

# Large Language Models, Small Labor Market Effects

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By some metrics, already living up to the immense hype

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Effects remarkable in size (often 15-50%) and speed (within few months)

Yet substantial disagreement remains about broader labor market implications

- ▶ Predictions range from dramatic disruption within a few years (Amodei 2025) to modest impacts over a decade (Acemoglu 2025)

# This Paper

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1. Two survey rounds (late '23, '24), 25,000 workers, 7,000 workplaces in Denmark
2. Link to admin labor market data (monthly earnings, hours, occupations, ...)
3. Examine whether chatbot adopters have fared differently in the labor market

# What Our Evidence Adds to Existing Approaches

- ▶ **Exposure studies:** Expert assessments of which tasks *could* be done with LLMs  
(Brynjolfsson, Chandar, Chen 2025; ...)
  - Measure *actual adoption* rather than technical potential
- ▶ **Adoption surveys:** Self-reported effects by users  
(Bick et al. 2025; Hartley et al. 2025; ...)
  - Link adoption to *admin outcomes*, moving analysis beyond self-reports
- ▶ **RCT evidence:** Productivity effects on specific tasks  
(Noy & Zhang 2023; Brynjolfsson, Li, Raymond 2025; ...)
  - Provide *large-scale* evidence from the broader labor market

# Why Denmark?

## Institutional setting

- ▶ At the forefront of GenAI adoption—on par with the US  
(Reuters 2024; Humlum & Vestergaard 2025; Bick et al. 2025)
- ▶ Flexible labor market with decentralized wage bargaining—similar to the US  
(Botero et al. 2004; Dahl et al. 2013)

## Data infrastructure

- ▶ Reach the population of Danes via digital mailboxes
- ▶ Link survey to admin registers: monthly earnings, hours, occupations, ..

# Survey

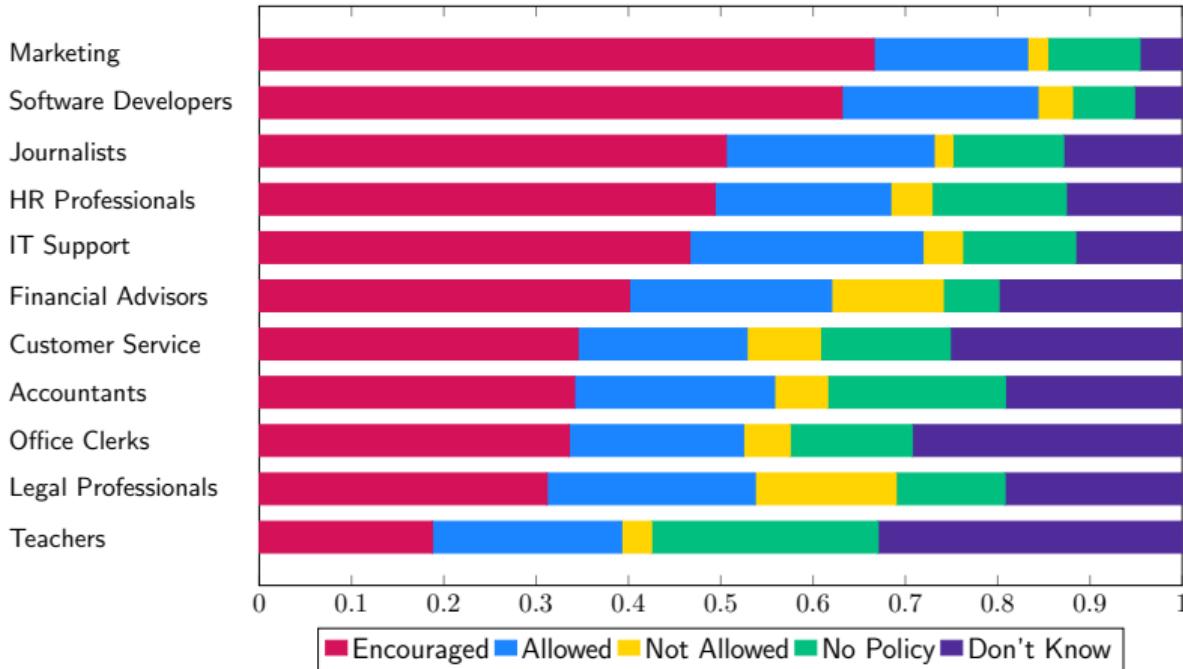
In collaboration with Statistics Denmark

- ▶ Invite 115k workers in November 2023 and 2024
- ▶ Target workers in 11 highly-exposed occupations ▶
- ▶ Invitations sent through “Digital Post,” with text/e-mail reminders ▶
- ▶ ~25k complete and valid responses per round ▶
- ▶ Representative samples ▶
- ▶ Validate survey responses against register data ▶

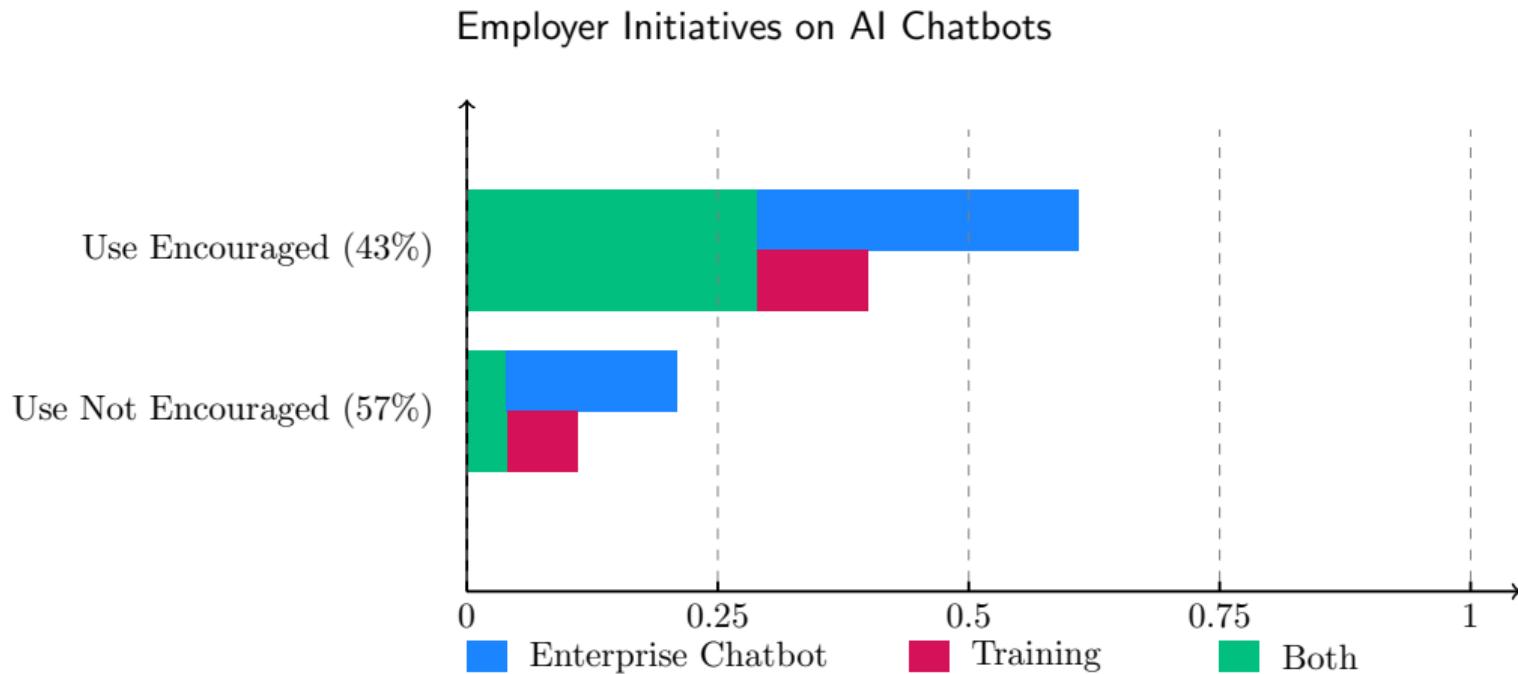
# The Landscape of AI Chatbot Adoption

# Most Employers Now Encourage AI Chatbots

Usage Policies on AI Chatbots (Nov '24)



# ... Investing in Enterprise Chatbots and Training Employees



## Employer Initiatives and Worker Adoption

To describe adoption, we examine how workers' chatbot behaviors vary with their employer initiatives:

$$Y_i = \beta' \text{EmployerInitiatives}_i + \gamma' X_i + \varepsilon_i \quad (1)$$

where

- ▶  $Y_i$  is a chatbot outcome of worker  $i$  (adoption, reported benefits, ...)
- ▶  $\text{EmployerInitiatives}_i$  is encouraged-use policy, enterprise chatbot, training
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Descriptive evidence, but estimates are robust to:

- ▶ Controlling for firm characteristics: size, age, productivity, growth
- ▶ Controlling for workers' detailed task mixes
- ▶ Measuring employer initiatives using coworker reports

# Employer Initiatives and Worker Adoption

	Adoption	
	Ever Used (1)	Daily Use (2)
Encouraged	0.350*** (0.009)	0.110*** (0.008)
Enterprise Chatbot	0.163*** (0.012)	0.008 (0.007)
Training	0.284*** (0.014)	0.019*** (0.007)
Encouraged × Enterprise Chatbot	-0.137*** (0.016)	0.015 (0.013)
Encouraged × Training	-0.154*** (0.017)	-0.014 (0.014)
Enterprise Chatbot × Training	-0.089*** (0.023)	0.033** (0.016)
Encouraged × Enterprise Chatbot × Training	0.109*** (0.028)	0.038 (0.025)
Worker Controls	✓	✓
Occupation FEs	✓	✓
No Initiative, Level	0.399	0.061

