

Inflation Dynamics in the West African Economic and Monetary Union (WAEMU)

Cecilia Melo Fernandes

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MF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on January 19, 2023. This paper is also published separately as IMF Country Report No 23/103.

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Inflation Dynamics in the West African Economic and Monetary Union (WAEMU)

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ABSTRACT: This paper analyzes recent inflation developments in the WAEMU. As in all inflation spikes in the past two decades, food is the main driver of inflation. The contribution from energy prices is also increasing, while inflation contagion effects are still limited to a few sectors. The share of professionals that believe that inflation will continue above the target within the one-year horizon is at high levels compared to 2021. Based on projections from two models, the chapter also evaluates the appropriate monetary policy responses to the recent inflationary pressures. The results suggest that inflation is expected to converge to its target range within 24 months given the reduction of exogenous shocks weighing-in on food and energy prices, the exhaustion of base effects as well as a reduction in supply and demand imbalances. However, numerous external and internal factors affect inflation prospects and should be carefully monitored, given the pronounced uncertainty surrounding geopolitical and economic developments, and further monetary policy tighten would be necessary unless downside risks to forecasts for baseline inflation and external buffers improve.

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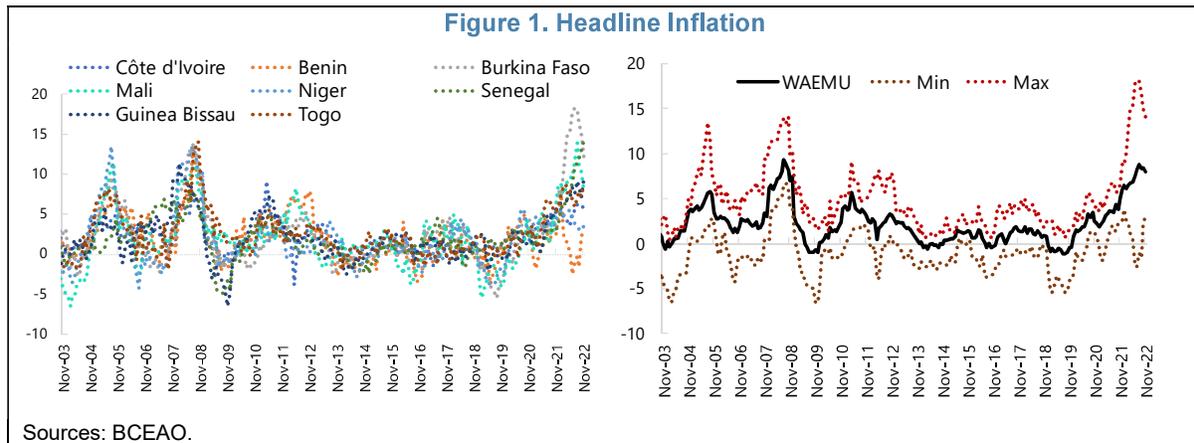
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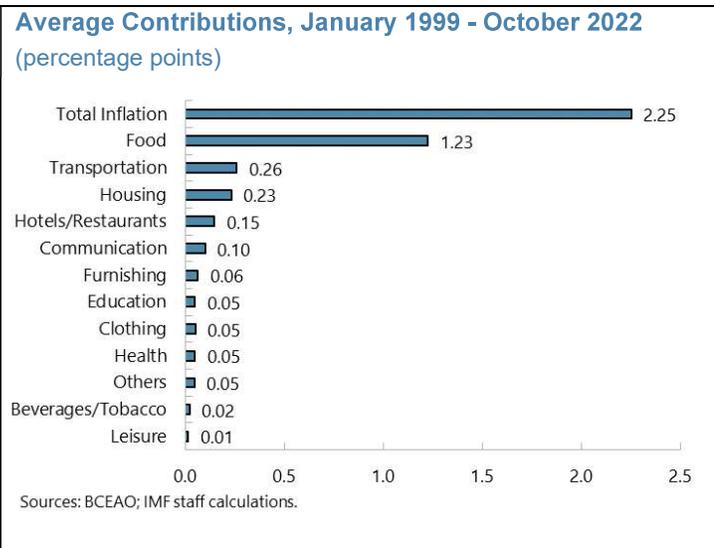
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I. Recent Developments in the WAEMU Inflation

Headline inflation has been steadily increasing and has been above the upper limit of the central bank’s target range (3 percent) since April 2021. After recording negative rates throughout 2019, headline inflation started to increase sharply at the beginning of 2020. Headline inflation peaked in August at 8.8 percent before slowing to 8.0 percent in November 2022. While the inflation rates of the WAEMU countries have historically been reasonably homogeneous (see Figure 1), a more heterogenous pattern has recently emerged: in November 2022, the inflation rate in Burkina Faso was 12.2 percent, while in Benin it was 3.2 percent.¹



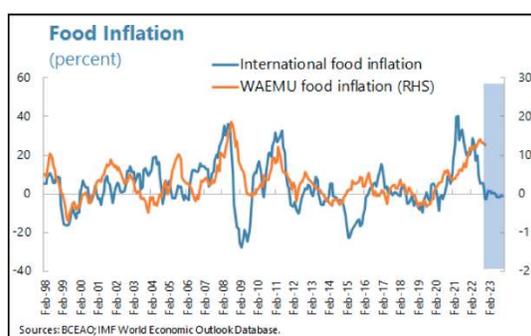
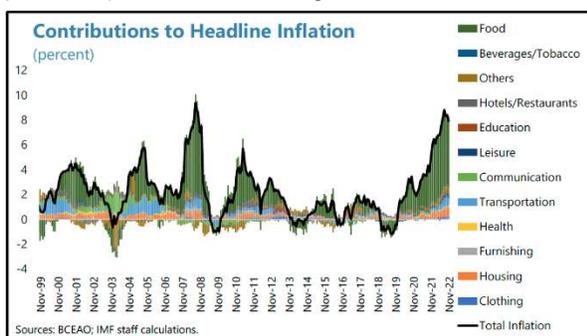
To place the analysis in context, we note that historically food has always been the component with the largest contribution to headline inflation, followed by energy and transportation. Between January 1999 and October 2022, food contributions were on average 1.2 percentage points, against a 2.3 percent average inflation rate in this period (see text Figure). After food, housing and transport are the components that traditionally provide the largest contributions to inflation. This is not surprising as in the WAEMU classification these categories include several items related to energy, such as electricity, gas, fuel, etc. In the past two decades, housing and transport contributed jointly with approximately 0.5 percentage points to headline inflation, while the contributions



