BANCO DE ESPAÑA
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POTENTIAL GROWTH OF THE SPANISH ECONOMY AFTER THE PANDEMIC

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Joint OGWG - ECFIN - JRC Conference

"*Assessment of output gaps and potential output in the context of the COVID-19 pandemic and its aftermath*"

29 -30 September 2021

ECONOMIC DEVELOPMENTS DEPARTMENT

INDEX

1. Impact of COVID19 on potential output

- Shock nature
- Different mechanisms

2. Alternative estimate approaches

- Production function methodology
- Sectoral analysis
- Statistical methodology

- **Non-economic character shock, completely exogenous**
  - Nevertheless, possible **long-term impact** due to **intensity** and **persistency**
- **Effects on both supply and demand**
  - Impact on **factors of production** and possible structural changes in **demand**
- **Very different effects between sectors**
  - Concentration in sectors with **high social interaction** and **labor-intensive sectors**
- **Key role of economic policies in mitigating the effects of the crisis**

- Analysis of the effect of the pandemic on potential growth through its **determinants**:
  - Total Factor Productivity
  - Labour
  - Capital
- It can be **distinguished**:
  - Short-term effects
  - Long-term effects (*scarring effects*)

Total Factor Productivity

- Clearly **negative** effects in the **short term** due to lower use of installed capacity
  - Restricted worker mobility and disruption of supply chains

- **Ambiguous long-term** effects
  - Changes within the company:
  - Breakdown of worker-company or customer-supplier matchings
  - Adoption of new technologies: digitalization and e-commerce

  - Inter-firm shifts and business demographics:
  - Lower entry rate of new companies due to poorer economic conditions
  - High number of companies in financial difficulties: risk of an excessive level of liquidations
  + Exit of less productive firms (empirical evidence in the EBAE)
  + Estructural change towards sectors with higher contribution to productivity growth

Labour

- Hysteresis effects:
  - Increase in NAIRU due to **mismatches** between labor demand and supply
  - Workers with low qualifications or close to retirement **leave the labor market**
  - International restrictions on mobility **reduce migratory flows**
  - Long-term negative effects of school closings on **human capital** accumulation

Capital

- **Reduced incentives** to invest in new capital
- **Early obsolescence** of existing capital due to demand changes
+ Decreased capital depreciation and increased useful life due to **lower utilization**

Production Function Methodology

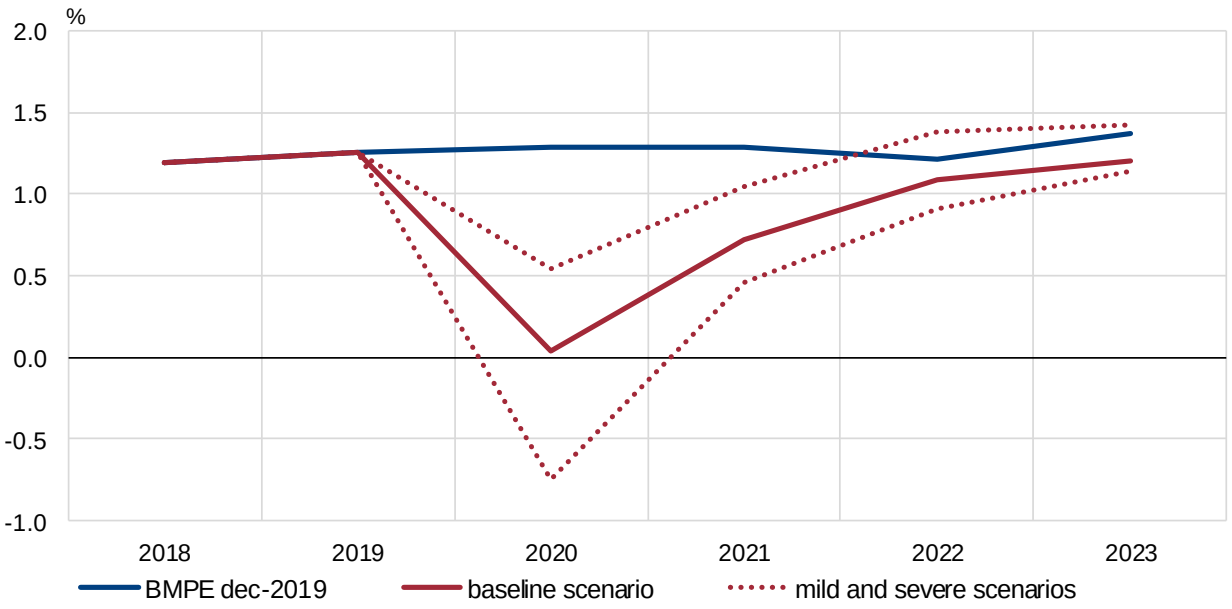
- **Contribution to potential growth of each growth factor**
  - Labour
    - *NAIRU - neo-Keynesian Phillips curve estimation (Galí, 2011)*
    - *Working-age population - INE projections*
    - *Participation rate*
    - *Worked hours per worker*
  - Capital
  - Total Factor Productivity

