

CEDEFOP: Meeting on SBAS

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Forecasting occupations and education levels

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Outline of presentation

Issues to be covered:

- General approach to projecting skill needs over long-term
- Links between macroeconomic projections, employment developments and skill demand and supply
- Data used
- Data issues:
 - General
 - Occupations
 - Education levels
- Implications for short-term forecasting

General approach

- Modelling divided between demand and supply projections of labour skills
- Skills defined in first instance in terms of education levels associated with doing particular jobs
- Jobs defined as occupations in different sectors of activity
- Starting-point – generation of macroeconomic projections on range of assumptions - base scenario plus alternatives using a sectoral model
- Projections of labour demand by sector used to project skill needs
- Demand projections confronted with projections of potential labour available with different skills (education levels) – taking account of demographic and migration trends
- Approach similar to that for short-term but explicit account taken of sectoral interactions and labour supply

Links between macroeconomic projections and skill needs

- Two separate modelling exercises:
 - Sectoral input-output model used to generate projections of labour demand in each of sectors distinguished
 - Division of employment by occupation modelled in each sector along with division of each occupation by education level
 - Projections therefore take account of trends in both dimensions:
 - of shift towards higher level occupations within sectors
 - of increase in education levels within occupations
 - First in part reflects trend towards automation, ICT etc.
 - Second reflects higher education levels needed to do particular jobs but also growing numbers with higher education – hard to distinguish the two
 - In both cases reinforced by effect on skill needs of sectoral shifts – though not uniformly towards demand for higher skills

Data used

- Data for macroeconomic projections mainly from national accounts
- Sectors distinguished at NACE 2-digit level with some aggregation of smaller sectors
- More detailed employment data from Labour Force Survey
- Occupations distinguished at ISCO 2-digit level (27 categories) in model but complemented by ISCO 3-digit level (149 groups) for more detail
- Education levels distinguished at ISCED 2-digit level (7 levels)
- Field of education study also distinguished (15 fields)
- All data divided by sex and age (15-24, 25-54, 55-64, 65-69, 70+)
- For labour supply modelling, data from LFS for each individual year of age 15-69 and 70+, divided by sex, education level and field of study
- Same source for short-term projections

