



CEDEFOP

European Centre for the Development
of Vocational Training

cecambridge
econometrics

connecting you to the future

Forecasting skill demand and supply in Europe: Evaluating the results

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Overview

General Considerations: Various aspects to evaluating the projections:

- **“Accuracy”**
- **Robustness**
- **Use**

Quantitative Assessment

- Detailed *Internal, Quantitative* evaluation of the results

Qualitative Assessment (as in 2010/2011):

- An *External Qualitative* review of users opinions

General Considerations in Evaluating Labour Market Forecasts

- Previous evaluations of occupational employment projections
- Important considerations:
 - Accuracy versus value & usefulness
- Focus and objectives
 - Understanding the rationale for employment forecasting
 - Qualitative assessment of employment forecasts

Definition of Terms

Variables and parameters

Time series

Dependent variable

Independent or explanatory variable

Endogenous and Exogenous:

Base year and Target year:

Systems of classification:

- **NACE**
- **ISCO**
- **ISCED**

Models:

- **Simultaneity**
- **Behavioural relationships**
- **Accounting relationships**

Trends & Trend extrapolation

- **Linear Trend**
- **Exponential Trend**
- **Logistic Trend**

Taxonomies of Errors

- General Taxonomies:
 - History and forecast
 - Losses and scores
 - Scale, sectoral & occupational effects
 - Quantitative and qualitative assessment
- Range of detailed quantitative analysis to be undertaken

Qualitative evaluation:

Qualitative evaluation of projections (illustrative)

Outcome/ Forecast	Fast decline	Low decline	Little change	Low growth	High growth	all
Fast decline	5	5	0	0	0	10
Slow decline	6	10	4	0	0	20
Little change	4	0	10	4	2	20
Slow growth	0	0	10	6	4	20
Fast growth	0	0	1	0	10	11
Total	15	15	25	10	16	81

Data errors

Historical data revisions:

- error in the measurement of the **dependent variable**
- errors in the **endogenous drivers**
- errors in the **assumptions** about **exogenous variables**

Forecast errors

errors of judgement about exogenous variables;

errors of specification reflected in the various **parameters** of the model.;

errors of judgement in running the models (econometric and other forecasting models are rarely used without some intervention by the operator to deal with perceived problems).

Summary of quantitative errors

- Errors due to data revision as opposed to forecast model errors;
- Distinctions due to scale, industry, occupation and other effects;
- relative (%) as opposed to absolute (000) differences (with variations to allow for direction of change);
- Qualitative indicators % getting it more or less right (direction and rough magnitude).