- **Three scenarios (baseline, mild and severe) based on the outlook for the severity and duration of the pandemic**
  - Based on the official macroeconomic projections of the Bank of Spain
- **Projection horizon to 2023**

Baseline scenario:

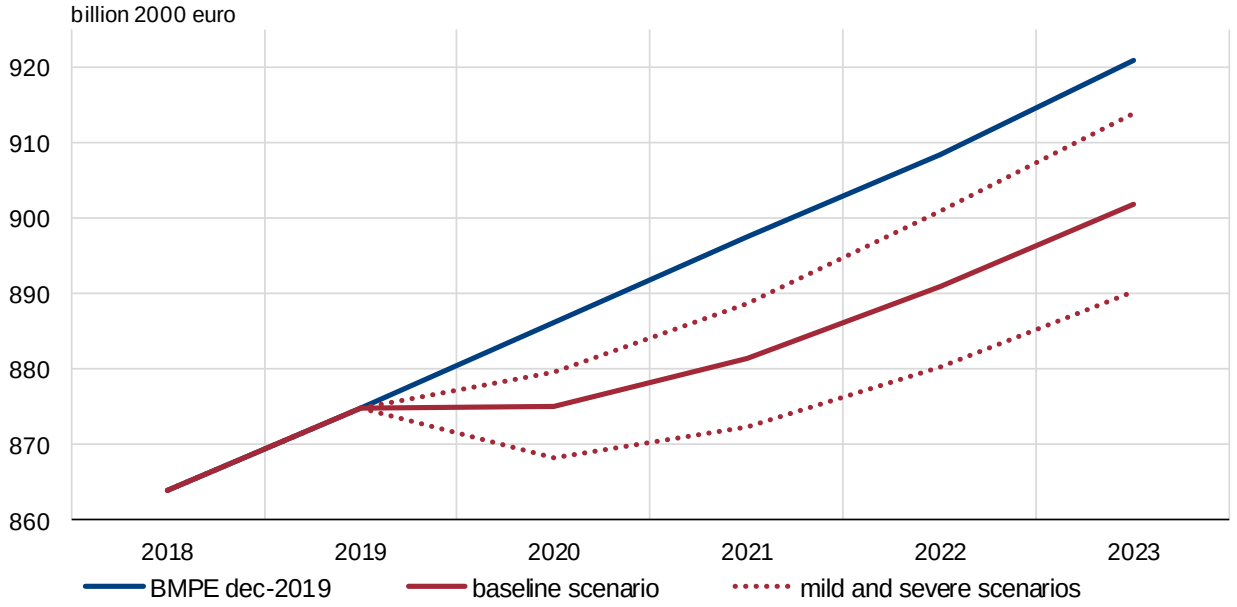
- Potential **growth** rates **only slightly lower**, from 2022 onwards, than the previous scenario
- Permanent **lower level of potential** GDP (around -2%)

POTENTIAL GDP GROWTH IN SPAIN
(Production Function Methodology)



Sources: BMPE dec-2019 and BMPE nov-2020.

POTENTIAL GDP LEVEL IN SPAIN
(Production Function Methodology)