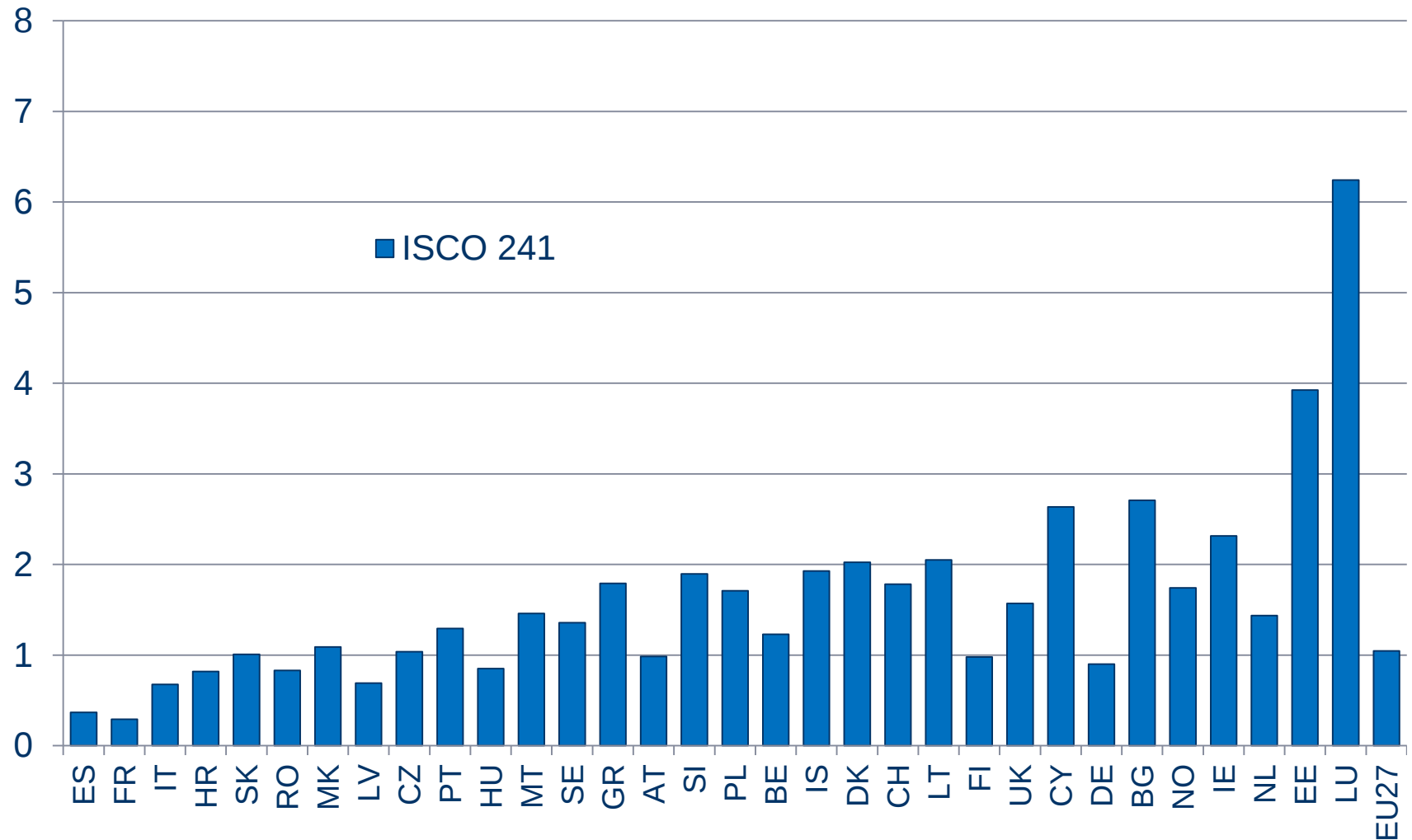
Data issues

- Major problems in building coherent database with consistent historical series for generating meaningful projections over both short and long-term
- Problems stem mainly from sample basis of LFS allied with degree of detail required for projecting skill needs
- Sample size varies from 0.1% of population aged 15-74 in France to 1.8% in Ireland and Malta - 0.5% or less in 14 of 27 EU Member States
- Means that sample covered in some occupations in some sectors in some countries very small or zero – creates problems for time-series analysis
- Limits feasibility of more detailed breakdown - e.g. to NACE 3-digit level (188 groups) as proposed implies average of 50 or fewer people covered per sector in 11 EU27 MS and under 100 in 16 before further breakdown
- Problems exacerbated by breaks in LFS series, often undocumented, stemming from changes in sampling methods, base data, etc.
- Much effort needed to adjust data for breaks plus 'noise' from sample nature of LFS – but essential to do so for projections to be meaningful

