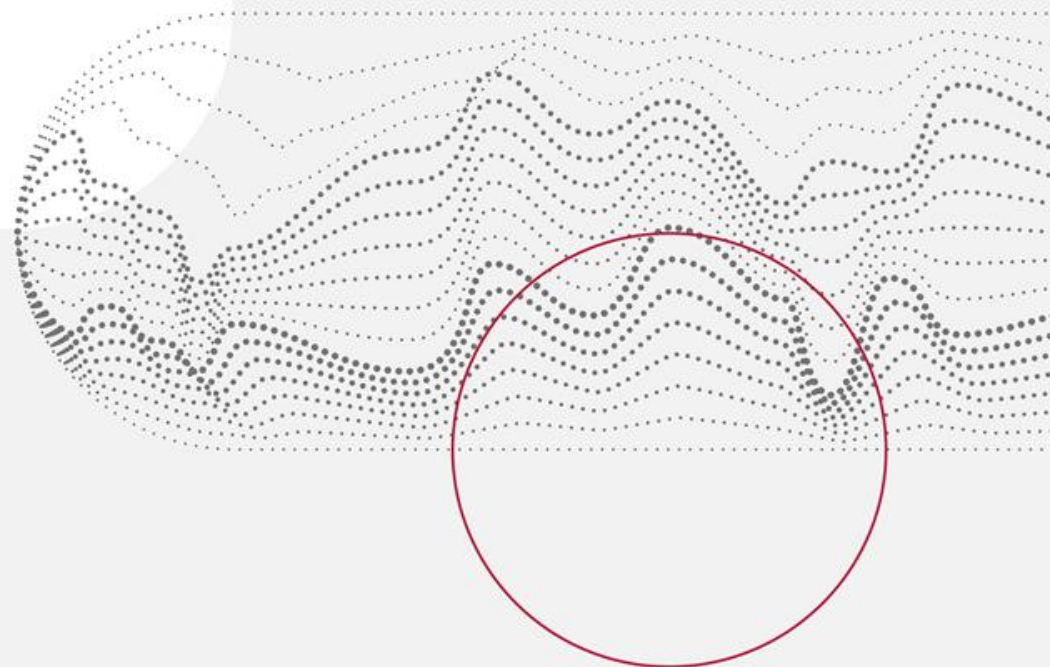![IBS logo] instytut
badań
strukturalnych

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

- Only few papers look at sub-groups of workers (Autor & Dorn 2009, Cortes 2016)

We focus on age

- Older workers (55-64) more likely to have low problem-solving and numeracy skills, and less likely to use information-processing skills at work than workers aged 25-54 (PIAAC)

- Older workers exhibit lower between-occupation mobility than younger workers (Tempest & Coupland, 2016)

- Automation may reduce hiring and employment of young workers (Dauth et al. 2017)

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
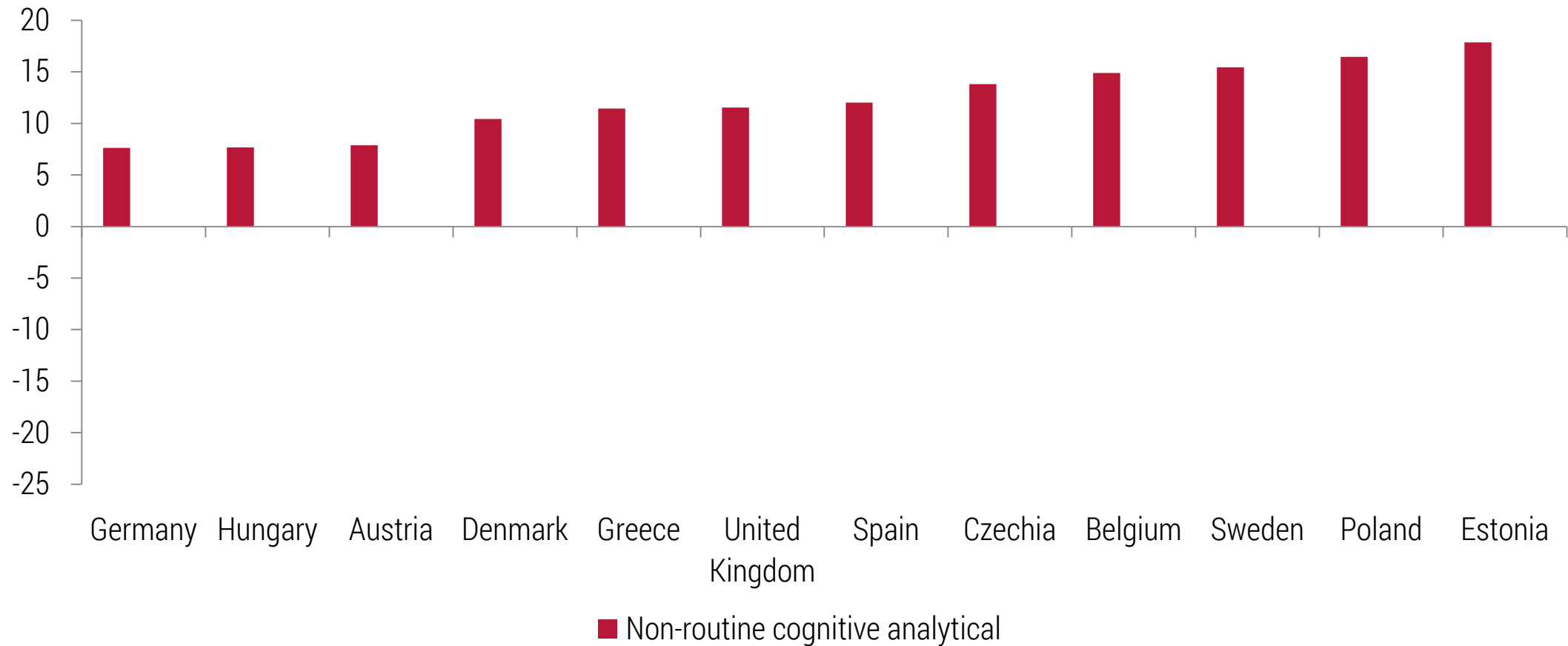countries in 1998-2015,
3-digit ISCO occupations