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

► Plot: Adoption

► Plot: Gender Gap

► Total Time Savings

# Even Without Employer Support, Many Workers Have Used AI Chatbots

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# Employer Initiatives Associated with Higher Take-Up

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# Employer Encouragement Is the Main Predictor of Regular Usage

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# ... And Greater Reported Benefits Among Users

	Adoption		Reported Benefits (Among Ever Used)			
	Ever Used (1)	Daily Use (2)	Any Time Saving (3)	60+ min/day (4)	Quality (5)	Creativity (6)
Encouraged	0.350*** (0.009)	0.110*** (0.008)	0.087*** (0.011)	0.034*** (0.010)	0.076*** (0.014)	0.065*** (0.013)
Enterprise Chatbot	0.163*** (0.012)	0.008 (0.007)	-0.000 (0.015)	-0.024** (0.011)	-0.033* (0.017)	-0.016 (0.016)
Training	0.284*** (0.014)	0.019*** (0.007)	-0.065*** (0.018)	-0.006 (0.011)	-0.041** (0.017)	-0.031* (0.017)
Encouraged × Enterprise Chatbot	-0.137*** (0.016)	0.015 (0.013)	0.009 (0.019)	0.014 (0.016)	0.045** (0.023)	0.009 (0.021)
Encouraged × Training	-0.154*** (0.017)	-0.014 (0.014)	0.028 (0.023)	-0.013 (0.016)	0.066*** (0.024)	0.079*** (0.024)
Enterprise Chatbot × Training	-0.089*** (0.023)	0.033** (0.016)	0.040 (0.032)	-0.011 (0.020)	0.095*** (0.033)	0.022 (0.031)
Encouraged × Enterprise Chatbot × Training	0.109*** (0.028)	0.038 (0.025)	0.023 (0.037)	0.043* (0.026)	-0.047 (0.039)	-0.020 (0.039)
Worker Controls	✓	✓	✓	✓	✓	✓
Occupation FEs	✓	✓	✓	✓	✓	✓
No Initiative, Level	0.399	0.061	0.702	0.148	0.460	0.027

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# Training and Enterprise Solutions Alone Associated with Smaller Gains

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# Gains Maximized When Employers Combine All Three

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# AI Chatbots and New Workloads

## New Workloads from AI Chatbots

	Among Ever Used		Among Never Used	
	Same Tasks (1)	New Tasks (2)	Same Tasks (3)	New Tasks (4)
Encouraged	0.020*** (0.006)	0.039*** (0.008)	-0.003 (0.003)	0.018** (0.009)
Enterprise Chatbot	0.005 (0.008)	0.027*** (0.010)	0.020*** (0.006)	0.023*** (0.007)
Training	0.015** (0.007)	0.078*** (0.016)	-0.002 (0.004)	0.050*** (0.016)
Encouraged × Enterprise Chatbot	0.009 (0.011)	0.001 (0.014)	-0.007 (0.009)	0.002 (0.015)
Encouraged × Training	-0.022** (0.011)	-0.035* (0.021)	0.018 (0.014)	-0.018 (0.032)
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Encouraged × Enterprise Chatbot × Training	0.011 (0.020)	0.042 (0.030)	-0.056* (0.033)	-0.050 (0.043)
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No Initiative, Level	0.051	0.080	0.007	0.027

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# AI Chatbots Create New Job Tasks

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# ... Extending Even to Non-Adopters

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# Employer Initiatives Predict New Work from AI Chatbots

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# Labor Market Effects

## From Adoption to Labor Market Outcomes

**Taking stock:** AI chatbots are widespread, but strategies vary markedly

- ▶ Employer encouragement associated with higher adoption, greater reported benefits
- ▶ Yet even among similar workers under identical policies, usage ranges from none to daily
- ▶ AI chatbots create new job tasks, indicating workplace transformation

**Question:** What are the impacts on labor market outcomes?

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3. Analyze effects at worker and workplace levels

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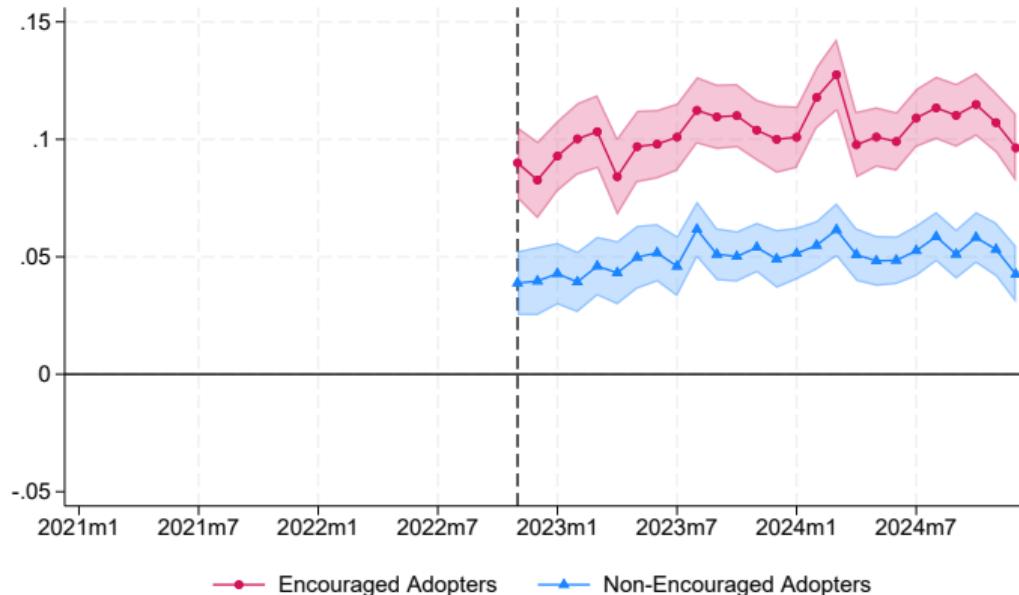
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3. Analyze effects at worker and workplace levels
4. Emphasize “AI front-runners”—workplaces with proactive initiatives; workers with intensive usage
5. Examine impacts on worker earnings, workplace employment, job mobility

# Worker Earnings

# Have Adopting Workers Experienced Earnings Gains?

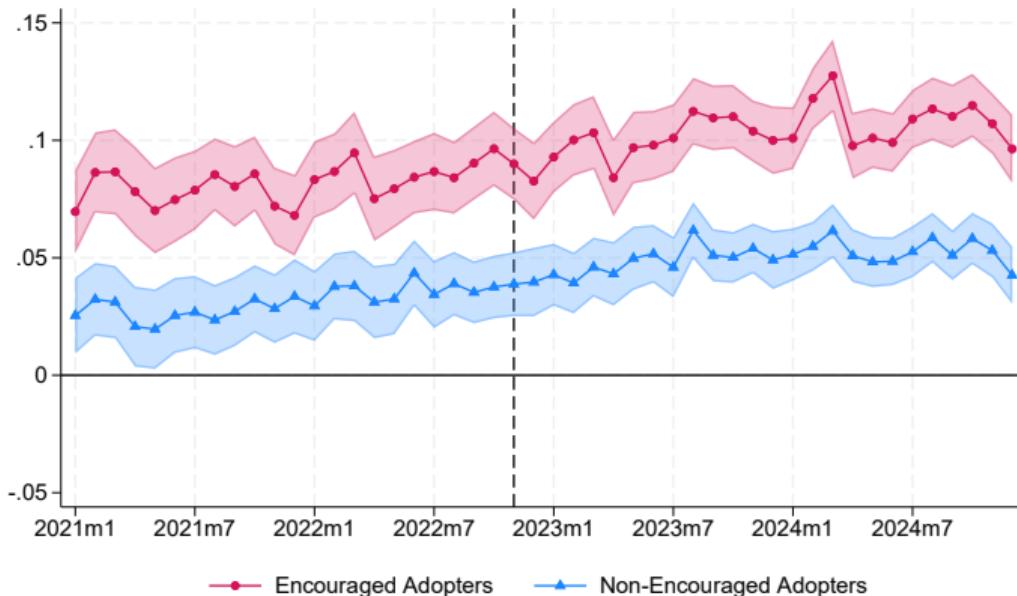
Log Earnings of Adopters  
(Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

# Have Adopting Workers Experienced Earnings Gains?

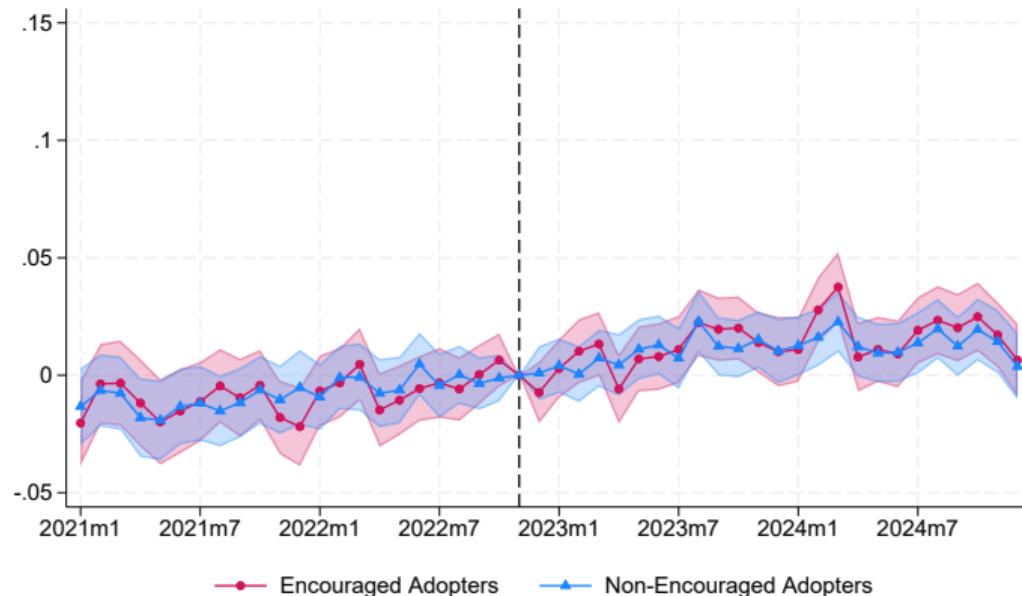
Log Earnings of Adopters  
(Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

