



CEDEFOP

European Centre for the Development
of Vocational Training

Supporting Development of Skills Forecasting / Anticipation in small countries

Expert Workshop

Thessaloniki November 22nd -23rd 2016

Introduction to Skills Forecasting

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OVERVIEW

1. WHY ?

- **Rationale:** Aims & Objectives

2. HOW?

- **Methodological Issues:** Alternative approaches to Anticipation; History; Lessons; Problems & pitfalls
- **Technical Issues:** Models & methods, econometrics, theory & judgment

3. TO WHAT PURPOSE?

- **The value of skills projections** and their limitations
 - What skills forecasts can and cannot achieve

1. THE RATIONALE FOR FORECASTING IN A MARKET ECONOMY

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Why Forecast?



Why Not?

Forecasting is *impossible*

Forecasting is *unnecessary*

Forecasts are *inaccurate* and based on *invalid assumptions*

(They are *illegal* (at least in the UK!))

Act Against Conjuration, Witchcraft and Dealing with Evil Spirits

First enacted during the reign of James I, partially repealed in 1736, but nevertheless:

“prediction of the future is illegal as are any pretence to such arts and powers whereby ignorant people are frequently deluded and defrauded”

However, practitioners were no longer condemned to death:

“shall for every such offence suffer imprisonment for the space of one whole year without bail, and once every quarter of the said year shall stand openly in the pillory for the space of one hour”

However.....

Fortunately for UK forecasters at least this was further amended more recently in:
the **Fraudulent Mediums Act, 1951**
in which such activities are excused if:

“done solely for the purposes of entertainment”

Is systematic anticipation possible?

Nobody can **predict** the future with certainty or precision –
“All forecasts are wrong!”

Everybody can prepare or **plan** for the future - Government, employers, educational institutions & individuals

These plans and related decision help to determine actual outcomes – such planning involves some element of forecasting: either implicitly or explicitly

In this sense not only is forecasting **possible** it is **inevitable**

Comprehensive, systematic, consistent projections, based on explicit and transparent assumptions provide useful information for all labour market participants, helping to inform all those making choices & decisions

Is Forecasting Necessary?

Rapid change, uncertainty & evidence of market failure

Long lead times on investment decisions such as education and training choices

Need for a regular and systematic assessment of future prospects to:

- guide & inform policy formation;
- guide & inform individual decision making;
- avoid future imbalances & mismatches;
- need for a counterfactual to assess policy or different choices

The only meaningful questions are therefore **how**, by **whom** and with **what end** in mind?

So, Forecasts: Who Needs Them?

A Variety of audiences

The State - planners/policy makers

Education and training providers

Companies/Employers

- labour market pressures

- other reasons

Individuals: career choices

Careers advisors

With different requirements ?

Occupational demand - future employment levels/ Skills

Replacement demands - job openings

Education and training requirements - qualifications needed

Supply/demand balances

Terms and conditions of employment (pay)

2. METHODOLOGICAL ISSUES: HOW TO FORECAST

Crystal ball

Folk-lore

More systematic
approaches:

Quantitative computer
models

Delphi techniques

Scenario development



Ostrich approach to planning



How to Forecast / Anticipate

Formal, quantitative models:

- Extrapolation of past trends
- Time series methods
- Need for behavioural content

Other approaches:

- quantitative & qualitative
- surveys
- scenario development

Key elements

- Where are we now?
- What will happen next?

Advantages of quantitative modelling

Natural desire to quantify, measure and evaluate:

- Benefits of a formal model
- Value of benchmark forecasts

Technological progress and statistical infrastructure

International best practice - Quantitative modelling approaches, based on macroeconomic, multi-sectoral models

Elements in a Forecast & Different Approaches to Forecasting

There are many alternative methods, each has:

- Strengths & weaknesses
- Problems & pitfalls

Most require: Data; Modelling or Analysis; Assumptions; and Judgement

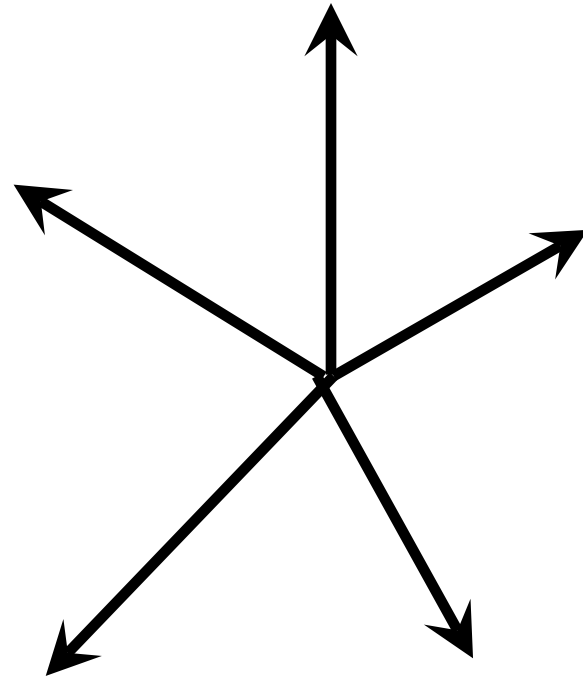
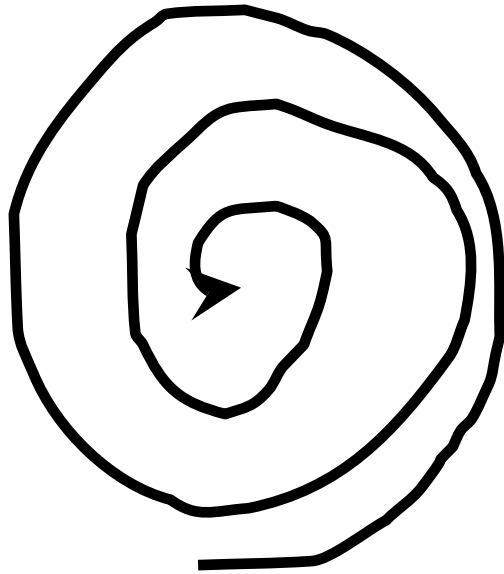
Forecasting as a “process” rather than an “end” in itself

Some care needed in how to interpret and use forecasts

Alternative approaches

Approach	Advantages	Disadvantages
Formal, national level, quantitative models based projections	Comprehensive (typically, covers all sectors) Consistent Transparent and explicit Quantitative	Data hungry Costly Not everything is quantifiable May give a false impression of precision/ certainty
Surveys of employers, etc, asking about skill deficiencies & skill gaps	Direct “user/ customer” involvement Easy to set up and carry out	May be very subjective and inconsistent Too much focus on the marginal and ephemeral
Focus groups/round tables, Delphi style methods; Scenario development	Holistic (considers a broader range of factors that just economic) Direct “use/customer” involvement	Can be non-systematic Can be inconsistent Can be subjective
Sectoral/ occupational / regional studies and /or Observatories (using both quantitative & qualitative evidence)	Holistic (for the sector) Partial (ignores other sectors) Strong on sectoral & other specifics	May introduce inconsistency across sectors

Quantitative Forecasting and Scenarios



Certainty

Uncertainty

*Quantitative Forecasting,
Delphi studies*

Scenarios

Scenario development

Systematic - aims to generate a *strategic conversation or dialogue*

Aims to help participants (and others) to plan strategies for the future taking account of uncertainties

Scenarios are a means to an end - not the main outcomes

Enables wide consultation and incorporation of a range of expert opinion

Not convergent - emphasises uncertainty and alternative strategies

Not a derivative of quantitative forecasts nor a substitute

Holistic: covers all angles, supply and demand

TECHNICAL ISSUES - DEVELOPING A QUANTATIVE APPROACH

The purpose of making projections

Illustrative approach: the CEDEFOP framework for skills forecasting

Macroeconomic models

- Econometric models (e.g. E3ME)
- Dynamic Computable General Equilibrium (CGE) models

Modelling the supply of and demand for skills

Requirements of a quantitative approach

Purpose of making projections

To provide a *quantified*, comprehensive and consistent overview of anticipated skill demand and supplies (using common data and models?)

taking account of key drivers such as climate change, globalisation, technological change and demographic developments

To inform strategic thinking and policy-design to respond successfully to challenges and opportunities