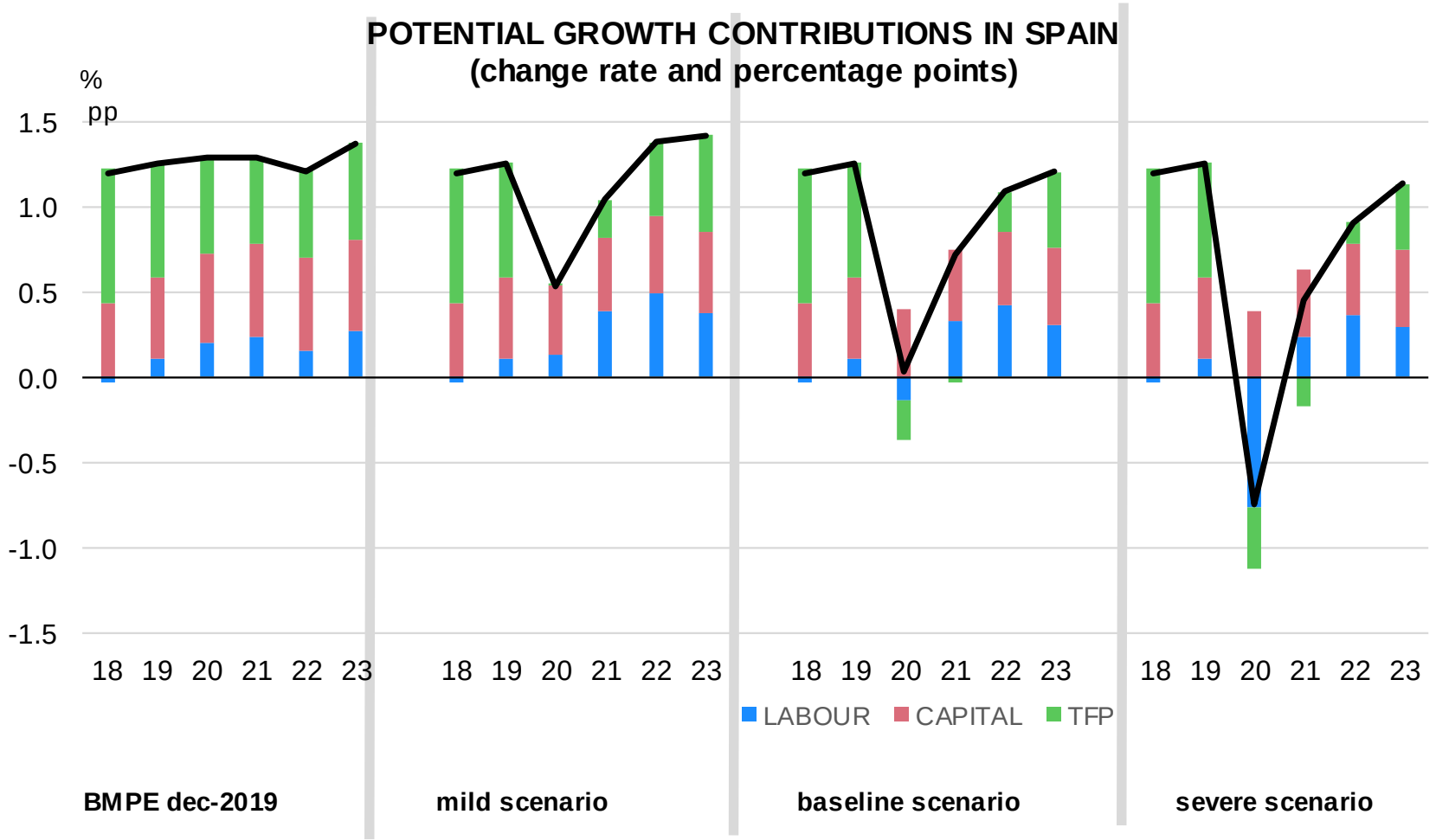


Sources: BMPE dec-2019 and BMPE nov-2020.

- **Labour**
  - **NAIRU increase** to about 16% between 2020 and 2023
  - **Fall in the working-age population**
    - *Reduction of net inflows of immigrants in 2020*
  - Significant **drop in activity rate and hours worked per employee**
    - *Recovery in following years*

- **Capital**
  - **Positive contribution**, although slightly lower
    - *Delayed investments due to increased uncertainty*

- **TFP**
  - **Severe drop in 2020** due to production disruptions
    - *Recovery of pre-Covid contribution by 2023*



