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Discussion of paper by Eszter Baranyai, Marcell Granát, Mór Szepesi

“The Impact of Large Language Models on the Labour Market: Spatial Evidence from Job Ads in Hungary“

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The Impact of AI on the Macroeconomy and Monetary Policy
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What this paper does?

- Web-scrapes **job adds data** and links it to **O*NET** by:
  - job tasks description
  - job titles

- Applies exposure to LLM according to estimates by Eloundou et al. (2023) and Briggs and Kodnani (2023) across O*NET occupations

- Finds that LLM exposure of jobs advertised is **on average 10%** in Hungary
  - Slightly lower than in the US
  - The majority of jobs have exposure below 30% -> authors interpret it as **LLM being complementary** and not substitutable to existing tasks

- Finds **large spatial differences in** exposure to LLM -> big cities much more exposed

-> **Contribution**: focus on LLM, spatial differences in exposure

Comments

1. **Validity**: job adds vs whole labour market

2. **Interpretation**: complementarity vs substitutability of LLM

3. **Contribution**: counterfactual regional inequality without LMM; LMM and monetary policy

Validity: job adds vs occupational structure

- Authors create large machinery to link Hungarian job descriptions and job titles to O*NET
  - 2 alternative strategies: task description vs job titles

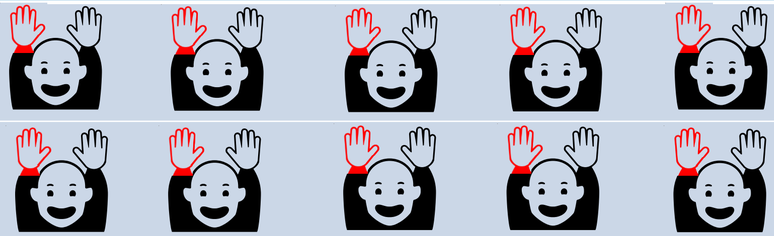
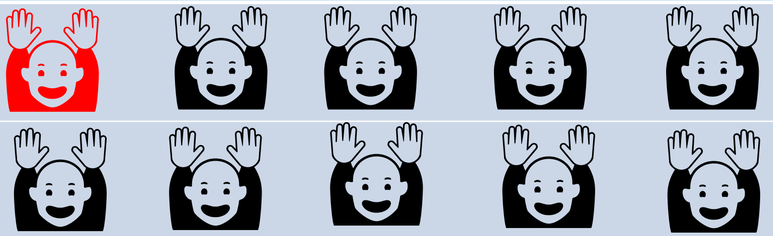
- Apply findings of 2 papers on exposure to LLM by O*NET occupations
  - Eloundou et al. (2023) vs Briggs and Kodnani (2023)

- However, no efforts are made to estimate whether occupational structure in **job adds** is representative to occupational structure of **labour market**
  - Job adds are web-scraped in early 2024, Chat GPT was introduced in 2022 -> structure of **occupations in job adds are affected by LLM**
  - Very likely that jobs affected/killed by LLM are underrepresented in job adds or not there at all -> downward bias in exposure
  - Authors acknowledge the under-coverage of blue-collar jobs -> upward bias in exposure

- **Suggestion**: take the occupational structure from LFS at **2-digit ISCO** level & industry structure at **1-digit NACE** level and create **calibration weights** so that job adds data would be representative to the Hungarian labour market
  - Especially relevant for unconditional estimates on exposure

Interpretation: complementarity vs substitutability

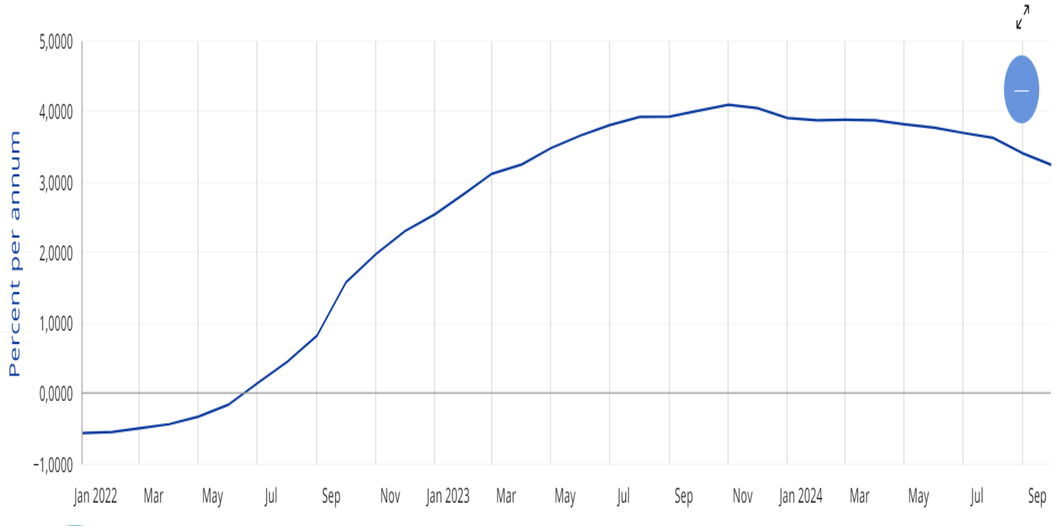
- Authors: „Very rarely does job-level exposure exceed 30%, highlighting **complementary** attributes“

