New Technologies and Jobs in Europe

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Motivation: New technologies and the labor market

- Media routinely portray a future where AI and robots will "take all our jobs"
- However, economic theory suggests that:
  1. Automation displaces human labor from certain tasks → Displacement effect
  2. But it also raises productivity, which can potentially increase labor demand in other tasks or create new tasks → Productivity and Reinstatement Effect

Which effect dominates?

Study this question in the specific context of AI (different from previous automation waves!) and across 16 countries in Europe

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This paper: Data and methods

Data:

- Occupation-level measures of exposure to new technologies:
  1. AIOI (Felten et al. 2019) - 2015
  2. Exposure to artificial intelligence and software (Webb 2020)
- Labor market data: EU-LFS. Employment shares, centiles of average wages
- Coverage: 15 euro area countries + UK

Methods:

- Pooled and country-level regressions of changes in employment share / wages on measures of AI / software exposure
- Unit of observation: sector-occupation
- Theoretical model to disentangle different effects of AI

This paper: Findings

1. AI exposure positively correlated with increases in employment shares
2. Effect larger for occupations with relatively younger and more skilled workers
3. Heterogeneous but mostly consistent relationship across countries
4. AI exposure not significantly associated with relative wages

→ **Reinstatement effect seems to dominate**

Definitions

Software and Computers

Software and computers perform tasks by implementing manually-specified rules

Artificial Intelligence (AI)

Machine learning algorithms that learn to perform tasks by following statistical patterns in data, rather than following instructions given by humans.

- AI has the potential to affect all occupations
- Differently from other technological developments, AI does not affect only routine jobs $\rightarrow$ Highly-educated workers more exposed

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Measures of AI exposure / exposure to new technologies

1. What are the measures of AI exposure capturing?
   - An advantage of the paper is to look at broad measures of AI exposure, as opposed to other existing work looking at, e.g., robots (relevance!)
   - However, relatively low correlation between measure from Webb (2020) and Felten et al. (2019)
   - Could be useful to add a plot with levels of the two AI exposure measures by occupation
   - How do these measures correlate with, e.g., uptake of robots at the occupation/industry level, or other existing measures of automation?

2. Timing:
   - Deployment of new software was probably already quite advanced in the period of analysis
   - In contrast, AI was (still is?) probably in its infancy (Acemoglu et al. 2022)
   - How does this difference in timing affect the interpretation of the results?
   - Webb (2020) finds large negative effects of software exposure on changes in employment shares between 1980 and 2010 (in the US)

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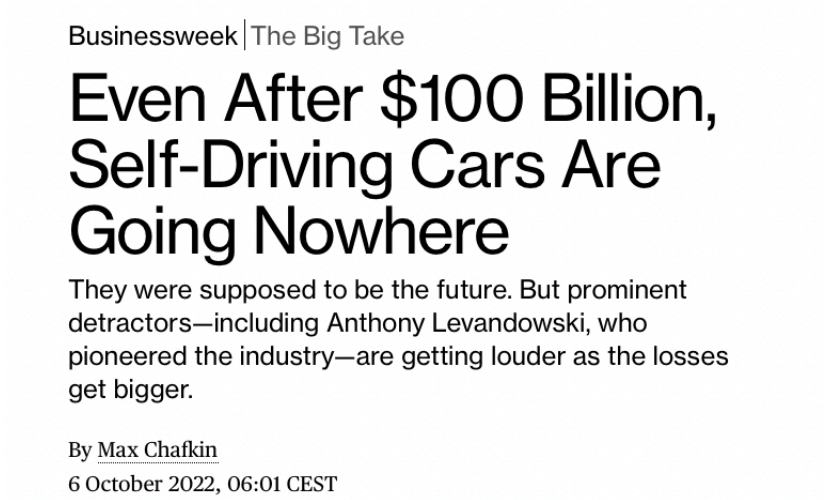
Actual AI exposure

Advances in AI enabled automation may be lagging behind relative to potential exposure (in certain sectors more than others)



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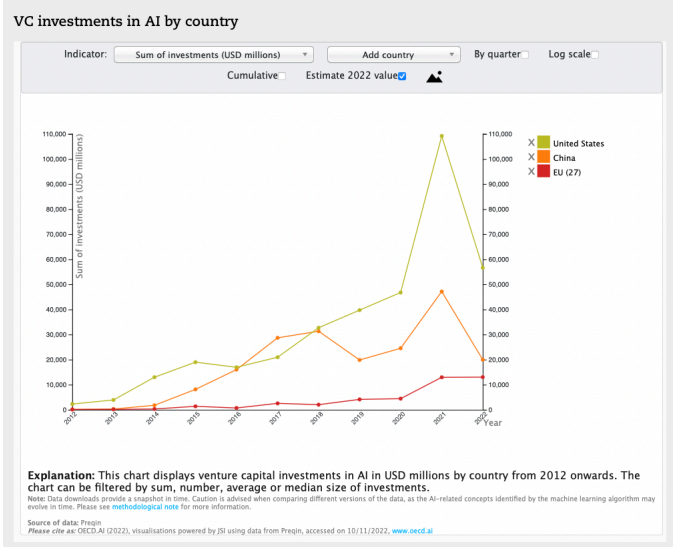
They were supposed to be the future. But prominent detractors—including Anthony Levandowski, who pioneered the industry—are getting louder as the losses get bigger.

By Max Chafkin

6 October 2022, 06:01 CEST

Actual AI exposure

Lower investments in AI in Europe compared to e.g. US or China



Empirical specification

$$y_{so,c} = \alpha_c + \alpha_s + \beta_c X_{so,c} + \epsilon^S_{so,c} \quad (1)$$

- Use country x sector fixed effects to absorb country x sector specific trends
- Add controls at country-occupation level
  - Avg. years of education
  - Avg. age
  - Female share of employment
- Control for software exposure in AI regressions?
- Can you look at effects on the composition of workers (within sector-occupation cell) by using as additional outcome variables:
  - Change in share of workers with high education
  - Change in average / median age of workers

Heterogeneity

Across countries:

- What is the role of labor market policies in explaining cross-country heterogeneity?
- Employment protection
- Active & passive labor market policies

Across sectors:

- Some sectors likely exposed to AI more than others where the deployment of AI is costly (service sector vs manufacturing)
- Run the analysis separately by sector
- Are the employment effects different in sectors with larger deployment of AI?

Summary

- **Important question!**
- The main contribution is the fact that the analysis covers 16 countries
- The authors could do more on the cross-country heterogeneity of results
- Clarifying what the different measures of exposure to new technologies capture would be useful