Box 2. An assessment of potential GDP for Romania in the pandemic context

The outbreak of the COVID-19 pandemic and, subsequently, the multiple shocks that hit the economy (mobility restrictions, bottlenecks in global production and supply chains, sharp hikes in energy prices) entailed adverse and persistent effects on productive capacities. Potential GDP is defined as the volume of real GDP achieved by making full use of factors of production (capital, labour and total factor productivity, TFP) while being consistent with the lack of inflationary pressures. Since potential GDP is a theoretical concept, which is not directly observable, its assessment becomes particularly challenging in such times[1], when the economy is marked by various shocks and, hence, by elevated volatility of statistical data series.

In this context, this analysis is aimed at assessing the impact of the pandemic crisis on potential GDP dynamics for Romania by using a relatively small unobserved components model (UCM), developed within the European System of Central Banks[2]. The analysis also presents prospects for a possible sustainable economic growth and the key role that investment flows would play in such a process, *inter alia* on the back of the implementation of EU-funded projects.

The UCM employs a multivariate Kalman filter[3] that specifies the links between the variables viewed as having an impact on medium- and long-term growth. Thus, variables such as real GDP, capital stock, working-age population, unemployment rate, labour force participation rate, number of hours worked, a measure of core inflation and wage growth are included in the model. The specification of the potential GDP dynamics implies the definition of a standard Cobb-Douglas production function[4]. Other relationships included in the model are Okun's Law (the link between the cyclical components of unemployment rate and GDP) and two Phillips curves modelling price increases and wage dynamics respectively.

The outbreak of the pandemic crisis in early 2020 unleashed a number of broad-based adverse effects on the global economy, with a dampening impact on both demand and supply of goods, along with a steep drop in consumption of services amid strict social distancing measures. Romania's economy took a deep plunge in Q2[5] (with a major impact on the full-year dynamics, i.e. an annual contraction of 3.7 percent). This reflected both the shock that hit the sectors vulnerable to social distancing measures and the fast-paced decline in foreign demand. The unprecedented measures taken by the authorities to contain the spread of the virus materialised in severe temporary restrictions on supply. At the same time, the context was marked by a sharp weakening of economic agents' confidence and bottlenecks in global value chains. Given the fast-paced recovery of the economy

1 For instance, the impact of the pandemic crisis on euro area potential GDP is analysed in papers such as Bodnár *et al.* (2020). The study assessed sizeable adverse effects on the indicator in the 2020-2021 period, in contrast to the robustness of projections made during pre-pandemic forecasting rounds.

2 The structure of the model is detailed in Tănase and Pleșa (2020) or Tóth (2021).

3 The Kalman filter is a statistical algorithm that uses a set of (observable) variables to estimate unobservable components of interest.

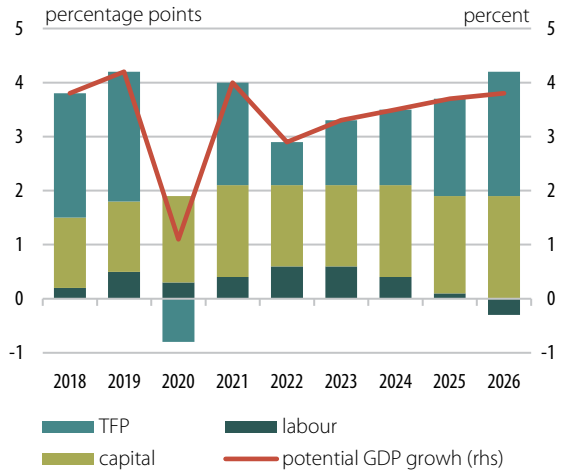
4 A theoretically detailed description of the production function methodology can be found in Havik *et al.* (2014).

5 The assessments in this box are based on the historical series published in NIS Press Release No. 85 of 8 April 2022.

starting 2020 Q3, which revealed the temporary nature of losses in productive capacities, the worsening of economic activity was mostly reflected in the dynamics of the cyclical component and, to a lesser extent, in those of potential GDP.

However, according to the UCM estimations (Chart A), in 2020 as a whole, potential GDP growth slowed down by about 3 percentage points as compared to 2019. This implied mainly a contraction of the TFP trend (with sizeable efficiency losses in the utilisation of factors of production), while the favourable contributions of the other factors proved more persistent. The solid build-up of capital stock hinged on the resilience of investment, a typical feature of Romania's economy within the European context during 2020[6]. As for labour, the deterioration of its contribution (induced by both higher levels of the trend of unemployment rate – NAIRU – and fewer hours worked) was mitigated by the support measures taken by the authorities after the pandemic broke out.

Chart A. Potential GDP dynamics and contributions of production factors



Source: NBR assessments based on a number of working hypothesis concerning the long-term dynamics of subcomponents of production factors

Throughout 2021, potential GDP was estimated to rebound at a swift pace, also on the back of important base effects, amid the gradual fading of the pandemic's adverse consequences. The path reflected the recovery of economic activity in most sectors. The recovery was supported simultaneously by the large contribution of capital stock and by efficiency gains, in the context of changes to firms' business strategies as well as faster digitalisation and automation of operational processes. Nevertheless, the rise in energy prices and the persistent bottlenecks in global supply chains had a negative impact.

The results, finalised at a time when actual data painted the economic picture prior to the conflict in Ukraine, reveal a path of potential GDP further characterised by robust annual growth rates. The path would indicate, compared to the economic developments in the main trading partners, an ongoing real convergence of Romania's economy. The profile of contributions from factors of production and, implicitly, that of potential GDP are shaped by a complex set of assumptions, including technical ones, as regards the developments in the determinants of sustainable economic growth such as working-age population, capital stock or TFP. Nonetheless, the overlapping and persistence of factors such as the energy crisis, bottlenecks in value chains and the uncertainty surrounding the medium-term economic impact of the armed conflict in Ukraine could bring about markedly downward revisions of the indicator's dynamics.

6 Having posted solid growth in 2019, gross fixed capital formation recorded positive annual rates in 2020 as well, amid rises in construction works and computing and equipment purchase.

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