INFLATION DYNAMICS AND FOOD PRICES IN HUNGARIAN AGRICULTURAL ECONOMY

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Abstract

During 2021-2022, many commodity prices rose to record levels. As a result, Hungary in 2022 experienced high inflation, large trade deficits, and an unstable macroeconomic environment. High commodity prices, particularly for food, also have adverse effects on poverty.

Hungary has not experienced for a long time such an increase in inflation, which is among the highest in Europe. Inflation growth has recently been associated with large energy price shocks, food price increases are traditionally believed to have rather small effects. At the same time, there has been an absence of rigorous work to identify empirically the relative importance of each factor contributing to inflation.

It is thus of vital importance to improve the understanding of the causes of inflation in Hungary to allow adequate policies to be put in place. The purpose of this paper is to fill this gap and thoroughly analyze the determinants of inflation in Hungary using data for the current decade, with a focus on food prices.

The authors identify the relative importance of several factors contributing to overall inflation and its major components. The main finding is that, in a longer perspective, one of the main factors that determine domestic inflation is food prices. In the short run, agricultural supply shocks strongly affect domestic inflation, causing large deviations from long-run price trends.

The results suggest the need for a multi-pronged approach to fighting inflation. This analysis suggests monetary and exchange rate policies need to take into account agricultural production, which is among the key determinants of inflation. Moreover, it has a greater influence on inflation than is widely known.

Keywords: *inflation, food prices, Hungary, agricultural economy*
JEL: O11, Q14

Introduction

This research gives a brief description of the Hungarian agro-economy inflation experience. It is then put forward to explain the historically unprecedented inflation process.

Hence, research efforts geared toward understanding inflation dynamics, its explanatory variables, and contributory factors are an exercise in the right direction. Globally, the extant literature documents inflation forecasting from the demand side based on the Phillips curve analysis. It is crucial to observe inflation from the supply-side such as the agro-economy.

Literature review

Among the supply-side factors, the role of commodities; especially, energy, food, and agricultural commodity prices receiving greater research and policy attention. These commodities are relevant to modern societies and are linked to the real economy, as they serve as pointers to domestic demand and supply pressures. They also reflect global shocks (shocks from international oil price and

exchange rate fluctuations) and play a significant role in driving inflation (see Vasa, 2003; Vásáry et al., 2013; Chen et al., 2014; Koirala et al., 2015; Sensoy et al., 2015; Pourroy et al., 2016; Rafiq and Bloch, 2016; Zhang et al., 2018).

Further motivation to consider agricultural commodity prices relies on the argument that the commodities are vital to the production process either as energy or non-energy inputs; thus, increases in their costs could herald inflationary pressures. (Guth-Vasa, 2003; Esposti and Listorti 2013; Bakucset al. 2014). Agricultural price developments are an important inflation factor. A detailed analysis of the agricultural prices in Hungary between 1995 and 2012 is presented in Széles et al. (2014).

There are welfare implications, particularly in economies with a large proportion of the population living below the poverty line where poor members of society spend a higher proportion of their incomes on food, and are hence made to suffer severely from rising food prices (see Barrett and Dorosh, 1996; Arndt et al., 2008; Moncarz et al., 2018). The subsidies received under the CAP (Common Agricultural Policy) have a significant impact on the profitability of farms and the structure of production (Rajczi and Wickert 2015).

There is a lag between agricultural production supply and demand changes, hence, domestic commodity prices exhibit sharp fluctuations over time compared to non-agricultural prices.

Demand elasticities for most agricultural commodities are so low that small changes in demand cause a large change in price. (Moses et al 2019)

Price volatility is a particularly high risk in the agricultural sector because profit levels in many production sectors are close to equilibrium profit, which is minimal. (Bareith and Csonka 2019; Bareith and Csonka (2022)

During 2021-2022, many commodity prices rose to record levels. As a result, Hungary in 2022 experienced high inflation, large trade deficits, and an unstable macroeconomic environment. High commodity prices, particularly for food, also have adverse effects on poverty.

