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CHANGES IN FOOD DEMAND IN POLAND DURING THE COVID-19 PANDEMIC²

Key words: COVID-19 pandemic, demand, food, transmission channel, Poland

ABSTRACT. The aim of the study was to determine changes in the demand for food in Poland during the COVID-19 pandemic. The analysis covered 2017-2021, i.e., the period both before and during the pandemic (2022 was excluded due to the impact of events related to the war in Ukraine). The study uses comparative and descriptive analysis methods. The macroeconomic indicators of the Central Statistical Office were used to identify the macroeconomic determinants of demand for food, while the identification of purchasing changes was determined on the basis of the results of household budget surveys. During the pandemic, despite the decline in the GDP, we could see an improvement in household income. Despite the reduction in total consumption in the first year of the pandemic, household food consumption increased significantly, which continued the following year. In turn, a significant reduction in household spending on catering services indirectly influences the demand for agricultural and food products, but the scale of this impact is difficult to estimate. Further study of changes in food demand should include the period of the war in Ukraine. In its aftermath, agricultural and energy commodity prices rose, and there was an influx of refugees to Poland, which undoubtedly impacted changes in food demand.

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INTRODUCTION

The COVID-19 pandemic had a significant impact on the economies of most countries in the world. As a result of administrative decisions, global disruptions occurred both in terms of demand and supply [Sieroń 2020, Rio-Chanona et al. 2020]. The dual impact of the pandemic affected the functioning of many branches of the economy. In addition, the pandemic had an asynchronous impact on the economy, which means that the severity of the pandemic felt by various groups was not synchronized in time. The source literature indicates that a characteristic feature of the crisis caused by the COVID-19 pandemic was its intensive sectoral diversity [Forsythe et al. 2020, Mouloudj et al. 2020, Zawojska 2021]. However, the impact of the pandemic on the agricultural and food sector was different than in the case of other sectors. In principle, the restrictions and limitations imposed on the economy did not affect the sector of primary agriculture, as food was considered to be a basic necessity, and therefore the sector continued to operate during the pandemic [Weersink et al. 2021]. However, the pandemic caused some disruptions in the agricultural sector, which may have long-term consequences. The channels of transmission to agriculture include many macroeconomic processes affecting all elements of the agricultural and food system (primary production, processing, trade, logistics systems, and demand for food), as well as the markets of production factors and indirect inputs of production [Schmidhuber et al. 2020]. Among the main channels of transmission of the COVID-19 pandemic to the agricultural sector, we can distinguish demand and supply channels. Demand channels include the demand for agricultural products in the domestic market and foreign markets. They consist of: the household food demand channel, the channel of agricultural products demand by the food industry, and the agricultural and food products export channel. Supply channels, in turn, affect the availability and prices of production factors, the volume and structure of production, as well as domestic and import investment outlays. Supply channels include: the agricultural and food import channel, the means of production industry channel and the services for agriculture channel, the credit channel, and the labour market channel.

Disruptions in the agricultural sector in terms of demand due to the pandemic concern, among others, household demand for food. The main reason for the decrease in demand is the prolonged economic slowdown, affecting the consumer purchasing power decrease as a result of, among others, an increase in unemployment and uncertainty [Bohlen et al. 2010]. Although expenditures on food are generally considered inflexible in terms of income [Szczepaniak et al. 2020], there are significant differences between countries with different levels of economic development, as well as within countries between consumer groups with different purchasing power. Low income makes the response to food expenditures stronger, and demand for food may decrease due to a reduction in income. There are also significant differences in the income elasticity of the demand for particular food products. In turn, the need to stay in the place of residence and the fact that remote working and learning have become more and more popular may contribute to an increase in the share of food expenditure in total household consumption [Hambardzumyan and Gevorgyan 2022]. In addition, the fear of coronavirus infection encouraged the society to consume less processed food, including plant-based foods.

On the other hand, consumers' concern about the continuity of food supply may result in unpredictable, rapid changes in food demand – in the short term, additional demand and possible price increases. There are also significant changes in consumer behaviour, which, due to unclear and unusual information, may cause events that may put the normal functioning of the market at risk, including price increases and periodic restrictions of the availability of certain categories of products [Kowalczyk 2020].

The objective of the study was to determine changes in the demand for food in Poland during the COVID-19 pandemic. In order to achieve the objective, the significant macroeconomic indicators were analysed and assessed over time, and the household budgets were analysed.

