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Routine and ageing? The intergenerational divide in the task composition of jobs in Europe

Work in progress

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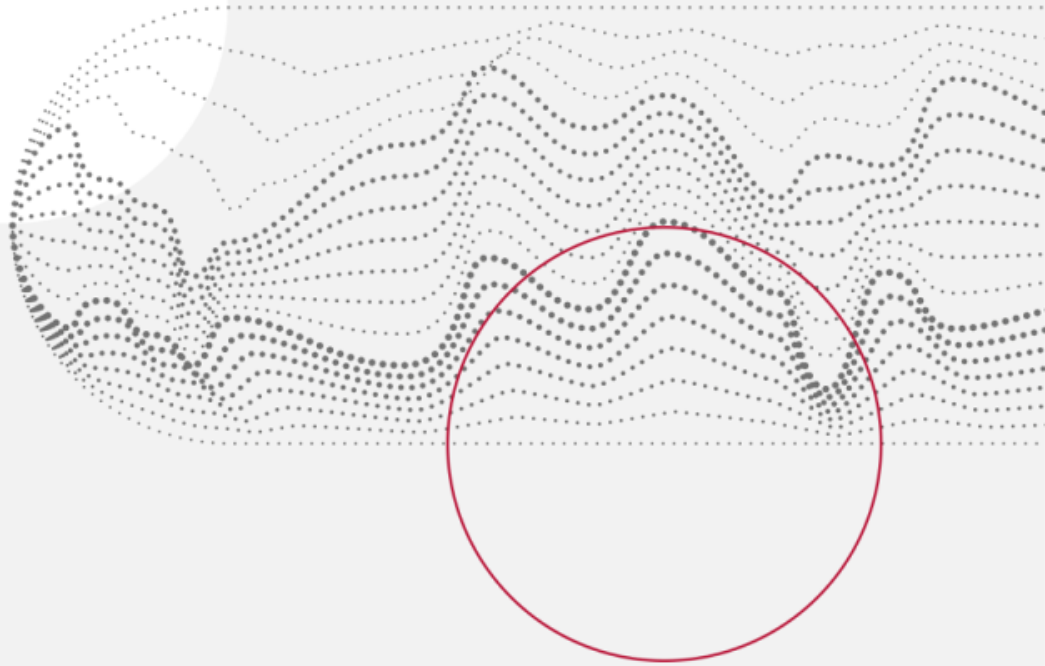

Tasks – what are they and how to categorise them?

TASK

=

„a unit of work activity that produces output”

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≠

SKILLS

=

„worker’s abilities for performing various tasks”

Particular occupations are more intensive in particular 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

Tasks help to understand substitution of labour by technology

- Routinisation / polarisation literature (Autor et al. 2003, Michaels et al. 2013, Goos et al. 2014) relates ICT and automation to:
  - Hollowing-out of middle-skilled (routine) employment
  - Rising wage premium for high-skilled workers

- Others pay attention to:
  - Labour supply – workforce upgrading, migration (Oesch 2013, Salvatori 2015, Eurofound 2015, Hardy et al. 2016)
  - Labour market & wage-setting institutions (Oesch 2013, Eurofound 2015)
  - Structural change, offshoring

Research questions & motivation

- The age dimension of routinisation still under-researched
- Is there any intergenerational divide in the task composition of jobs?
- Are routine occupations ageing faster?
- Are the (young) routine workers exposed to a larger unemployment risk?

How do we measure the task content of jobs?

EU-LFS data for 12 EU countries in 1998-2014, 3-digit ISCO occupations

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O*NET data – editions 2003 and 2014