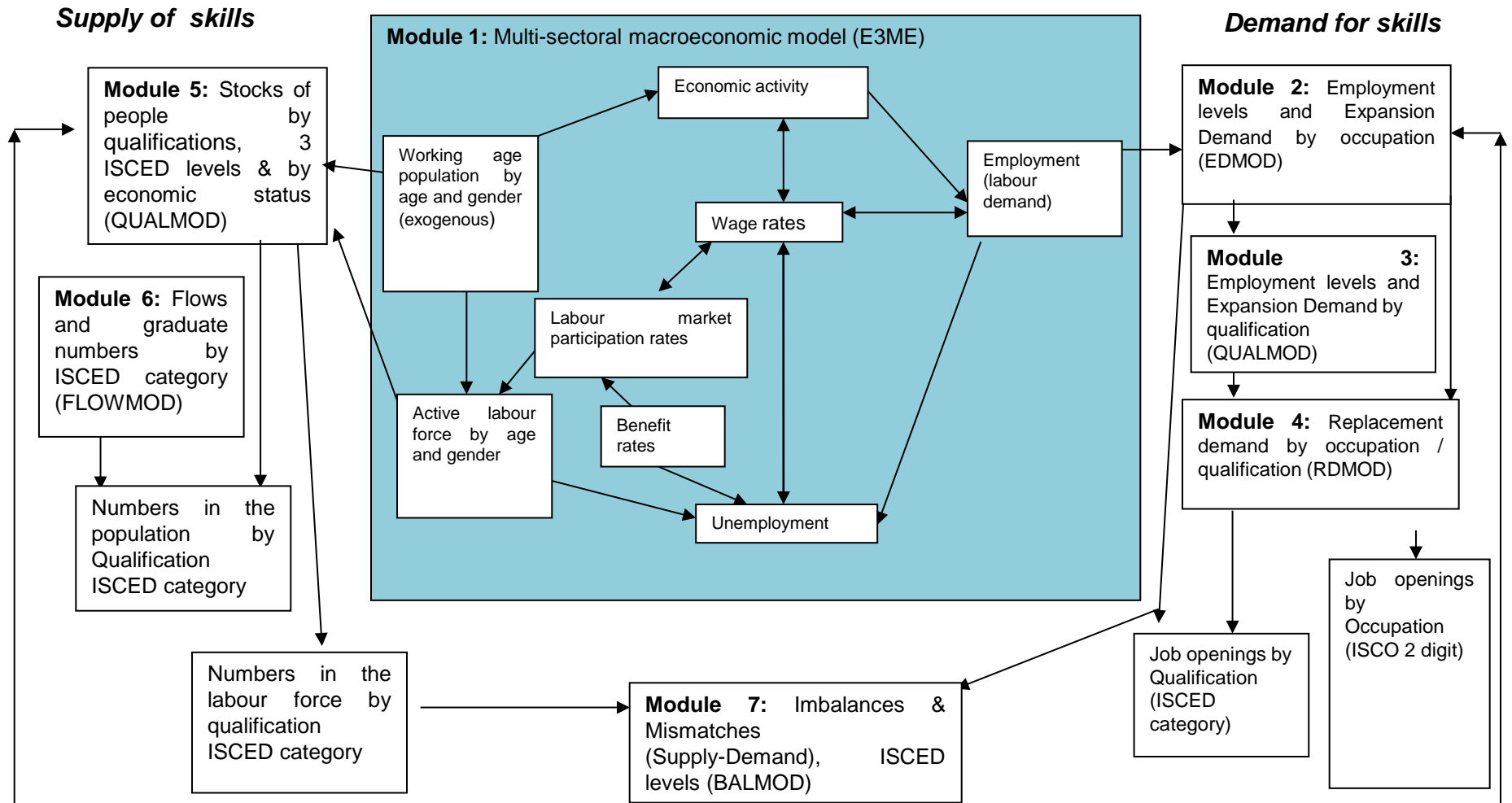
The CEDEFOP framework for skills forecasting in Europe

Developments in the labour market are crucially dependent on what happens to the economy more generally

The typical quantitative modelling approach therefore involves two key elements:

- Multi-sectoral macroeconomic model
- Modules to translate the results into implications for skills demand and supply