RESEARCH MATERIAL AND METHODOLOGY

The material scope included the analysis and assessment of changes in macroeconomic indicators and changes in income and expenditure of the household budgets. Two main sources of statistical information were used, i.e. macroeconomic data of the Central Statistical Office and the results of household budget surveys. The first source was used to identify macroeconomic determinants of demand for food. In the analysis of macroeconomic data, the total consumption has been taken into account, which constitutes the value of products used to meet the needs of the total population and includes private consumption, i.e. consumption in the household sector and consumption in the sector of non-profit institutions serving households, and the sector of governmental and selfgovernment institutions. Gross disposable income in the households sector is obtained as a result of gross primary income minus: current taxes on income, wealth, etc., net social contributions, social benefits (social security benefits and other social benefits), and other current transfers. Gross primary income accounts and gross disposable income accounts include transactions describing income flows between institutional sectors. In the analysis of data from the household budget survey disposable income, total expenditures, and expenditures on consumer goods and services were taken into account, focusing mainly on two categories of expenditures, i.e. expenditures on food and non-alcoholic beverages and expenditures on catering services. Disposable income includes current household income (financial and non-financial) from individual sources less advances on personal income

tax, property income taxes, taxes paid by self-employed persons, including representatives of liberal professions and persons using an individual farm in agriculture, and social and health insurance contributions. Disposable income is discretionary income less other expenses. Expenditures include expenditures on consumer goods and services and other expenditures. Expenditures on consumer goods and services are used to satisfy the needs of the household and are classified by purpose [GUS 2018].

In order to characterize the price determinants of demand, the aggregate retail price indices of consumer goods and services estimated by the Central Statistical Office were used. The period of empirical analyses referred to the period before the pandemic and during the pandemic, i.e. the years 2017-2021. It was decided that the analysis of the data from 2022 would not be used due to disruptions in the indicators, which were caused by the events related to the Russian-Ukrainian war. The methods of comparative and descriptive analysis were used in the study.

RESEARCH RESULTS

In the years 2017-2021, the level of GDP in Poland fluctuated. The highest annual growth rate in the analysed years occurred in 2021 and amounted to 6.9%. This was a significant increase after a 2% decrease in GDP in 2020, caused by the COVID-19 pandemic (Table 1). In the years before the pandemic, GDP in Poland grew steadily, although some slowdown in growth could have been observed since the 3rd quarter of 2019, when the economic growth rate (compared to the same period in the previous year) reached 4.2%, and in the next quarter it reached 3.4%. In the year 2020 there was a decrease in GDP, since the second quarter, when GDP decreased by 7.8% as compared to the same period in the previous year.

Changes in the economic situation in Poland caused by the pandemic were accompanied by changes in the labour market. The number of persons employed in the national economy systematically increased in the analysed period, except for the year 2020, during which the decrease amounted to 8.3% as compared to the previous year. This situation affected the registered unemployment rate, which, after an annual decrease since the year 2017, increased to 6.3% in the year 2020. In the next year, however, there was a decrease in the registered unemployment rate to the level almost equal to the level recorded before the pandemic outbreak, i.e. 5.4%. The average monthly gross nominal salary increased in the analysed period. During the first year of the pandemic, there was a slowdown in the growth rate of average monthly gross nominal salary. Over the last two years before the pandemic outbreak, these salaries slightly increased by more than 7% per year, in 2020 the growth rate amounted to 5.1%, and in the following year, the growth rate of nominal salaries amounted to 10%. However, taking into account the rising prices of consumer

Specification	Indices of change (previous year = 100)					
	2017	2018	2019	2020	2021	
Real GDP	105.1	105.9	104.5	98.0	106.9	
Final consumption expenditure	105.4	104.4	104.1	98.5	105.9	
Gross average monthly wages and salaries (nominal)	105.5	107.3	107.3	105.1	110.0	
Price indices of consumer goods and services	102.0	101.6	102.3	103.4	105.1	
Price indices of food and non- alcoholic beverages	104.2	102.6	104.9	104.7	103.2	
Gross average monthly wages and salaries (real)	103.5	105.6	104.9	101.6	104.6	
Gross real disposable income in households sector	103.4	103.8	104.3	103.8	97.0	
Real consumption – food and non-alcoholic beverages	-	100.1	102.3	113.9	109.1	
Situation on the labour market						
Employed persons [thousand]	15,710.8	1,5949.7	16,120.6	14,789.1	15,002.6	
Registered unemployment rate [%]	6.6	5.8	5.2	6.3	5.4	