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

Legend: Non-routine cognitive analytical

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

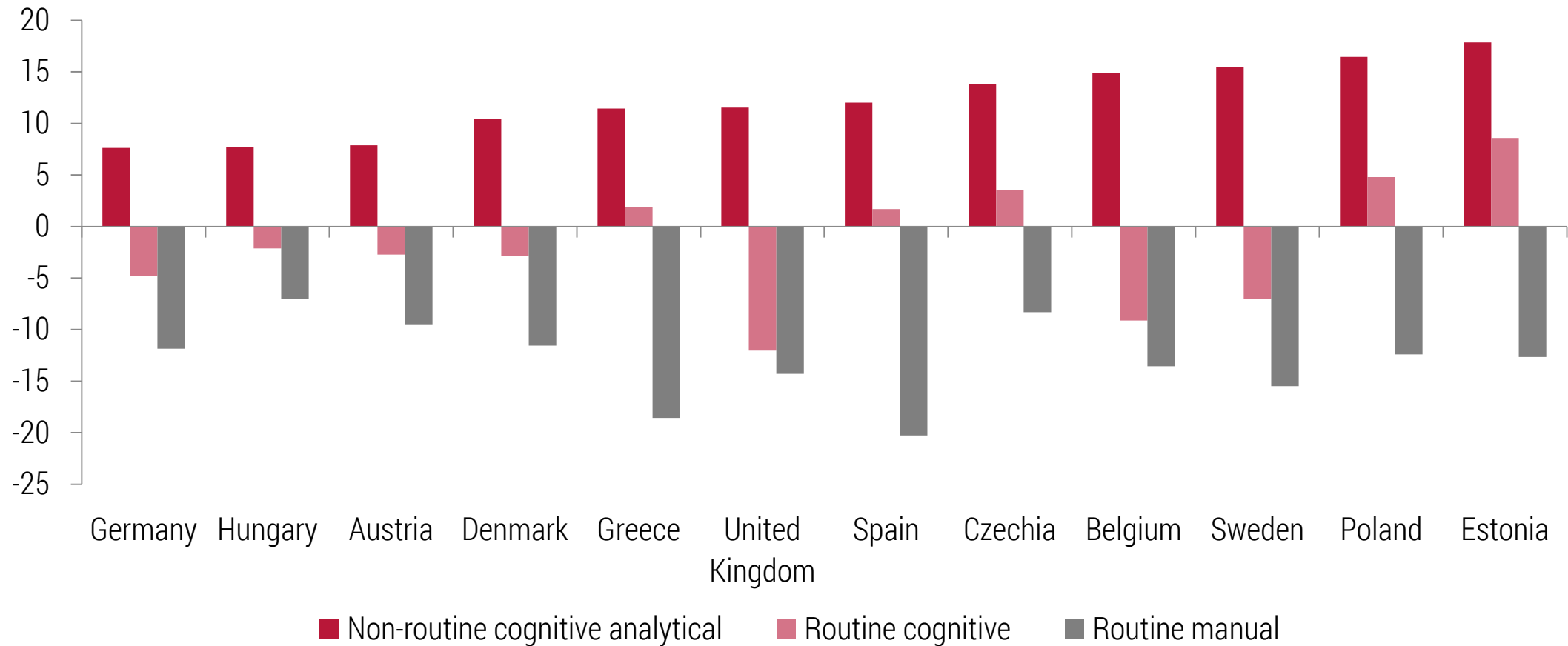## Change in the task content intensity by country, 1998-2015

