ORIGINAL SCIENTIFIC PAPER
UDK: 336.748.12(497.11)"2020/2021"
616.98:578.834]:338.2
DOI: 10.5937/EKOPRE2202023T
Date of Receipt: January 17, 2022

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INFLATION FACTORS DURING THE PANDEMIC: GLOBAL TRENDS AND THE CASE OF SERBIA

Faktori inflacije tokom pandemije: globalna kretanja i slučaj Srbije

Abstract

No issue has stirred such debate recently as inflation. In this paper, inflation factors are divided into three groups: 1) global – which dictated inflation movements in 2020 and 2021 in the majority of countries; 2) base effect, which was also a shared component; 3) domestic factors, specific for each country, which gave rise to the differences in the monetary policy response. Factors of ongoing global inflation movements are presented, as well as the assessment of its character in the case of Serbia. The paper offers a response to what monetary policy can and should do in order to preserve price stability over the medium run. Generally, the decomposition of y-o-y inflation rates into global, regional and domestic factors by applying the principal components method indicates that global factors played a key role in determining inflation growth in Serbia and the neighbouring countries in 2021. Also, autocorrelation functions for various groups of price time series were assessed – unprocessed food, processed food, petroleum products and core inflation, where the results obtained indicate that core inflation is a relatively good estimate of the durability of inflationary pressures, as well as that deviations of headline inflation from core inflation are, as a rule, temporary in nature. All of the NBS analyses suggest that there are no fundamental demand-side pressures that would drive Serbia's inflation up in the medium term.

Keywords: *inflation, monetary policy, prices of primary commodities, halts in global value chains, pandemic*

Sažetak

Skoro se oko neke teme nisu vodile diskusije kao oko inflacije. U ovom radu faktori inflacije podeljeni su u tri grupe: 1) globalne - koji su opredeljivali kretanje inflacije u 2020. i 2021. godini u najvećem broju zemalja; 2) bazni efekat koji je takođe bio zajednička komponenta; 3) domaće faktore koji su specifični za svaku zemlju, što je opredelilo i razlike u reakciji monetarne politike. U radu su dati faktori tekućeg kretanja inflacije na globalnom nivou, kao i ocena njenog karaktera u slučaju Srbije. Nudi se i odgovor šta monetarna politika može i treba da preduzme da bi se očuvala cenovna stabilnost u srednjem roku. Generalno, dekompozicija mg. stopa inflacije na globalne, regionalne i domaće faktore primenom metoda glavnih komponenti upućuje da su globalni faktori ključno opredelili rast inflacije u Srbiji i zemljama u okruženju u 2021. godini. Ocenjene su i autokorelacione funkcije za različite grupe vremenskih serija cena – neprerađene hrane, prerađene hrane, naftnih derivata i bazne inflacije, gde dobijeni rezultati ukazuju da bazna inflacija predstavlja relativno dobru ocenu trajnosti inflatornih pritisaka, kao i da su odstupanja ukupne od bazne inflacije po pravilu privremenog karaktera. Sve analize NBS ukazuju da nema fundamentalnih pritisaka sa strane tražnje koji bi u srednjem roku povećali inflaciju u Srbiji.

Ključne reči: *inflacija, monetarna politika, cene primarnih proizvoda, zastoji u globalnim lancima snabdevanja, pandemija*

Introduction

Before the COVID-19 pandemic hit the global economy, inflation in the majority of advanced and emerging countries was at a historical low. Central banks pursued an extremely accommodative monetary policy in an effort to bring inflation closer to the target in a sustainable way. The languid global economic recovery in the period following the global economic crisis of 2008 was not conducive to central banks' efforts, as it was accompanied by low productivity and investments, and in the years leading up to the pandemic it also featured heightened geopolitical and trade tensions. Slow global growth was a key factor of low prices of primary commodities in the global market and the ensuing disinflationary pressures.

Soon after the pandemic broke out, it became clear that this global shock would have strong effects on the level of economic activity and inflation across economies. The effects were pronounced on both the demand and supply sides, with the potential to impair business and consumer confidence. The pandemic also struck domestic and external demand, as well as global production chains which suffered halts and occasional disruptions. Due to the introduction of restrictive health measures, some service sectors, such as tourism, catering and transport, were almost entirely suspended or reduced to a minimum, especially in the first months of the pandemic. Central banks were the first line of defence, responding promptly at the onset of the pandemic by monetary policy accommodation, and conventional and unconventional measures. Then came fiscal programmes, whose scope depended on the room which countries had created in the pre-crisis period.

Failure to respond would have meant a collapse of the labour market, workers being fired and/or a drastic fall in income. Such failure to act would have cost dearly. There were many unknown variables, but the goal was clear: to safeguard the economy, and preserve jobs, liquidity and favourable financing conditions. To preserve consumer and business confidence. In such a mosaic of many intertwined factors having opposite effects on inflation, it was uncertain which factor would prevail and how inflation would move going forward. In the initial stage of the pandemic, there were more of those who thought that inflation would remain low [1, p. 3; 2; 3; 4, p. 7; 5, p. 13]. The question arises as to the reason behind such expectations. Primarily a drastic fall in demand and consumer and business confidence, increased risk aversion and significantly lower global oil prices. Still, there were some back then who hinted at potential inflation growth [6; 7] stating that, once extraordinary measures are revoked and the existing inventories exhausted, a significant rise in consumption would trigger inflation. Also, there were estimates that depreciation pressures in some countries could boost inflationary pressures, thus limiting room for a more accommodative effect of monetary policy [8, p. 18].

What actually happened? In the first stage, the so-called „lockdown", the disinflationary trend picked up the pace at the global level. The negative shock on the supply side that arose due to the disruptions in company operations (to prevent the spread of the virus) did not cause any major inflationary pressures. The reason behind this is the simultaneous sharp fall in global demand amid temporary containment measures. There was also a simultaneous drop in investments and spending in conditions of heightened uncertainty. This collapsed the global oil price and, in turn, the majority of countries saw a slowdown in price growth, and even their fall. The exception were several countries where even before the pandemic inflation was relatively high, and during the pandemic it continued to grow mostly as a consequence of depreciation pressures.

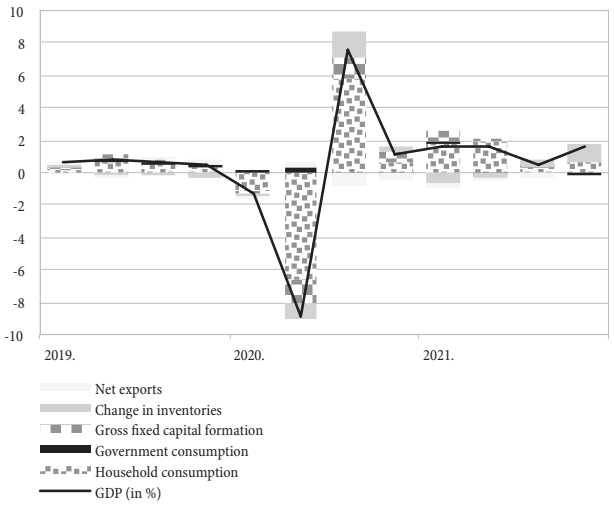
In the second stage, the so-called „opening", restrictive health measure were mitigated, and progress in vaccine rollout increased optimism with respect to the global economic recovery. After strong fiscal stimuli, monetary policy support and savings accumulated during the first stage of the pandemic, global demand was „unlocked". Supply cannot adapt to the rising demand in the short term, partly because of the fact that there was still a shortage of some raw materials and production inputs, which created production bottlenecks and halts in global value chains. In parallel, more favourable global growth outlook generated a more significant rise in the prices of primary commodities in the global market. After a

period of extremely low inflation in 2020, all of this together resulted in a rise in cost-push pressures and accelerated inflation in 2021. We are entering a period where after a long time inflation is recording growth at the global level (in some countries it is at the highest level in decades), and analyses are being launched to determine to what extent this is attributable to temporary factors, or whether inflation is establishing an upward trend. Data in this paper are given ending with and inclusive of 2021.

The largest number of central banks, including the Federal Reserve System and the European Central Bank, as well as the majority of international financial institutions, agree that as of mid-2022, inflationary pressures would calm down [9; 10, p. 11]. Still, they communicated also that inflationary pressures have turned out to be stronger and more durable than previously expected.

Bearing in mind the urgency of this topic for economic policy makers, notably for the monetary policy, as well as that debates and concerns over the durability of inflationary pressures have intensified, further in the paper we will present the factors behind the current inflation growth at the global level, and an assessment of its character in the case of Serbia. We will also offer a response to the question of what monetary policy can and should do to preserve price stability in the medium term.

Chart 1: Contributions to s-a real GDP growth rate of the USA (quarterly, in pp)



Source: U.S. Bureau of Economic Analysis.

