Cambridge Econometrics' E3ME Macro-econometric Model

Quantitative and qualitative methods used for employment projections

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clarity from complexity

Quantitative and qualitative methods used for employment projections

- The rationale for making quantified projections of employment and skills

- Cambridge Econometrics' E3ME macro-econometric model
  – the production of Cedefop's skills supply and demand forecasts

- Scenario analyses to investigate uncertainties

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The rationale for making projections of employment and skills

- Identify labour market trends and skills shortages
- Inform policy and planning for the provision of education and training
- Inform active labour market policies to retrain the unemployed or reintegrate individuals who are economically inactive
- Improve the information available to guide the decisions of those making investments in human capital and career choices
- Better match labour market needs and skills supply
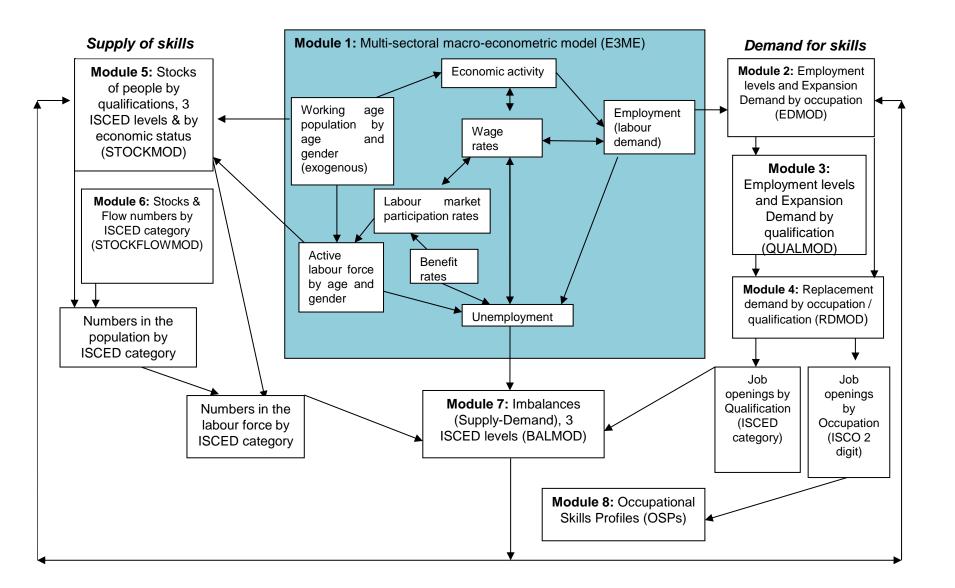
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Cedefop's skills supply and demand forecasts

- Original methodology for Cedefop's skills supply and demand forecasts was developed in mid-2000s
- Our consortium developed the original methodology and has delivered the forecasts under four successive contracts since 2006
- A quantitative modelling framework…
- …supplemented by qualitative judgement through validation by *Skillsnet* experts

Quantitative modelling framework

Supply of skills

Module 5: Stocks of people by qualifications, 3 ISCED levels & by economic status (STOCKMOD)

Module 6: Stocks & Flow numbers by ISCED category (STOCKFLOWMOD)

Numbers in the population by ISCED category

Numbers in the labour force by ISCED category

Module 1: Multi-sectoral macro-econometric model (E3ME)

Economic activity

Working age population by age and gender (exogenous)

Wage rates

Employment (labour demand)

Labour market participation rates

Active labour force by age and gender

Benefit rates

Unemployment

Demand for skills

Module 2: Employment levels and Expansion Demand by occupation (EDMOD)

Module 3: Employment levels and Expansion Demand by qualification (QUALMOD)

Module 4: Replacement demand by occupation / qualification (RDMOD)

Job openings by Qualification (ISCED category)

Job openings by Occupation (ISCO 2 digit)

Module 7: Imbalances (Supply-Demand), 3 ISCED levels (BALMOD)

Module 8: Occupational Skills Profiles (OSPs)

The outputs delivered

Skills demand

- Sector /industry (41 NACE Rev 2 industries)
- Occupation (one and two-digit level ISCO08 occupational groups)
- Qualifications (3 broad ISCED qualification/ education levels)
- "Expansion" demands
- "Replacement" demands
- "Total Net Requirements"

Skills supply

- Age group (5-year age bands starting from 15-19 until 65+)
- Gender
- Qualifications (3 broad ISCED qualification/ education levels)

Mismatch and imbalances

- Unemployment by country and qualification level
- Imbalance indicators (indicators focussing on the reconciliation of the demand and supply measures by highest qualification level)

A common and consistent economy-wide overview of skill needs, allowing detailed comparisons across countries and sectors

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The E3ME macro-econometric model

- Computer-based model of the world's economic, energy and the environment system

- Based on an accounting framework and designed for projections for business and policy analysis

- Collection of stochastic behavioural equations and accounting identities

- Macro-econometric model based on a post-Keynesian framework
  - institutional behaviour (e.g. of an industry) is specific to a region over a time period
  - demand-led: consumer demand made effective by income
  - optimisation not assumed, no general equilibrium

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E3ME - the treatment of the labour market

- **Labour markets**
  - disaggregated by industry and region with interactions across industries and regions in wage equations

- **Labour demand**
  - derived from demand for goods and services
  - Number of jobs determined by output, costs of labour relative to value of output produced, unemployment and benefit rates

- **Labour supply**
  - derived from working age population and participation rates by gender (in turn affected by regional unemployment)

- **Wage rates**
  - set in an employer-union bargaining model adapted to industry-region labour markets

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Scenario analysis to investigate uncertainties

- It is best practice to use a multi-sectoral macroeconomic model for employment projections
  - captures secondary impacts (often termed *multiplier effects*)
  - links developments in labour market to economic, technological and social trends
  - provides a systematic framework to examine alternative assumptions about key economic, technological and social trends

- Cedefop's skills supply and demand forecasts
  - baseline forecast consistent with Eurostat demographic projections and DG ECFIN macroeconomic projections
  - sensitivity analyses using alternative macroeconomic assumptions
  - scenario of increased labour market participation and migratory flow across member states

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Other examples of E3ME analyses

- Impacts of macroeconomic drivers and policy changes
    - R&D and innovation
    - fiscal policy, tax reform
    - trade agreements
    - resource efficiency

- Assess the feasibility of a European unemployment and benefit scheme

- Estimate the impacts of increased gender equality

- Green jobs – the employment consequences of policies to achieve key EU environmental targets

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Summary

- The rationale and methods for making quantified projections of employment and skills are now well established

- The projections provide evidence to help improve the match between labour market needs and skills supply

- Ongoing developments are required
  - to better meet the needs of users, for example: measuring jobs and skills; communicating the results and their value
  - to adapt to and measure the changing nature of the labour market

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