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Routine and ageing? The intergenerational divide in deroutinisation of jobs in Europe

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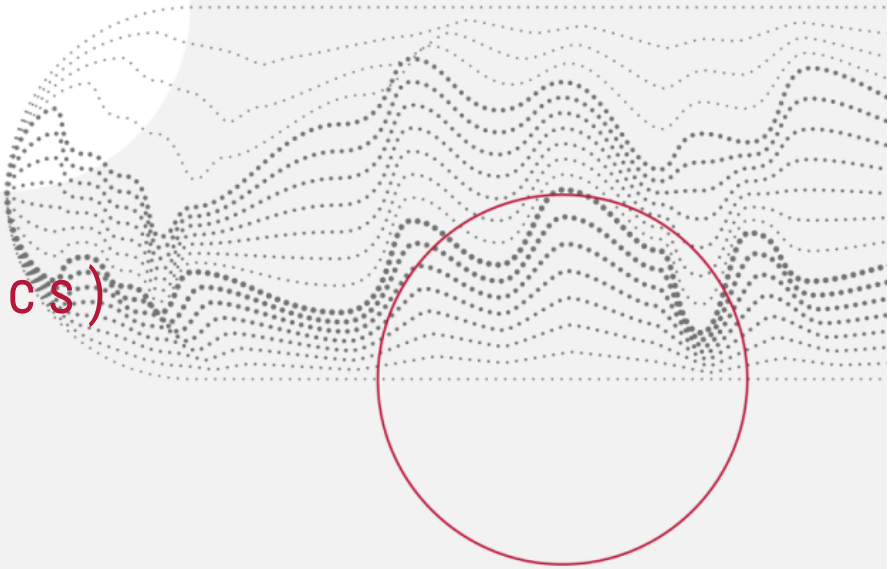

What do we know already?

- Deroutinisation = a shift away from routine and towards non-routine tasks/jobs
- Commonly found in developed countries (Autor et al. 2003, Acemoglu & Autor, 2011, Goos et al. 2010, 2014)
- Routine-replacing technical change, off-shoring, educational upgrading are believed to be driving it
- Tasks help to understand how the nature of work changes

Task is not a skill – it is a unit of work activity that produces output

Particular occupations involve various amounts of each of five tasks

Non-routine cognitive (analytical and personal)	Routine cognitive	Manual (routine and non-routine)
• Managers • IT specialists • Architects • Engineers	• Bookkeepers • Tellers • Office clerks • Salespersons	• Assemblers • Toolmakers • Drivers • Farmers

Main questions we ask

Age dimension is so far under-researched (except Autor & Dorn, 2009)

- Is there any intergenerational divide in the deroutinisation of jobs?
- Are routine occupations ageing faster?
- Do routine workers face a higher unemployment risk?
- If so, are there differences by age and over time?

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How do we measure the task content of jobs?