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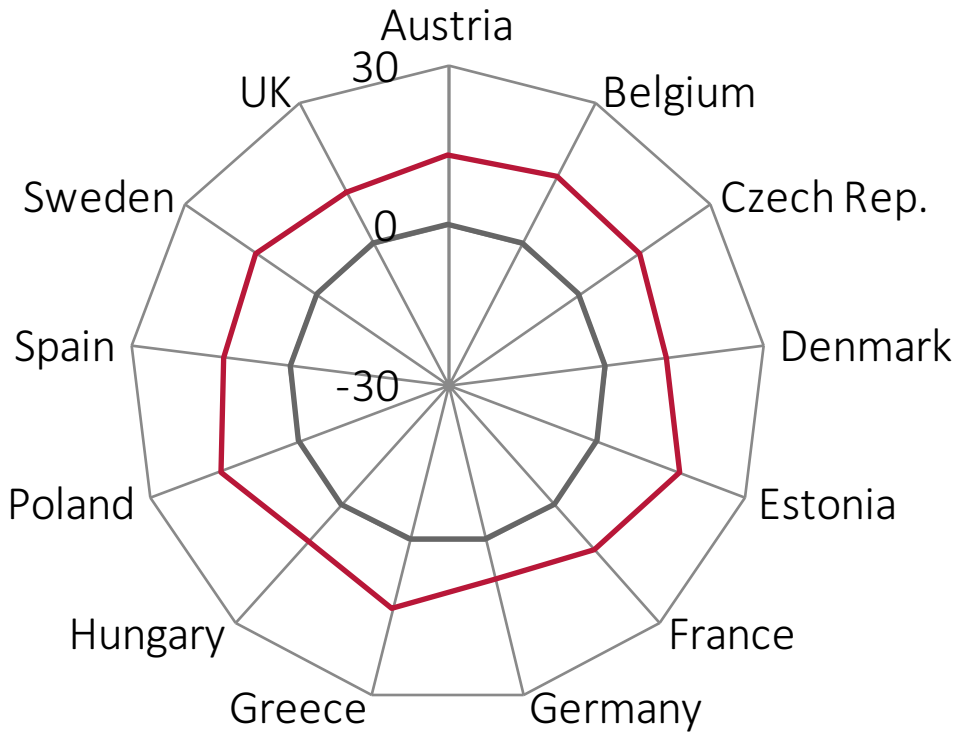
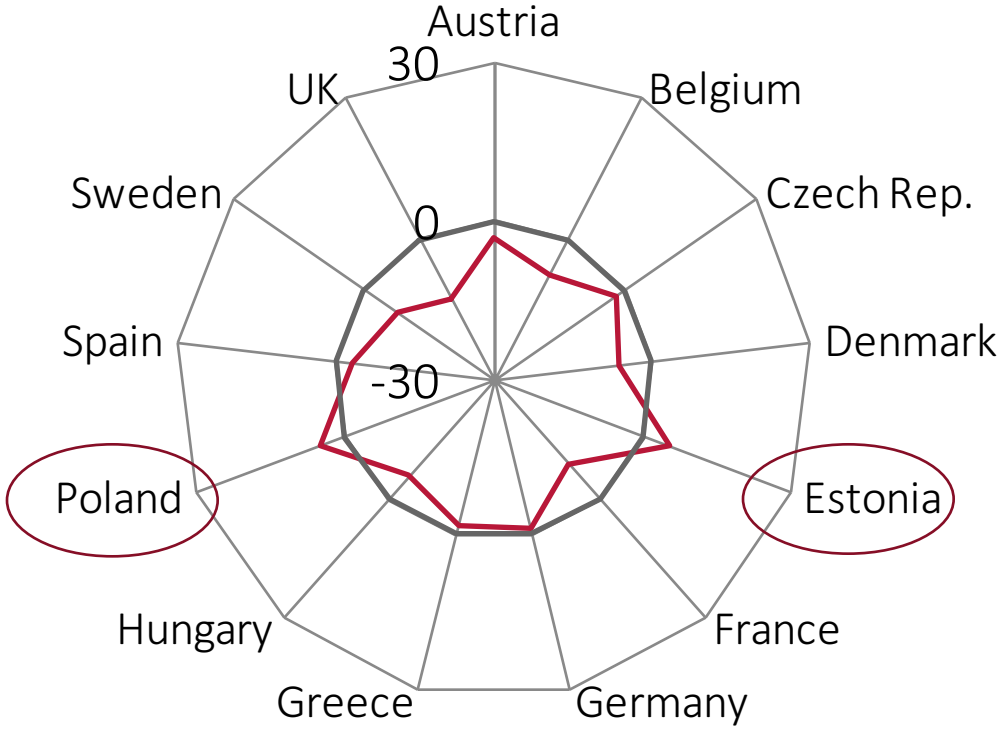
5 annual country-level task content measures Autor & Acemoglu (2011)

Non-routine ones cognitive tasks increase everywhere, but developments of routine ones vary