The annual inflation rate in Hungary increased to 15.6% in August of 2022, the highest since May of 1998, from 13.7% in July. According to the Hungarian Central Statistical Office, the inflation rate reached 20.1% in August 2022, while the Magyar Nemzeti Bank's medium-term inflation target is 3% +- 1%. . Prices increases were seen for consumer durables (20.9%), alcoholic beverage and tobacco (13.1%), and services (7.7%), namely taxi (27.3%), repair and maintenance of dwellings (21.7%), repair and maintenance of vehicles (18.1%), recreational services (13.5%) and rents (12.5%). Compared to the previous month, consumer prices increased 1.8%. (Hungarian Central Statistical Office 2022)

Figure 1. Annual inflation rate in Hungary 2013-2022 (%)
Source: Hungarian Central Statistical Office 2022

Food prices went up 33.1%, led by margarine, bread, cheese, pasta products and milk products. (Hungarian Central Statistical Office 2022)

Figure 2. Annual inflation rate os food products in Hungary 2013-2022 (%)
Source: Hungarian Central Statistical Office 2022

Material and method

In this article, we have analysed data from the Central Statistical Office. The consumer price index measures the change over time in the (average) price of goods and services purchased by households (the population) for their own use. Partly for methodological reasons and partly for technical reasons, certain purchases, such as real estate or certain services (benefits in kind), are excluded.

The consumer price index indicates the rate of inflation, the 'money depreciation'. Price changes are measured on the basis of a consumer basket of appropriately selected representatives of goods and services, monitoring price changes from month to month. The representatives are relatively large volumes of goods and services with key quality characteristics that determine the value in use.

The scope of the representatives is reviewed every year by the Central Statistical Office (KSH)

Each of the 1,000 or so representatives belongs to one of the 140 consumption groups. The individual price indices for each representative are calculated on the basis of the average prices for the reference month and the base month. The price index for the most detailed consumption groups is the weighted (or in some cases unweighted) arithmetic average of the individual price indices of the corresponding representatives.

Of the 140 groups, the price indices for the main consumption groups and total consumption:
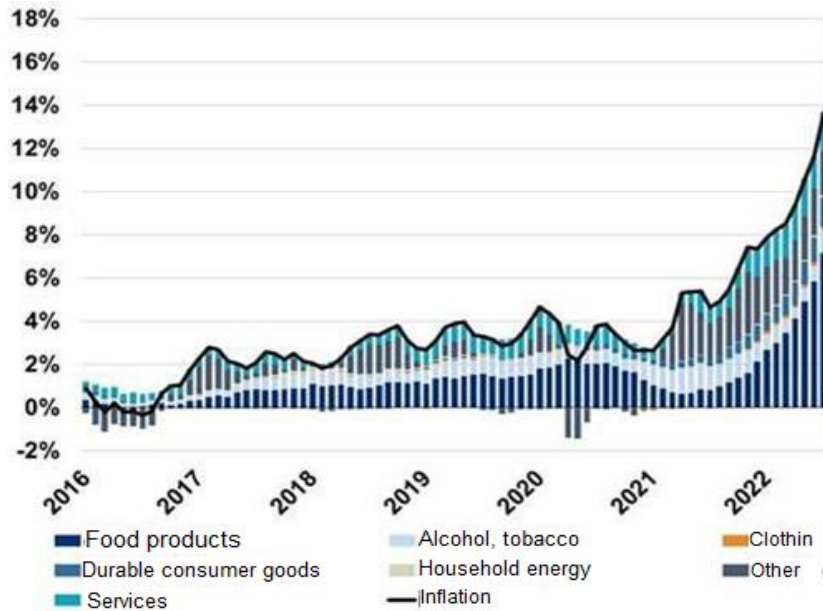
$I_p = \sum w_i p_i / \sum w_i$ (Laspeyres price index),

where w_i = the percentage share of consumption group i in total consumption ($\sum w_i$ is less than 100 if it is not total consumption!),
p_i = price index of consumption group i

Results

Food contributed the most to the increase in inflation, thanks to the large weight in the consumer basket.