EU-LFS data for 12 EU countries in 1998-2015, 3-digit ISCO occupations

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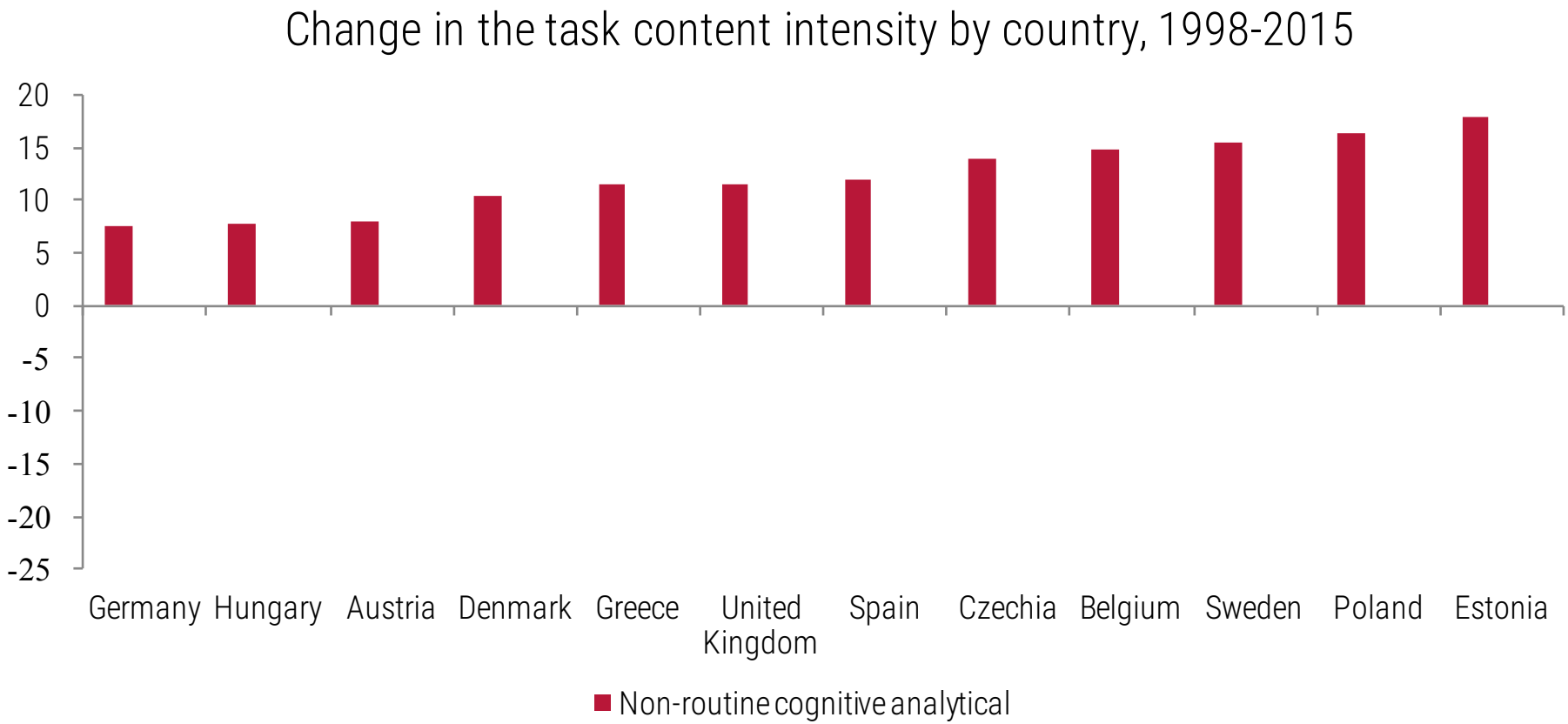
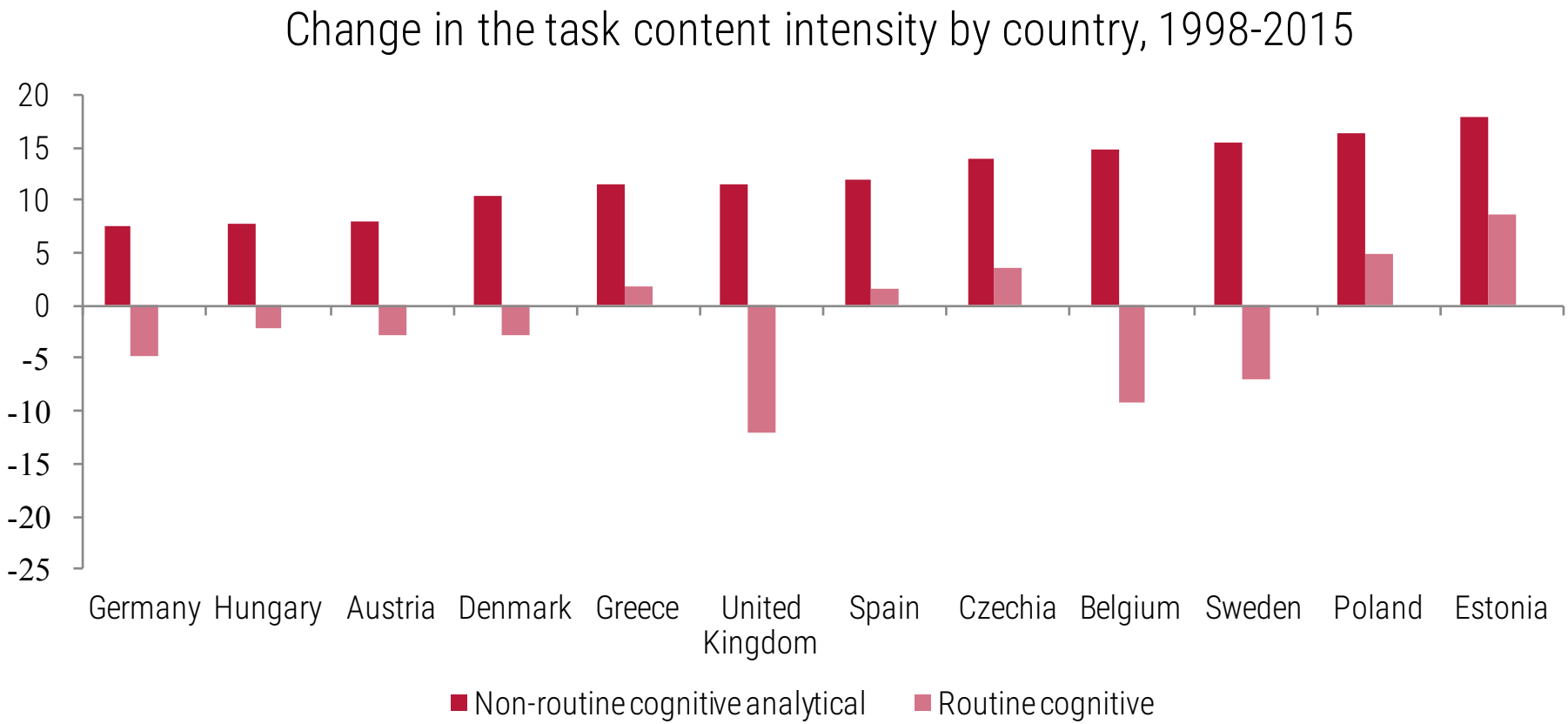
5 annual country-level task content measures (Autor & Acemoglu, 2011)

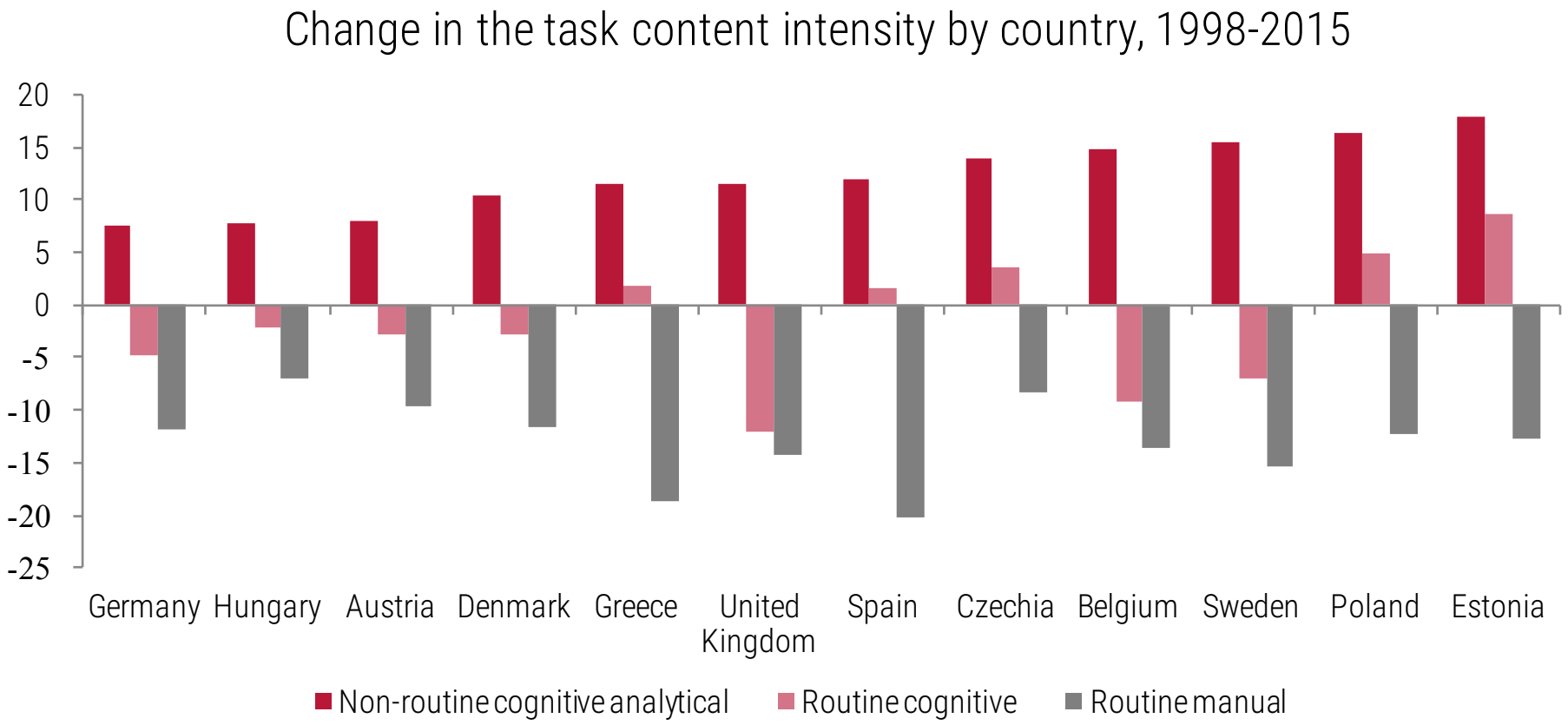
Non-routine cognitive tasks increased in all European countries



