

How “Hungaricum” is inflation in Hungary? The classical and specific factors of outstanding inflation in Hungary

Zoltán Sipiczki¹, Gabriella Imre^{2,*}, József Varga^{1,3,4}

¹ Department of Investment, Finance and Accounting, Hungarian University of Agricultural and Life Sciences, Kaposvár 7400, Hungary

² Department of International and Applied Economics, Széchenyi István University, Győr 9026, Hungary

³ Department of Macroeconomics, Corvinus University of Budapest, Budapest 1000, Hungary

⁴ Faculty of Economics, Sapientia Hungarian University of Transylvania, Braşov 260000, Romania

* Corresponding author: Gabriella Imre, imre.gabriella@sze.hu

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Abstract: The study examines the factors shaping inflation in 2022–2023 and explores why inflation in the Hungarian economy has increased more sharply than in neighboring countries with similar structures. The research hypothesis suggests that the inflationary surge, which is notable both globally and within the European Union, is not solely due to market economy mechanisms, but also to specific circumstances in Hungary, including the state’s radical interventions aimed at curbing inflation. The study seeks to highlight these effects and provide recommendations for economic policymakers to develop a more resilient inflation policy. Additionally, it focuses on analyzing inflation in the agricultural sector. The results indicate that, alongside global inflationary pressures, several country-specific factors have driven up the inflation rate in Hungary. Energy prices have risen sharply, and some supply chains from the East have been disrupted. The country under study is less productive, and the impact of the energy price shock on the energy-intensive food industry is higher than in surrounding countries. Consequently, the exchange rate volatility in 2022–2023, combined with short- and medium-term factors, has had a significant impact on food inflation, causing substantial deviations from long-term equilibrium. The research concludes that, in addition to increasing food self-sufficiency, special attention should be given to the domestic development of the agricultural supply chain.

Keywords: inflation; monetary policy; interest rate policy; food price inflation

1. Introduction

Hungary’s significant inflation in 2022–2023, both at the EU level and globally, has surprised economists. The classic supply- and demand-side shocks discussed in economic literature—such as substantial unproductive money outflows during Covid-19, external economic conditions (energy price shocks), natural issues (drought), and a deteriorating balance of payments due to energy price hikes and exchange rate shocks—do not fully explain why inflation in Hungary is significantly higher than in neighboring countries with similar economic environments (**Table 1**). While some reasons for inflation in Hungary align with general economic theories, others are specific to Hungary, such as the impact of subsidies (price caps) and price policies that interfere with market conditions. The combination of these factors is responsible for the sharp increase in inflation in Hungary in 2022–2023.

This study is based on the assumption that government interventions intended to reduce inflation paradoxically increased the inflation rate. This paper aims to answer the question of why inflation has risen more sharply in the Hungarian economy than in

neighboring countries with a similar structure. This trend is particularly evident in the rise in agricultural prices, which peaked at 45% (based on the same month of the previous year, ksh.hu). The study hypothesizes that the surge in inflation is due not only to market economy mechanisms but also to the state’s radical market interventions. Although it is difficult to isolate and quantify the impact of these two causes, the research’s fundamental thesis is that market economy processes alone would have resulted in a smaller and shorter period of inflation.

2. Materials and methods

The aim of the research is to explore the causes of inflation developments in Hungary in 2022–2023 and to explain why inflation in the Hungarian economy rose faster than in neighboring countries with a similar structure (**Table 1**).

Table 1. Comparison of inflation rates in Hungary and selected neighboring countries (HICP—monthly data, annual rate of change).

Title 1	Czechia	Croatia	Hungary	Austria	Poland	Romania	Slovenia	Slovakia
2010-01	0.2	1.3	6.2	1.2	4.0	5.2	1.8	-0.2
2011-01	2.0	1.8	4.0	2.5	3.5	7.0	2.3	3.2
2012-01	3.8	1.4	5.6	2.9	4.1	2.8	2.2	4.0
2013-01	2.0	4.6	2.8	2.8	1.6	5.1	2.8	2.5
2014-01	0.3	0.4	0.8	1.5	0.6	1.2	0.9	0.0
2015-01	-0.1	-0.6	-1.4	0.5	-1.1	0.5	-0.7	-0.5
2016-01	0.5	-0.2	1.0	1.4	-0.3	-1.5	-0.8	-0.6
2017-01	2.3	0.9	2.4	2.1	1.4	0.3	1.5	0.8
2018-01	2.1	1.2	2.1	1.9	1.6	3.4	1.7	2.6
2019-01	2.0	0.6	2.8	1.7	0.6	3.2	1.2	2.2
2020-01	3.8	1.8	4.7	2.2	3.8	3.9	2.3	3.2
2021-01	2.2	0.0	2.9	1.1	3.6	2.0	-0.9	0.7
2022-01	8.8	5.5	7.9	4.5	8.7	7.2	6.0	7.7
2023-01	19.1	12.5	26.2	11.6	15.9	13.4	9.9	15.1
2024-01	2.7	4.8	3.7	4.3	4.5	7.3	3.4	4.4

¹ Source: Eurostat.

The research mainly used data and document analysis. The data and information needed to analyze inflationary trends were provided by a combination of sources, including official statistical databases such as the Central Statistical Office (Eurostat), as well as analyses and reports published by the Hungarian Central and other economic research institutions. The data included consumer price indices, monthly data on inflation rate developments and changes in agricultural prices. The data collection covered the period 2010–2024, with a special focus on the period 2022–2023.

