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Changes in the classification of occupations: the implications for skills projections

***Skillsnet* Technical seminar**

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Nature of problem

- Model used to generate projections of skill needs links sectoral employment developments with occupational developments in sectors.
- Coherent historical dataset required to base model on
- Sector data come from national accounts, occupational data from LFS - only comparable source of employment data by occupation and characteristics of people employed - their education, age, sex – as well as by sector to make link
- National accounts data designed to be time series – efforts made to ensure consistency between years even when change in classification of sectors
- LFS data cross-sectional – designed to show situation at one point in time – very limited efforts made to make series consistent
- Applies equally to changes in classification – of sectors in 2008 from NACE Rev.1 to Rev.2 and occupations in 2011 from ISCO-88 to ISCO-08
- No backward adjustment of LFS historical data by Eurostat in either case, unlike for national accounts sector data – need for us to adjust

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Breaks in series and change in NACE classification

- Even apart from classification changes, LFS data not necessarily consistent over time – if only because of sample nature and changes in survey methods
- Data used for model projections adjusted for breaks in series - often not identified by Eurostat
- But breaks usually specific to one country and affect one variable – e.g. shift of some jobs from one sector or occupation to another
- Switch from NACE Rev.1 to Rev.2 much more far-reaching – involves wholesale change in philosophy of how to classify activities
- Some activities classified in new system combined with others in old system - main example Other business activities (NACE.74) divided into 6 new sectors
- No simple way of shifting jobs from old 2-digit sectors to new ones in a number of cases
- But in many cases, sectors remain much the same – for a large part of employment not a major problem

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Adjusting sector data for NACE switch

- But for significant part of employment, major problem of correcting for change in NACE
- Problem made easier by data being available on both old and new classifications for 2008 and 2009 for all but 5 countries (incl. Poland+ Sweden)
- By using overlapping data, possible to create series for employment to span NACE change (for 5 countries where data missing, based on similar country)
- But difficulty of creating historical series because of need to assume trends in division of employment (by occupation, education, etc.) in previously aggregated sectors apply equally to new disaggregated ones
- Assumption especially questionable for sectors included before in Other business activities very different in nature – e.g. management consultancy, security services, cleaning
- Carrying back series for more than a year or two problematic – data generated unlikely to provide reliable basis for forecasting

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Change in ISCO

- Switch from ICSO-88 to ISCO-08 poses even more testing problems
- As for NACE shift, occupations now distinguished that were not before - reflecting change in methodology, more focus on education requirements and managerial responsibilities
- Increase in ISCO 2-digit categories from 27 to 43 plus no full correspondence between two systems even at very detailed level – i.e. not possible simply to combine ISCO 3- or 4-digit occupations in a different way
- Moreover, in this case no overlapping data from LFS – data for 2010 on old basis, data for 2011 on new basis
- No information available at EU level to aid conversion – might be data for some countries but probably not for most
- Detailed comparison of LFS data for 2010 and 2011 indicates:
  - Significant shift of jobs even between ISCO 1-digit groups
  - Big differences between size of shift between countries
  - Differences in characteristics of jobs aggregated before, disaggregated now

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Shift at ISCO 1-digit level

- Main shifts to Professionals and Sales and service workers and away from Managers but net changes conceal shifts in both directions plus real changes

	% Total employed		%-point difference
	2010	2011	
Managers	8.3	6.0	-2.3
Professionals	14.6	18.0	3.4
Technicians+assoc. professionals	16.5	15.4	-1.0
Clerical support workers	10.7	9.8	-0.8
Service+sales workers	14.2	17.1	2.9
Agricultural workers	4.1	3.9	-0.2
Craft+related trades workers	13.1	12.3	-0.7
Plant+machine operators, assemblers	8.2	7.5	-0.7
Elementary occupations	9.6	9.3	-0.3

