

The Effects of Artificial Intelligence on Jobs: Evidence from an AI Subsidy Program

Mark Hellsten¹ Shantanu Khanna² Magnus Lodefalk³ Yaroslav Yakymovych⁴

¹University of Tübingen ²Northeastern University ³Örebro University ⁴Uppsala University

January 26, 2026

AI in Action Conference

Introduction

- AI is expected to rapidly reshape labor markets worldwide (Deming et al., 2025)
 - In theory AI can displace, reinstate, or complement labor (Autor et al., 2003; Acemoglu and Restrepo, 2019)
- Causal evidence on firm-level impacts of AI is scarce
 - AI adoption is endogenous.
 - Exposure or survey based evidence and specific experiments (Acemoglu et al., 2022; Engberg et al., 2025; Aghion et al., 2025; McElheran et al., 2025; Babina et al., 2024).
- To what extent should governments shape AI-adoption through targeted subsidies? (Hirvonen et al., 2022; Criscuolo et al., 2019)

- We leverage quasi-experimental variation generated by a **targeted AI subsidy program** in Sweden.
- What are the medium run impacts of AI adoption induced by this program on:
 - Labor demand: Job vacancy postings.
 - Employment impacts, including hiring and separations.
 - Explore heterogeneity for white and blue collar vacancies, AI and non-AI occupations, job experience, labor market tightness, among others.

The Swedish AI Subsidy Program

- Innovation agency *Vinnova* initiated an AI subsidy program for SMEs in 2019.
- “AI” defined as machines mimicking intelligent human behavior (Machine Learning focus).
- Targeted to firms who wanted to implement their **first practical AI project** (AI based product or using AI to improve internal processes).
- Competitive: **190 applicants** and **53 awardees**.
- Max award amount: 500,000 SEK (\approx 50,000 USD).

▶ Criteria

Examples of subsidized AI projects: Did AI adoption happen?

Monitor ERP System AB:

Enhanced its enterprise resource planning software with predictive analytics for B2B clients.

- Used historical order data for model training, predicted up to 40% of production delays (out-of-sample).

Portal+ AB:

Developed AI-based traffic planning module for bus operators.

- Optimized fleet scheduling → 5% fuel savings (210,000 liters diesel saved annually). 546,900 kg CO_2 reduction (200 buses).

Examples of subsidized AI projects: Did AI adoption happen?

Monitor ERP System AB:

Enhanced its enterprise resource planning software with predictive analytics for B2B clients.

- Used historical order data for model training, predicted up to 40% of production delays (out-of-sample).
- Follow-up surveys show most evaluated projects as “successful” and many reporting deployments.
- Awards associated with increase in “expenditure on AI” (Statistics Sweden survey on “ICT usage”).

Portal+ AB:

Developed AI-based traffic planning module for bus operators.

- Optimized fleet scheduling → 5% fuel savings (210,000 liters diesel saved annually). 546,900 kg CO_2 reduction (200 buses).

Data and Descriptives

- Program data on applicant firms linked to job vacancy data from the Swedish Public Employment Service and population-wide administrative registers for employment, hiring, and separations.
- Balanced panel of firm level outcomes between 2017 and 2024.

Data and Descriptives

- Program data on applicant firms linked to job vacancy data from the Swedish Public Employment Service and population-wide administrative registers for employment, hiring, and separations.
- Balanced panel of firm level outcomes between 2017 and 2024.
- Average firm size: 30 employees.
Applicants from ICT and Law/Econ/Science/Tech, Wholesale, and Manufacturing Industries.
- Over half the applicants from three largest cities.

▶ Detailed Descriptives

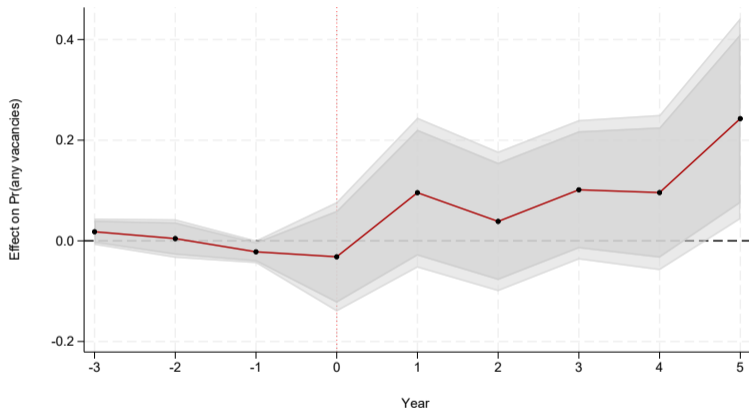
Empirical Approach: Synthetic Difference-in-Differences (SDID)

- Compare **awarded** and **non-awarded** applicants using SDID.
- SDID involves optimally choosing weights to create a more credible counterfactual matching on pre-exposure trends (Arkhangelsky et al., 2021).