# Have Adopting Workers Experienced Earnings Gains?

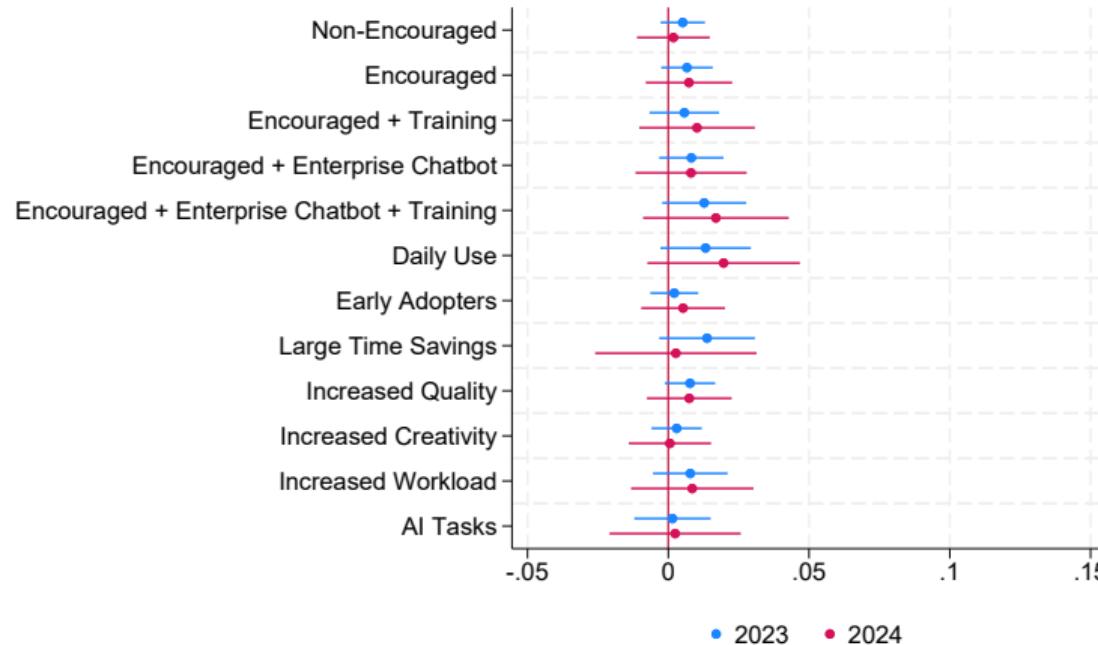
Log Earnings of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

# Heterogeneity by Strength of Treatment

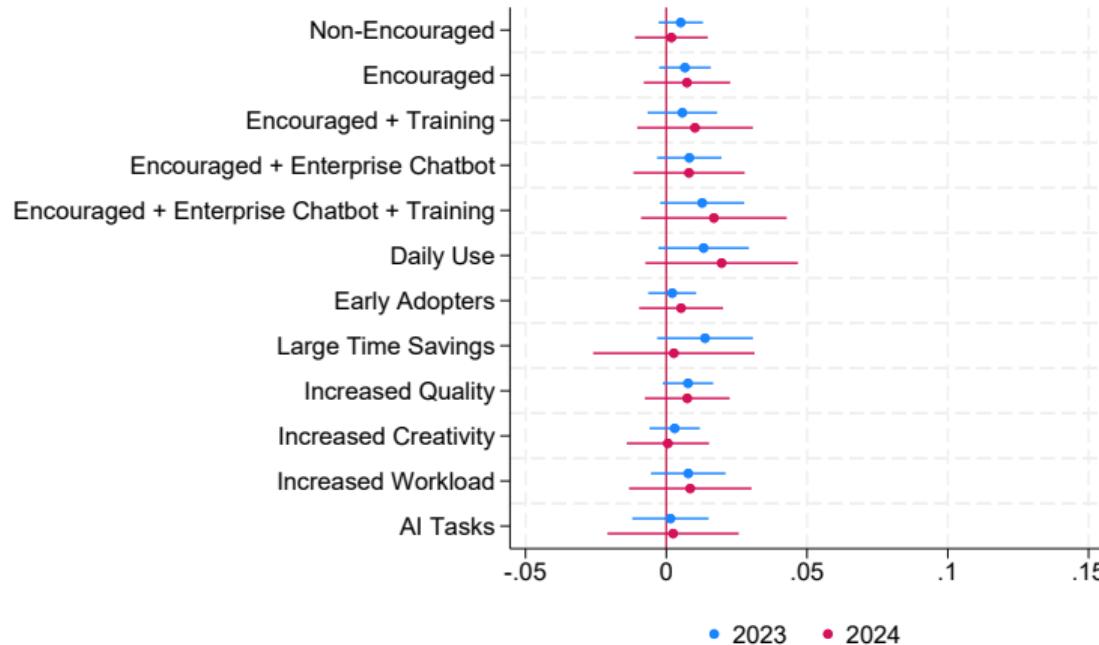
Log Earnings of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality, time trends

# Even for Intensive Users with Large Gains, Earnings Effects Remain Null

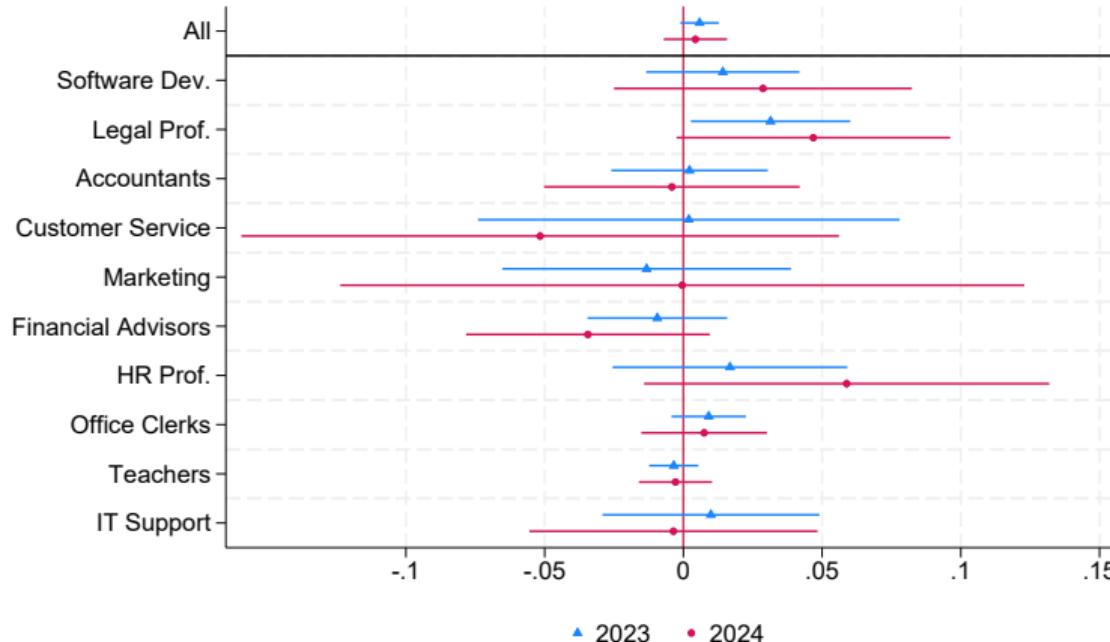
Log Earnings of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality, time trends

# Occupational Heterogeneity

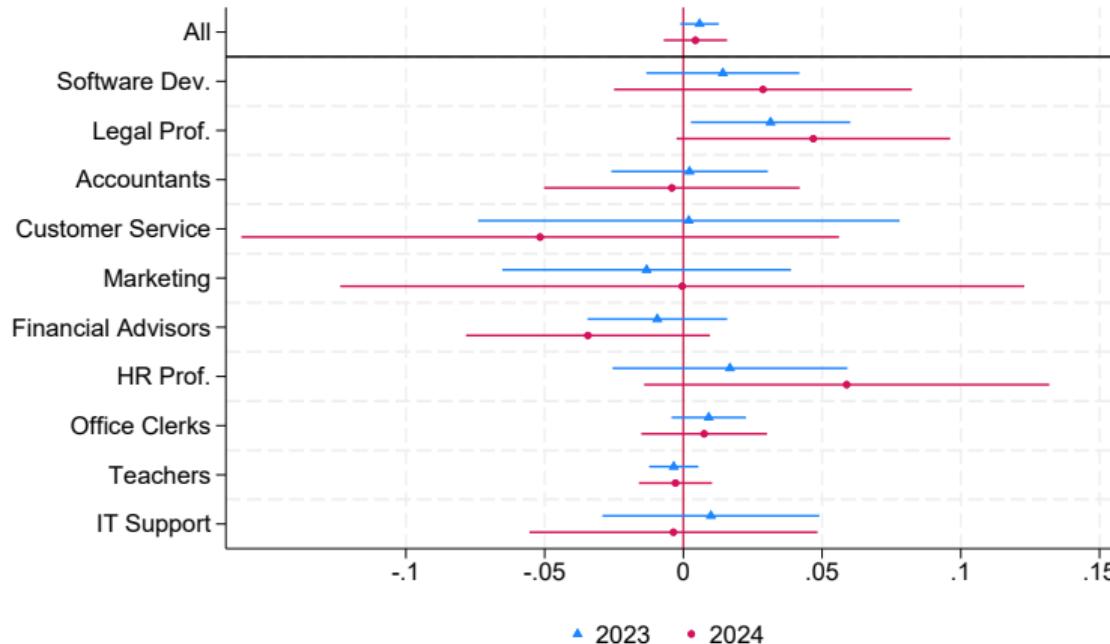
Log Earnings of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality, time trends