Figure 3. Annual inflation rate in Hungary 2016-2022 (%)
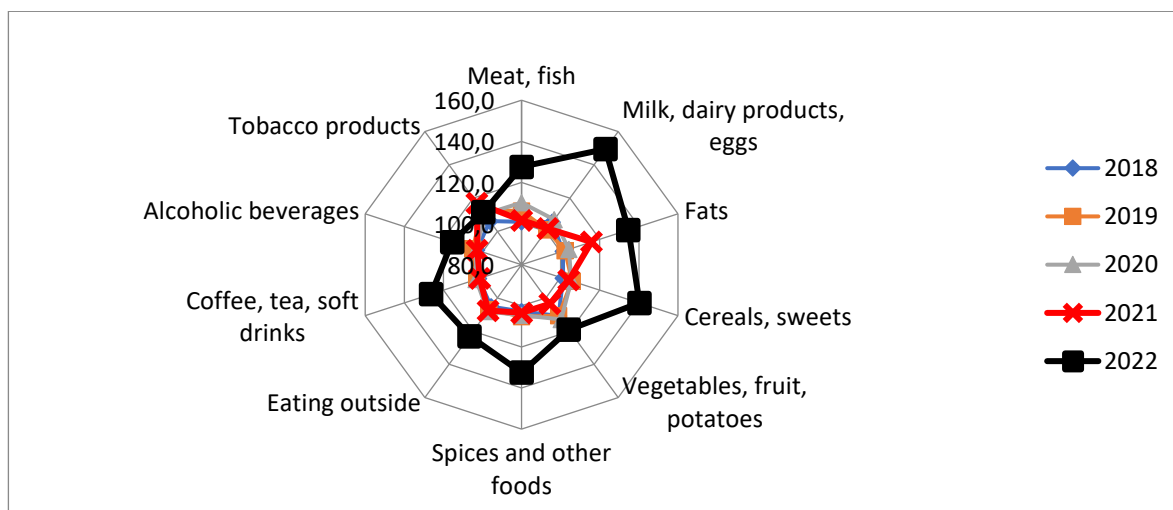*Source: Own editing based on Hungarian Central Statistical Office 2022*

The figure shows that inflation has been moderate in all the main product groups in previous years and that in two thousand and twenty-two, there have been substantial increases in most groups. However, the most significant increase appears to have taken place in food prices.
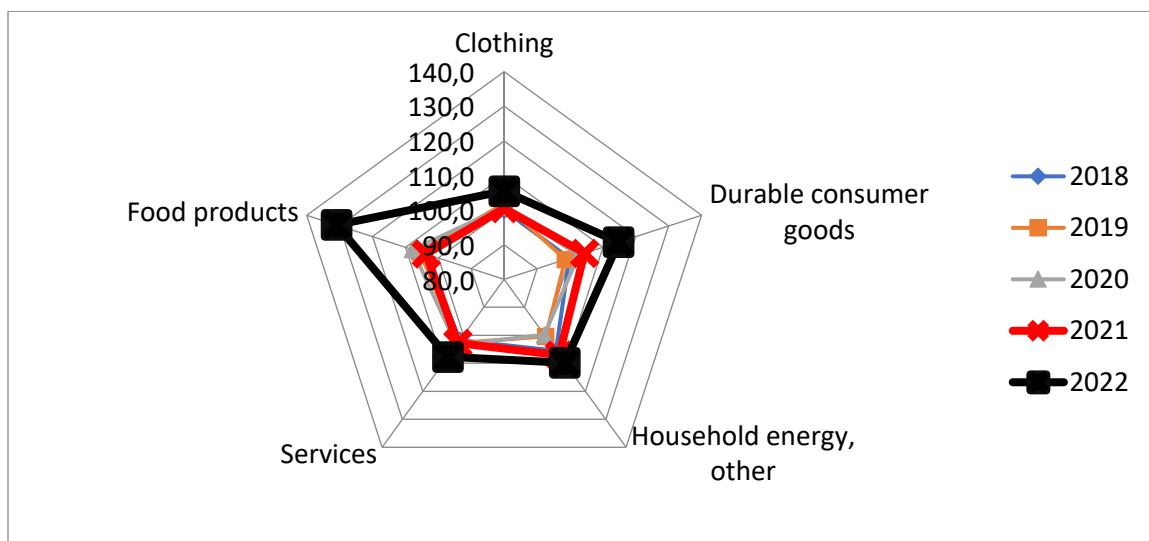
Figure 4. Annual inflation rate of goods clusters in Hungary 2018-2022 (%)
Source: Own editing based on Hungarian Central Statistical Office 2022