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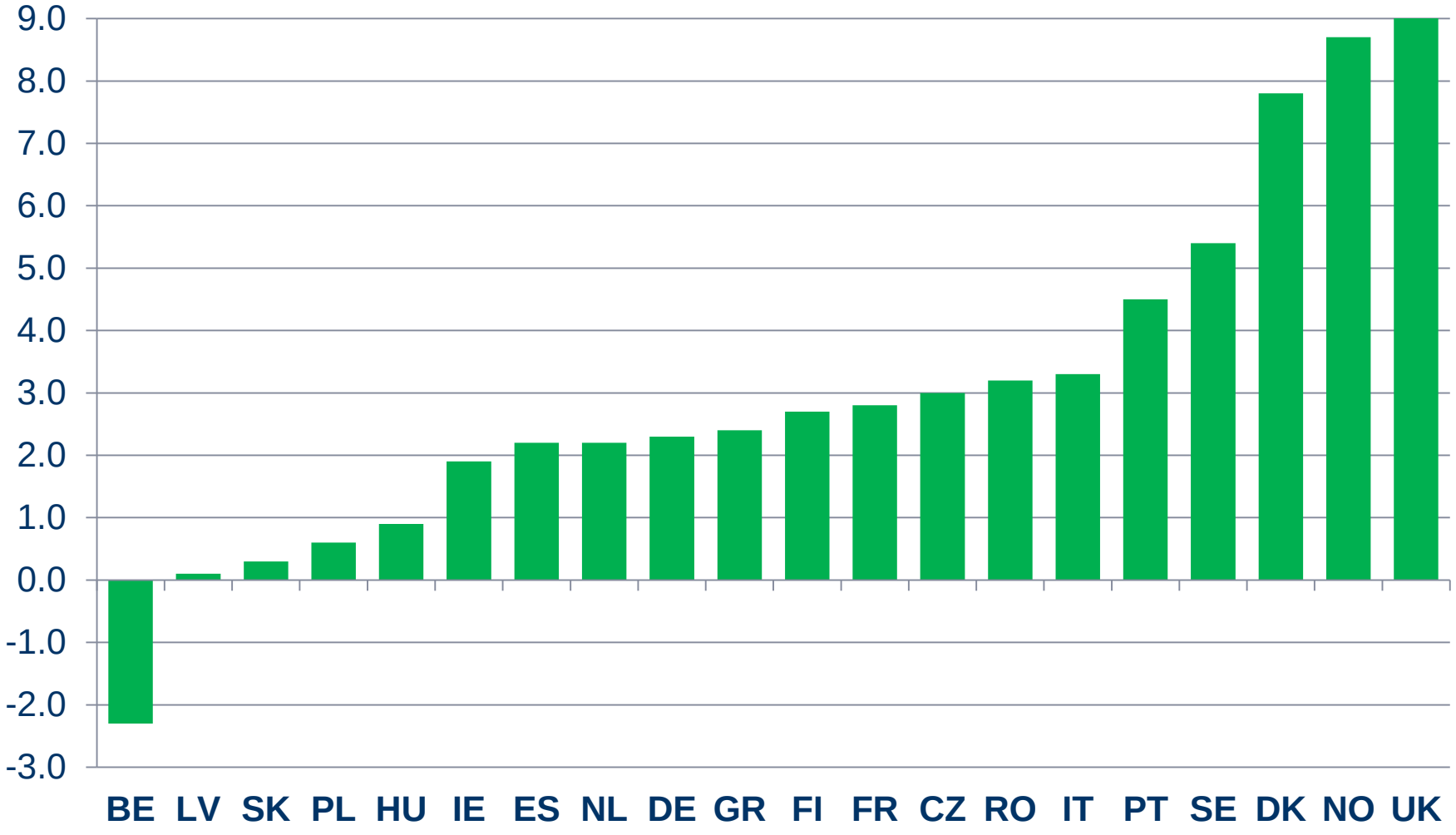
Shifts in 1-digit occupations vary markedly between countries – Professionals: %-point change 2010 (ISCO-88) to 2011 (ISCO-08)