# Earnings Effects Null Across Occupations, Even with Flexible Wage Setting

Log Earnings of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)

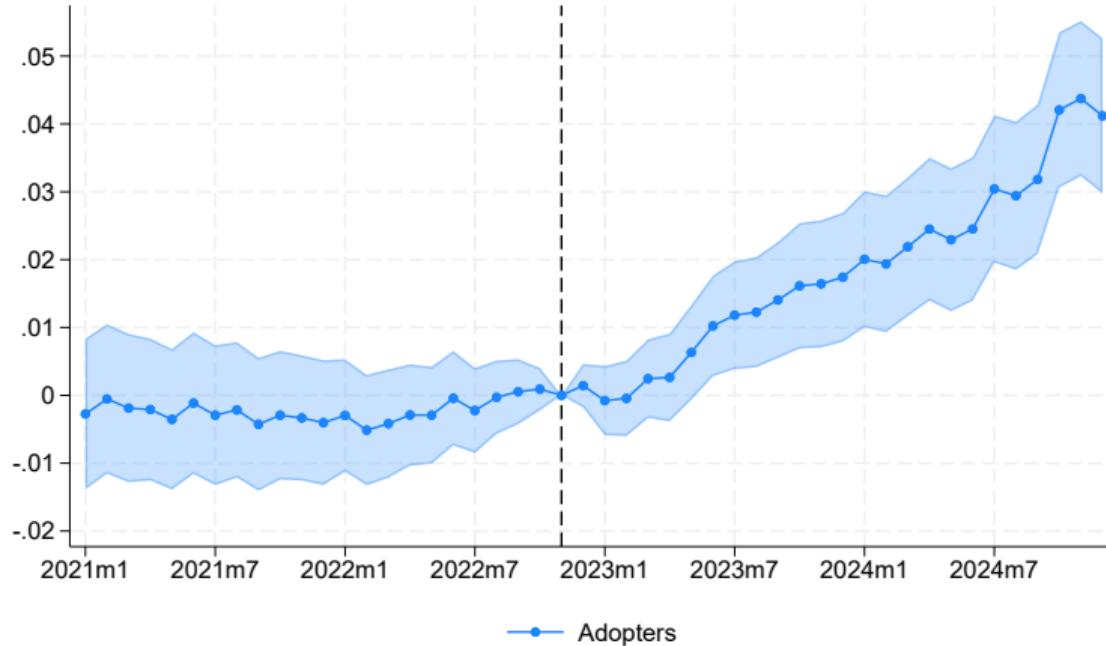


Controls: occupation, age, experience, gender, seasonality, time trends

# Job Mobility

# Adopters Have Switched Into New Occupations

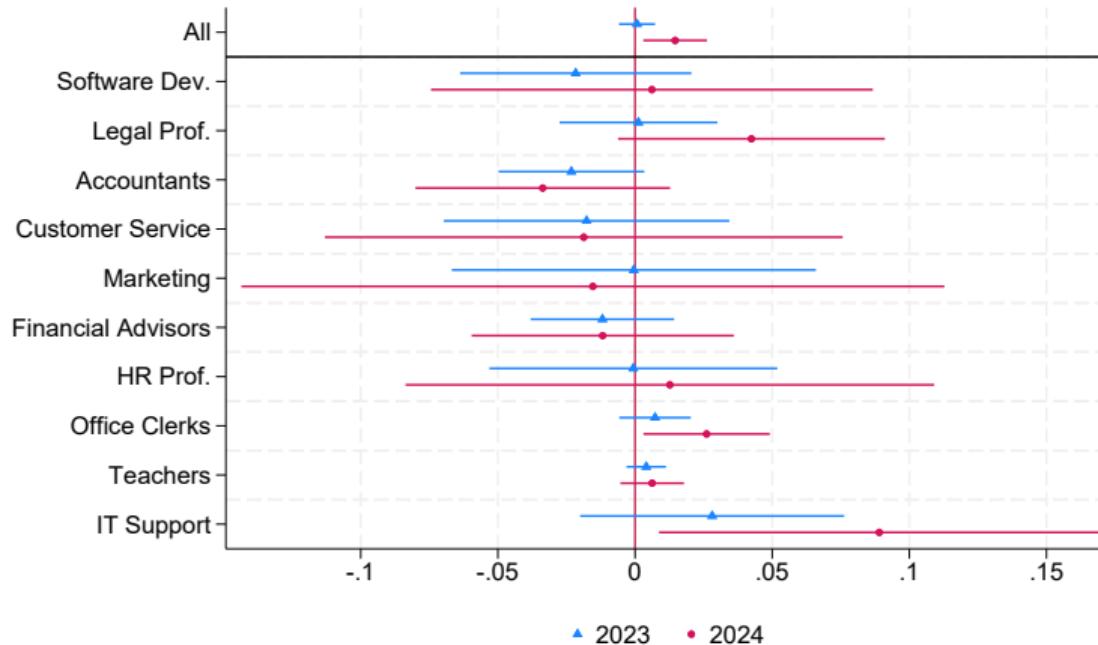
FTE Employment in Latest Occupation  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

# Mobility Effects Strongest Into IT and Office Support

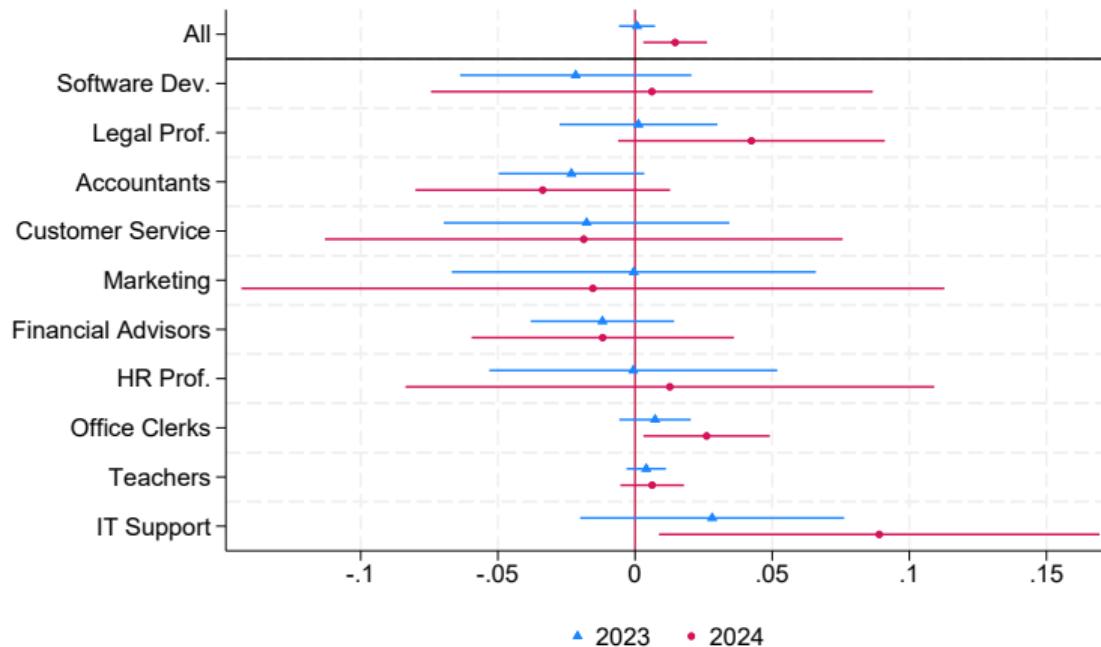
FTE Employment in Latest Occupation  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality, time trends

# No Effects for Licensed Occupations or Those with Established IT Systems

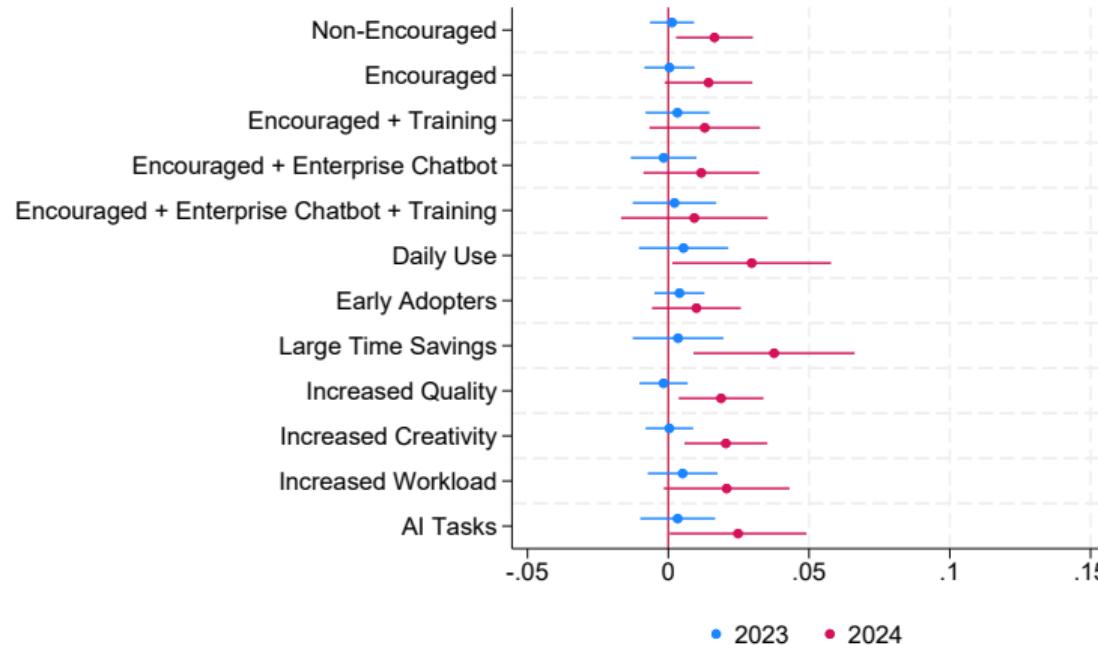
FTE Employment in Latest Occupation  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality, time trends

