

Future Regional Labour Markets in Europe

Automation and skill complementarity

Deyu Li, Milene Tessarin, Sergio Petralia and Ron Boschma

Utrecht University

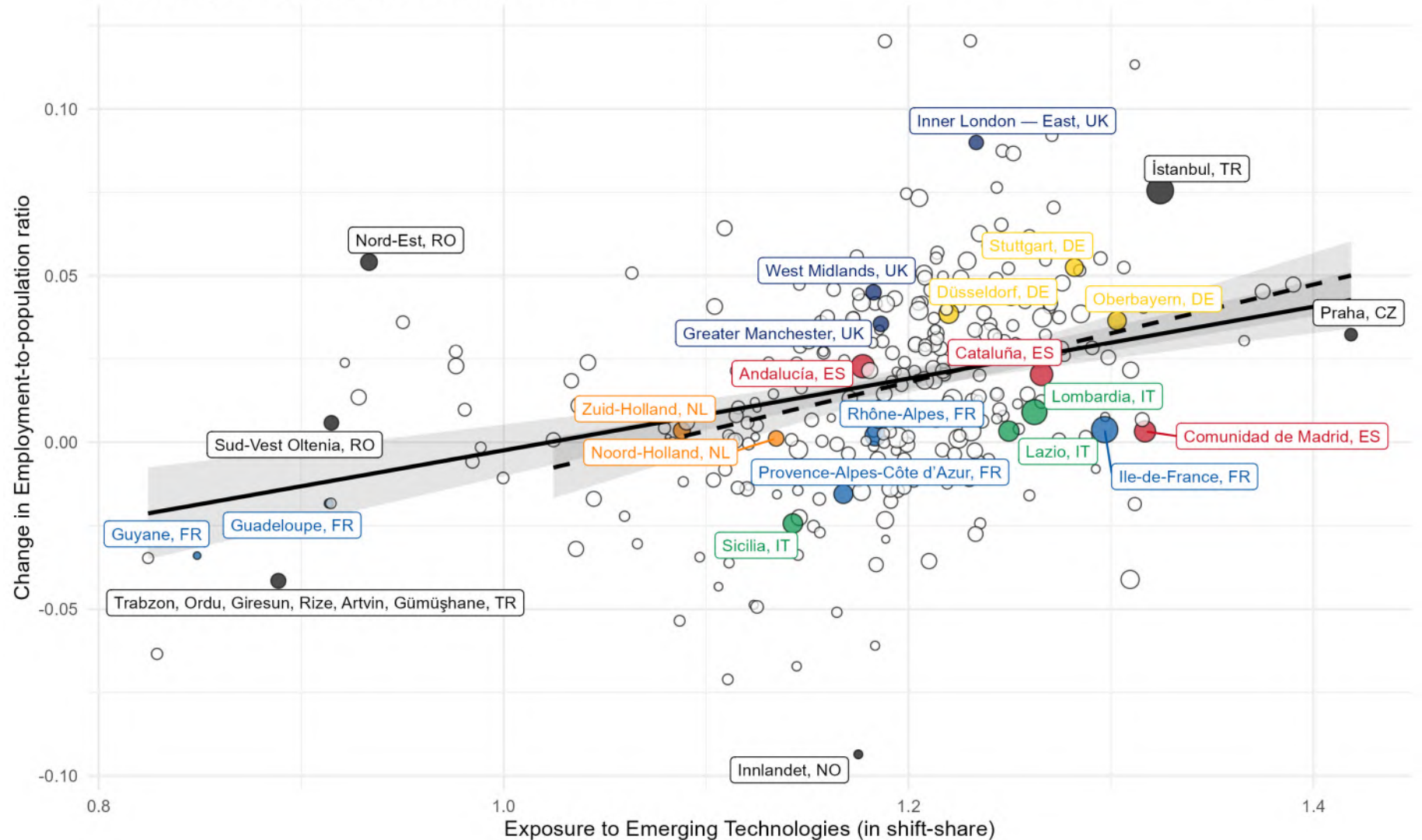
Horizon 2020 Research and Innovation Programme
Pathways to Inclusive Labour Markets (101004703)

Automation is a regional challenge

Positive relationship between employment growth and exposure to automation technologies