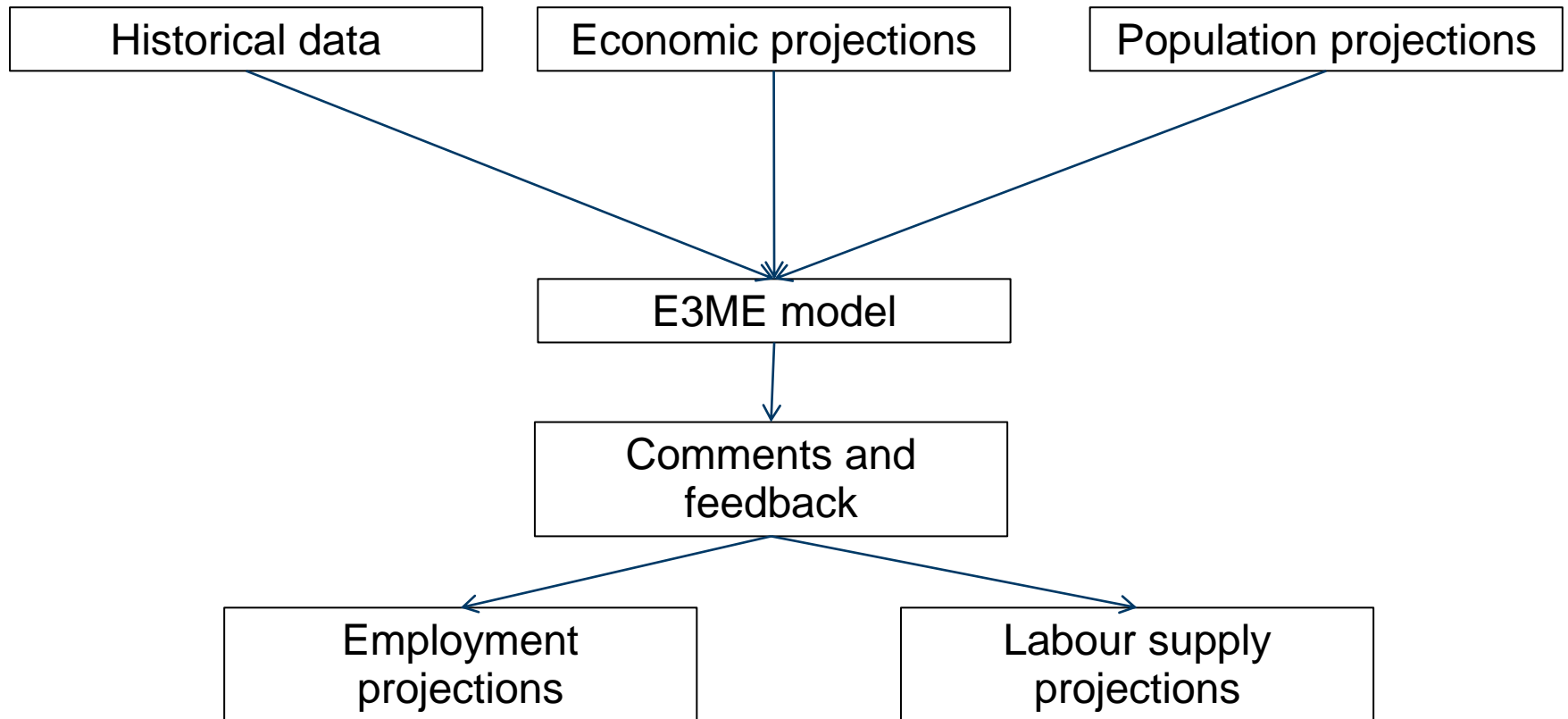
What we are comparing

2007 and subsequent demand projections

2008 and subsequent supply projections

- with 2008-11 outcomes (short-term); and
- Each subsequent projection (medium-term trends)

The Modelling Process



Specific considerations in the Cedefop approach

- **Role of E3ME**
- **Modular approach, need to focus on:**
 - **Sectors**
 - **Occupations**
 - **Qualifications**
- **Other aspects:**
 - **Supply;**
 - **Replacement demands, etc**



Data and related considerations

- **Industry and occupational classification**
- **Data revisions**
- **The Global financial crisis**



Variables	Data errors: classification changes			Forecaster's Errors		Total error
	dependent variables	endogenous variables	Exogenous assumptions	Exogenous assumptions	Model error parameters	(ex post)
Macro-level/ Scale effects						
1a. Macro-economic	GDP	Prices, wages, components of aggregate demand	Public finances, World economy Exchange rate Demography	Changes in key indicators	Macro model parameters	GDP growth Productivity growth
1b. Total Employment	Total employment	GDP	aggregate labour productivity	Productivity adjustments	Macro model parameters	Total employment growth
Industry etc						
2a. Detailed employment by sector	Sectoral employment	Output, wages	Sectoral productivity	Sectoral productivity trends	Econometric estimates	Sectoral employment growth
2b. Employment by type (gender, status)	Employment by type	N/a	Employment by Sector	Trends by type	Coefficients (shares)	Shares by type and gender
Occupation						
3a. Detailed employment by occupation	Employment by occupation	N/a	Employment by Sector and by type	Trends by occupation	Coefficients (shares)	Shares by occupation

Projection	Base year	Target year	NACE	ISCO	ISCED	Price base
Cedefop 1 (Demand for skills, 2007)	2007	2015	NACE	ISCO	ISCED	2000
Cedefop 2 (Supply of skills, 2008)	2008	2020	NACE	ISCO	ISCED	2000
Cedefop 3 (Demand and Supply of skills, 2009/10)	2010	2020	NACE	ISCO	ISCED	2000
Cedefop 4 (Demand and Supply of skills, 2010/11)	2010	2020	NACE	ISCO	ISCED	2000
Cedefop 5 (Demand and Supply of skills, 2011/12)	2010	2020	NACE	ISCO	ISCED	2000

Economic projections

By far the largest difference in both actual outcomes, due to the economic crisis