Causes of inflation growth globally and in Serbia in 2021

Inflation factors in 2021 can be analysed through three key groups:

1. global factors,
2. base effect,
3. domestic factors.

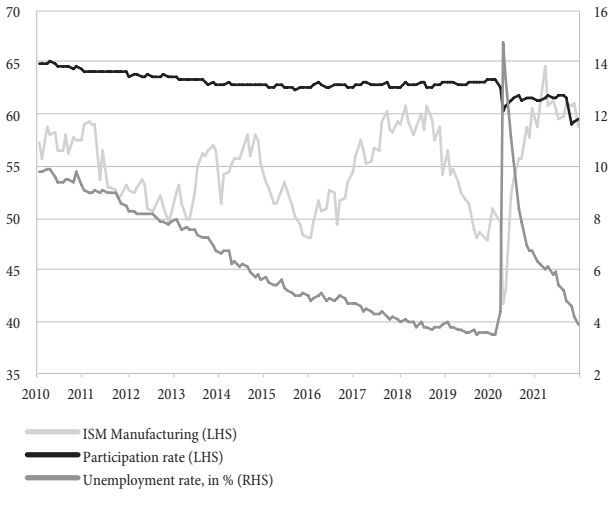
Global factors dictated the movement of inflation in the majority of countries in 2020 and 2021. Moreover, the low base effect in the so-called acute stage of the pandemic, marked by a sharp drop in the prices of primary commodities, was also a shared component. The difference is created by the impact of domestic factors specific for each country, which also dictated the differences in monetary policy response by country.

Impact of global factors on inflation

What characterised the global conditions in the initial stage of the pandemic, in the first half of 2020? A drastic fall in consumption and production, which adversely affected the labour market, notably employment, as we can see in the example of the USA (Charts 1 and 2).

Together with the plummeting global oil prices, this resulted in a significant slowdown in inflation globally, and in some countries even drove inflation into the

Chart 2: US labour market and economic activity indicators (in index points)



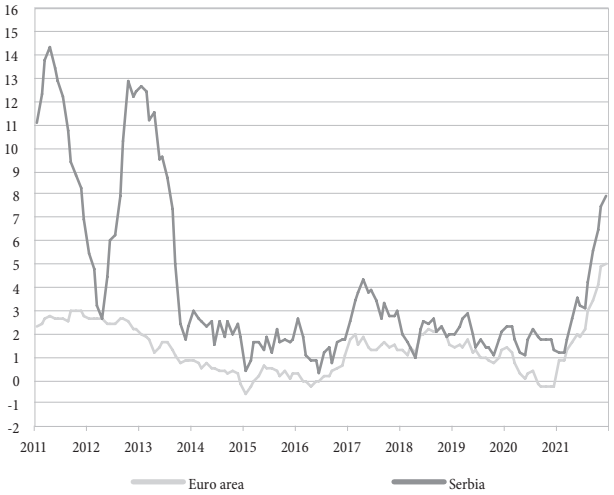
Sources: U.S. Bureau of Labor Statistics and Institute for Supply Management.

negative territory. In the euro area, our key foreign trade partner, y-o-y inflation (measured by the Harmonised Index of Consumer Prices) in April 2020 measured 0.3%. In August that year it went into the negative territory and remained there until end-2020. In Serbia, inflation was also low during 2020, and ended the year with the y-o-y rate of 1.3% (Chart 3).

Among global factors of low inflation in 2020, **global oil prices** were dominant, falling to around USD 20 per barrel in April 2020 (Chart 4), while oil futures stepped into the negative zone for the first time in history. As economies gradually opened and health measures were loosened, with OPEC+ countries cutting down production, global oil prices posted an upward trend as of mid-2020. The trend picked up further with announcements about progress in vaccine research and distribution as of end-2020. It continued into 2021, when accelerated recovery of economies led to a continued rise in oil demand, though the supply from OPEC+ countries did not manage to keep up with the trend entirely. As a result, global oil prices during 2021 exceeded their pre-crisis level (Chart 5), and at around USD 84 dollars per barrel in October 2021, they were more than 80% higher relative to the same period a year earlier. The news about the spread of the new omicron variant and poorer prospects for global growth on this account led to a temporary drop in global oil prices in November and December 2021, before moving back to upward trajectory in January 2022 due to geopolitical tensions. Such developments during 2021 spilled over onto retail prices of petroleum products, which in December 2021 were higher in y-o-y terms by 28.6% in the euro area and by 23.5% in Serbia (Chart 6). In terms of the composition of headline inflation, we can see that retail prices of petroleum products contributed -0.6 pp (euro area) and -0.7 pp (Serbia) to headline inflation in December 2020, compared with 1.2 pp (euro area) and 1.4 pp (Serbia) in December 2021.

A tendency similar to that of oil prices was also recorded by **global metal prices**. In the first stage of the pandemic, i.e. from February to May 2020, they posted a fall, though less pronounced than that of oil prices. Specifically, in April the global prices of metals were around 15% lower than at the start of the year. As the year went on, and with the gradual loosening of containment measures, these prices struck an upward path, accelerating during 2021, only to reach their multiyear maximums in May and June 2021. This was certainly facilitated by the rising demand from China and other developed countries. With news about the spreading of new coronavirus strains and somewhat unfavourable prospects for the world's largest metal consumers, the prices of metals recorded a fall, but still remained significantly above the pre-crisis level. Ultimately, in October 2021, the global prices of metals and minerals were by around 42% higher y-o-y, but went down in November, just as the global prices of oil. Underpinned by higher demand, this prices again recorded increase in December.

Chart 3: Inflation in euro area and Serbia (y-o-y rates, in %)



Source: Eurostat.

Chart 4: World oil price movements (average monthly prices, in USD)

Source: Bloomberg.

In the period February–May 2020, **global prices of primary agricultural commodities** (maize, wheat, soybean) were also on a decline, and in conditions of a globally dampened demand and large inventories in April 2020 they were around 8% lower relative to end-2019. Still, around mid-2020, the prices of this group of primary commodities also struck an upward path. In addition to increased demand from China, which sought to renew the livestock capital, poorer than anticipated harvest in the USA and unfavourable weather conditions, notably in Brazil and Argentina – the world's largest corn and coffee producers – also reflected on the prices of primary commodities. The higher prices of primary agricultural commodities drove up the costs of food production which, together with the rising demand in the wake of the loosening of epidemiological measures and progress in vaccine rollout since the start of Q2 2021, dictated the rise in the prices of meat and other food products.

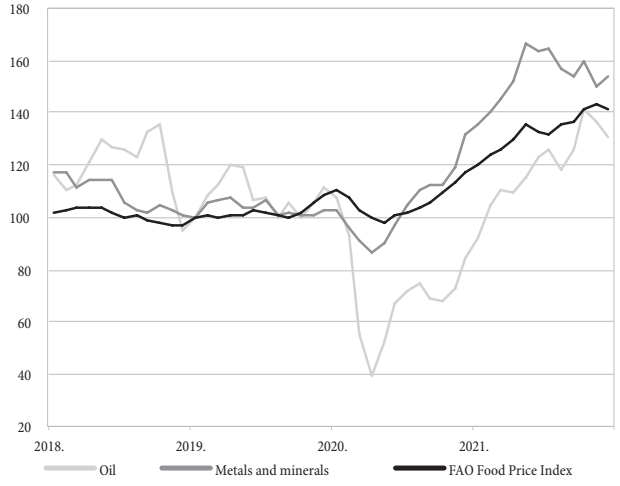
The lack of shipping containers also illustrates the depth of the disturbance. The rise in fuel prices and implementation of tighter health and sanitary measures, which prolonged the time for loading the goods, **slowed down the entire transport chain and resulted in the lack of shipping containers**. With the recovery and then a sudden rise in demand for consumer goods, the price of container transport surged. Specifically, after years of stability, the price of overseas container shipping from China to the Mediterranean increased almost six-fold relative to 2020 (Chart 7). With lower prices of primary commodities, trend of rising transportation costs was temporarily interrupted in November 2021, while rising trend again continued in December.

The halt in global supply chains is also a factor that stands out with its impact on the strengthening of cost-push pressures, both in the lockdown and opening stages of the global economy (Chart 8). On the one hand, global demand suddenly surged after the economies opened, while on the other, there were structural differences in terms of the speed that can reactivate the capacities and respond to the requirements of growing demand. Production bottlenecks were particularly pronounced with microchips, construction wood, metals and plastics.

The hike in production costs, driven by the prices of primary commodities in the global market, as well as shortages of some production inputs, resulted in **strong growth in industrial producer prices in many European countries**, which was two-digit in y-o-y terms since the mid of 2021 (Chart 9).

