



Economics & Data
ED23 GmbH

Predicting Future Skill Needs: Quantitative Skill Forecasting

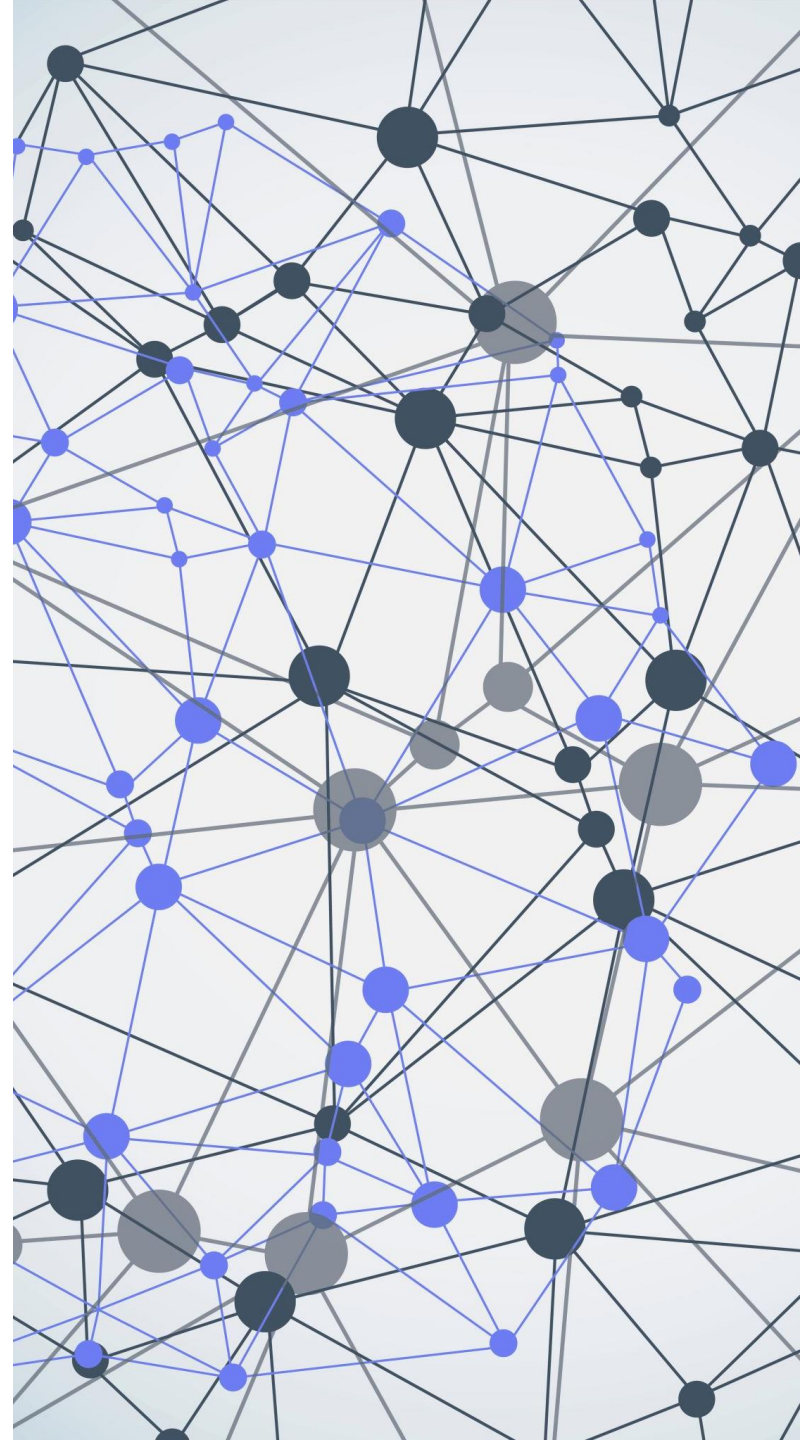
LMI for All Webinar Series

Institute of Employment Research / Warwick University

Ben Kriechel

Economix Research & Consulting
Economics & Data ED23 GmbH

<https://www.economicsdata.eu/>



What is a skills forecast?