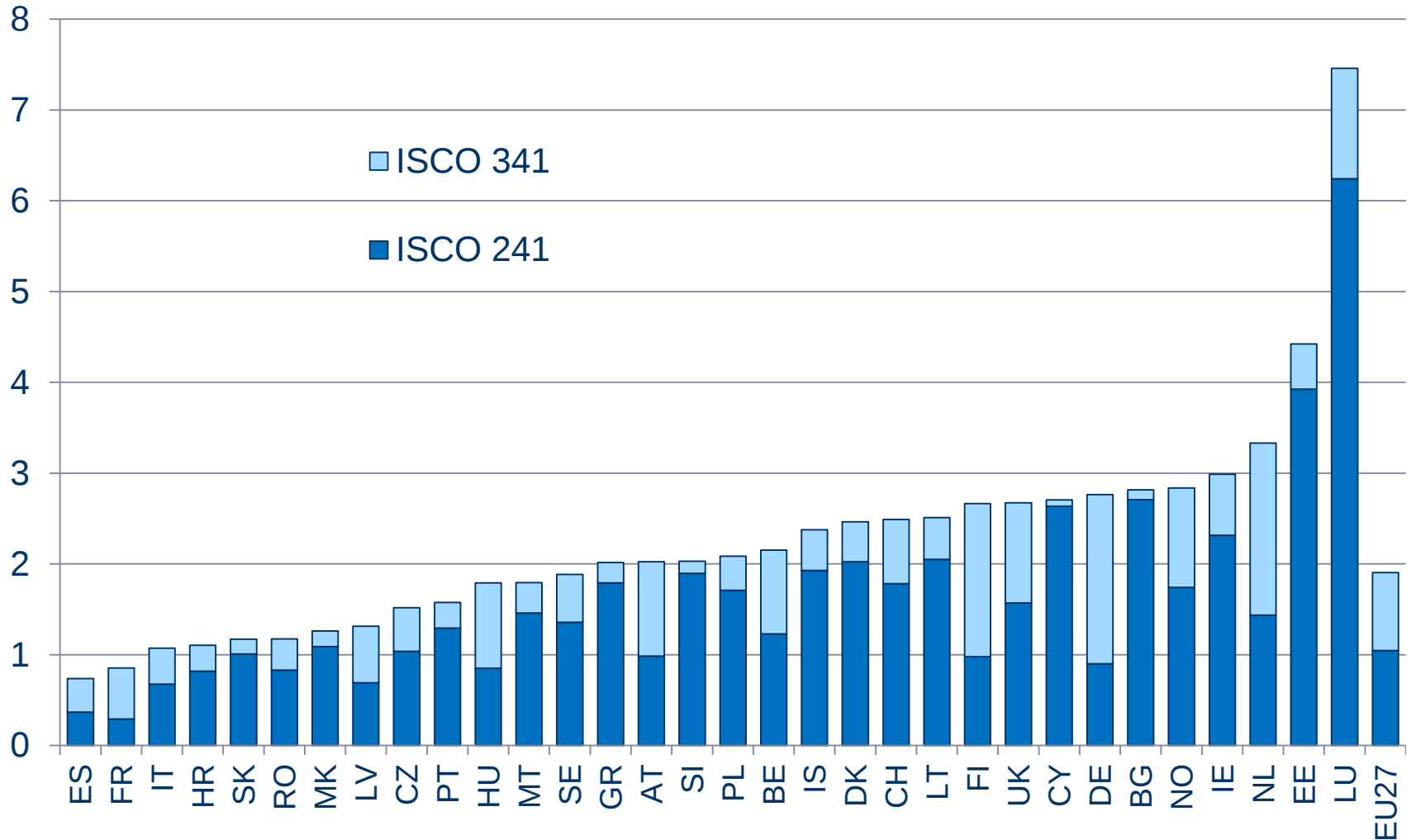
Data issues – short-term forecasting

- Sample size + other problems raise question-mark over use of LFS data for short-term forecasting
- Hazardous to use LFS to measure changes in employment over short-term, especially by sector and between quarters when need to take account of seasonal factors, adjustment lags, etc.
- Problems less serious for changes over long-term when trends predominate
- Short-term forecasting opens possibility of considering interesting issues to complement longer-term projections of skill needs, e.g:
 - how different occupations within sectors affected by downturn or upturn
 - how different groups (e.g. age or education) in occupations affected
- But question over whether LFS data suitable for this
- Features of LFS data on occupations and issues they give rise to illustrated by following charts, highlighting, first, wide differences between countries in classifying jobs to occupations ...

% of total employed as Business professionals (ISCO 241) varies from under 0.5% in Spain and France to 4% in Estonia and 6% in Luxembourg – unlikely to reflect true differences in jobs done ..



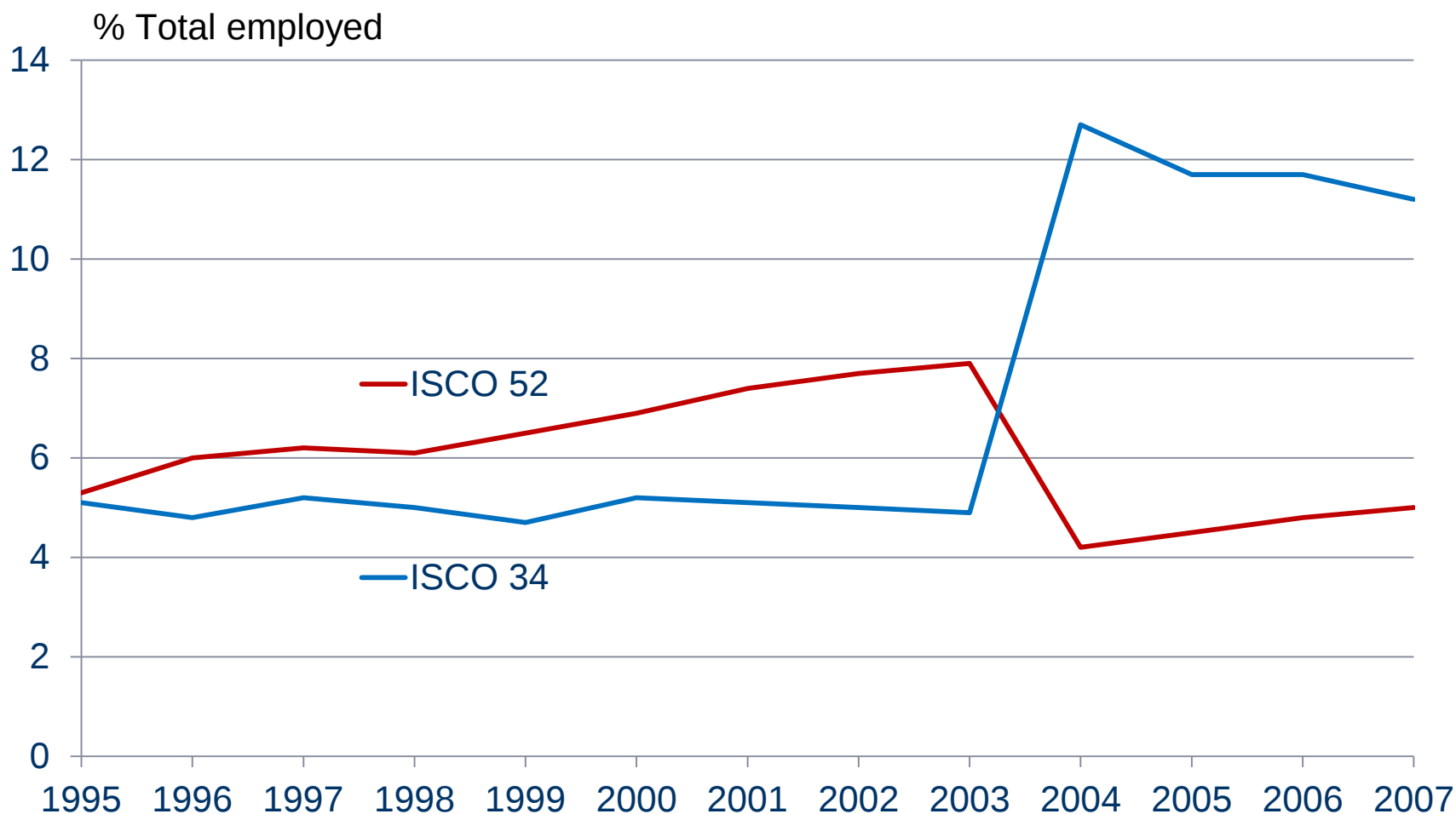
Variation reduced if those employed as Business associate professionals (ISCO 341) who do similar job taken into account but still wide



