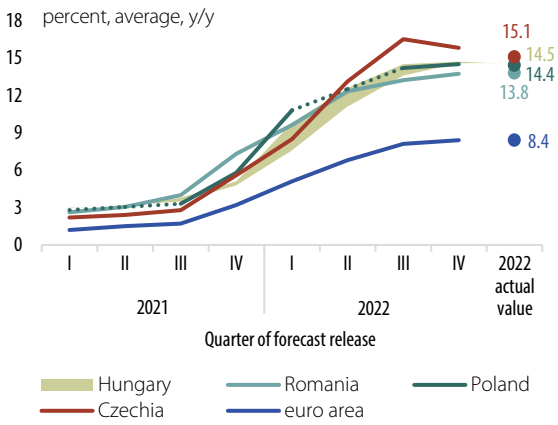
Box 2. Assessing the accuracy of macroeconomic forecasts on the December 2022 annual CPI inflation rate

This Box is part of the annual exercise designed to assess the accuracy of NBR projections on the annual CPI inflation rate at the end of the prior year, i.e. December 2022 in this case. The December 2022 annual CPI inflation rate was subject to eight forecasting rounds corresponding to the *Inflation Reports* published March 2021 through November 2022, with the projected values running below the actual level (16.37 percent, of which the contribution of inflation components beyond the scope of monetary policy was roughly 7 percentage points) in all rounds[1].

Over the past two years, central banks proceeded to repeatedly revise upwards the 2022 inflation projections (Chart A), amid extraordinary, mostly supply-side shocks with worldwide spillover effects. The very rapid, broad-based step-up in inflation rates to levels significantly above inflation targets was triggered by the overlapping of surges in commodity prices, especially energy and agri-food commodity prices, induced by disruptions in supply chains (in the context of the pandemic and later on of the war in Ukraine), with a resilient excess demand prevailing in the economy. The latter was supported by the easing of mobility restrictions after moving past the public health crisis, thus favouring the pass-through of production cost increases into final prices. Consequently, the global inflation rate has recently been exceptionally high, in many countries exceeding significantly the values recorded over the past decades.

Chart A. Revisions of the forecasts on 2022 average annual inflation rate made by some central banks



Note: The projections refer to headline inflation (calculated based on HICP for the euro area and CPI for Hungary, Poland, Czechia and Romania).

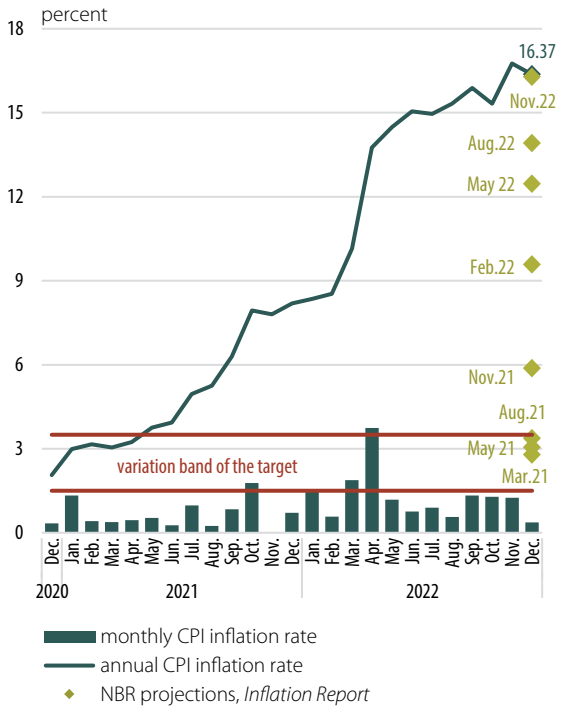
Source: central banks' websites

Under the circumstances, Romania has also posted a fast pick-up in the annual CPI inflation rate starting with the second half of 2021, partly dampened by the government support schemes for households, especially aimed to cap and compensate electricity and natural gas price hikes[2] (with an estimated impact of around -11 percentage points on the December 2022 annual CPI inflation rate). The 16.76 percent level seen in November 2022 is a peak since the adoption of inflation targeting strategy in August 2005, exceeding by about 7.7 percentage points the previous 9.04 percent peak reported in July 2008. Relevant developments in both the pandemic and geopolitical situation

1 In the November 2022 forecasting round, the difference between the actual value of annual CPI inflation rate in December 2022 and the forecast was marginal (below 0.1 percentage points).

