

### 1.3. Factor model forecasts for the short-term prospects in GDP

#### **Factor Model Economic Forecasting Unit Ersi Athanassiou, Theodore Tsekeris, Ekaterini Tsouma**

The current section presents the updated short-term forecasts of KEPE concerning the evolution of the rate of change of real GDP in Greece for 2021,<sup>1</sup> based on KEPE's dynamic structural factor model.<sup>2</sup> The underlying time series database used to estimate the model and produce the forecasts includes 126 variables,<sup>3</sup> covering the main aspects of economic activity in the country on a quarterly basis and spanning the time period from January 2000 up to June 2021.

As pointed out in the more recent issues of the *Greek Economic Outlook*, the extraordinary and constantly changing conditions caused by the COVID-19 pandemic significantly complicate the conduct of projections concerning the course of real GDP, due to both the ensuing uncertainty and the continuous alternation between periods of the implementation of restraining

measures and periods of the partial and gradual lifting of restrictions. In addition, the technical forecasting procedure followed does not allow any direct consideration of policy measures that could potentially have major effects on economic activity, especially from the second quarter of 2021 onwards, such as the disbursement and progressive utilization of the Recovery and Resilience Facility funds.<sup>4</sup>

According to the factor model econometric estimates presented in Table 1.3.1 and having incorporated published (provisional) data up until the second quarter of 2021,<sup>5</sup> the mean annual rate of change for 2021 is projected at 7.9%, and the mean rate of change for the second half of 2021 is forecasted at 8.8%. The respective forecasts reflect, first, the significant recovery of the economy, compared to the previous year, in which the economic recession triggered by the pandemic reached -7.8% in terms of the mean annual rate of change of real GDP. Second, they constitute a considerable upward revision – compared to the preceding factor model forecasts<sup>6</sup> – of the rates of change for 2021 as a whole and for the second half of the year, which were both estimated at 4.7%. The implied recovery is further mirrored in the estimated quarterly rates of change (as compared to the respective quarters of the previous year) for the third and fourth quarters of 2021, which are forecasted at 11.5% and 6.1%, re-

---

1. The date of the forecast is September 23, 2021.

2. A detailed description of the model can be found in Issue 15 (June 2011, pp. 19-20) of KEPE's scientific journal entitled *Greek Economic Outlook*. See <[https://www.kepe.gr/images/oikonomikes\\_ekselikseis/issue\\_15enb.pdf](https://www.kepe.gr/images/oikonomikes_ekselikseis/issue_15enb.pdf)>.

3. The database incorporates both real economy and nominal variables, as well as a considerable number of variables reflecting expectations and assessments of economic agents, as reported in earlier issues of the *Greek Economic Outlook*. The seasonal adjustment of the time series is carried out by use of the Demetra+ software, using the TRAMO/SEATS filter.

4. Note that the implementation of the dynamic factor model does not involve the explicit estimation of any effects caused by policy measures (policy neutral model), while the model itself is not suitable for a straightforward analysis of the impact caused by huge shocks, such as the COVID-19 pandemic, which create abnormal economic conditions and lead to sudden and extreme (away from the trend-determined course) shifts in GDP. Still, the model implicitly takes into account any impact, through the incorporation of the economic variables updated to the most recent period of reference (second quarter of 2021). Recall that the forecasts are obtained on the basis of a small number of 'factors', which summarise the information provided by a large number of explanatory variables, employing the procedure of principal components, with the aim to preserve as much of the variability of the underlying economic series as possible. Hence, in the current conjuncture, any assessment of the provided forecasts should be subject to the degree to which all short-run fluctuations in real economic activity are reflected and should, further, take into account the increased heterogeneity in the dynamic response of the economic series, in combination with the occurrence of outliers. In addition, the underlying data sample, which relies on quarterly data with a hysteresis of one quarter, does not mirror the most recent significant changes on a daily or weekly basis. All the aforementioned limitations might, in the current juncture, affect the forecasting performance of the factor model employed.

5. According to the most recent ELSTAT *Quarterly National Accounts* publication, dated September 7, 2021.

6. With respect to the preceding factor model forecasts, recall that, due to the non-availability of detailed data from the Quarterly Labour Force Survey for the first quarter of 2021 at the time of conducting the forecasts, the underlying data sample did not, by way of exception, include five variables related to individual subcategories of employment and unemployment aggregates, which are otherwise used as standard practice.

**TABLE 1.3.1 Real GDP rate of change (% , y-o-y)**

Quarters	2021	
	2021Q3	2021Q4
Quarterly rate of change	11.54 [11.22 , 11.85]	6.14 [5.65 , 6.63]
Second-half mean rate of change	8.84 [8.44 , 9.24]	
Mean annual rate of change*	7.90* [7.70 , 8.10]	

Note: Values in brackets indicate the lower and upper boundaries of the 95% confidence interval of the forecasts.