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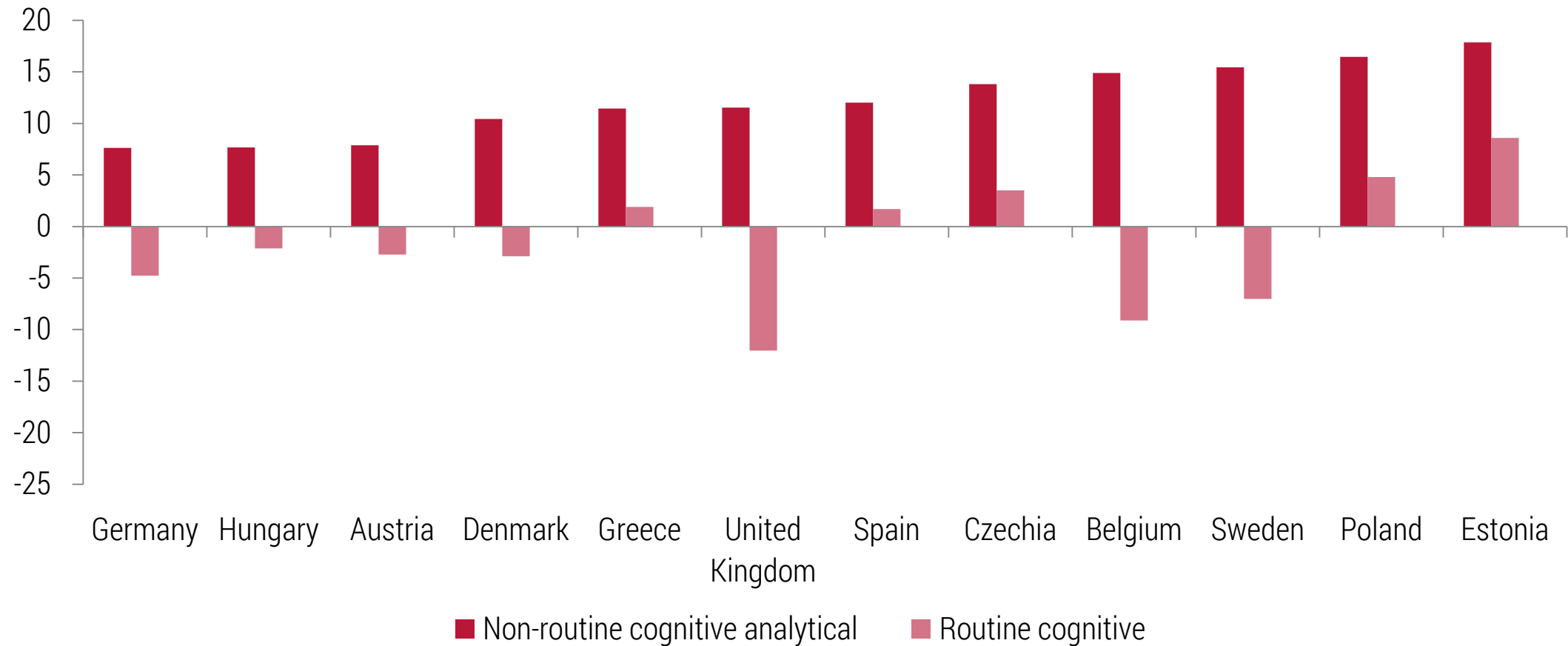
Manual tasks, especially the routine ones, shrank in all European countries

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

Legend: Non-routine cognitive analytical, Routine cognitive, Routine manual

Deroutinisation 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

— Non-routine cognitive analytical   — Routine cognitive   — Routine manual
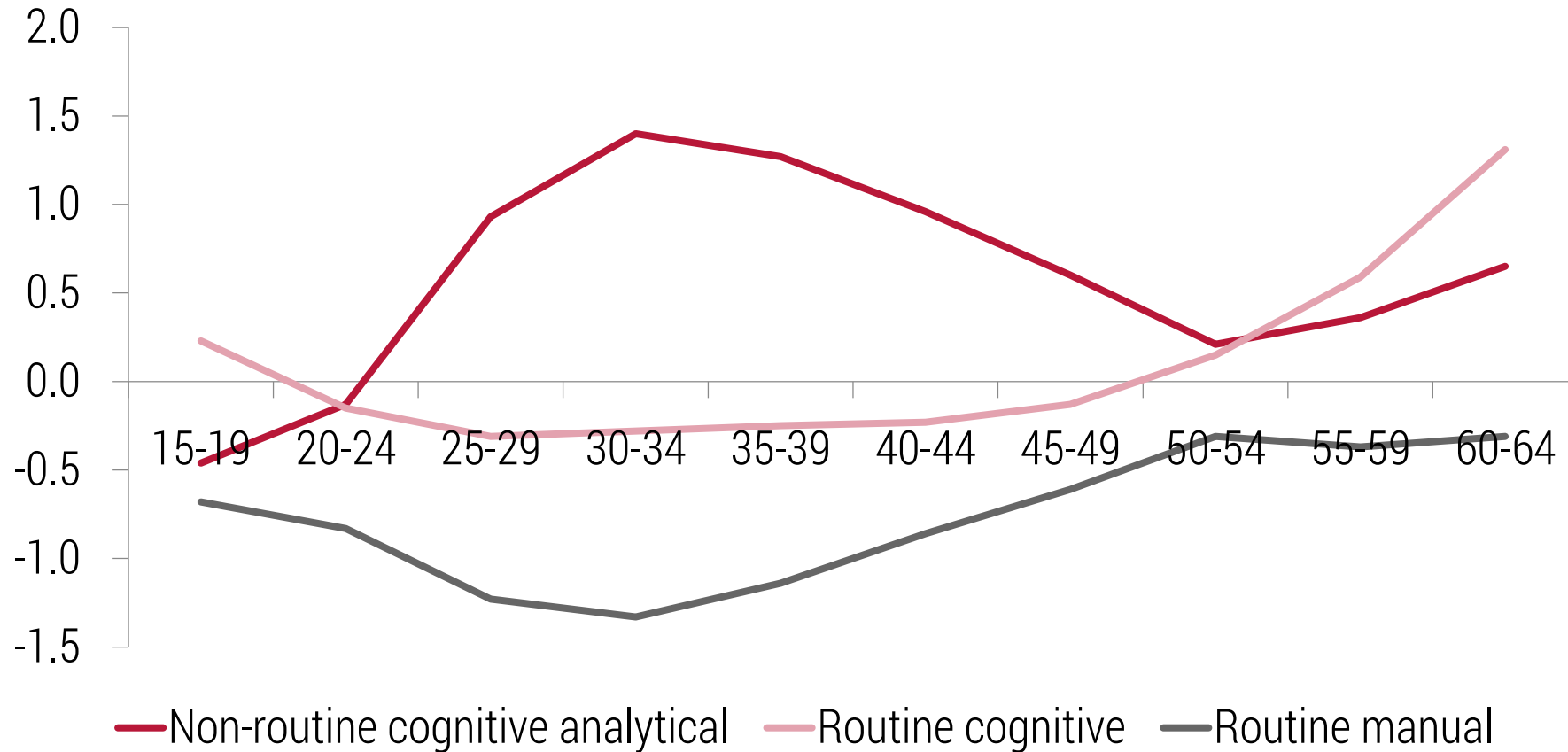
From here on I will use the routine task intensity (RTI, Autor & Dorn, 2009)