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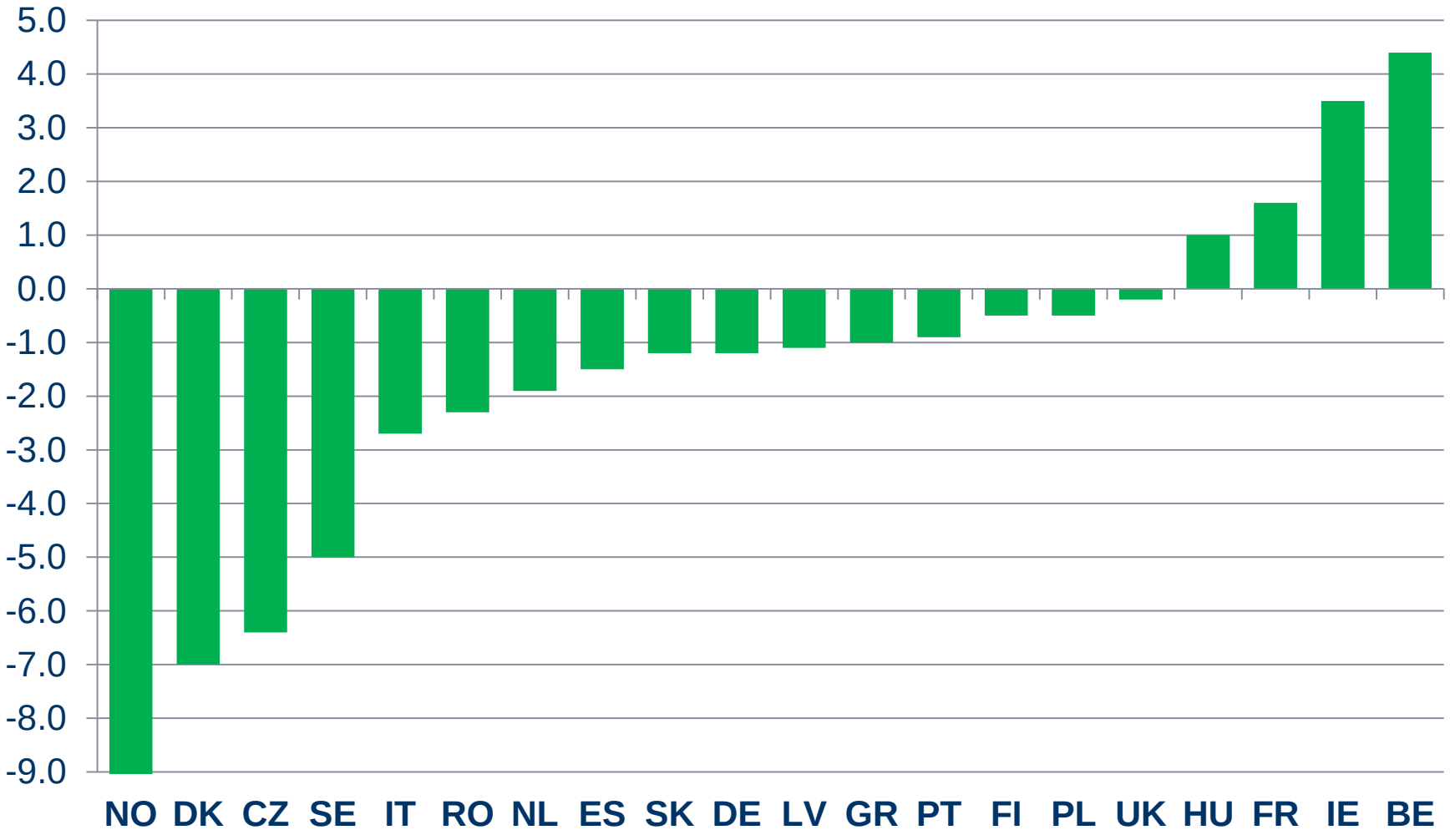
Apparent shifts vary even more for Technician and associate professionals : %-point change 2010 (ISCO-88) to 2011 (ISCO-08)