# Mobility Tied to Individual Rather Than Firm Factors

FTE Employment in Latest Occupation  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)

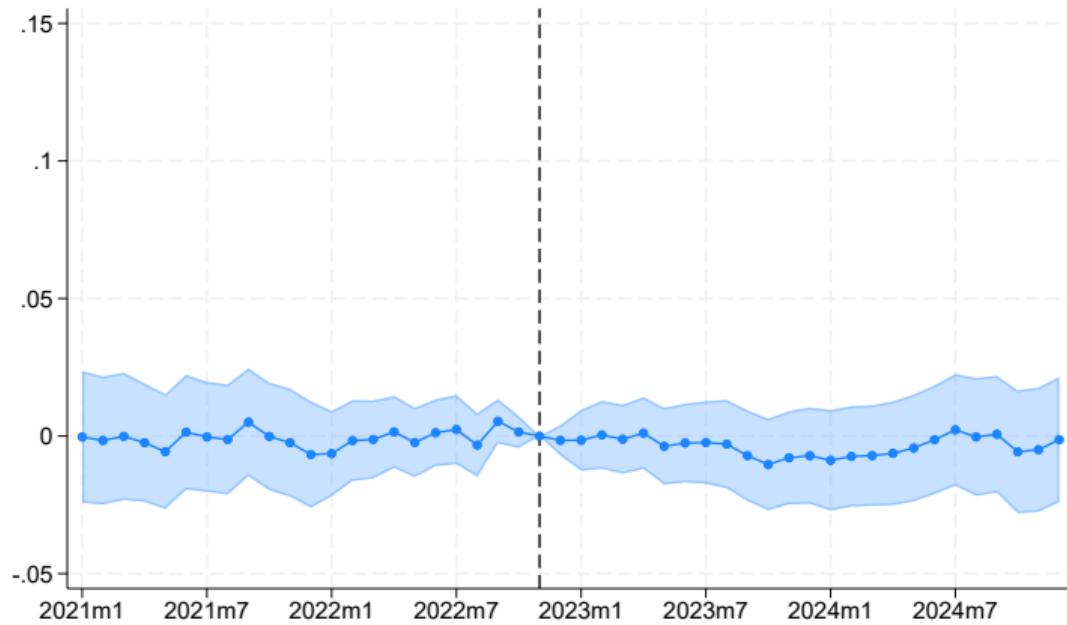


Controls: occupation, age, experience, gender, seasonality, time trends

# Workplace Employment

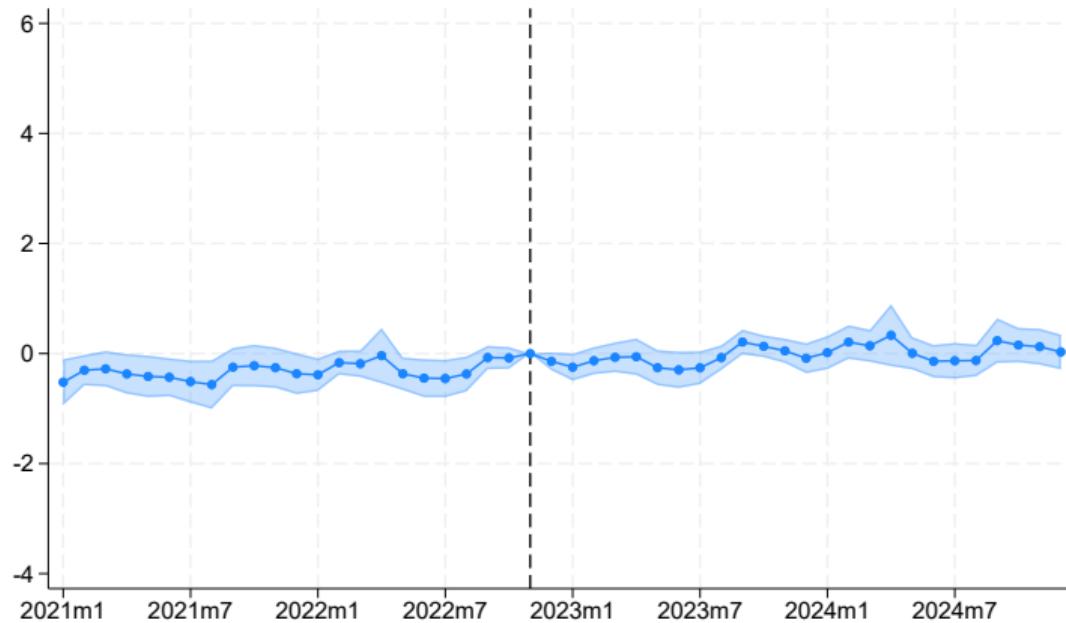
# Encouraged Workplaces Show No Differential Changes in Employment

Log Workplace Employment  
(Encouraged Diff-in-Diff)



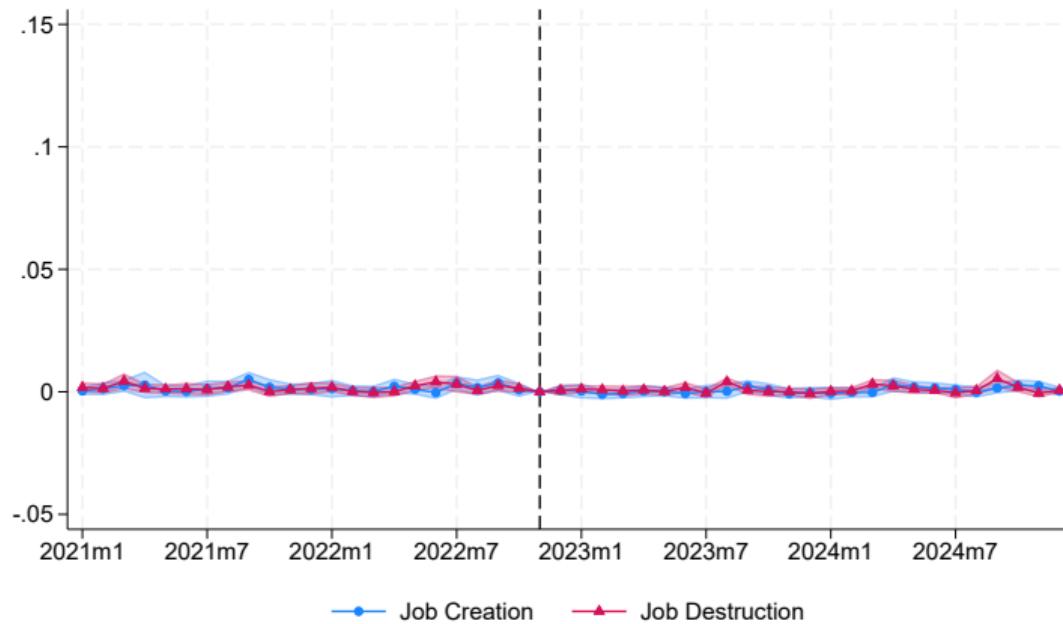
# Changes in Early-Career Employment Also Unrelated to Adoption

FTE Employment of Early-Career Workers  
(Encouraged Diff-in-Diff)



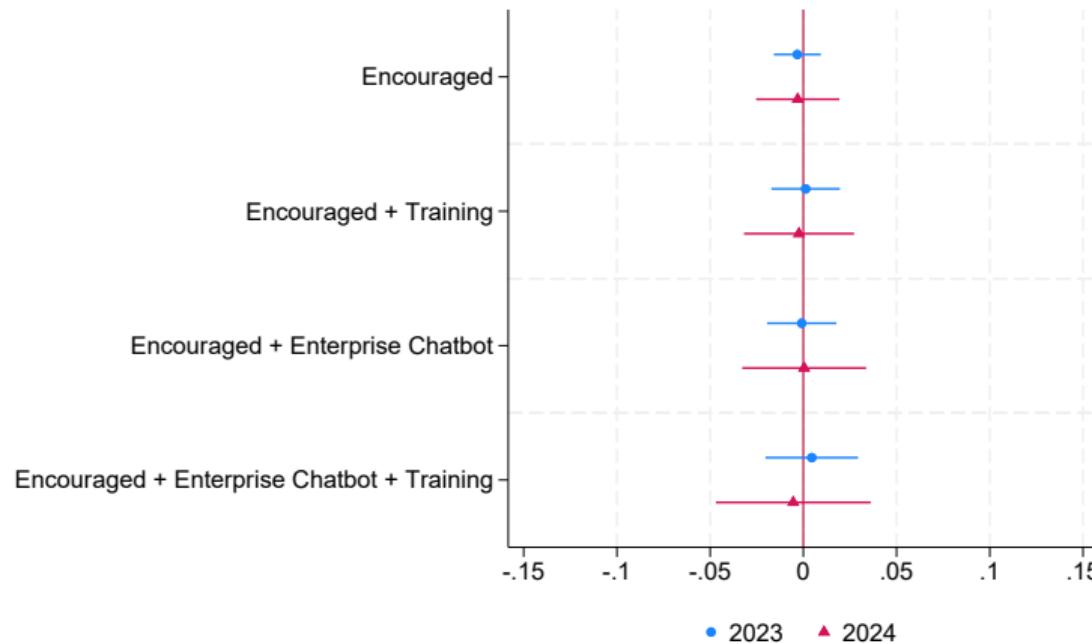
# Encouraged Workplaces Show No Differential Changes in Job Churn