Non-routine cognitive analytical

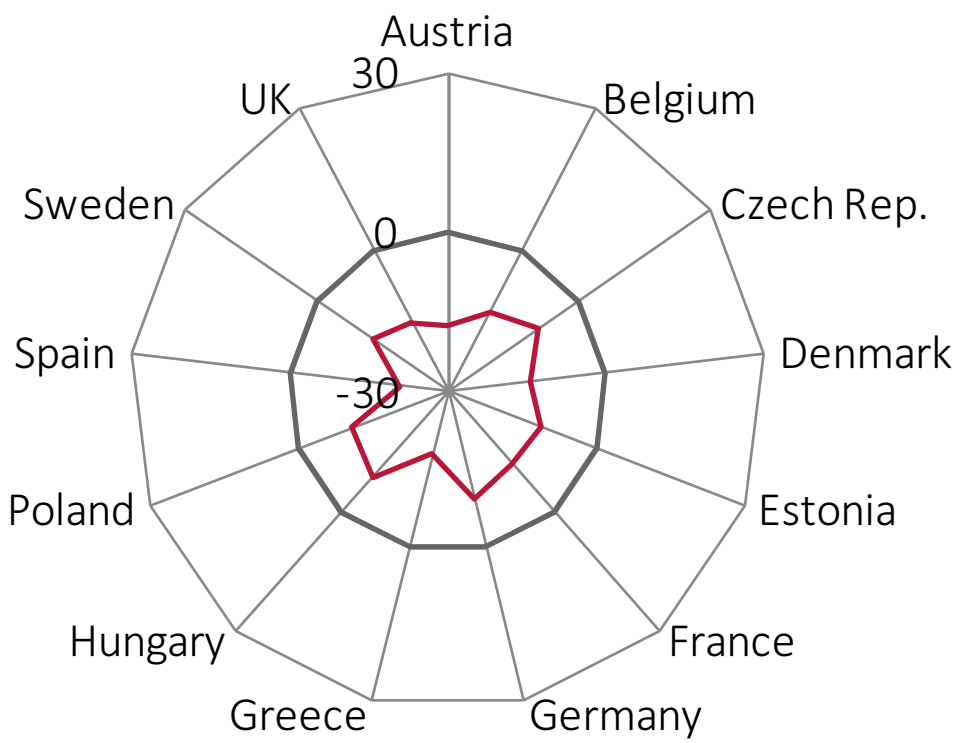


Routine cognitive

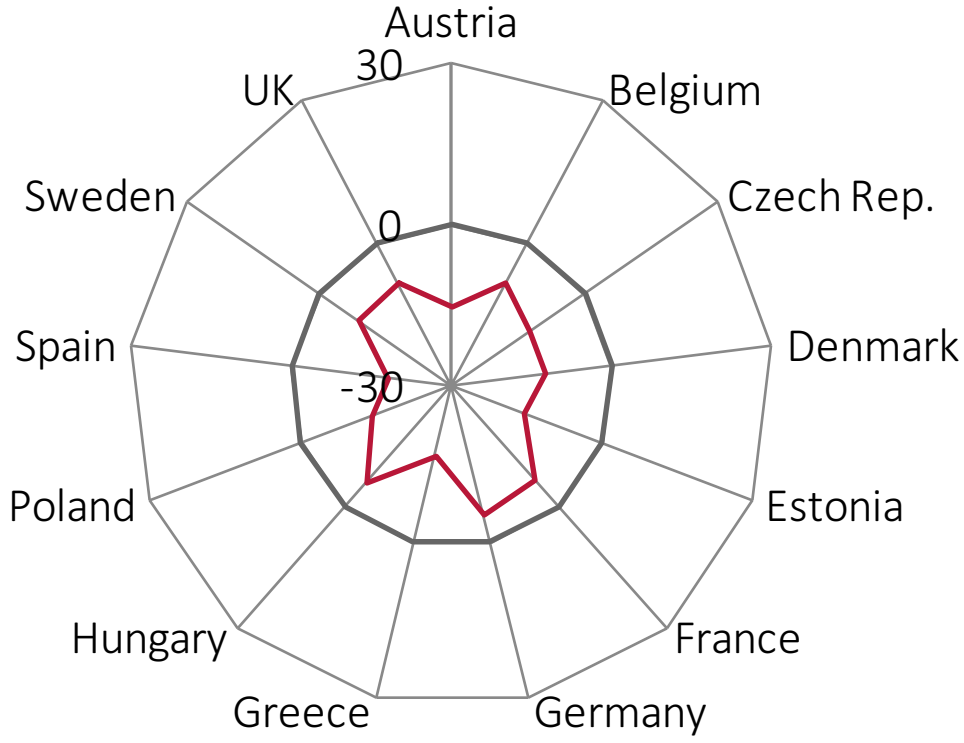


Manual tasks, especially routine, shrink

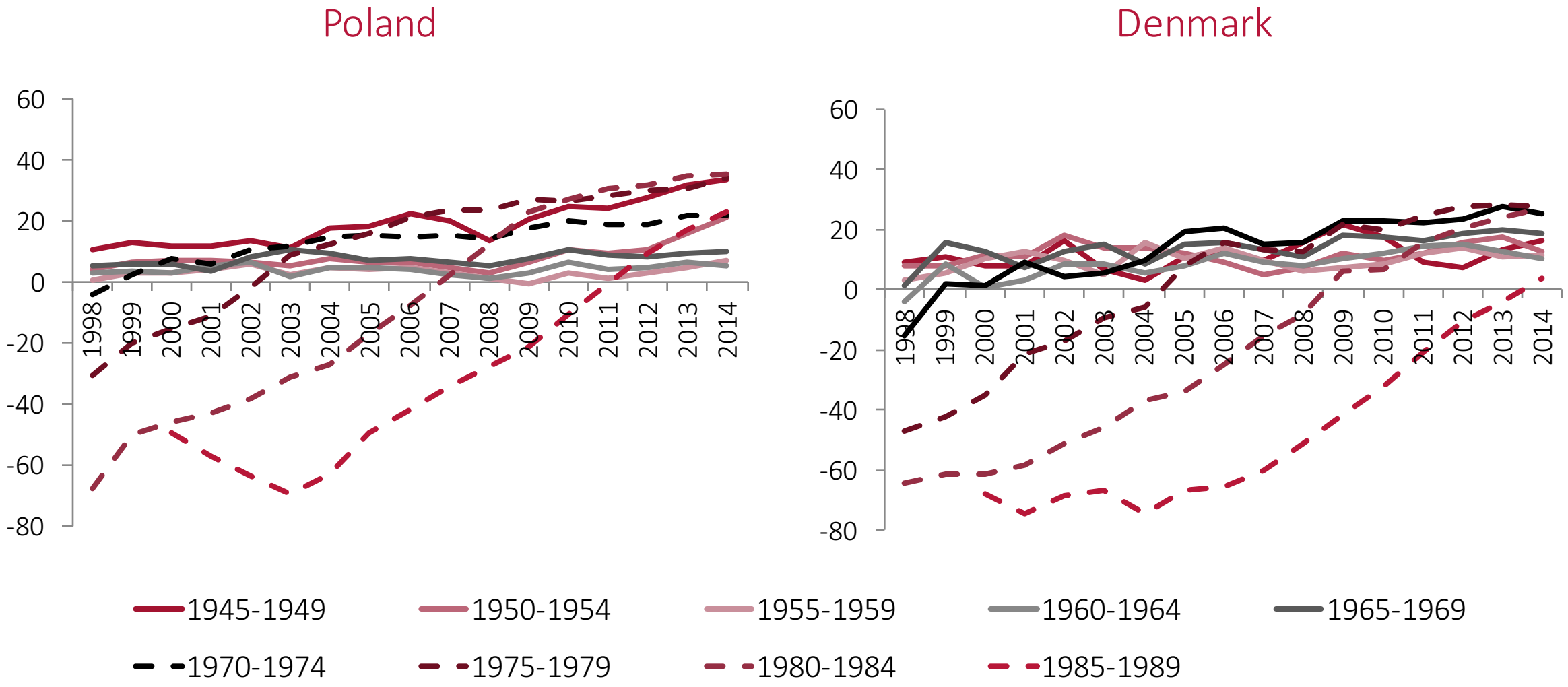
Routine manual



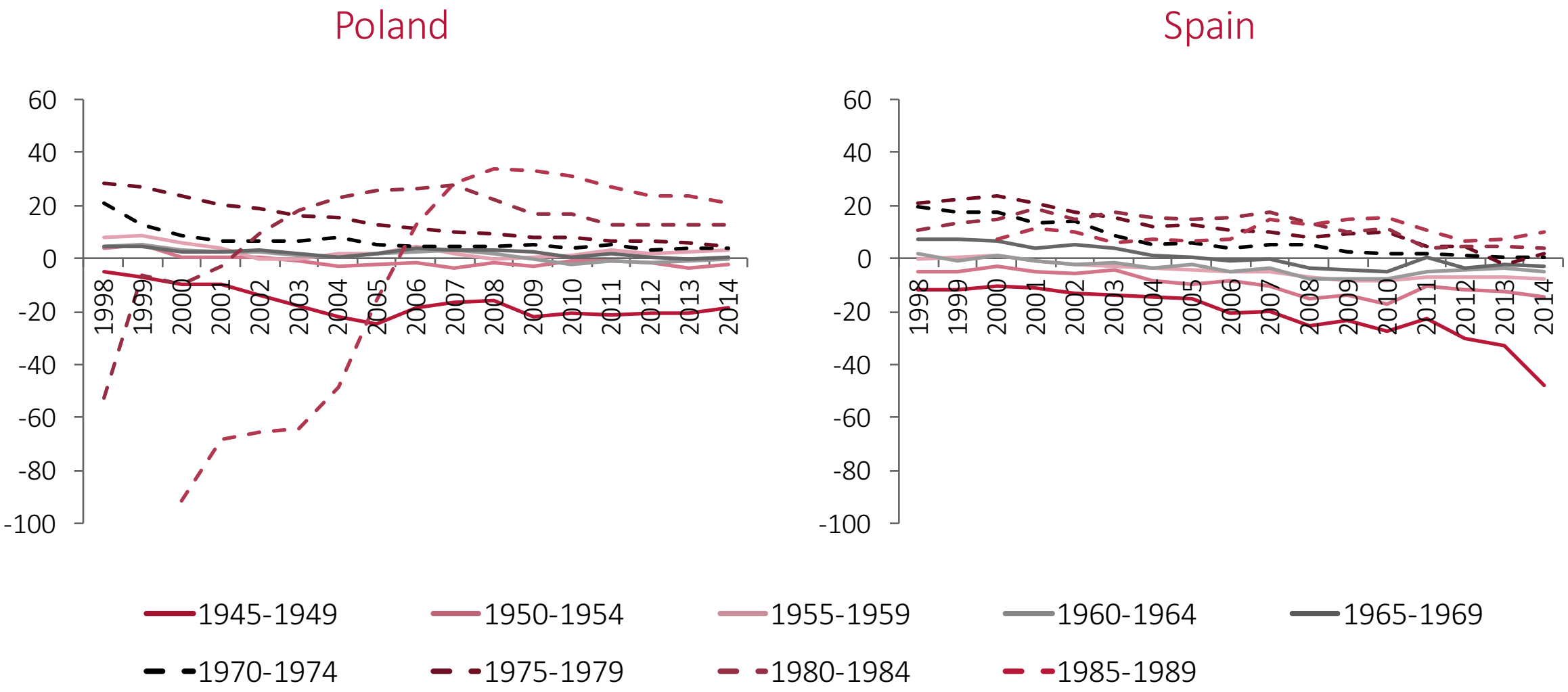
Non-routine manual physical



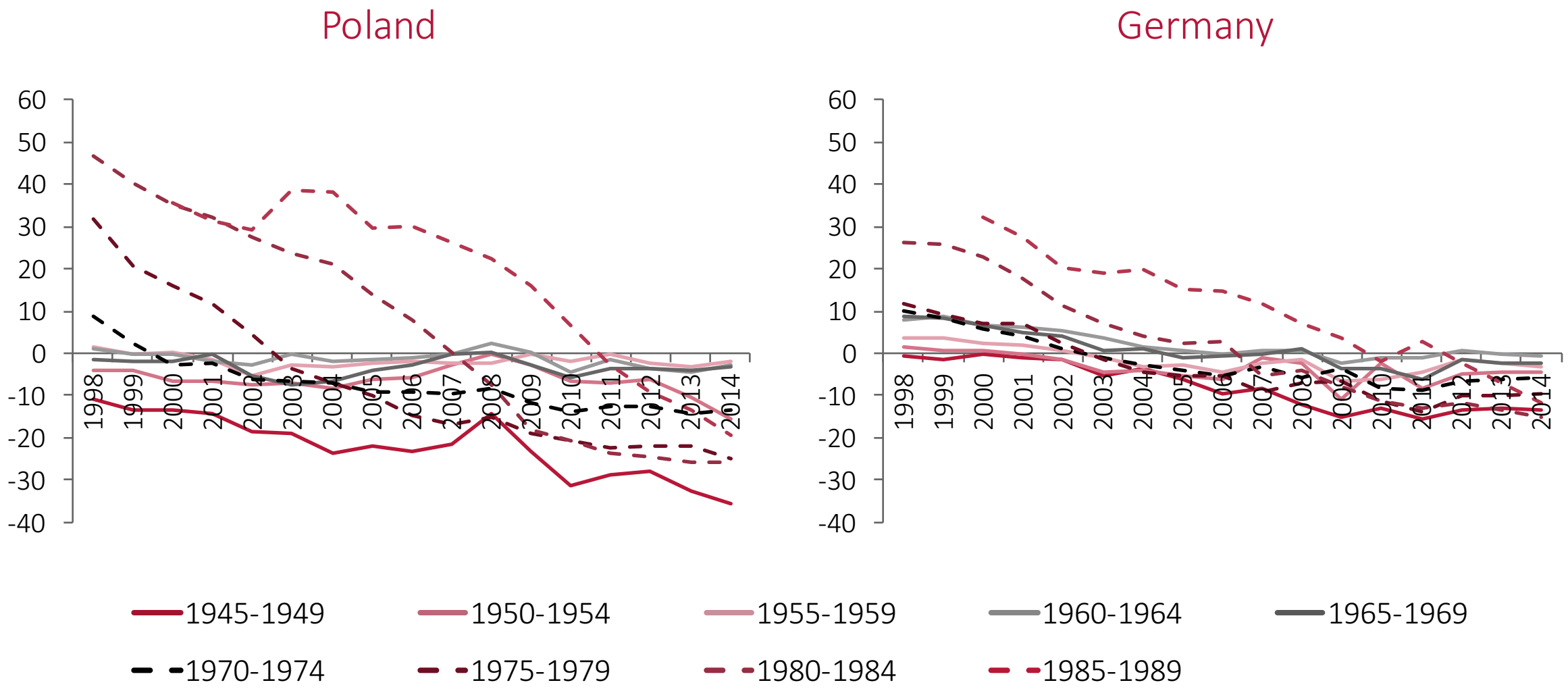
Non-routine cognitive tasks (pictured analytical): Younger cohorts are leapfrogging older cohorts



Routine cognitive tasks:
Reshuffling of cohorts in some countries, parallel declines in others



Routine manual tasks:
Steepest decline among younger cohorts



How does the age structure of routine intensive jobs change?

- Jobs rich in routine tasks are often rich in non-routine ones too
- Autor & Dorn (2009) – index of routine-task intensity