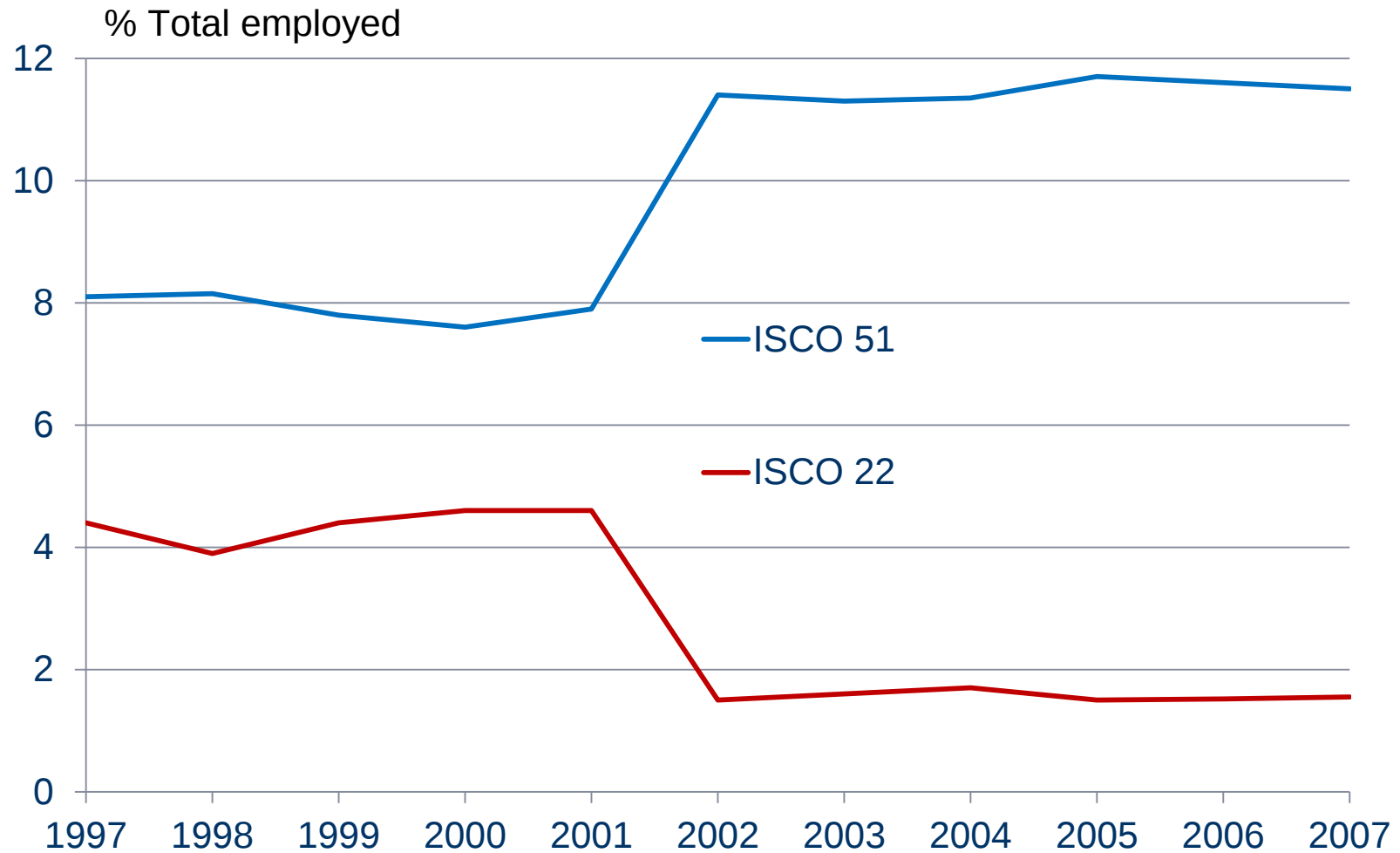
Data issues - Occupations (Cont)

- Differences make for difficulties in interpreting observed changes in employment, whether over short or longer-term
- Observed changes, therefore, affected not only by changes in survey methods or sampling problems but also by countries reconsidering how jobs should be classified
- Reconsideration can be prompted as well by gradual changes in nature of job (e.g. tasks becoming higher level or involving more responsibility)
- Both can result in sudden shifts in employment between occupations
- For example ...

