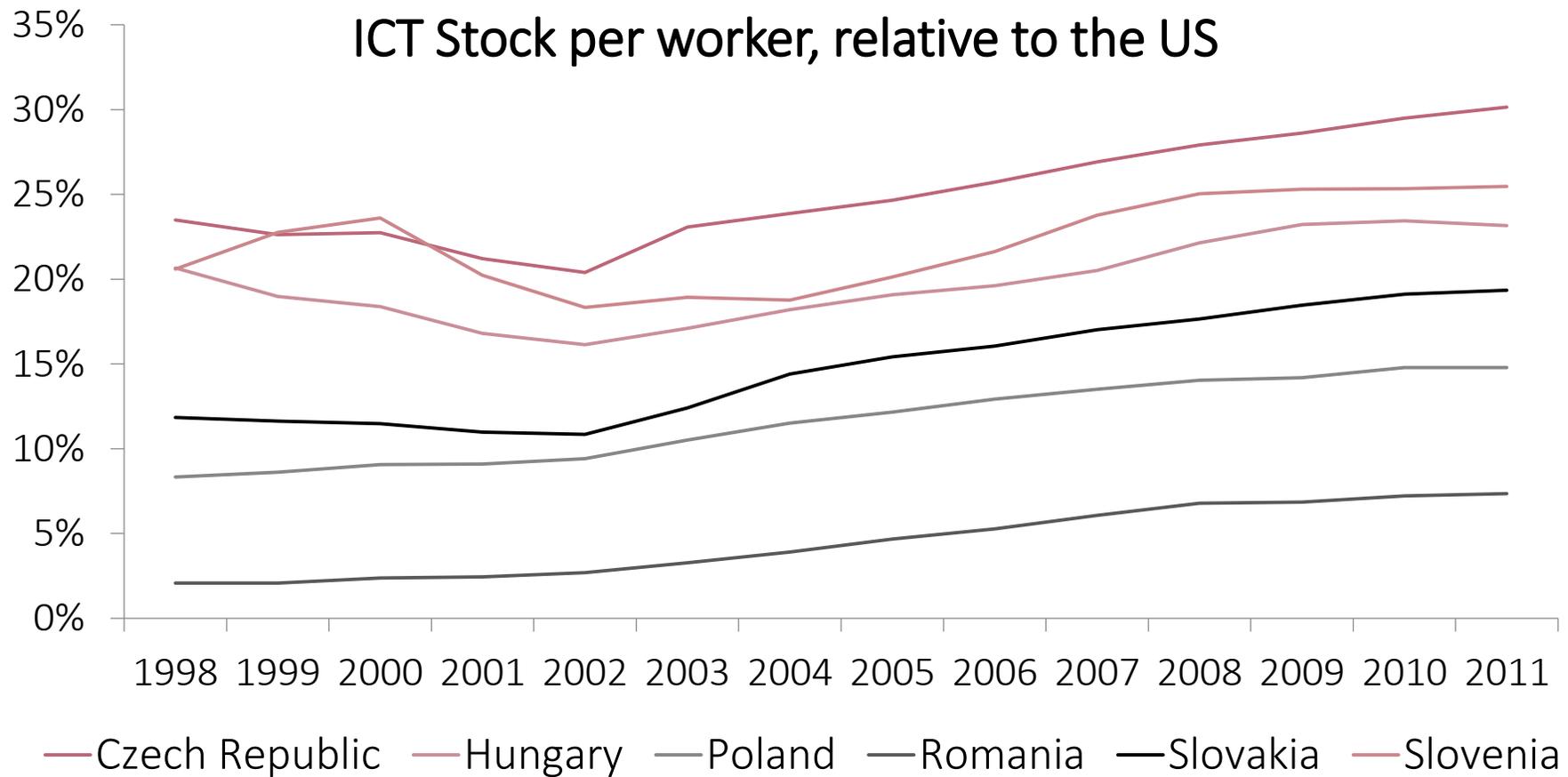


Technology or upskilling? Trends in the task composition of jobs in Central and Eastern Europe

Piotr Lewandowski

Roma Keister, Wojciech Hardy

Are the well-known task evolution patterns also present in countries at a lower development level?