Within this, pork prices increased by 14.2 percent in July. Poultry meat prices rose by 38.8 percent, and beef prices by 42.9 percent. Sausage prices increased by 25.2 percent, and salami and ham prices increased by 21.5 percent. The price of milk affected by the price restrictions rose by 29.6 percent, the price of cooking oil by 6.9 percent, the price of flour by 22.7 percent, and the price of sugar by 8.4 percent. The price of eggs rose by 37.5 percent, and margarine by 65.8 percent. In July, the price of bread rose by 57.9 percent, pastries by 38.5 percent, dry pasta by 49.1 percent, confectionery flour by 40.8 percent, and fruit prices by 12 percent. (Hungarian Central Statistical Office 2022)


Figure 5. Annual inflation rate of food products clusters in Hungary 2018-2022 (%)
Source: Own editing based on Hungarian Central Statistical Office 2022

We take agricultural prices into account as producer prices. We also used the price index of industrial goods used in agricultural production. The index calculated in this way is the quotient of the index of agricultural producer prices and the price index of industrial goods used for agricultural production. When calculating it, the agricultural producer price index is divided by the price index of agricultural inputs. The producer price index of agricultural products: shows changes in prices paid to producers for agricultural products purchased from agricultural producers for resale or processing, as well as sold directly to the population for consumption (on the market. The indices were calculated according to the Laspeyres formula.

Price indices of agricultural inputs: include not only industrial but also agricultural (e.g. seeds, fodder) products and services. Among the price indexes of products and services used for current production, KSH collects data on the sales price of feed mixes, fertilizers, plant protection agents, and veterinary medicinal products on a quarterly and annual basis. In the case of the other elemental indices, we use the industrial, construction, and consumer (partial) price indices.
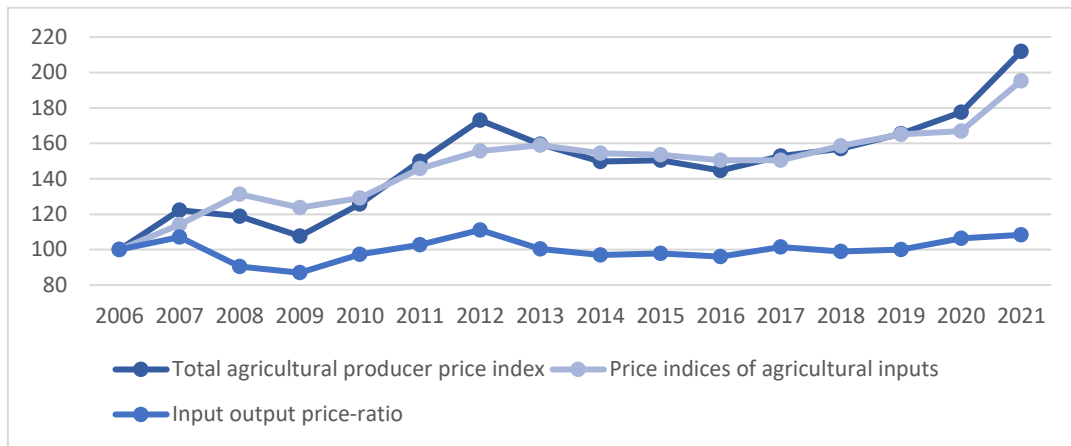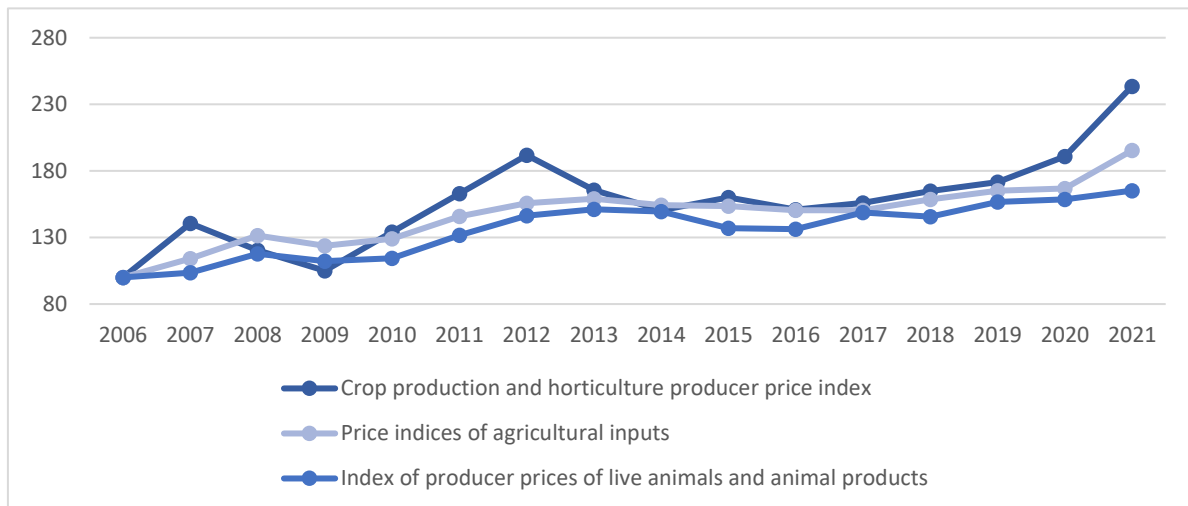
Figure 6. Dynamics of agricultural Input output price-ratio in Hungary 2006-2021 (in percent) 2006= 100