Shift to ISCO 34 (Business associate professionals) from ISCO 52 (Sales workers) and other categories in Austria in 2004



Shift of nurses to ISCO 51 (Personal and related service workers) from ISCO 22 (Health professionals) in Finland in 2001

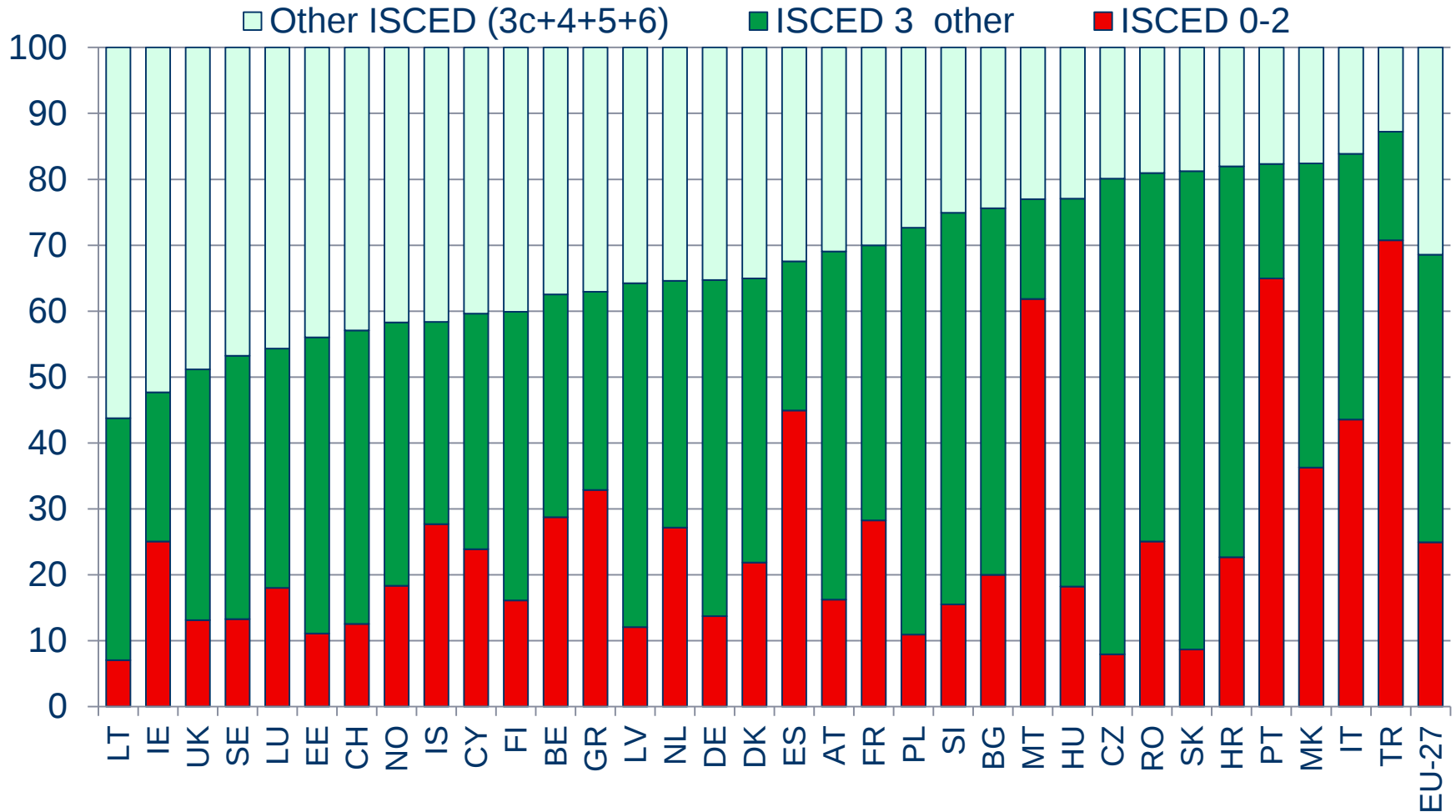


Data issues - Education levels

- This makes for difficulty in both modelling occupational shifts and interpreting the changes observed – as well as in building a coherent database for analysing such changes
- Problems also arise in assessing the educational or skill needs associated with a given change in employment by occupation
- As well as in identifying the education levels of the workers laid off or taken on
- In particular:
 1. Extent of breakdown of education levels very limited – makes it hard to judge education or training requirements of changes in any detail
 2. Education levels associated with particular occupations vary markedly across countries, in some cases reflecting equally marked differences in education levels of available labour supply
- These illustrated by following sequence of charts ...