Overall approach – modelling framework



Role of the E3ME multi-sectoral macroeconomic model

Model the links between the labour market and the wider economy

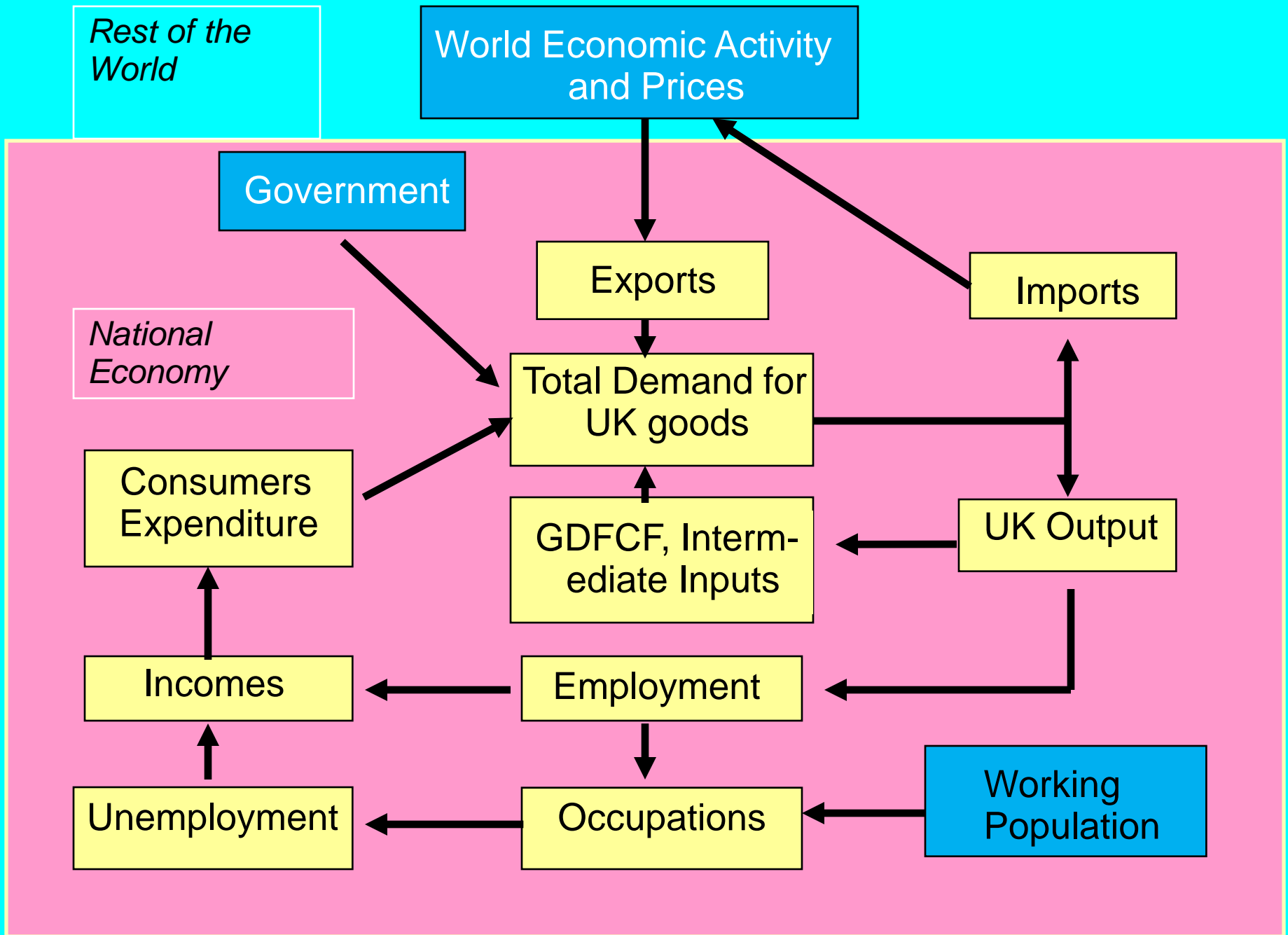
Provide a consistent modelling framework for projecting skills demand and supply together
allows analysis of imbalances (unemployment)