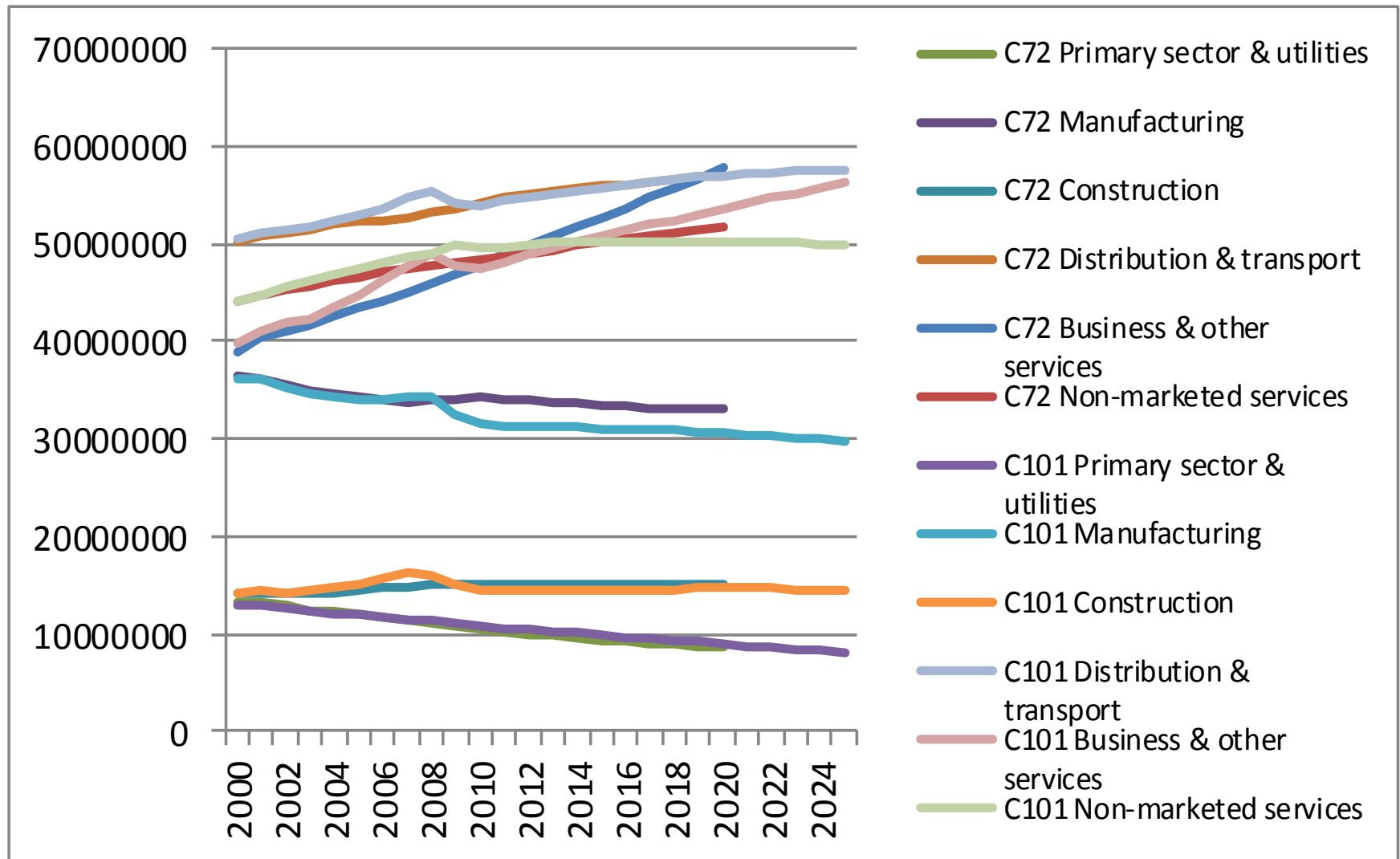
Makes any short-term assessment difficult -for example, productivity changes in 2008-09 would have been impossible to predict

