

David Sondermann
Deputy Head of Division
Supply Side, Labour and
Surveillance

Directorate General Economics

Measuring the output gap in times of large shocks

State of current work in the Eurosystem

SUREF Workshop “Measuring economic slack or shortages”,
28 March 2023

- **ECB's supply side team's reaction to these crises**
 - **Conceptual** review of approaches towards potential output measurement
 - **Adaptation of own models**, e.g. UCM (Szörfi and Le Roux, 2021, mimeo)
 - **Developed of novel bottom-up sectoral approach** (Bandera et al, 2022)
- **Today: Discuss three challenges of modelling potential output**
 - I. The case of **the COVID pandemic**
 - II. The **energy shock** and **supply chain constraints**
 - III. The **divergence between output and unemployment gap**

How we do potential output estimation in the Eurosystem?

- Strong **collaboration** between NCBs and ECB
- A **suite of models** is looked at to gauge our view on potential output
- **Horizontal discussions** among supply side experts and country desks
- **Regular exchanges with international institutions**, in particular on EU level through the Output Gap Working Group
- **Annual Supply Side Review (ASSR)** takes stock of latest developments
- ASSR compared **country-estimates** and features **topical discussions**
- Important: **Eurosystem potential output estimates are not published**
- potential output/output gap here: either a range of other institutions' or selected internal estimates, (e.g. Tóth, 2021; or Jarocinski/Lenza, 2016).
- Those should not be understood as the Eurosystem's potential output estimates.

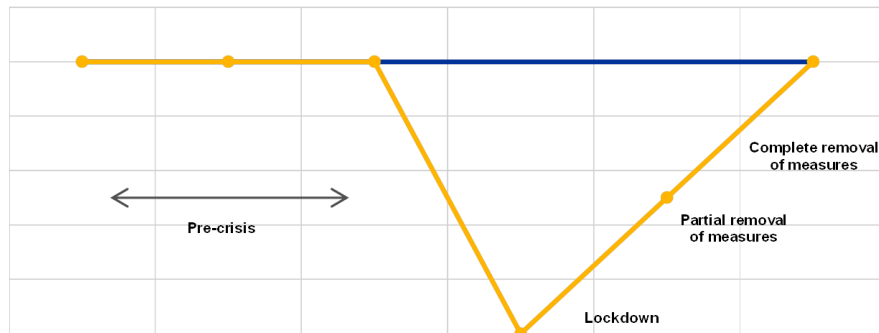
- **Potential output is a medium-term concept, with temporary shocks generally not expected to affect its growth rate.**
- This conceptual definition raises question: *How temporary are shocks?*
How cyclical is potential output?
- **The illustrative case of the COVID containment measures**

How temporary are shocks? Example of containment measures during COVID

Interpretation of potential output and the output gap (no units – illustration only)

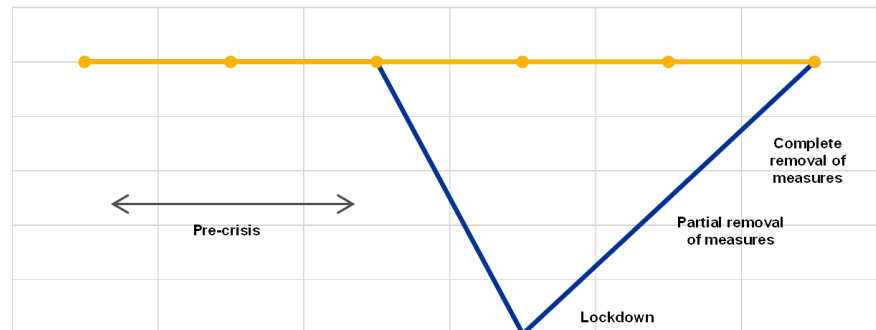
- Full capacity, interpretation 1
- Full capacity, interpretation 2

a) Full capacity or potential output level



- Output gap, interpretation 1
- Output gap, interpretation 2

b) Capacity utilisation or the output gap



Source: ECB staff calculations, ECB Economic Bulletin article, Issue 7/2020

How temporary are shocks? Example of containment measures during COVID

- **Labour:**

- **Migration** only temporarily affected. **Higher mortality**, but small impact as working age population less affected.
- Overall: euro area **labour force** even above pre-COVID levels. Less permanent damage, than in other jurisdictions. **EA policy measures** (job retention schemes) **key**.