Table 1. Dynamics of changes in macroeconomic values and the situation on the labour marke	t
in Poland in 2017-2021	

Source: own study based on [GUS 2022]

goods and services, the increase in salaries in real terms was not so significant. In the years 2017-2019, the annual growth in real salaries ranged from 3.5% in the year 2017 to 5.6% in the year 2018. In turn, in the first year of the pandemic, the increase in real salaries amounted to 1.6% and accelerated to 4.6% in the second year of the pandemic (Table 1).

Changes in the growth rate of GDP and the situation on the labour market did not coincide with changes in the income in the household sector (according to macroeconomic data). In 2020, real gross disposable income increased by 3.8% as compared to the previous year, which is slightly less than in the year preceding the pandemic outbreak, when the growth rate amounted to 4.3%. In turn, in the household sector, there was a decrease in real income by 3% in the year 2021.

In Poland, the increase in the prices of food and non-alcoholic beverages in the first year of the pandemic was slower than in the last year before the pandemic, and higher than the inflation rate. According to the Central Statistical Office, in 2020 in Poland, the prices of food and non-alcoholic beverages were increased by 4.7% on an annual basis, with an inflation rate at the level of 3.4%. In turn, in the second year of the pandemic, the increase rate of food prices slowed down and reached the level of 3.2%, with an inflation rate amounting to 5.1%.

In the first year of the pandemic, despite the decrease in GDP and the slowdown in real income growth and real food prices, the demand for food in Poland increased by 13.9%. There are many reasons for such an increase. Due to economic restrictions caused by the pandemic, the structure of household expenditures has changed. Expenditures on recreation, culture, restaurants or hotels decreased significantly [GUS 2022]. Households have significantly reduced their consumption of food outside the home for many months. This was probably the main reason for the increase in demand for food in the first year of the pandemic. In 2021, despite a decline in real gross disposable income in the household sector, the demand for food and non-alcoholic beverages increased again. This could have been due to an increase in consumption, which amounted to 5.9%. In the year 2021, in the case of almost all categories of expenditures, which were limited in the first year of the pandemic, the expenditures increased, however, they did not reach the pre-pandemic level in many categories [GUS 2022].

The development of the value of real disposable income in the household sector and the demand on the basis of national accounts was confirmed in household budget surveys, which show that in the years 2017-2021 the average monthly disposable income, both in nominal and real terms, increased. Nominal income growth rate reached the highest level in the year 2019 - 7.6% and in the year 2021 - 7.5%. This means that the high household income growth slowed down slightly only in the first year of the pandemic (to 6.5%). In real terms, household income grew more slowly, due to the accelerating growth in the prices of consumer goods and services. In the first year of the pandemic, real income increased by 2.5% as compared to the previous year, and in 2021, contrary to the results of macroeconomic data, real income increased by a 2.3%. Thus, it can be seen that the growth of prices of consumer goods and services largely eliminated the growth of nominal income in the years of the pandemic, but the growth rate was still positive (Figure 1).

It is also worth noting that the share of expenditures on consumer goods and services in disposable income decreased regularly in almost the entire analysed period – until the year 2020, which may indicate the improving economic situation of households, but a significant decrease in this share occurred in the year 2020, when households expenditures decreased. Considering the fact that income during the pandemic continued to increase, it can be assumed that households were afraid of a deterioration in the income situation in the first year of the pandemic, which is why they reduced expenditures and increased savings. The next year of the pandemic brought an increase in expenditures and their income share, but the saving tendency remained at a higher level than before the pandemic,

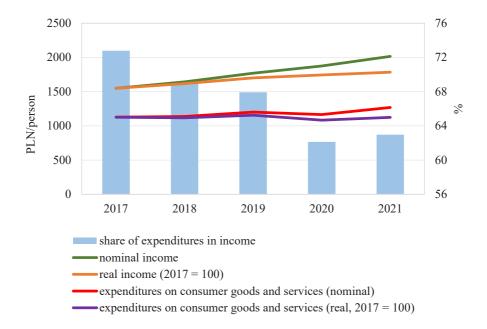


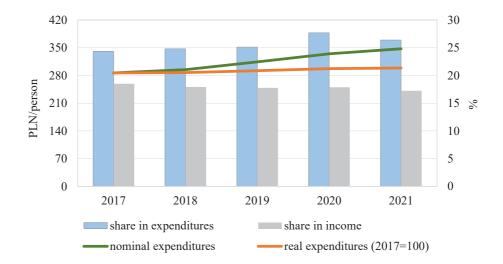
Figure 1. Nominal and real (2017 = 100) average monthly disposable income and expenditures on consumer goods and services [PLN/person] and the share of income expenditures in households in Poland [%] in the years 2017-2021