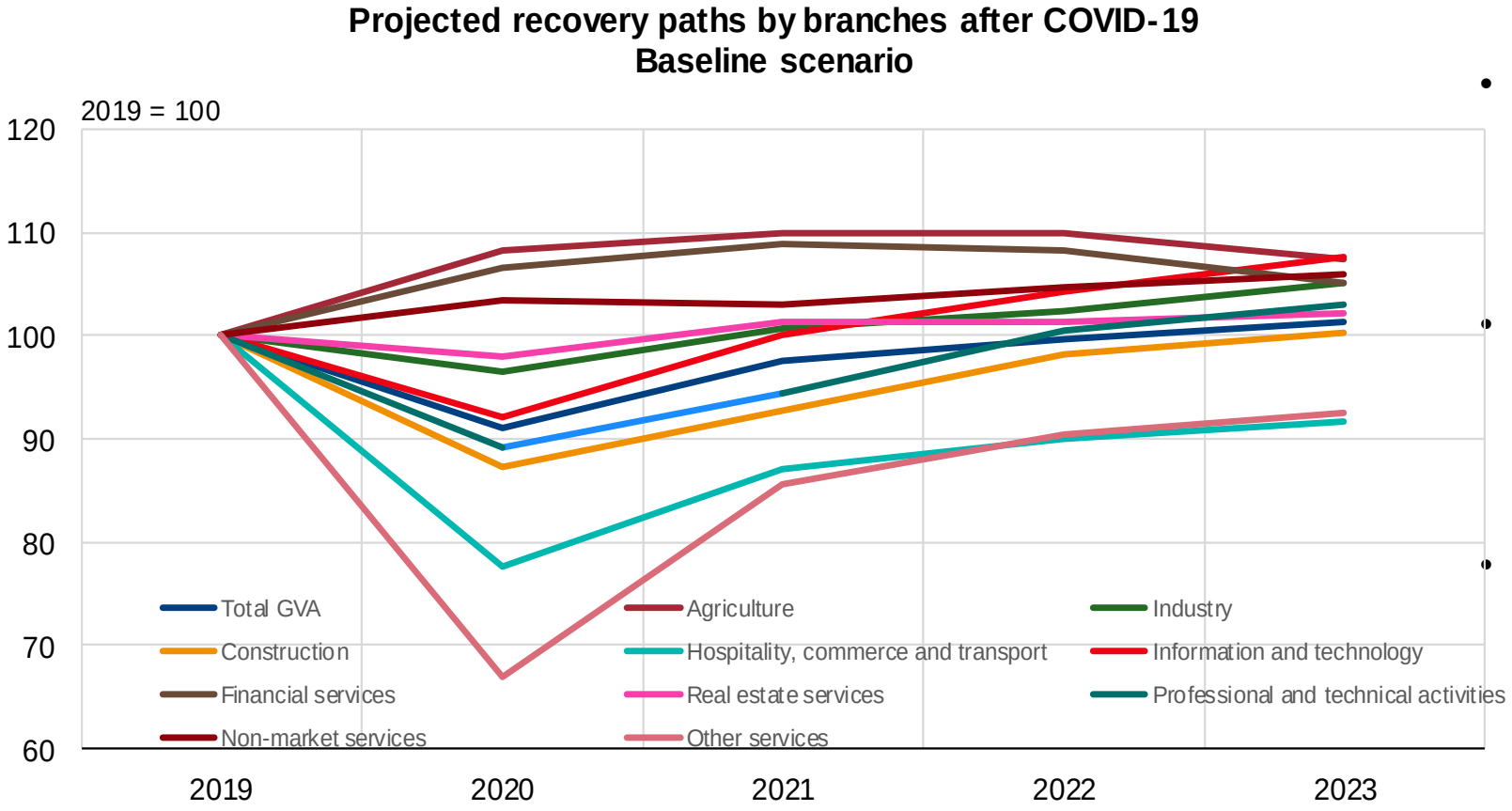
Sources: BMPE dec-2019 and BMPE nov-2020.

Sectoral analysis

- **Large differences in the impact of the pandemic according to productive sectors**
  - **Greater intensity and persistence** in sectors with **a higher component of social interactionl**

