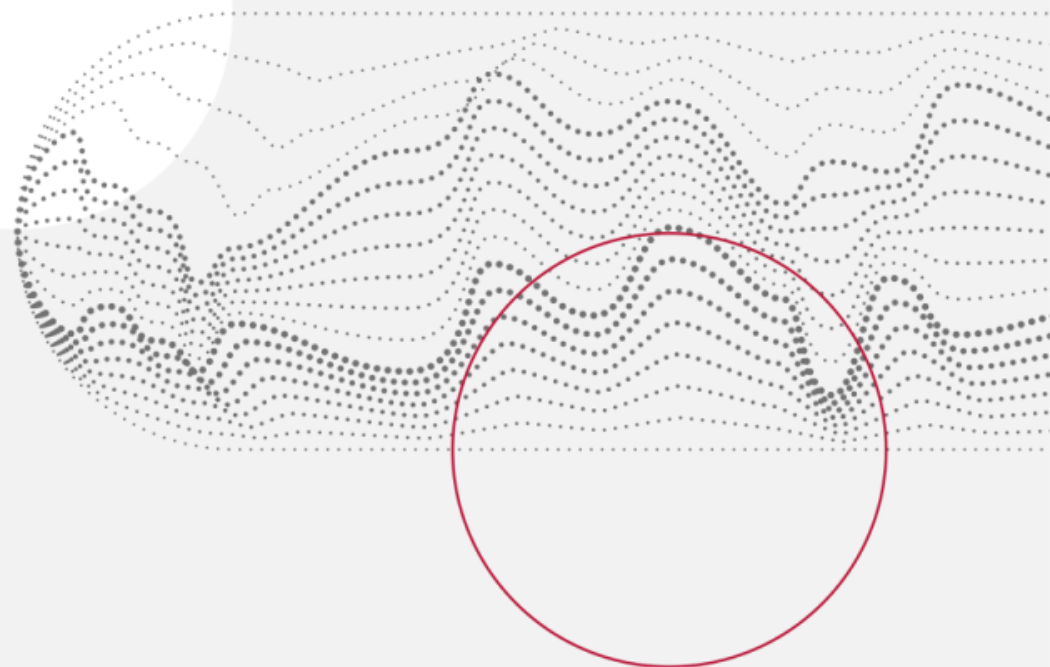# Routine and ageing?
The intergenerational divide
in deroutinisation
of jobs in Europe

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What do we know already?

- Deroutinisation = shift from routine to non-routine jobs/tasks

- Deroutinisation was found in many empirical studies (Autor et al. 2003, Goos et al. 2010, Acemoglu & Autor, 2011)

- Routine-biased technical change and off-shoring 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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O*NET data – editions
2003 and 2014

How do we measure the task content of jobs?

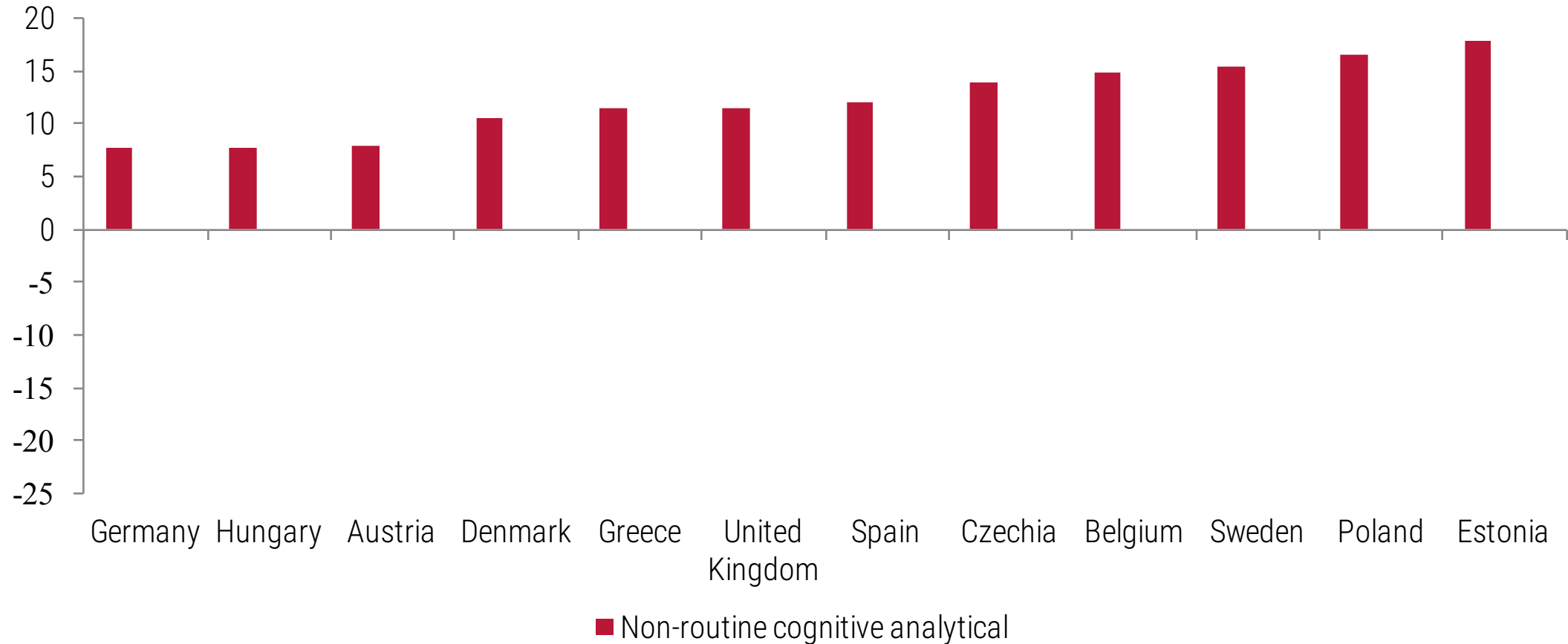EU-LFS data for 12 EU countries in 1998-2015, 3-digit ISCO occupations