Routine cognitive tasks declined in the Western European countries but increased in several CEE countries

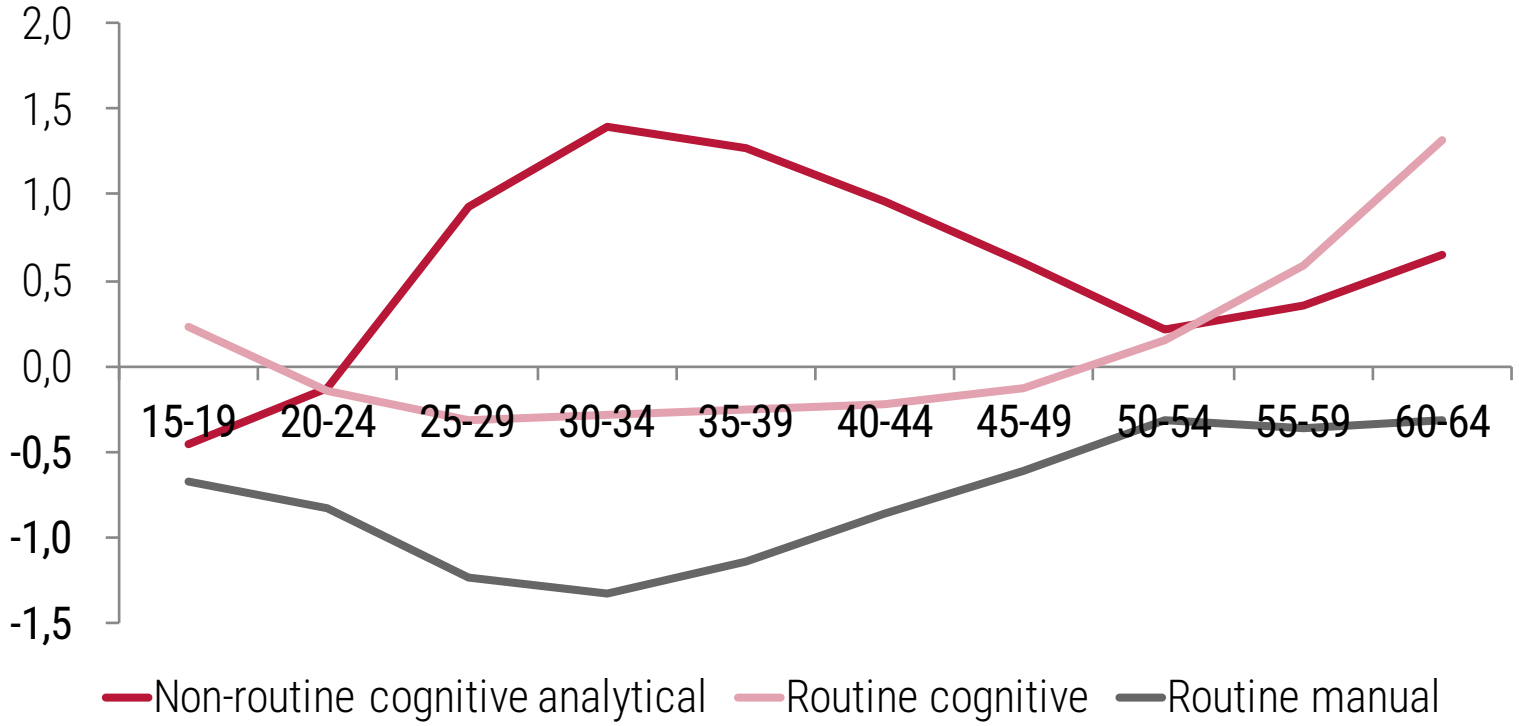


Manual tasks, especially the routine ones, shrank in all European countries



Deroutinisation was much faster among prime-age workers than among older/younger workers

Task intensity changes by age groups - panel estimates of linear time-trend coefficients, 12 EU countries in 1998-2015



From here on I will use the routine task intensity (RTI, Autor & Dorn, 2009)