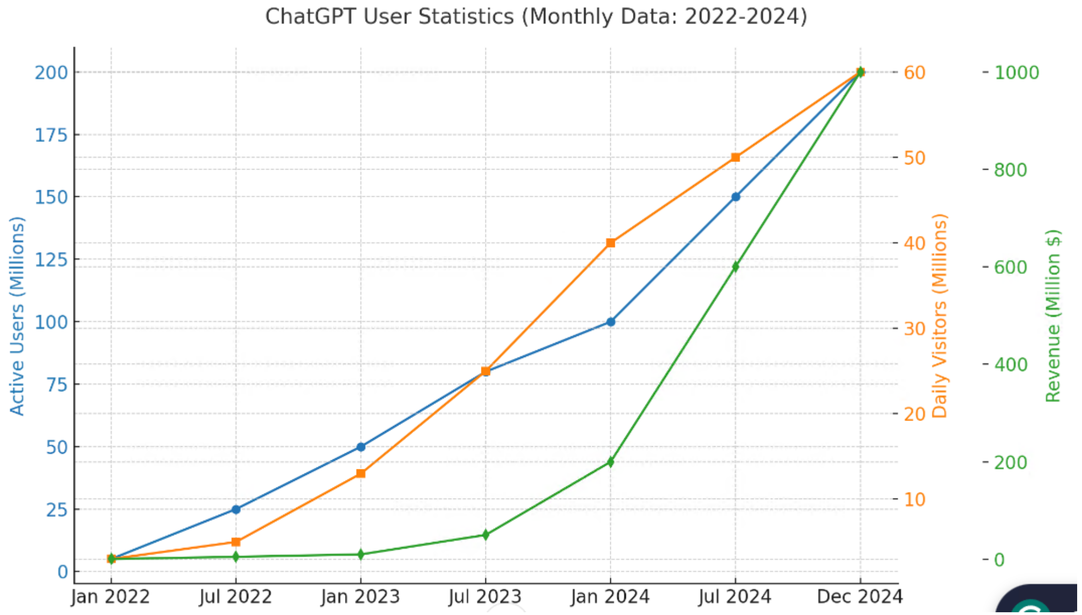
Complementarity a la Bessen (2019): technology boosts employment	Substitutability a la Harrison et al. (2014): process innovation allows more effective production
	

- **Can complementarity be tested? Suggestion**:
  1. Conduct **industry-level analysis** of highly exposed industries (ICT) vs moderately exposed industries (bank) to analyse whether their labour demand increases or decreases with introduction of LMM (GPT-3.5, GPT-4, GPT-4o)
  2. Ask professioon.hu for a **time-series of job posts**, e.g. repeated snapshots at the end of month since 2021M1 to estimate whether change in frequency of job adds by **occupations** changes with introduction of LLM

Contribution

- The LLM exposure detection machinery is **under-exploited**
- Much more inference can be obtained after establishing whether LMM complements or substitutes employment
- **Suggestion 1**: create counterfactual analysis of employment and wages by regions without LMM
  - There are large income differences between cities and rural areas: Is LMM aggravating these inequalities further or alleviating them?
- **Suggestion 2**: LMM coincides with interest rate hikes, disentangle the two effects
  - Left: earnings heterogeneity channel of monetary policy: interest hikes -> higher inequality in earnings (Amberg et al., 2022; Broer et al., 2022; Hubert & Savignac, 2023)
  - Right: GhatGPT users by ChatGPT





References

- Amberg, N.; Jansson, T.; Klein, M.; Picco, A., R. (2022) Five Facts about the Distributional Income Effects of Monetary Policy Shocks. American Economic Review: Insights, 4, 289 – 304.
- Bessen, J. (2019) Automation and jobs: when technology boosts employment. Economic Policy, 34(100), 589–626.
- Broer, T., Kramer, J.; Mitman, K. (2022) The Curious Incidence of Monetary Policy Across the Income Distribution. Sveriges Riksbank Working Paper Series 416,.
- Harrison, R.; Jaumandreu, J.; Mairesse, J.; Peters,B. (2014) Does innovation stimulate employment? A firm-level analysis using comparable micro-data from four European countries. International Journal of Industrial Organization, 35, 29-43.
- Hubert, P.; Savignac, F. (2023) Monetary policy and labor income inequality: the role of extensive and intensive margins. CEPR Discussion Paper 18310.