- RTI ↗ with relative importance of routine tasks,
  ↘ with relative importance of non-routine ones

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

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

Routine intensive occupations are ageing faster

Regression models	Δ mean age of occupation *i*, 1998-2010			
	Germany	Spain	Denmark	Poland
RTI in occupation *i* in 1998	0.54**	0.79**	0.75**	0.87***
Δ share of occupation *i*, 1998-2010	-0.49	0.07	0.43*	0.22**

As the share of young workers declines more in routine occupations

Regression models	Germany			Spain		
	Δ 15-29	Δ 30-54	Δ 55-64	Δ 15-29	Δ 30-54	Δ 55-64
RTI in occupation i in 1998	**-0.023****	0.025**	0.002	**-0.053*****	0.063***	-0.008
Δ share of occupation i, 1998-2010	0.023**	-0.019	-0.005	0.005	-0.007	0.001

Plus in Eastern Europe the share of older workers rises

Regression models	Poland			Denmark		
	Δ 15-29	Δ 30-54	Δ 55-64	Δ 15-29	Δ 30-54	Δ 55-64
RTI in occupation *i* in 1998	**-0.023****	0.010	**0.012*****	**-0.019***	-0.020**	0.001
Δ share of occupation *i*, 1998-2010	0.002	-0.024***	0.005***	-0.019*	0.018**	0.002

Jobs intensive in non-routine cognitive tasks age slower

Regression models	Δ mean age of occupation *i*, 1998-2010			
	Germany	Spain	Denmark	Poland
NRC Analytical in occupation *i* in 1998	-0.25*	-0.36*	-0.46*	-0.67***
NRC Interpersonal in occupation *i* in 1998	-0.20	-0.49***	-0.50**	-0.57**

Routine jobs and the risk of unemployment

- Routine jobs are falling in most of the EU countries

- The share of workers aged 15-29 in routine occupations decreases (in 8 out of 12 analysed countries)