- RTI ↗ with relative importance of routine tasks,
  ↘ with relative importance of non-routine tasks

$$\forall_{i \in occupations} RTI_i = \ln(RC_i + RM_i) - \ln(NRCA_i + NRCP_i)$$

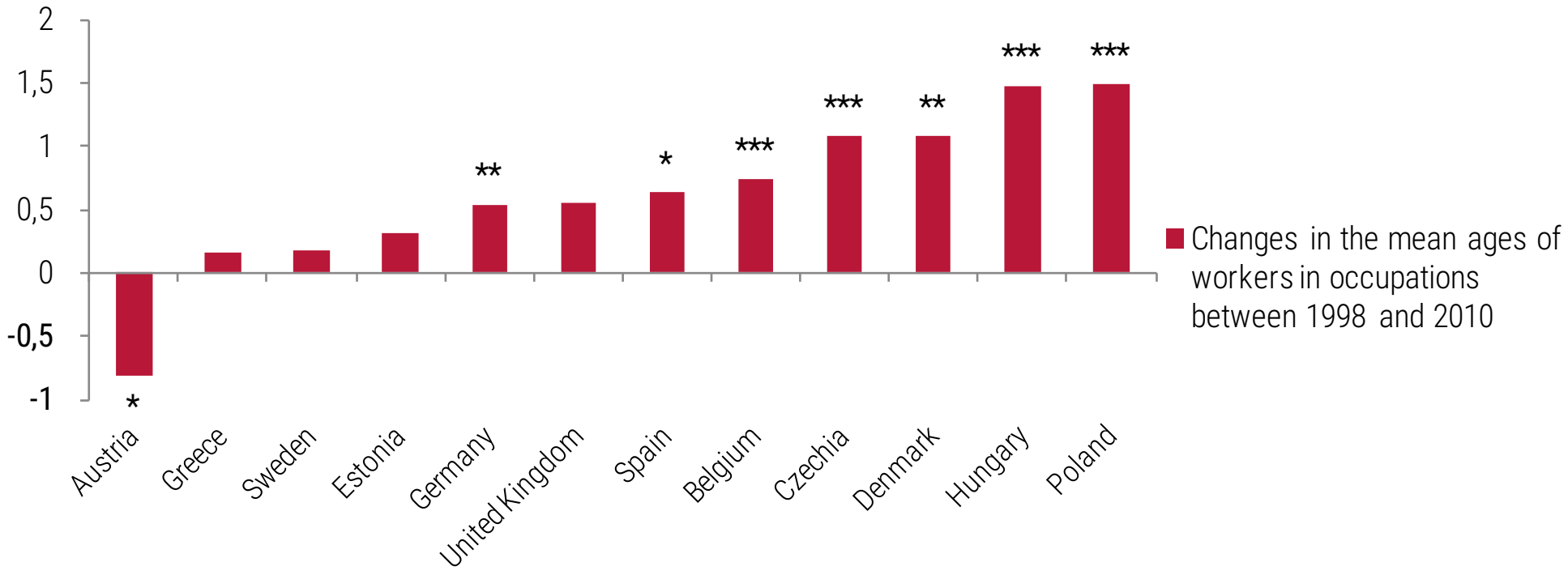
- For each country we estimate regressions of the form:

$$y_{i,c} = \beta_{0,c} + \beta_{1,c} RTI_i{}^{1998} + \beta_{2,c} \Delta occupation_i share$$

Where $y_{i,c} \in \{\Delta mean.age_{i,c}; \Delta age.group.share_{i,c}\}$

European workforce was ageing more quickly in occupations that were initially more routine-intensive

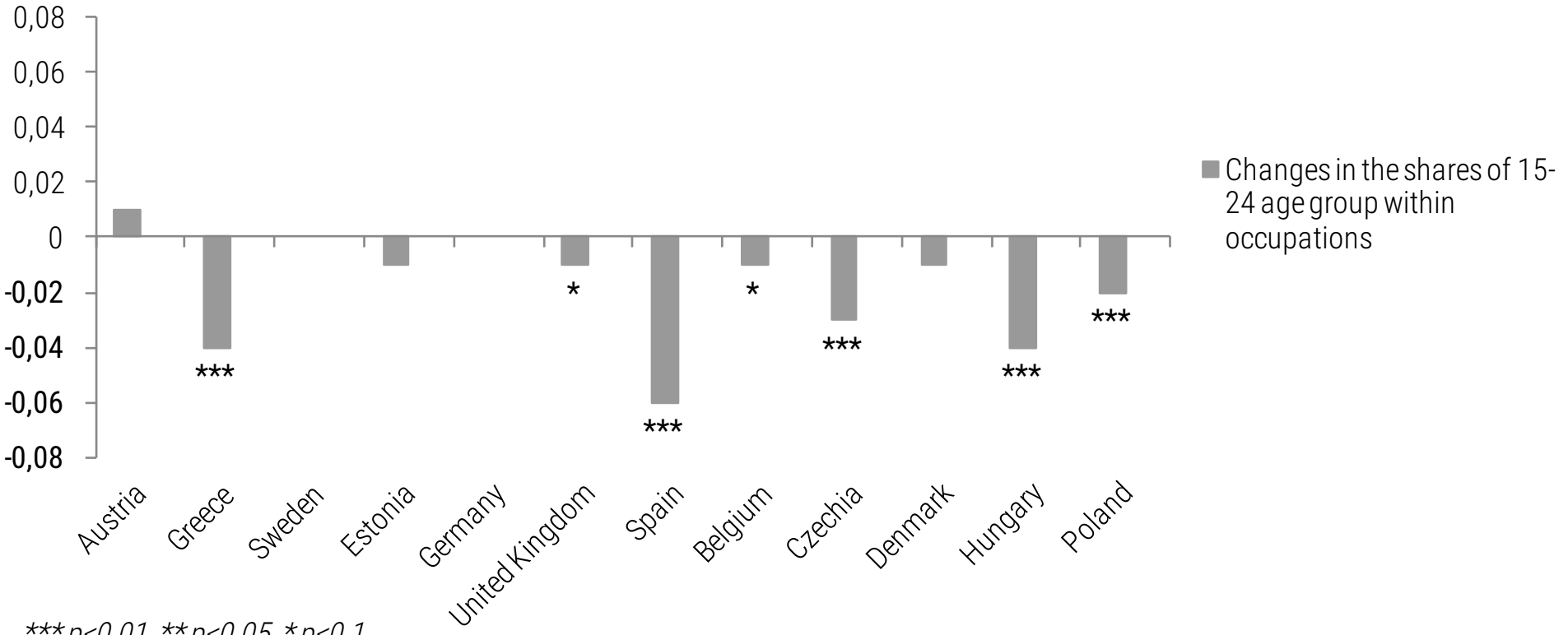
The estimated effect of the initial (1998 RTI) routine task intensity of occupations on changes in mean age by 2010



****p<0.01, **p<0.05, *p<0.1.*

As the share of young workers in the more routine-intensive occupations was declining