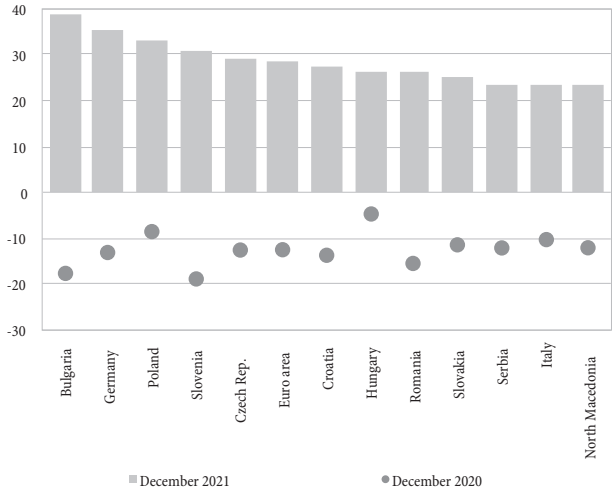
As a consequence of all of the noted global factors, primarily the higher prices of primary commodities, the rise in industrial producer prices for the domestic market in November measured 16.7%, before slowing down to 14.7% in December. The increase in the global prices of oil, metals and primary agricultural commodities within producer prices had a direct effect on the prices of petroleum products, basic metals and food products

Chart 5: Global prices of primary commodities (Jan. 2019 =100)



Sources: Bloomberg, World Bank, UN FAO.

Chart 6: Rise in petroleum product prices (y-o-y rates, %)



Sources: Eurostat, NBS calculation.

(aggregate contribution of these three industrial sectors to producer prices in December equalled 9.3 pp). Under the impact of the rise in the prices of primary commodities, we also saw a robust increase in the producer prices of chemicals and chemical products, as well as rubber and plastic products.

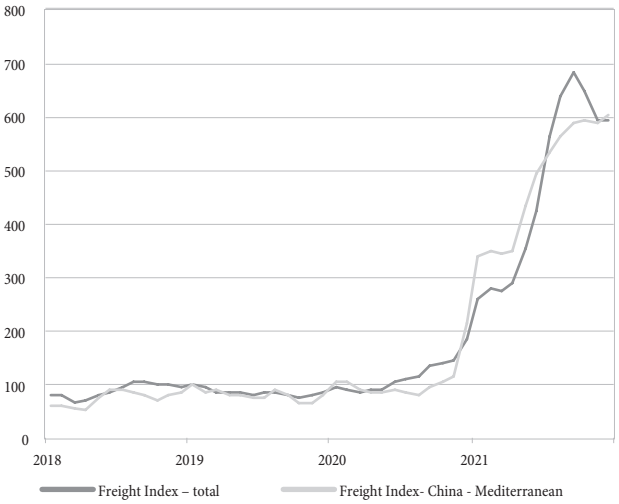
Impact of imported inflation on inflation in Serbia

That the impact of the global prices of primary commodities on industrial producer prices in Serbia was statistically significant is confirmed by the NBS's econometric analysis.

The NBS conducted the econometric analysis based on the assessment of the relationship between monthly changes in industrial producer prices for the local market with the global prices of primary commodities expressed in dinars, for the period between January 2009 and May 2021 [11, p.15]. The obtained results of the analysis suggest that the global prices of oil, primary agricultural commodities and metals spill over onto domestic producer prices **during the same or the following month**, via the rise in cost-push pressures.

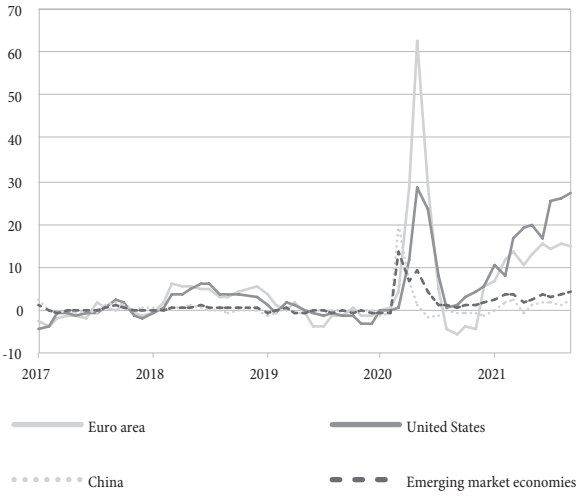
According to imported inflation indicator, which the NBS created for the purpose of its macroeconomic

Chart 7: Price of overseas container shipping (Jan. 2019 = 100)



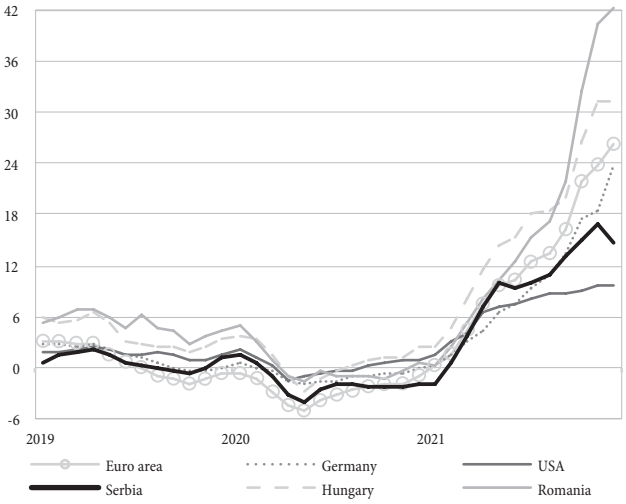
Source: Reuters.

Chart 8: Supply chain disruptions (in index points)



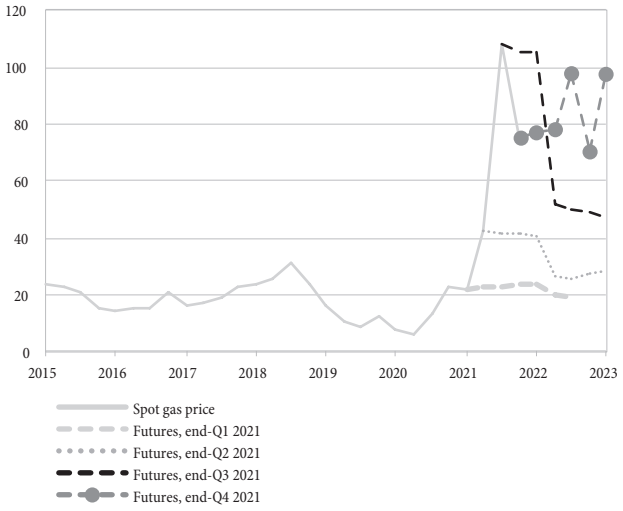
Source: WEO, IMF, October 2021.

Chart 9: Industrial producer prices (y-o-y rates, %)



Surce: Eurostat.

Chart 10: Benchmark natural gas price for Europe, Dutch TTF(EUR/MWh)

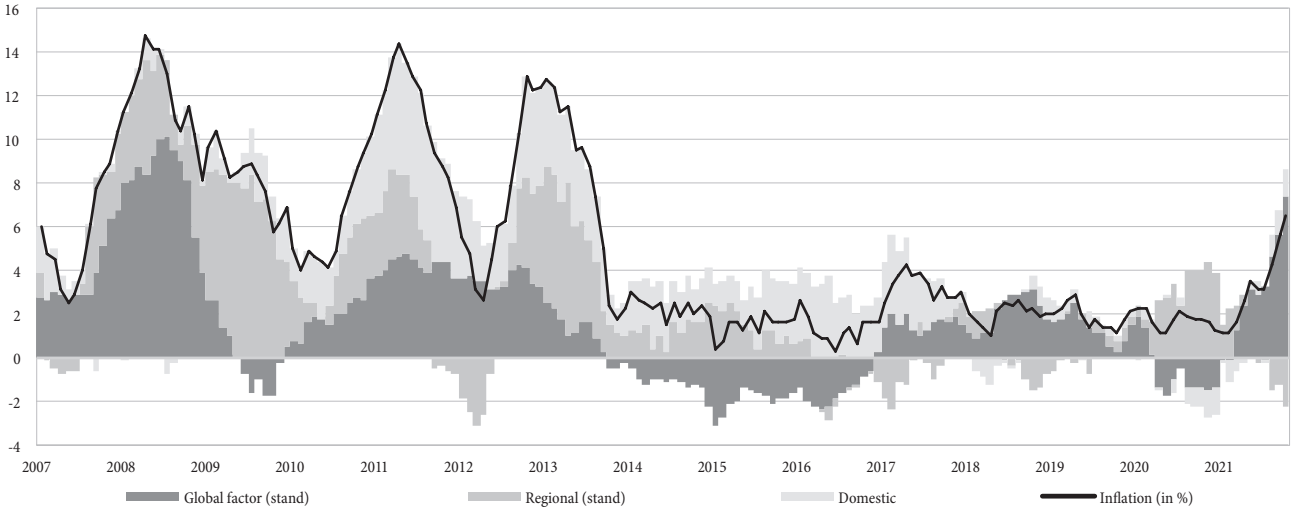


Source: Refinitive.