O*NET data – editions 2003 and 2014

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

# Non-routine cognitive tasks increased in all European countries

Change in the task content intensity by country, 1998-2015

■ Non-routine cognitive analytical

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

Change in the task content intensity by country, 1998-2015

Legend: ■ Non-routine cognitive analytical ■ Routine cognitive
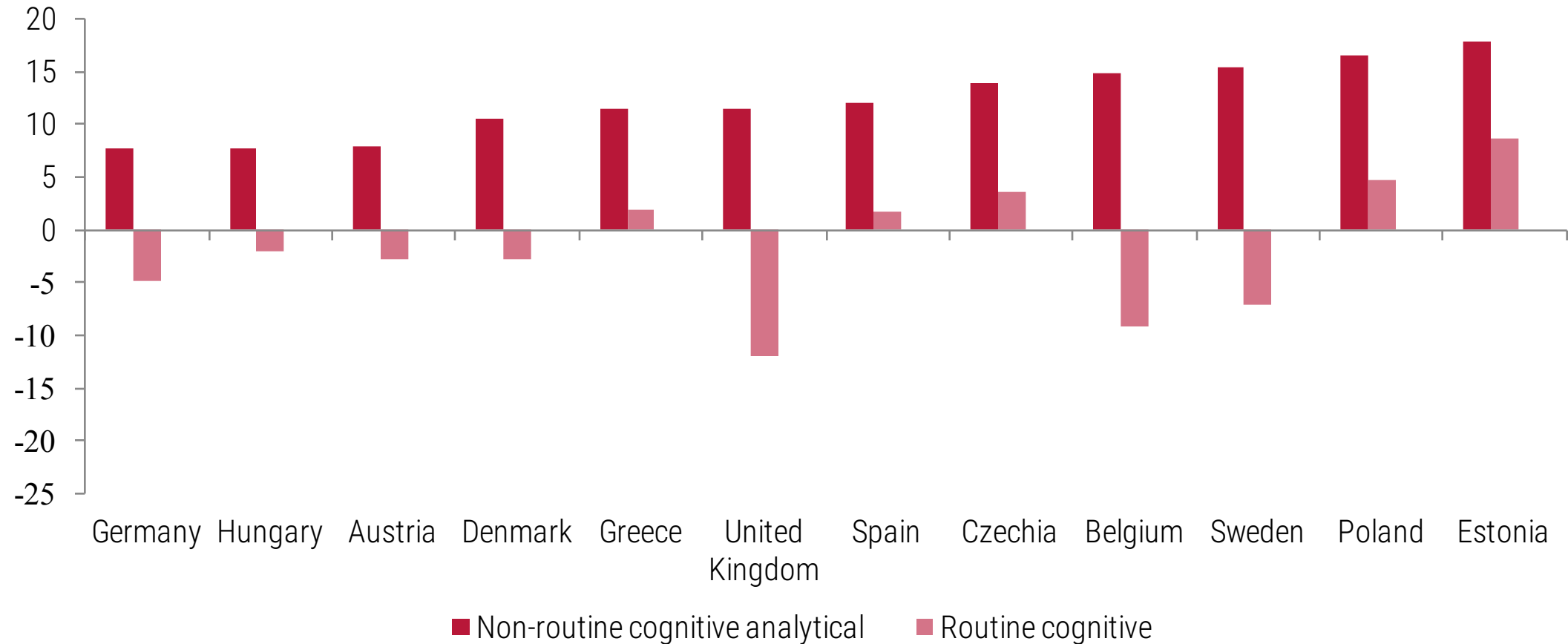
Manual tasks, especially routine ones, shrank in all European countries

Change in the task content intensity by country, 1998-2015

Legend: ■ Non-routine cognitive analytical ■ Routine cognitive ■ Routine manual
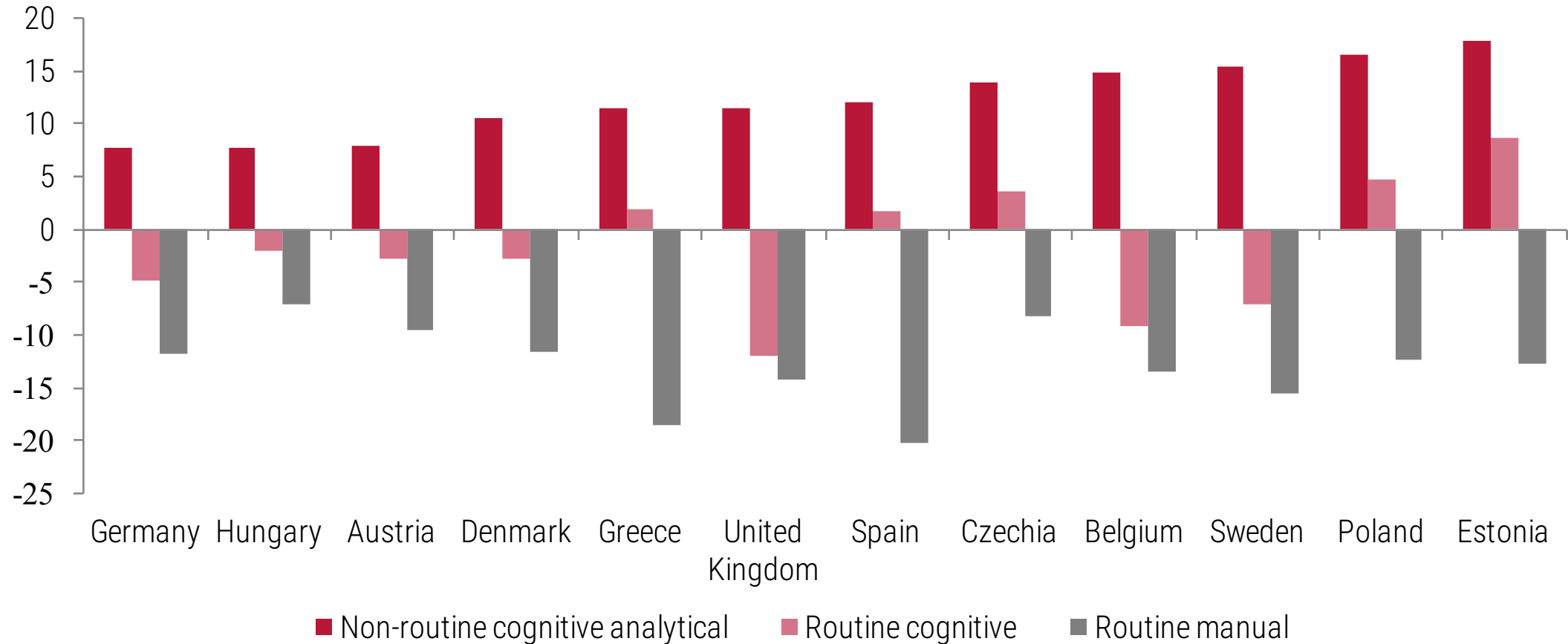
Deroutinisation occurred much faster among prime-age workers than among older/younger workers