Source: own calculations on Eden & Gaggi (2015) data on ICT capital stock and Eurostat data on employment

Post-transition labour markets were changing rapidly



- Macroeconomic convergence from middle- to high-income status
- Structural shifts
 - Agriculture ↘↘
 - Manufacturing ↘ but still quite large
 - Services ↗
- Educational boom
 - Primary and vocational ↘
 - Tertiary ↗

How do we measure task contents of jobs?



EU-LFS data for 10 CEE
countries, 1998-2013,
3-digit ISCO occupations

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O*NET data – editions
2003 and 2014

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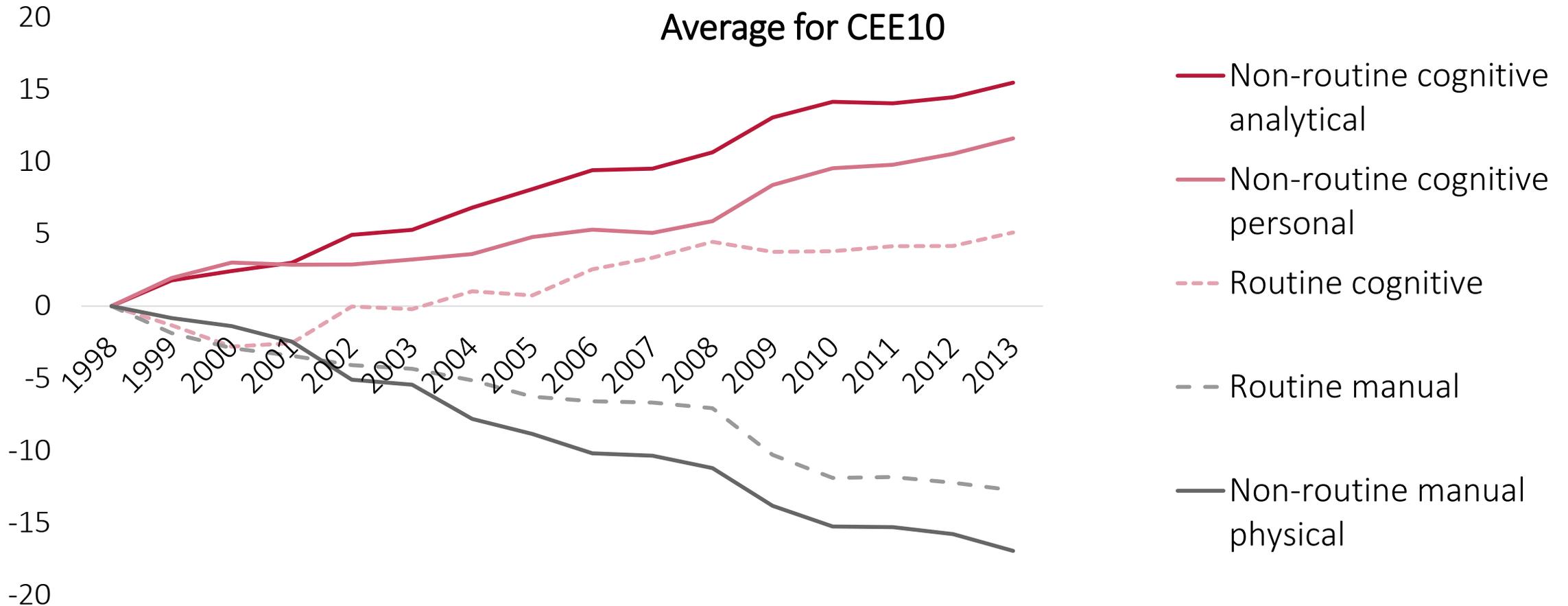


O*NET data – editions
2003 and 2014



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

Familiar picture except for **increasing intensity of routine cognitive tasks** . | :