Change in Employment-to-Population Ratio and Exposure to Emerging Technologies

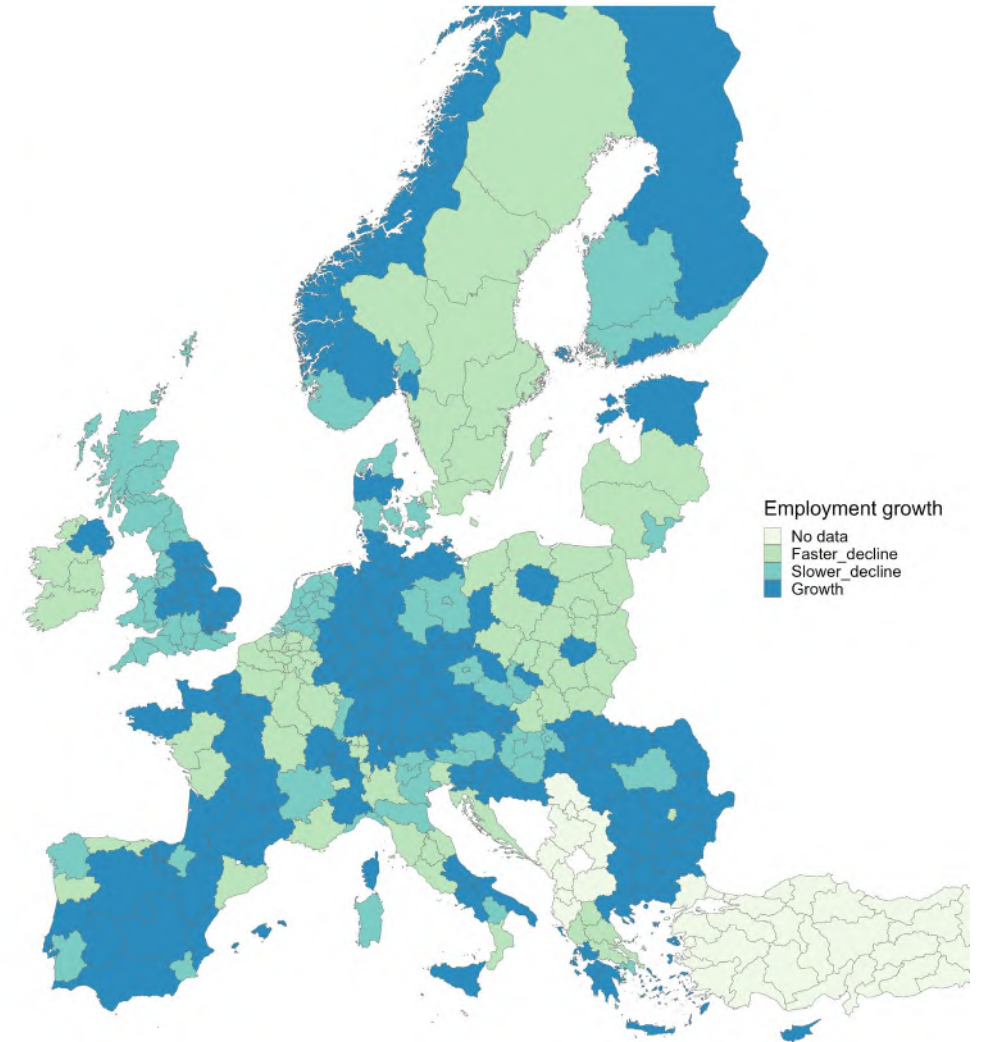
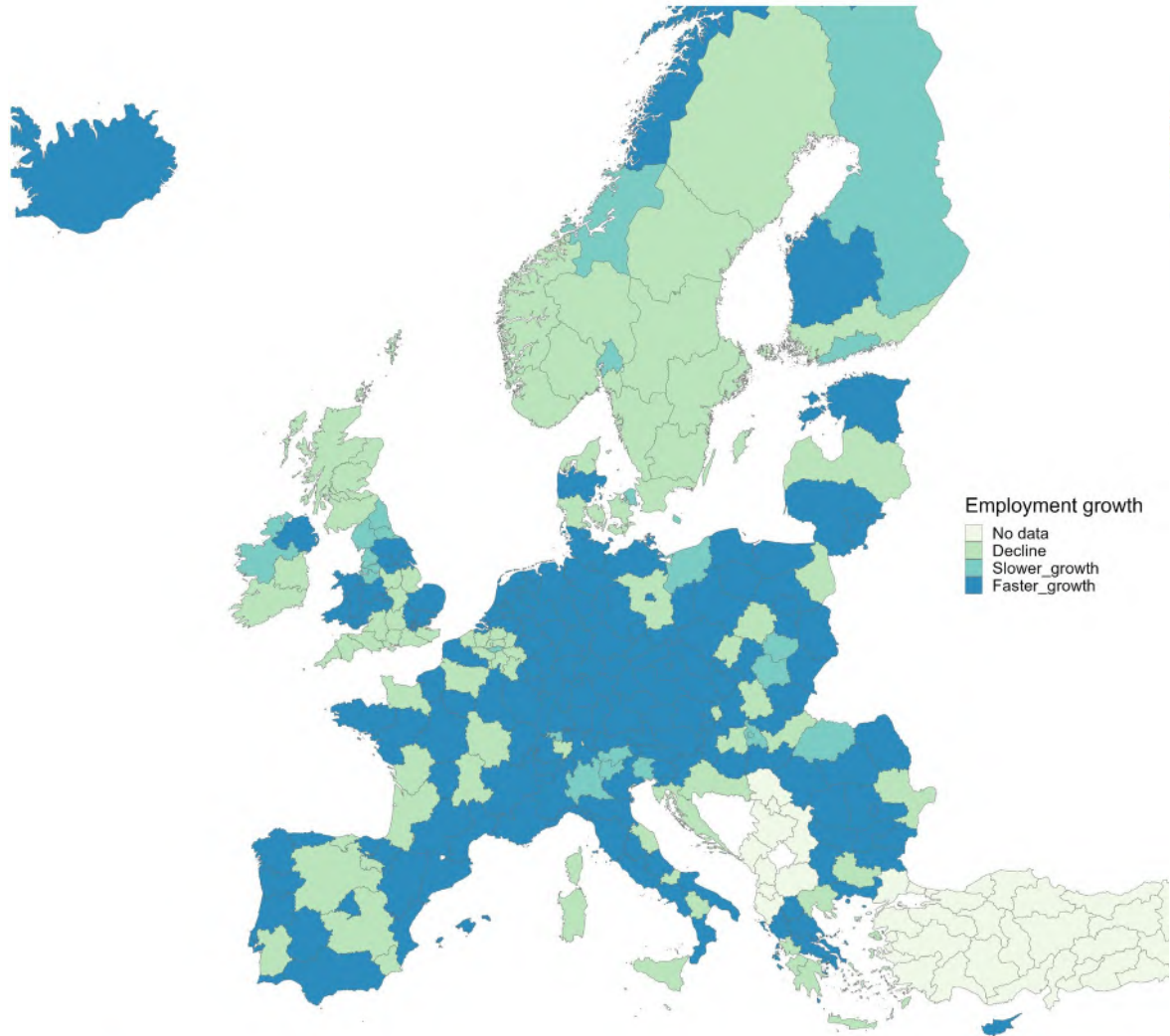
Relationship between the change in employment-to-population ratio and exposure to emerging technologies at the NUTS-2 level in European regions between 2010 and 2019