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

Legend: Non-routine cognitive analytical — Routine cognitive — Routine manual
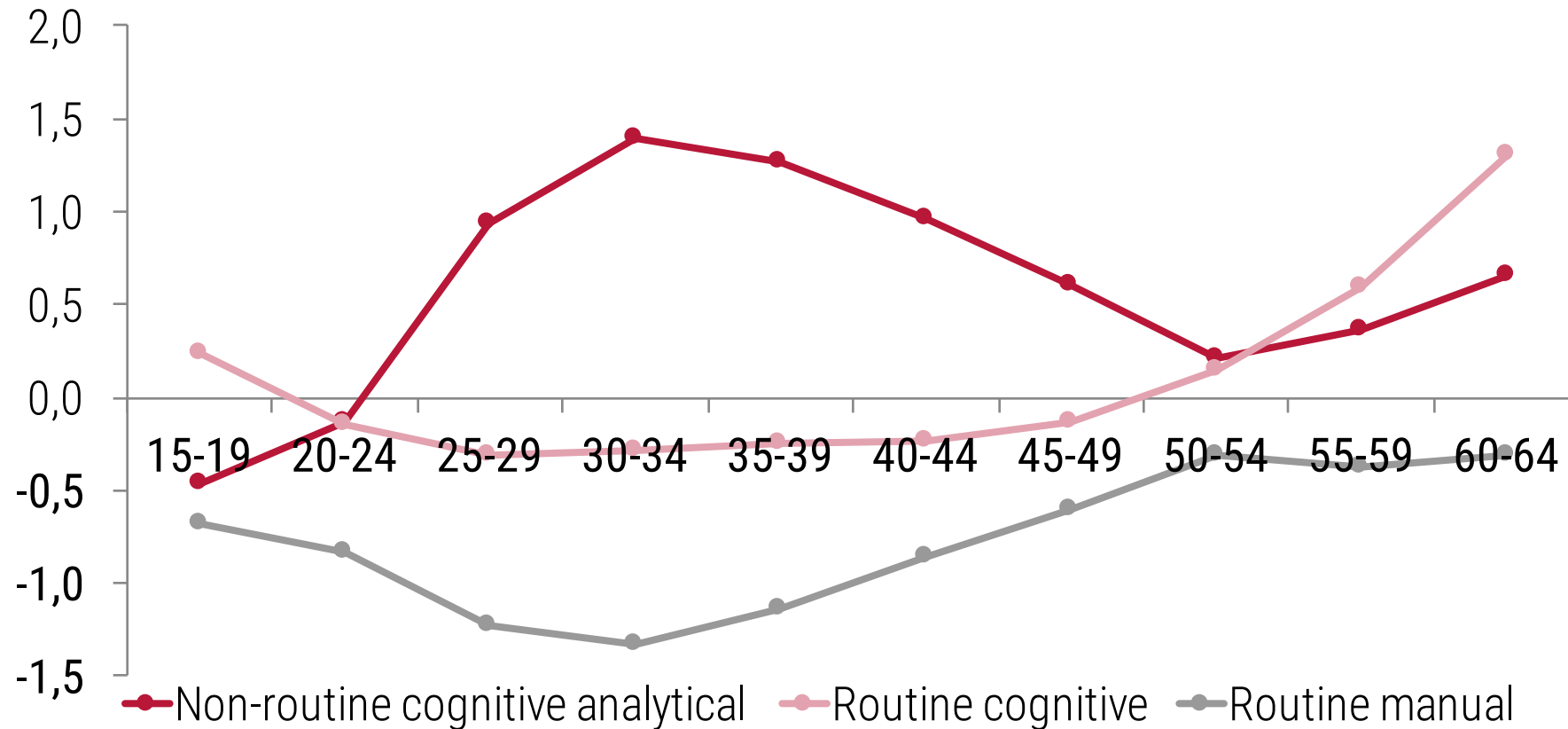
How has the age structure of routine-intensive jobs changed?

- Jobs rich in routine tasks are often rich in non-routine ones too
  so let's have a synthetic measure

- Autor & Dorn (2009) – index of routine-task intensity (RTI)

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

$$\forall_{i \in occupations} RTI_i = \ln(RC + RM) - \ln(NRCA + NRCP)$$

- RTI based on 1998 country-specific task structures, ≈100 occupations per country