Empirical Approach: Synthetic Difference-in-Differences (SDID)

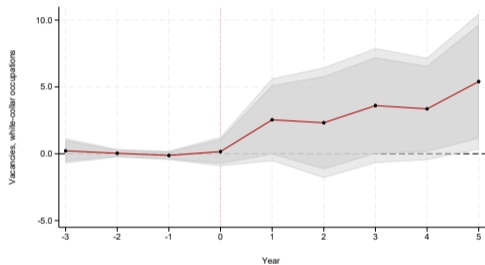
- Compare **awarded** and **non-awarded** applicants using SDID.
- SDID involves optimally choosing weights to create a more credible counterfactual matching on pre-exposure trends (Arkhangelsky et al., 2021).
- Event-study estimates combining two cohorts accounting for staggered adoption (Sun and Abraham, 2021).

Result: Labor Demand Impacts

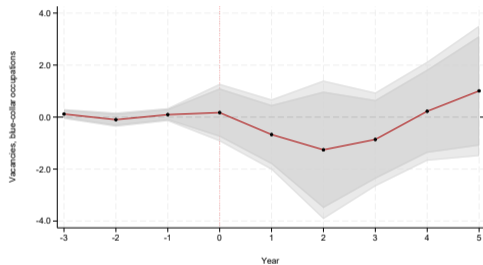


Treated firms are **+24.3 pp** more likely to post a vacancy five years after award.

Result: White vs. Blue Collar

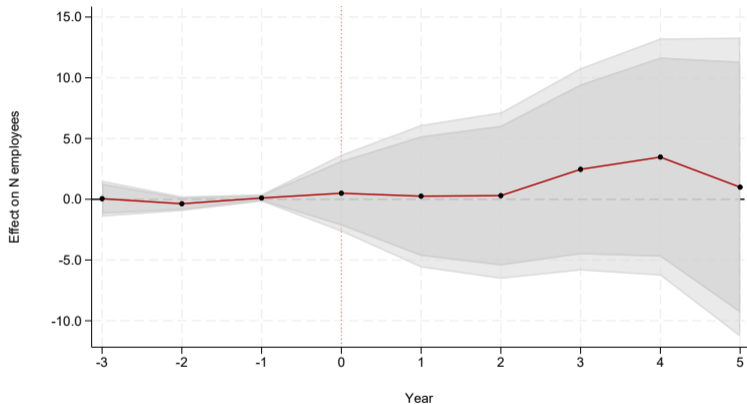


White-collar: Strong positive effects



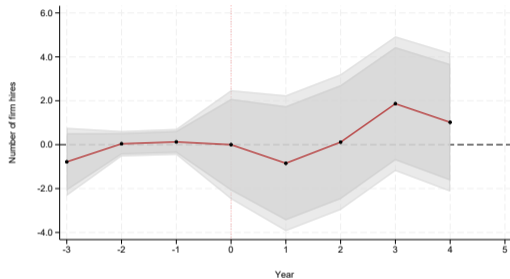
Blue-collar: No significant change

Result: Employment Levels

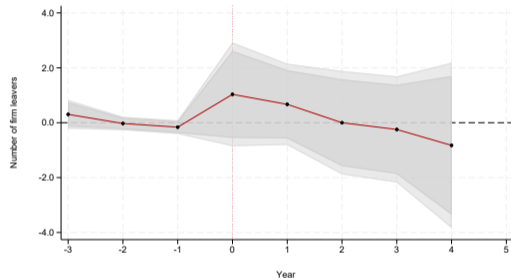


No significant net employment change: ≈ 1.4 employees

Result: Hires and Separations



Hires takeaway: Upward trend.



Separations takeaway: Downward trend.