2 The exceptional 3.7 percentage point leap recorded by the monthly CPI inflation rate in April 2022, compared to a 1.05 percentage point average for the remainder of 2022, occurred against the background of more restrictive requirements applicable to the support scheme for households compared to the previous ones.

Chart B. CPI inflation – historical developments and forecasts for December 2022



Source: NIS, NBR projections

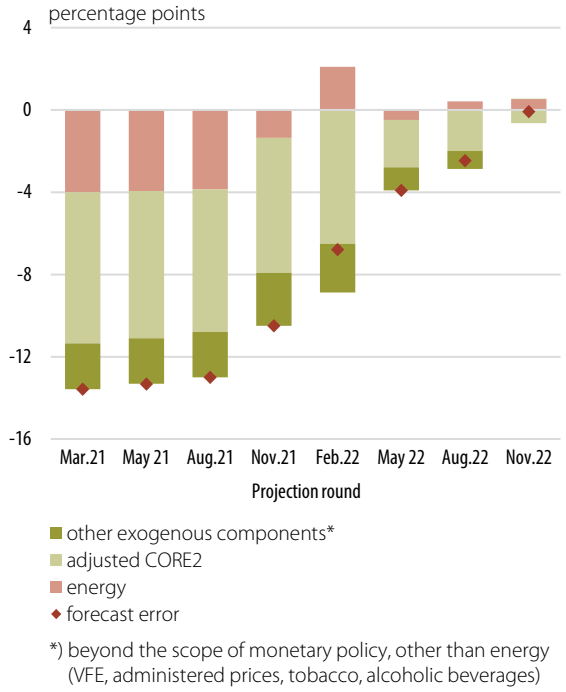
(and implicitly the magnitude of the related supply-side shocks) and the configuration of support schemes for households, which were difficult to predict, were gradually incorporated into the NBR forecasts, as the information became available. Thus, the forecast for the December 2022 annual CPI inflation rate was above the variation band of the target already in the *Report* published at the beginning of November 2021, being subject to successive upward revisions from one projection round to the next (Chart B). At the same time, the uncertainties about the nature and magnitude of such shocks were pointed out in the risk scenarios[3] associated with the forecasts in the baseline scenarios, which are part of central banks' information set underlying monetary policy decisions.

The breakdown of forecast errors, defined as the difference between the forecasted value and the actual one – by CPI components (Chart C) shows the main contribution, in almost all forecasting rounds, of the adjusted CORE2 index and energy price index (especially natural gas and electricity prices) to explaining the errors, as they were the components the most seriously affected by the above-mentioned shocks.

Thus, an important contribution to the step-up in inflation during 2022 came from the adjusted CORE2 index. The same as CPI inflation forecast, the annual core inflation forecast was subject to successive upward revisions from one projection round to the next during the period under review (Chart D), in the context of the gradual incorporation of high cost pressures. These were induced by the sizeable, persistent hikes in the prices of energy, agri-food commodities and other raw materials and materials (Chart E), as well as by the prices of some services (e.g. transport services). At the same time, the favourable evolution of demand eased the pass-through of increased production costs into final prices. A more significant revision of the forecasted trajectory was made during the projection round completed in May 2022, given the escalation of inflationary pressures in commodity markets amid Russia's invasion of Ukraine.

3 The most significant risk sources that may cause the CPI inflation rate to deviate from the projected path are referred to in Section 4.4. "Risks associated with the projection" of the *Inflation Reports*.