3. Literature review

Several authors have attempted the analysis of the causes of high inflation in

Hungary. Botos (2023) has produced a comprehensive analysis of the causes of inflation in Hungary. This paper has been chosen as the backbone of our analysis, with the aim of contributing to the much-needed debate in the economic literature. While the analysis covers many important factors and interrelationships, additional effects are worth exploring to obtain a complete picture. In the authors' view, several other factors played a role in the inflationary outliers observed in 2022–2023.

The phenomenon that requires the most explanation is why inflation in the Hungarian economy has risen more strongly than in neighboring countries with similar structures. This paper aims to shed light on these supplementary effects and provide suggestions for economic policymakers to design a more resilient inflation policy. This research responds to the views on inflation presented in two studies and then examines some global inflation trends. In our paper, special attention is given to the analysis of inflation in the agricultural sector, given the significant increase in Hungarian agricultural inflation in a global context.

Botos (2023) analyzed various internal and external causes of inflation. Focusing on the main agreement of the paper—without delving into the relationship between external and internal factors—we agree with the main finding that “a small, open economy can hardly manage to bring down inflation by autonomous monetary policy alone; its monetary policy cannot disconnect from international financial market trends due to indebtedness” (Botos, 2023:84). The details, however, present a mixed picture. Although the authors of this paper have the advantage of writing a few months later, the stagflation envisaged by Botos, which would involve economic stagnation alongside stubbornly high inflation, now seems fortunately unlikely. In fact, high inflation appears to be declining rapidly both globally and within our country. This is largely due to changes in global energy commodity prices, an external factor independent of the Hungarian economy. This conclusion aligns with that of Katalin Botos, who rightly notes that “international experience shows that disinflation has not been accompanied by lasting real gains” (Botos, 2023:85). According to a general justification in the Hungarian economics literature (Spéder and Vonnák, 2023)—a view shared by the authors—one of the main reasons for the rapid rise and fall in inflation is the peak and subsequent sharp decline in energy prices.

However, this required domestic monetary policy to tighten interest rates to reduce inflation, which was further suppressed by external factors. The increase in the daily interest rate to 18% was an effective complement to the decline in household and government demand, even though, in our view, the MNB was somewhat late in raising interest rates, lagging behind the rise in inflation (Botos, 2023). Nevertheless, this necessary step was eventually taken, though it negatively impacted economic growth and the fiscal balance, both directly (through increased interest expenditures) and indirectly (through a reduction in VAT revenues, which play a prominent role in the Hungarian budget).

The domestic inflationary drivers for 2022 can be summarized as traditional energy price increases, wage increases, retailer responses to the price cap regime, credit expansion consumption, and the effects of a drought year. Indeed, the expansion of household credit following the 2010 elections, while stimulating real output, also contributed to rising inflationary pressures. In the context of a post-Covid-19 recovery, a credit-led expansion of demand in sectors where output is below capacity would not

typically cause price increases (e.g., services, industrial production). However, in sectors already facing excess demand or limited supply (e.g., construction, food), it would indeed contribute to an expansion of inflationary pressures in those industries.

This paper focuses on the monetary policy aspect and does not address the main proposition of Botos' paper. Botos argues that replacing the predominantly value-added tax (VAT)-based fiscal revenue policy with a more structured policy that combines a more proportionate and progressive income tax policy is advisable (Botos, 2023). Similarly, due to space constraints, we do not address the historical discussion of the reasons for demand-driven inflation that began with the introduction of the forint. Nonetheless, the analysis addresses the combined role of monetary and fiscal policy and draws a far-reaching conclusion from the failures of this cooperation: "It seems, therefore, that the 'Hungarian model' will need to be modified in the wake of the 2022 inflationary wave" (Botos, 2023:93). Botos (2023) also highlights the situation of the Hungarian agricultural economy, noting that while the country has excellent agricultural conditions, food price inflation was the highest in Hungary last year compared to the rest of Europe, making food prices among the highest in the country under study. This is astonishing, as is the sharp decline in the performance of the country's food industry. Due to its importance, agri-food inflation is discussed in detail in the third and final part of this paper.

In addition to Botos' article, the study by Ábel et al. (2024) has had a significant impact on Hungarian economic thought, and we reflect on the main claims of this article here. The paper argues that most analysts focused on product market shocks rather than unemployment indicators when analyzing the sudden rise in inflation in 2021-2022. The Phillips curve approach, which traditionally provides the theoretical framework, was questioned. Alongside the surge in food and energy prices, new inflationary factors have emerged, such as supply chain disruptions, fiscal spending, and loose monetary policy in the context of the virus crisis.

The authors use Galbraith (2023) as a basis to analyze the impact of energy price increases on inflation. They find that before the Covid crisis, oil prices were particularly low; these declined further during the virus crisis. From this low base, energy price inflation became pronounced. Besides the rise in energy prices, the shortage in the semiconductor market—crucial to the automotive industry—is also a significant factor, as the decline in demand expected by car manufacturers did not materialize. As a result, prices in the used car market rose significantly. Ábel et al. (2023) mention the IMF's estimation of the Phillips curve for Hungarian data, based on a study by Cohn-Bech et al. (2023). The estimation results indicate that while the variables used in the traditional Phillips curve approach are significant in explaining inflation in Hungary, specific factors also played a substantial role. Foreign price shocks, for instance, emerged as an accelerating factor for inflation. Meanwhile, a number of internal effects that traditionally appear as inflation-enhancing factors, such as inflation expectations or demand-side factors, are not considered significant in the current inflation analysis.