Skill forecasting is the **systematic quantitative modelling** of **future developments** in the **labour market**.

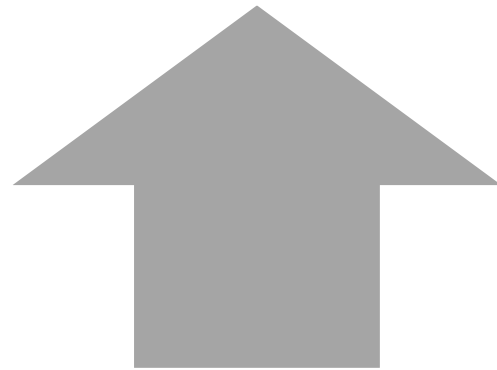
Using **historical data**, relationships are estimated between economic developments on the **supply and demand for qualifications**, such as the composition of employment in sectors by occupation and qualifications.



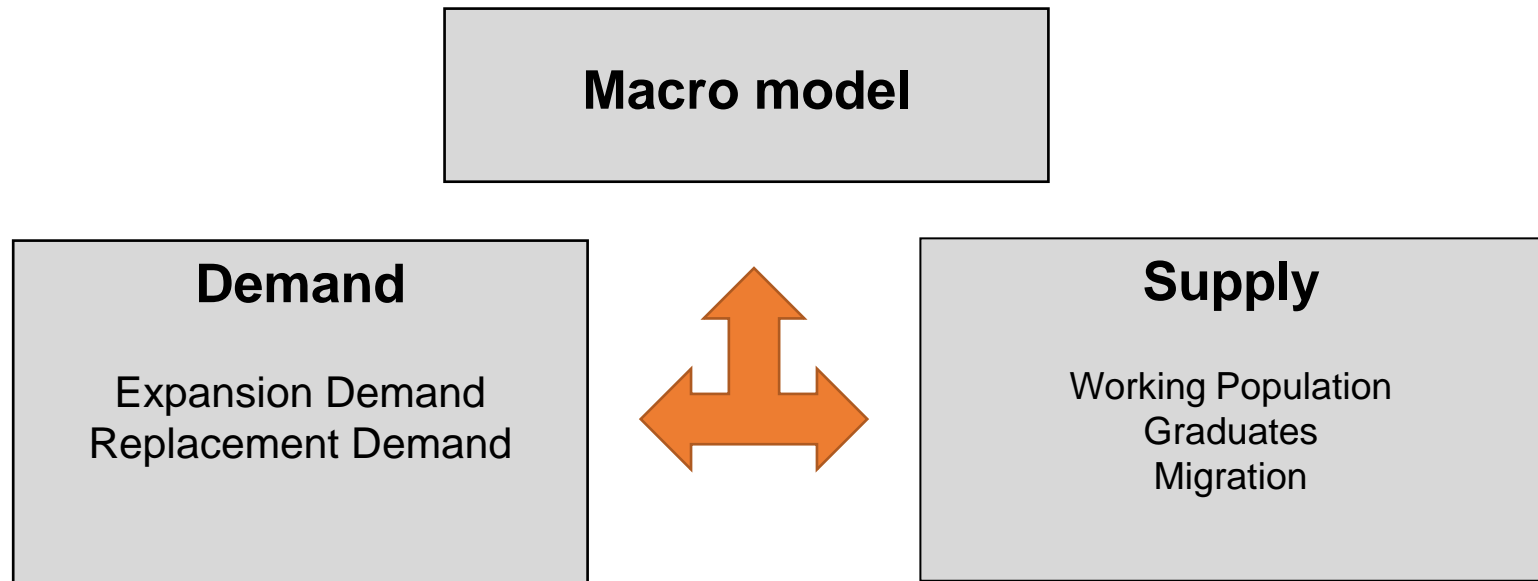
Supply of
Workers
with skills



Demand of
workers for
tasks



A generic quantitative skill forecasting model



Expansion Demand

Sector forecast

The sector forecast determines the employment by sector.