\* The mean annual rate of change incorporates the officially available (provisional) data for the first and second quarters of 2021, on a seasonally adjusted basis.

spectively, and exceed in both cases the respective rates of change of the previous forecast (6.6% and 2.8%, respectively). Note that the observed gradual unwinding of growth rates – when also taking into account the 16.2% rate of change for the second quarter of 2021 published by ELSTAT – towards the end of the year is somehow anticipated, given the corresponding evolution of the contraction during 2020, mounting in the second quarter and de-escalating afterwards.

The above-presented forecasts for the course of real GDP in 2021 reflect the rebalancing of economic conditions, inasmuch as the deep 2020 recession seems to be largely counterbalanced by the projected expansion in 2021. The respective development results from the improved epidemiological situation and the implied gradual reestablishment of the smooth operation of economic activity from the second quarter of 2021 onwards, following the strict implementation of measures to protect human health earlier in 2021 and the advancement of the vaccination programme in the country. The aforementioned favourable outlook for 2021 is reflected in the noteworthy positive course – during the second quarter of 2021 – of the majority of the economic variables and indicators (on a non-seasonally and non-calendar adjusted basis) underlying the forecast.

In more detail, all GDP main components recovered considerably during the second quarter of 2021, compared to the respective quarter of 2020. Private consumption expenditure, consumption expenditure by the General Government, overall investment, and exports of goods and services recorded significant – and in most cases double-digit (except for the General Government consumption expenditure) – positive rates of change. A marked increase characterised most of the

individual investment sub-categories. Remarkably favourable developments were indicated by the evolution of the industrial production index, in terms of the general index and all the sub-indexes, as well as the turnover index in industry, for the overall market and both the external and the internal markets, with double-digit positive rates of change in the second quarter of 2021 (as compared to the respective quarter of 2020) in all cases. Similar developments characterised retail trade, with double-digit positive rates of change in the overall volume index and seven of the underlying sub-indexes (and single-digit positive rates of change in the cases of the *supermarkets* and *automotive fuel* subcategories). Construction and building activity also recorded a rising course, as indicated by the markedly favourable developments in the production indexes in construction and the considerable upswing in private building activity in terms of volume on the basis of permits issued. Similar dynamics in the same positive direction characterised the General Index of the Athens Stock Exchange, passenger car licenses, the turnover index for motor trade (*wholesale and retail trade, repair of motor vehicles and motorcycles*), the turnover index in wholesale trade, transport receipts and, in particular, travel receipts, which recorded an impressive rebound (607.8%), as compared to the second quarter of 2020. An improvement was further registered in terms of cost/price competitiveness, as implied on the basis of the majority of the underlying relevant indicators, while positive developments characterised spreads, which declined significantly, as compared to the respective quarter of 2020 (note that they recorded an increase, compared to the first quarter of 2021). With regard to indicators reflecting agents' expectations and assessments of the course of the economy, developments during the second quarter of 2021, as compared to

the respective quarter of the previous year, were exceptionally favourable, with the positive developments in export expectations for the months ahead, business expectations in construction and new orders in recent months in industry standing out.

With reference, finally, to the domestic labour market conditions in the second quarter of 2021, there were positive signals from an increase in both total employment and employment in the primary and tertiary sectors (despite the marginal decline in employment in the secondary sector), as well as from a moderation in both total and long-term unemployment (although there was a modest increase in the newly unemployed).

The projected course of real GDP in 2021 might develop according to a less or more favourable scenario – than indicated by the above-presented forecasts – depending on the effects of a number of crucial and dynamic factors, a number of which continue to be directly intertwined with the evolution of the pandemic. All these factors will determine, among other things, demand and supply dynamics, Greece’s export performance, investment and saving decisions by households and enterprises, employment and unemployment aggregates and, hence, income, as well as financial conditions and fiscal aggregates.

Factors that could potentially operate in the positive direction include: (a) the predominance of a favour-

able scenario with reference to the evolution of the pandemic during the second half of 2021, on the basis of greater progress in the field of vaccinations and lower infection rates, that would imply the creation of a secure environment for the unfolding of economic activity, on domestic and international levels, (b) the extension of targeted support measures, in order to preserve the support for businesses and employment, in all sectors deemed necessary and (c) the initiation of the National Recovery and Resilience Plan, by making use of the Recovery and Resilience Facility resources, in order to boost investment and complete crucial structural reforms with the aim to transform and promote innovation in the Greek economy.

Factors that could potentially operate in the negative direction include: (a) the high degree of uncertainty with respect to the short-term evolution of the pandemic, which could cause, among other things, a further withholding in major economic aggregates, (b) any potential adverse development with respect to the pandemic towards the end of the year, severe enough to once again negatively affect economic activity in the country, (c) the expected impact on production costs and final consumer prices of price increases in food and raw materials and the upsurge in transportation costs, and (d) any unwarranted development in the direction of an aggravation of geopolitical tensions and a deterioration of the prevailing conditions with respect to migration waves.