Tracking labour market during wartime

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Challenges since the full-scale invasion

- “Collapse” of official statistics
  - Discontinued/disrupted surveys
  - Lagged data or missing
- Policymakers have tried to conduct alternative surveys
  - Sparse/Irregular data
- Severe composition drift
  - Occupation mix, regional coverage, and wage levels distorted by displacement and reporting collapse

⇒ Online vacancies as the alternative: real-time statistics

Roadmap

- Jooble data: Pros and Cons
- Data processing
- Trends in demand and “supply” since Jan 2022
- Wage and labour demand/supply: A glance
- Next steps

Jooble platform

- A global job search aggregator collecting job listings from thousands of company websites, recruitment agencies, and job boards
- Operating in over 70 countries
- Headquartered in Ukraine
- One of the largest job search platforms in Ukraine

Jooble data - Coverage

- From Jan 2022, continuously updated until now
- Vacancies were de-duplicated by Jooble
- Sample for analysis: Jan 2022 – August 2024
- Data fields: job identifier, title, description, location, min salary (if available), currency, salary rate, number of clicks (**from August 2022**), and created date

Jooble data - Limitations

- Lack of representativeness:
  - over-represent certain sectors (e.g., technology, professional services), occupations (e.g., white-collar roles), urban areas, and jobs requiring higher education
  - under-represent jobs in public and informal sectors and labourers
- Posted wage ≠ Transacted wage

Jooble data - Pros

- Broad coverage
- Rich meta data
- Could be utilised to extract real-time, “surviving” signals when official data collapse

Data processing

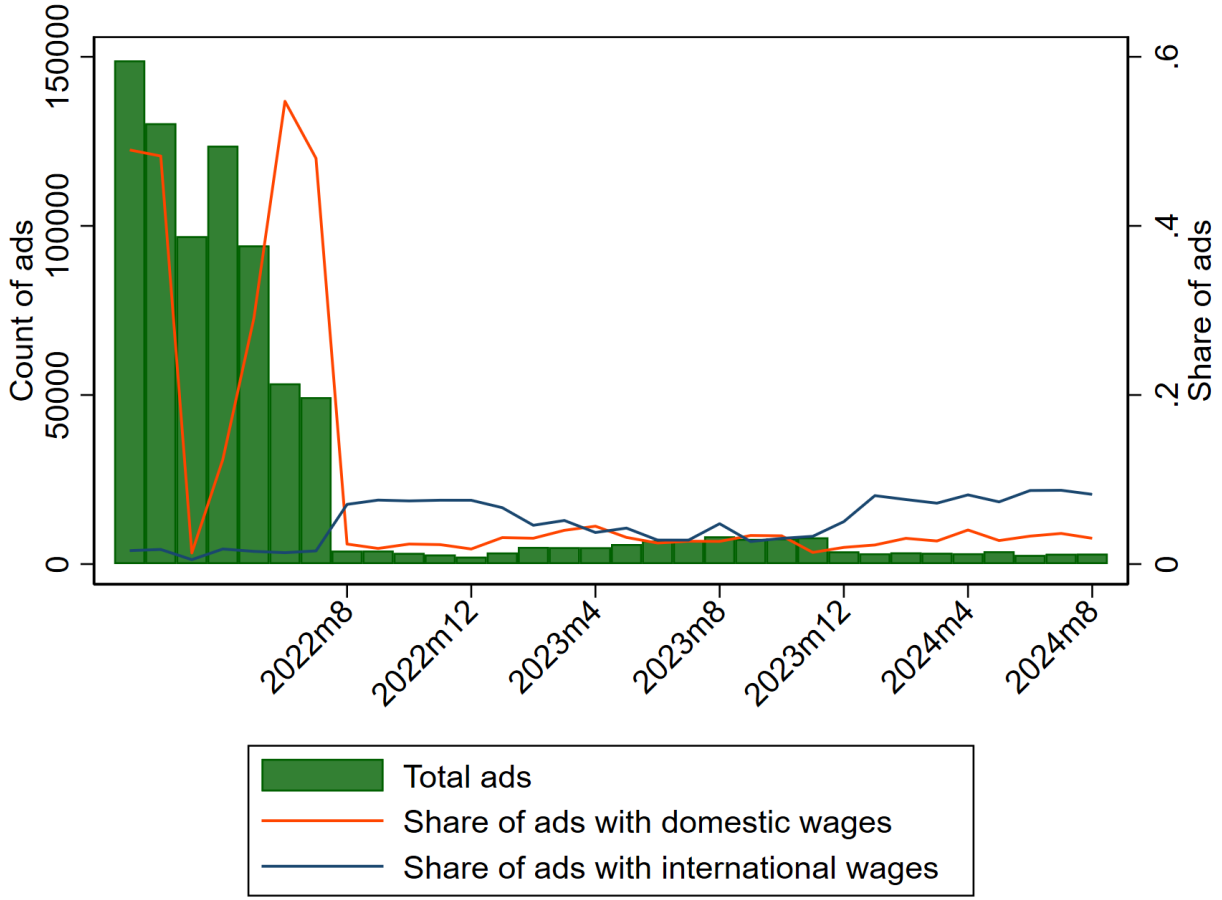
- Keep jobs of which location is Ukraine
  - Could be remote or hybrid
- Posted wages:
  - Monthly wage vs. others
  - Those listed in UAH = “domestic” wages vs. listed in USD/EUR = “international” wages