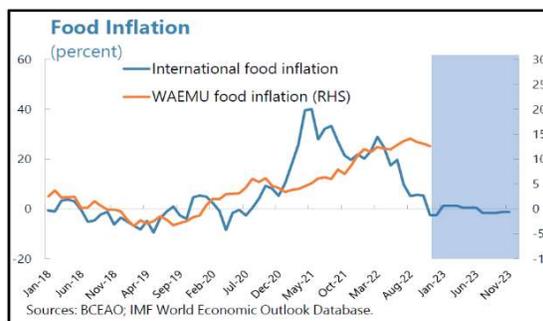
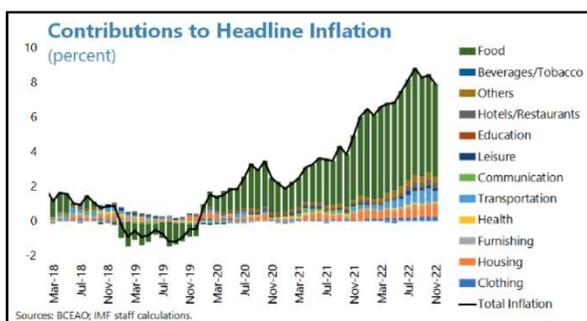
¹ Recent inflation dynamics reflect several Benin-specific factors—a favorable 2021/2022 harvest season; the authorities’ measures to limit the impact of rising international prices and curb the upward trend in food insecurity; and stronger custom’s border control to limit smuggling of staple food and subsidized fertilizers.

from the remaining nine components were 0.6 percentage points. Food, housing, and transport are the components with largest weight in the WAEMU basket consumption,² which also explains their substantial relative contributions.

Domestic food prices have generally driven most of the volatility of inflation, being the main culprit for the large spikes in inflation and its quick reversal. The period associated with the global financial crisis is particularly interesting, as inflation went from about 2 percent (the target) to over 10 percent and back to the target in a time span of about two years. This fluctuation was mainly driven by food prices: when excluding food items, inflation remained close to target (see text Figure below). It is also particularly valuable to notice that domestic food prices tend to follow quite closely international prices, which makes the region particularly vulnerable to global food price shocks. It is quite important to notice that international food price inflation is expected to decline significantly (based on the WEO forecasts), so that it is conceivable to expect—as in the past—a quick reversal of regional food inflation.

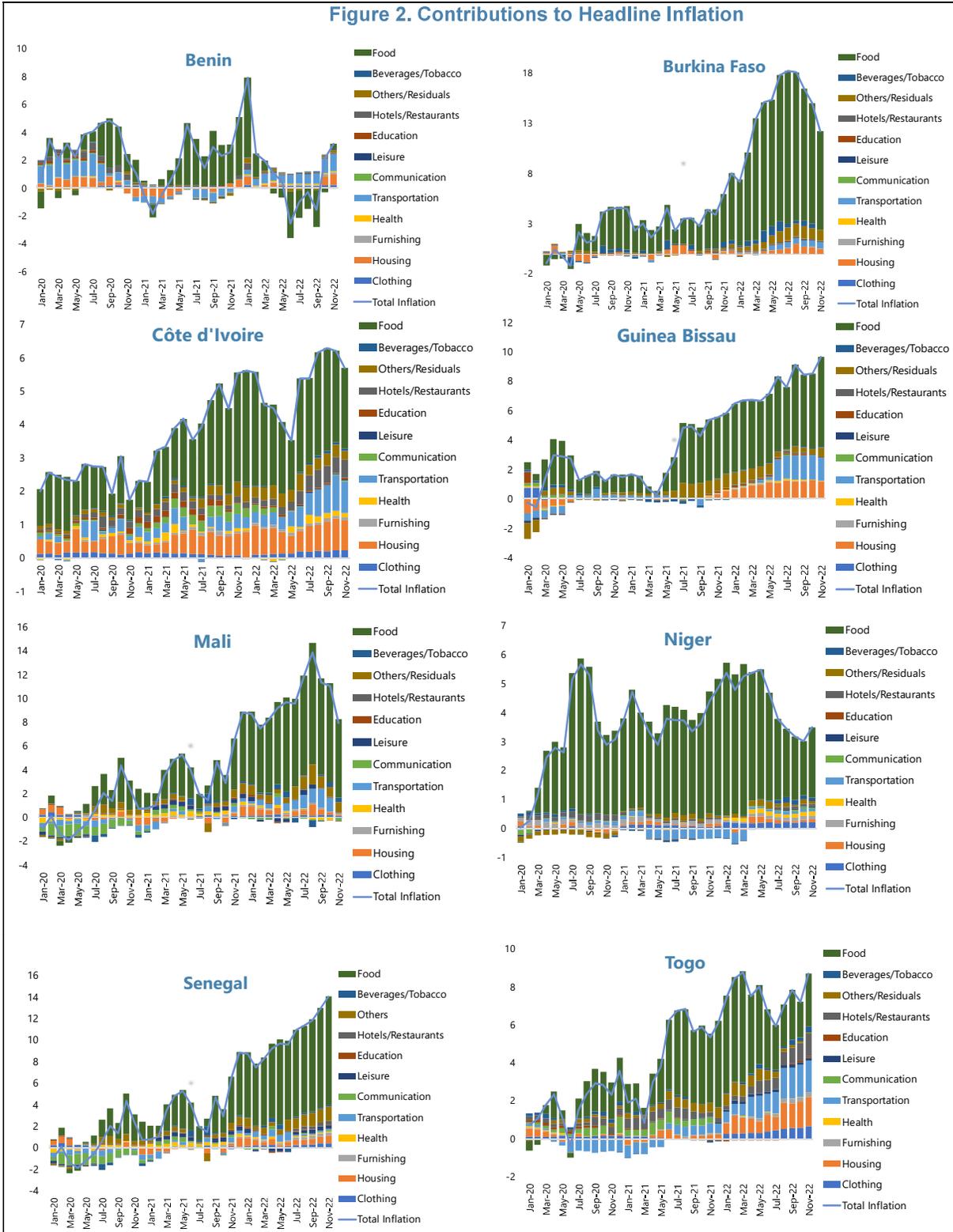


Consistently with historical patterns, the recent surge in inflation is particularly driven by food (and to a lesser extent by energy) prices, with levels similar to the ones in the third quarter of 2008, when inflation reached a record high in the region. The Figure below, which is a short-term version of the Figure above, shows more clearly that, in November 2022, food, housing and transportation contributed respectively with 5.3, 0.7 and 0.6 percentage points to inflation, against 7.4, 0.5 and 0.75 percentage points in the historical peak of August 2008, and compared to 1.2, 0.2, and 0.3 percentage points in the historical average. Food contributions are particularly relevant in Burkina Faso, while Togo and Ivory Coast have the most diversified contributions across the inflation components; this is in part a reflection of the fact that inflation is mainly a food phenomenon also at the country level, being countries with higher inflation tend to have a large contribution from food prices (see Figure 2).