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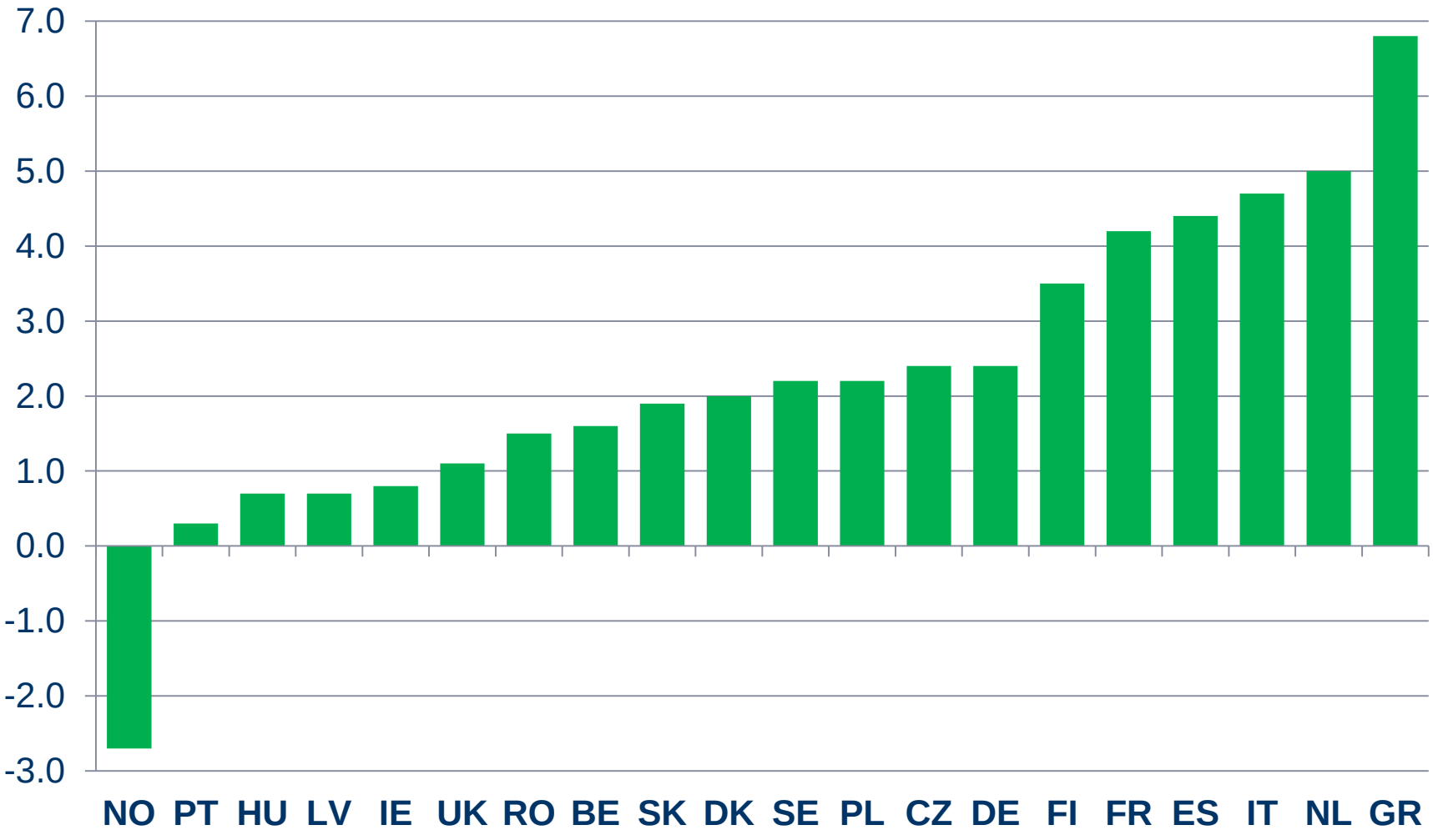
Variation in shifts seems smaller for Sales and service workers but still significant: %-point change 2010 (ISCO-88) to 2011 (ISCO-08)



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Change in composition of employment in occupations

- Variation in apparent size of shifts might stem not only from differences in relative importance of activities concerned but also from countries altering how they classify particular jobs
- Tasks involved in performing jobs change over time - change in classification system gives opportunity to classify jobs more in line with new tasks involved
- These possible changes in classification allied with shifts in jobs between occupational groups give rise to changes in composition of employment in ISCO groups in terms of sex, age and education levels
- Differences in composition between old and new systems not large in aggregate, but much bigger in individual countries
- Illustrated in case of education by comparing share of those with tertiary education employed as Professionals and Associate professionals according to ISCO-08 in 2011 with share in 2009 and 2010 according to ISCO-88 …