Overall, we agree with the authors' view that the Phillips curve was flat before the Covid crisis (for 20 years), mainly due to the decline in workers' bargaining power, particularly the diminished ability of organized labor to assert its interests (Ábel et al., 2024; Gelencsér et al., 2024). However, we believe that further studies are needed on

the non-linear Phillips curve. The authors reviewed a large body of literature where the unemployment rate was replaced by the number of vacancies, but the results are inconclusive.

Nevertheless, we fully agree with the authors' conclusion that current inflation is not driven by rising wages but by increasing profits. While there have been suggestions in the US and the EU that the increase in demand following the pandemic crisis drove up prices, the data do not suggest that aggregate demand increased excessively (Ábel et al., 2024). Based on various references in the literature, the study attributes approximately 60% of the role of profit growth in the evolution of inflation. The authors of this paper also consider this factor to be of paramount importance, and we, therefore, present our views separately in the section on global inflation trends. The authors agree with the analysis of the role of wages and profits in the Phillips curve. Since the inception of the Phillips curve approach, there have been significant changes in the approach to inflation, reflecting changes in the nature of inflation. For example, the unemployment gap was later replaced by the output gap. In the current situation, the output gap has been replaced by arguments in favor of including enterprise pricing, marginal costs, and profit rates (Ábel et al., 2024).

4. Results and discussion

4.1. Global inflation trends

In early 2021, inflation exceeded the central bank's tolerance range and began rising rapidly, highlighting the critical role of monetary policy in maintaining economic stability. This inflationary spike was driven by both global and country-specific factors. On one hand, demand rebounded quickly after the pandemic, while supply chain disruptions caused by partial lockdowns posed additional challenges. Furthermore, global raw material prices surged with economic recovery, a trend exacerbated by the Russia-Ukraine conflict and the European energy crisis. In this environment, the role of monetary policy became even more significant for Hungary, which, with its high dependence on energy imports, faced strong pressures from imported inflation. At the same time, weakened fiscal discipline prolonged demand-side adjustments, with some government policies further elevating long-term inflation.

The Hungarian National Bank (MNB) responded with a strong demonstration of the role of monetary policy as a stabilizing force. Among the first in Europe to act, the MNB signaled heightened inflationary risks in early 2021 and promptly began raising interest rates. To restore price stability, the MNB undertook the largest cumulative rate hikes among EU countries, further underscoring the central role of monetary policy in counteracting inflation. This decisive intervention led to inflation peaking in early 2023, followed by a period of rapid disinflation. Consequently, inflation returned to the central bank's tolerance range within a year, reaffirming the essential role of monetary policy in achieving economic stability, with this target reached by January 2024. In line with the arguments presented in the two papers above, this paper explores the broader inflationary processes by analyzing current global inflation trends from our perspective. Over the last two decades, low inflation has been largely sustained by "megatrends" such as digitalization and globalization (Matolcsy et al.,

2020). These trends have introduced significant phenomena from both an economic perspective and in terms of understanding the causes of inflation. For example, companies have continuously improved their efficiency through more effective communication and digitalization techniques, while globalization and the rise of cheap (though recently fragile) global supply chains have further reduced the costs of goods and services.

However, this favorable period is likely to end in the medium to long term. While there is still potential for further technological developments, these are increasingly costly to implement in everyday business operations. High-speed internet, mobile communications, rapid data analysis via office software, and enterprise information systems are all tools that nearly all firms have integrated into their processes. Although further advancements in AI, the metaverse, and big data offer opportunities, their practical application in efficiency-enhancing business environments is not yet widespread. Additionally, challenges such as epidemics, armed conflicts, and potential trade wars are making it increasingly difficult to maintain the previously favorable supplier prices (Goodhart and Pradhan, 2017; Hajnal and Várhegyi, 2016).

Hungary is particularly vulnerable to international influences in this context. In more open economies, inflation is more sensitive to external rather than internal factors as trade barriers are reduced (Nagy and Tengely, 2018). Auer et al. (2019) also examined the inflation-synchronizing effects of globalization and found that global value chains and input-output linkages significantly facilitate the co-movement of inflation across countries. Cravino and Levchenko (2017) illustrated this interdependence clearly when they investigated the strength of international input-output relationships. They found that global inflation shocks are transmitted significantly across countries. On average, a shock that increases inflation by 1% in one country raises domestic producer price inflation by 0.19% in other countries.

The deteriorating social age profile across Europe and in Hungary also points to a further negative inflation trend (**Figure 1**).