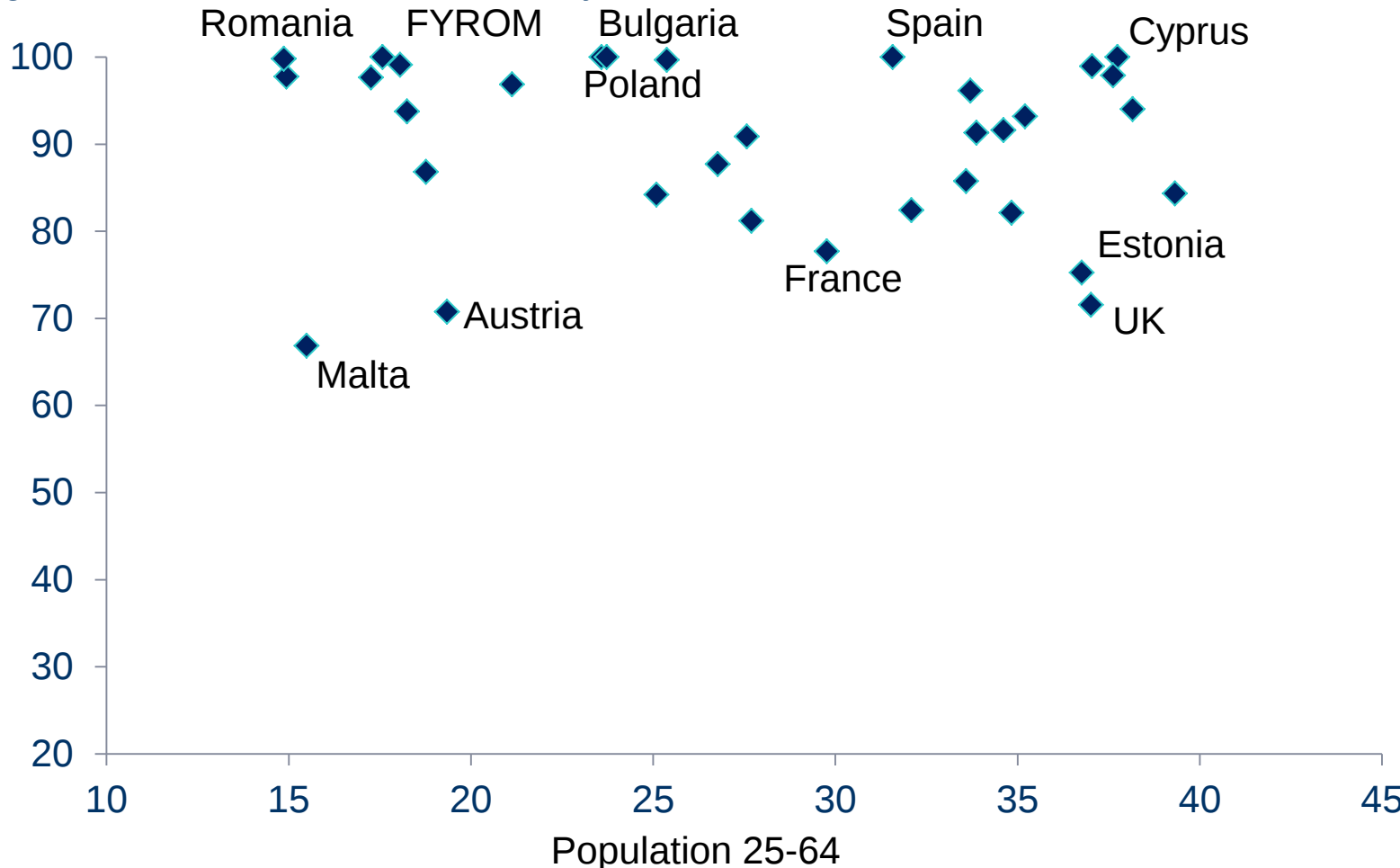
In most countries, most people aged 25-64 with education beyond basic schooling (ISCED 0-2) have ISCED level 3 – covering VT qualifications. LFS gives no breakdown of this. Can breakdown 'Others' but numbers limited