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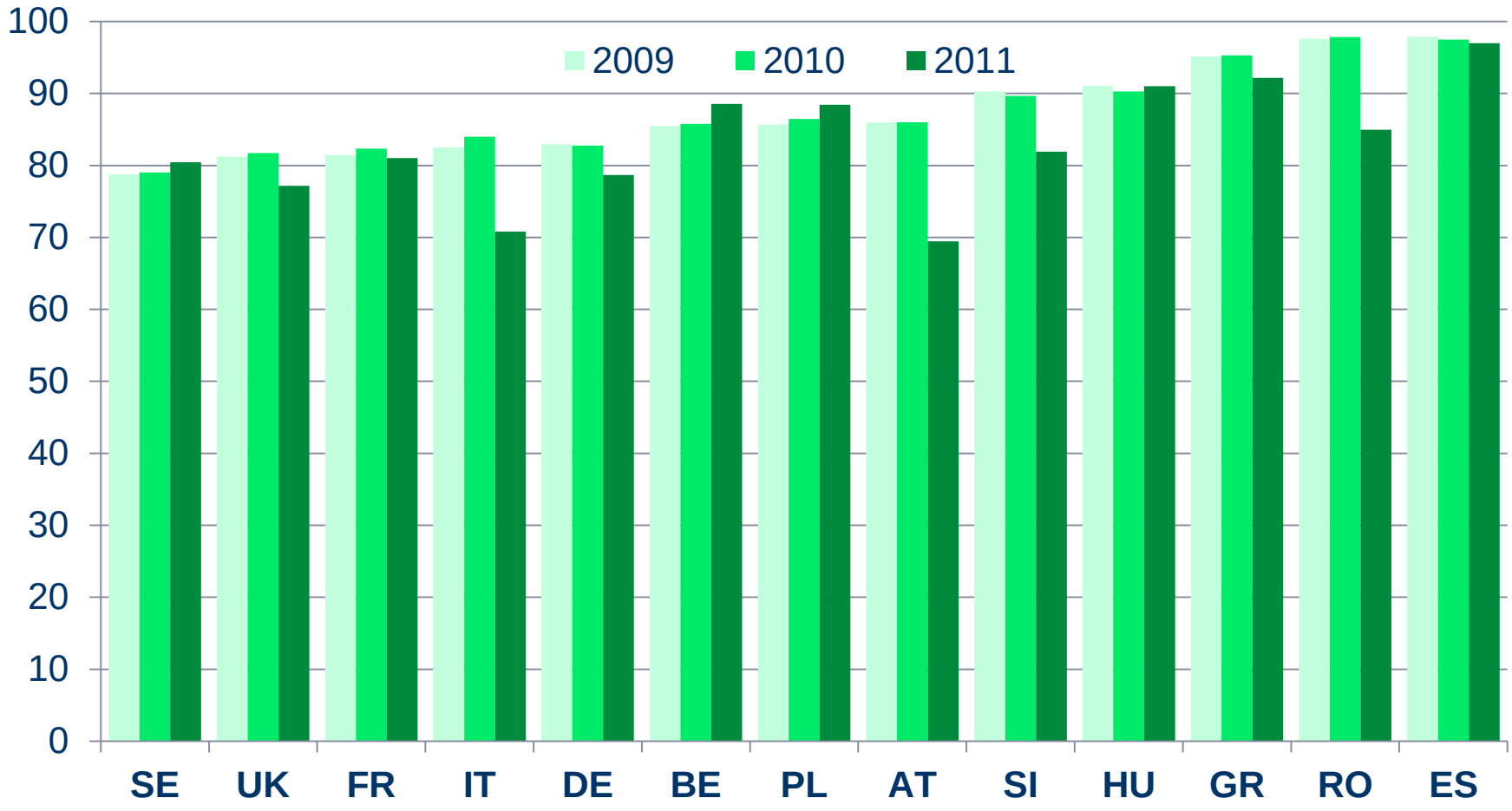
Share (%) of total employed as Professionals with tertiary education in 2009 and 2010 according to ISCO-88 and in 2011 according to ISCO-08