Title processing

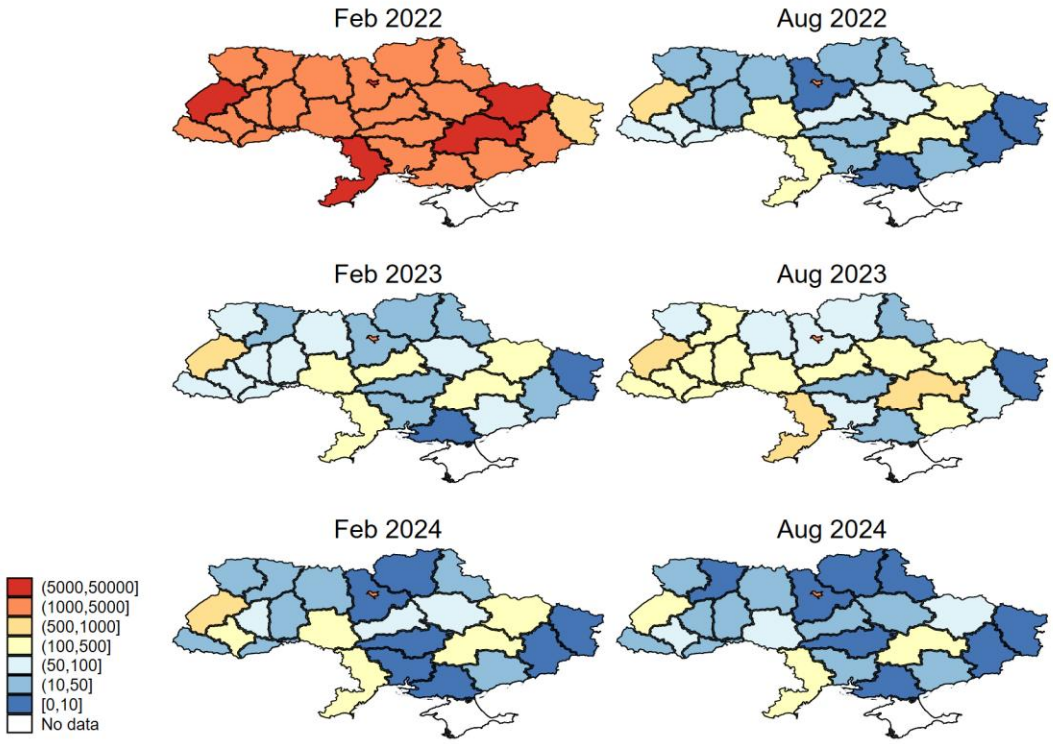
2-step procedure

- Map each raw job title to an ESCO occupation using GPT-4o
- Normalise GPT-4o outputs using JobBERT
  - Remove noisy GPT-4o outputs
  - Make sure the normalised occupations are in line with the ESCO taxonomy
  - Allow for different levels of aggregation