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

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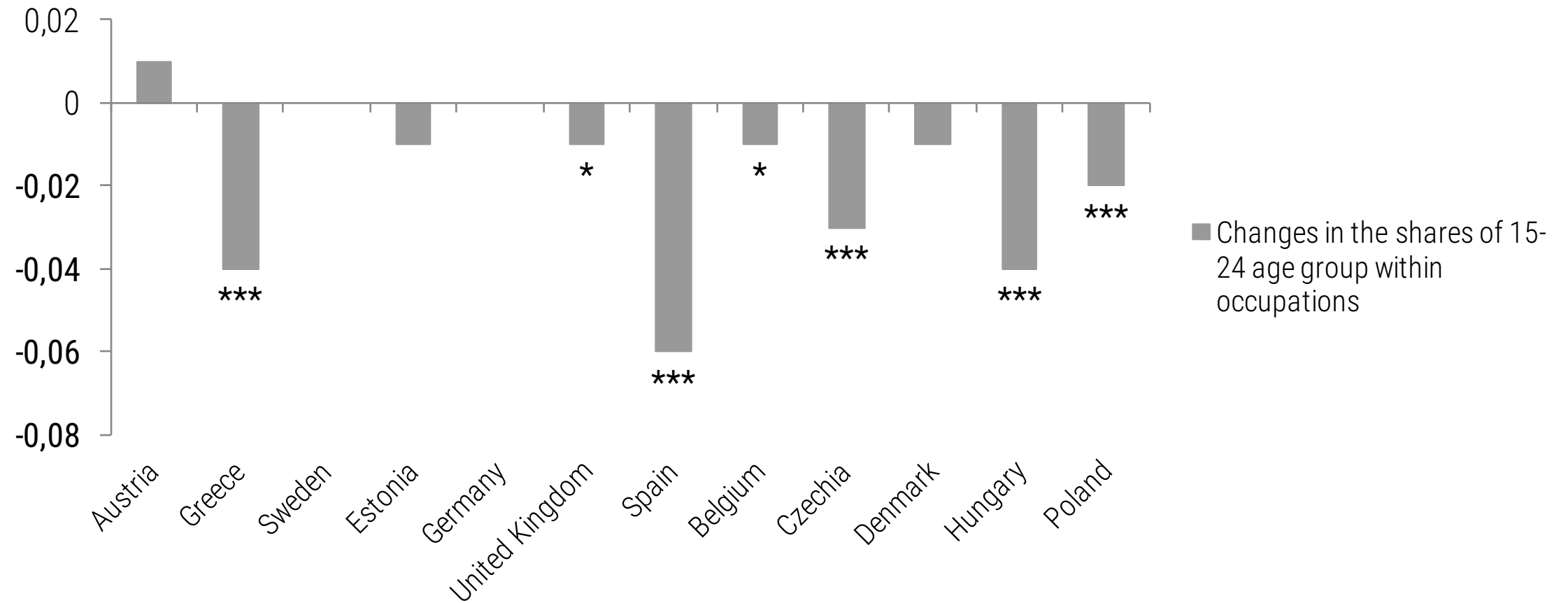

Changes in the mean ages of workers in occupations between 1998 and 2010
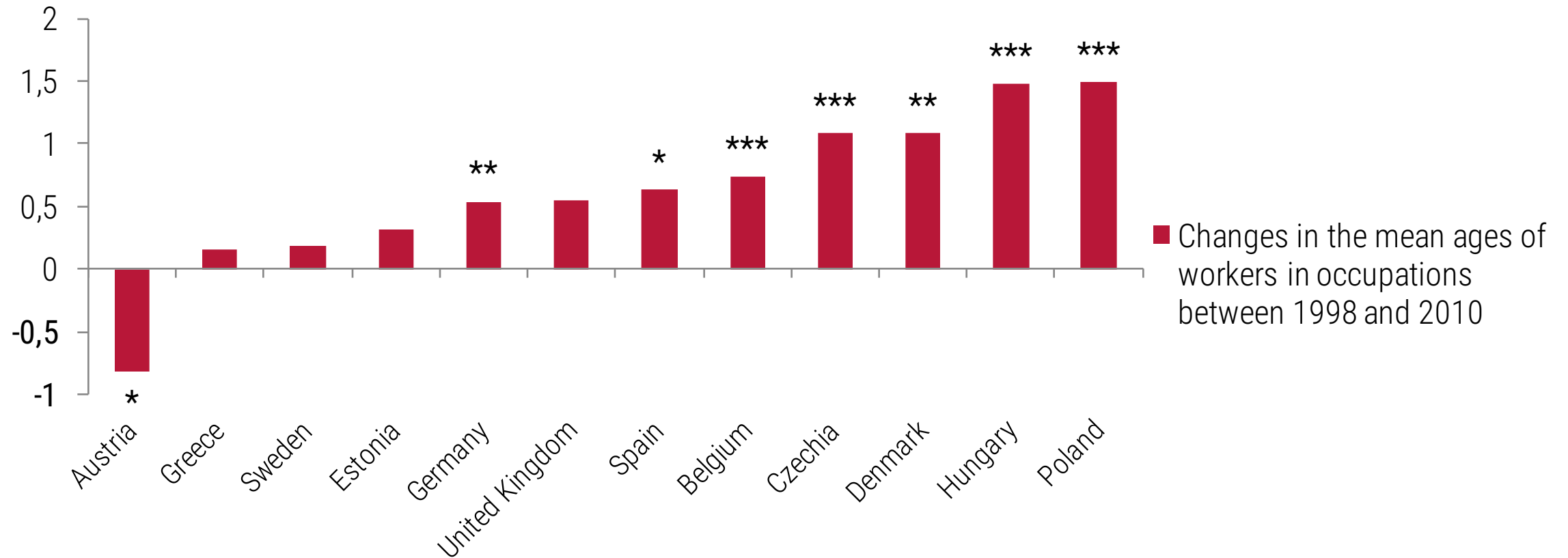
*** p<0.01, ** p<0.05, * p<0.1.