Employment dynamics (2014-2019)

ISCO 25 - ICT professionals

ISCO 83 - Drivers and mobile plant operators

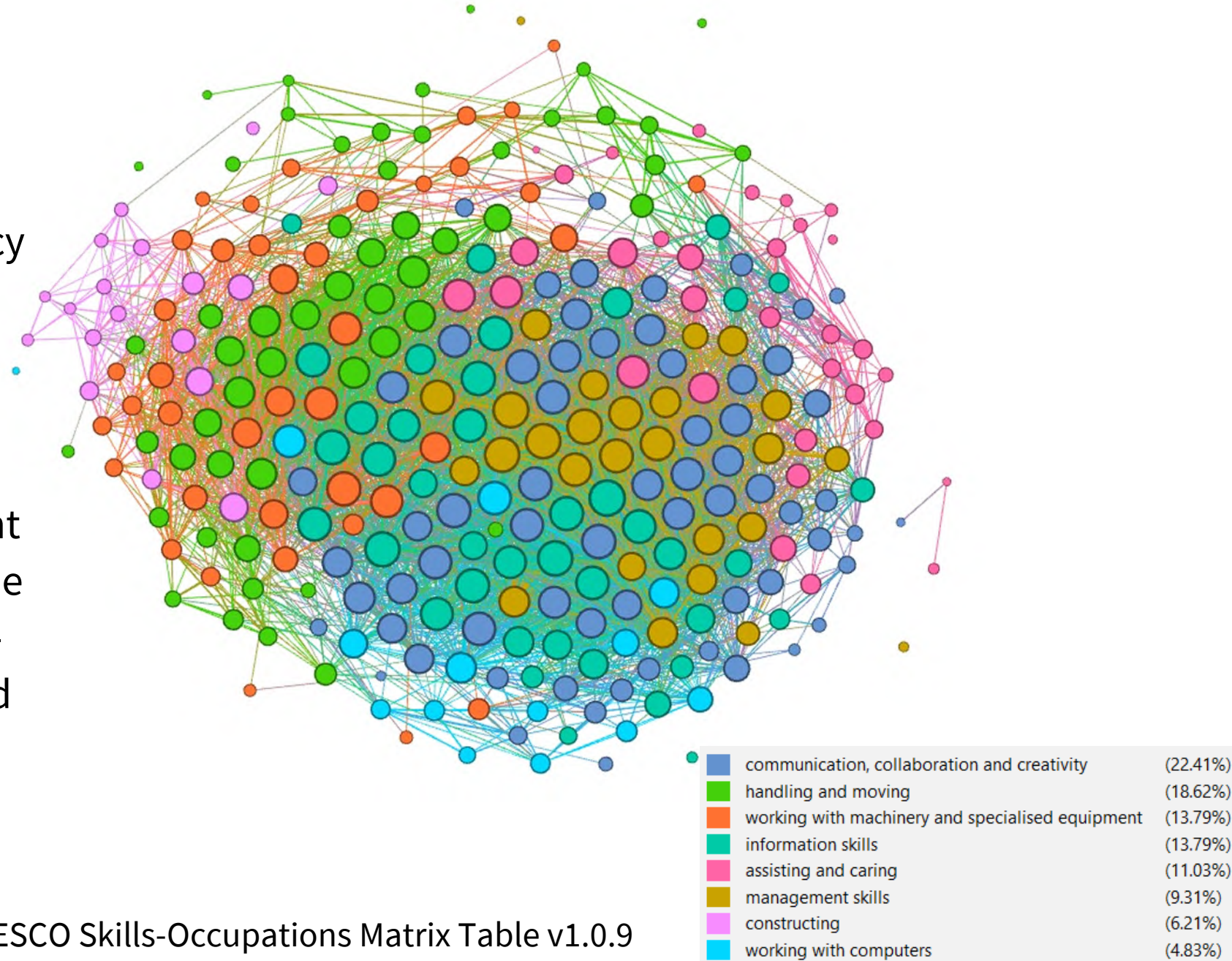


Complementarity between skills

Skill complementarity and skill space

Skill complementarity: frequency of two skills that are both used intensively in the same occupation.

Cognitive skills (i.e. management and information skills) tend to be more complementary than non-cognitive skills (i.e. handling and moving, constructing)