Vacancy trends: Over time



Vacancy trends: Across regions



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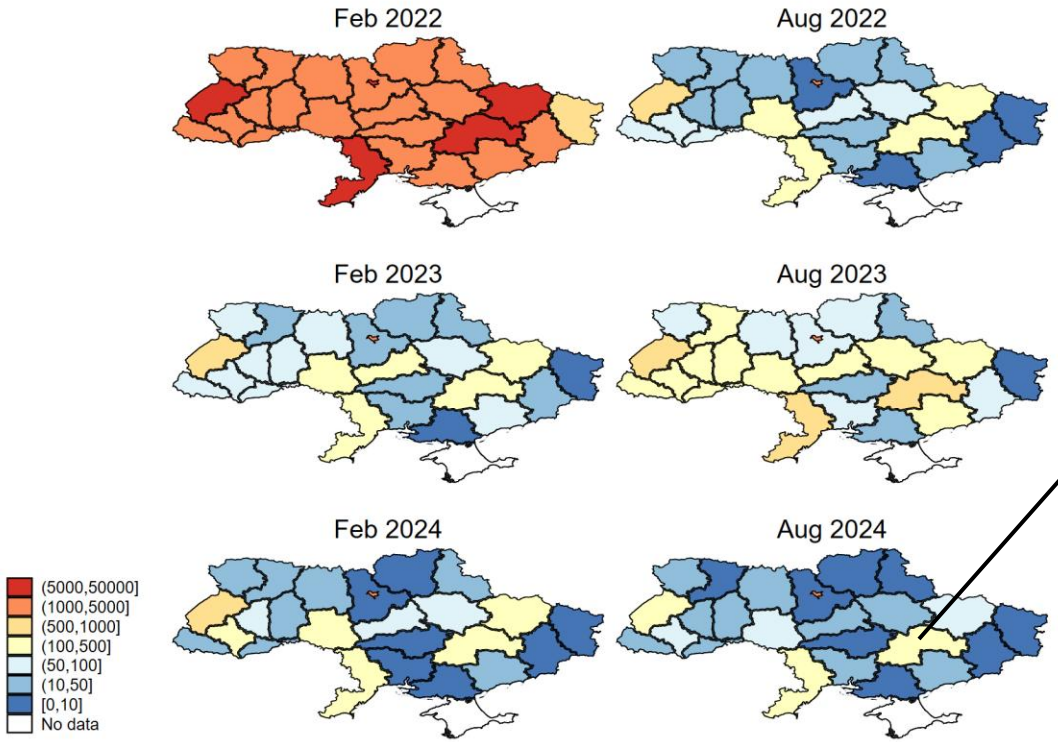
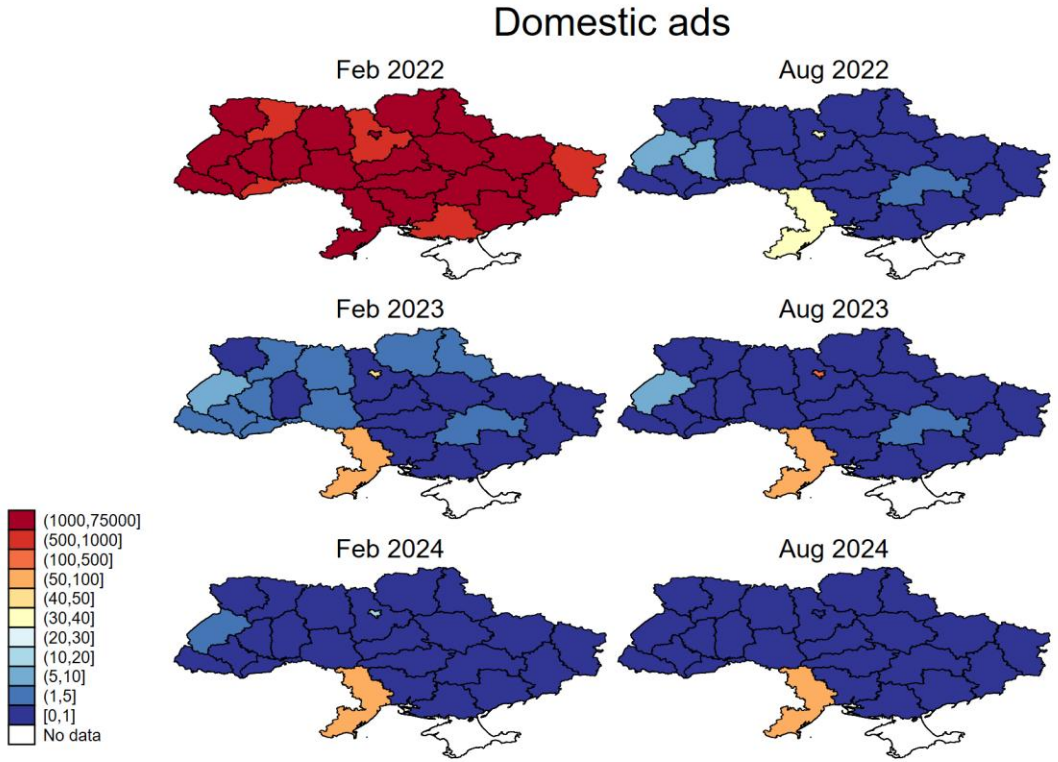