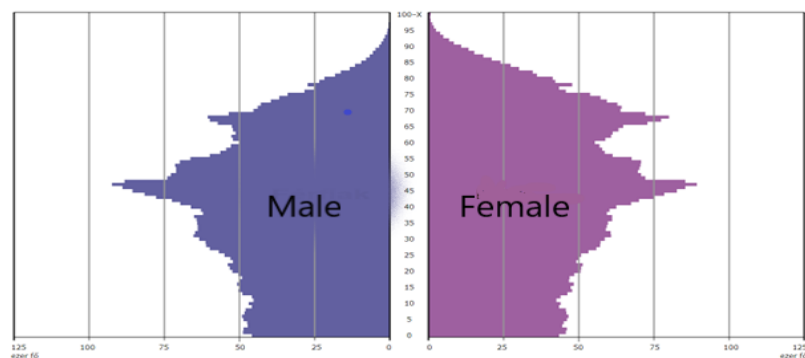


Figure 1. Population of Hungary by sex and age, 2023.

Source: KSH (2024a).

An increase in the proportion of older people also implies fewer workers in the economy as the proportion of working-age individuals decreases, which in turn raises inflation (Yoon et al., 2014). This demographic shift further fuels inflation by enhancing workers' bargaining power in wage negotiations due to the decreasing number of working-age individuals in the labor market. Higher wages lead to

increased demand, thereby driving inflation upward. Moreover, higher tax burdens on workers become inevitable to maintain the social safety net and provide care for the elderly (Goodhart and Pradhan, 2017). Higher wages also raise firms' costs, which are reflected in higher prices. This scenario further heightens inflation expectations, causing workers to demand even higher wages in negotiations, potentially triggering a self-perpetuating wage-price spiral (Hajnal and Várhegyi, 2016).

Indeed, while encouraging family formation to improve the deteriorating age structure is a vital long-term policy goal, in the short to medium term, it is equally important for the government to focus on preventing the emigration of the current young generation and creating a favorable social and economic environment for them.

A significant factor contributing to inflation in Hungary during 2022–2023 is the phenomenon known as “profit inflation,” which has surfaced with negative connotations in Hungary during this period. This term refers to instances where companies set prices for their products significantly higher than expected, even beyond the price increases of their suppliers, to generate higher profits for themselves (Kharroubi and Smets, 2024). While this may be a rational decision for individual companies at the micro level, it leads to adverse effects at the macro level. Companies could raise their prices even without a corresponding rise in costs. Contributing factors such as rising energy prices, extraordinary taxes (e.g., windfall taxes), and increasingly widespread price caps have all led to market uncertainty. To hedge against these risks, many manufacturers, distributors, and service providers responded by increasing their profit margins. As noted in the Central Bank's (MNB) Inflation Report published in December 2023, “corporate profits have risen significantly in recent quarters” (MNB, 2023). In a stable regulatory and tax environment, market competition and financially conscious consumer behavior (reinforced, for example, by a Price Watch) would penalize those with excessively high corporate profits. However, in a volatile and unpredictable legal framework, rational behavior is to prepare for potential losses, resulting in market selection not occurring. Therefore, it is recommended that special attention be given to reducing special taxes in the future and avoiding sudden economic interventions without proper impact assessments.

In autumn 2021, the government temporarily introduced a price freeze on certain basic foodstuffs. In November 2022, the government decided to extend this price freeze (Government Decree No. 6/2022 [I. 14.]). The prices were monitored by the general consumer protection authority, namely the county and metropolitan government offices, with the involvement of the National Food Chain Safety Office. A growing number of peer-reviewed articles conclude that the price-cap policy, intended as an anti-inflationary measure, has actually contributed to the intensification of inflation (Petschnig, 2023), and that maintaining price caps and interest rate freezes has had a negative impact (Várhegyi, 2023). Conversely, some analysts argue that “administrative barriers to price increases—from ration cuts to price caps—have had a temporary, morale-boosting effect, but have also led to waste, supply disruptions, or even imbalances” (Karsai, 2023).

It is important to highlight that profit-driven inflation, exacerbated by market uncertainty, may have been further influenced by the sharp weakening and continued volatility of exchange rates in 2022 (**Figure 2**). This sharp deviation from the usual trend in 2022 was something economic agents could not anticipate in their previous

plans. When exchange rates become unstable, firms are uncertain about the future exchange rate and set the prices of their products or services high enough to ensure profitability even if an exchange rate loss occurs.

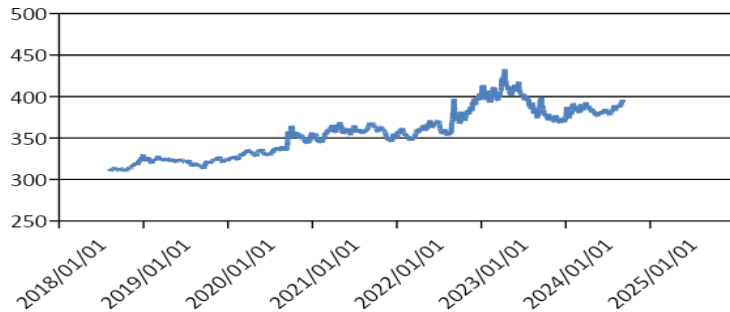


Figure 2. Value of the euro in national currency.

Source: MNB (2024a).

4.2. Distorting factors in the population’s perception of inflation

Another bias in the population’s perception of inflation, which we examine in our analysis of global trends, is the fact that the decade prior to 2021 was a period of relatively low inflation. Concerns about inflation in the economic literature were overshadowed after the 2008 global economic crisis. For nearly a decade following the 2008 crisis, economic agents experienced a period of relative calm, with some minor geographical and temporal exceptions. This period was characterized by a trinity of low inflation, low interest rates, and high economic growth. However, this economic policy environment has shifted since 2021, particularly due to the rise in the US Federal Reserve’s interest rates.