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
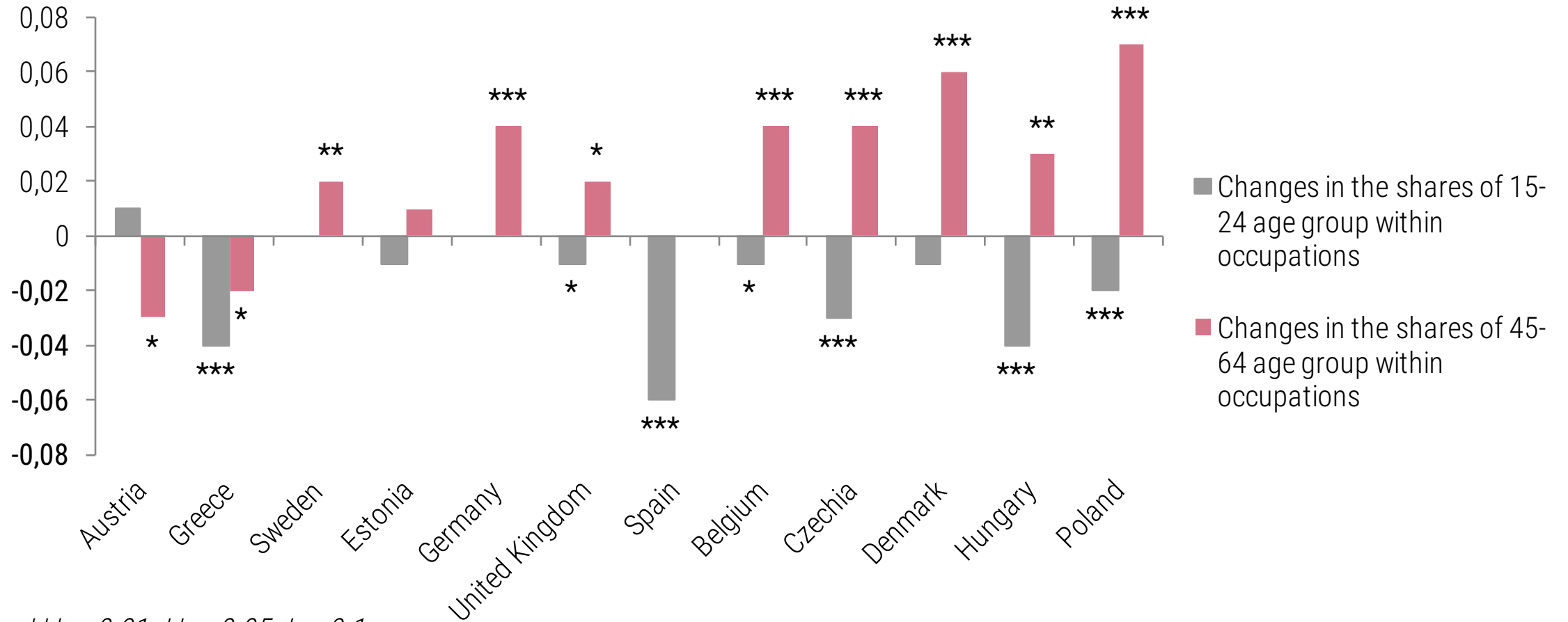

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And the share of the oldest workers was increasing

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

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

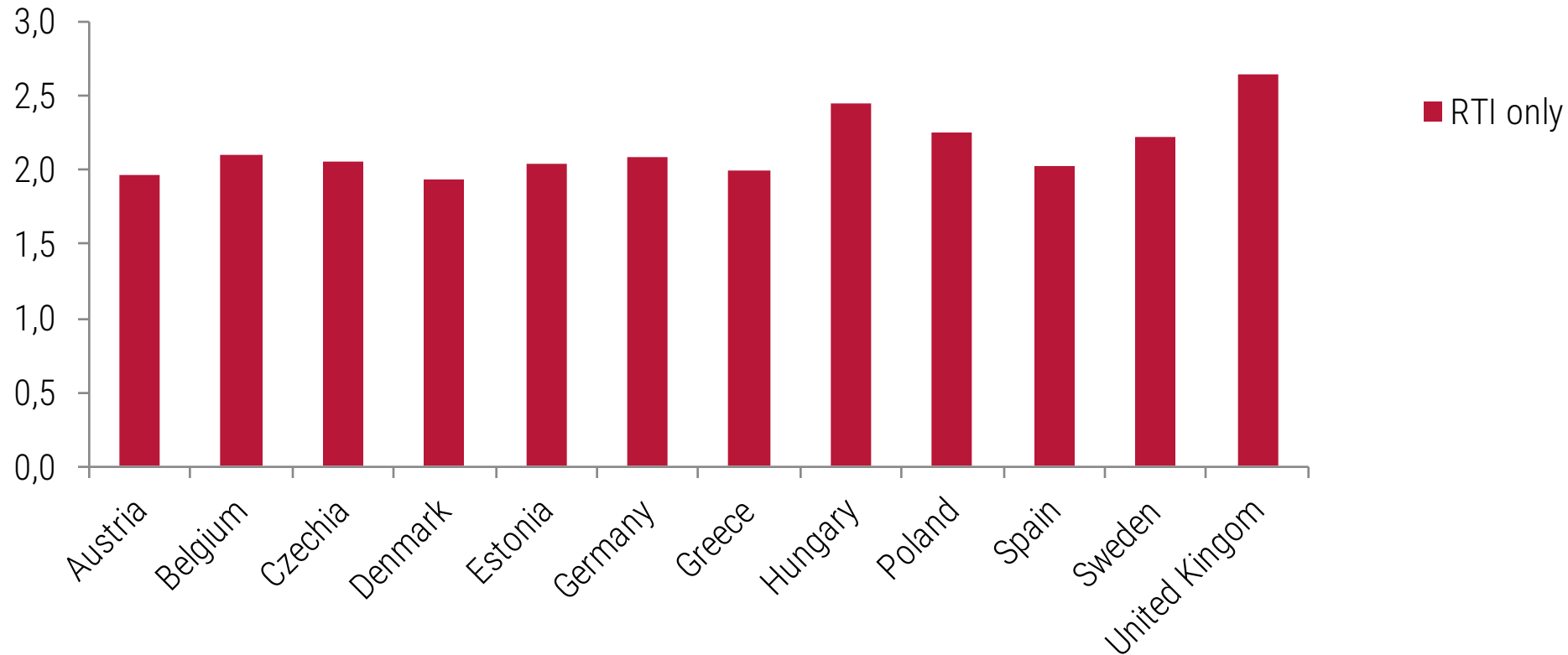# Deroutinisation may increase the risk of unemployment among routine workers