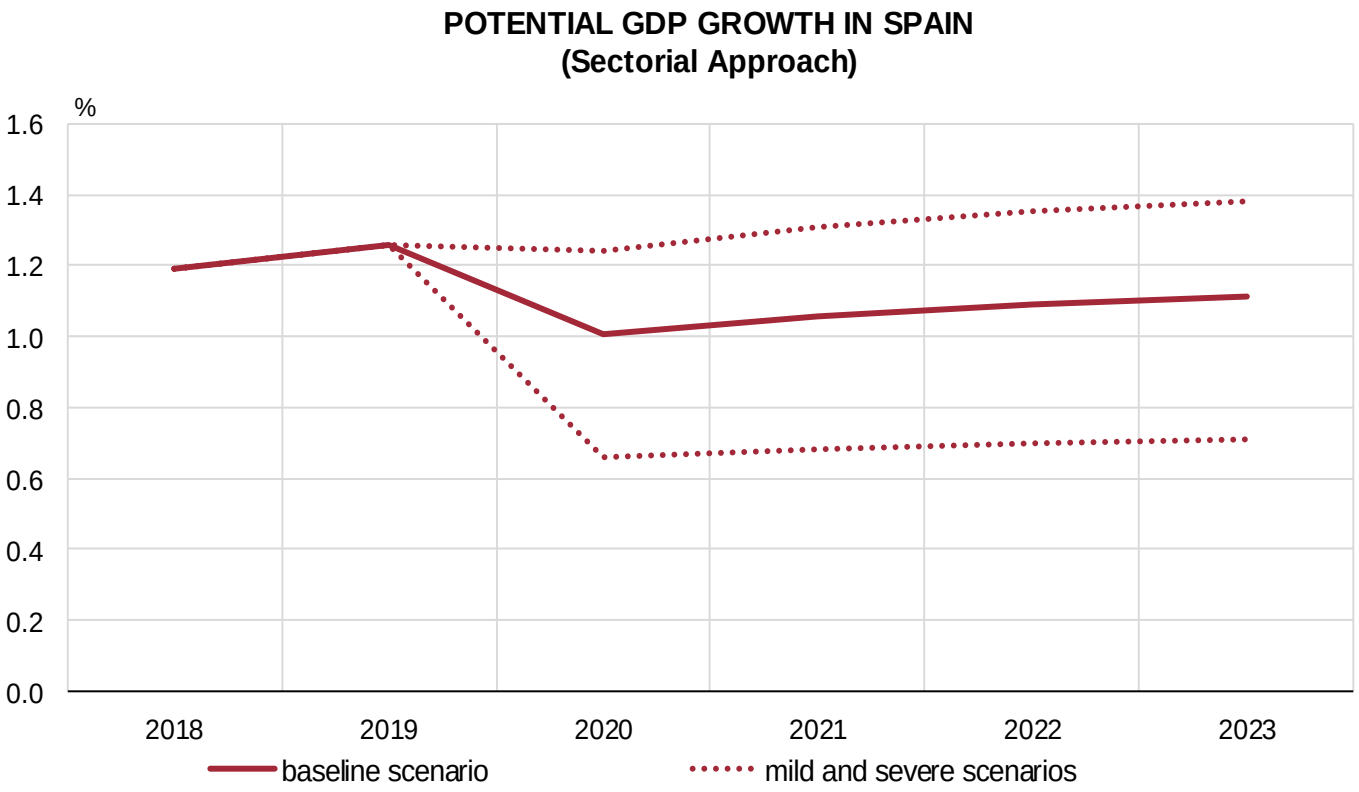
- **Two-step methodology:**
  1. Setting **unequal paths of recovery** of the pre-covid activity level for each **branch of activity** based on the responses obtained in the **EBAE**
     - *The disaggregation by sector of the aggregate GVA forecast is made according to the percentage of companies that state that they are able to recover the pre-covid level of activity in 2021, as of 2022 or that there is too much uncertainty to respond*

  2. Estimated potential growth by industry based on **Hodrick-Prescot filter**
     - *Calibrated lambdas that replicate the aggregate level of potential pre-Covid product*



- Hotels, transport and commerce and Entertainment services
  - do not recover their pre-pandemic level in 2023 in the central scenario
- Information and communication, Financial services and Education, Health and Public Administrations.
  - will maintain sustained growth paths
- Negative effects are concentrated in labor-intensive sectors with a high level of social interaction

Source: Banco de España.



Source: Banco de España.

- **Baseline scenario**
  - Potential growth of around 1% in 2023
  - Slightly lower than the 2019
  - Pre-COVID level not recovered
- **Mild scenario**
  - Positive effects on potential in the long term
- **Severe scenario**
  - Severe drop in the short term
  - The drop in potential is both in growth rates and levels