Both international and domestic populations have become accustomed to an inflationary environment of around 5% or lower, making the recent surge in prices unexpected. However, as historical inflation data (**Figure 3**) indicates, inflation rates of 5%–10% were not uncommon before the 2000s. Thus, it cannot be said that the extremely low inflation rates post-2010 represent the natural course.



Figure 3. Consumer price index by food major group and pensioner consumer price index [previous year = 100.0%].

Source: KSH (2024b).

In our view, the period of low inflation in the last decade and a half has been a one-off or, to put it less extreme, a rare event, and we should settle for a period of around 5% rather than 2%–3% on a sustained basis, given global trends.

4.3. Food price inflation and its distorting factors in the public’s perception of inflation

Food prices are weighted at around 20% when measuring inflation (Table 2). Inflation also plays a significant role in driving food price increases (Bareith and Fertő, 2023).

Table 2. Consumption weight of food in the measure of inflation.

Breakdown of detailed groups of the KSH by MNB, weights (%)												
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Market goods	81.0	81.0	82.3	83.6	83.8	84.0	83.4	84.9	86.3	87.6	86.8	86.9
Foods	18.3	18.7	19.3	19.1	19.3	18.8	19.3	19.4	20.2	19.4	19.6	19.6

Source: MNB (2024c).

There are several distorting factors in the public’s perception of inflation. These distortions tend to amplify the perceived severity of the inflation reflected in statistics. A significant portion of household budgets is spent on goods and services that are purchased less frequently, such as cars or durable goods. These expenditures and changes in the prices of such goods are often overlooked when forming an opinion on inflation. Meanwhile, regularly purchased items (e.g., food, fuel) weigh more heavily in household perceptions, so when the prices of these items increase, people tend to overestimate actual inflation (Molnár, 2014).

However, this is only partly a perception bias, as individuals in lower income deciles spend a higher proportion of their income on food compared to those in higher income deciles. Figure 4 depicts the significant surge in food price inflation in Hungary during 2022. Consequently, food inflation has a more severe impact on these already financially vulnerable groups than the average inflation rate (Sipiczki et al., 2023). In these low-income groups, inflation in Hungary is almost synonymous with food price inflation. International experience suggests that this has significant welfare consequences, particularly in economies where a large share of the population lives below the poverty line. In such societies, the poor spend a larger portion of their income on food and, therefore, suffer disproportionately from rising food prices (Arndt et al., 2008; Barrett and Dorosh, 1996; Moncarz et al., 2018; Tóth et al., 2021).

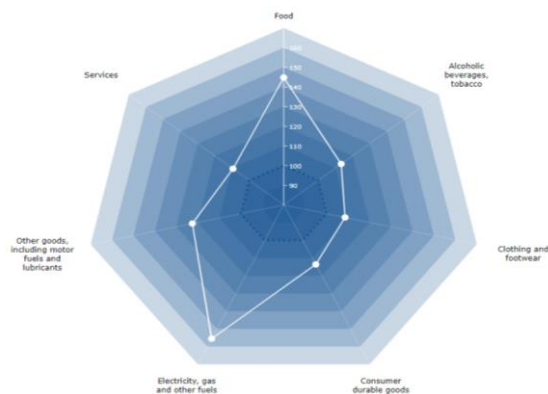


Figure 4. Inflation radar, December 2022–Consumer price indices by expenditure group (same month of previous year = 100).

Source: KSH (2024c).

As a small, open economy with declining domestic food self-sufficiency and an increasing reliance on agricultural imports, Hungary is particularly vulnerable to the negative effects of price changes. The demand elasticity for most agricultural commodities is so low that small changes in demand can lead to large price fluctuations (Moses et al., 2019). Price volatility is especially risky in the agricultural sector, where profit margins in many production sectors are minimal, often hovering around equilibrium profits (Bareith and Csonka, 2022). Botos (2023) noted in her study that the increase in food prices in 2022 was largely driven by drought and was exacerbated by export difficulties and a deteriorating exchange rate. However, this assessment should be complemented by another perspective: the weakening of the forint is closely linked to food prices. One unfortunate reason for this is that the domestic food industry’s supply chain is heavily dependent on imports. In other words, a portion of Hungary’s agricultural and food consumption is covered by imports, a share that has been increasing over the last two years. Therefore, the falling exchange rate of the forint has a price-distorting (inflation-increasing) effect. **Figure 5** illustrates the evolution of food price inflation in Hungary.