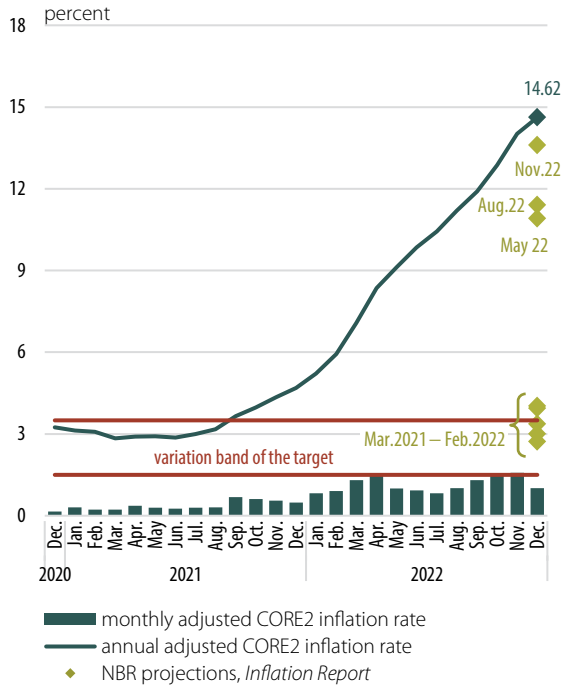
Chart C. The breakdown of forecast errors for end-2022 annual inflation rate by CPI components



*) beyond the scope of monetary policy, other than energy (VFE, administered prices, tobacco, alcoholic beverages)

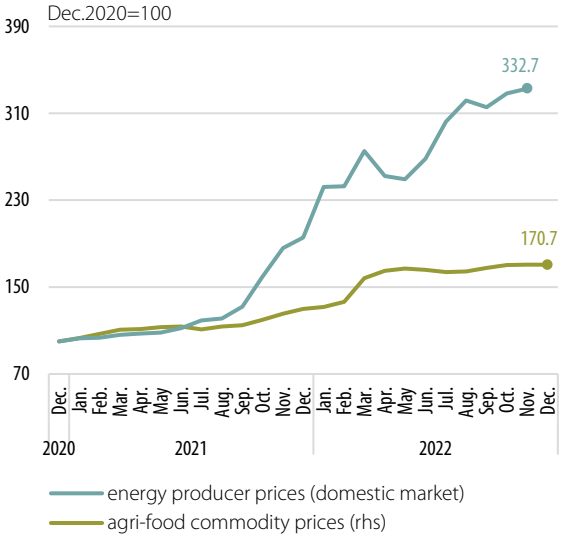
Source: NIS, NBR projections and calculations

Chart D. Adjusted CORE2 inflation – historical developments and forecasted values for December 2022



Source: NIS, NBR projections

Chart E. Developments in energy producer prices and agri-food commodity prices



Source: Eurostat, ECB

Turning to the energy component, both natural gas and electricity prices have seen unprecedented hikes starting with 2021 H2. The worsening of market conditions was due to both demand and supply issues, being compounded by the specifics of the European energy market architecture[4]. During 2022, price volatility rose sharply amid the ongoing war in Ukraine. In the context of a significant drop in the natural gas imports from Russia, prices on European wholesale markets climbed to historical highs in 2022 Q3, nearing EUR 350/MWh (versus an annual average of EUR 46/MWh in 2021[5]). This evolution had a fast impact on electricity markets, which were also affected by the drought of last summer, with prices on European wholesale markets reaching in this case an average of around EUR 400/MWh[6] July through September 2022, i.e. almost 4 times higher than in the same period of 2021. Domestic wholesale markets reflected external market trends, yet most households benefited from capped prices, based on the electricity and natural gas

4 For further details, see the box entitled "Design of European energy markets", included in the August 2022 *Inflation Report*.

5 The benchmark for gas prices is the price of natural gas traded at the Dutch TTF gas hub.

6 For electricity, the price on the external market is calculated as the average for Germany, France and the Netherlands.

bills support scheme in place. The configuration of these schemes underwent several changes during the period under review, the incorporation of their impact on CPI inflation into the NBR forecast being conditional on the timing when these adjustments were enacted. Moreover, the sanctions imposed on Russia caused oil prices, and implicitly fuel prices, to embark on a steeply upward path until late 2022.

Another contribution to underestimating the December 2022 annual CPI inflation rate, albeit of a considerably lower magnitude, came from the volatile food (VFE) price component of the consumer basket (on average by around 0.75 percentage points). The annual dynamics of VFE prices (20.7 percent at end-2022) incorporated the impact of adverse weather developments during the summer, gathering momentum in the latter part of the previous year, compounded also by the hikes in producers' energy costs.

Administered prices and tobacco product and alcoholic beverage prices made marginal contributions to the forecast errors for the December 2022 annual CPI inflation rate.