- This may lift the risk of unemployment, especially among the youngest workers

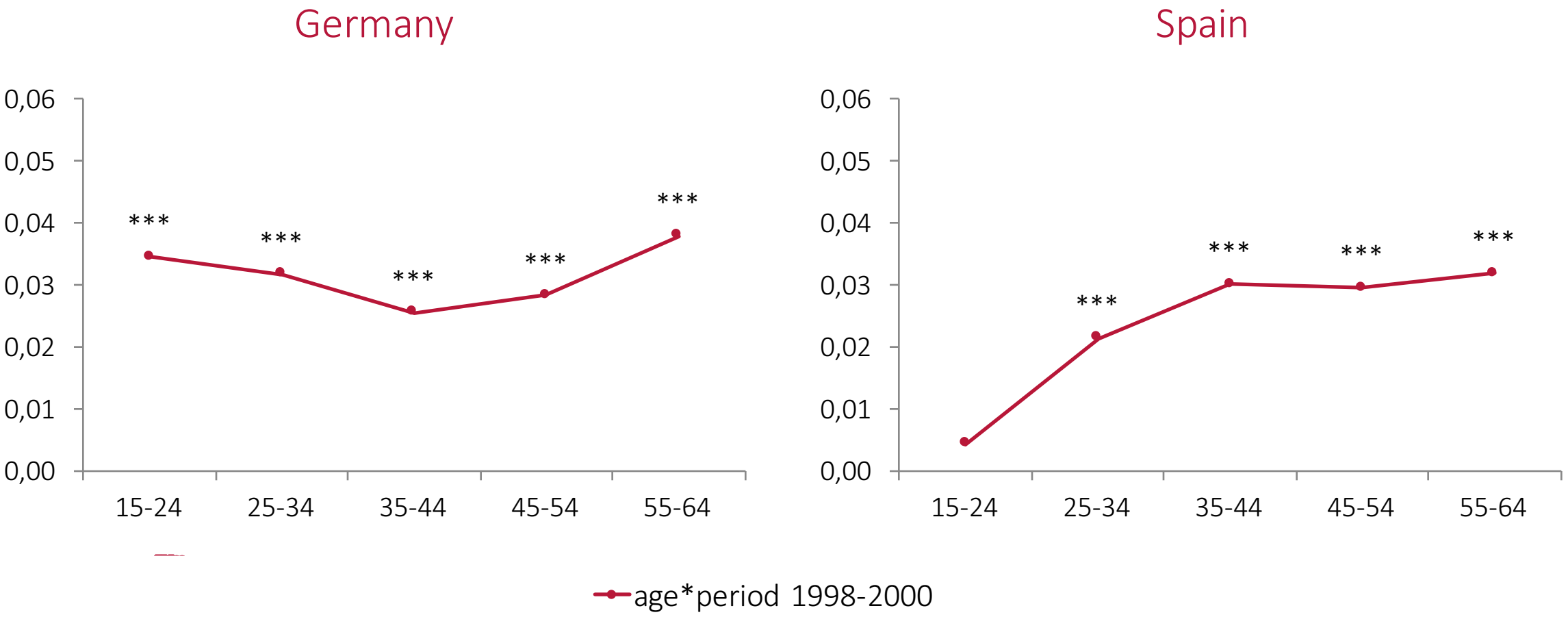
The higher RTI, the higher the change of unemployment rate

Regression models	Δ UR of occupation *i*, 1998-2010			
	Germany	Spain	Denmark	Poland
RTI in occupation *i* in 1998	-0.86***	2.45***	2.21***	-0.25

- What about the age dimension?

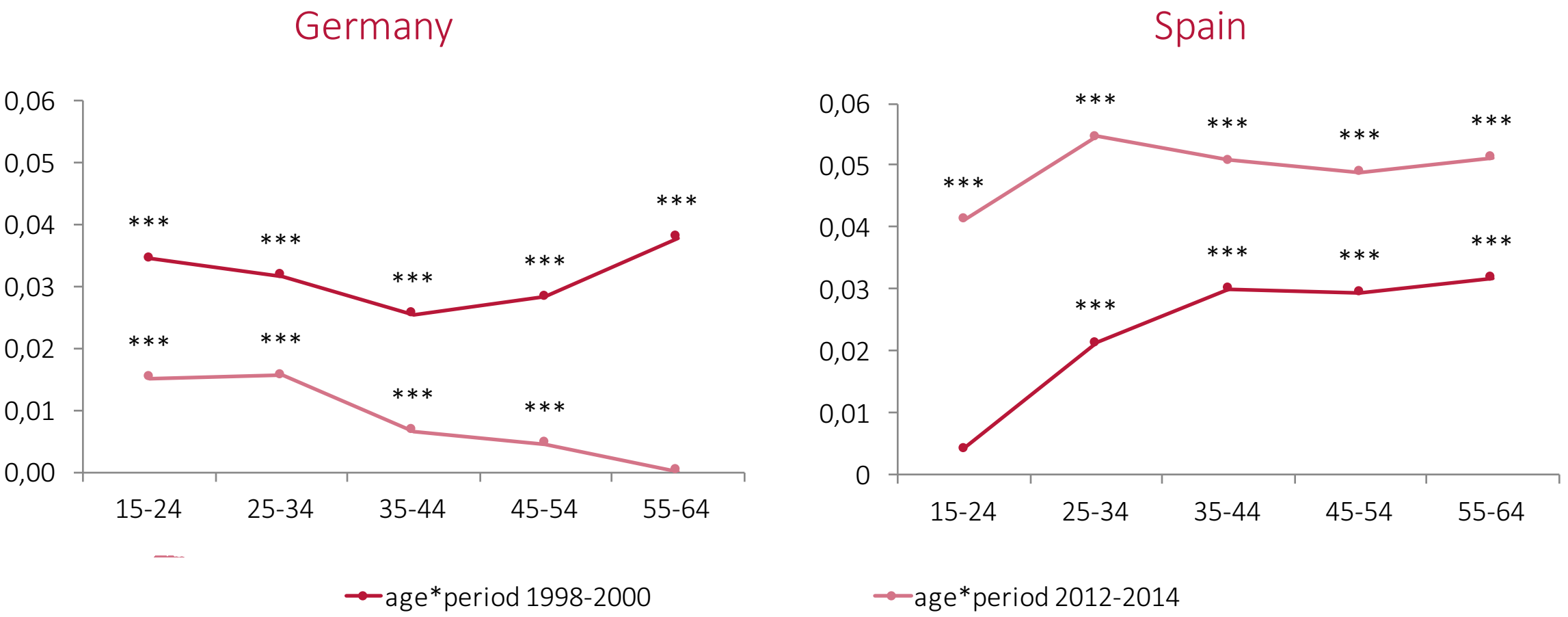
- Logit models for the probability of being unemployed
  (12 EU countries, accounting for changes over time, control variables)