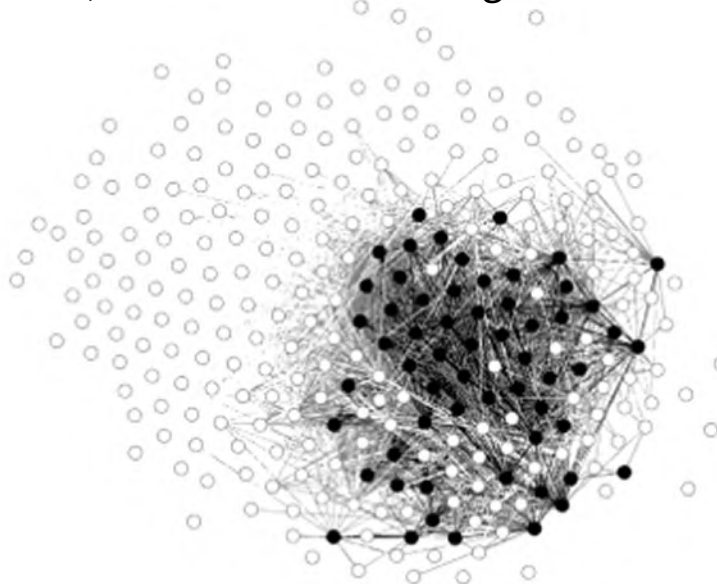
Occupations in the Skill Space

Black dots in the skill space: the skills that workers in each occupation most frequently use.

Significant heterogeneities between occupations

- Occupations with more cognitive skills are more complementary to other occupations
- Higher share of cognitive skills are associated with higher wage

Chief executives, senior officials and legislators



Information and communications technicians



Stationary plant and machine operators



Customer services clerks



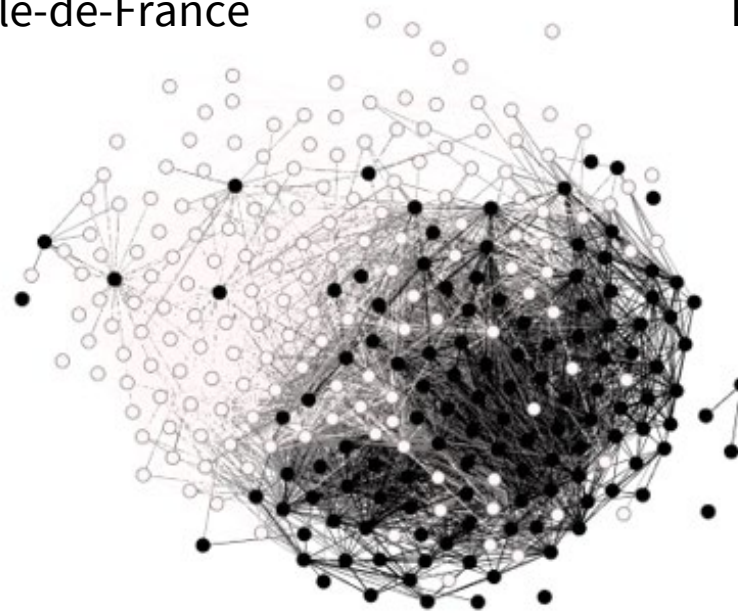
Regional labour markets in the Skill Space

Black dots in the skill space: the skills that workers in the region most frequently use.

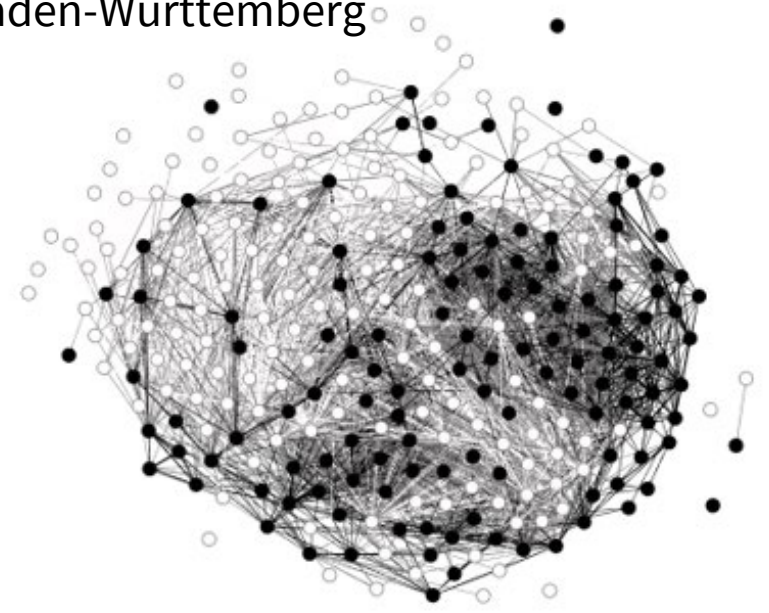
Significant heterogeneities
between regions

- Metropolitan regions / regions with strong industrial base
- Southern / periphery regions

Île-de-France



Baden-Württemberg



Southern Italy



Eastern Romania



*Outcomes of regional disparities in
complementary skills?*

Outcomes of regional disparities in complementary skills?