Take key drivers into account

e.g. the impacts of the financial crisis and demographic change

Include analyses of key uncertainties

develop alternative scenarios to see how these will impact on skills in the future



Key strengths of E3ME

Integration of the economy, energy systems and environment, and the labour market

Detailed sectoral disaggregation and linkages (69 NACE sectors and full input-output table)

Geographical coverage and linkages linked through international trade equations

Econometric specification with estimated equations for: labour demand; supply; wages; and working hours

Estimating econometric behavioural equations

Empirical evidence to estimate behavioural relationships

Example: Employment (labour demand)

$$E = f(Q, W, T)$$

$$Q = \text{OUTPUT}$$

$$W = \text{REAL WAGE}$$

$$T = \text{TECHNOLOGY}$$

$$E = \text{EMPLOYMENT}$$

$$f(.) = \text{depends upon/is a function of}$$

Dynamic Computable General Equilibrium modelling as an alternative to econometric models

- Model the links between the labour market and the wider economy
- Detailed sectoral disaggregation and linkages (input-output table)
- Develop alternative scenarios
- Behavioural relationships imposed based on theory – time series data not required

Modelling the supply of and demand for skills

Use of the Labour Force Survey to measure skills (occupations and qualifications)

Separate supply, demand and imbalances modules

Demand – occupational and qualification patterns within industries

Supply – stock flow models of qualification attainments

Imbalances and mismatches – reconciling demand with available supply

Summary of the quantitative approach to forecasting

Multi-sectoral Macroeconomic Model:

- output and employment by industry, etc

Quantitative, econometric models, moderated by qualitative evidence for occupations & qualifications, often using simpler extrapolative methods where data are weaker

Judgement

- all forecasts are based on assumptions – it is important they are *explicit & transparent*

Requirements of a quantitative approach

Approach used is determined by:

- available data
- labour market context (user requirements)

Data requirements for quantitative modelling

- National accounts (macro/sectoral models) and input-output table
- Time series on employment by sectors
- Information on occupational and qualification structure within sectors
- Structure of the population (past and future)

3. WHAT FORECASTS CAN AND CANNOT DO

Aims & objectives

Understanding past trends

Future employment prospects:

- Numbers employed by sector & occupation -job openings

- Education and training requirements - qualifications and skills needed

- Supply/demand balances (including terms and conditions of employment (pay))

Caveats:

- Implicit assumptions about the labour market

- Not mechanistic manpower planning

- Focus on the formal economy

- The Future is not fixed or predetermined

Forecasting Accuracy and Validity

Should we expect accuracy in labour market forecasting?

What is the purpose of forecasts?

- Making technical information digestible for a lay audience
- To guide individual decisions and highlight alternatives
- Setting out options to policy makers
- To influence and change behaviour, including policy

Therefore outcomes are often EXPECTED to be different from forecasts

Methods are improving but margins of error remain uncertain and probably quite large (but no more so than in other types of social science forecasting)

Forecasts can:

Help to Make Assumptions about the Future **Explicit** and **Transparent**

Help to Enforce **Systematic** and **Logical** Thinking

Act as a **Focus** for intelligent **Debate**

Provide a useful **counterfactual** to assess policy impacts

Help to explain past developments in a coherent and logical fashion and then make certain assumptions about how this behaviour will develop into the future.

All plans have to be made on the basis of some forecast (even if it is that tomorrow will be the same as today).

The main aim is to improve understanding of the causes of past changes will provide a more useful guide to future developments.

“Horses for courses” – may need different approaches for different purposes/ different audiences

But they cannot deliver:

Mechanistic “manpower” plans

Precise indications of education and training requirements or job opportunities

Not a crystal ball: Impossible to foresee the unforeseen

LMII: a “public good”

Individual plans need to be guided by robust Labour Market Information and Intelligence (LMII), including a forward looking element

Regular, comprehensive, systematic, consistent and transparent projections are a “Public good”

Needs to serve many audiences (stakeholders, social partners, practitioners and individuals) – not just policy makers

Anticipation – a key part of labour market policy in most developed countries, with especially high investment in the USA

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Cedefop Pan-European projections:

www.cedefop.europa.eu/skillsnet

UK projections “*Working Futures*”

<https://www.gov.uk/government/publications/uk-labour-market-projections-2014-to-2024>

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