- 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:

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

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
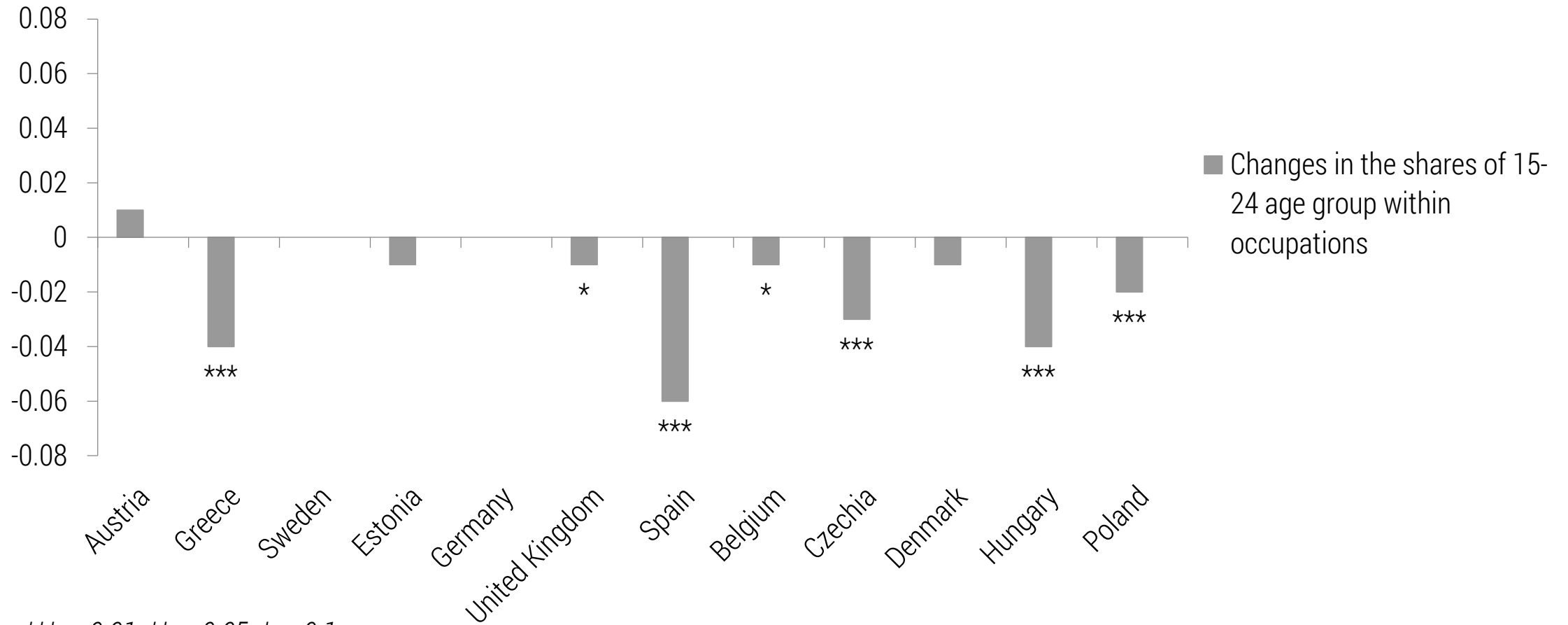