By occupation and region

- Occupations with higher automation exposure → lower employment growth
- Highly exposed occupations in regions with complementary skills and occupations → higher employment growth, lower risk of unemployment and higher rate of self-employment
- Job opportunities that require new skills are more likely to emerge in regions with complementary skills

Li *et al.* (2023a) Automation exposure, skill complementarity and labour market dynamics in European regions. *Forthcoming*

Li *et al.* (2023b) Automation exposure, within-occupation skill change and new job opportunities in European regions. *Forthcoming*

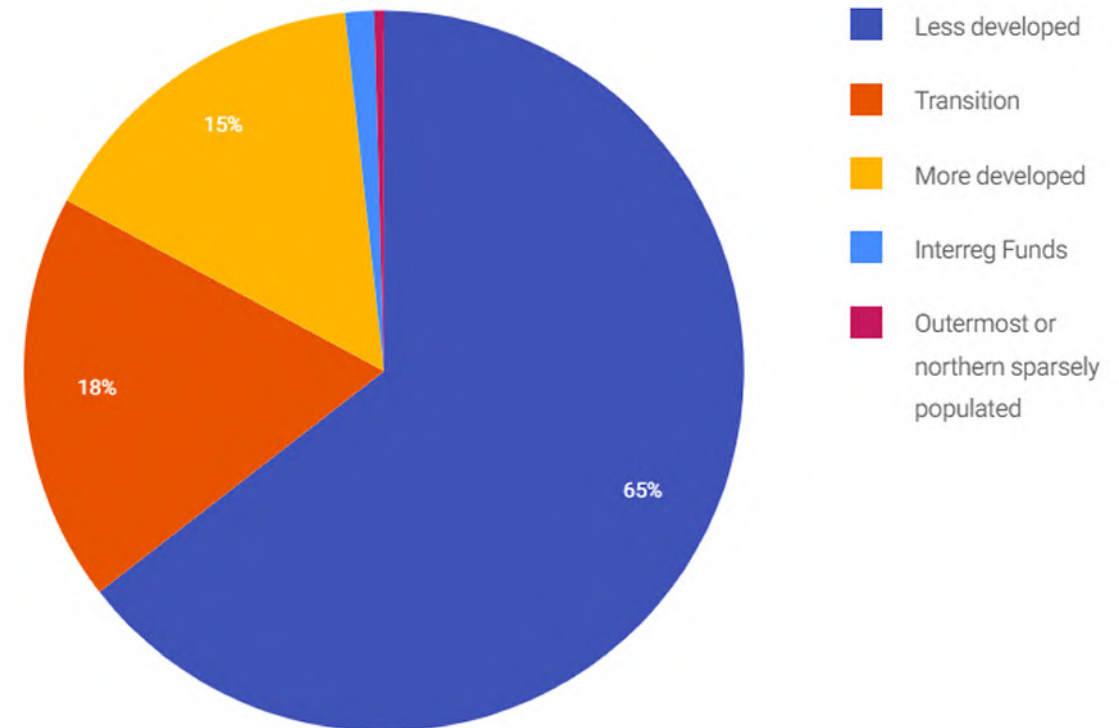
Outcomes of regional disparities in complementary skills?

Individuals in occupations that are highly exposed to emerging automation technologies

- More likely to transition to self-employment when unemployed
- More likely to lose jobs or have lower wages, especially in self-employment
- Better off in regions with many complementary skills and occupations

How to overcome the challenges in the future

- Cohesion policies (2021-2027) support education, training and skills in the less developed regions (Hernández Littlewood *et al.*, 2023)
- The importance of complementary skills
- Identifying the complementary capabilities between regions to facilitate interregional cooperations, especially between economically leading and lagging regions (Balland and Boschma, 2021; Bachtrögler-Unger *et al.*, 2023)





**Utrecht
University**

Sharing science,
shaping tomorrow