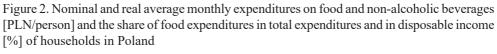
Source: own study based on [GUS 2018-2022]

and expenditures constituted less than 63% of income as compared to 68% in the year 2019 (Figure 1).

Turning to the analysis of the level of expenditures on particular categories of consumer goods and services of households in Poland, it can be concluded that the pandemic did not significantly affect expenditures on food, but expenditures on catering services were significantly decreased. The level of expenditures on food and non-alcoholic beverages in nominal terms was increased systematically throughout the analysed period, however, the growth in the second year of the pandemic. Both in the year 2019 and 2020, expenditures on food and non-alcoholic beverages in nominal terms were increased by more than 6%, while in the year 2021, this increase amounted to 3.7%. In turn, in real terms, the increase in expenditures in the years 2019 and 2020 amounted to 1.7% per year, and in 2021 - 0.5%. At the same time, the share of expenditures on food and non-alcoholic beverages grew systematically in the analysed period, except for the year 2021. The largest increase amounted to 27.7% of all household expenditures, as compared to 25.1% in the year 2019.

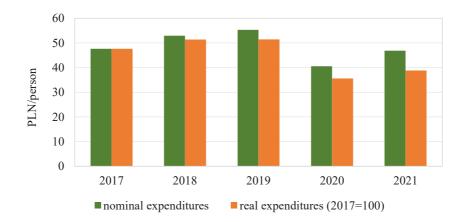
Such an increase in the share of the analysed expenditures in total expenditures resulted from the reduction of the latter as a result of, on the one hand, household uncertainty and a suspended saving tendency, and, on the other hand, from limited possibilities of spending money due to the introduced restrictions in the functioning of many industries. The share of food expenditures in household income remained stable at the level of 17% (Figure 2).

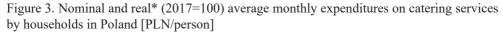




Source: own study based on [GUS 2018-2022]

Significant changes in household expenditures, mainly on food, occurred during the pandemic in expenditures on catering services. These changes were primarily caused by limitations in the operation of catering facilities. Bearing in mind the years before the pandemic, there is an increasing trend in terms of expenditures on catering services, both in nominal and real terms. The highest relative increase in real expenditures, by 7.8%, occurred in the year 2018. The first year of the pandemic in Poland resulted in a decrease in expenditures on catering services – in nominal terms by 26.7%, which resulted in a real decrease in expenditures amounting to 30.7%. The second year of the pandemic resulted in an increase in household expenditures on catering services, in fact, by 8.9%, which means that these expenditures did not even reach the pre-pandemic level. In the year 2019 (Figure 3). This may mean that the demand for agricultural products by catering facilities was significantly limited during the pandemic.





* "Hotels and restaurants" price index was adopted to calculate real expenditures Source: own study based on [GUS 2018-2022]

The results of the study confirmed the concerns mentioned in the literature. An analysis of consumer behaviour during the first period of the pandemic shows that there was an increase in demand for food due to fear of ensuring the continuity of supply of basic foodstuffs [Kowalczyk 2020]. However, this was a temporary phenomenon. A much greater threat was identified in the decline in total spending on consumer goods and services [Waniowski 2021]. In the aspect of food demand, the reduction is primarily in food service spending, which could affect the entire agri-food sector. The closure of restaurants and hotels is one of the sectors of the food economy that has had a significant impact on the decline in agricultural GDP, especially in countries where a significant portion of food spending is spent on eating out. In the U.S. in 2019, spending on meals away from home accounted for 52% of total food expenditures [USDA 2024]. During the pandemic, spending on eating out dropped significantly, which had a huge impact on the economy. On the one hand, this sector reports demand for basic agricultural products; on the other hand, it is a place of employment. Although spending on out-of-home consumption in the US accounts for more than half of food spending, higher margins than in grocery stores mean that the sector accounts for about a third of the food supply [Lusk and Anderson 2020]. It can, therefore, be surmised that the sector's impact on GDP is less due to reduced demand for agricultural products and much more related to the loss of labour income and restaurant receipts [Beckman and Countryman 2021]. In Poland, a much smaller share of food expenditures is spent on eating out, but the importance of changes in this sector on food demand and the economy as a whole should not be overlooked.