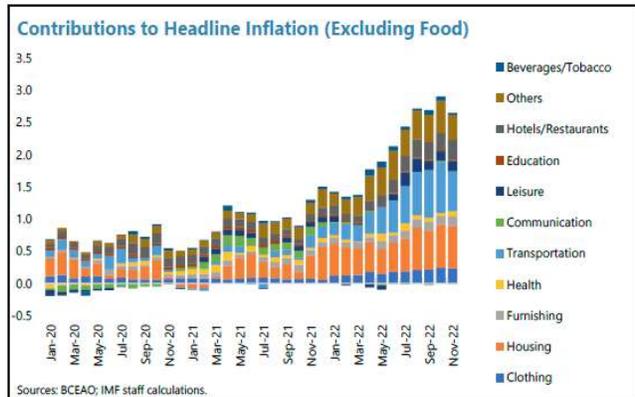
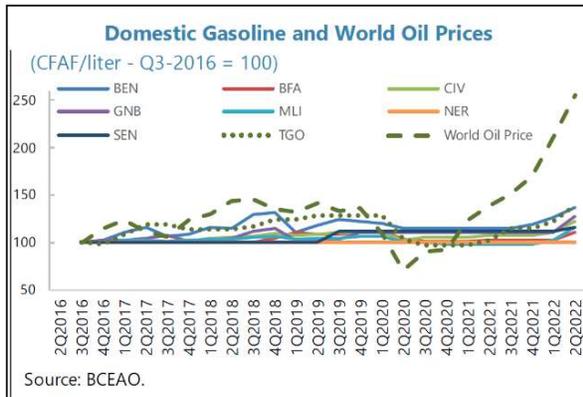
² Food has a weight of 42 percent in the consumption basket in the WAEMU, while energy items are included in housing (11 percent weight) and transportation (9 percent weight).

Figure 2. Contributions to Headline Inflation

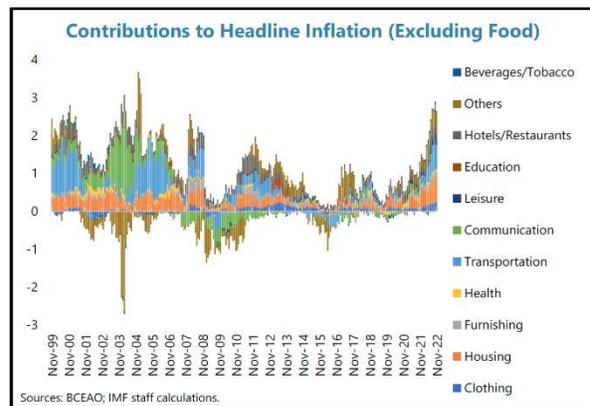


Sources: BCEAO; IMF staff calculations.

Non-food inflation is rising but remains low. Non-food inflation rarely exceeded the target over the past two decades. Over the past year and a half, it increased from about half a percent to about 2.7 percent, mainly on account of three categories. Two of them, housing and transportation, have been driven mainly by higher energy prices, as mentioned earlier. In this respect, it is interesting to notice that the contribution to inflation from energy prices has remain muted despite large increase in the international price of oil; this is mainly because of domestic policies containing those effects in most countries (text Figure below). The third category is “other” items, which may be reflecting some broad second round effect coming from services (see left Figure below for a long-term horizon and right Figure below for the recent period).



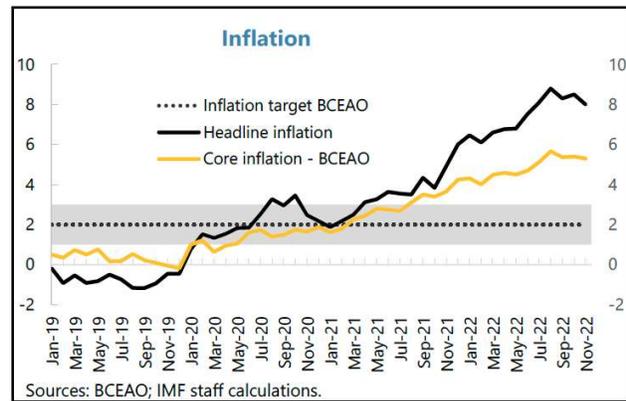
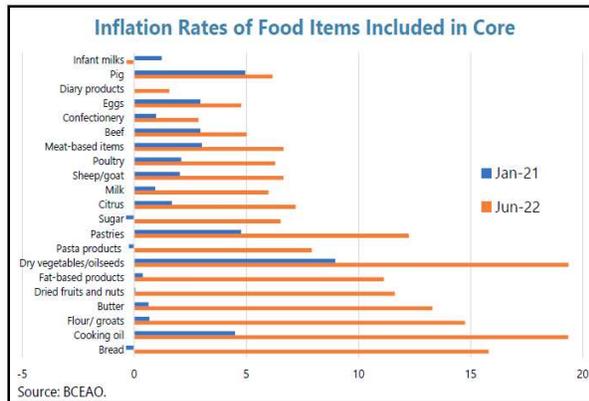
Recently, cereals have been the main driver of the surge in food inflation in most countries. Several constraints on local production given climate shocks, security, and health crises aggravated a situation that has been already challenging due to external global shocks on food prices. Besides the strong role of non-transformed cereals in terms of contributions to food inflation, the surge in food prices is also driven by the prices of oils, sugar, tubers, and meat in most countries of the Union. The role of cereals in driving food inflation is particularly important in Burkina Faso, while Benin and Ivory Coast have more diversified sources of contributions.



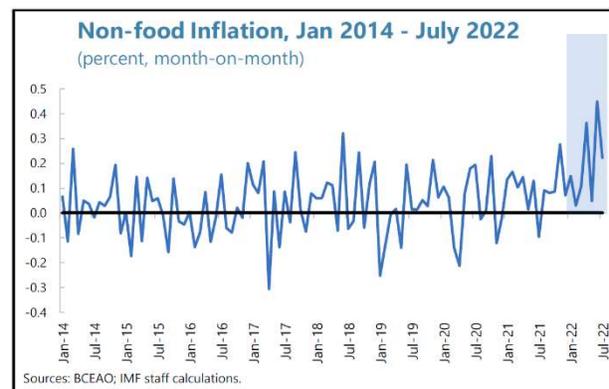
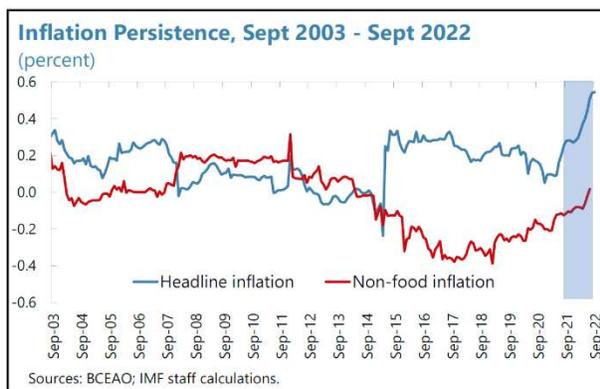
The official measure of core inflation is affected by food prices, and hence—not surprisingly—has been rising substantially but may not adequately represent underlying inflation. Official core inflation excludes “fresh” food and energy prices from headline inflation, but still retains several non-perishable and other food items.³ Overall, contribution to headline inflation from food inflation suffered an increase from 1.4 percent in January 2021 to 5.3 percent in November 2022. In the period between January 2021 and June 2022, the text Figure shows that the most exorbitant increases were from bread (-0.4 to 15.9 percent), cooking oil (4.5 to 19.4 percent), and flour and groats (from 0.7 to 14.8 percent). The recent developments in food

³ Very detailed breakdown of sectoral inflation data is not available for recent months.

items included in the official core measure largely explains its steady rise, since it breached the upper limit of the central bank’s upper target in August 2021, reaching 5.3 percent in November 2022. However, the numerous components of food prices in official core inflation weaken its adequacy in capturing the underlying trend in inflation.