The higher routine intensity, the higher probability of unemployment, especially among older workers



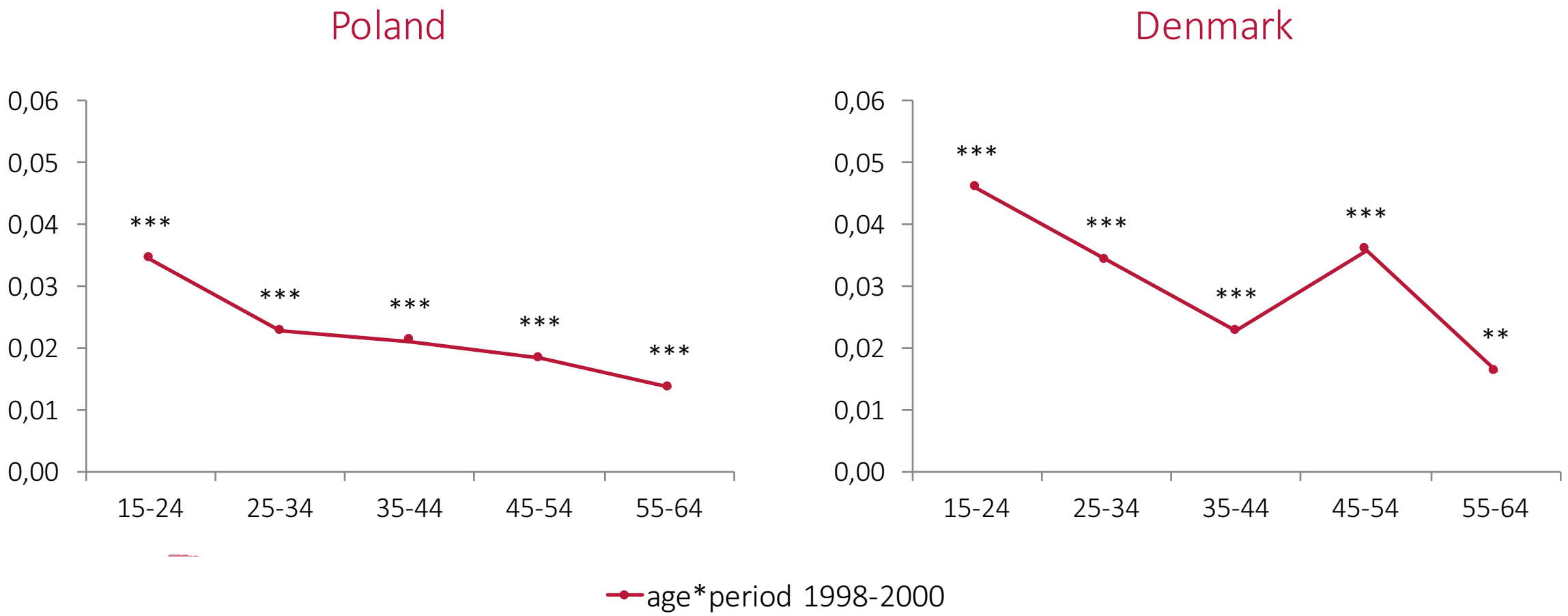
Marginal effects of RTI over age from country-specific logit regressions