■ Changes in the mean ages of workers in occupations between 1998 and 2010
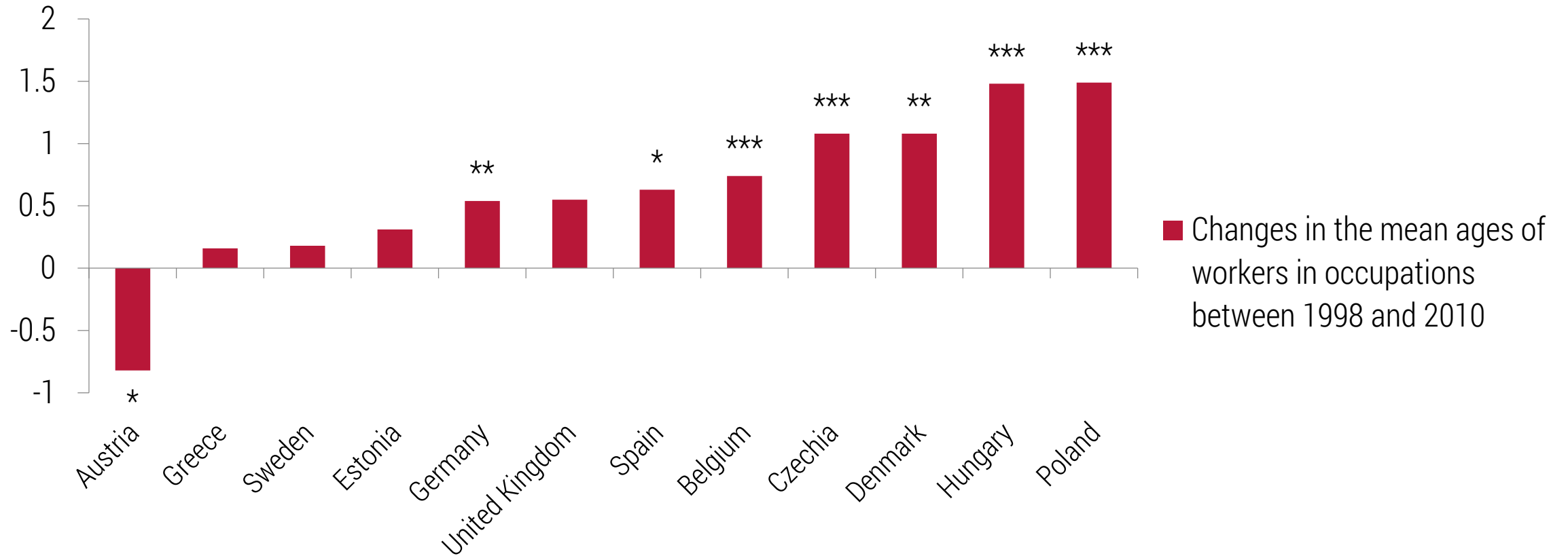
*** p<0.01, ** p<0.05, * p<0.1.

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
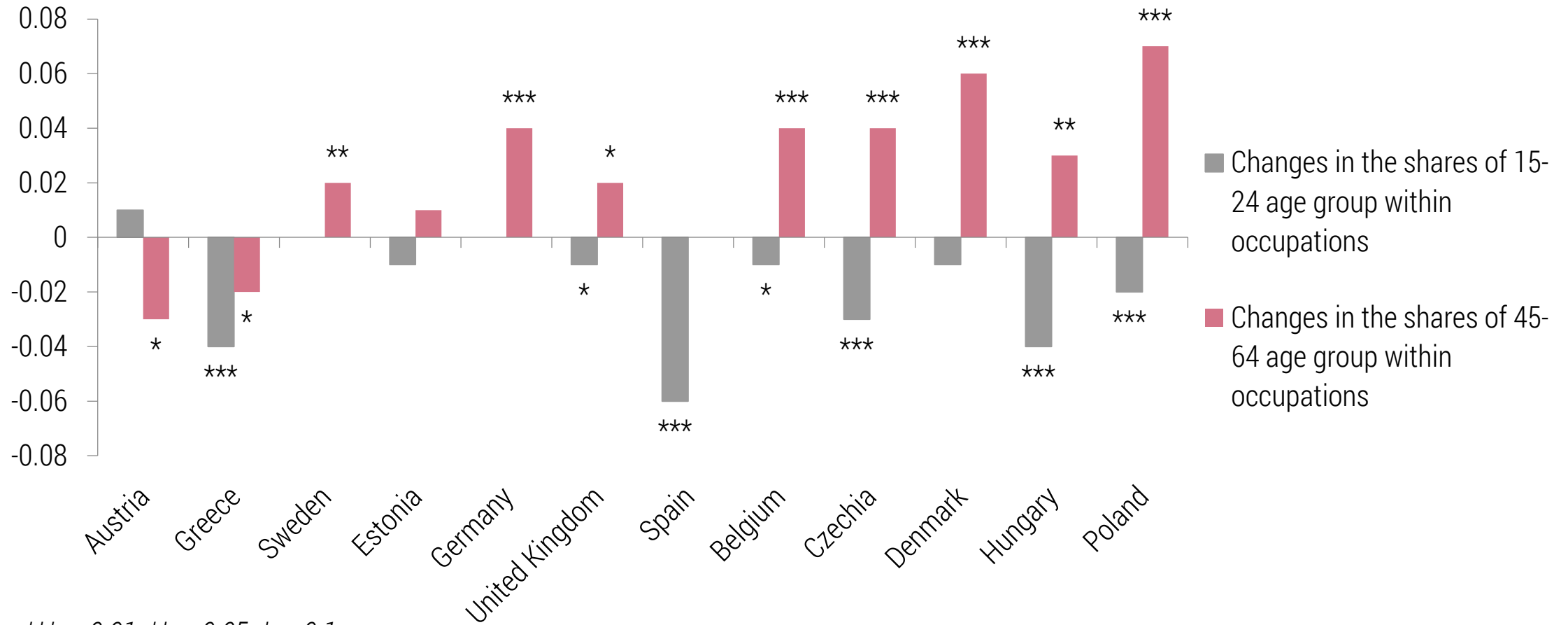