- Are 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
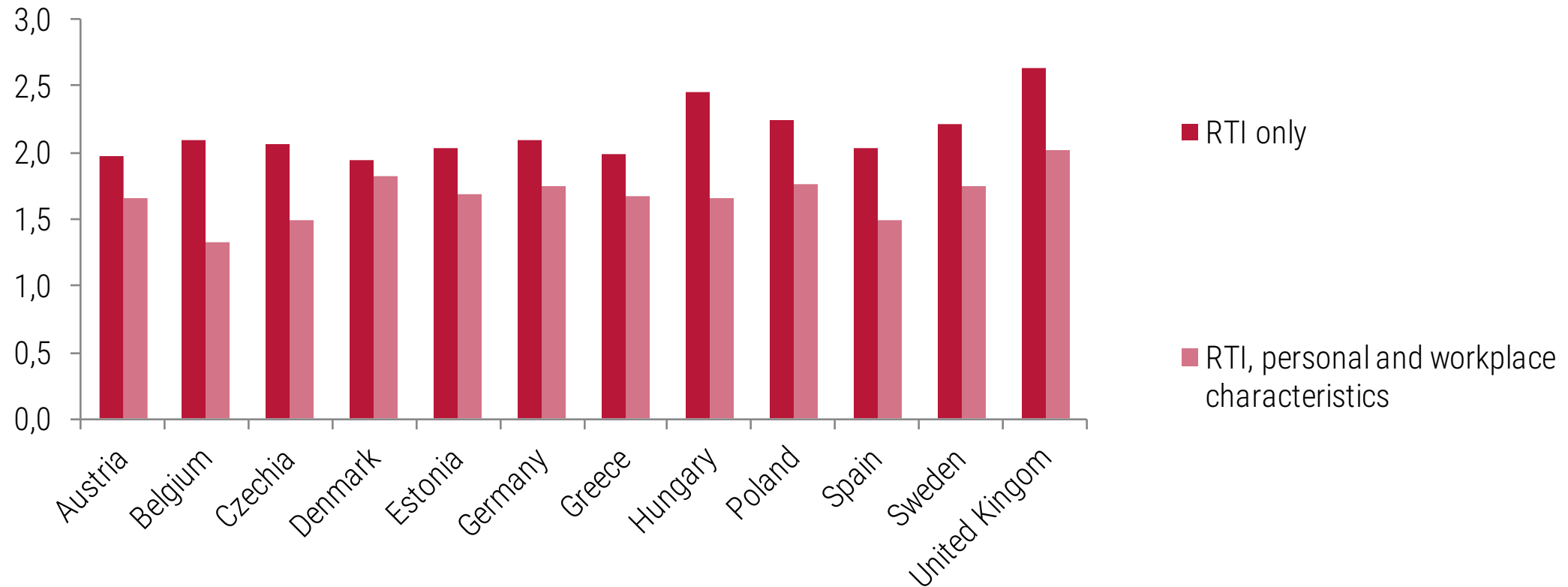

Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

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

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

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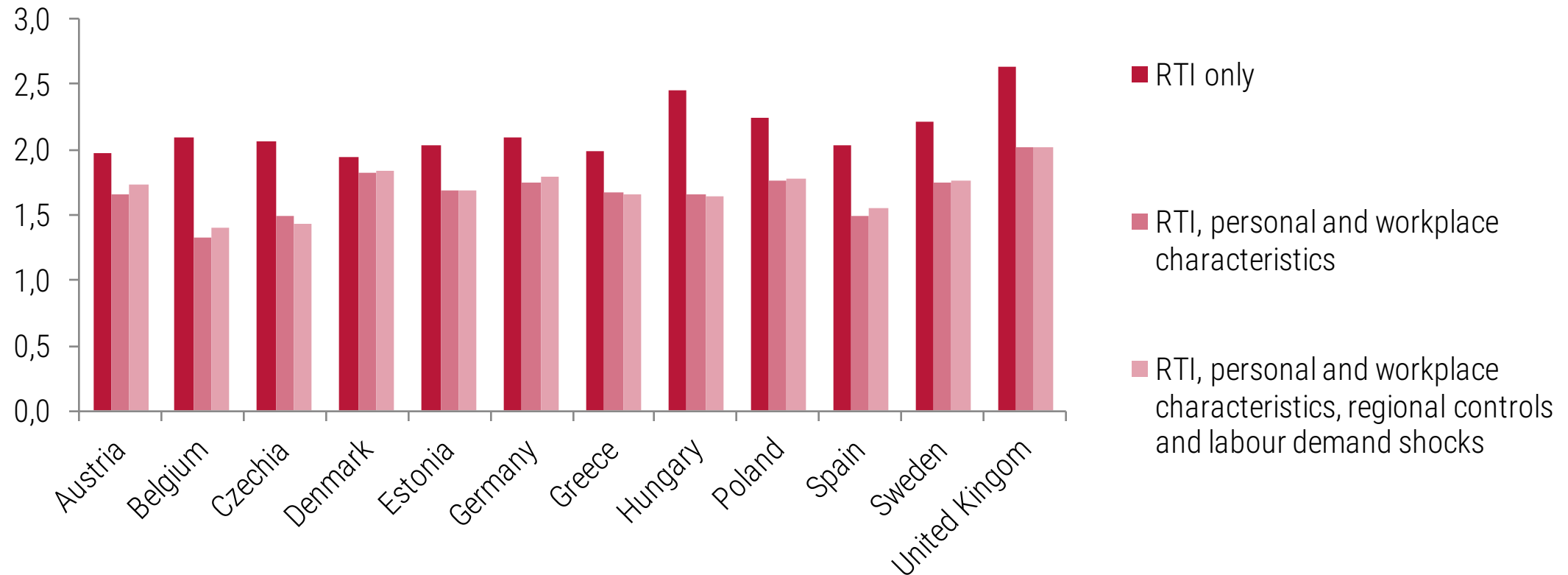