- **Capital:**

- **Investment growth**
- **Capital stock** affected in case of **firm closure** (policy measures prevented this)

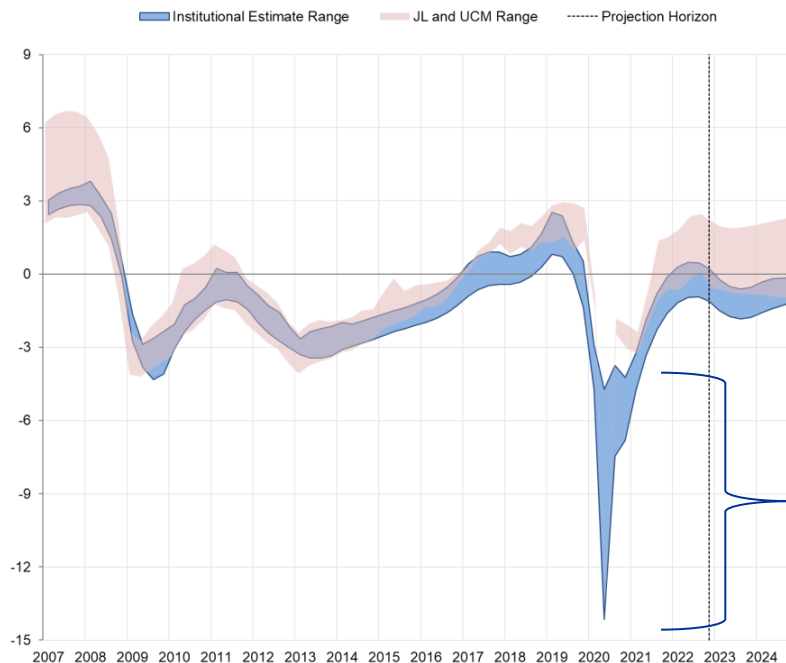
- **Productivity:**

- **Digitalisation** has accelerated since the onset of the pandemic, made economy more resilient (i.e. protect potential output to some extent).
- **Supply chain disruptions** limited firms' capacity to produce and transfer technology, with negative impact on growth rate of trend TFP.

How temporary are shocks? Example of containment measures during COVID

Range of output gap measures

(in percent of potential output)



Range related to the different conceptual understandings of how much PO was affected by COVID, e.g. EC vs. IMF estimates