Source: Own editing based on Hungarian Central Statistical Office 2022

In 2020 and 2021, the situation arose that output prices exceeded producer input prices. This is a favorable development since in recent years there has been a trend towards this.

In the following, the examined area is divided into its parts. Indeed, the global investigation hides the fact that Input output price ratio gives a different picture in the field of crop cultivation and animal husbandry. That is why it is worth examining the trend of the development of scissors according to the direction of production.

Figure 7. Dynamics of agricultural Input output price-ratio according to production direction in Hungary 2006-2021 (in percent) 2006= 100

Source: Own editing based on Hungarian Central Statistical Office 2022

The index of agricultural producer prices was split up into the index of "crop and horticulture producer prices", which includes cereals, industrial crops, vegetables, and fruits; and the index of "producer prices of live animals and animal products". As can be seen from the figure, the producer

prices for crop cultivation and horticulture developed rather hectically, but favorably. In the examined period, the average increase in the price level of industrial goods used for agricultural production lagged behind the increase in the producer price of agricultural products related to crop production.

On the other hand, the increase in producer prices of live animals and animal products remained below the price indices of agricultural inputs. All of this causes deterioration since the Input-output price-ratios worsening sometimes realized with a decrease in agricultural prices too. In summary. Livestock farm costs have increased more than their income. One reason for this is rising feed prices.

Our results show that inflation in Hungary is heavily associated with the dominant role of agriculture and food in the economy. In fact, Hungarian inflation is practically synonymous with food price inflation, and prices for major cereals, such as wheat, and maize, matter most.

It was not the purpose of this study to evaluate the transmission mechanism from domestic food prices, but we highlight a few issues.