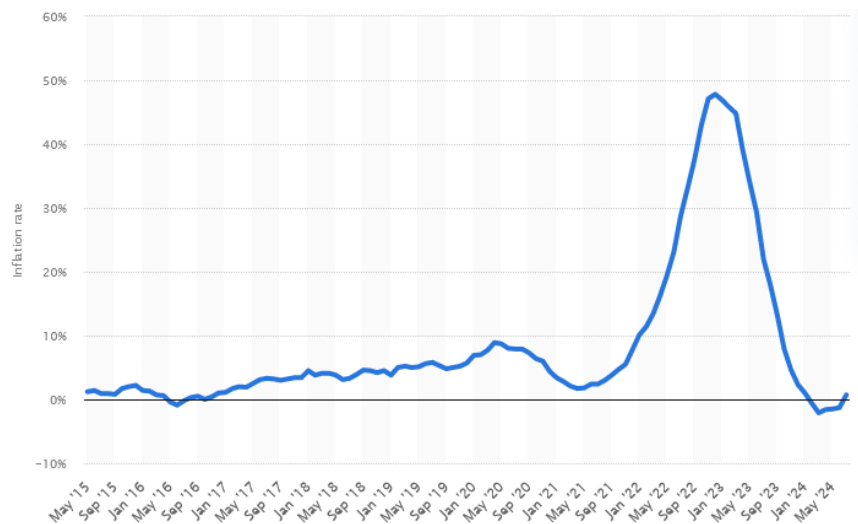


Figure 5. Food price inflation in Hungary.

Source: Trading Economics, Hungarian Central Statistical Office.

In 2023, the volume of agricultural goods exported from Hungary exceeded the volume imported into the country. Agricultural exports accounted for 9% of total trade, while imports made up only 7% (AKI, 2024). A major import category for the agricultural sector includes chemical products (fertilizers, plant protection products) and machinery. Agricultural entrepreneurs primarily imported machinery and agricultural products for their activities, with a smaller share dedicated to food and chemical products. On the cost side, the weakening of the forint has increased expenses for domestic farmers, who have had to factor these costs into their prices, contributing to additional inflationary pressure.

Additionally, the spillover mechanism from the Eurozone HICP significantly impact Hungarian inflation, given the economic interconnections between Hungary and the Eurozone, particularly in terms of import prices and the consumer price index. Price changes in the Eurozone affect domestic inflation both directly and indirectly,

for instance, through variations in raw material and energy costs, as well as in the prices of imported goods. Understanding this mechanism can shed light on the external inflationary pressures affecting the Hungarian economy, thereby aiding in formulating appropriate economic policy responses. “An increase in the price of an intermediate product causes a cost increase for the buyers, who, in turn, pass this on to their customers to avoid a decrease in value added. At the endpoints, final consumers face all original and spill-over effects transmitted by the whole global value chain as an increase in the price of their consumption bundle expressed by consumer price indices” (Koppány et al., 2023). Further cost-push inflationary pressures arose from the fact that, although households were partly shielded by rationing measures, the state largely financed rising purchase prices through corporate taxes. These taxes were subsequently passed on to consumers through higher prices. Energy prices rose sharply, and the war in Ukraine disrupted some supply chains in the East, further increasing the costs of materials for agricultural work. Additionally, the prices of fertilizers and crop protection products have surged in recent years, leading to further increases in agricultural costs.

Food inflation plays a crucial role in the public welfare and financial security of a country. Energy price shocks, coupled with exchange rate depreciation, have a strong impact on food inflation in the short and medium term, causing significant deviations from long-run equilibrium. There is also considerable uncertainty about the future inflation path of the agricultural economy in 2024. While various scenarios exist, some basic trends can be outlined. It is likely that the negative effects of climate change will intensify, leading to more frequent droughts and water scarcity, which will exert further upward pressure on inflation. On the other hand, uncertainty surrounding the exchange rate of the forint will increase domestic production costs, as explained earlier.

Moreover, we contend that the current level of production in the food industry is inadequate in several respects. Domestic production has significantly declined, and in a deteriorating exchange rate environment, this trend is fueling inflation. Combating inflation requires a multi-faceted approach. In addition to increasing food self-sufficiency, particular attention should be paid to the domestic development of the agricultural supply chain. Monetary and exchange rate policies should consider agricultural consumption as a key determinant of inflation, which has a greater impact on lower-income groups than is widely recognized.

5. Conclusion

This study examined the factors influencing inflation in Hungary from various perspectives. The main cause of inflation in Hungary was identified as the impact of changes in global energy prices, an external factor beyond the control of the Hungarian economy. Global epidemics, armed conflicts, and potential trade wars have negatively impacted the sustainability of previously favorable supplier prices. As an open economy, Hungary is particularly vulnerable to international influences in this area. The further adverse inflationary trend projected for Europe and Hungary will be exacerbated by the deterioration of the social age structure.

We have demonstrated that the megatrends analyzed have significantly impacted

inflation in Hungary. However, there were specific Hungarian factors contributing to the classical causes of inflation. Our study supports the hypothesis that a significant portion of the inflation in Hungary (the inflation surplus relative to neighboring countries) was caused by specific economic policy interventions in Hungary. These include the delayed response of the MNB in raising interest rates, which lagged behind the rise in inflation. An important lesson from the Ábel et al. (2024) study is that current inflation is primarily driven by profit increases rather than wage growth. Strong profit inflation due to weak competition, coupled with the sharp weakening and continued volatility of exchange rates in 2022, also contributed to inflation.

Our study on the perception of agricultural inflation highlighted the important point that the population's perception of inflation may be distorted by factors such as food inflation and the increased sensitivity of lower-income groups to changes in food prices. Another country-specific factor that significantly impacted food inflation in Hungary was the disruption of supply chains in the East. However, combating inflation requires a multi-faceted approach. In addition to increasing food self-sufficiency, the domestic development of the agricultural supply chain should be a key focus to reduce agricultural inflation. Monetary and exchange rate policies should consider agricultural consumption, which is a main determinant of inflation and has a greater impact on lower-income groups than is widely recognized.