Legend:
- RTI only
- RTI, personal and workplace characteristics
- RTI, personal and workplace characteristics, regional controls and labour demand shocks
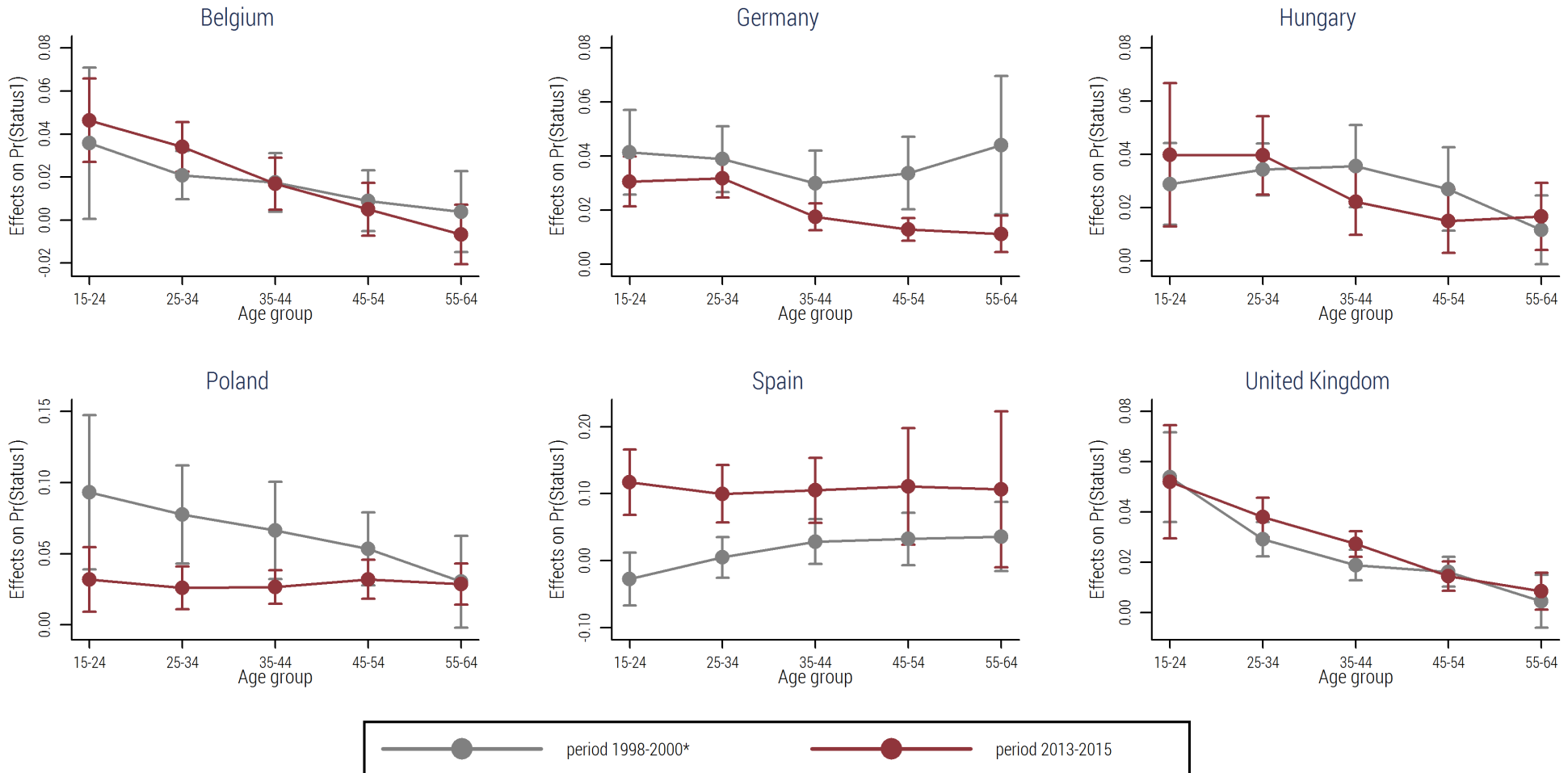
Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

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.

What do tasks tell about intergenerational differences in jobs

- Widespread shift from manual to cognitive work
  and routine cognitive tasks decline in richer (EU15) countries

- Younger cohorts experience this change more strongly than older cohorts

- Routine-intensive occupations:
  - Age faster because of declining share of young workers
  - Create higher unemployment risk for the young and prime-aged

- Routine jobs likely to ↘ as ICT stock ↗ and technology prices ↘

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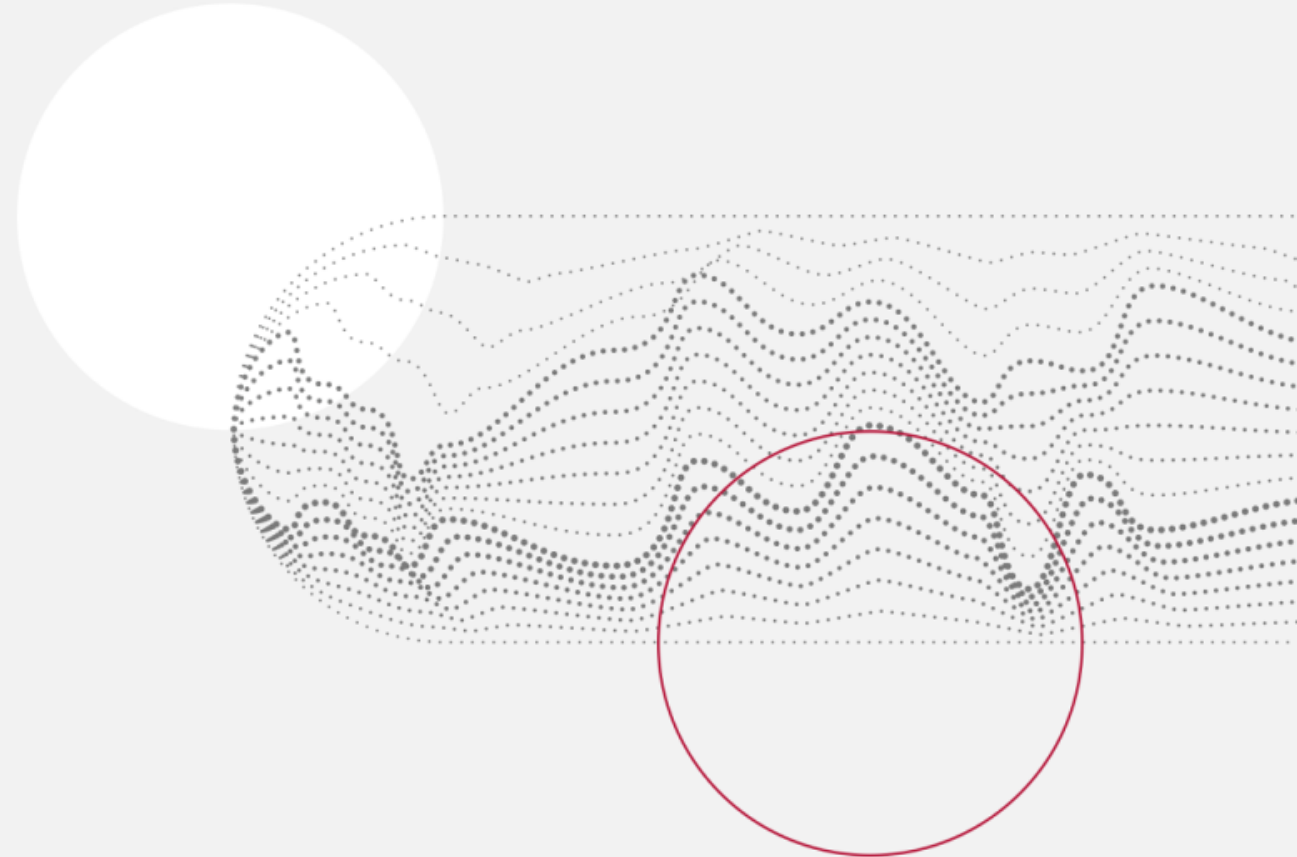
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badań
strukturalnych