Non-routine cognitive tasks ↗ and manual tasks ↘ across the CEE



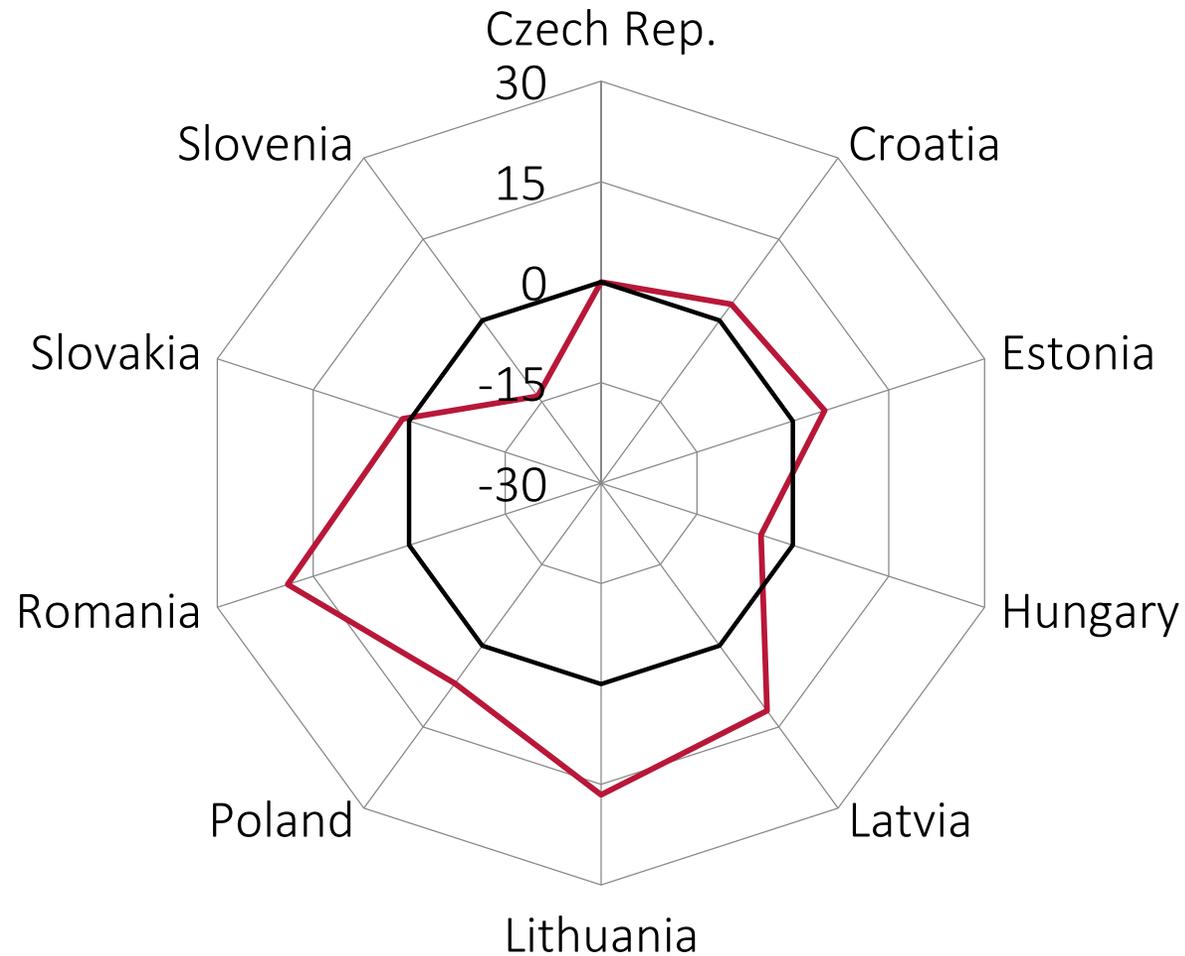
Non-routine cognitive analytical



Routine manual



But changes in **routine cognitive** tasks were heterogenous



What was the correlation between education, technology, and aggregate task content changes in CEE