projections[1] [12, p. 12], in December 2021 imported inflation measured 12.4% y-o-y, while at end-2020 it was in the negative zone (-1.9%). In addition to these growing **cost-push pressures on account of the global prices of primary agricultural commodities, transport and halts in global supply chains**, another factor leading to higher imported inflation was the **higher prices of natural gas and electricity, notably in the euro area**, from which we import the most. Increased **demand** for this energy source was the result of: economic recovery after the pandemic; adverse weather conditions during last winter and summer (which led to a simultaneous reduction in the production of energy from renewable sources); transition towards production with a smaller degree of carbon-dioxide emission; while the **supply** was affected by the decrease in the inflow of gas from Russia to the rest of Europe, due to delays in the launch of the new gas pipeline. Under the impact of these numerous factors on both the demand and supply sides, the prices of natural gas in the global market recorded a significant increase during 2021, and in mid-October reached record high levels (Chart 10). Although the price of natural gas for Europe decreased at end of October, low stocks and increased demand for gas in the winter months caused its further growth to

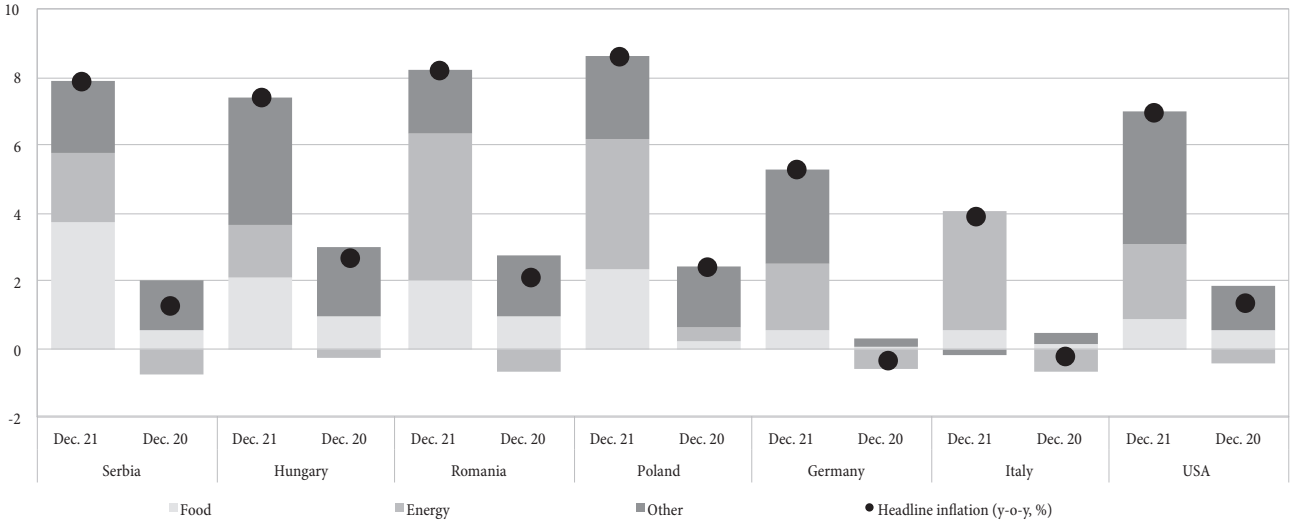
1 The indicator was calculated as a weighted average of the changes in the global prices of oil and food, consumer prices in the EU and Germany's export prices. The weights were the shares of corresponding groups of products and services in the composition of Serbia's import.

Chart 11: Decomposition of y-o-y inflation rate in Serbia (in pp)



Sources: SORS, NBS calculation.

Chart 12: Contribution to inflation by country – December 2021 and December 2020 (in pp)



Sources: national statistical offices, NBS calculation.

new record high level in mid-December. The effects of the energy crisis fell particularly hard on Europe, which is highly import dependent on gas. What happened? In 2021, gas inventories in Europe dropped to a minimum, and gas prices rose by more than 600% from 2020. This resulted in a sharp increase in the prices of electricity, as well as coal as an alternative energy source (the use of coal is restricted by the decarbonisation policy). The effects of the high increase in energy prices are mostly felt in areas with high energy dependency, such as the production of construction materials, chemicals and pharmaceuticals, basic metals, and mineral fertilisers for agriculture.

That global factors are crucial to inflation growth in Serbia and the neighbouring countries in 2021 is confirmed by the decomposition of y-o-y inflation rates in Serbia into global, regional and domestic factors, by applying the principal components method. Decomposition was conducted on a data base for 33 European countries (advanced and emerging), for the period from January 2007 until and inclusive of October 2021 (Chart 11). A similar conclusion is also indicated by the fact that key differences in contributions to y-o-y inflation rate at end-2021 and in 2020 come from the prices of energy and partly food, which are mostly determined by the global prices of primary commodities (Chart 12). This conclusion is also applicable to Serbia, as well as other countries.

Base effect

The second common factor dictating inflation movements in 2021 in Serbia and globally is the base effect, which the ECB defines as a purely mechanical effect, i.e. low base from the previous year. The base effect can be described as the effect which an unusual monthly change in the prices from a year ago has on the current y-o-y inflation rate. It is usually calculated as a deviation of the monthly (non-seasonally adjusted) inflation rate achieved 12 months ago, from the estimated typical monthly change for that month. This means that the base effect in the observed month will be positive if price growth a year ago was smaller (or a fall was bigger) than seasonally usual for that month, and vice versa – it will be negative if price growth a year ago was bigger (or a fall was smaller) than usual. The positive base effect will act towards increasing, and the negative towards decreasing y-o-y inflation [11, p. 69–70].

Looking at 2021, the **base effect was present in the period March–May for energy prices**, which is attributable to the impact of the pandemic on the global prices of oil in the same period in 2020, and thereby on the reduction of the prices of petroleum products in the domestic market. **On average, y-o-y inflation in those three months of 2021 was around 0.4 pp higher solely based on the low base effect.** A positive base effect was also present in the August-October period, on account of the prices of unprocessed food which were lower in the same period of 2020 that usual for the season (notably prices of fruit and fresh meat). During 2020, the prices of fresh meat also reflected the dampened demand, which was impacted by the fact that celebrations and other mass gatherings were not held due to the pandemic.

The NBS estimates that the base effect will have a significant impact on the profile of y-o-y inflation in 2022 as well, and this time it will act towards its slowdown. Overall, the base effect will be almost neutral in January and February, because the higher base for energy prices will mitigate the effect of the lower base for the prices of unprocessed food. As of March, in addition to energy prices, the base effect will also be negative on account of the prices of unprocessed food. The negative base effect will be the strongest in August (-0.6 pp) and September (-1.1 pp), because the prices of vegetables and fruit during Q3 2021 recorded growth, whereas they usually record a seasonal fall in the third quarter (Chart 13), as well as in November (–0.9 pp), due to relatively high increase of processed food prices affected by cost-pressures from world commodities. In aggregate, y-o-y inflation in 2022 will be 3.9 pp lower due to the base effect, which will significantly contribute to its slowdown (Chart 14).

Impact of domestic factors on inflation in Serbia

Among domestic factors, inflation movements in 2021 were predominantly determined by **unprocessed food prices**. The prices of **fruit and vegetables** in early 2021 recorded lower growth than typical for the season (considerably

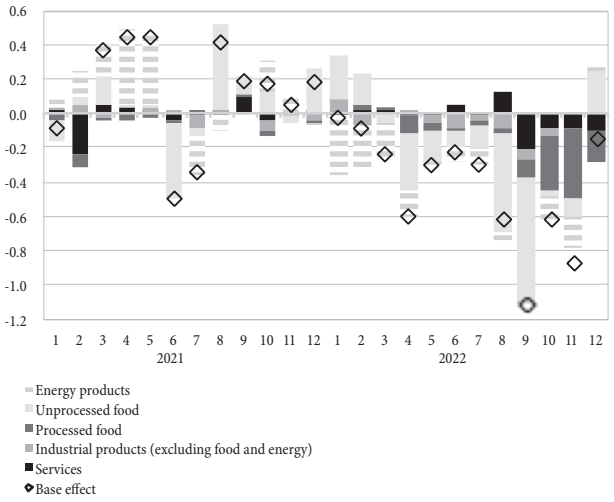
below the multiyear average), pushing y-o-y inflation in January and February below the lower bound of the target tolerance band. However, due to the effects of cold weather, the lower price growth of this product group early in the year was almost fully compensated for in April. In Q3 as well, fruit and vegetable prices in the domestic market displayed seasonally unusual movements, again as a consequence of unfavourable weather conditions, i.e. high temperatures and drought. In y-o-y terms, vegetable prices rose by 22.4% in December. **Fresh meat** prices in the domestic market also recorded high y-o-y growth in December (23.1%). Fresh meat prices reflected growth in prices of primary agricultural commodities, as well as the fact that they trended low throughout 2020, which was unfavourable for one part of producers and also created the effect of an extremely low base. The contribution of unprocessed food prices to y-o-y inflation thus reached 2.1 pp in December, determining around 25% of the December inflation outcome, while at end-2020 their contribution was mildly negative.