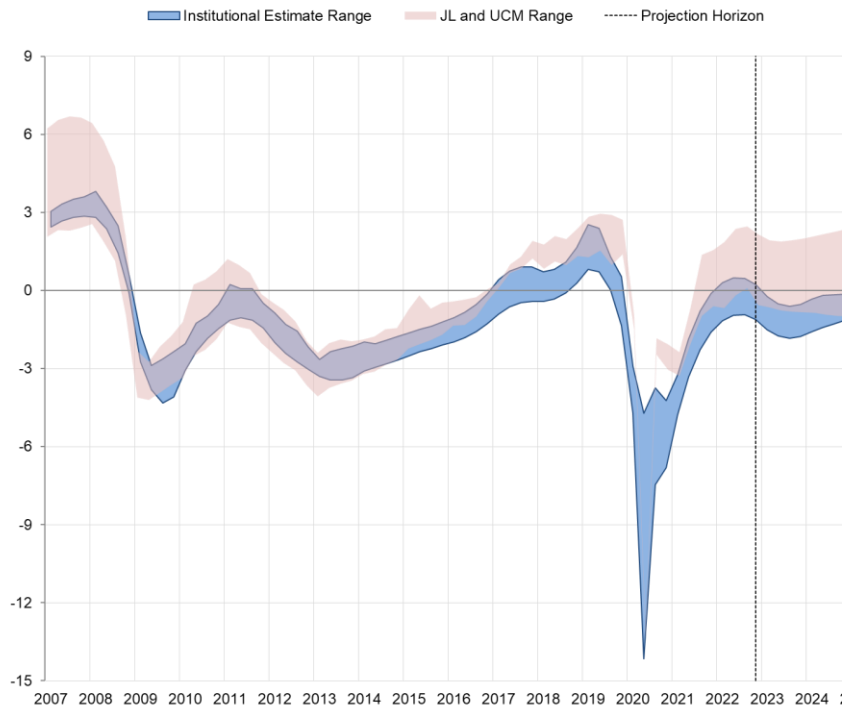
Sources: ECB calculations. Models shown: i) the Unobserved Components Model (UCM) of Tóth (2021) and the dynamic factor model of Jarocinski Lenza (J-L) (2018); iii) the production function approaches of the European Commission EU Common Agreed Methodology and the OECD Potential Output Estimation Methodology; and v) the country-specific method approach taken by the IMF medium-term forecasts of GDP growth.

- **Define potential output as the level of actual output that does create (dis-)inflationary pressures compared to trend/target over the medium-term.**
- This conceptual definition raises question: *How to measure potential output when shocks affect growth and inflation differently?*
- **The illustrative case of the energy price shock**

How to measure potential when shocks affect growth and inflation differently?

Range of output gap measures

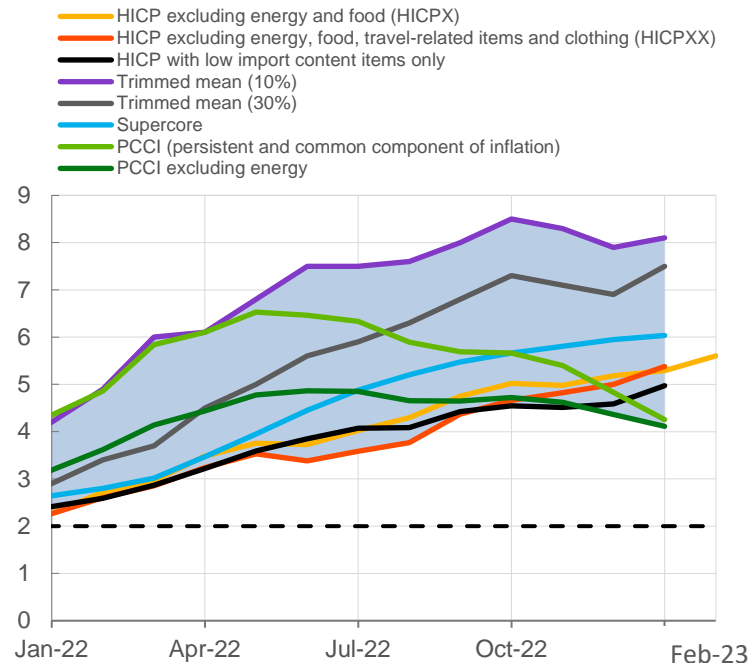
(in percent of potential output)



Sources: ECB calculations. Models shown: i) the Unobserved Components Model (UCM) of Tóth (2021) and the dynamic factor model of Jarocinski Lenza (J-L) (2018); iii) the production function approaches of the European Commission EU Common Agreed Methodology and the OECD Potential Output Estimation Methodology; and v) the country-specific method approach taken by the IMF medium-term forecasts of GDP growth.

Indicators of underlying inflation

(annual percentage changes)



Sources: Eurostat and ECB calculations.

Latest observation: February 2023 (flash) for HICPX, January 2023 for the rest.

How to measure potential when shocks affect growth and inflation differently?