Deroutinisation may lift the risk of unemployment among routine workers

- In 6 out of 12 countries, the occupation-specific unemployment rates increased significantly stronger in more routine intensive occupations

- Is there a relationship at the individual level?

- 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)

Tasks help to understand how the nature of work changes, but the age dimension of task content changes is under-researched

- Deroutinisation was found in many empirical studies

- Routine-biased technical change and off-shoring are believed to be driving it

- But is there any intergenerational divide in the deroutinisation of jobs?

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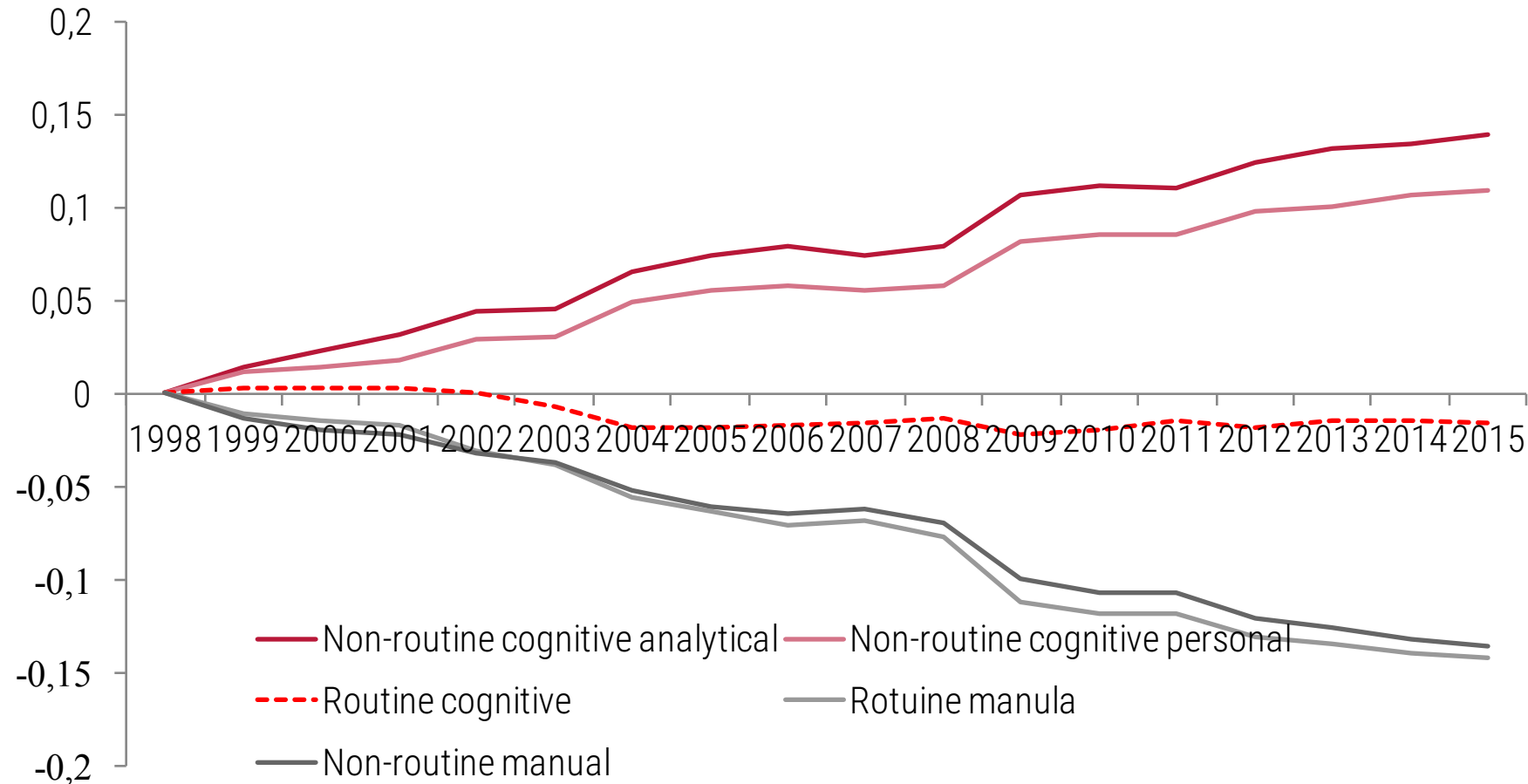
Is it correct to apply O*NET to European countries?

- 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