The magnitude of RTI marginal effects changed over time



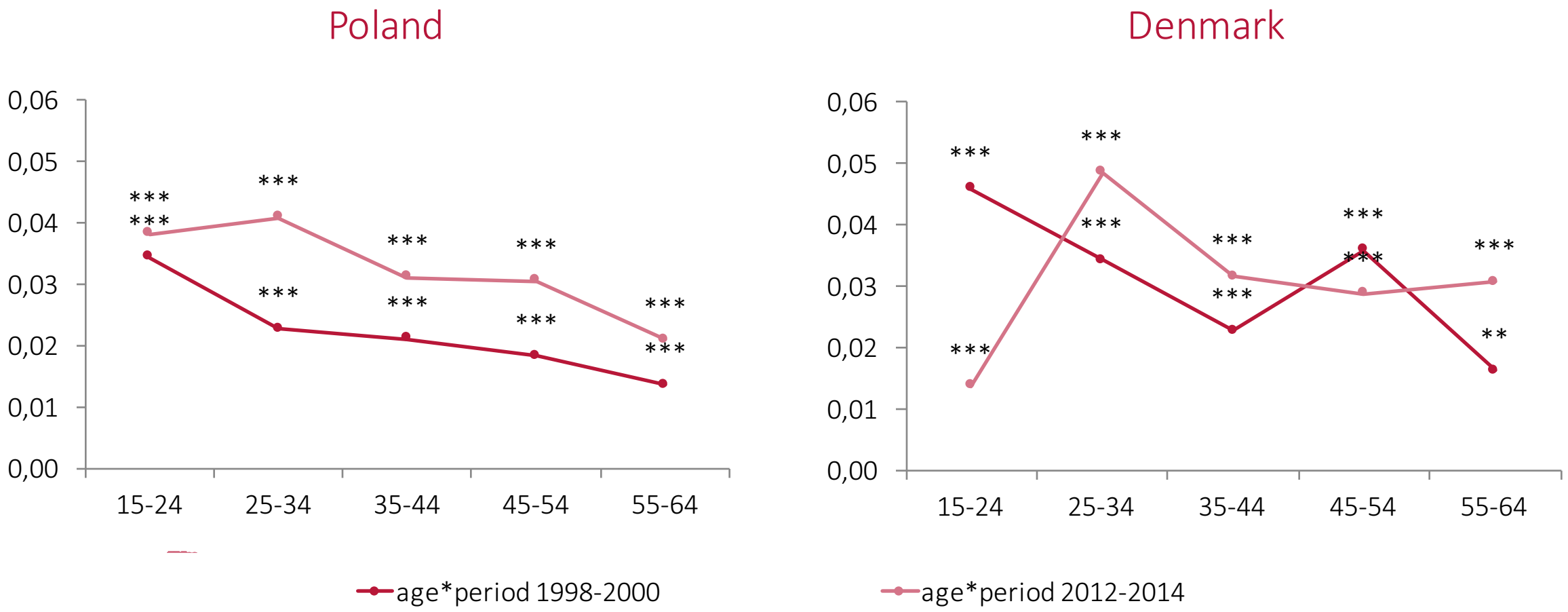
Marginal effects of RTI over age from country-specific logit regressions

In some countries younger workers are also vulnerable



Marginal effects of RTI over age from country-specific logit regressions

And this rather do not change over time (in the most of the countries studied)



Marginal effects of RTI over age from country-specific logit regressions

What tasks say about intergenerational differences in jobs

- Widespread shift from manual to cognitive work, with routine cognitive tasks shrinking in richer (EU15) countries
- Younger cohorts experience this change stronger 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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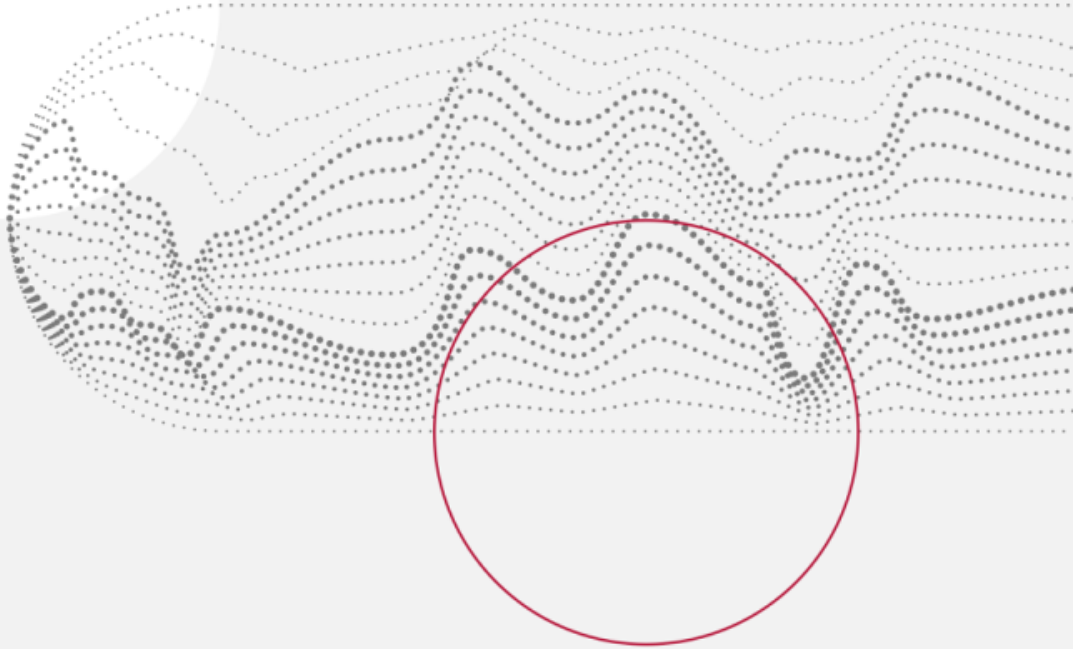

Is it correct to apply O*NET to European countries?

- 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

Upskilling is embodied in the **younger cohorts**