Qualification

The sector-by-occupation mix is usually historically determined and ideally follows some dynamics.

Occupation forecast

The outcome is then accumulated across occupations, to determine the employment growth (or decline) by occupation.

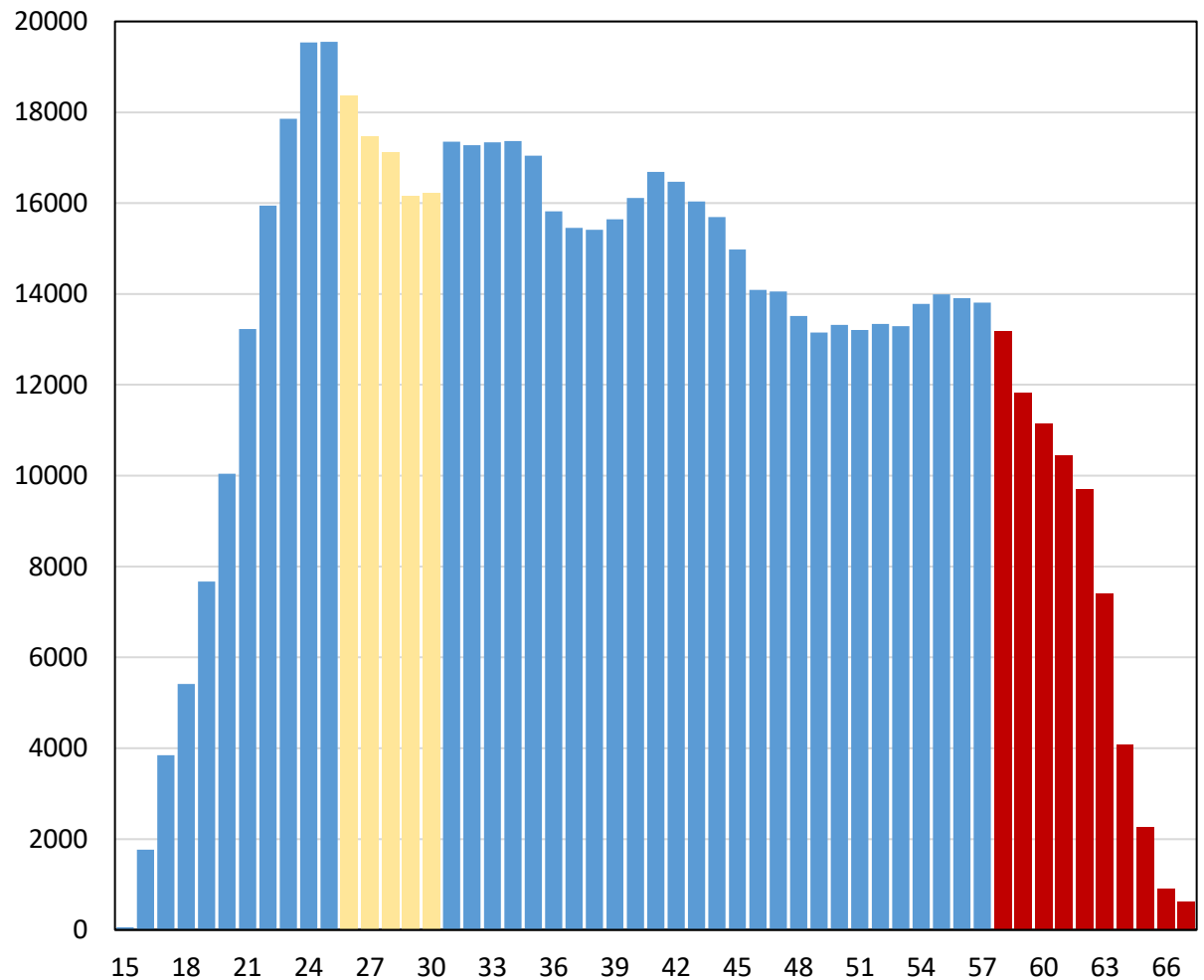
Replacement Demand

Replacement demand is determined through the **outflow probability** at specific ages in each occupation.