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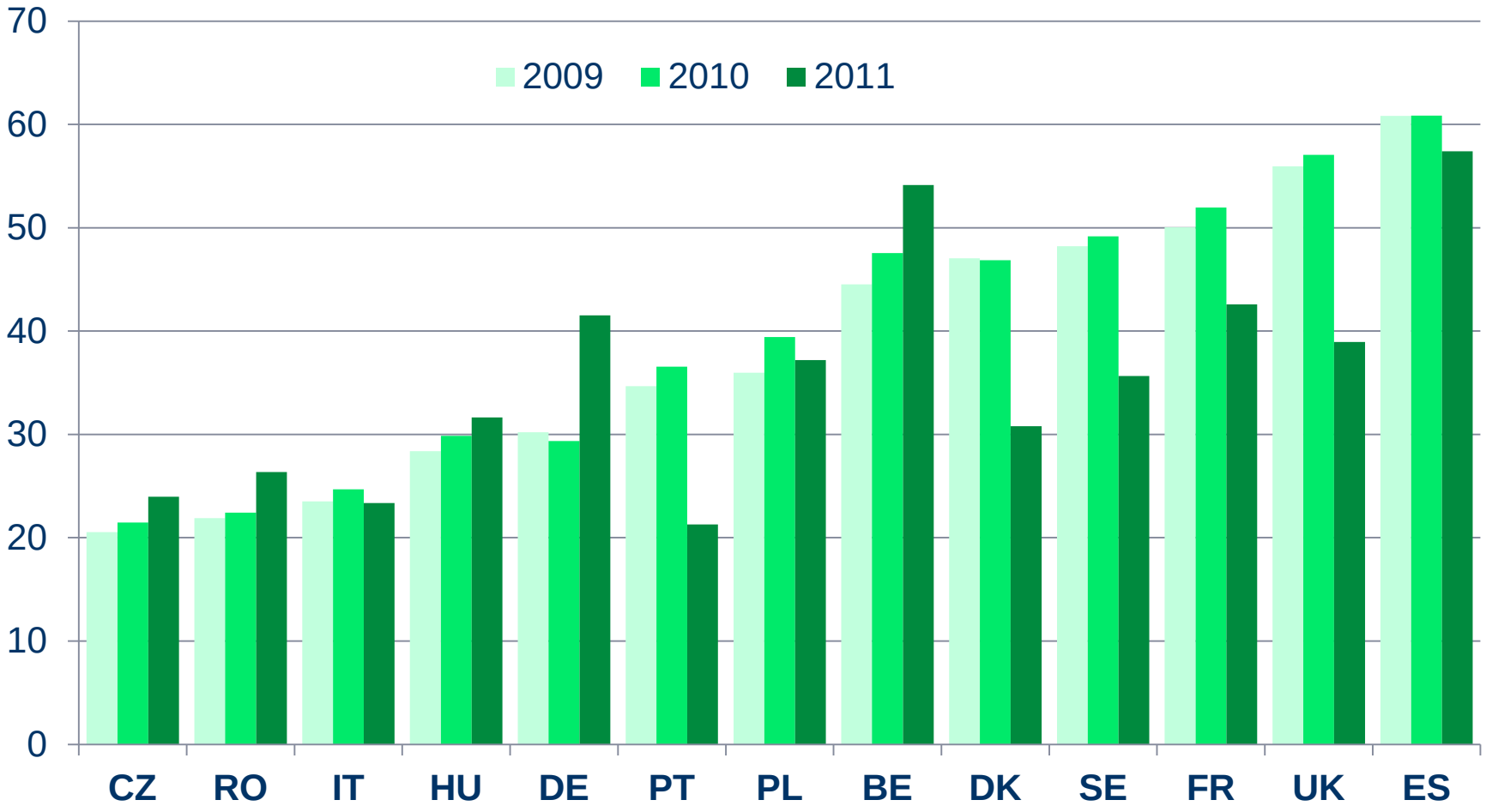
Share (%) of total employed as Associate professionals with tertiary education in 2009 and 2010 according to ISCO-88 and in 2011 according to ISCO-08



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Changes at ISCO2-digit level

- Focus so far on changes at ISCO 1-digit level but changes larger at 2-digit level at which projections are made
- Not only are many jobs classified differently, but number of ISCO 2-digit categories increased by almost 60% (27 to 43)
- Effect can be illustrated by comparing division of ISCO 1-digit categories into ISCO 2-digit occupations before and after change and associated division of employment …

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Changes to Professionals and Associated professionals

Professionals					
ISCO-88 (2010)		%	**ISCO-08 (2011)**		%
21	Physical, maths, engineering science	3.6	*21*	Science, engineering	3.0
22	Life science and health	1.9	*22*	Health	2.7
23	Teaching	4.2	*23*	Teaching	5.0
24	Other	4.8	*24*	Business+admin	3.2
			25	ICT	1.5
			26	Legal, social, cultural	2.6
Technicians and associate professionals					
ISCO-88 (2010)		%	**ISCO-08 (2011)**		%
31	Physical, engineering science	3.7	*31*	Science+engineering	3.7
32	Life science and health	2.8	*32*	Health	2.6
33	Teaching	1.3	*33*	Business+admin	6.8
34	Other	8.6	*34*	Legal, social, cultural+related	1.7
			35	ICT	0.7