However, contrary to the prevailing view, we find that the growth of food prices is determined in the external sector. *In other words, the exchange rate and international prices explain a large fraction of inflation.*
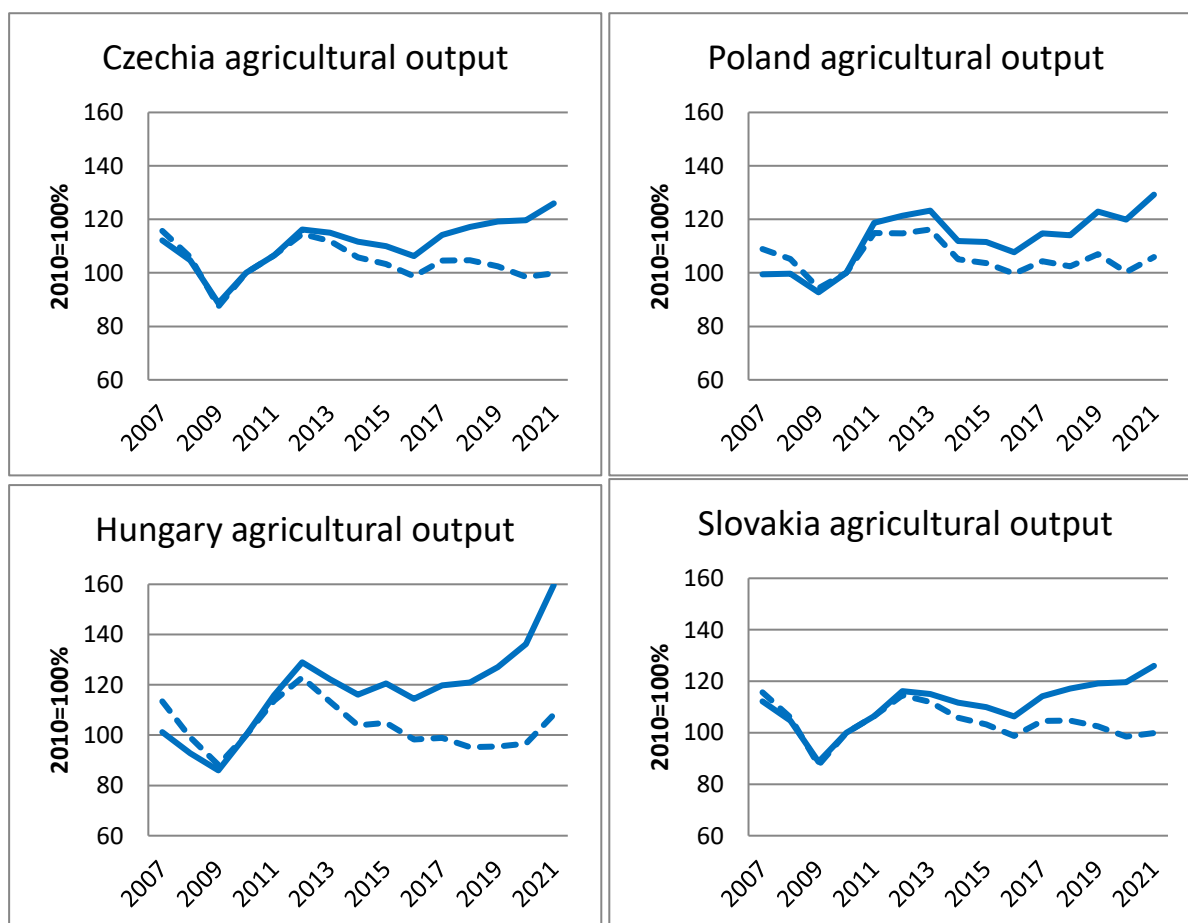
Figure 8. Nominal (line) and real price (dotted line) agricultural output in V4 countries 2007-2021

Source: Own editing based on EUSTAT 2022

Another significant factor in agricultural inflation dynamics is the weakening of the forint currency. The graph shows that agricultural output in Hungary and the neighboring countries is stagnating at around one hundred percent in real terms. In nominal terms, however, while the prices of the products produced have increased by twenty percent in the neighboring countries, domestic nominal prices have increased by sixty percent to two thousand twenty-one