The demographic **age distribution** and the **outflow coefficient** determine the total replacement demand.

Replacement demand is usually the larger share of total demand.

Age Distribution



Supply

Demographics:

- Existing population
- Migration
- Activity rate (available workforce)

Qualification:

- Qualification of existing workforce
- Qualification choices of school-leavers

Use of Forecasts



What Forecasts can do

- Skill forecasts provide insights into recent developments in a structural way.
- Combining macro-economic forecasts with occupational changes, they provide insights into the occupational demand
- Combining supply and demand forecasts allows for uncovering structural shortages and identifying problematic occupations or qualification needs.

What forecasts cannot do

- Skills forecasts cannot predict the future.
- A forecast can only provide the level of detail available within historic data series (or it will be based on strong assumptions).
- While in principle, the forecast can provide information on employment at the occupation level, it does not directly provide insight into skills needed.
- Skills forecasts provide quantitative outcomes but should not be taken literally.

Strategic policy decisions

Typical questions:

- Greening of the economy
- Digitization
- Migration

Analysis:

- Combine forecasts with other outcomes (Qualitative, Scenario, Data)

The German Labour Market 2030

- Carried out on behalf of the German Federal Ministry for Labour and Social Affairs (BMAS)
- Detailed skills forecast of supply and demand in Germany
- Goal was to support mid- to long-term policy decisions
- The latest edition was also part of the ministry's "Work 4.0" dialogue process



Example: The German Forecast to 2030

Methods used:

Methodological link of qualitative scenarios with quantitative-econometric models. Full sets of modules covering supply, demand (including replacement demand), and imbalances)

Data :

German LFS provided by the Federal Statistical Office and administrative data by the Federal Employment Agency as well as data from macroeconomic structural change forecasts & scenarios (digitalisation).

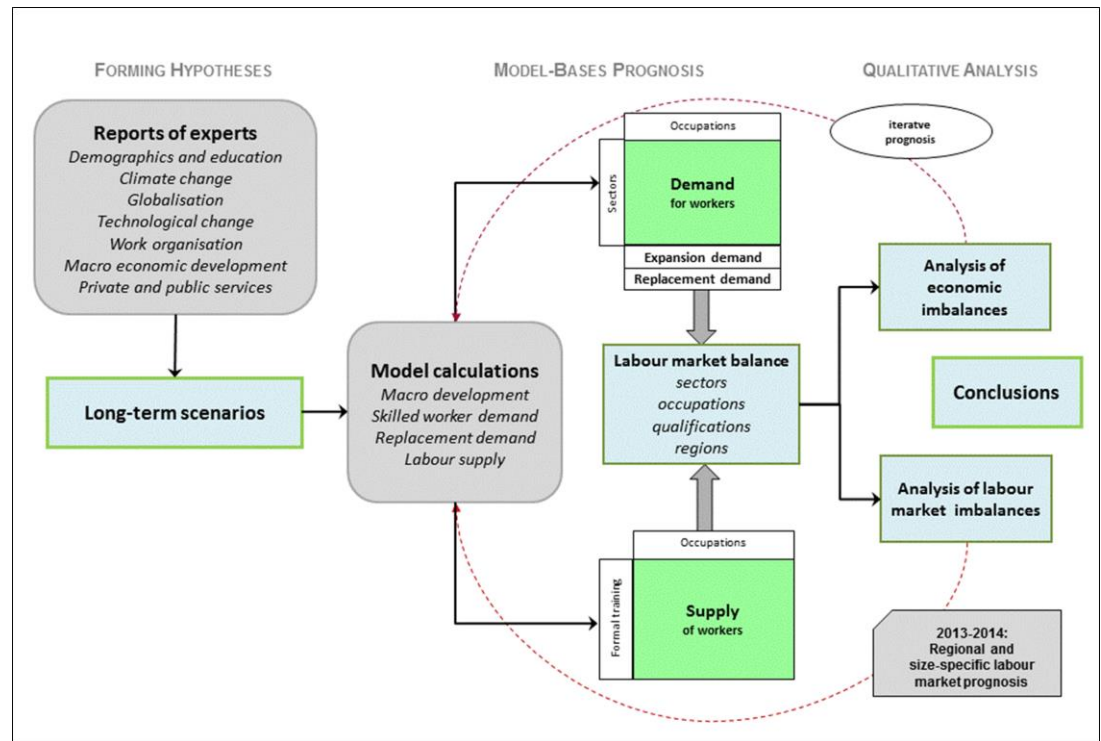
Classifications:

Differentiation by 44 sectors; 147 occupations; 29 qualifications arranged in four main groups: tertiary training, dual training, occupational college training, no training.

The German Forecast to 2030

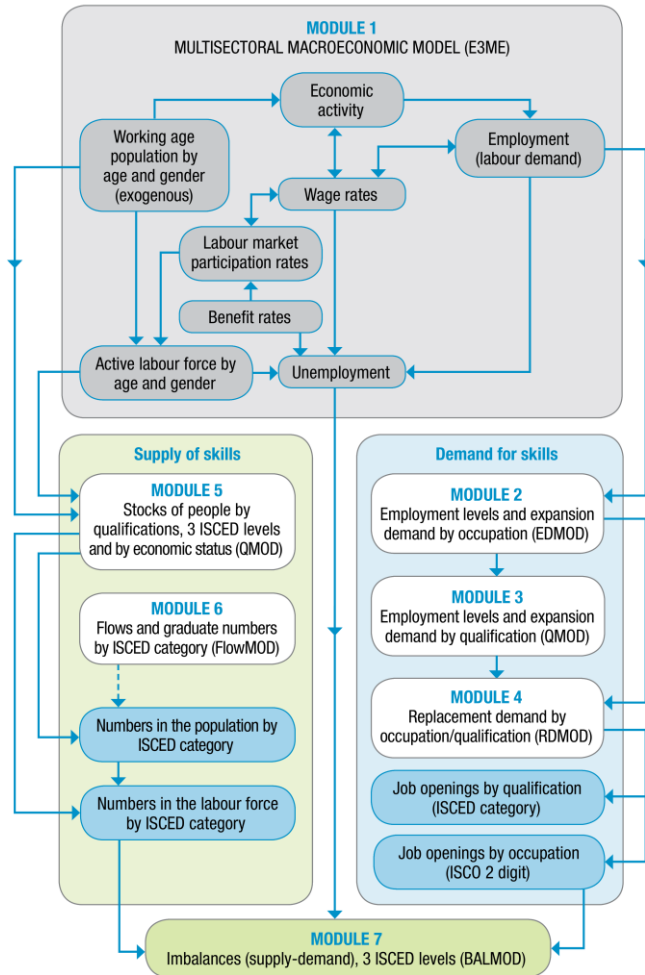
- **Scenarios on:**

- Demographics, employment and education (2012),
- Regional: forecast on Länder-level (2013),
- Immigration (2014),
- Digitization of the labour market (2016)



The Cedefop Skills Forecasting Model

Figure 1. Modelling skill supply and demand



- Developed since 2007 by a consortium of IER/Warwick University; Cambridge Econometrics, ROA, Economix/Economics & Data.
- Provides skills forecast by occupation and qualification for each member state.
- Can be linked to various assumptions/scenarios (e.g. Eurofound automation study).