Finally, we identified that a series of anti-inflationary government measures inadvertently contributed to the strengthening of inflation. The reduction of rationing, maintenance of price caps, and interest rate freezes have negatively impacted the inflation process. Furthermore, administrative obstacles to price increases have, in addition to their temporary effects, led to wastage, supply disruptions, and market imbalances.

Author contributions: Conceptualization, JV and ZS; methodology, ZS; software, GI; validation, GI, JV and ZS formal analysis, ZS; investigation, GI; resources, JV; data curation, ZS; writing—original draft preparation, JV; writing—review and editing, GI; visualization, ZS; supervision, JV; project administration, GI; funding acquisition, GI. All authors have read and agreed to the published version of the manuscript.

Conflict of interest: The authors declare no conflict of interest.

References

- Ábel, I., Bognár G., Lóga M., et al. (2024). Changes in the explanation of inflation. *Public Finance Quarterly*, 70(1), 108-130. https://doi.org/10.35551/PFQ_2024_1_6
- AKI (2023) Az élelmiszer-gazdaság külkereskedelme. Available online: <https://www.aki.gov.hu/termek/az-elelmiszer-gazdasag-kulkereskedelme-2023-ev/> (accessed on 18 August 2024)
- Arndt, R., Benfica, N., Maximiano, A.M., et al. (2008). Higher fuel and food prices: impacts and responses for Mozambique. *Agricultural Economics*, 39(1), 497-511. <https://doi.org/10.1111/j.1574-0862.2008.00355.x>
- Auer, R. A., Levchenko, A. A., Sauré, P. (2019). International inflation spillovers through input linkages. *Review of Economics and Statistics*, 101(3), 507-521. https://doi.org/10.1162/rest_a_00781
- Bareith, T., Csonka, A. (2022). Dynamics of Competition in the Hungarian Poultry Industry. *AGRIS on-line Papers in Economics and Informatics*, 14(2), 15-29. <https://doi.org/10.7160/aol.2022.140202>.

- Bareith, T., Fertő, I. (2023). Can monetary policy stabilize food inflation? (Hungarian). *Statisztikai Szemle*, 101(4), 354-380. <https://doi.org/10.20311/stat2023.04.hu0354>
- Barrett, C. D., Dorosh, P. A. (1996). Farmers' welfare and changing food prices: nonparametric evidence from rice in Madagascar. *American Journal of Agricultural Economics*, 78(3), 656-669. <https://doi.org/10.2307/1243283>
- Botos, K. (2023). Inflation and finance. *Public Finance Quarterly*, 69(4), 84-94. https://doi.org/10.35551/PFQ_2023_4_5
- Cohn-Bech, E., Foda, K., & Roitman, A. (2023). Drivers of inflation: Hungary. International Monetary Fund. <https://www.imf.org/-/media/Files/Publications/Selected-Issues-Papers/2023/English/SIPEA2023004.ashx>
- Cravino, J., Levchenko, A. A. (2017). Multinational firms and international business cycle transmission. *The Quarterly Journal of Economics*, 132(2), 921-962. <https://doi.org/10.1093/qje/qjw043>
- Galbraith, J. K. (2023). The quasi-inflation of 2021–2022: a case of bad analysis and worse response. *Review of Keynesian Economics*, 11(2), 172-182.
- Gelencsér, M., Kőműves, Z. S., Hollósy-Vadász, G., & Szabó-Szentgróti, G. (2024). Modelling employee retention in small and medium-sized enterprises and large enterprises in a dynamically changing business environment. *International Journal of Organizational Analysis*. <https://doi.org/10.1108/IJOA-09-2023-3961>
- Goodhart, C., Pradhan, M. (2017). Demographics will reverse three multidecade global trends. Available online: http://eprints.lse.ac.uk/84208/1/Goodhart_Demographics%20will%20reverse_2017.pdf (accessed on 20 November 2022)
- Government decree No. 6/2022 (14 January) on the different application of Act LXXXVII of 1990 on setting price rates during a state of emergency (Hungarian) Available online: <https://njt.hu/jogszabaly/2022-6-20-22> (accessed on 18 August 2024)
- Hajnal, M., Várhegyi, J. (2016). Inflation (Hungarian). Magyar Nemzeti Bank, Oktatási füzetek, 1, Available online: <https://www.mnb.hu/letoltes/mnb-oktatasi-fuzetek-inflacio-2016majus.pdf> (accessed on 16 October 2022)
- Karsai, G. (2023). GKI Economic Researcher JSC: This year, a 0,5 percentage of decrease and 19 percent annual inflation are expected (Hungarian). *Külgazdaság*, 67(3-4), 32-52. <https://doi.org/10.47630/KULG.2023.67.3-4.32>
- Kharroubi, E., Smets, F. (2024). Monetary policy with profit-driven inflation. Bank for International Settlements, No. 1167 Available online: <https://www.bis.org/publ/work1167.pdf> (accessed on 18 August 2024)
- Koppány, K., Vakhal, P., & Pusztai, P. (2023). Hungary's inflationary exposures to global price movements. *Society and Economy*, 45(3), 186-207.
- KSH (2024a). Age structure (Hungarian). Available online: <https://www.ksh.hu/interaktiv/korfak/orszag.html> (accessed on 21 April 2024)
- KSH (2024b). The consumer price index by main consumption groups and the retired consumer price index (Hungarian). Available online: https://www.ksh.hu/stadat_files/ara/hu/ara0002.html (accessed on 3 April 2024)
- KSH (2024c). Inflation radar December 2022. Consumer price indices by expenditure groups (Hungarian) Available online: https://www.ksh.hu/interaktiv/fogyar_radar/index.html (accessed on 3 April 2024)
- Matolcsy, Gy., Nagy, M., Palotai, D. et al. (2020). Inflation in the digital era – The measurement and distortions of inflation in the 21st century (Hungarian). *Hitelintézet Szemle*, 19(1), 5-36. <http://doi.org/10.25201/HSZ.19.1.536>
- MNB (2023). Inflation report, December 2023 (Hungarian). Available online: <https://www.mnb.hu/letoltes/hun-ir-digitalis-24.pdf> (accessed on 1 March 2024)
- MNB (2024a). Euro exchange rate (Hungarian). Available online: <https://www.mnb.hu/arfolyam-tablázat?deviza=rbCurrencySelect&devizaSelected=EUR&datefrom=2018.+02.+07.&datetill=2024.+03.+07.&order=1> (accessed on 7 March 2024)
- MNB (2024b). Quick analysis on inflation trends, February 2024 (Hungarian). Available online: <https://www.mnb.hu/letoltes/gyorselemzes-az-inflacio-alakulasarol-hu-2024-februar.pdf> (accessed on 1 March 2024)
- MNB (2024c). The consumption weight of food in the measurement of inflation broken down by MNB (Hungarian). https://statisztika.mnb.hu/idosor-3678;0203_mnbcsoportok (accessed on 1 March 2024)
- Molnár, Gy. (2014). Why can perceived inflation be higher than reality? (Hungarian). Available online: <https://www.mnb.hu/letoltes/molnar-gyorgy-miert-lehet-magasabb-az-erzekelt-inflacio-a-valosagnal.pdf> (accessed on 26 April 2024)
- Moncarz, P; Barone, S.; Descalzi, R. (2018). Shocks to the international prices of agricultural commodities and the effects on welfare and poverty: a simulation of the ex ante long-run effects for Uruguay. *International Economics*, 156, 136-155. <https://doi.org/10.1016/j.inteco.2018.01.007>