SUMMARY

The research identified changes in demand for food and non-alcoholic beverages from households during the COVID-19 pandemic. Based on the analysis of macroeconomic data, it can be concluded that household demand for food and non-alcoholic beverages increased during the COVID-19 pandemic. In the first year of the pandemic, despite the increase in real income in the household sector, the level of consumption decreased, however, food consumption in households increased significantly, and the next year of the pandemic resulted in an additional increase therein.

Data from the household budget survey confirmed an increase in the real level of expenditures on food and non-alcoholic beverages in both years of the pandemic, which translated into a significant increase in the share of expenditures on this category of goods in consumer expenditures in the first year of the pandemic and a slight decrease in the second year of its duration.

At the same time, significant changes in household expenditures occurred during the pandemic in terms of expenditures on catering services, which are mainly expenditures on food and indirectly affect the demand for agricultural products. The increasing trend in terms of these expenditures before the pandemic was inhibited, mainly due to restrictions in the operation of catering facilities. The second year of the pandemic resulted in an increase in these expenditures, but they did not reach the pre-pandemic level. This may mean that the demand for agricultural products by catering facilities was limited significantly during the pandemic.

The paper may provide a voice in the discussion of the impact of pandemics on the agri-food sector. The previous two crises (the global financial crisis in 2008 and sanctions against Russia in 2014) raised concerns that international trade in agri-food commodities would fall and food prices would rise [Mizik 2021]. However, the different nature of the pandemic situation meant that past experiences could not provide a basis for predicting the consequences of the situation. Based on experience, it could be assumed that in times of uncertainty, with a declining income, households would reduce spending, including on food [Zalega 2012]. However, the COVID-19 pandemic did not significantly affect household incomes, but there was a significant reduction in spending on food and non-alcoholic beverages, however, was not reduced during the pandemic. However, the reduction in household spending on food services may impact not only the demand for agricultural products but also the economy as a whole due to the loss of income from labour and activities in the industry. Estimating this impact could be an important direction for further research.

The research area covered in this study is extremely vast. It is planned to expand the period covered by the study to include the period of the war in Ukraine, in the wake of which energy and agricultural commodity prices increased. Also, the influx of refugees to Poland has certainly impacted on changes in food demand.

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ZMIANY POPYTU NA ŻYWNOŚĆ W POLSCE W CZASIE PANDEMII COVID-19

Słowa kluczowe: pandemia COVID-19, popyt, żywność, kanał transmisji, Polska

ABSTRAKT. Celem badań było określenie zmian popytu na żywność w okresie pandemii COVID-19 w Polsce. Analizą objęto lata 2017-2021, tj. okres zarówno przed, jak i w czasie trwania pandemii (wykluczono 2022 rok ze względu na wpływ wydarzeń związanych z wojną w Ukrainie). W pracy zastosowano metody analizy porównawczej i opisowej. Do identyfikacji makroekonomicznych determinant popytu na żywność wykorzystano dane makroekonomiczne GUS, natomiast identyfikację zmian nabywczych określono na podstawie wyników badań budżetów gospodarstw domowych. W czasie pandemii, mimo spadku realnego PKB sytuacja dochodowa gospodarstw domowych uległa polepszeniu. Mimo ograniczenia konsumpcji ogółem w pierwszym roku trwania pandemii, spożycie żywności w gospodarstwach domowych znacznie wzrosło, a wzrost ten był kontynuowany $w\,2021\,roku.\,Z\,kolei\,znaczne\,ograniczenie\,wydatków\,gospodarstw\,domowych\,na\,gastronomię,$ pośrednio przełożyło się na popyt na produkty rolno-żywnościowe, jednak skala tego wpływu jest trudna do oszacowania. Dalsze badania zmian popytu na żywność powinny obejmować okres wojny w Ukrainie. W jej następstwie wzrosły ceny surowców rolnych i energetycznych oraz nastąpił napływ uchodźców do Polski, co niewątpliwie wywarło wpływ na zmiany popytu na żywność.

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