Conclusion

- Treated firms post more vacancies (labor complementarities), but employment impacts muted in medium run, possibly due to skill shortages (Autor et al., 2003; Acemoglu and Restrepo, 2019).
- Pair adoption support with skill pipelines and organizational complements (Brynjolfsson et al., 2021).
- Modest AI grants can generate more vacancies, without harming jobs (in the medium run).
- AI adoption here is firm-specific but the context and program design matter.
- Back-of-envelope cost-per-job \approx **38,000 USD** is within the range of estimates for other firm subsidies.

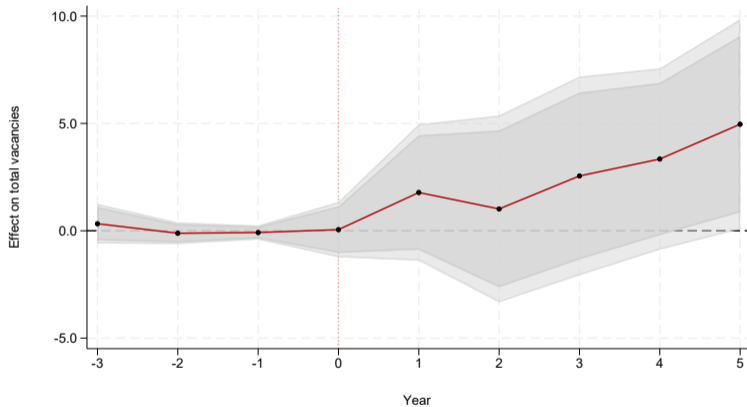
Thank you!

Contact: s.khanna@northeastern.edu

Website: www.shantanukhanna.com

Appendix

Labor Demand (Intensive Margin): Number of Vacancies



At $t = +5$, treated firms post **+4.96** more vacancies.

Evaluation Criteria

Goal: Increase the practical competence, strategic ability, and experience of SMEs in AI.

- Independent experts reviewed the applications, followed by a joint assessment with Vinnova. Some applicants were also interviewed as part of the assessment process. Final decisions were made by Vinnova, with no appeals possible.

Decisions were based on several factors:

- The project's value for the organization, the competence, credibility, and diversity of the team, and the feasibility of the plan, budget, and approach.
- Successful applicants demonstrated that projects had good potential for AI use, for instance, through new products, services, or more efficient production processes.
- No explicit mention of the decisions being based on any of the outcomes of interest: Evaluation criteria laid out in the call for applications do not mention benefits to workers or employment impacts.

Firm Characteristics - Size

	Shares (%)			N appl.
	All eligible	Awarded	Not awarded	
Firm Size (Employees)				
0-2	0	6	20	31
3-9	67	21	28	50
10-49	29	57	36	80
50-99	3	8	9	16
100-499	2	9	5	12
≥500	0	0	1	1
Mean Number of Employees	14	34	29	190
Median Number of Employees	6	17	10	190

Firm Characteristics - Industry

	Shares (%)			N appl.
	All eligible	Awarded	Not awarded	
Industry				
Primary	3	4	1	3
Manufacturing	10	13	5	14
Utilities	0	0	0	0
Construction	17	0	0	0
Wholesale & retail	20	4	10	16
Transport & storage	6	0	1	1
Hotels & restaurants	10	2	1	2
Information & communication	5	40	39	74
Finance & real estate	3	0	4	4
Law/economics/science/tech	11	36	34	66
Other services	9	0	5	7
Education	3	0	1	2
Healthcare	4	2	0	1

Firm Characteristics - Location, Revenue & Job Ads

	Shares (%)			N appl.
	All eligible	Awarded	Not awarded	
Municipality type of HQ				
3 largest cities	41	51	62	112
Other cities	26	34	26	54
Towns	14	8	9	16
Rural areas	19	8	3	8
	Mean			
	All eligible	Awarded	Not awarded	N appl.
Job Ads				
Total job vacancies	4.4	1.7	4.3	190
AI job vacancies	0.4	0.8	1.4	190
Share with any vacancies	0.17	0.23	0.29	190
Share with any AI vacancies	0.03	0.21	0.18	190

Additional Heterogeneity Results

- Vacancy impacts driven by both AI and Non-AI occupations.
- Vacancy effects higher for Metropolitan areas relative to Non-Metro areas. [▶ Metro](#)
- Null employment impacts for both junior and senior positions.
- Positive (but not significant) interaction effect between treatment and geographical labor market tightness measure (filling rate) for employment effects.