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Changes to Professionals and Associated professionals

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21	Physical, maths, engineering science	3.6	*21*	Science, engineering	3.0
22	Life science and health	1.9	*22*	Health	2.7
23	**Teaching**	**4.2**	*23*	**Teaching**	**5.0**
24	Other	4.8	*24*	Business+admin	3.2
			25	ICT	1.5
	Teaching total = 5.5% in 2010		*26*	Legal, social, cultural	2.6
Technicians and associate professionals					
ISCO-88 (2010)		%	**ISCO-08 (2011)**		%
31	Physical, engineering science	3.7	*31*	Science+engineering	3.7
32	Life science and health	2.8	*32*	Health	2.6
33	**Teaching**	**1.3**	*33*	Business+admin	6.8
34	Other	8.6	*34*	Legal, social, cultural+related	1.7
			35	ICT	0.7

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Changes to Clerical support and Sales and service workers

Clerical support workers					
ISCO-88 (2010)		%	**ISCO-08 (2011)**		%
41	Office clerks	8.6	*41*	General and keyboard	3.3
42	Customer services	2.1	*42*	Customer services	2.2
			43	Numerical+ material recording	2.8
			44	Other clerical support	1.6
Sales and service workers					
ISCO-88 (2010)		%	**ISCO-08 (2011)**		%
51	Personal, protective services workers	9.1	*51*	Personal service workers	4.6
52	Models, salespersons, demonstrators	5.1	*52*	Sales workers	7.3
			53	Personal care workers	3.6
			54	Protective services workers	1.6

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			43	Numerical+ material recording	2.8
			44	Other clerical support	1.6
Sales and service workers					
ISCO-88 (2010)		**%**	**ISCO-08 (2011)**		**%**
51	**Personal, protective services**	**9.1**	*51*	Personal service workers	4.6
52	**Total sales workers**	**5.1**	***52***	**Sales workers**	**7.3**
			53	Personal care workers	3.6
			54	Protective services workers	1.6

Total 'Office clerks'= 7.7%

Total ISCO-08 51+53+54 = 9.8%

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Problems of constructing historical series on ISCO-08 basis

- Disaggregation of old ISCO-88 2-digit groups into two or more ISCO-08 groups highlights difficulty of constructing historical data on new basis
- Do we assume that three groups which now make up Personal and protective services all developed in same way as aggregate group 51 under ISCO-88 – in terms of employment, education levels, etc.?
- Or that Business and administrative professionals and Legal, social and cultural professionals both developed in same way as 'Other professionals' (group 24 under ISCO-88) they were combined in before?
- Or that ICT professionals developed in same way as Physical, maths, engineering and science professionals (group 21 under ISCO-88) they used to be part of?
- Difficulty not resolved by using more disaggregated ISCO 3-digit data (most detailed LFS data available or many countries) ….

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Electrotechnology engineers were part of ISCO 214, but so were 7 other 4-digit occupations which were larger and almost certainly developed differently

215	Electrotechnology engineers	214	Architects, engineers+related
2151	Electrical engineers	2143	Electrical engineers
2152	Electronics engineers	2144	Electronics, telecoms engineers
2153	Telecoms engineers		
		2141	Architects, town, traffic planners
		2142	Civil engineers
		2145	Mechanical engineers
		2146	Chemical engineers
		2147	Mining engineers, metallurgists+related
		2148	Cartographers, surveyors
		2149	Architects, engineers+related n.e.c.

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Concluding points

- Above demonstrates impossibility of constructing reliable historical dataset based on ISCO-08 classification given information available
- But projections need to be made and need to be based so far as possible on past developments
- Simplest option is to assume constant occupational division of employment within sectors as given by 2011 data
- But known to be wrong because evidence of changing occupational structure within sectors – of trend shift towards higher level jobs
- Trend needs to be embodied in projections – only viable way is to base trend on past development of nearest ISCO-88 group despite strong assumptions implied
- But trends assumed need to be made explicit so that they can be questioned and open to variation in alternative projections – and can be checked and if necessary modified as new data become available

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Thanks for your attention

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