New Hires and Separations as Shares of Employment  
(Encouraged Diff-in-Diff)



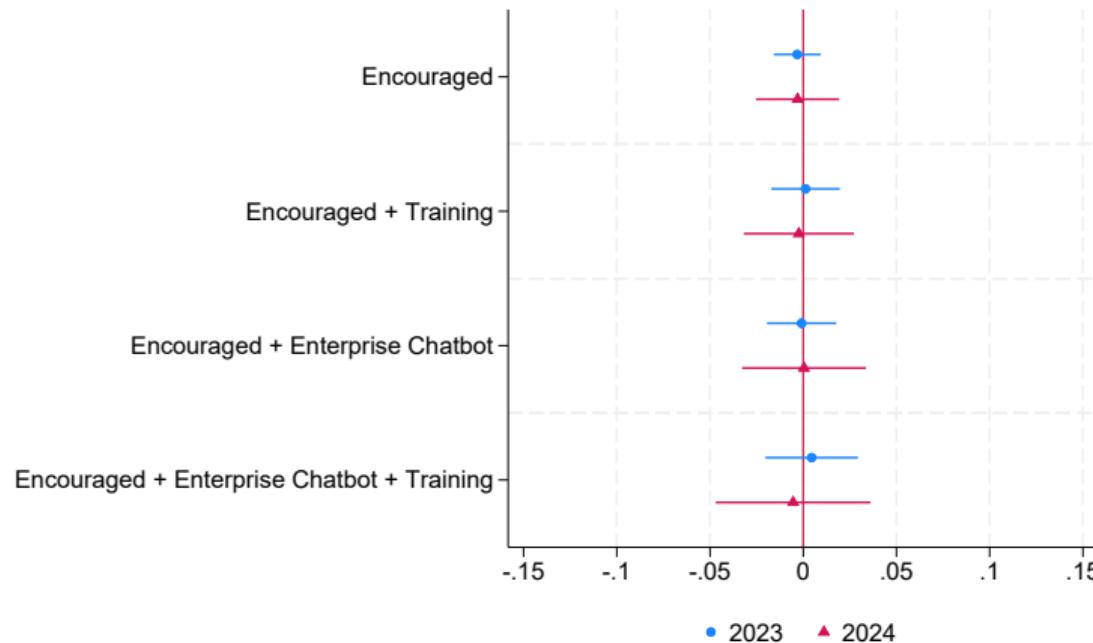
# Null Employment Effects Even with Additional Investments

Log Workplace Employment  
(Encouraged Diff-in-Diff)



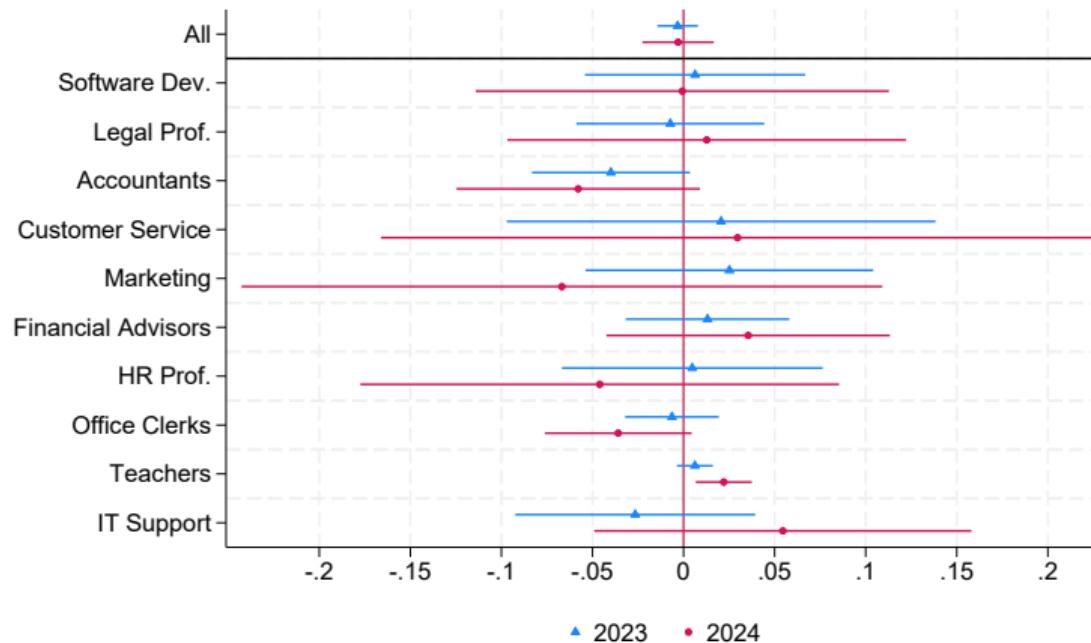
# Null Employment Effects Even with Additional Investments

## FTE Employment of Early-Career Workers (Encouraged Diff-in-Diff)



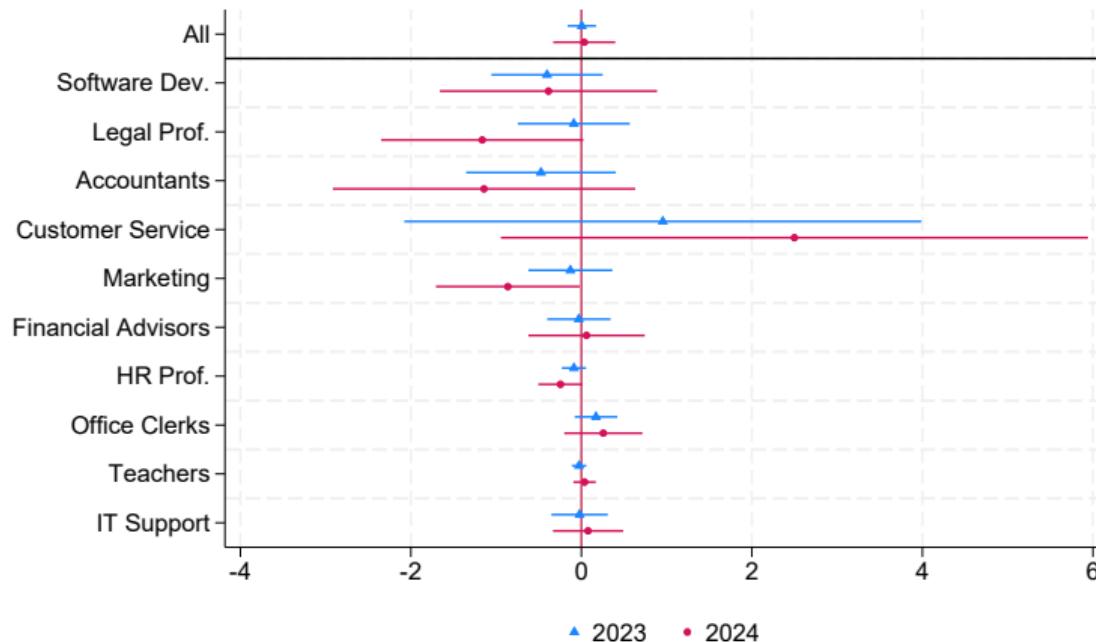
# Null Effects Across Occupations, Even with Flexible Labor Rules

Log Workplace Employment  
(Encouraged Diff-in-Diff)



# Null Effects Across Occupations, Even with Flexible Labor Rules

FTE Employment of Early-Career Workers  
(Encouraged Diff-in-Diff)



## Supplementary Evidence

# Perceived Labor Market Impacts

To complement the diff-in-diffs,  
we asked workers directly:

*“Have AI chatbots affected your  
earnings?”*

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→ 98% responded “*No*”

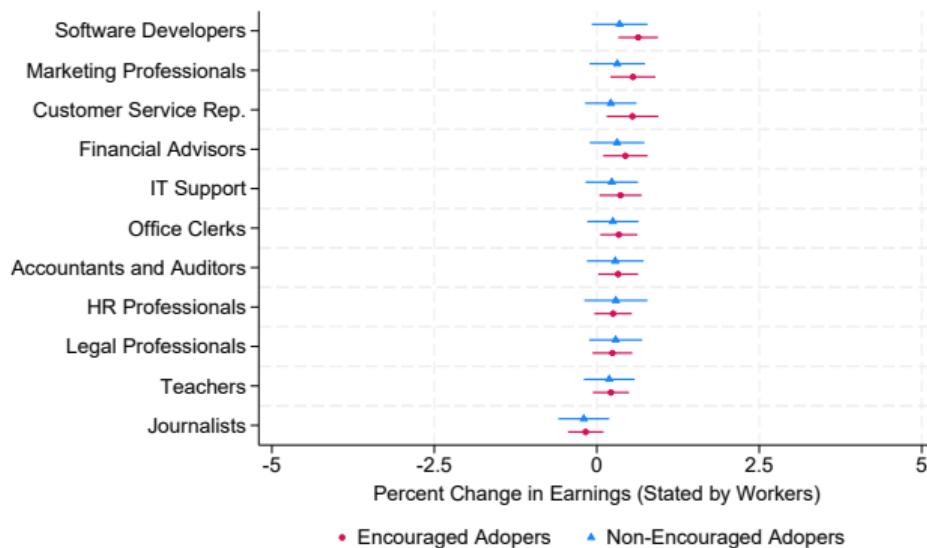
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Average Perceived Effect on Earnings (Adopters)



# Conclusion

## Large Language Models, Small Labor Market Effects

Despite rapid adoption, precise zeros on earnings and hours

- ▶ Even among AI front-runners, labor market effects remain flat

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Our evidence highlights how GenAI may transform labor markets:

- ▶ Adoption is linked to occupational switching
- ▶ AI chatbots create new job tasks
- ▶ Firm-led initiatives help unlock productivity potential

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Our evidence highlights how GenAI may transform labor markets:

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**THANK YOU**

# Occupations (Humlum & Vestergaard, 2025)

Select occupations with

- ▶ Job tasks in which ChatGPT can save time eloundou2024gpts
- ▶ Well-defined ISCO codes
- ▶ Enough workers for statistical analysis

List of occupations

1. Accountants
2. Customer service representatives
3. Financial advisors
4. HR professionals
5. IT support
6. Journalists
7. Legal professionals
8. Marketing professionals
9. Office clerks
10. Software developers
11. Teachers

## Job Tasks in the Survey: Journalists

1. Write commentaries, columns, or scripts.
2. Coordinate and serve as an anchor on news broadcast programs.
3. Examine news items of local, national, and international significance to determine topics to address, or obtain assignments from editorial staff members.
4. Analyze and interpret news and information received from various sources to broadcast the information.
5. Arrange interviews with people who can provide information about a story.
6. Present news stories, and introduce in-depth videotaped segments or live transmissions from on-the-scene reporters.