The rise in global prices of primary agricultural commodities, via higher cost-push pressures in food production, also triggered an increase in **processed food prices**, which posted a y-o-y rise of 8.0% in December 2021 (the overall contribution of food prices in December thus reached 3.7 pp, i.e. the prices of unprocessed and processed food determined around 47% of the December inflation outcome). That pass-through is effected via producer prices, with the results of the econometric analysis of the National Bank of Serbia [11, p.16] demonstrating that the pass-through from producer to consumer prices is not complete. According to the estimates at which we arrived, **a 1% monthly increase in food production prices triggers a roughly 0.4% rise in consumer prices of processed food and fresh meat,** and the pass-through largely occurs within the same month.

The results of the analysis showed that the pass-through effect from producer to consumer prices is not complete in case of other products and services either – around one half of the monthly increase in producer prices passes through to consumer prices. This explains why producer prices increased more than consumer prices in 2021.

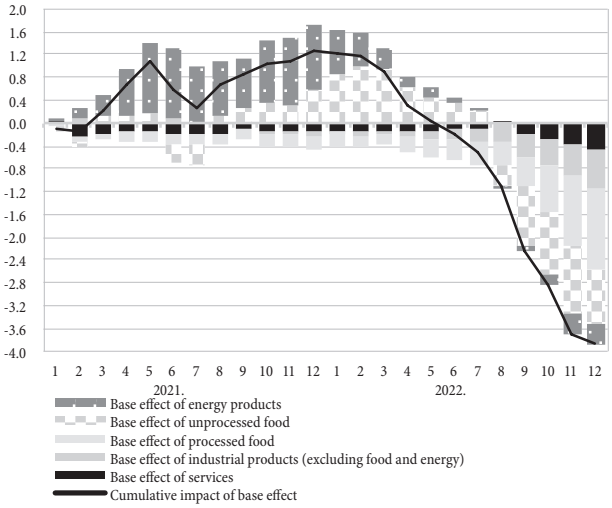
Specific for Serbia was the fact that, as opposed to global oil prices, natural gas prices did not directly impact Serbia's inflation to any major extent. Thanks to the underground storage facility in Banatski Dvor and the launch of the TurkStream pipeline, Serbia has improved its natural gas supply to the market. Based on favourable contracts signed with Russia, in effect until mid-2022, Serbia is paying a much lower gas price compared to market prices in the rest of Europe. The electricity price

Chart 13: Decomposition of the base effect into key components in 2021 and 2022 (in pp)



Sources: SORS and NBS calculation.

Chart 14: Cumulative impact of the base effect on y-o-y inflation since January 2021 (in pp)



Sources: SORS and NBS calculation.

for households is administered, and the approvals for its adjustments are issued by the Energy Agency. In the largest part of the corporate sector, the electricity price is market-based, but, at the end of 2021 the Government decided that electricity price for the corporate sector should be temporarily capped for a 6 months period at the level of EUR 75 per MWh, while the global energy market is facing difficulties. All this suggests that natural gas and electricity prices should not cause any larger disturbances for the domestic economy, nor add to cost-push pressures on inflation. Still, indirect effects on domestic inflation on account of higher energy prices in the global market do exist, as they are embedded in the prices of imported products.

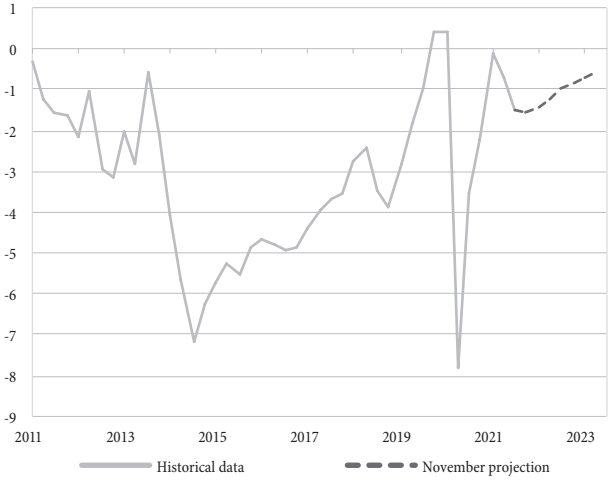
Demand is surely an important factor underlying the movement of inflation in both directions. Though domestic demand has rallied vigorously in 2021 and Serbia will have posted one of the best growth results in Europe in the two pandemic years (around 6.5% cumulatively), domestic demand created no major inflationary pressures. This is due to simultaneous growth in potential output, i.e. growth in production capacities and jobs, which is supported by extensive and timely monetary and fiscal stimuli aimed at preserving the economy during the pandemic. On that account, a significant boost to Serbia's economic growth in 2021 also came from investment and exports, not just from private consumption.

This is also indicated by the NBS's assessment of the output gap, which is used as a standard measure of demand by other central banks as well. According to the NBS's assessment, the output gap will remain negative until the end of the projection horizon, i.e. over the next two years, which means that **demand-side disinflationary pressures will persist until the end of the projection horizon, with a gradual weakening of this effect** (Chart 15). Also, though growth in private and public sector employment and wages is expected to continue, consumption is estimated to rise more slowly than nominal GDP and therefore no major demand-side inflationary pressures are expected in the medium term either.

Significant domestic factors which contributed to price stability in the past eight years and which in 2021 limited the pass-through effect from imported to domestic prices, i.e. from elevated food and energy prices to other prices, are the relative stability of the exchange rate and mid-term inflation expectations of the financial and corporate sectors anchored within the bounds of the target band. These are at the same time the key factors which helped core inflation in 2021 to run below headline inflation and remain around the target of 3.0% (3.5% at year-end).

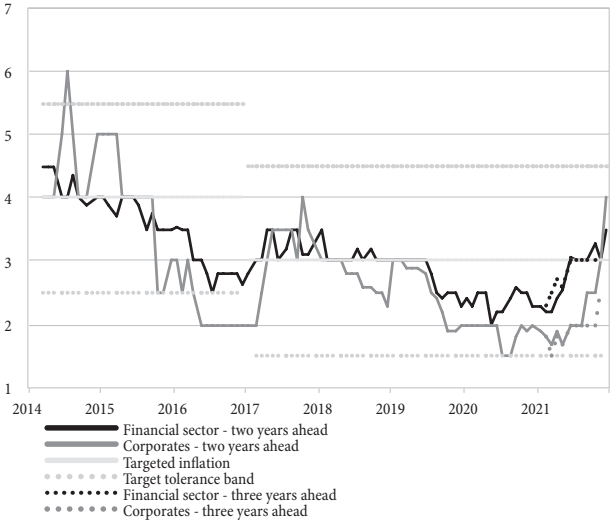
Medium-term inflation expectations of financial sector in December (Chart 16) equalled 3.5% (two years ahead) and 3% (three years ahead). Corporates medium-

Chart 15: Output gap estimate, February 2022 (% of potential output)



Sources: SORS and NBS.

Chart 16: Medium-term inflation expectations (in %)



Sources: Ipsos/Ninamedija and NBS.

term expectations are 4% (two years ahead) and 3.0% (three years ahead). This indicates that the financial and corporate sectors assess that the Serbian inflation is mainly driven by factors with temporary effect and that in the medium-term it would return to pre-pandemic levels.