The estimated effect of the initial routine task intensity of occupations in 1998 on changes in age structures by 2010



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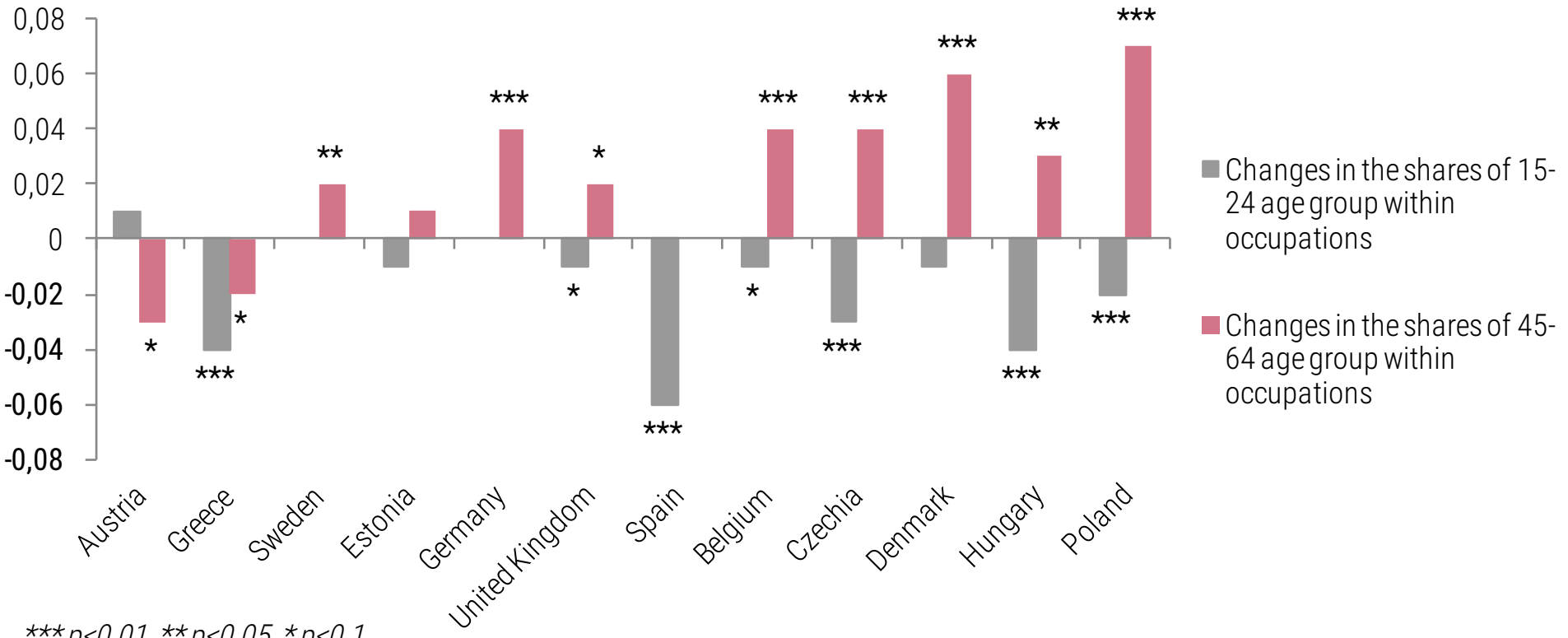
And the share of the oldest workers was increasing

The estimated effect of the initial routine task intensity of occupations in 1998 on changes in age structures by 2010



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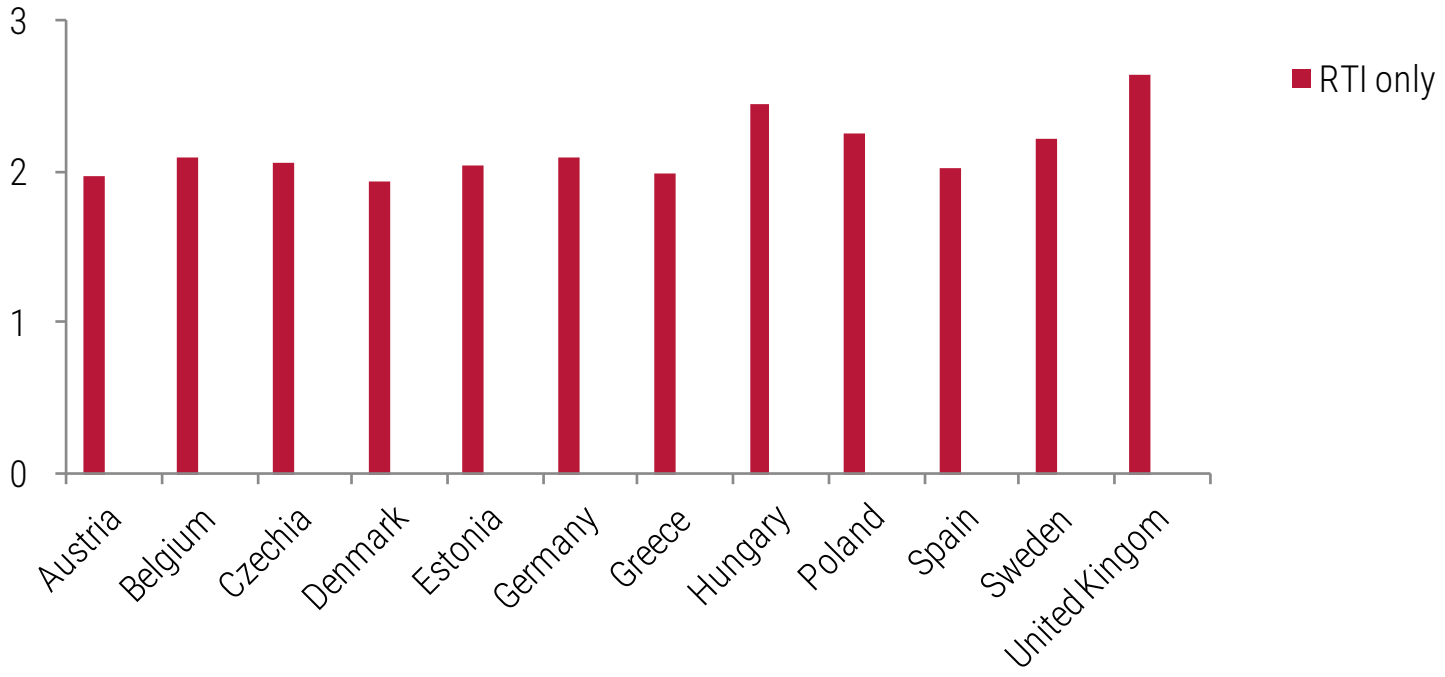
Deroutinisation may increase the risk of unemployment among routine workers