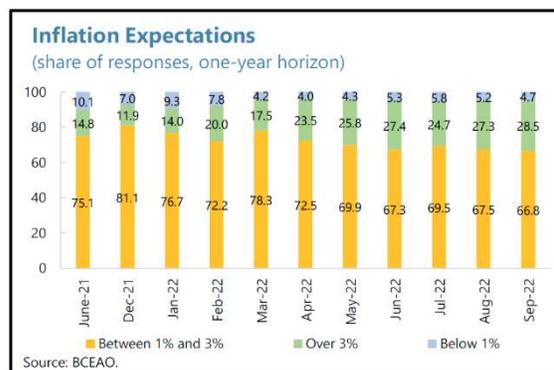


Inflation persistence has been steeply rising in tandem with headline inflation since January 2021, and if continues it may pose challenges for monetary policy. The persistence index⁴ has increased from 0.10 in January 2021 to 0.55 in September 2022, considerably above the historical average of 0.2 (see Figure below). The higher the inflation persistence, the more challenging it is for the central bank to control inflation, given the stronger influence from past inflation on expectations, on price formation, and hence on current and future inflation. As clearly a large part of inflation today and of its persistence is due to rapidly rising food inflation, it is useful to also assess the persistence of non-food inflation. The negative persistence of non-food inflation in the past few years indicates that it was not persistent: an upward movement in the monthly non-food inflation was followed by a downward movement, such that the mean of month-over-month non-food inflation was around zero (as for example since June 2014, see Figure below). However, that pattern has recently changed, with non-food inflation averaging a positive number, and its persistence has moved towards zero from being negative.



⁴ The persistence index is obtained by estimating an AR(1) process, and averaging the estimated coefficient with a 48-months rolling window. The results—in particular for the period of interest starting in January 2021—are robust for different specifications using other AR processes.

Inflation expectations constitute an important decision factor for the BCEAO to increase the policy rates, and the share of professionals that believe that inflation will continue above the target has been rising at high levels compared to 2021 (see text Figure). According to a recent BCEAO survey of inflation expectations, the share of companies' leaders that reported inflation expectations above 3 percent in one year horizon increased from 11.9 percent in December 2021 to 28.5 percent in September 2022, while the share of responses with expectations for one year inflation between 1 percent and 3 percent decreased from 81.1 percent to 66.8 percent.



II. Sectoral Dynamics and Inflation Contagion

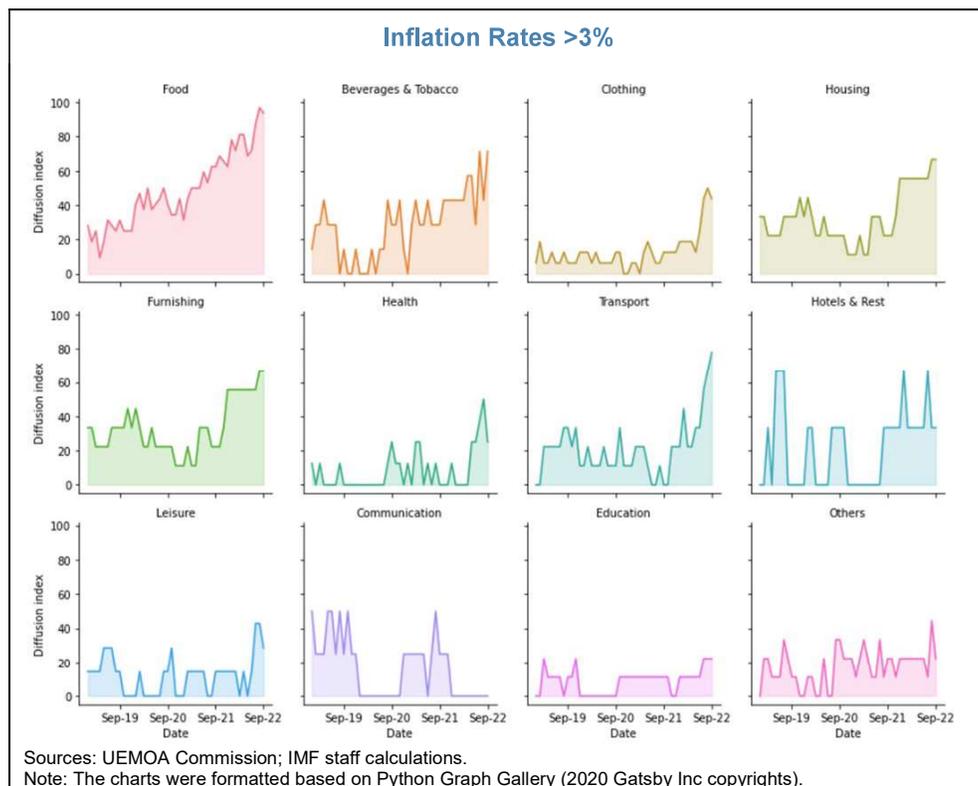
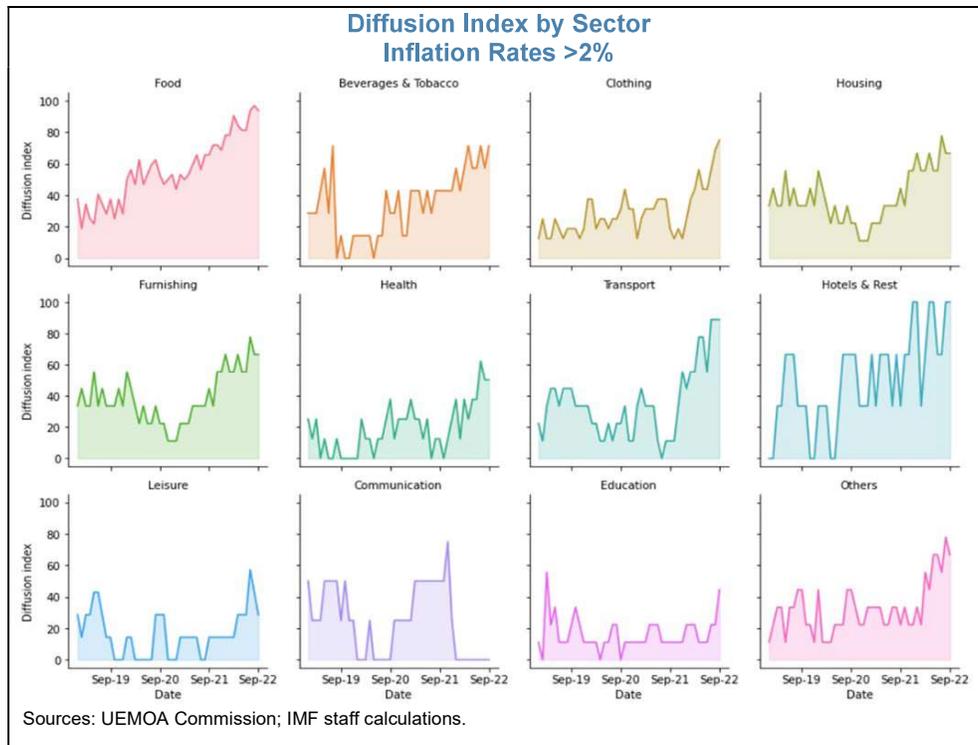
The high degree of informality in the WAEMU economy and the scarcity of data on labor market hinders a broad understanding of potential second-round effects. Unfortunately, wage measures are not widely available in a time fashion. The scarce availability of data on labor market in the WAEMU and the high degree of informality prevent deep analyses and an accurate assessment of potential second-round mechanisms, the pass-through effects of inflation on wage and price setting, and the wage-price spiral process.