*** p<0.01, ** p<0.05, * p<0.1.

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

Legend:
- Changes in the shares of 15-24 age group within occupations (gray)
- Changes in the shares of 45-64 age group within occupations (pink)

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

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
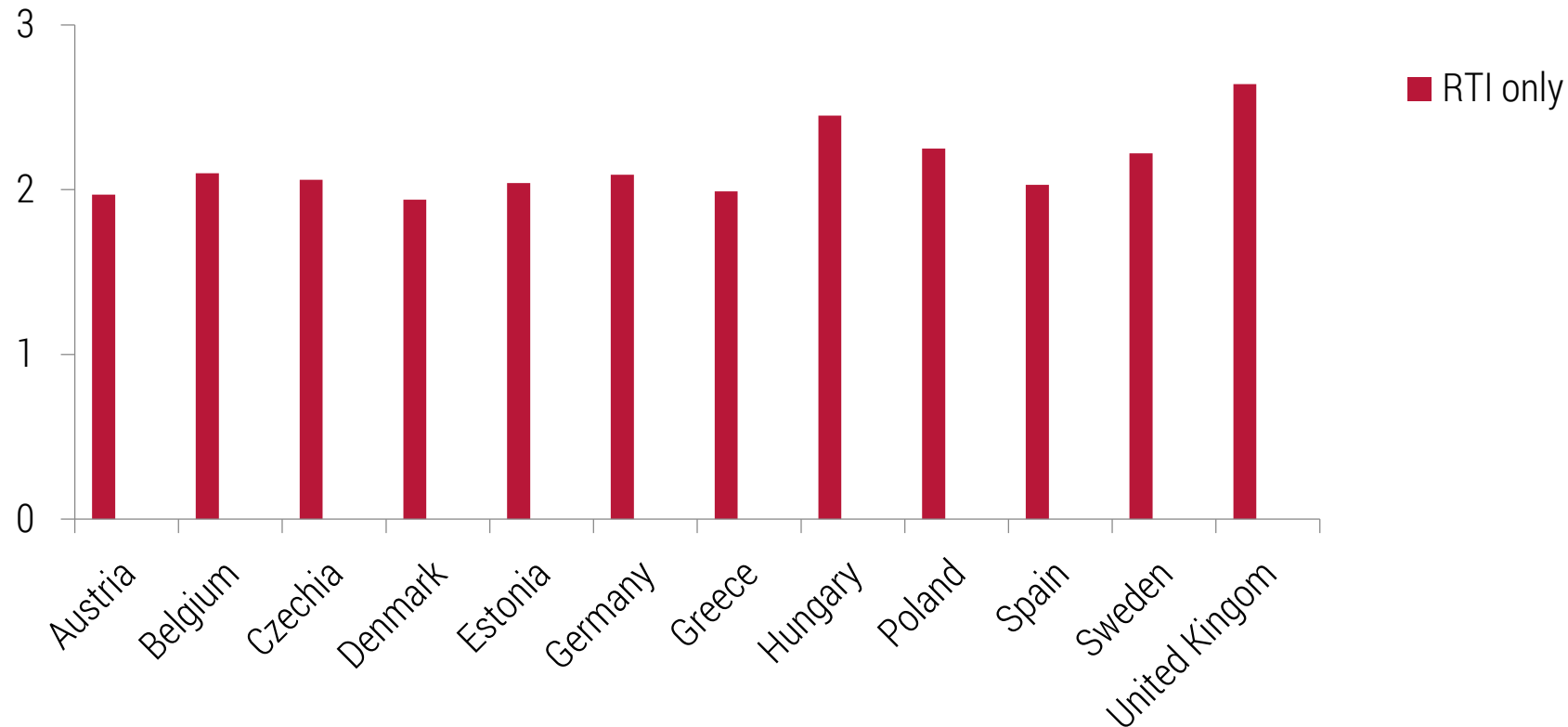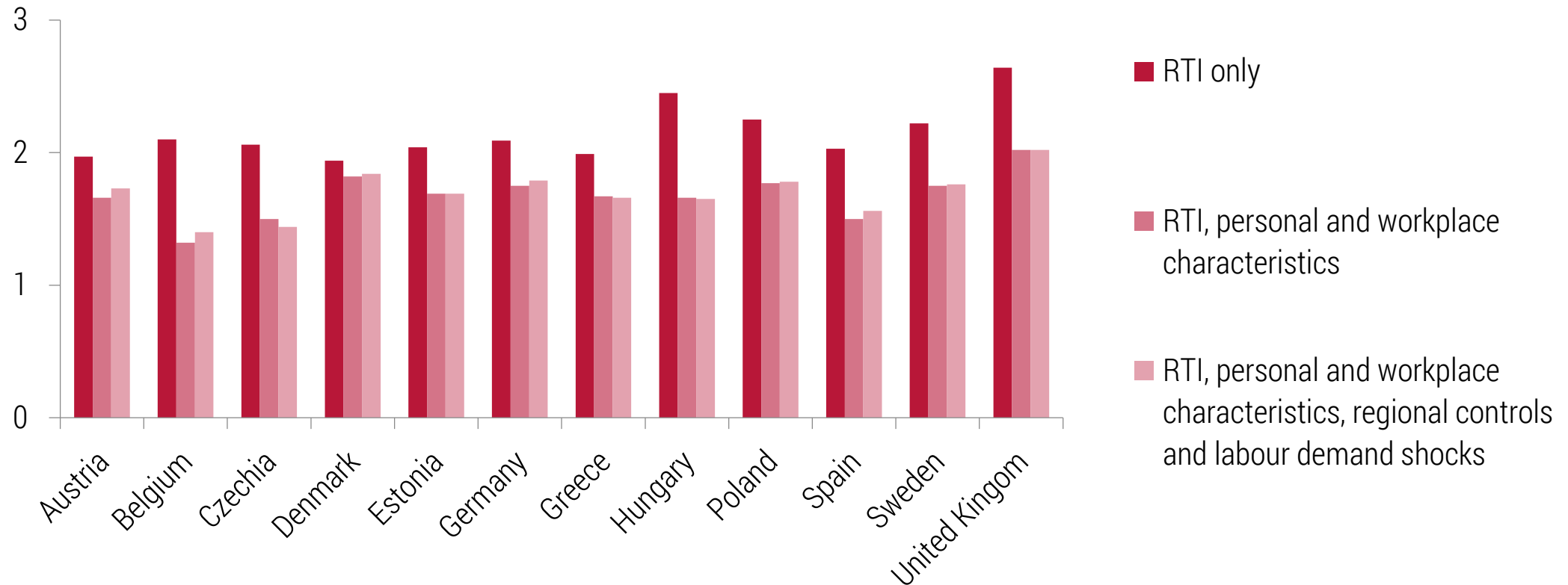

Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

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

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

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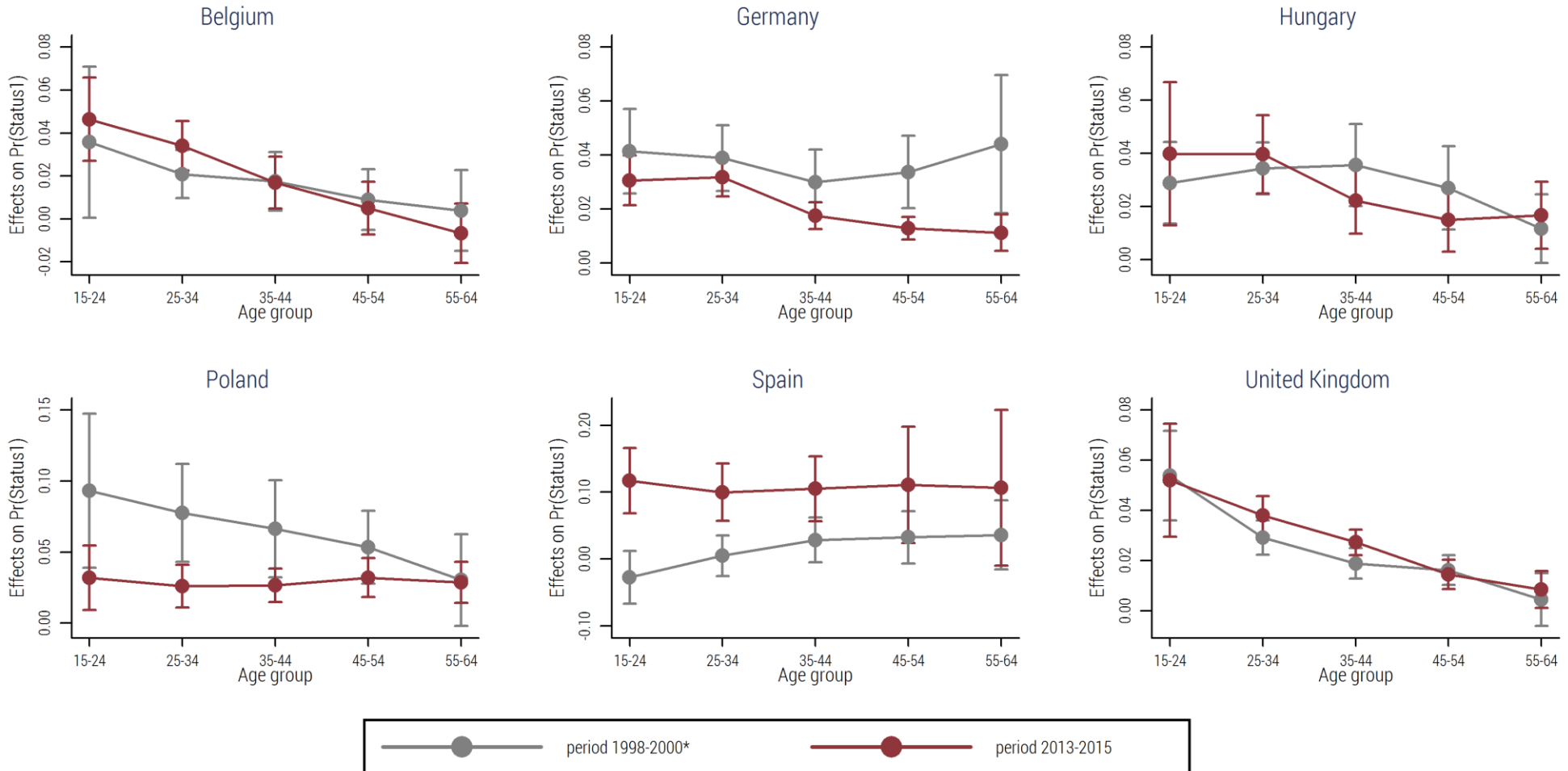
Logit regressions at individual level. Standard errors clustered at occupation level. All effects significant at 0.01.