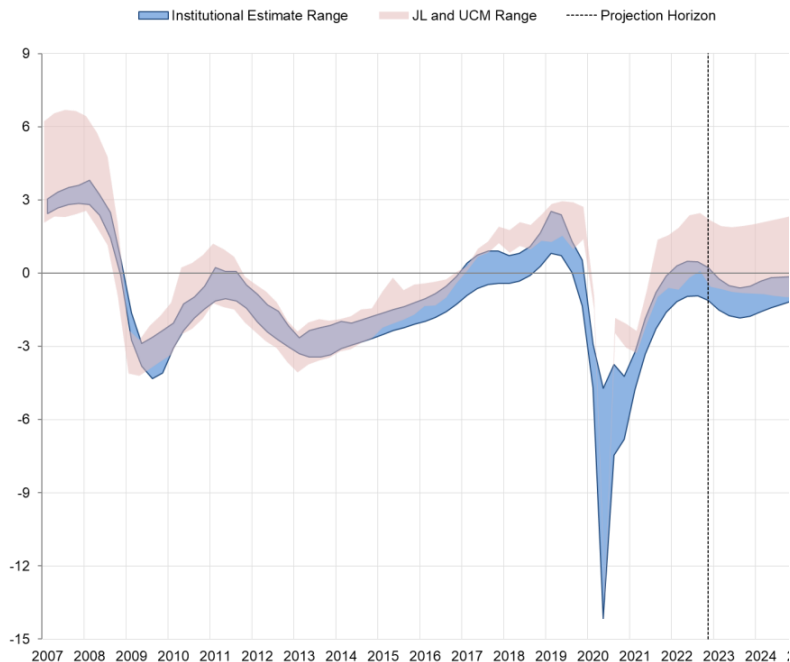
- Recent **energy price shock** could lower level of euro area potential output in the long run, mainly **through higher corporate production costs**.
- **Military spending**: Tentative **estimates are inconclusive** regarding the impact of increased on euro area potential output.
- The additional impact on potential output growth from possible **re-localisation**, i.e. of **de-globalisation**, could be rather adverse, but depends on the extent of it going forward.

Challenge of modelling potential output during large shocks (III)

Is there a disconnect between the unemployment and output gap?

Range of output gap measures

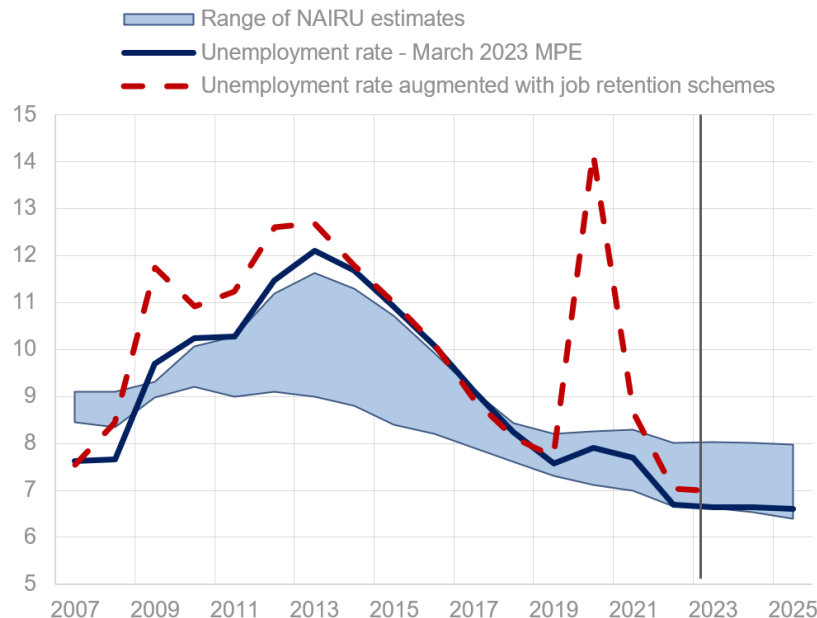
(in percent of potential output)



Sources: ECB calculations. Models shown: i) the Unobserved Components Model (UCM) of Tóth (2021) and the dynamic factor model of Jarocinski Lenza (J-L) (2018); iii) the production function approaches of the European Commission EU Common Agreed Methodology and the OECD Potential Output Estimation Methodology; and v) the country-specific method approach taken by the IMF medium-term forecasts of GDP growth.