Despite the methodological limitations in estimating second-round effects, some analytical tools—such as the diffusion index—can help to analyze potential inflation contagion across sectors in the WAEMU. The diffusion index—i.e., the share of items with inflation above a certain threshold—is a suitable proxy to monitor potential contagion dynamics of inflation dispersion, since it assesses how widespread inflation has become across the 126 items included in headline inflation. The share of items with inflation rates above 2 percent (the target) surpassed 50 percent in March 2022 and reached 68 percent in September 2022—after having remained at relatively stable levels at around 30 percent since 2019—indicating that now a slight majority of the items have prices rising at rates above the BCEAO target level (see text Figure). The diffusion index based on an inflation threshold of 3 percent (the upper range of the target band) has been also rising since 2021, but and it is now above 50 percent.

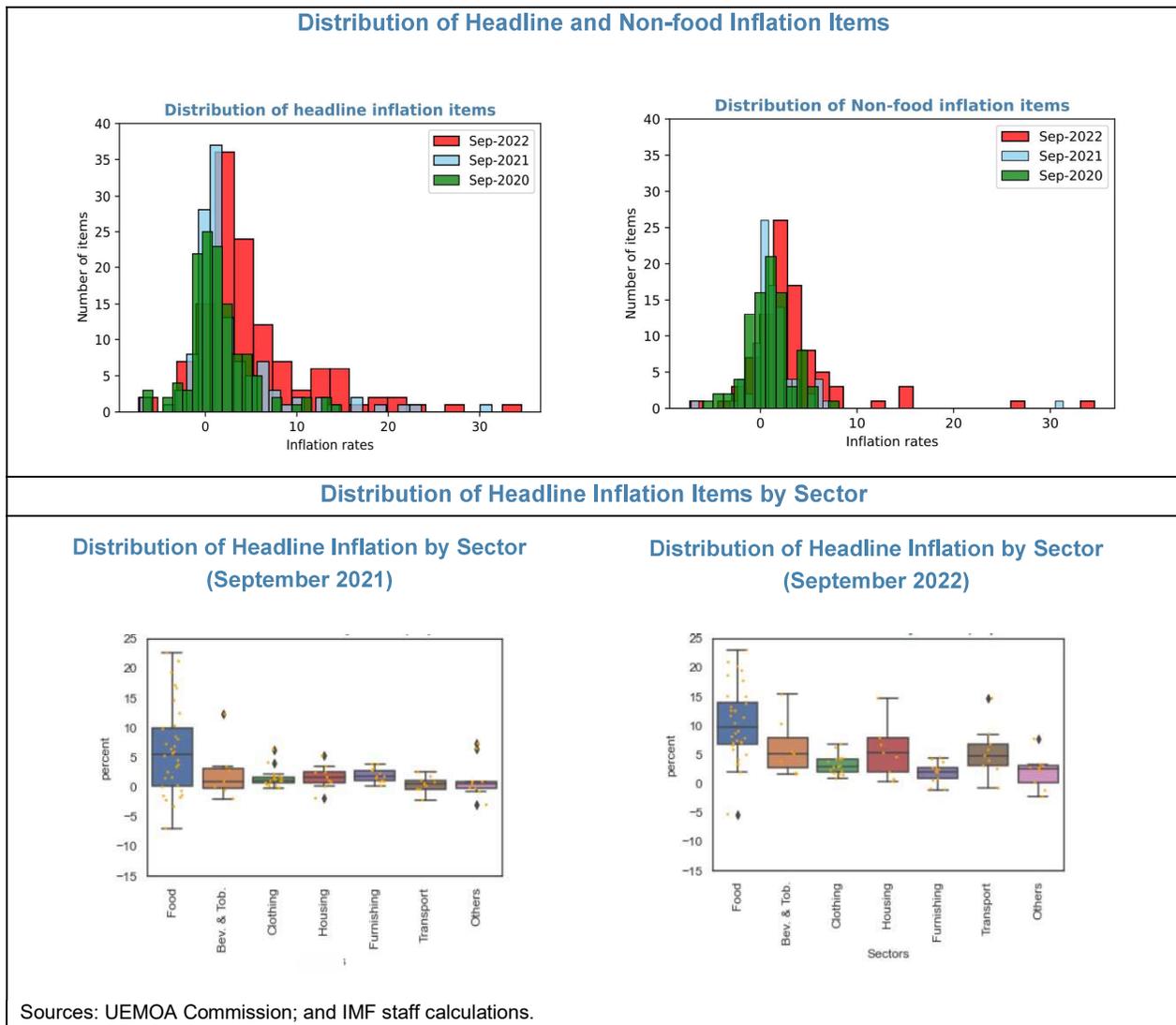


The breakdown of the diffusion index by sector indicates that some inflation contagion effects outside of food and energy have emerged but remain still limited to a few other sectors. The diffusion index with

inflation rates above 2 percent shows that—excluding food, housing and transport—the sectors with the highest increase in prices are beverages & tobacco, clothing, furnishing, and “others” (containing several services). And this potential pass-through from higher food or energy prices onto the price of other products and services is rising. The diffusion index remains contained in other sectors, such as leisure, education, health, and communication. When the threshold of the diffusion index is increased to inflation rates above 3 percent, the evidence of contagion prevails only in beverages & tobacco as well as furnishing (hotels and restaurants is a very volatile category, which has only 3 items and is strongly related to food and energy – see Figure below). Hence these contagion effects are not strong yet.