- Regression of tasks contents on educational structure and R&D spending
- Panel fixed-effects, 1998-2012, 10 CEE countries
- R&D as a proxy for ICT

log ICT stock per worker	Coefficient	Std. err.	R ² within	R ² between	Correlation
R&D spending / GDP	118.9**	39.55			
Constant	-0.63	0.36	0.17	0.59	0.73
Observations	84 (6 countries)				

Workforce upskilling associated with growing non-routine cognitive and falling manual tasks



	Non-routine cognitive analytical	Non-routine cognitive personal	Routine cognitive	Routine manual	Non-routine manual physical
Share of persons with tertiary education attained	1.49***	0.82***	0.74	-1.18***	-1.74***
Share of persons with secondary education attained	0.71***	0.01	0.60	-0.33	-1.17*
R&D spending / GDP	3.73*	3.04*	-4.71	-3.01*	-1.81
R ² (between/within)	0.01/0.84	0.01/0.75	0.03/0.20	0.00/0.80	0.04/0.82

Shift-share decomposition of tasks content changes



- Structural change

$$\forall_{i \in T} BS_i = \sum_{j \in S} t_{i,j,03}^{98} (h_j^{13} - h_j^{98}),$$

- Educational change

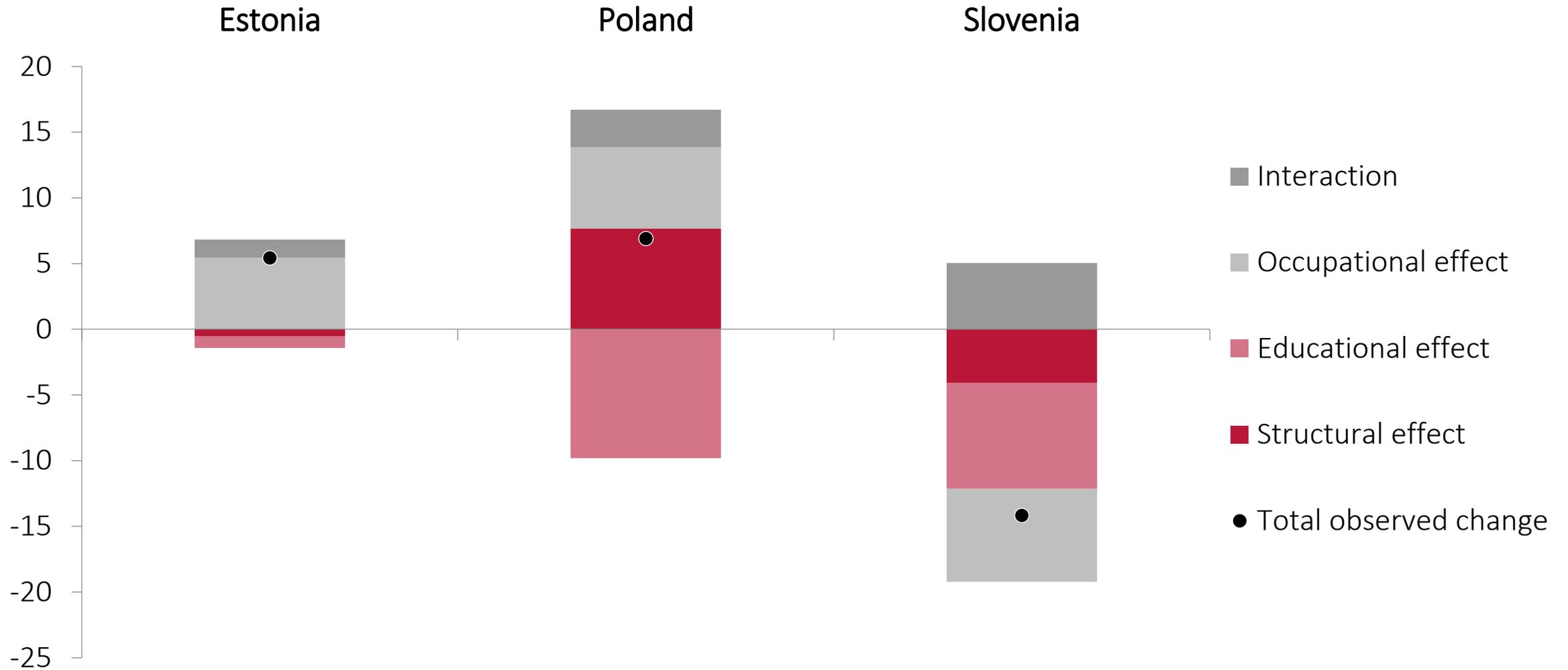
$$\forall_{i \in T} BE_i = \sum_{j \in S} \left[\sum_{k \in E} t_{i,j,k,03}^{98} \left(\frac{h_{j,k}^{13}}{h_j^{13}} - \frac{h_{j,k}^{98}}{h_j^{98}} \right) \right] h_j^{98},$$