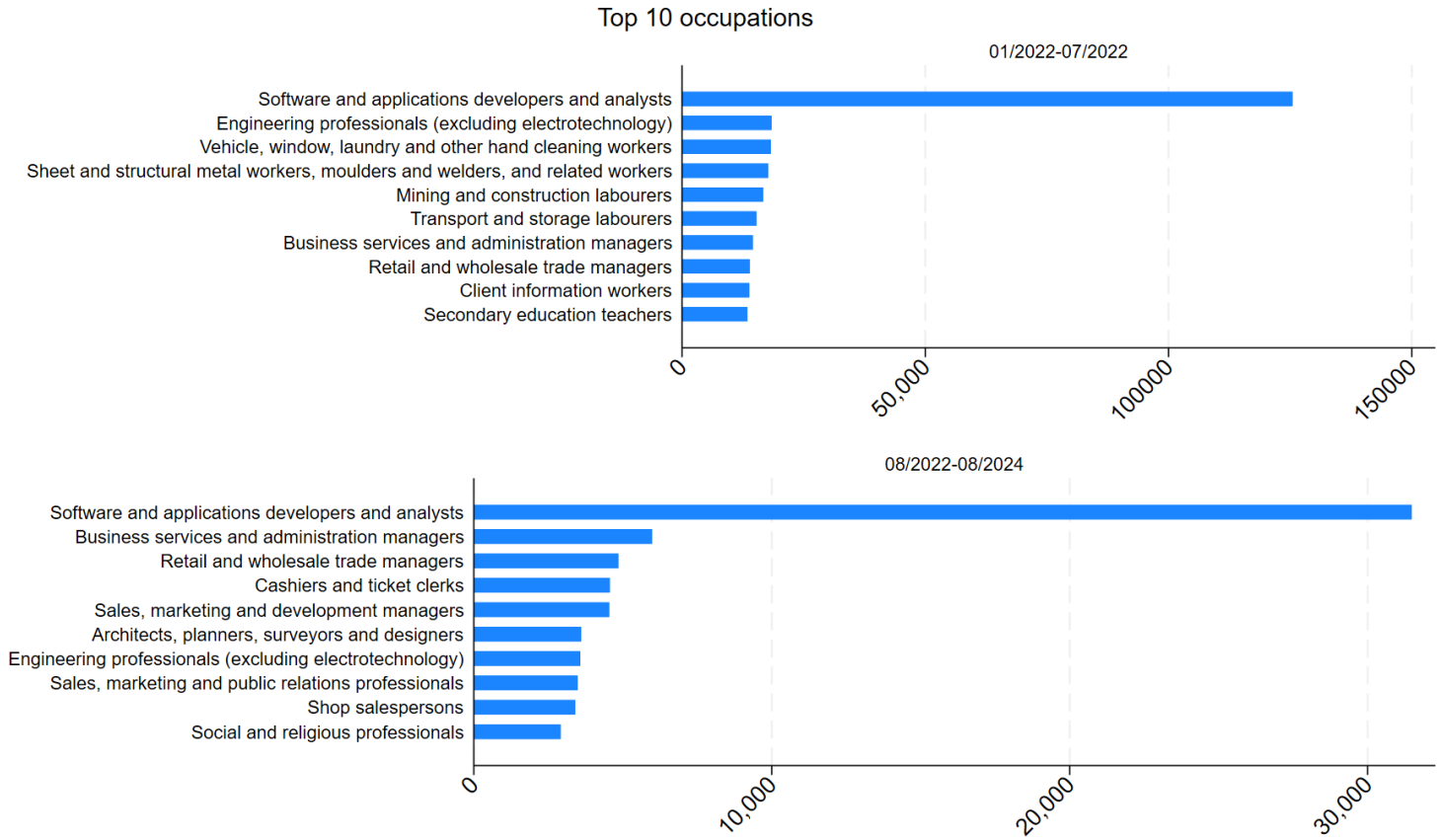
IT, logistics, and cybersecurity jobs

Vacancy trends: Across regions



No new “domestic” vacancies in many regions!