% Total aged 25-64



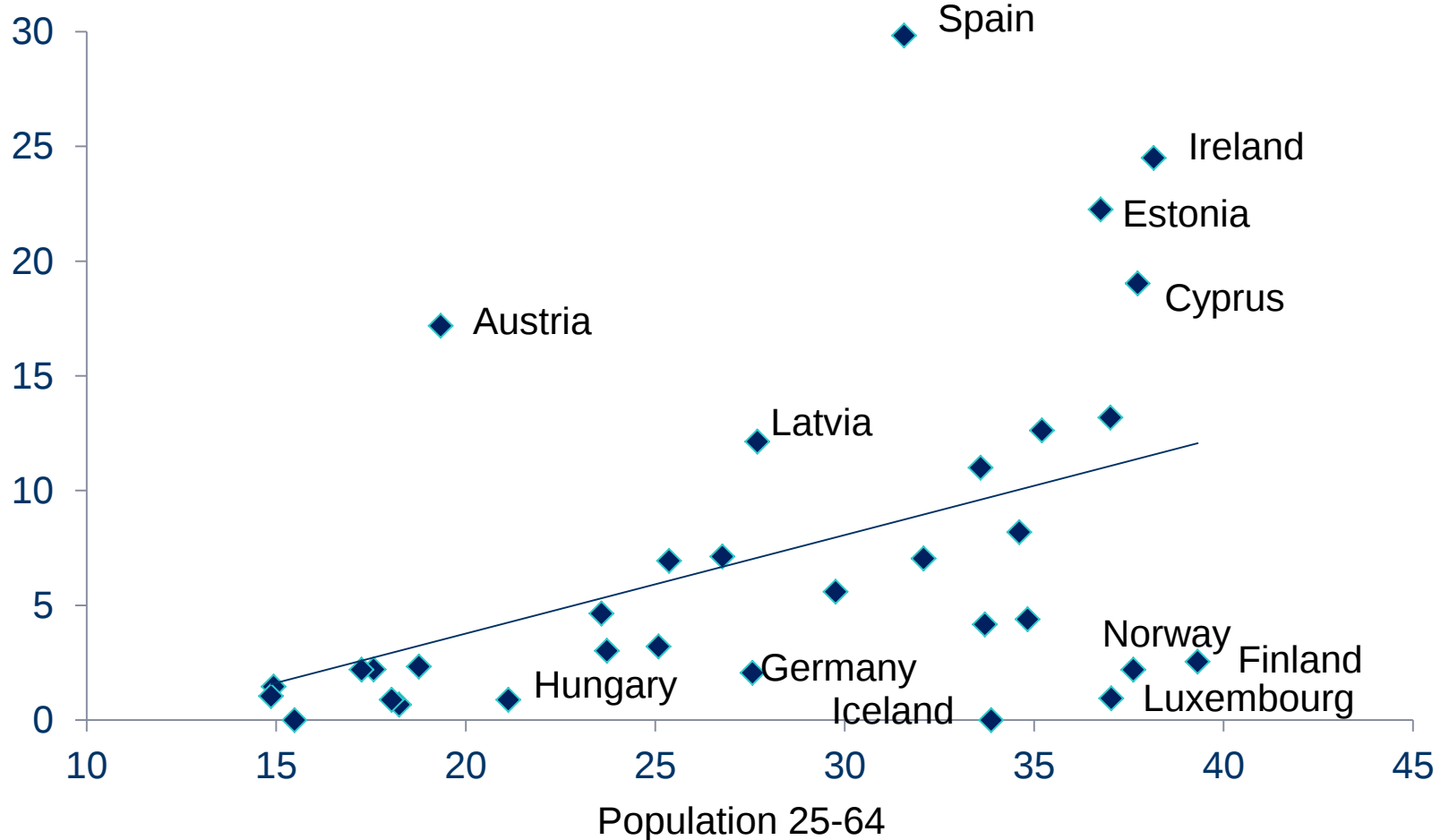
% with Tertiary education among Engineers and related professionals (ISCO 214) and % population aged 25-64 with Tertiary education – in all countries bar 5, above 80%. No variation with % labour supply with tertiary education