- Are the routine workers more likely to be unemployed?
- Are there differences by age and over time?
- Country-specific logit models for the probability of being unemployed (accounting for changes over time, individual, workplace and regional variables)

Higher routine intensity was associated with higher risk of unemployment

The estimated effect of the routine task intensity on unemployment risk – odds ratios from country-specific models



Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

Also when we add personal and workplace characteristics, regional controls and labour demand shocks

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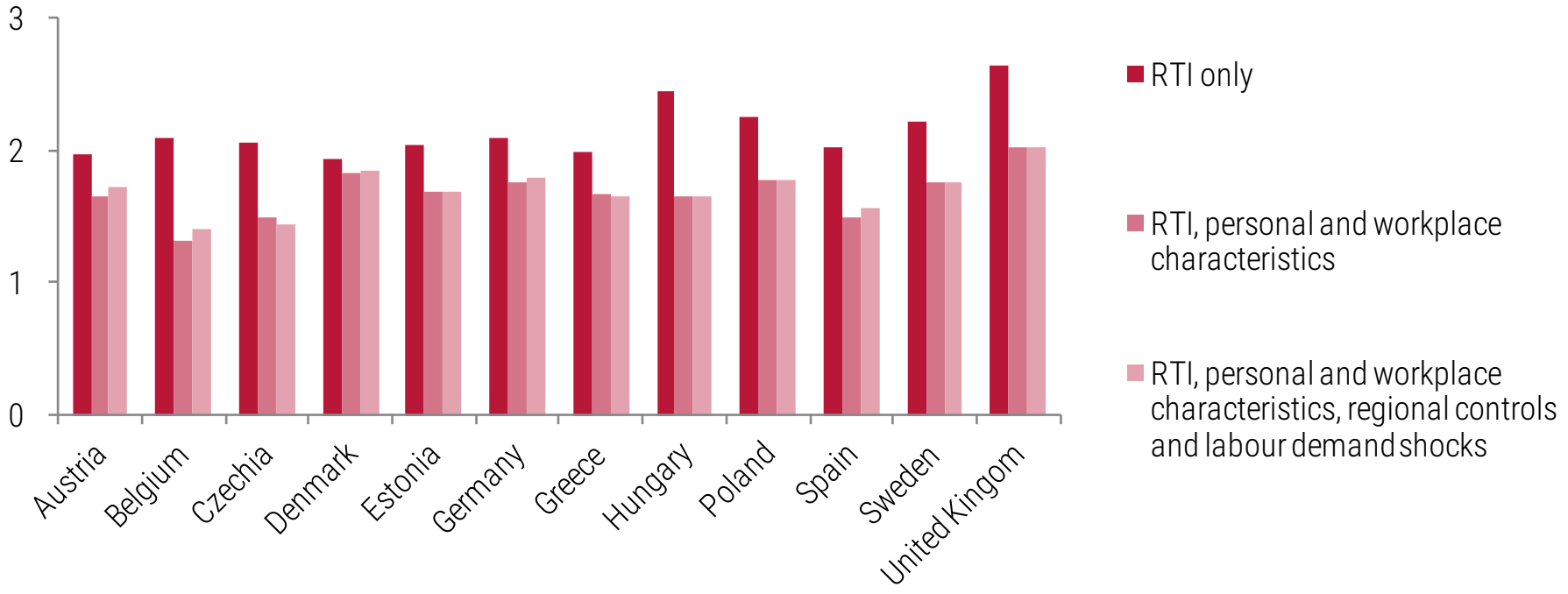
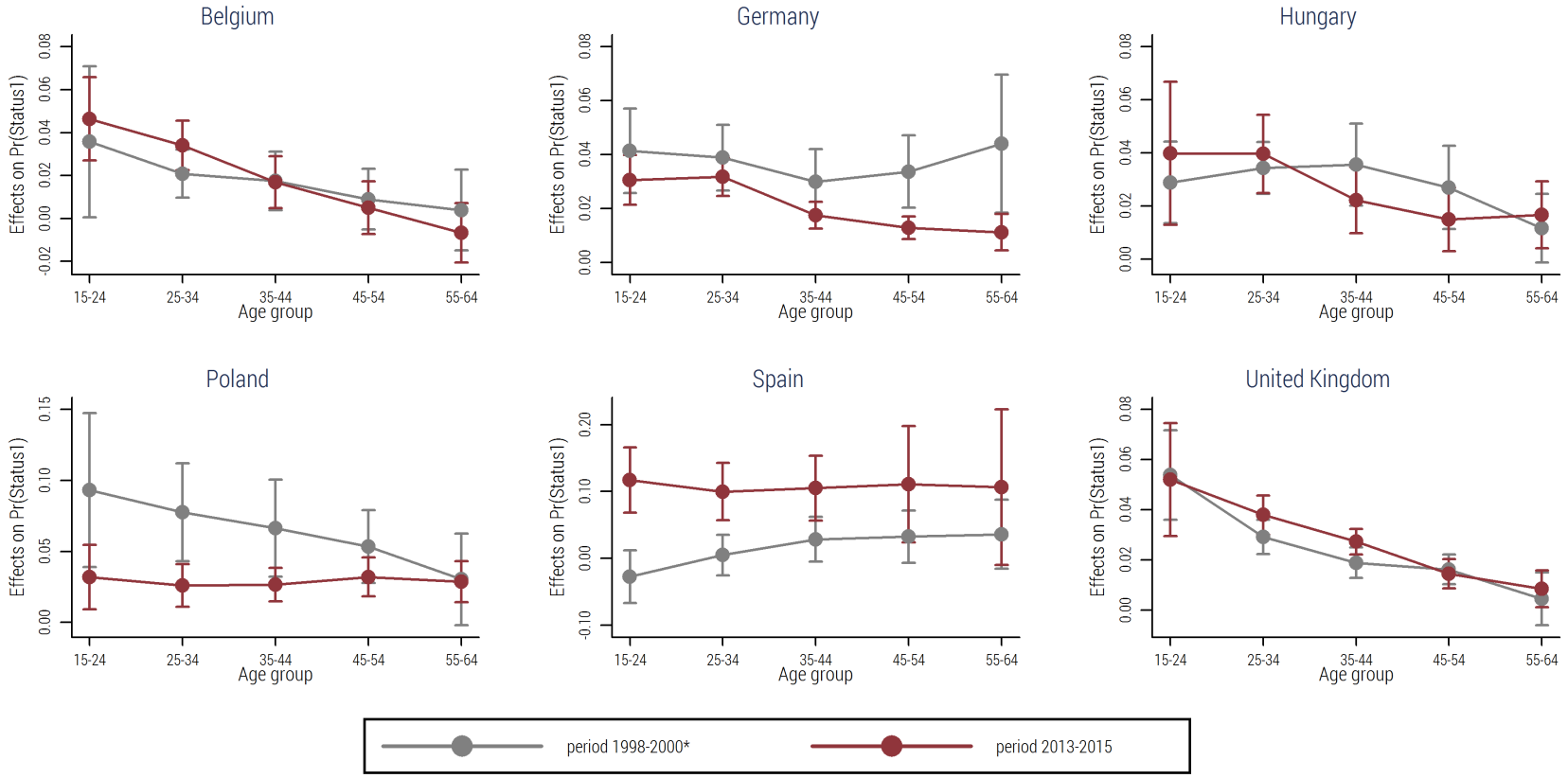


Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

In several countries, the relationship between routine task intensity and unemployment probability is declining with age

The marginal effects of the routine task intensity (RTI) on the unemployment risk, by age



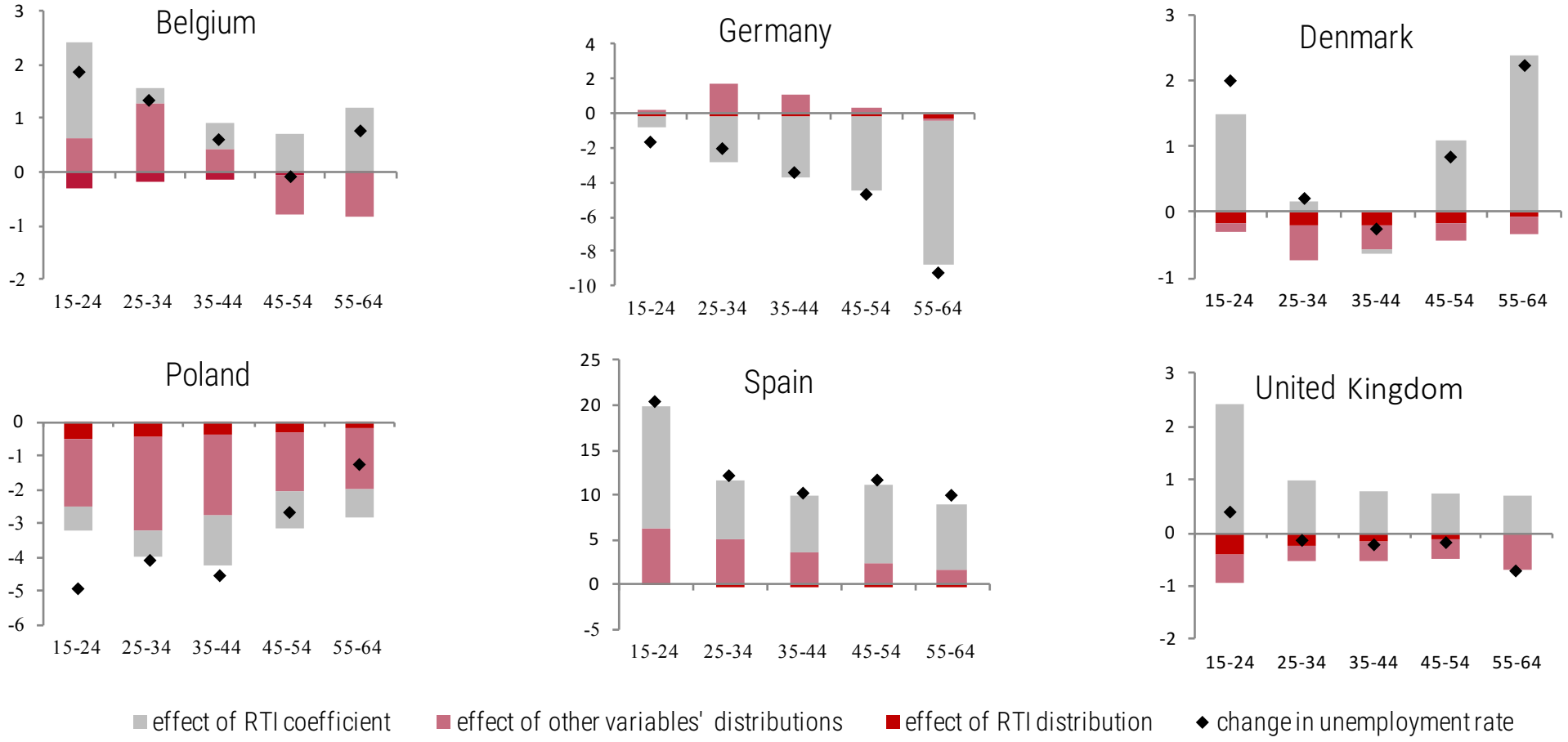
Logit regressions at individual level. Standard errors clustered at occupation level.

How much of the change in unemployment rates can be attributed to the RTI?