- Occupational change

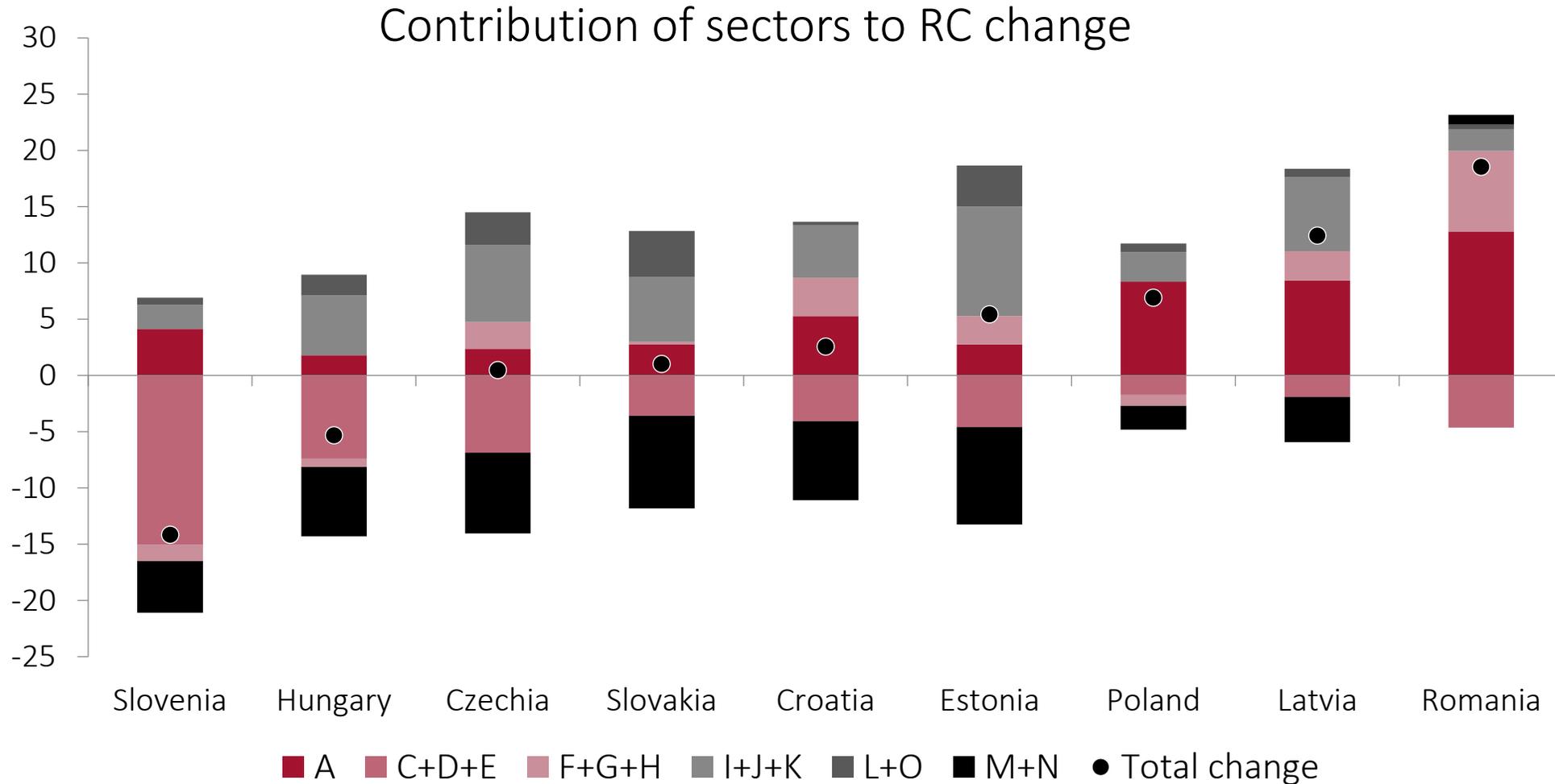
$$\forall_{i \in T} OC_i = \sum_{j \in S} \sum_{k \in E} (t_{i,j,k,14}^{13} - t_{i,j,k,03}^{98}) h_{j,k}^{98}$$