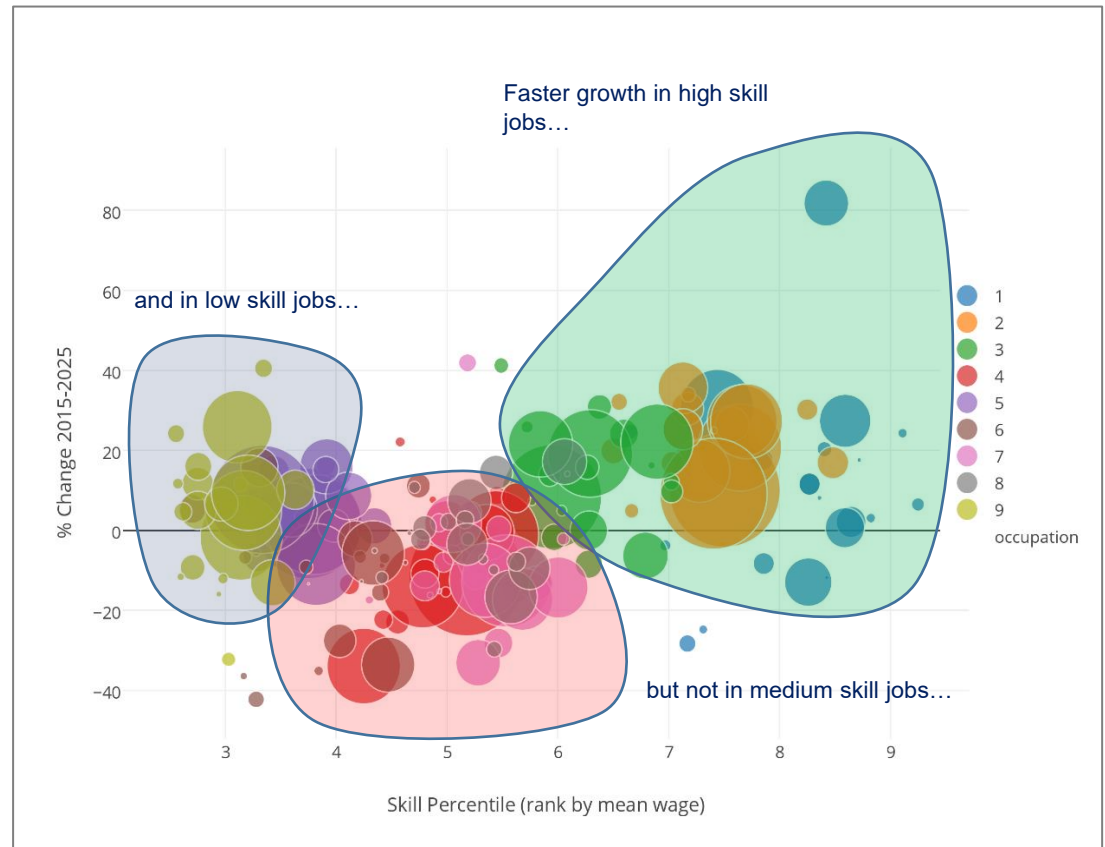
Source: Figure 1 on page 15 of <https://www.cedefop.europa.eu/en/publications-and-resources/publications/3077>

Analysing topical policy issues: Digitization

Polarisation of the labour market

Using Skill Forecast combined with 'skill measure' (rank of mean wage)

The forecast allows us to evaluate future developments by occupations (and their impact on wage distributions).



Calculations based on employment growth according to the Cedefop Forecast (2021-2025) combined with wage percentiles (EU-LFS) at each member state. Own calculations.