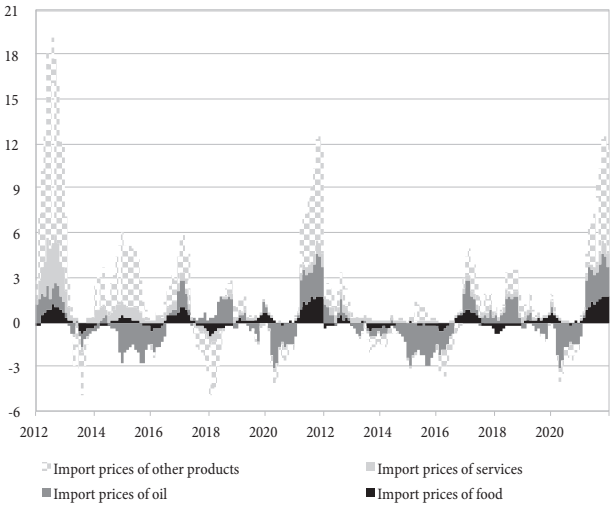
Bearing in mind that according to our previous assessments, the pass-through effect of the exchange rate on inflation after one quarter is around 0.15%, and in the one-year period around 0.4–0.45%, it is clear that the exchange rate can significantly mitigate or heighten the imported prices' impact on domestic inflation. Chart 17 also shows that the impact of shocks in the movement of global prices of primary commodities on domestic inflation was additionally strengthened until August 2012 by the effects of a considerable weakening of the dinar against the euro, which resulted in high and volatile inflation at home. The Chart also reflects the fact that the achieved and maintained relative stability of the dinar exchange rate in the period after August 2012 contributed to a lower level and volatility of domestic inflation and inflation expectations.

The importance of the exchange rate and anchored inflation expectations for maintaining price stability is also confirmed by IMF materials. The analysis presented in the October 2021 WEO, monitoring 55 high-inflation episodes, evenly distributed across advanced and emerging economies, indicates that, in the countries observed, depreciation is the key and statistically significant factor ushering in high inflation episodes [10, p. 52]. On average, for emerging economies, the nominal exchange rate depreciated by around 8% in the quarter the high-inflation episode began. According to the results of this analysis, inflation accelerations were also preceded by an upsurge in fiscal and current account deficits in emerging economies (Chart 18)**. As shown by the analysis, episodes during which inflation remained elevated for six quarters or more were also associated with a steeper rise in medium-term inflation expectations.**

Similarly, the IMF analysis from the October 2018 WEO, conducted for a panel of 19 emerging economies for the period Q1 2004 – Q1 2018, reveals the importance of domestic factors for inflation movements, primarily medium-term inflation expectations and the output gap [13, p. 106]. According to the results of this analysis, after the effect of the external shock dissipates, inflation more quickly returns to its long-run level if inflation expectations are better anchored. This gives policymakers more space to apply a lower-scale monetary policy response, which by extension means less fluctuation of economic activity.

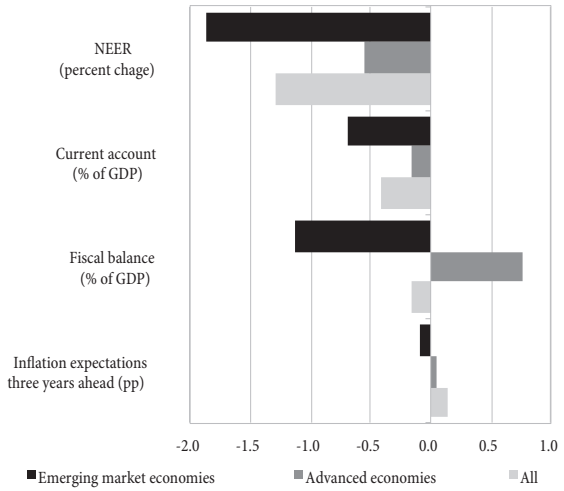
The above factors – domestic demand, maintained relative stability of the exchange rate and mid-term inflation expectations within the bounds of the target, explain why core inflation in Serbia is lower than in

Chart 17: Contributions of individual components to y-o-y growth rate of imported prices (in pp)



Sources: Destatis, FAO, Bloomberg, Eurostat, SORS

Chart 18: High inflation episodes



Note: The chart shows the difference between the average value in the three quarters prior to the inflation pick-up episode (q-3 to q-1) and the average value in the past six quarters (q-9 to q-4).

Sources: WEO, IMF, October 2021 and NBS calculation.

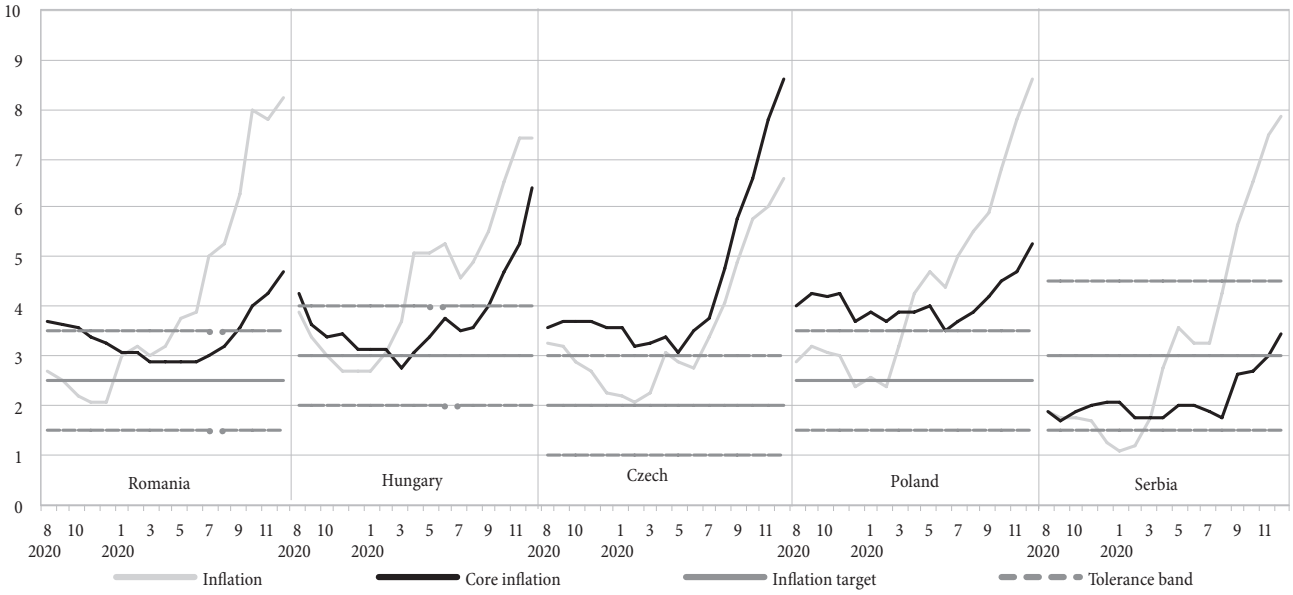
many neighbouring countries which are also running inflation targeting regimes, but face core inflation above the upper bound of the target (Chart 19). Also, some of the observed countries experienced economic overheating and strengthening of inflationary pressures driven by labour market factors even before the pandemic, while COVID-19 outbreak only briefly "cooled" the inflation in its initial months.

What are the expectations regarding future inflation movements globally and in Serbia?

Since Q2 2021 debate has been going on as to whether elevated inflation is temporary or more durable in character. While cost-push pressures turned out stronger and more persistent than initially expected, the prevailing estimate is that global inflationary pressures should gradually subside in the coming period [10; 15].

An upswing in primary commodity prices like that recorded in 2021 is unlikely to occur again in 2022. Specifically, the close to 70% hike in the global oil price or the 30% rise in global prices of primary agricultural commodities are unlikely to be repeated. The estimates of international financial institutions and those based on futures also indicate that both global oil prices and prices of primary agricultural commodities will experience a mild fall in 2022. Apart from the stabilisation of global economic growth and wearing off of the effect of a sudden expansion in demand, this should also be supported by supply-side factors – a gradual lifting of caps on oil production and the new agricultural season, after the last one which recorded below-average output worldwide. Inflationary pressures which in late 2021 also stemmed from high-rising energy prices (natural gas, coal, oil) are estimated as temporary, with prices expected to return to lower levels in early 2022 as heating demand slackens and inventories are adjusted. It is also expected that halts in global supply chains and product shortages in most of the production branches will gradually be resolved, i.e. that global supply will step up. The effects of sizeable monetary and fiscal stimuli which were necessary during the first stage of the pandemic in order to preserve the economy and jobs will also gradually wear off. The impact of accumulated savings and delayed consumption, which in the phase of economic opening contributed to a significant and accelerated demand growth, will also be exhausted. In other words, **in the coming period supply and demand should gradually converge and balance at the global level.** Still, economic growth will continue to face uncertainties with the emergence of the new virus strain, which could again impact supply and demand, as well as inflation.

Chart 19: Headline and core inflation by country (y-o-y growth in %)



Sources: central banks of selected countries.

Historically, extended inflation episodes were linked to three factors, which in some cases worked individually, and in others in combination:

1. demand which outstripped supply over a longer period;
2. wage growth above productivity growth, when persisting over an extended period; and
3. unanchored inflation expectations.

It is easiest to reduce inflationary pressures on account of the first factor [16, p. 4]. The other two factors may be addressed as well, except that the response must be more complex.