- Interaction (equation in the paper)

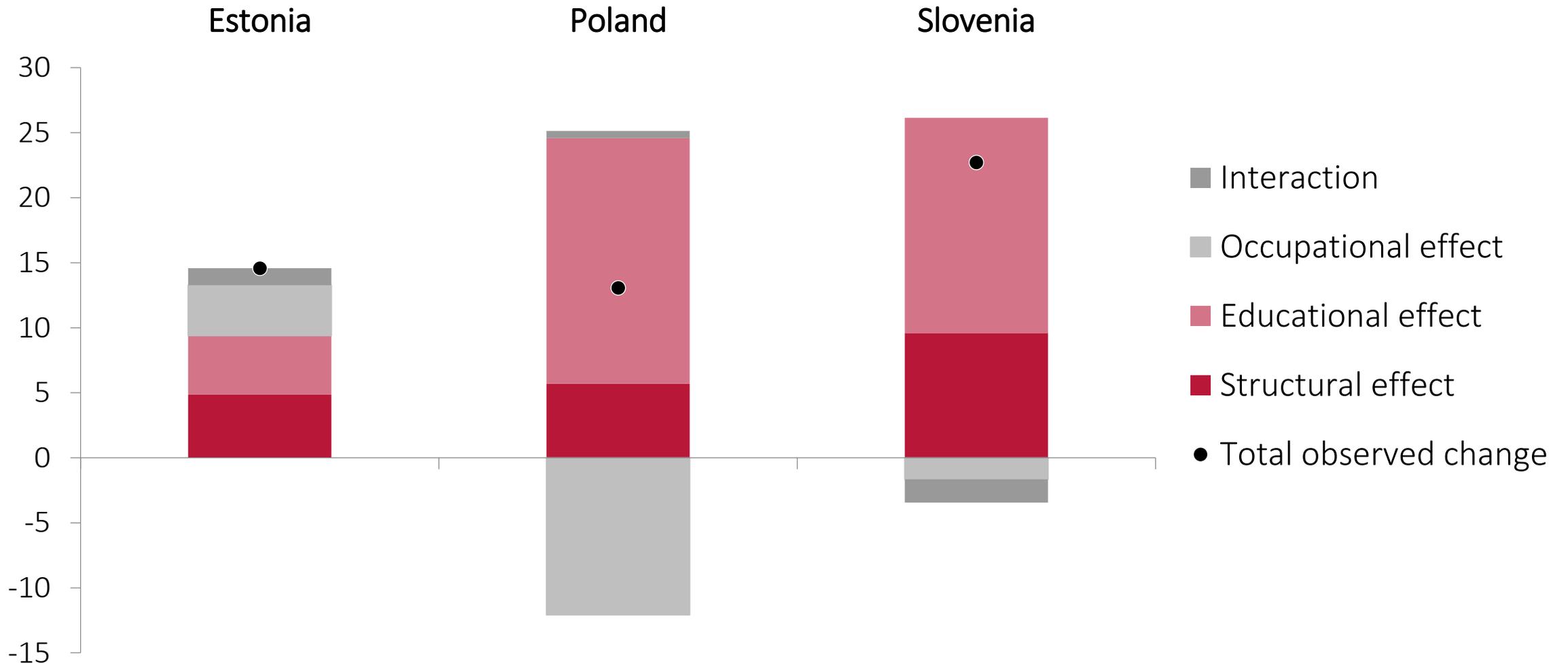
Structural and occupational changes drove the growth of routine cognitive tasks