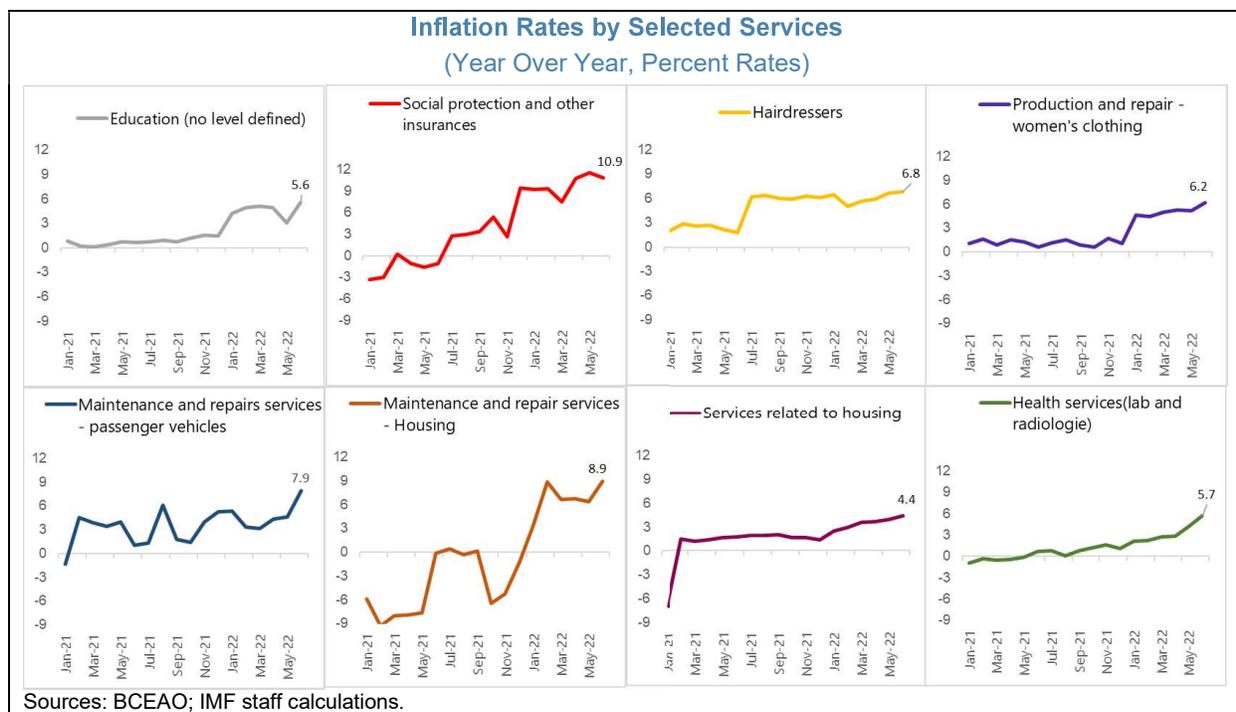


Since 2020, the dispersion of inflation rates across items within the WAEMU consumption basket has increased, although again mainly for those related to food and energy. The Figure below shows the distribution of inflation across the consumption basket items in the WAEMU, via the histogram for all components of headline inflation, for three consecutive years since September 2020. The Figure shows that not only the mean had become higher (i.e. higher inflation), but the distribution has become wider while shifting to the right (hence more dispersion particularly towards higher inflation). However, these movements are more nuanced when considering only the components excluding food items. The Figure confirms that the major upsurges both in the mean and price dispersion have been on food, housing, and transport, while the changes in prices in other categories were more contained.



The highest price increases excluding the items related to food and energy come from services, which is an alarming signal of potential second round effects. The Figure below shows the items that suffered major increases in prices, outside food and energy. They consist of services such as hairdresser, insurance, maintenance and repair for housing, clothing, among others. A common feature across all these services is

that one year earlier they were either under deflation or their price growth rates were very close to 0 percent—while headline inflation was already close to 4 percent. The price acceleration could hence also be explained by supply and demand imbalances followed by the economic rebound after the pandemic. Going forward, if the price surge of such items remains sustained, it could be a strong indication of second-round effects.



III. Going Forward: Inflation Forecasts and Monetary Policy Implications

Robust inflation forecasts are of fundamental importance for the monetary policy decision-making process of the BCEAO. Indeed, the BCEAO adopts a forward-looking decision-making approach, targeting a 2 percent year-over-year inflation rate (with a symmetrical ceiling and floor of 1 percentage point) within a horizon of 24 months. In order to derive inflation projections, we rely on methodologies that evaluate the impact of exogenous factors, such as the international prices of food and energy (as forecasted in the IMF WEO) over the next two years.

This section describes two models with different degrees of complexity and forecast horizons, which can offer medium-term inflation forecasts. These models are: (i) a Seasonal Auto-Regressive Integrated

Moving Average model, with exogenous factors (SARIMAX) and the (ii) African Module of the Flexible System of Global Models (AFRMOD-FSGM) based on Andrieu et al. (2015) applied to the WAEMU.⁵

The SARIMAX model consists of a Seasonal Auto-Regressive Integrated Moving Average model including exogenous factors. This is an econometric exercise where the independent variable is the WAEMU headline inflation, while the exogenous variables are international fuel and foods prices as well as the nominal effective exchange rate, based on the IMF WEO database. The estimation period employs year-over-year quarterly frequency data covering the period between 1997Q1 and 2022Q2. The forecast period starts in 2022Q3 and ends in 2024Q4. The recent depreciation of the nominal effective exchange rate is assumed to abate so the yearly change converges to zero during the forecast period. As this exercise is based on an econometric estimation, it cannot explore alternative monetary policy responses, and it would capture the monetary policy response only to the extent this is reflected in the average historical behavior (and thus in the estimated coefficients).

The AFRMOD-FSGM is a multi-region and forward-looking model of the global economy combining both micro-founded and reduced-form formulations of economic sectors with unique parameterization tailored for the WAEMU.⁶ The objective of this exercise is to obtain a simulation based on the AFRMOD-FSGM theoretical model. In the model, real GDP is determined in the short run by the sum of its demand components, and in the long run by the level of potential output. Fiscal policy stabilizes debt as a percent of GDP in the long-run and responds to changes in the output gap in the short-term. Monetary policy is represented by an interest rate reaction function where the standard form is an inflation-forecast based rule. Given the presence of capital controls which allow for some monetary policy independence, and the limited ability of the model to fully reflect this institutional setup, two different exchange rate regime scenarios are presented: (i) a fixed exchange rate with a small addition of country risk premium and (ii) a managed float. Finally, there are three commodities in the model—oil, metals, and food. The model has annual frequency and goods prices are sticky.

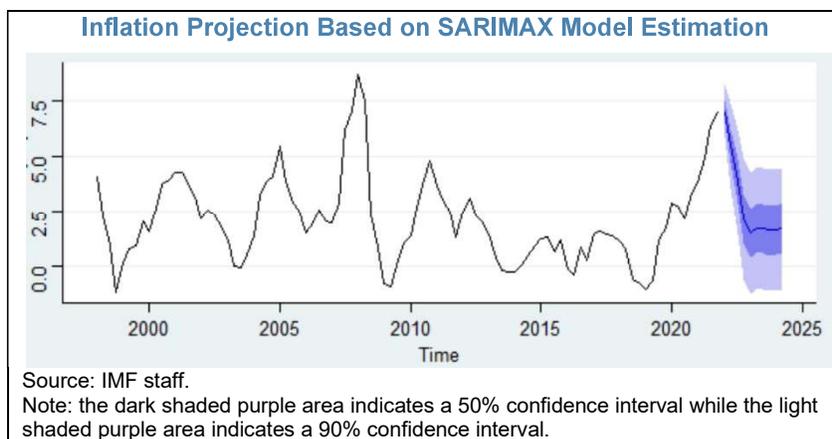
Results

The SARIMAX model shows that inflation is expected to decline towards the target within 24 months.