Unemployment gap

(Unemployment and NAIRU as percent of labour force)



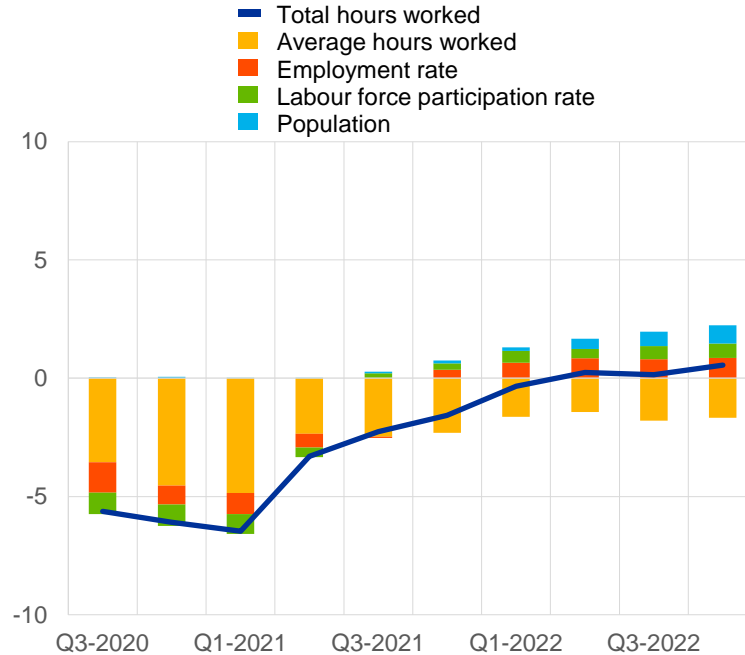
Sources: Eurostat, own calculations

Notes: The range of NAIRU estimates includes estimates from the UCM (Tóth, 2020), Jarocinski-Lenza (2016), as well as the European Commission NAWRU estimate.

Complementary indicator of labour market slack are key

Wider adjustment margins of labour utilisation

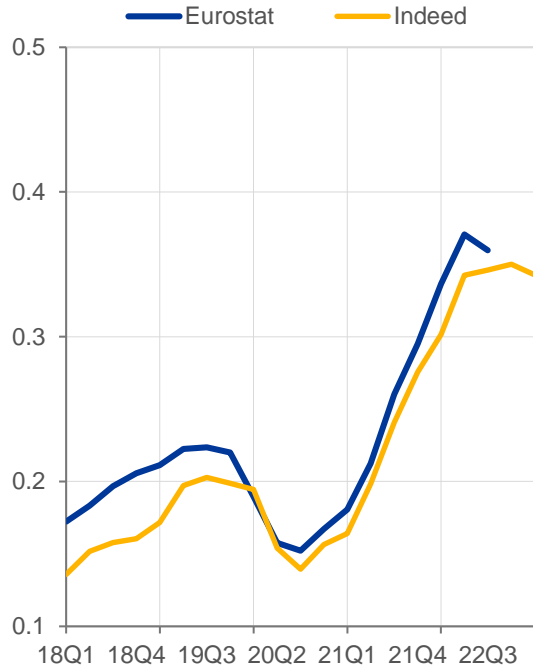
(cumulative percentage growth since 2019 Q4;
percentage point contributions)



Sources: Eurostat.
Latest observation: 2022 Q4.