Historical Data and Population

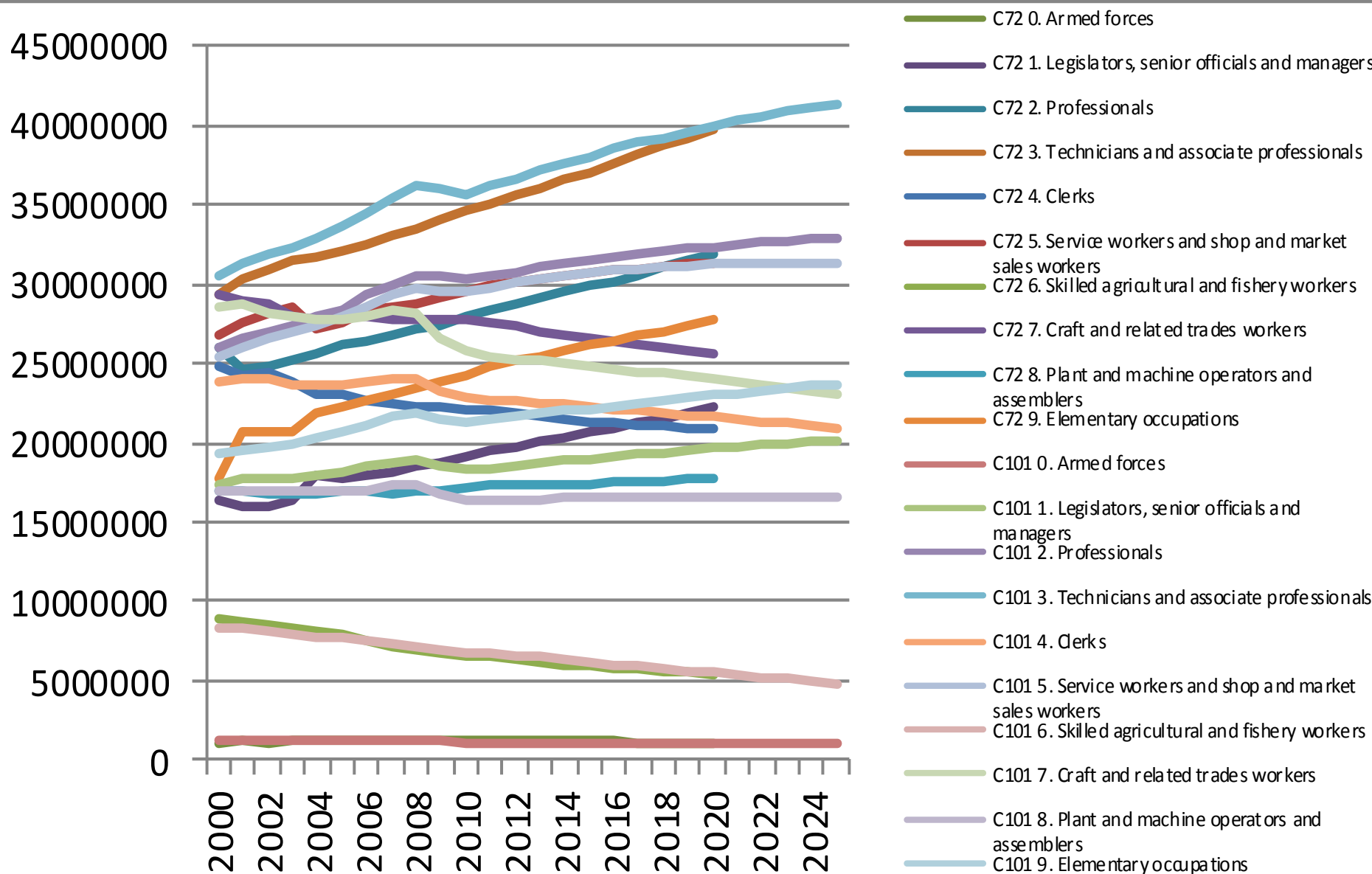
Some revisions to historical data, particularly recent years, but not a major factor

Population projections were revised after the 2007 forecast, difficult to evaluate due to data availability