% aged 25-64 in ISCO 214 with tertiary education



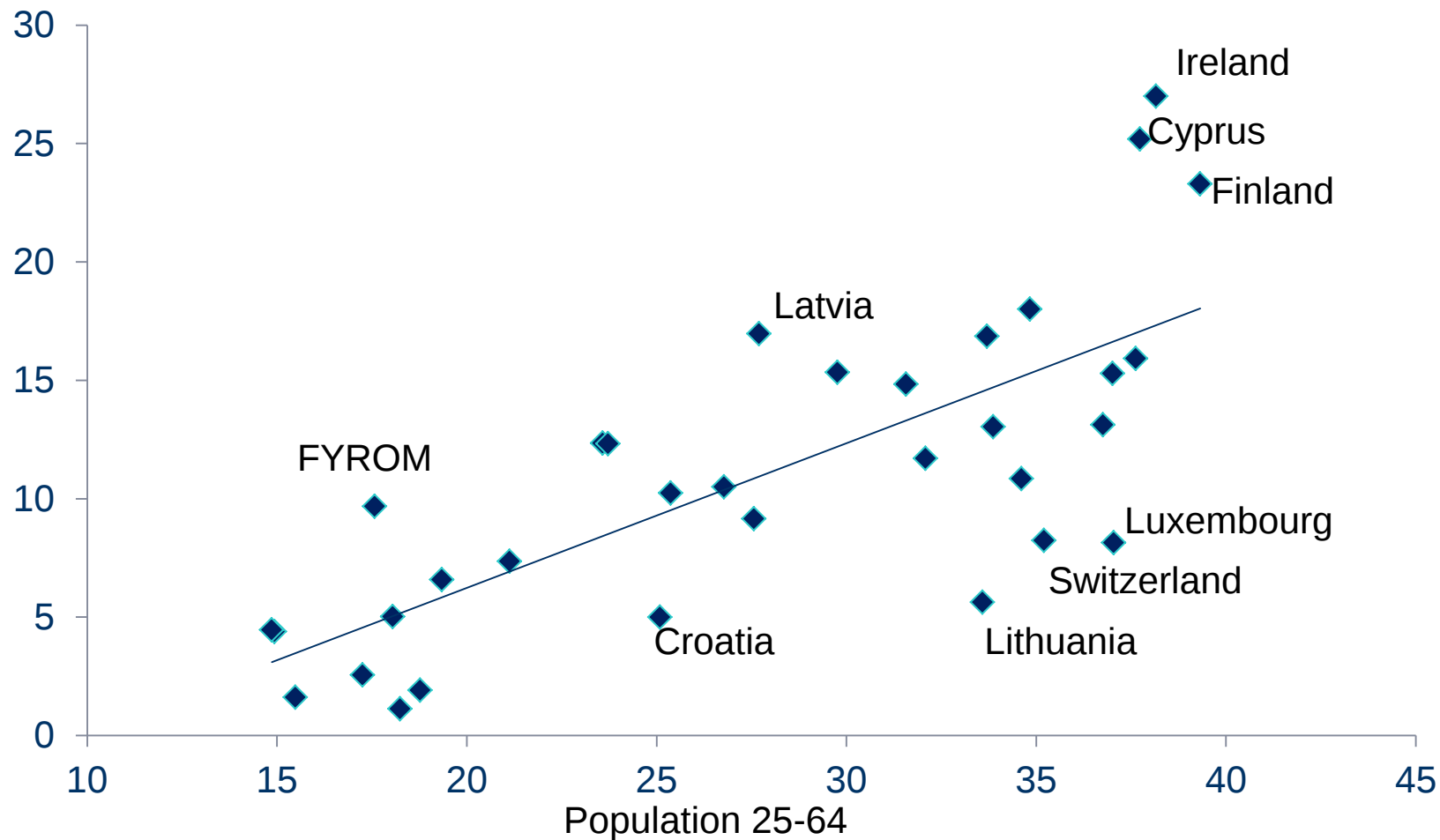
% with Tertiary education among Machinery mechanics and fitters (ISCO 723) and % population aged 25-64 with Tertiary education – some tendency for % to vary with % labour supply with tertiary education

% aged 25-64 in ISCO 723 with tertiary education



% with Tertiary education among Personal care and related workers (ISCO 513) - more tendency to vary with % labour supply with tertiary education,

% aged 25-64 in ISCO 513 with tertiary education



Data issues - Education levels by occupation

- For many occupations, education level of workers reflects education level of labour supply
- Implies that education requirements of job cannot necessarily be deduced from education level of people doing it – unless tasks involved in jobs differ between countries - unlikely
- Makes it hard to assess education needs - and implications for VET - of given increases in demand for particular occupations
- Data also indicate that education levels – and education profiles – of those employed in all but higher level occupations vary greatly
- Means that education levels of those taken on or laid off can also vary – making it harder to assess potential recruitment problems or problems of those losing their job getting a new one
- Lack of detailed data on educational levels has led to examination of possible use of field of study data to give added insight into educational requirements of different jobs

Some concluding points

- Nature of LFS data makes it hazardous to use to measure changes in employment over short-term in particular – the more so, the greater the level of detail
- Building a coherent database to analyse detailed employment changes, whether over the long or short-term is difficult – requires much time and effort to adjust data for breaks in series and ‘noise’
- Such a database, and analysis, necessary as basis for short-term forecasting – cannot assume occupational and educational structure of sectors and jobs remains unchanged, or at least need to justify assumption
- Adjusting for changes in classification systems even more difficult – some link, even if limited, can be made between NACE Rev 1 and Rev 2 sector data but not between ISCO 88 and 08 occupation data
- Linking occupations to education levels and skill needs is tricky – data require careful interpretation