13 Complementary indicator of labour market slack are key

Vacancy-unemployment ratio (vacancy per unemployed)

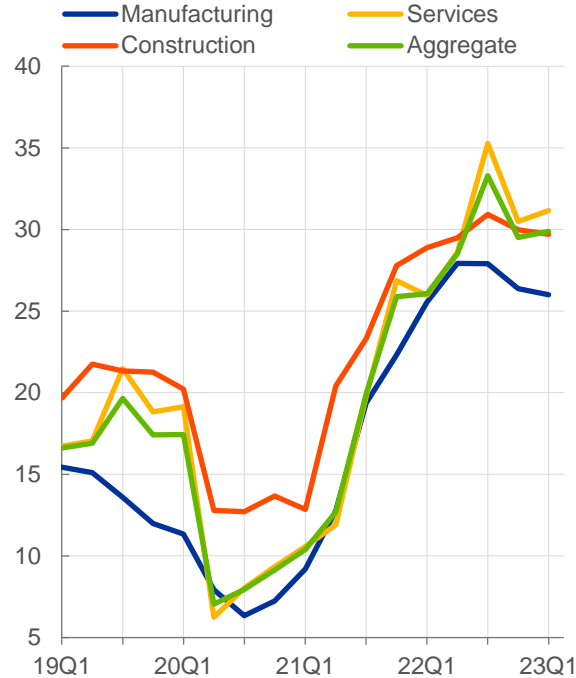


Sources: Eurostat, Indeed data.

Notes: For 2022 Q3, data for Portugal are not yet available.

Latest observations: job vacancies: 2022 Q3. Indeed job postings: January 2023. Unemployment: December 2022.

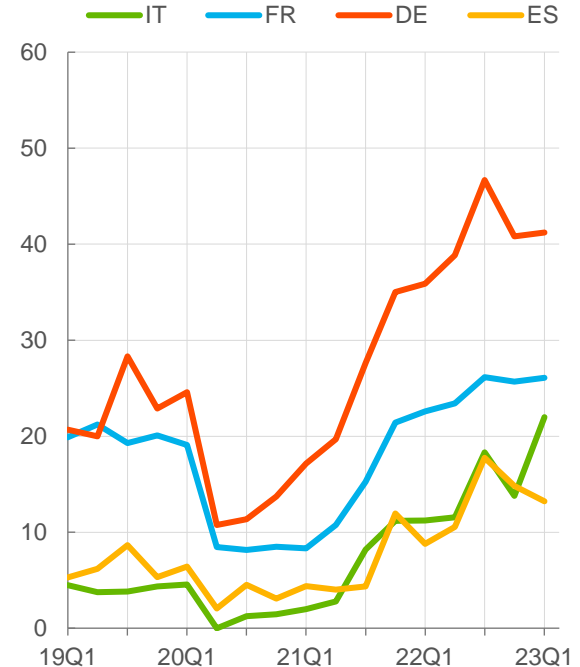
Shortage of labour across EA sectors (percentage)



Source: European Commission.

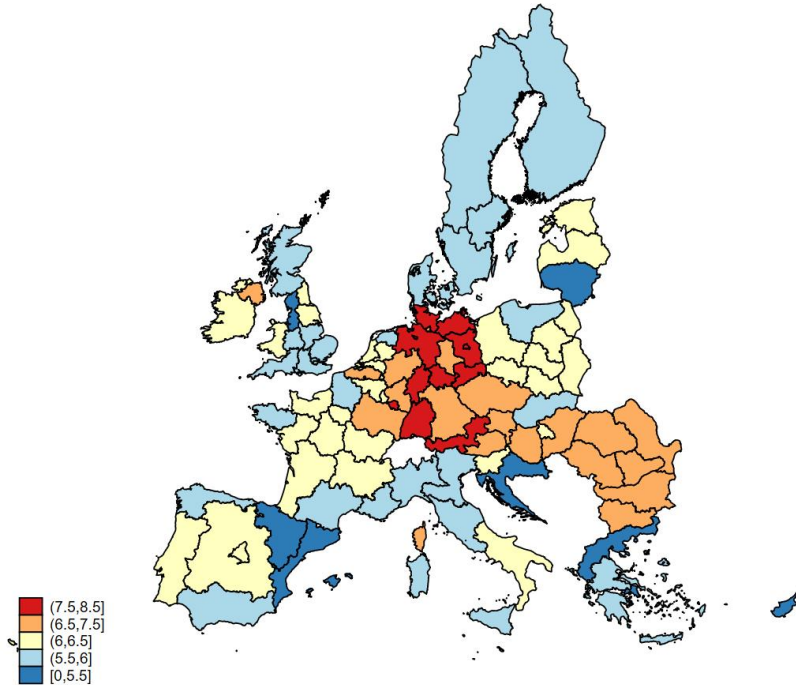
Notes: Survey in industry and the services sector: percentage of firms who indicate labour shortages as limits on production and business. Latest observation: 2023 Q1 (January 2023).