Compared to other countries in the region, it can be seen that the nominal output price of agricultural products has increased much more in Hungary than in neighboring countries. Meanwhile, real prices moved with almost similar dynamics.
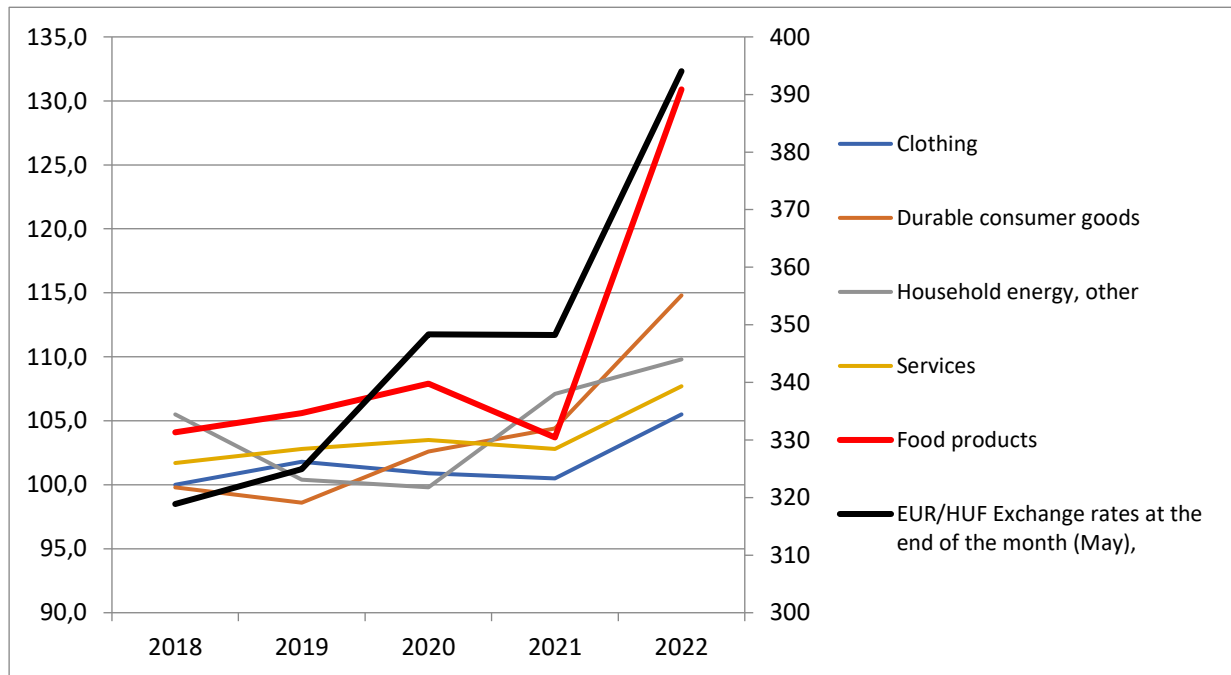

Figure 9. Annual inflation rate of goods clusters in Hungary and EUR/HUF exchange rate 2018-2022

Source: Own editing based on Hungarian Central Statistical Office 2022

It can also be seen in the figure above that the weakening HUF has a close relationship with food prices. One important reason for this is that the domestic agricultural sector is quite dependent on imports.

Prices of agricultural and food products are correlated because part of domestic consumption is covered by imports. The declining forint currency thus has a price-distorting (inflation-increasing) effect. However, as the graph below shows, the amount of goods exported from Hungary exceeds the amount imported into Hungary. Agricultural exports account for 9% of total trade and imports for only 6%.
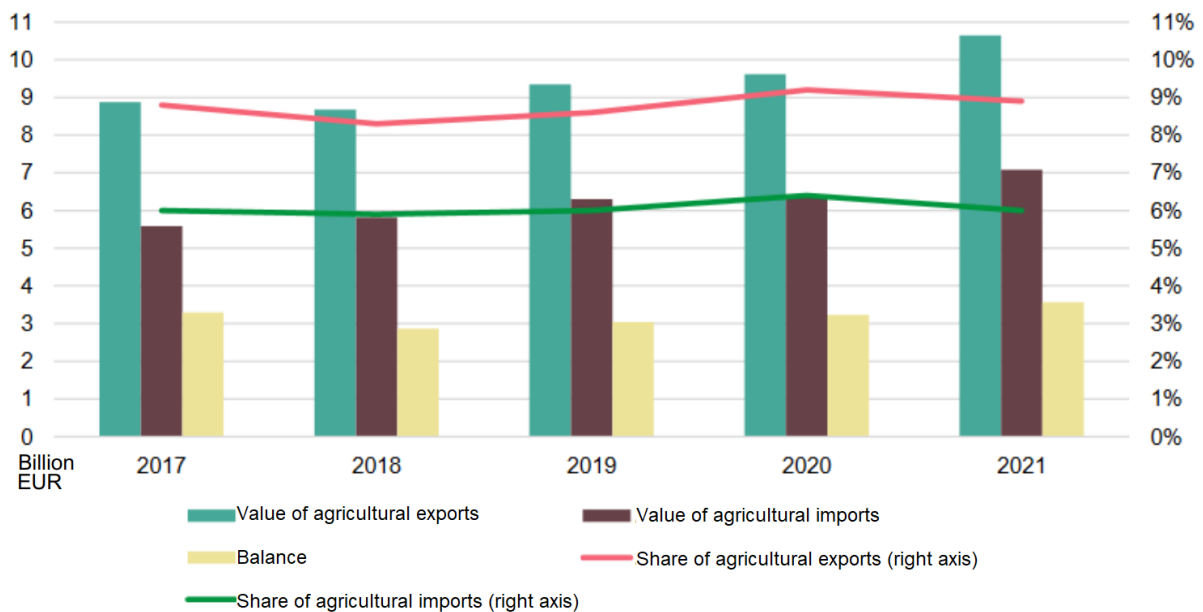
Figure10. Trends in agricultural foreign trade and its share in the total national economy of total exports and imports (2017-2021)