- Moses K. Tule, Afees A. Salisu, Charles C. Chiemeka, Can agricultural commodity prices predict Nigeria's inflation?, *Journal of Commodity Markets*, Volume 16, 2019, 100087, ISSN 2405-8513, <https://doi.org/10.1016/j.jcomm.2019.02.002>.
- Nagy, É., Tengely, V. (2018). The external and domestic drivers of inflation: the case study of Hungary. In: Bank for Settlements (ed.) *Globalisation and deglobalisation*, Bank for Settlements. Volume 100, pp.149-172. <https://doi.org/10.31477/rjmf.201803.49>
- Petschnig, M. Z. (2023). 2022: Definite increase in inflation, mainly due to internal reasons (Hungarian). *Külgazdaság*, 67(1-2), 130-135. Available online: https://real.mtak.hu/180842/1/K16_Petschnig_d1ec8be9f1.pdf (accessed on 6 April 2024) <https://doi.org/10.47630/KULG.2023.67.1-2.130>
- Sipiczki, Z., Parádi-Dolgos, A., Varga, J. (2023). Analysis of the inflationary redistribution of consumption and wealth, evidence from Hungary. *Acta Oeconomica*, 73(1), 129-143.
- Spéder, B., Vonnák, B. (2023). Inflation shocks and disinflation: stylized facts based on the last 50 years (Hungarian). *Hitelintézet* Szemle, 22(3), 26–47. <https://doi.org/10.25201/HSZ.22.3.26>
- Tóth, K., Borbély, C., Nagy, B., Szabó-Szentgróti, G., & Szabó-Szentgróti, E. (2021). Measurement of Food Losses in a Hungarian Dairy Processing Plant. *Foods*, 10(2), 229. <https://doi.org/10.3390/foods10020229>
- Trading Economics. (October 16, 2023). Inflation rate for food in Hungary from May 2015 to September 2023 [Graph]. In Statista. Available online: <https://www.statista.com/statistics/537444/inflation-rate-food-in-hungary/> (accessed on 13 August 2024)
- Tule, M. K., Salisu, A. A., Chiemeka, C. C. (2019). Can agricultural commodity prices predict Nigeria's inflation? *Journal of Commodity Markets*, 16 <https://doi.org/10.1016/j.jcomm.2019.02.002>.
- Várhegyi, É. (2023). Uncredited policy, sticky inflation (Hungarian). *Külgazdaság*, 67(1-2), 164-168. Available online: https://real.mtak.hu/180374/1/K20_Varhegyi_800268d371.pdf; (accessed on 6 April 2024) <https://doi.org/10.47630/KULG.2023.67.1-2.164>
- Yoon, M. J. W., Kim, M. J., & Lee, J. (2014). Impact of demographic changes on inflation and the macroeconomy. *International Monetary Fund*.