Shortage of labour across EA countries (percentage)



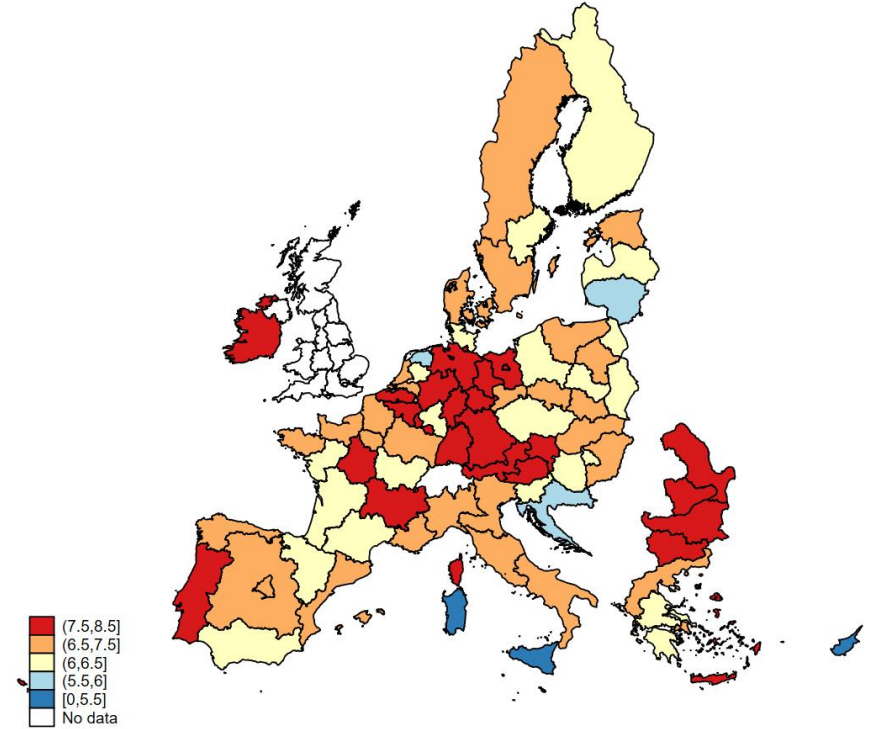
2012-2021 labour shortages in services

(index 1-10; 10=highest)



2022 labour shortages in the services

(index 1-10; 10=highest)



Sources: Groiss and Sondermann (forthcoming); SAFE and ORBIS.

- 1) Finetuning the toolkit to estimate potential output and output gap; as well as NAIRU estimates.** Inter alia, developing a semi-structural model to evaluate impact of policies on trend/medium term growth;
- 2) Eurosystem Expert Group on Productivity** (around 40 experts from 14 NCBs and the ECB). Recent shocks and structural trends on productivity; 4 reports with the analysis published in autumn and in an EB article with the main highlights. Will feed into forecast work on the medium-term prospects for productivity growth ;
- 3) Physical risks on potential output growth.** Developing a regional dataset of extreme weather events, merged with granular corporate information.