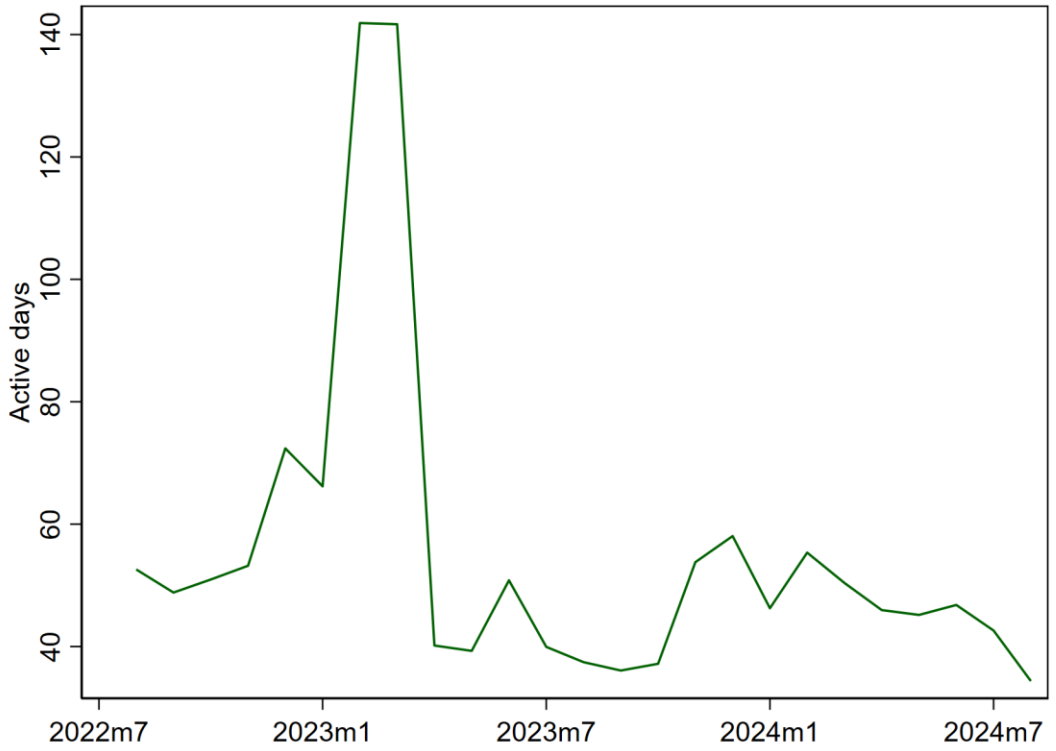
Vacancy trends: Across occupations



Click trend

- Ads posted in 2022 attracted more cumulative clicks
- Early to mid 2023: lowest total engagement period
- Since early 2024: declining engagement

“Duration” trend



- Early 2023: longest active period

Wage and demand pressure

	(1)	(2)	(3)
	Dependent variable: $\log(w_{i,j,t})$		
$\log(\text{vacancies}_{j,t-1})$	0.067***	0.067***	-0.013
	(0.004)	(0.004)	(0.187)
Region FE	Y	Y	Y
3-digit occ FE	Y	Y	Y
Month FE	Y	Y	Y
Observations	142,775	140,825	1,934
R-squared	0.303	0.303	0.362

Wage, labour demand, labour "supply"

	(1)	(2)	(3)	(4)
	Dependent variable: $\log(w_{i,j,t})$			
$\log(clicks_{j,t-1})$	-0.339**		-0.212**	
	(0.160)		(0.079)	
$\log(war\ events_{j,t})$			1.209*	0.357**
			(0.699)	(0.135)
$\log(clicks_{j,t-1})\times\log(war\ events_{j,t})$			-0.118**	
			(0.056)	
$\log(ads_{j,t-1})$	0.340**		0.454**	
	(0.129)		(0.170)	
$\log(ads_{j,t-1})\times\log(war\ events_{j,t})$			0.048***	
			(0.008)	
$\log(clicks_{j,t-1}/ads_{j,t-1})$		-0.339**		-0.324***
		(0.161)		(0.110)
$\log(clicks_{j,t-1}/ads_{j,t-1})\times\log(war\ events_{j,t})$				-0.062***
				(0.018)
Observations	1,875	1,875	1,875	1,875
R-squared	0.373	0.373	0.376	0.375

Key takeaways (1)

- Vacancy trends
  - Sharp regional and occupational distortions
  - Uneven severity
- Clicks dynamics
  - Declining since early 2024 suggests “slack” market
- Demand/supply pressure
  - Suggestive evidence of both employer demand pressure and job seeker pressure
  - Wartime shocks amplify both

Key takeaways (2)

- Even with noisy data, the signals are consistent with labour-market theory
- Suggestive evidence of non-linearity
- What can we do with these signals?
  - Vacancy and click dynamics can serve as early warning indicators of wage pressure and labour market slack.
  - Regional vacancy collapse highlights where targeted support or reconstruction policies are most urgent.

Next steps

- Leverage rich job descriptions:
  - Extract skills, tasks, sectoral, and contract type information from text.
  - Improve occupation mapping and detect emerging demand.
- Extrapolate posted wages:
  - Use indicators obtained from text analysis (text features, occupations) and location to impute missing wages.
  - Allow for tracking wage growth
- Extend the dataset to pre-2022 to build a baseline to compare wartime vs. pre-war dynamics.