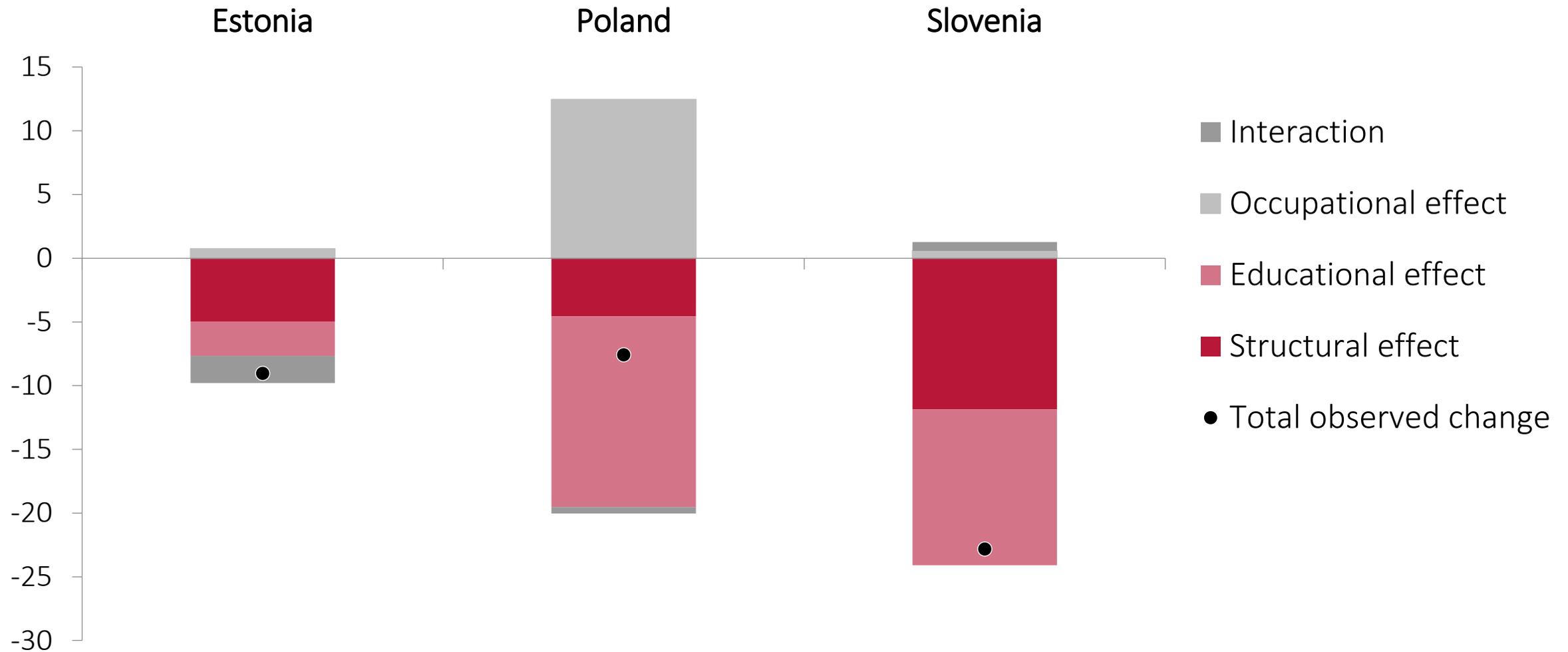
Agriculture contributed most of **routine cognitive tasks**' growth in countries where RC grew most



Educational boom fuelled the growth of non-routine analytical tasks



Educational boom fuelled the growth of non-routine analytical tasks and the fall of routine manual tasks



So far no de-routinisation in CEE



- Growth of non-routine cognitive tasks and decline of manual tasks
- Prevailing increase in routine cognitive tasks
- Changes largely attributed to workforce upskilling
- Structural change most important for the rise of routine cognitive

Thank you!

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