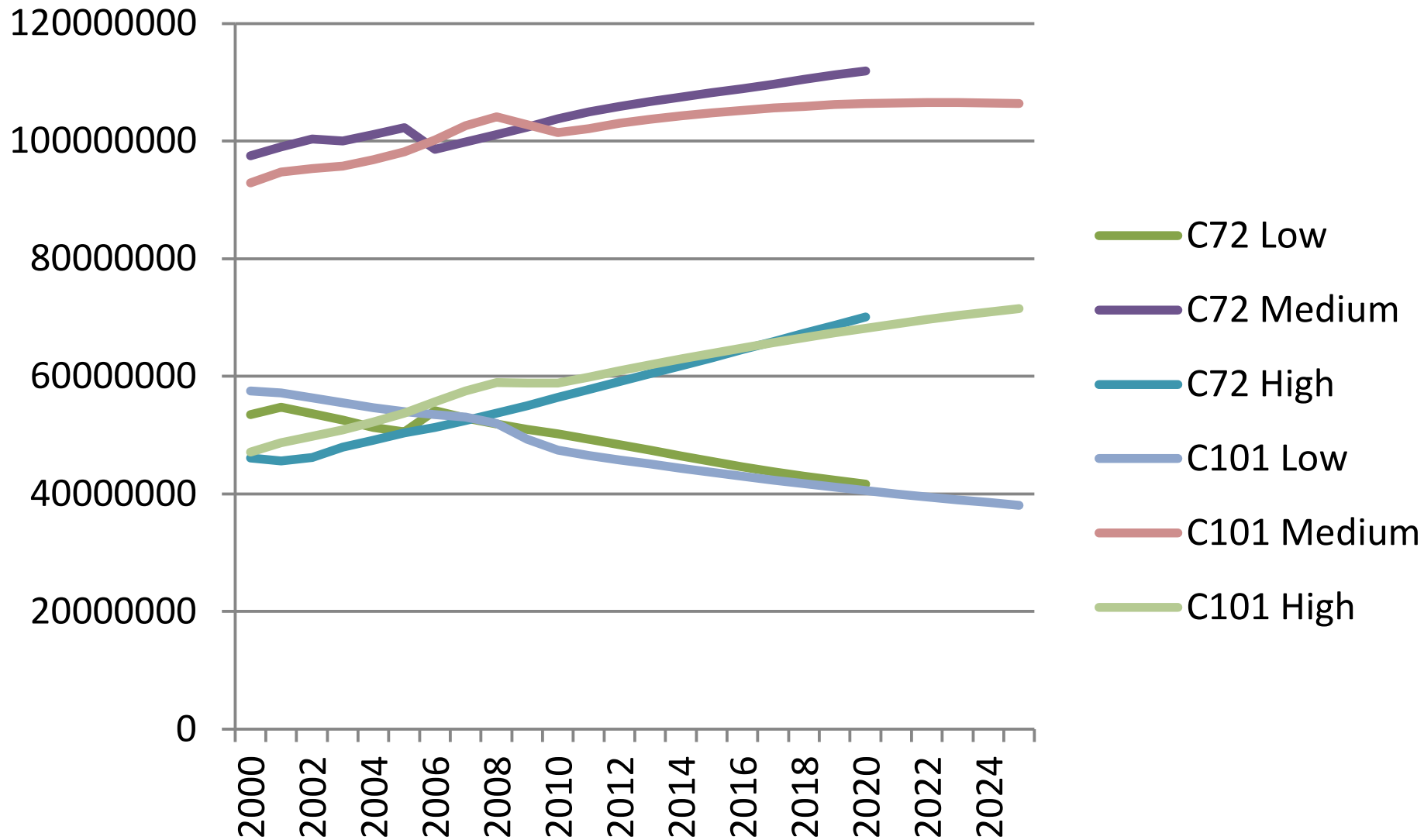
Sectoral employment



Occupational employment



Employment by qualification



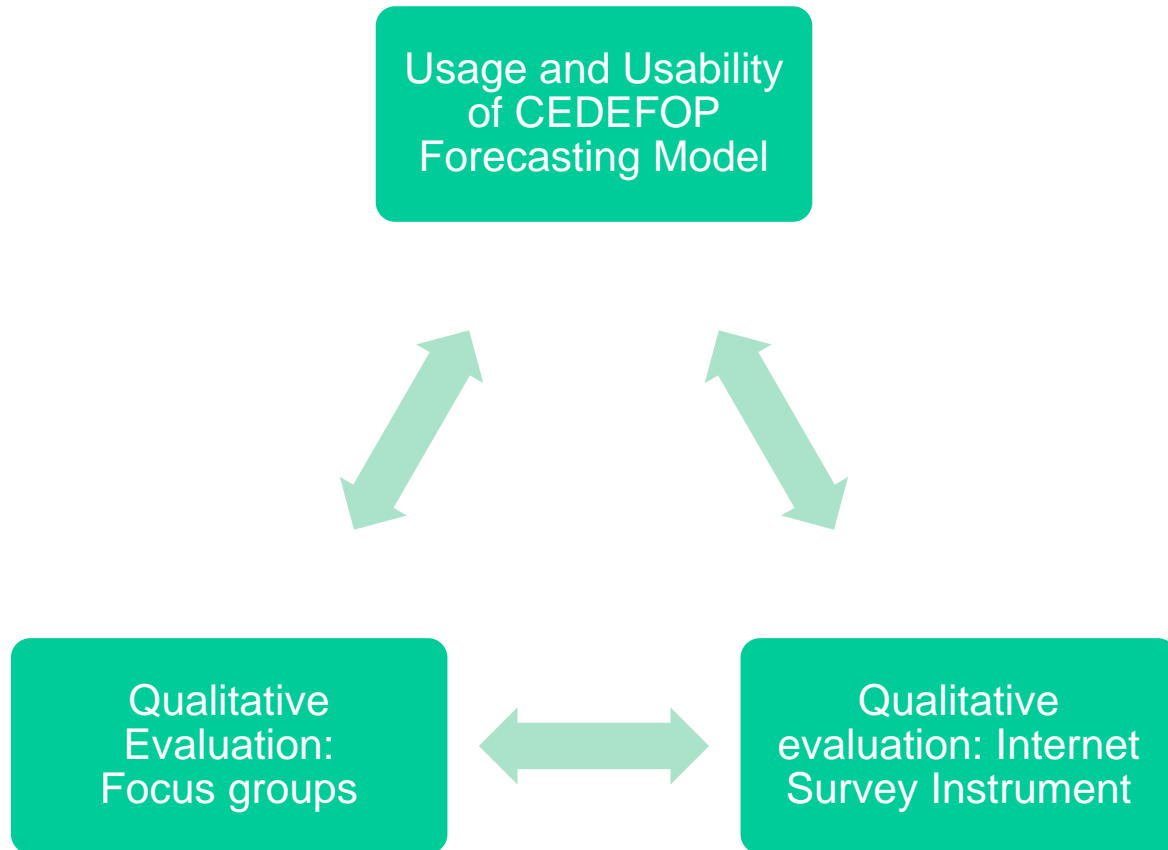
Quantitative assessment: Results and Conclusions