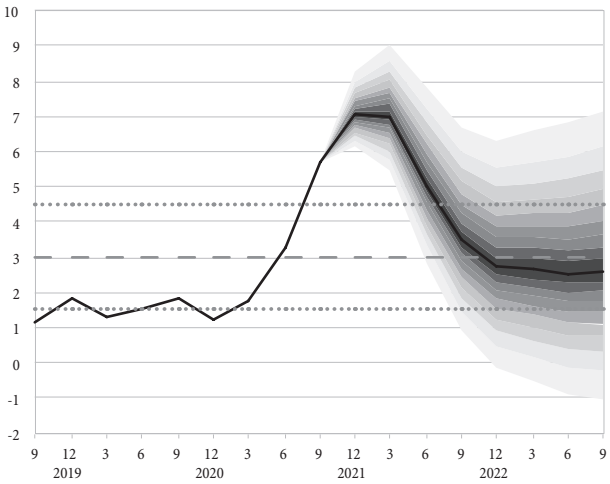
Global inflation growth is for the time being not considered durable, because medium-term inflation expectations are anchored, due to which the so-called secondary effects are not present. Still, these is a risk that further inflation growth could shift them [14, p. 82]. For this reason, and for the sake of further strengthening of the labour market and potential closing of the unemployment gap [17], which would most probably strengthen the so-called Philips curve, i.e. the link between demand and inflation, central banks must exert further caution to avoid the deepening of medium-term inflationary pressures.

According to our central projection from November 2021[2] (Chart 20), we expect that, once the effects of the 2021 rise in oil and fruit and vegetable prices drop out from the calculation, y-o-y inflation will start to decline as of Q2 2022 and to be around the central target at end-2022, and to remain there in 2023 as well. The inflation decline will mostly be supported by the weakening inflationary effect of most supply-side factors which in 2021 were related to disturbances triggered by the global economy's exit from the pandemic and to the agricultural season. The resolution of the energy crisis in the global market will also contribute to a decline in inflation through several channels. Such movement will also be aided by the measures taken by the National Bank of Serbia, aimed at reducing monetary policy accommodation.

As our econometric analyses reveal, most of inflation growth in Serbia is estimated to be temporary in character. Specifically, we have assessed autocorrelation functions for different groups of time series of prices – unprocessed food, processed food, petroleum products and core inflation. When a group of prices is under the effect of temporary, short-term factors, their time series displays a low degree of autocorrelation. As shown in Chart 22, the time series of unprocessed food has zero autocorrelation at the first lag already, while petroleum products have zero autocorrelation from the second lag onwards. By contrast, a higher degree of autocorrelation for prices included in the calculation of core inflation and, to a smaller extent, also for processed food prices, indicates that their movement is more persistent, i.e. when they go up, their growth continues for some time [17, p. 19]. **The obtained results indicate that**

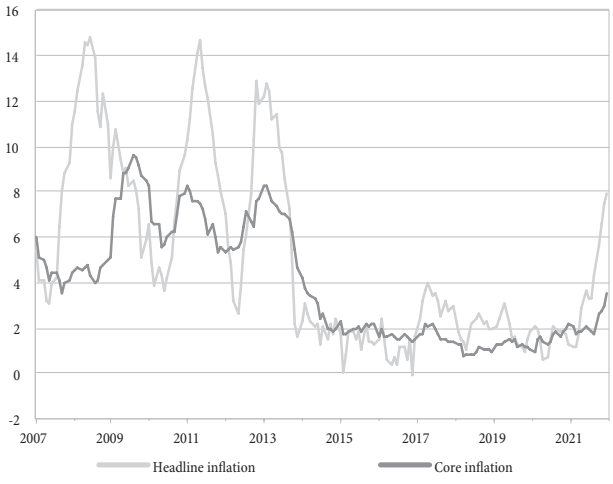
2 At the moment when paper was finished, February projections were run, but they were not closed.

Chart 20: Medium-term inflation projection (%)



Source: NBS.

Chart 21: Y-o-y growth rates of core and headline inflation (%)



Sources: SORS and NBS calculation.

core inflation is a relatively good measure of durability of inflationary pressures, and that departures of headline from core inflation are, as a rule, temporary in character. With this in mind, **in order to assess the durability of inflationary pressures and the scale of monetary policy response, it is key to estimate the anticipated movement in core inflation. Under our November 2021 projection, core inflation will remain within the target tolerance band until the end of the projection horizon, which indicates that for the time being there are no fundamental demand-side pressures that would push up inflation in Serbia in the medium term.**

What monetary policy can and should do to prevent inflationary pressures?

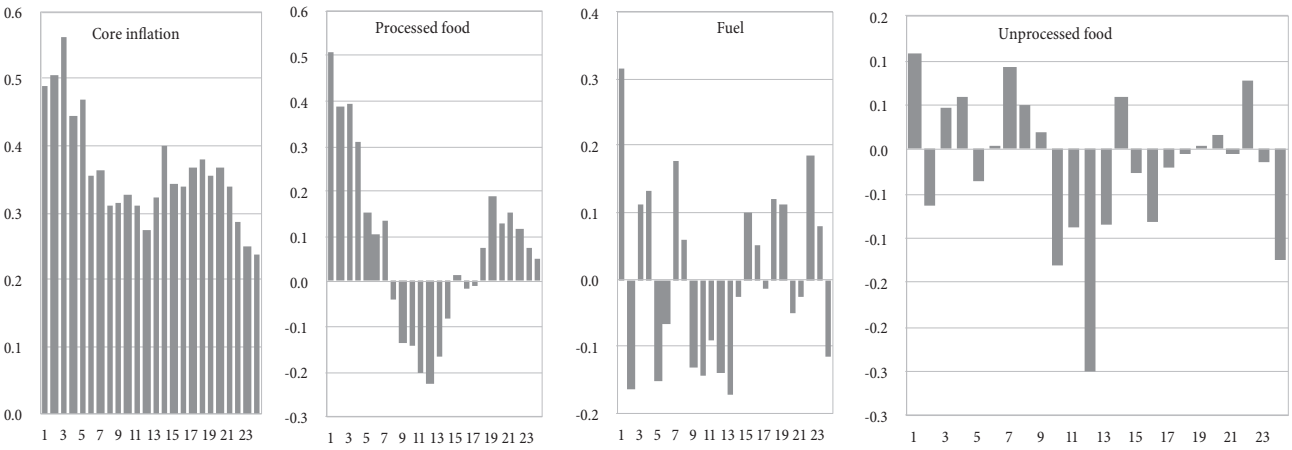
Generally speaking, central banks are less concerned about inflation when it is guided by supply-side factors, as they are mostly temporary in character and their direct impact on inflation withers after a while. When these factors produce no major secondary effects, inflation returns to its previous level after their impact ceases, even without a monetary policy response. It is clear that monetary policy cannot influence global prices of primary commodities, for example, nor resolve the problem of value chain disruptions or the energy crisis. Even if production costs went up amid elevated prices of energy, production inputs and transport, a more significant monetary policy tightening through higher interest rates could raise production costs further, add to inflationary pressures and slacken economic activity. In that case, the monetary policy response would only amplify the effect of the shock on inflation and economic activity.

If the central bank estimates that higher cost-push pressures are spilling over to other prices through inflation expectations, i.e. if the rise in prices of some products and services produces secondary effects, monetary policy should respond in order to contain growth in inflation expectations and prevent further spillover to other prices. The same holds true when cost-push pressures exert pressure on robust growth in wages, much above nominal GDP growth.

A completely opposite approach to containing inflation is adopted in case of demand-side inflationary pressures, where the response of the central bank's monetary and prudential policies is much more efficient. For example, higher loan costs discourage further growth in demand, and it is also possible to take prudential measures limiting loan supply.

There is consensus that monetary policy makers need to monitor different inflation factors from the domestic and international environment and estimate the nature and intensity of their impact on inflation. At the same time, monetary policy makers should not disregard the impact of these factors on the pace of economic growth and on financial stability, which is why it is important that the response is adequate and timely. If monetary tightening is early and/or excessive, economic growth could slow down. Namely, this could weaken the earlier positive effects of monetary relaxation, while pressures

Chart 22: Correlograms of CPI component series



Source: NBS calculation.

on inflation may turn out to be temporary. Furthermore, a more aggressive monetary policy response could have a negative impact on financial stability as well since it would unnecessarily increase the cost of loans. Conversely, monetary policy tightening could also be late and/or insufficient, if inflation pressures later prove not to have been temporary, i.e. if there was an overheating of the economy and an opening of the inflationary spiral amid heightened pressures for excessive wage increase. Such inadequately measured response has the potential to produce negative effects through several channels – lower real value of households' and businesses' income; loss of a part of central banks' credibility as they failed to respond timely; need for a more robust response to compensate for what has been missed, which would reflect negatively on economic growth.