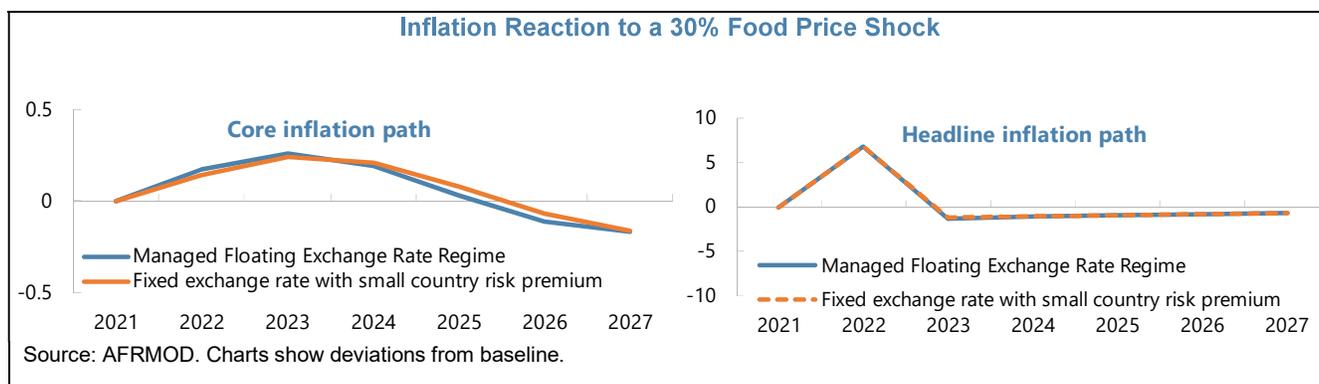
The estimation suggests that inflation is expected to decrease to 1¾ percent by 2024Q4, based on the WEO GAS projections of lower fuel and food prices in the near future (as a result of the global monetary policy tightening and the associated economic slowdown), as well as minimal pressure from exchange rate movements.

⁵ Andrieu, M., Patrick Blagrove, Pedro Espallat, Keiko Honjo, Benjamin Hunt, Mikko Kortelainen, Rene Lalonde, Douglas Laxton, Eleonora Mavroeidi, Dirk Muir, Susana Mursula, and Stephen Snudden, 2015, “*Flexible System of Global Models – FSGM*,” IMF WP/15/64. The case for the WAEMU was prepared by Keiko Honjo (RES).

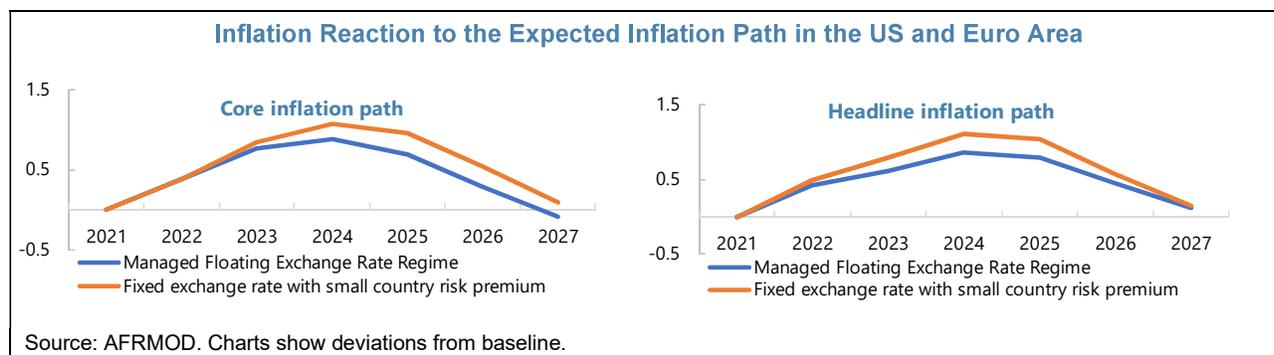
⁶ For a recent theoretical model adapted to the WAEMU region please see De Resende, C., Fall, A. and Sy, D. (2022). “A Quarterly Projection Model for the WAEMU”, IMF Working Paper No.2022/215. The QPM-WAEMU model incorporates aspects specific to the WAEMU zone, such as the fixed exchange rate regime, the presence of controls of capital flows, and—consequently—the BCEAO’s limited ability to influence the money market of the WAEMU. It also includes the relevance of foreign exchange reserves for monetary policy decisions through the incorporation in the monetary policy rule of the risk premium as a function of reserves.



The estimations from AFRMOD for the impact of two different shocks on WAEMU inflation also show evidence that inflation is expected to decline in the medium-term. The first shock consists of an increase in global food prices of 30 percent in 2022 (the model is calibrated on annual data). In this case, there is a short-lived reaction of headline inflation in WAEMU, which increases by 5 percentage points in 2022, fading away in the subsequent years. The effect on traditional core inflation (excluding food and energy) is negligible. The second shock consists of increases in the Euro area and US inflation path.^[1] Following this shock, headline inflation gradually increases by approximately 1 percentage point in WAEMU and slowly decreases by half percentage point by the end of 2026, but the small inflation impact is cushioned by a central bank moderate monetary policy reaction.



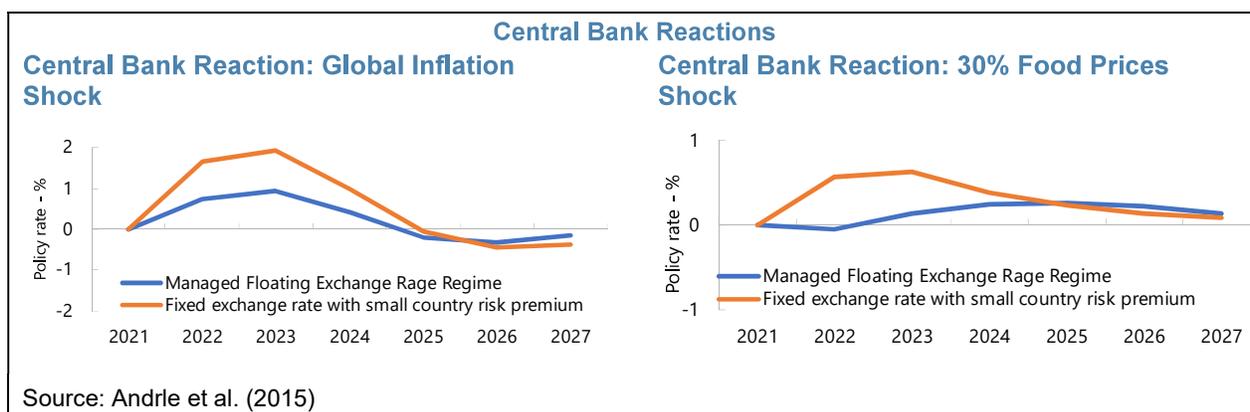
[1] The path for core inflation was obtained from WEO and the inflation gap (inflation shock) was calculated by subtracting 2 percent from this path, since 2 percent is the steady state core inflation for both euro and US.