The crisis dominates this exercise, both as an input and in the modelling

Short-term comparisons are not possible, long-term trends remain broadly unchanged, with a few exceptions in particular sectors

The exercise should be revisited when we have more data points and a better understanding of the long-term effects of the crisis

Qualitative evaluation



Qualitative Evaluation

I. Usability

- i. Workbook**
- ii. Actual usage**
- iii. Interactive**

II. Outcomes

- i. Sector**
- ii. Occupation**
- iii. Education**
- iv. Supply / Demand**
- v. Level of aggregation**

III. Methodology

- i. Sector model**
- ii. Scenarios**
- iii. Expansion demand**
- iv. Replacement demand**
- v. Supply (stock / flow)**

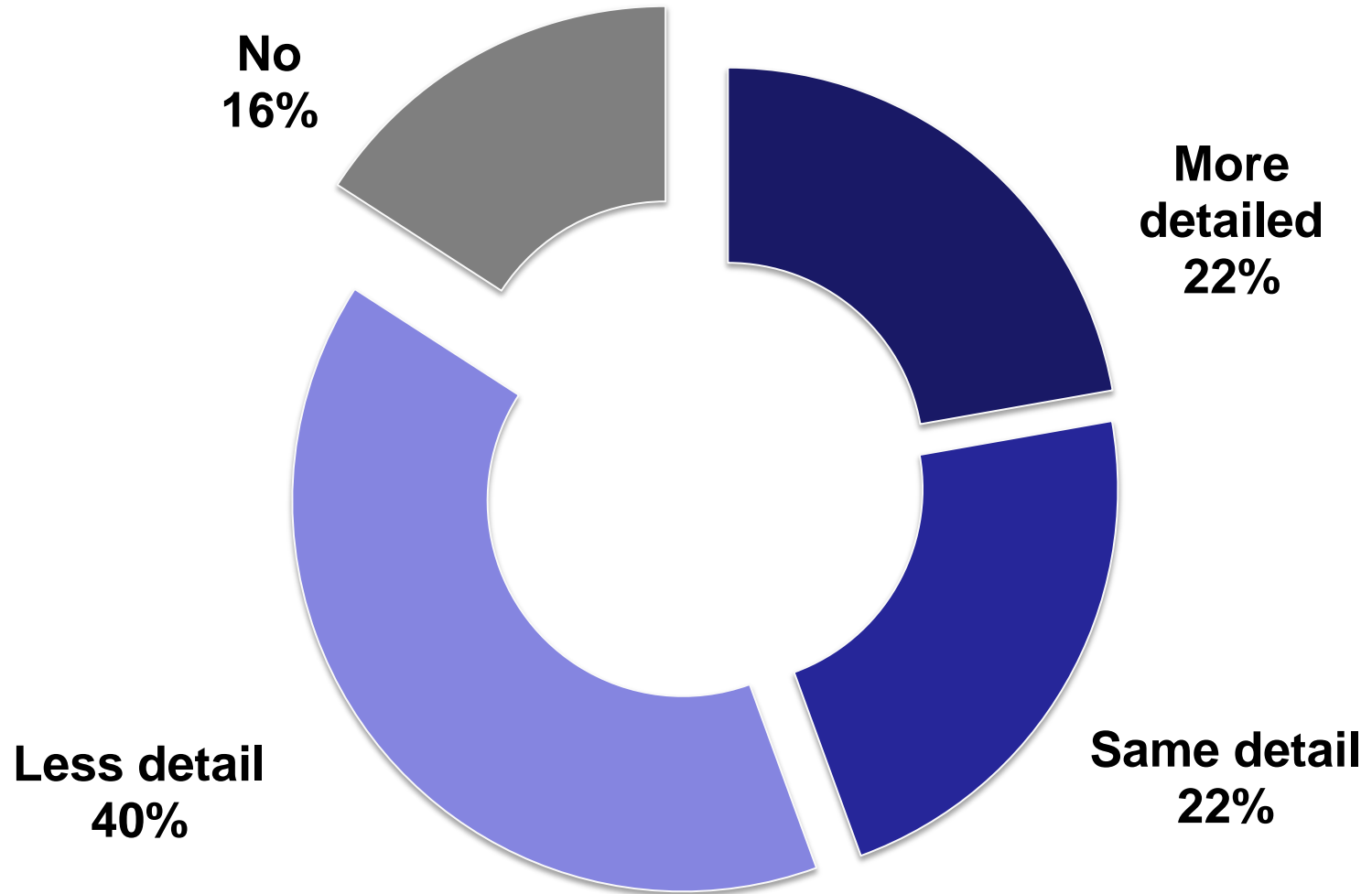
Overview

- **Part of the evaluation of project**
- **Population: SkillsNet and users of the forecast data (as published on the Cedefop website).**

Topics include:

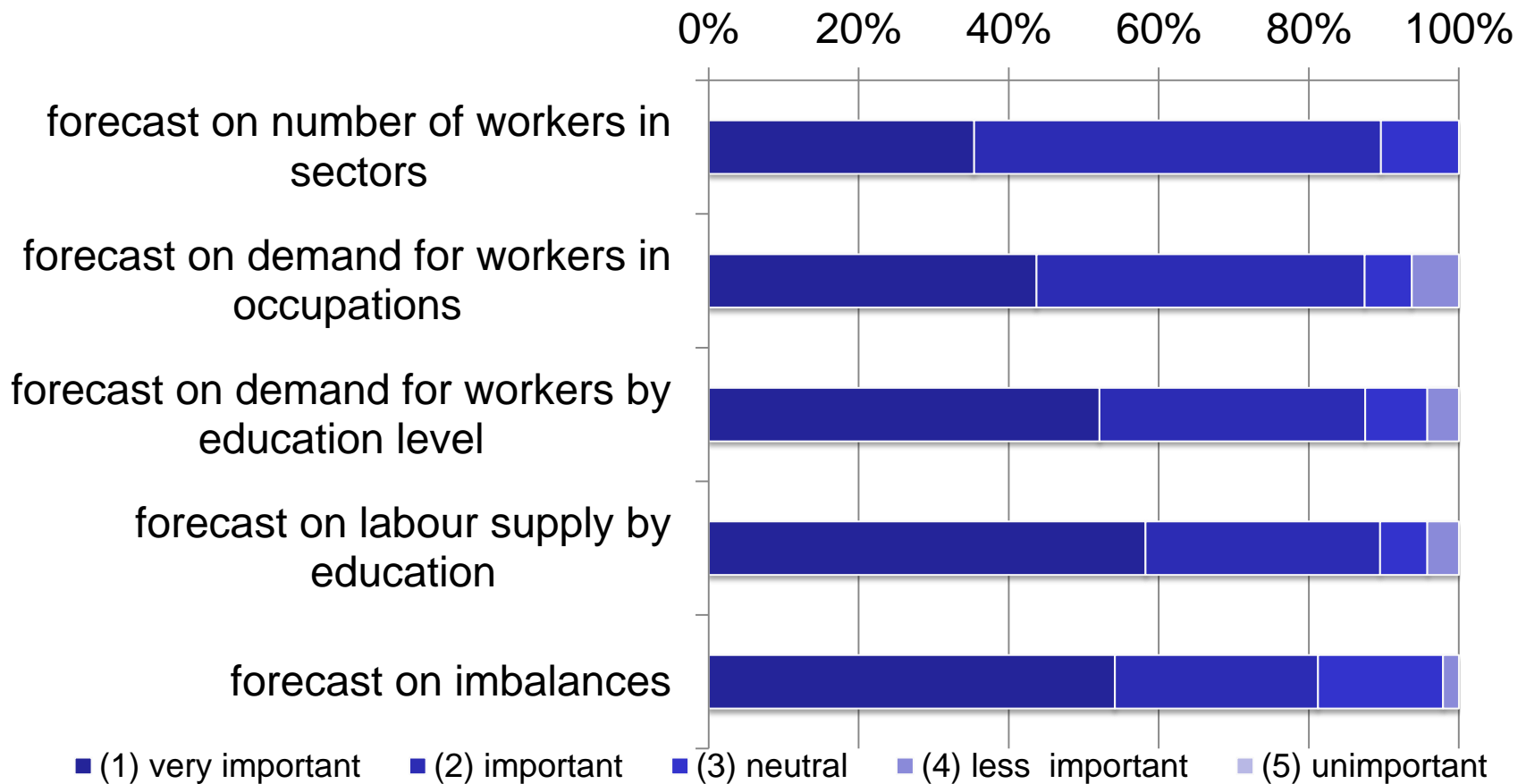
- **Use of results**
- **Evaluation of outcomes**
- **Spin-offs from the project**

Comparable national skill forecasts in own country?