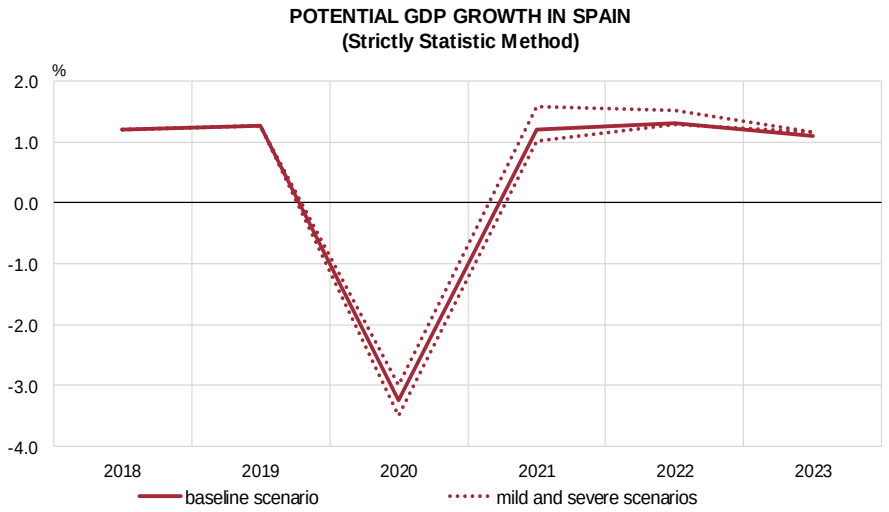
Statistical methodology

- **Problem with non-parametric models (such as Band-Pass or Hodrick-Prescott filters):**
  - The huge fall in GDP in 2020 Q1-QT2 implies **large revisions** to potential output in **pre-pandemic** periods
  - It is **difficult** to justify an **endogenous nature** of the COVID-19 shock

- **Possible solution: Unobserved components models**
  - Modeling of the **cyclical and trend components** of GDP
  - Including a **component associated with the effect of the active pandemic**
    - *It prevents the estimation of the cycle and the trend from being distorted by the exogenous shock*
    - *And r*educes *potential product* revisions of prior periods
  - Incorporating information on **working conditions** for greater accuracy

POTENTIAL GROWTH ESTIMATE

Statiscal methodology



Source: Banco de España.

- After the sharp downturn in 2020, potential output would quickly recover positive and pre-pandemic-like growth rates under all three scenarios

- The "pandemic" shock negatively influences 2020 GDP, with a similar magnitude in all three scenarios

Conclusions

Similar results from the three approaches. In the **baseline scenario**:

- **Significant drop** in the potential **growth** rate in **2020**
- **Recovery** of pre-pandemic rates towards the **end of the projection horizon**
- **Permanent effect** on **the level** of potential output

According to the production function approach, **deterioration due to**:

- **Hysteresis** effects in the **labour market**
- Significant **drop** in **TFP** in the **short term**

Projections subject to **high uncertainty**: **health** and **economic policy** developments

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THANK YOU FOR YOUR ATTENTION

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Metodología Estadística

$$y_t = \tau_t + c_t + p_t, \quad p_t \sim N\left(0, \sigma_{p,t}^2\right) \tag{1}$$

$$u_t = \bar{u}_t + \theta_1 c_t + \theta_2 c_{t-1} + v_{u,t}, \quad v_{u,t} \sim N\left(0, \sigma_u^2\right) \tag{2}$$

$$\sigma_{p,t}^2 = \begin{cases} 0 & If \quad t \notin T_{pandemia} \\ \sigma_p^2 & If \quad t \in T_{pandemia} \end{cases} \tag{3}$$

$$\tau_t = \tau_{t-1} + \delta_{t-1} + \eta_{\tau,t}, \quad \eta_{\tau,t} \sim N\left(0, \sigma_\tau^2\right) \tag{4}$$

$$\delta_t = \delta_{t-1} + \eta_{\delta,t}, \quad \eta_{\delta,t} \sim N\left(0, \sigma_\delta^2\right) \tag{5}$$

$$c_t = \phi_1 c_{t-1} + \phi_2 c_{t-2} + \eta_{c,t}, \quad \eta_{c,t} \sim N\left(0, \sigma_c^2\right) \tag{6}$$

$$\bar{u}_t = \bar{u}_{t-1} + \eta_{\bar{u},t}, \quad \eta_{\bar{u},t} \sim N\left(0, \sigma_{\bar{u}}^2\right) \tag{7}$$

- **Componente tendencial, τ_t**
  - Paseo aleatorio
  - Tasa de crecimiento como paseo aleatorio
- **Componente cíclico, c_t**
  - Proceso autorregresivo
- **Componente pandémico, p_t**
  - Activo solo a partir de 2020
- **Desempleo tendencial, $\bar{u}_t$**
  - Paseo aleatorio