- We decompose the change in the predicted unemployment rate between 1998-2000 and 2013-2015 into:
  - the contribution of change in the distribution of RTI,
  - the contribution of change in the distributions of other explanatory variables,
  - the contribution of change in the coefficient expressing the effect of RTI on unemployment risk (“returns to RTI”)

The change of unemployment rates was largely attributable to changes in the coefficient of RTI and much less to changes in RTI distribution

Decompositions of the predicted changes of unemployment rates



What tasks tell us about intergenerational differences in jobs in Europe

- Widespread shift from manual to cognitive work and routine cognitive tasks decline in richer (EU15) countries
- Prime-aged groups experience this change more strongly than older and younger groups
- Routine-intensive occupations:
  - Age faster because of declining shares of youngest and increasing of oldest workers
  - Create higher unemployment risk for the young and prime-aged

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Thanks for listening

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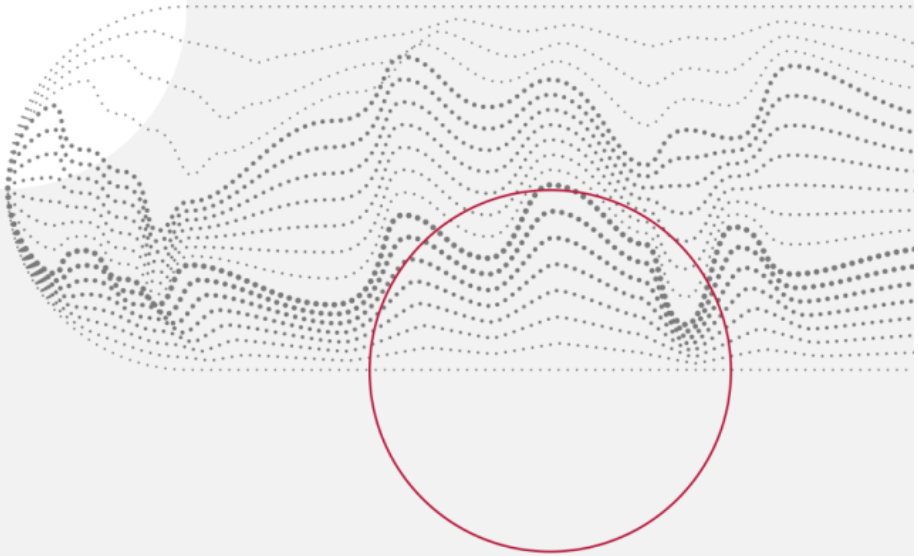
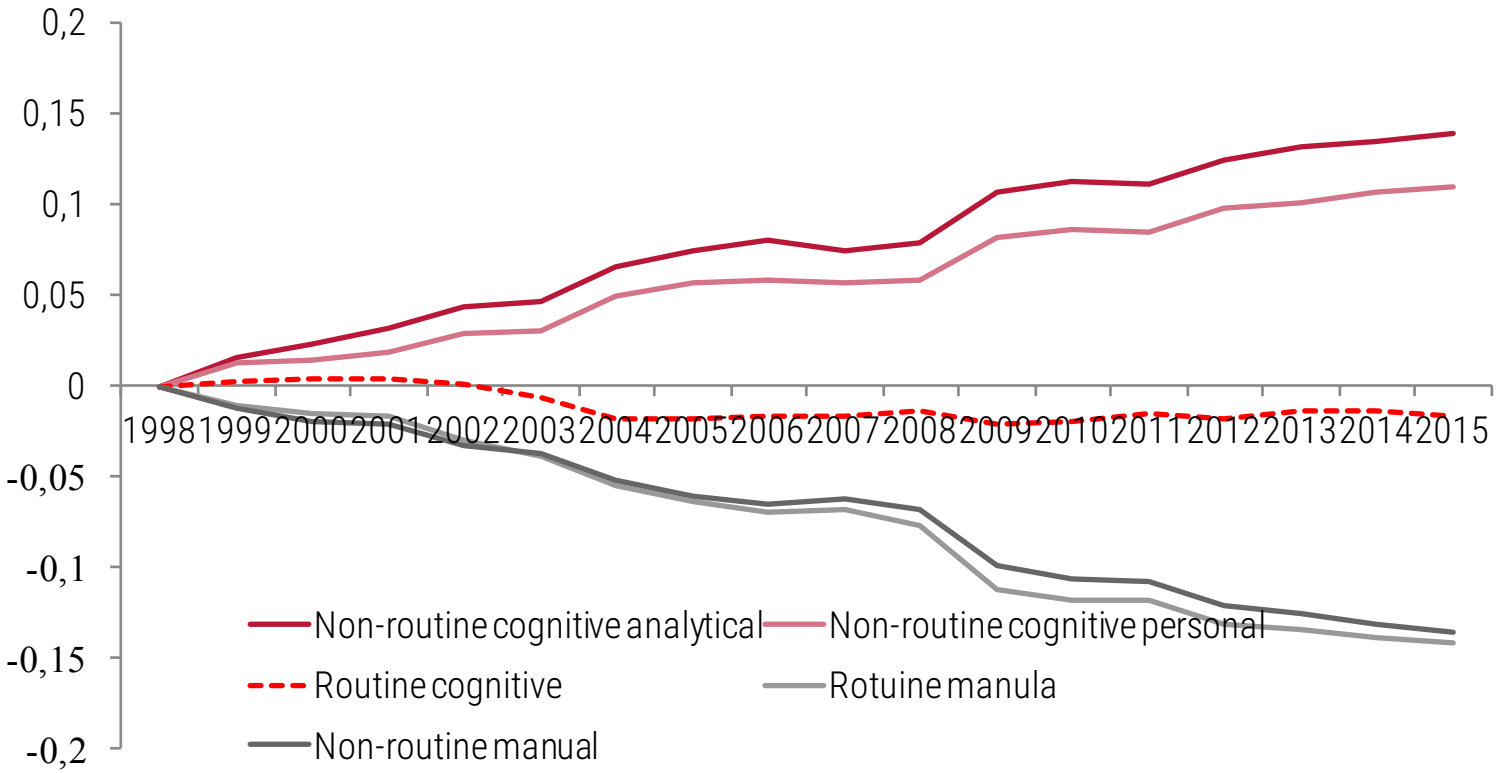


A secular shift away from manual work towards cognitive work and from routine tasks towards non-routine tasks

Task content intensities in the EU (average for 12countries), 1998-2015



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Is it correct to apply O*NET to European countries?

- Handel (2012) – US occupation-based and non-US skill survey-based measures lead to very similar outcomes for European countries

- Cedefop (2013) – high correlation between country-specific surveys tasks measures (for Czech Rep. and Italy) and O*NET scores

- O*NET likely to underestimate routine task content