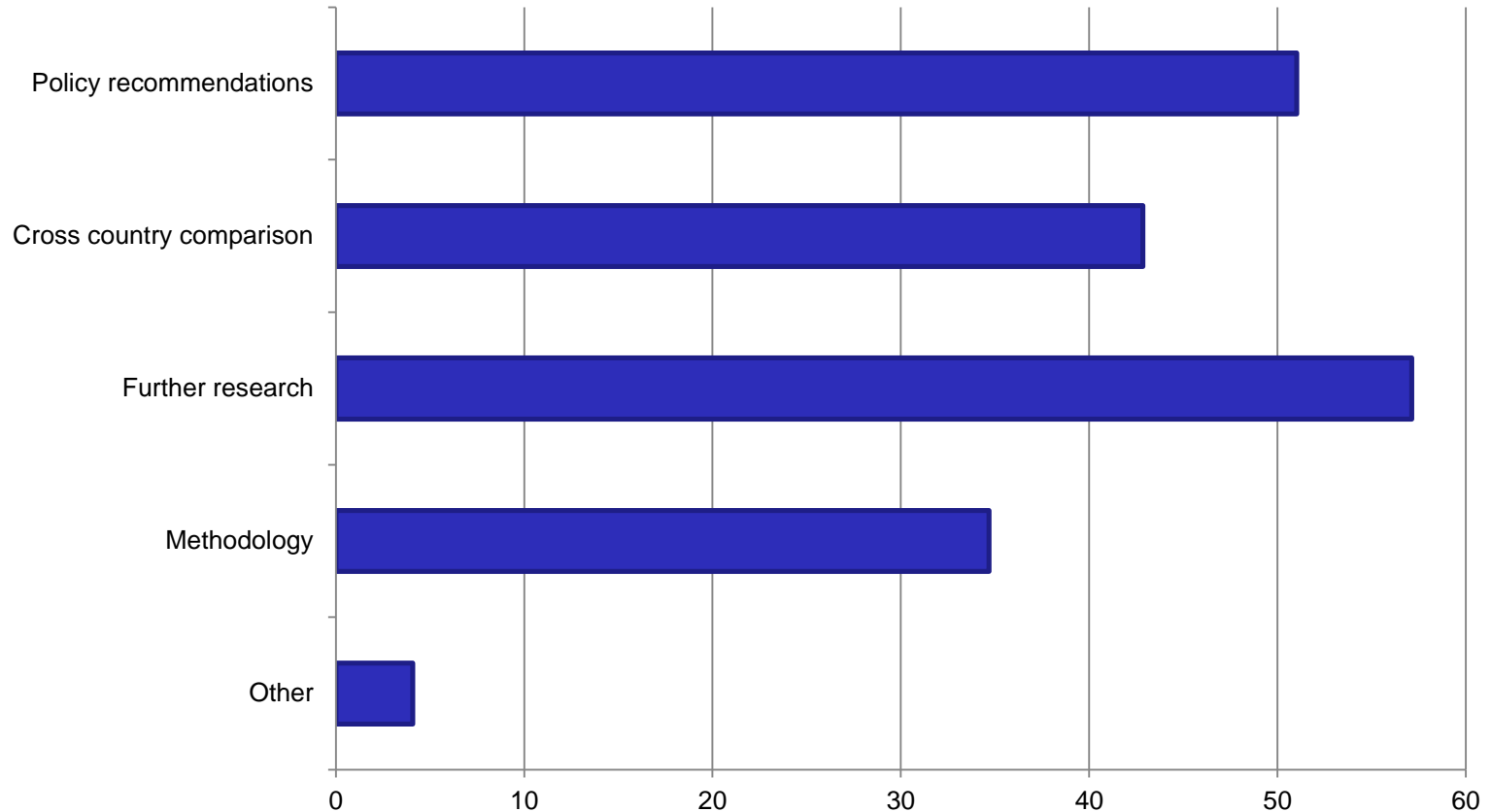
Source: Qualitative evaluation 2010; ROA

Importance of different aspects of the forecast



Source: Qualitative evaluation 2010; ROA

Usage of skills forecast



Notes: Multiple categories allowed.

Source: Qualitative evaluation 2010; ROA

Topics of the survey

- **Comparable national skill forecasts in own country?**
- **Importance of different aspects of the forecast**
- **Usage of skills forecast**
- **Plausability of forecast**
- **Usability of web-tool (workbooks)**

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