For this reason, central banks are now facing the question of how best to ensure fine tuning and avoid the trap of early/late and/or excessive/insufficient responses. One thing is sure – there is not and cannot be any single answer to the question as to how fast monetary policy should be tightened in current circumstances and whether it should be tightened at all, since the impact of domestic factors varies greatly across countries. Some central banks are taking faster and more robust responses in present circumstances. Others are postponing monetary tightening or responding gradually, on a smaller scale. Probably more than ever, central banks are under additional pressure as the markets are vigilant and keeping a close eye on central banks' each move (hawks and doves, as market analysts call them). At the beginning and at the end of the day, it is clear that everyone is watching closely the unfolding of events in the international arena and the responses of other central banks, but they are adjusting their own monetary strategy to conditions at home.

Central banks of small and open economies find it even more difficult to decide in 2021 if and when to start monetary tightening due to the uncertainty regarding the response of leading central banks, most notably the ECB and the Fed. The impact of change in their policies will be felt through several channels, most notably the financial and trade channels, via their effect on movement in capital, goods and services, and interest rates in the international financial market which then spill over to national economies. Countries with marked macroeconomic imbalances and substantial needs for external financing find it particularly difficult to estimate the effect of change in leading central banks' policies and to adjust to them timely.

In the monetary strategy (Strategy) of the National Bank of Serbia, the inflation target is a medium-term target, which means that inflation outturns can depart from the target in the short run, amid exogenous disruptions. The National Bank of Serbia will also allow such temporary departures if restoring inflation to target level over a short time horizon calls for changes in monetary policy that could trigger macroeconomic volatility. The Strategy cites sudden changes in prices of primary commodities as an example of exogenous disruptions which could cause inflation to depart temporarily from the target [19, p. 3].

Serbia's monetary policy framework gives monetary policy scope to respond by its instruments so as to avoid a trade-off between the preservation of price stability, financial stability and support to sustainable economic growth. Drawing on the flexibility of the framework which we ourselves created in late 2012, the inflation targeting regime applied by the National Bank of Serbia ensures precisely that. Since December 2012, key auctions of repo sale of dinar securities were conducted applying the variable multiple interest rate method, providing another channel of monetary policy influence – the possibility to respond promptly, even without changing the main interest rates, and the possibility to respond between Executive Board meetings. Monetary policy decisions are also guided by the fact that the transmission mechanism of monetary policy takes place at different speed and intensity through different channels. In other words, time needs to pass in order for the full effects of measures to play out, through different channels, on the level of economic activity, domestic demand and labour market, as well as inflation. Decisions are therefore taken not only based on departures of current inflation from the target, but also based on the departures of expected one-year ahead inflation from the target.

When all facts are considered: 1. that inflation in Serbia is guided primarily by supply-side factors; 2. that inflation expectations are within the bounds of the target band, and

3. that in the monetary policy horizon, according to the November National Bank of Serbia's projection, inflation will be within the bounds of the target band, we estimated that, in such conditions there was no need for a faster or more substantial tightening of monetary conditions, but that gradual monetary policy adjustment is called for. Using the flexibility of the current monetary framework which we created ourselves, since October 2021 we have been gradually reducing monetary policy accommodation without changing our main interest rates. In addition to discontinuing repo securities purchase auctions through which in the prior period (during the pandemic) banks were provided with dinar liquidity, the National Bank of Serbia is gradually increasing the percentage of excess dinar liquidity which it withdraws for a week through reverse repo auctions (repo sale of securities), as well as the weighted average rate in these auctions. Since October 2021, this rate increased from 0.11%, to 0.75%, which is its level at the latest reverse repo auction in the first week of February 2022. These measures were taken in view of heightened cost-push pressures in the international and domestic environment and the need to keep inflation expectations anchored and financial conditions favourable, which is still necessary given the uncertainty about the course of the pandemic and the emergence of new virus strains. We assess that the desired effects can be achieved at a somewhat lower degree of monetary accommodation as well. The National Bank of Serbia stands ready to respond promptly by using all monetary policy instruments on hand should any of the risks that would keep inflation above the upper bound of the target band for a prolonged period of time materialise.

Concluding remarks

Inflation increased in many countries in 2021 on the tide of economic recovery, with consumer and business optimism rising, buoyed up by fiscal and monetary accommodation. And whereas demand, bolstered by measures, recovered robustly, production fell short in some segments, creating disruptions in value chains. The sudden rise in global prices of primary commodities, shortages of some production inputs and supply bottlenecks led to amplified cost-push pressures which, coupled with the effects of last year's low base, pushed inflation up to several decades' highs in many advanced economies. The same question is debated worldwide: are pressures temporary or more durable in character?

Globally elevated inflation pressures have so far had no major impact on a change in economic behaviour of market participants and their inflation expectations, but extended duration of high cost-push pressures could change this. If inflation expectations go up, so will the potential of secondary effects. Also, some structural factors could keep inflation more permanently above central banks' targets, such as labour force shortfalls in some sectors. Altogether, this calls for careful monitoring and assessment of the nature and intensity of inflationary pressures, with clear and transparent communication with the public and readiness to respond promptly and adequately using all disposable measures.

Though assessments prevail that inflation growth has for its most part resulted from temporary factors, the extended duration of global value chain disruptions, especially when they are more complex, reveals that global supply is not sufficiently flexible when faced with demand which displays a high growth potential. Potential more durable consequences should therefore not be disregarded either. Specifically, the "stop and go" recovery has resulted from: 1. differentiated sectoral impact of the pandemic, which monetary and fiscal measures were not able to balance out fully; 2. changeable epidemiological conditions in some countries; 3. differences among countries with regard to stimuli directed at preserving capacities included in global production and trade chains. Together with the still unclear effects of the pandemic on the composition of demand, this has heightened uncertainty with regard to macroeconomic developments and, by extension, prices, and again opened the question of stagflation. What do we know? If structural factors are the key determinant of inflation, monetary policies will face a new kind of challenges to which they will not be able to respond using their measures only. On the other hand, the contribution to be expected from fiscal and structural policies will greatly depend on the fiscal space available for repairing these distortions. Substantial fiscal stimuli taken so far

have narrowed this space in many economies. This will be particularly important for small and open economies, where fiscal space, along with the efficiency of previously undertaken measures, will significantly determine the possibility of external financing and, by extension, the stability of the exchange rate. In Serbia, in the conditions of full coordination of adequate monetary and fiscal policy measures, external imbalances have narrowed drastically, while the internal balance has been struck and reserves built up. A proactive approach, coupled with the implementation of structural reforms, bolstered our economy's resilience to numerous external uncertainties.

Historically speaking, episodes of long and persistent inflation were mostly associated with: excessive demand growth over a longer period of time; high and unsustainable wage growth above productivity; unanchored inflation expectations; macroeconomic imbalances resulting in a weakening of the domestic currency. As a result of our policies, Serbia is now far from that scenario – medium-term inflation expectations of the financial and corporate sectors are anchored around target midpoint, external imbalance has improved significantly, while the country's FX reserves are at an all-time high, contributing to relative stability of the exchange rate. The medium-term macroeconomic framework, also agreed with the IMF, envisages robust investment in infrastructure coupled with a strengthening of the fiscal position, preservation of external position within sustainable bounds, inflation returning to pre-pandemic projected paths and wage growth below nominal GDP. This view is shared by international financial institutions which expect inflation in Serbia to slow in 2022 and return within the target band, as the effects of temporary factors wear off. An example of such expectations is Standard&Poor's which in its press release in mid-December 2021 revised up Serbia's investment-grade outlook, which means we are half a step away from achieving our goal: "*… in contrast with regional peers, core inflation has remained within the NBS's target thanks to the stable exchange rate, but also thanks to broadly anchored inflation expectations on the back of the institution's effective efforts to keep low and stable inflation over the last seven years… This could mean that headline inflation could converge back to the NBS' target tolerance band of 3% ± 1.5% fairly quickly in the second half of 2022 as prices of food and energy normalize*" [20, p. 3].

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Jorgovanka Tabaković

has been serving as Governor of the National Bank of Serbia since August 2012. In early 1992, she was employed by Prištinska banka a.d., part of the Beogradska banka system, as Deputy General Manager and continued to work in the banking industry until 1999. From March 1998 until October 2000, she served as Minister of Economic and Ownership Transformation in the Serbian Government. Since 1999 until her appointment as Governor, she worked in the Telecommunications Company "Telekom Srbija", initially at the position of General Manager of the Logistics Department (March 2005-December 2008), after which she worked as an expert for economic operations.

She obtained an MA degree in 1999 from the Faculty of Economics of the University of Priština and earned her PhD in Economics from the same university in May 2011. She has authored a number of studies on privatisation and financial markets. In 2006 and 2007, she lectured at the Faculty of Management in Novi Sad.