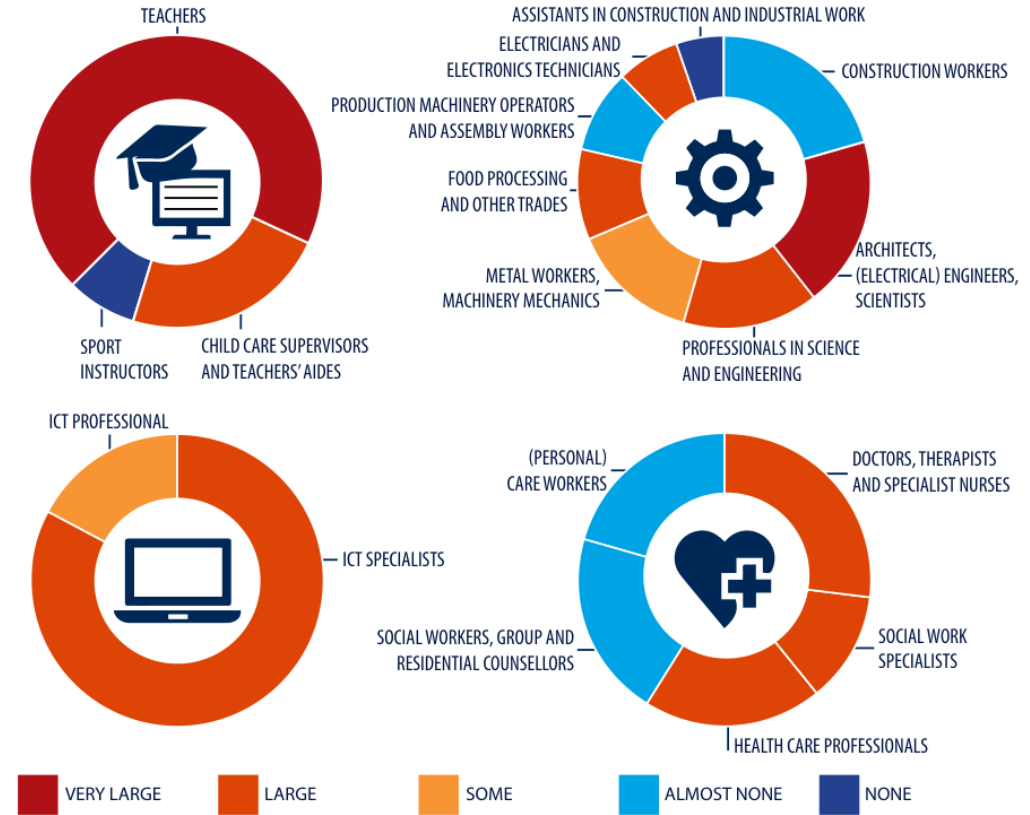
Study Choice and Guidance

- Mid-term forecasts have also been developed to inform individuals either directly (student/parent) or indirectly (Guidance counsellor)
- Typically, detailed levels of forecasting outcomes are used (occupation; qualification)

Example: Study choice

- Dutch POA system has existed since the 1990s
- More than 100 occupations and qualifications are forecasted
- One main aspect is to inform study/occupation choice

MAJOR BOTTLENECKS FOR EMPLOYERS IN EDUCATIONAL, SCIENCE AND ENGINEERING, ICT AND HEALTHCARE OCCUPATIONS



Source: Factsheet labour market forecast up to 2026 (ROA-F-2021/2E)
<https://www.roa.nl/files/roaf20212arbeidsmarktprognoses2026pdf>

Conclusions

- Many countries use quantitative skill forecasting to supplement their toolbox of labour market monitoring and skill anticipation.
- Quantitative forecasting modellers need to build up experience in their model to make full use of it.
- To progress, institutional and organisational structures should be developed to support the transmission of information from the model to the stakeholders and develop a feedback loop of early results from stakeholders to the team developing and analysing the model results.
- Other institutions and departments should develop expertise to review the outcomes and translate them into relevant information for their peers and users.

Contact

Dr. Ben Kriechel

Lindwurmstraße 9
80337 München / Germany

<https://www.economicsdata.eu>



Economics & Data
ED23 GmbH

Some links

The German labour market forecast on behalf of the BMAS is summarised here:

<https://economix.org/en/services/research-areas/forecast-2030.html>

The BiBB/IAB Forecast can be found here:

<https://www.bibb.de/de/11727.php>

The Dutch forecast by ROA can be found here:

<https://roa.nl/project-onderwijs-arbeidsmarkt-poa>

Information on forecasting from a UK perspective:

<https://warwick.ac.uk/fac/soc/ier/researchthemesoverview/researchprojects/forecasting/>

The information on the Cedefop forecast can be found here:

<https://www.cedefop.europa.eu/en/projects/skills-forecast>

A guide on foresighting and forecasting written on behalf of Cedefop / ETF / ILO can be found here:

[http://www.etf.europa.eu/web.nsf/pages/Vol. 2 Developing skills foresights](http://www.etf.europa.eu/web.nsf/pages/Vol._2_Developing_skills_foresights)