# Invitation Letter



November 2024

## Artificial intelligence and your job tasks

Dear [name]

Statistics Denmark is inviting you to participate in a research project about AI chatbots and your job tasks. You can participate by clicking the link below and completing the questionnaire.

**AI chatbots use artificial intelligence to read and write text.** You have been selected because you work in an occupation where AI chatbots may be relevant.

**Your responses are important** for research on new technology in the labor market. Everyone who completes the questionnaire will automatically participate in a lottery with a **prize of [X,XXX] DKK tax-free**.

Statistics Denmark is conducting the survey on behalf of researchers at the University of Copenhagen and the University of Chicago. The questionnaire takes **about 10 minutes** to complete.

**Start the survey [url]**

Or access [www.dst.dk/ditsvar](http://www.dst.dk/ditsvar) and enter your response code **[code]**.

Statistics Denmark handles your data **confidentially**. Results are presented in a way that prevents individual answers from being identified, and the data is used solely for statistical and scientific purposes.

Participation is voluntary. If you do not wish to participate, you can indicate this here: [\[refusal\\_link\]](#)

If you have any questions, you can e-mail [info@dstsurvey.dk](mailto:info@dstsurvey.dk) or call on 7777 7708 (every day between 9am and 4pm). Please provide your response code when contacting us.

Best regards,

Marie Fuglsang  
Head of Division, DST Survey

Anders Humlum  
Assistant Professor, University of Chicago

# Sample Construction

	2024 Survey		Main Survey		2023 Survey		Follow-Up Only	
	Individuals	Percent of invitees	Individuals	Percent of invitees	Individuals	Percent of invitees	Individuals	Percent of invitees
1. Invitees	115,000	100.0	100,000	100.0	15,000	100.0		
2. Respondents	30,411	26.4	29,067	29.1	4,094	27.3		
3. In target occupation(s)	26,925	23.4	25,121	25.1	3,504	23.4		
4. Complete responses	25,241	21.9	18,109	18.1	2,561	17.1		
5. Linked to registers	24,796	21.6	17,907	17.9	2,559	17.1		

# Balance Table for Survey Respondents

	2024 Survey			2023 Main Survey		
	Population (1)	Sampled (2)	Responded (3)	Population (1)	Sampled (2)	Responded (3)
Age	42.93 (11.54)	42.94 (11.52)	46.11 (11.50)	42.41 (11.57)	42.40 (11.57)	45.38 (11.51)
Female	0.56 (0.50)	0.56 (0.50)	0.56 (0.50)	0.52 (0.50)	0.52 (0.50)	0.49 (0.50)
log(Earnings)	12.98 (0.70)	12.98 (0.70)	13.01 (0.64)	13.07 (0.58)	13.07 (0.59)	13.11 (0.53)
Experience	6.11 (4.80)	6.11 (4.80)	7.24 (4.92)	6.05 (4.58)	6.05 (4.57)	7.12 (4.67)
Wealth / Earnings	10.92 (2,148.09)	6.50 (286.36)	6.74 (204.16)	4.09 (157.40)	4.87 (262.31)	4.10 (39.57)
Observations	284,439	115,000	25,241	283,806	100,000	18,109

# Balance Table for Complete vs. Partial Responses

	2024 Survey		2023 Main Survey	
	Completed (1)	Drop Out (2)	Completed (1)	Drop Out (2)
<i>Panel A: Characteristics</i>				
Age	46.11 (11.50)	44.46 (11.98)	45.38 (11.51)	45.00 (11.53)
log(Earnings)	13.01 (0.64)	13.00 (0.71)	13.11 (0.53)	13.10 (0.53)
Experience	7.24 (4.92)	6.52 (4.82)	7.12 (4.67)	6.88 (4.63)
Net Wealth/Earnings	6.74 (204.16)	3.77 (10.08)	4.10 (39.57)	3.75 (16.43)
Female	0.56 (0.50)	0.57 (0.49)	0.49 (0.50)	0.60 (0.49)
<i>Panel B: Adoption</i>				
Used	0.69 (0.46)	0.75 (0.43)	0.55 (0.50)	0.51 (0.50)
Used for Work	0.49 (0.50)	0.58 (0.49)	0.40 (0.49)	0.38 (0.48)
Used for Core Task	0.31 (0.46)	0.15 (0.35)	0.21 (0.41)	0.17 (0.38)
Observations	25,241	1,773	18,109	7,012

# Balance Table for Participation Prize Categories

	2024 Survey					2023 Main Survey				
	Levels 1000 DKK (1)	Differences to 1000 DKK 2500 DKK (2)	Differences to 1000 DKK 5000 DKK (3)	Differences to 1000 DKK 10000 DKK (4)	p-value (5)	Levels 1000 DKK (1)	Differences to 1000 DKK 2500 DKK (2)	Differences to 1000 DKK 5000 DKK (3)	Differences to 1000 DKK 10000 DKK (4)	p-value (5)
<i>Panel A: Characteristics</i>										
Age	46.11	-0.25 (0.20)	-0.18 (0.90)	-0.44 (0.91)	0.18	45.38	-0.46 (0.24)	-0.42 (0.96)	-0.49 (0.97)	0.15
log(Earnings)	13.01	-0.00 (0.01)	-0.01 (0.11)	-0.01 (0.11)	0.48	13.11	-0.03 (0.01)	-0.00 (0.06)	-0.01 (0.06)	0.04
Experience	7.24	-0.09 (0.08)	-0.11 (0.40)	-0.06 (0.40)	0.55	7.12	-0.01 (0.09)	-0.01 (0.35)	-0.05 (0.35)	0.95
Net Wealth/Earnings	6.74	-1.96 (1.71)	0.62 (36.33)	0.94 (35.44)	0.50	4.10	-0.05 (0.27)	0.87 (0.42)	0.38 (0.42)	0.55
Female	0.56	-0.02 (0.01)	-0.00 (0.03)	-0.02 (0.04)	0.04	0.49	0.00 (0.01)	-0.01 (0.04)	-0.00 (0.04)	0.41
<i>Panel B: Adoption</i>										
Used	0.69	0.00 (0.01)	-0.00 (0.03)	-0.01 (0.03)	0.69	0.55	-0.02 (0.01)	-0.01 (0.03)	-0.01 (0.03)	0.40
Used for Work	0.49	-0.00 (0.01)	-0.02 (0.03)	-0.02 (0.03)	0.02	0.40	-0.01 (0.01)	-0.00 (0.04)	-0.00 (0.04)	0.61
Used for Core Task	0.31	-0.00 (0.01)	-0.01 (0.03)	-0.00 (0.03)	0.75	0.21	-0.01 (0.01)	0.00 (0.04)	-0.00 (0.04)	0.59
Response Rate	0.20	0.02 (0.00)	0.02 (0.00)	0.03 (0.00)	0.00	0.16	0.02 (0.00)	0.02 (0.00)	0.04 (0.00)	0.00
Observations	5,787	6,351	6,432	6,671		4,026	4,525	4,549	5,009	

# Validation: Occupation in Survey vs. Registers

Table: Correlation Between Occupation in Survey vs. Register,  $P(\text{Survey}|\text{Register})$

	Journalists	Software Developers	Paralegals	Accountants and Auditors	Customer Service Rep.	Marketing Professionals	In Survey	Financial Advisors	HR Professionals	Office Clerks	Teachers	IT Support	Observations
	Panel A: 2024 Survey												
Journalists	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	325.00
Software Developers	0.00	0.86	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.08	0.00	2,799.00
Paralegals	0.01	0.03	0.81	0.02	0.00	0.00	0.02	0.02	0.07	0.01	0.01	0.01	2,106.00
Accountants and Auditors	0.00	0.02	0.01	0.86	0.01	0.01	0.02	0.01	0.05	0.00	0.01	0.01	2,793.00
Customer Service Rep.	0.00	0.02	0.01	0.01	0.79	0.03	0.00	0.01	0.09	0.01	0.01	0.01	631.00
Marketing Professionals	0.00	0.07	0.01	0.01	0.09	0.69	0.01	0.01	0.07	0.01	0.03	0.03	1,781.00
Financial Advisors	0.00	0.00	0.00	0.00	0.01	0.00	0.96	0.00	0.01	0.00	0.00	0.00	1,243.00
HR Professionals	0.01	0.03	0.03	0.01	0.00	0.02	0.02	0.73	0.12	0.01	0.01	0.01	849.00
Office Clerks	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.01	0.01	6,488.00
Teachers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	6,440.00
IT Support	0.00	0.13	0.00	0.00	0.02	0.02	0.00	0.00	0.03	0.00	0.79	0.00	1,470.00
	Panel B: 2023 Survey												
Journalists	0.97	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	555.00
Software Developers	0.00	0.87	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00	0.08	0.00	3,185.00
Paralegals	0.01	0.03	0.79	0.02	0.01	0.00	0.01	0.02	0.08	0.01	0.01	0.01	2,518.00
Accountants and Auditors	0.00	0.02	0.01	0.85	0.01	0.01	0.02	0.02	0.05	0.00	0.01	0.01	2,710.00
Customer Service Rep.	0.01	0.03	0.01	0.01	0.79	0.04	0.01	0.01	0.07	0.01	0.01	0.01	869.00
Marketing Professionals	0.00	0.05	0.00	0.00	0.09	0.74	0.01	0.01	0.06	0.00	0.03	0.03	2,125.00
Financial Advisors	0.00	0.00	0.00	0.00	0.01	0.00	0.95	0.00	0.02	0.00	0.00	0.00	1,918.00
HR Professionals	0.01	0.03	0.06	0.01	0.00	0.01	0.02	0.68	0.14	0.01	0.02	0.02	1,434.00
Office Clerks	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.96	0.00	0.01	0.01	3,395.00
Teachers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	4,135.00
IT Support	0.00	0.15	0.00	0.00	0.02	0.02	0.00	0.01	0.03	0.00	0.76	0.00	2,277.00