Monetary Policy Implications

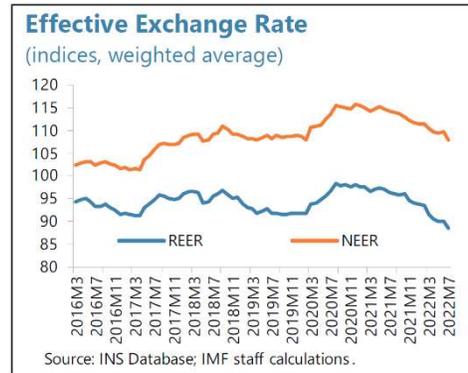
The results of the SARIMAX estimation—which can be used as a simple benchmark—do not call for a monetary policy tightening. According to the SARIMAX estimation, by the end of 2024, inflation is expected to reach 1¾ percentage points, which is within the target range. Hence this calculation does not call for a change in monetary policy. This is not surprising as the SARIMAX model accounts for food inflation which—as we have seen—is the key driver of inflation in the region. Of course, the SARIMAX model—while well-grounded in the key drivers of inflation—remains a simple benchmark that does not encompass a broad set of fundamentals in a general equilibrium setting. And to the extent this time around persistent and second round effects are stronger than over the historical sample over which the SARIMAX model was estimated, the model would not be able to capture these effects.

The simulation from AFRMOD results suggest that the central bank should react mainly to global inflationary shocks, and not to pure food prices shocks in the absence of second-round effects. In the case of a global food price shock, given the short-lived reaction of headline inflation and the very limited reaction of core inflation, the simulation indicates that the central bank does not need to react. This might be appropriate in the case of a pure, short-lived supply shock with no further inflation contagion across sectors nor second-round effects. However, in this model a positive shock to the Euro area and US inflation paths results in a more persistent and gradual increase in core and headline inflation, triggering a policy rate response ranging between 0.9 and 2 percentage points by the end of 2023, depending on the exchange rate regime assumed. This result suggests that in contrast to the food prices shocks, the central bank needs to react to sources of global inflation shocks that might persistently affect the region, in particular to those triggering other channels of inflationary pressures in the economy.

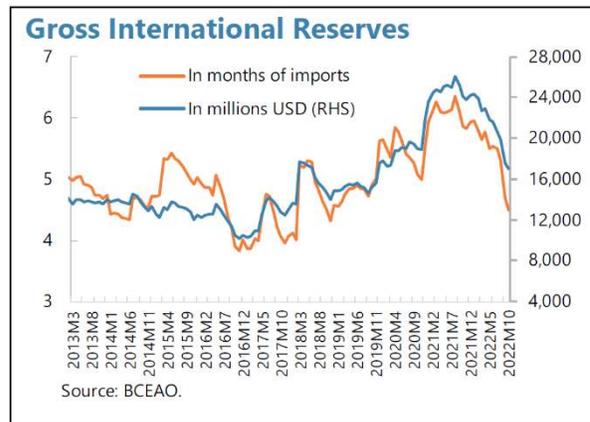


IV. Other Factors Relevant for Inflation Developments and Desirable Monetary Response

The uncertainty surrounding external and internal political and economic factors remains pronounced. Externally, critical developments of the war in Ukraine, further aggravation of sanctions against Russia, tighter than expected monetary policy in developed countries, further increases both in international transportation bottlenecks and in European natural gas and fertilizers prices, and further depreciation of the Euro versus the U.S. dollar are risks that might put pressure on inflation upwards.

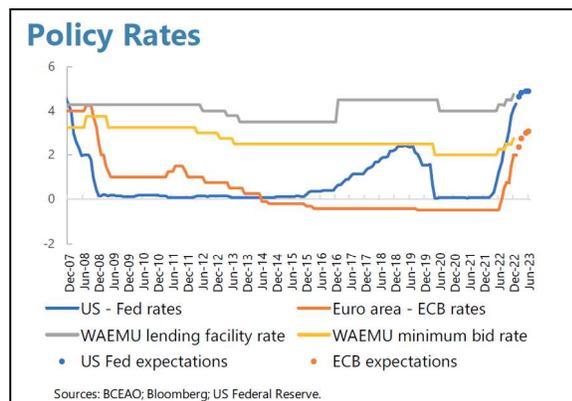


Challenges in fiscal consolidation should be carefully monitored. Fiscal consolidation is essential not only to maintain an adequate level of external reserves, but it is also crucial for price stability as higher deviations of fiscal deficit from current trends would exert additional pressure on inflation. To the extent the subsidies and price controls on essential goods implemented this year to contain price increases are not sustainable for much longer, one may expect again additional pressure on inflation.



Additional risks relate to climate and security. Some producing countries have been particularly affected by weather conditions and security issues.

A deterioration of reserves and more difficult access to international capital are also risks that, if

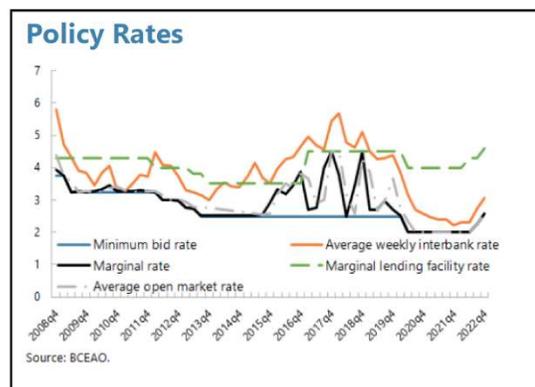


materialized, might tilt the desirable monetary policy response. While a tightening of monetary policy normally entails costs in terms of growth, it contributes to the mitigation of inflationary pressures as well as the preservation of foreign exchange reserves. The level and evolution of foreign reserves are indeed important factors considered by the BCEAO. Article 76 of the BCEAO statutes specifies a minimum threshold for its level of foreign reserves, below which the monetary policy stance would need to be reassessed and remedial actions would have to be taken.⁷ Although the BCEAO does not

⁷ Specifically, the BCEAO should not let the monthly average of foreign exchange reserves fall below 20 percent of its sight liabilities (banknotes in circulation and deposits at the central bank) for three consecutive months. However, exchange rate stability is not a de jure objective of monetary policy.

traditionally follow the monetary policy decisions of the ECB (as visible in the Figure below) mainly due to its capital controls, the current monetary policy tightening in the euro area is expected by the markets to be substantial both in terms of speed and levels, and as such it may place unusual pressure on WAEMU monetary policy. Therefore, it is important to further monitor these developments. Finally, it is important to avoid further risks of contagion and potential second-round effects, which might result in de-anchored expectations.

Overall, the analysis presented in this paper suggests that further monetary policy tighten would be necessary unless downside risks to current baseline inflation and external buffer forecasts improve. As always, monetary policy would need to be data-dependent based on economic developments, given the numerous external and internal risks affecting inflation prospects, which should be carefully monitored.



References

Andrieu, M., Patrick Blagrove, Pedro Espinosa-Vega, Keiko Honjo, Benjamin Hunt, Mikko Kortelainen, Rene Lalonde, Douglas Laxton, Eleonora Mavroeidi, Dirk Muir, Susana Mursula, and Stephen Snudden, 2015, “*Flexible System of Global Models – FSGM*,” IMF WP/15/64. The case for the WAEMU was prepared by Keiko Honjo (RES).