].

Type of household		Households at risk		
		Share [%]	Number	Expenditures on food * [%]
Single	Employed	5	5217	42
	Unemployed	15	797	42
	Old age pensioner	16	25801	44
	Disabled person/person unable to work	5	569	42
Single with at least 1 child under the age of 25 years	Employed	8	4174	44
	Unemployed	85	851	50
	Old age pensioner	23	315	42
	Disabled person/person unable to work	60	802	55
Single with all children over the age of 25 years	Employed	11	10531	42
	Old age pensioner	23	7749	47
	Disabled person/person unable to work	43	3415	44
Couple without children	Employed	5	8685	43
	Old age pensioner	22	44790	44
	Disabled person/person unable to work	6	470	41
Couple with at least 1 child under the age of 25 years	Employed	6	33485	42
	Disabled person/person unable to work	15	448	43
	Other	49	2562	48
Couple with all children over the age of 25 years	Employed	6	7119	42
	Old age pensioner	18	5695	43
	Disabled person/person unable to work	15	424	42
Other	Employed	8	14214	45
	Old age pensioner	25	6149	44
	Disabled person/person unable to work	39	818	53
	Person in the household	19	155	44

Statistics calculated using weights to maintain representativeness. * – Average share of expenditure on food is given. Households at risk are defined as the 10 % of households with the highest share of food expenditures (more than 38.2 % of total expenditures).

Tab. 5. Measures compensating inflation in Slovakia in 2022 and 2023 [28].

Type of measure	Year	Number of benefitting persons/households	Public expenditures (in milliones EUR)	Targeted support to vulnerable households mainly
Set 1. One-time increase in the system benefit/allowance				
Child allowance	2022	687 174 households/1 140 672 children	85.30	No (share of vulnerable 7 %)
Aid to persons in material need	2022	74 394 beneficiaries	7.40	Yes
Contribution to adoptive parent	2022	6 365 persons	0.60	Yes
Care allowance	2022	66 574 persons	6.60	Yes
Extra alimony to orphans with no regular pension	2022	1 393 persons	0.14	Yes
Disability payments	2022	10 924 persons	1.10	Yes
Total			101.17	
Set 2. One-time humanitarian aid subsidies				
Pensioners over 62 years with no pension and no income from work	2022	14 980 persons	0.15	Yes
Caregivers without regular support	2022	369 persons	0.04	Yes
Personal assistants	2022	11 246 persons	1.10	Yes
Care for children with long-term health problems	2022	569 persons	0.06	Yes
Support for persons with alimony less than 150 EUR	2022	22 639 persons	3.20	Yes
Alternative childcare termination from 30 April 2020 to 31 October 2022	2022	335 children	0.03	Yes
Termination of care in an orphanage from 30 April 2020 to 31 October 2022	2022	116 children	0.01	Yes
Low-income households	2023	50 000 households	5.00	Yes
Total			9.58	
Set 3. Valorization and adjustment of system benefits				
Payment of 13th pension and extraordinary 13th pension	2022	1.43 million pensioners (July) 1.44 million pensioners (December)	513.70	No (share of vulnerable 20 %)
Valorization of pensions from 1 January 2023	2023	1.4 million pensioners	1 032.80	No (share of vulnerable 20 %)
Extraordinary valorization of pensions from 1 July 2023	2023	1.4 million pensioners	529.80	No (share of vulnerable 20 %)
Increase of minimum pension from 1 July 2023	2023	59 thousand pensioners	2.00	Yes
Increase of minimum pension from 1 October 2023	2023	48 thousand pensioners	7.70	Yes
Housing allowance increase and valorization of aid to households in need from 1 October 2023	2023	26 946 households (allowance increase) 62 200 households (valorization)	10.20	Yes
Total			2 096.20	

children. Within this measure, only 7 % of the supported households were vulnerable to an increase in food price.

In the second set, 8 one-time measures with no long-term effect on public expenditures were introduced. All measures were addressing low-income households and households with disabled persons or orphans. All measures in this set addressed mainly households vulnerable to food price increase.

The third set of measures has a long-term effect on public expenditures and targets mostly non-vulnerable households. Three of the 6 measures, along with a majority of the allocated budget, were linked to pensionaries in the form of an extra pension and valorization of the existing pensions by 11.8 % as of January 2023 and 10.6 % as of July 2022. These three measures reached up cumulatively 2.08 billion EUR (94 % of the total budget for all sets of measures). Only 20 % of the households supported by these measures were vulnerable to the food price increase.

Out of the total 2.21 billion EUR of public expenditures linked to all 20 measures, only a low share of public expenditures was targeted to vulnerable groups. 16 out of 20 measures targeted mainly vulnerable households, but the share in total public expenditures was only 2.2 %. As much as 97.8 % of public expenditures were in form of untargeted support.

Beyond the direct financial support measures, a policy document titled "Mitigating the impacts of inflation and better price stability of food and agricultural products in Slovakia" was prepared to assess food inflation and propose recommendations for addressing the issue. The document assessed food inflation in Slovakia and provided recommendations to address the problem of rising food prices, particularly through targeted support of vulnerable population groups. It also advises against price regulation but rather suggests increasing the long-term efficiency of the food supply chain. Likewise, it recommends enhancing information transparency, including the profits of farms, food producers, and retailers in the food value chain.

CONCLUSIONS

Since mid-2021, consumer prices, including those of food and energy, have started to increase significantly in the EU mainly linked to the COVID-19 pandemic and war conflict in Ukraine. The rise in prices impacts consumers, businesses, and the state. The faster growth of consumer prices relative to incomes has also led to a decrease in the purchasing power of the population. However, the impact of rising prices varies among different consumer groups. Food prices grew faster than other prices, negatively affecting households whose expenditures on food constitute a high proportion of their total consumer spending. This article provides an overview of household expenditures for the years 2019–2021 using the latest available data from the HBS. Based on the data, the article assesses which population groups are most affected by the overall rise in food prices, which could lead to a deterioration in household food security.

The average monthly household expenditures on food in Slovakia for the years 2019–2021 amounted to 231 EUR and per person 89 EUR. Slovak households spend the largest share of their total expenditures on food and housing. Together, these two items constituted almost half of the total expenses of an average household. The share of expenditures on food and housing is higher in the case of low-income households.

In Slovakia, the highest share of households allocated between 20 % and 25 % of their total expenditures to food. We identified the household group most at risk of rising food prices as the 10 % of households with the highest share of food expenditures (more than 38.2 % of total expenditures). Food inflation in Slovakia most threatens the households of a single unemployed parent with at least one child under the age of 25. The second most vulnerable group is a single parent (disabled) with at least one child under the age of 25. Single disabled parents could be employed, and they always receive social allowances for disabled persons, unlike unemployed single parents. However, in general, a household where the reference person is disabled falls among the endangered households. In absolute terms, a childless household with a pensioner has the largest representation among the at-risk groups in terms of rising prices. These households should be the focus of income support from the state by the targeted support scheme in the future.

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