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?
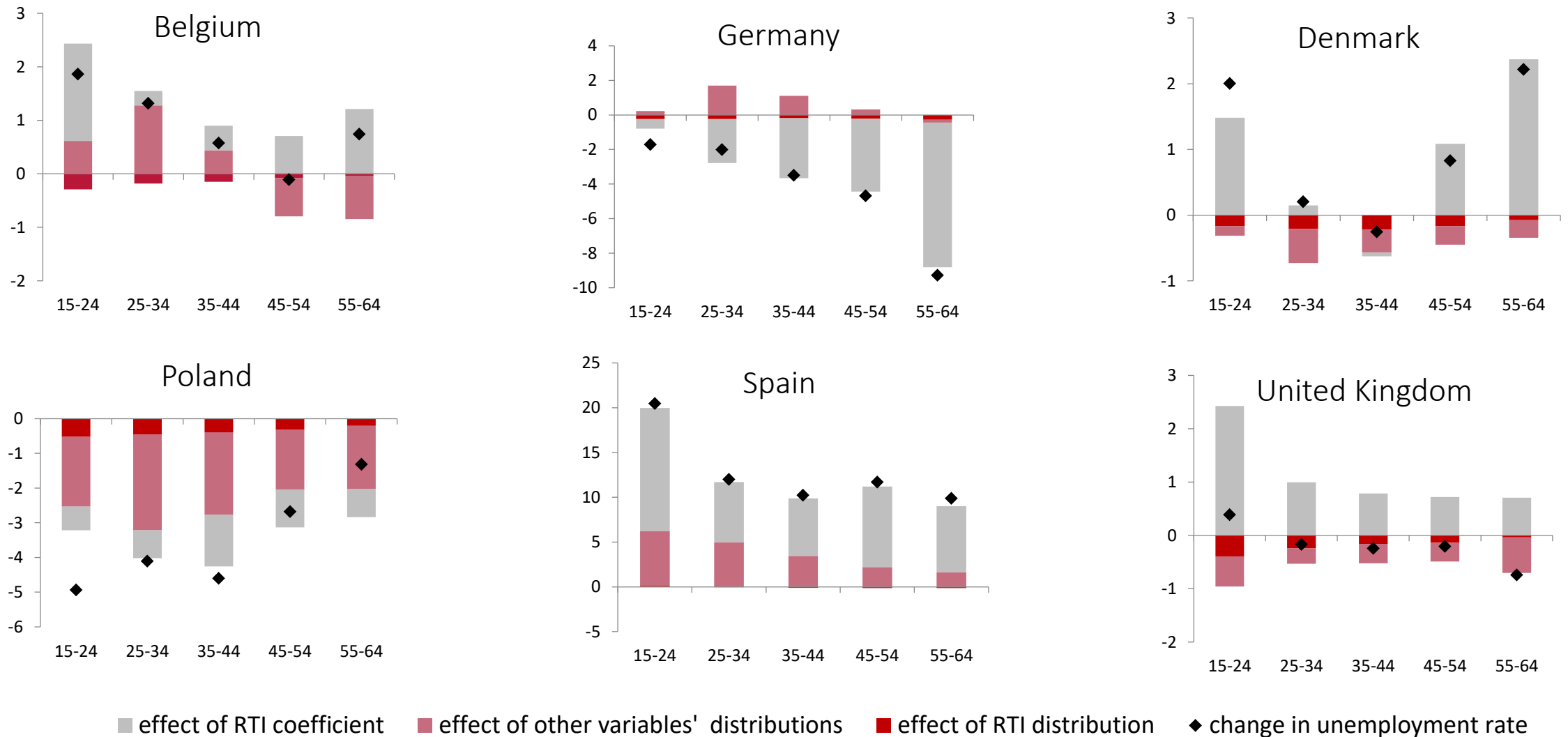
- We decompose the change in the predicted unemployment rate between 1998-2000 and 2013-2015 into:

  - 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.

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

Belgium

Germany

Denmark

Poland

Spain

United Kingdom

■ effect of RTI coefficient   ■ effect of other variables' distributions   ■ effect of RTI distribution   ◆ change in unemployment rate

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

Thanks for listening

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