Source: AKI 2022

However, as the table below shows, the sector is not only importing agricultural products. Other important items for the agricultural sector are the import of chemical products (fertilizers, pesticides) and machinery equipment. On the cost side, this is a cost-increasing item due to the weakening forint, which agricultural producers integrate into their prices. This means additional inflationary pressure.

The agricultural entrepreneurs mainly imported agricultural and machinery products for their activities, with a smaller proportion of food and chemical products. The machines and equipment were also used as investments, a part of the food imports covers commercial sales. The majority of exports consisted of agricultural products and a smaller part of food industry products. The share of machinery and chemical products was equally decisive in the turnover of industrial and com-mercial enterprises in both directions.

Table 1. The product structure of foreign trade according to national economic branches, 2020%)

Product\Industry Field	Industry	Agriculture	Trade	Other	Industry	Agriculture	Trade	Other
	export				import			
Agricultural	0,3	80,4	6,3	3,7	0,7	**47,1**	2,3	1,1
Mining	0,4	0,1	0,0	10,2	5,5	**1,3**	0,1	3,3
Food industry	6,3	13,6	4,9	7,2	2,6	**16,1**	8,1	3,0
Light industry	3,9	3,6	4,2	4,9	3,3	**3,6**	9,0	7,1
Chemical industry	18,8	1,1	17,9	14,1	16,3	**10,5**	26,8	10,8
Machine industry	64,9	0,7	60,2	49,1	66,5	**16,7**	47,9	51,9
Other industrial	3,7	0,1	3,6	4,9	3,7	**0,3**	3,9	17,6

Product\Industry Field	Industry	Agriculture	Trade	Other	Industry	Agriculture	Trade	Other
	export				import			
Other	1,7	0,3	2,8	5,9	1,4	**4,5**	1,7	5,1
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: KSH 2022

The prices of energy increased greatly. This also increases the material costs of agricultural work. In addition, the prices of fertilizers and plant protection have also increased significantly in recent years, which will result in further increases in agricultural costs due to the import price-inflating effect of the exchange rate decline, which predicts further food inflation.

Conclusions, suggestions

Food inflation plays an important role in public welfare and financial security for a country. Energy price shocks along with exchange rate decline factors have a very strong effect on food inflation in the short to medium run, causing large deviations from long-run equilibrium. Promoting price stability is even more critical.. In essence, the rate of inflation must be kept relatively low and stable, and doing so will require analyses that offer guidance to the relevant monetary policy authority to achieve the same.

There is a high level of uncertainty about the future inflation path of the agricultural economy. Many different scenarios can be foreseen in this area, but some basic trends can be outlined. It is likely that the climate situation will increase in number and duration so droughts and water shortages will occur more frequently. This will support the inflationary process, including the increase in agricultural inflation. On the other hand, uncertainties arise from the evolution of the forint exchange rate, which is expected to strengthen if Hungary receives EU funds. Also expected to strengthen from changes in energy prices, which could fall significantly in the medium term.

The inflationary process is disadvantageous for consumers. At the same time, however, agricultural producers may even benefit. If the increase in their production costs and production risks is smaller than the increase in the price of the agricultural commodity prices they will sell. In summary, the input-output price ratio improves.

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