# Survey overview

1. Facts about job
2. Use of AI chatbots
3. Employer initiatives
4. Impact on work

# Survey overview

## 1. Facts about job

- ▶ Primary occupation
- ▶ Importance of job tasks (O\*NET)

## 2. Use of AI chatbots

## 3. Employer initiatives

## 4. Impact on work

# Survey overview

1. Facts about job
2. Use of AI chatbots
  - ▶ Chatbot products: ChatGPT, Gemini, ...
  - ▶ Domains of use: Work vs. leisure
  - ▶ Frequency and duration of use
3. Employer initiatives
4. Impact on work

# Survey overview

1. Facts about job

2. Use of AI chatbots

3. Employer initiatives

- ▶ Usage policies
- ▶ In-house models
- ▶ Training courses

4. Impact on work

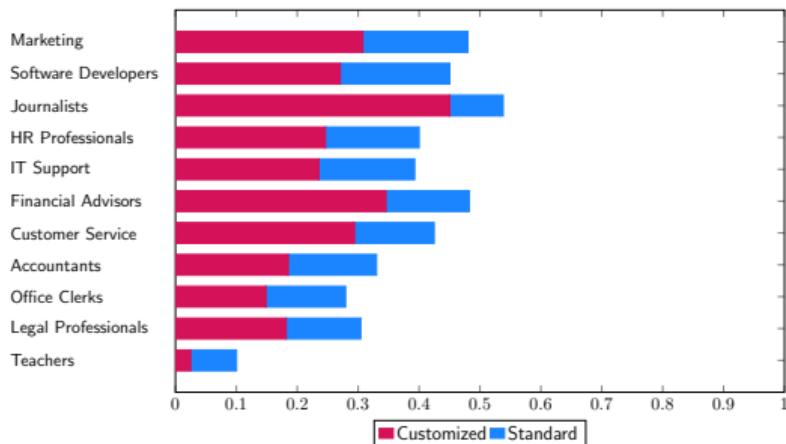
# Survey overview

1. Facts about job
2. Use of AI chatbots
3. Employer initiatives
4. Impact on work
  - ▶ Benefits for users: time savings, quality, creativity, ...
  - ▶ Allocation of time savings: tasks, breaks, leisure
  - ▶ New workloads from AI chatbots
  - ▶ Perceived impact on earnings

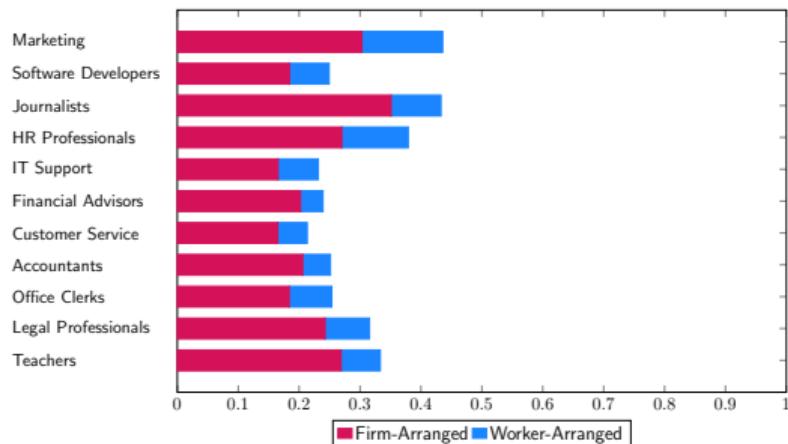
# ... Investing in Enterprise Chatbots and Training Employees

## Employer Investments in AI Chatbots

Have Enterprise AI Chatbot



Received Training in AI Chatbots



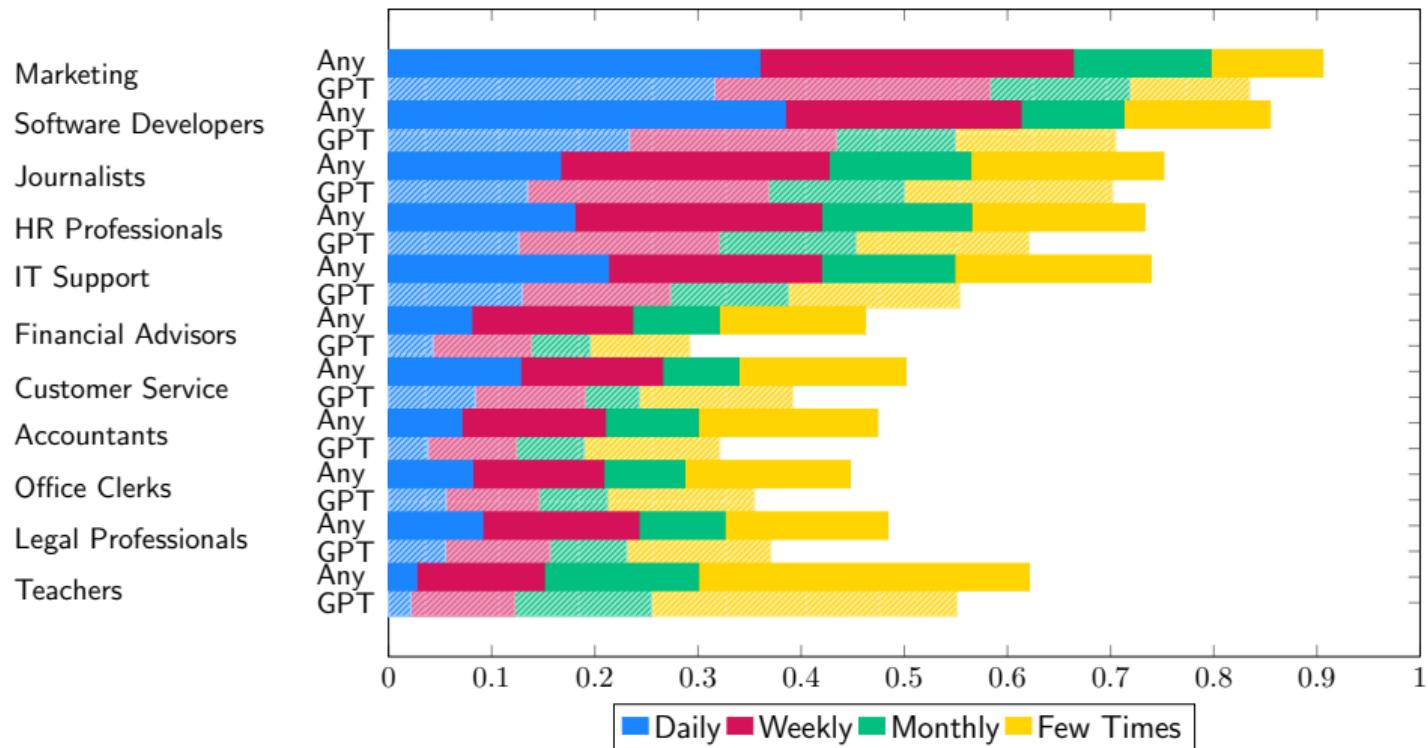
# Which Workplaces Have Adopted AI Chatbot Initiatives?

	Encouraged (1)	Allowed (2)	Not Allowed (3)	No Policy (4)	Don't Know (5)	Firm-Arranged Training (6)	Enterprise Chatbot (7)
Firm Age (10 Years)	-0.0140** (0.0044)	0.0030 (0.0021)	0.0028 (0.0026)	0.0038* (0.0016)	0.0044 (0.0025)	-0.0122** (0.0039)	-0.0091* (0.0043)
log(Firm Employment)	0.0036 (0.0048)	-0.0082*** (0.0023)	0.0036 (0.0023)	-0.0195*** (0.0022)	0.0204*** (0.0029)	-0.0048 (0.0043)	0.0362*** (0.0056)
log(Firm Labor Productivity)	0.0468** (0.0153)	0.0275*** (0.0077)	0.0051 (0.0051)	-0.0374*** (0.0077)	-0.0420*** (0.0084)	0.0765*** (0.0135)	0.0697*** (0.0176)
Private Firm	0.0414* (0.0168)	-0.0076 (0.0094)	-0.0141* (0.0072)	-0.0104 (0.0066)	-0.0092 (0.0096)	0.0257 (0.0144)	0.0554** (0.0180)
Occupation FE's	✓	✓	✓	✓	✓	✓	✓
Mean of Outcome	0.419	0.209	0.061	0.132	0.178	0.231	0.375
Within $R^2$	0.013	0.003	0.009	0.016	0.016	0.010	0.042
$R^2$	0.106	0.005	0.032	0.046	0.071	0.023	0.123
Observations	24184	24184	24184	24184	24184	24184	24184

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

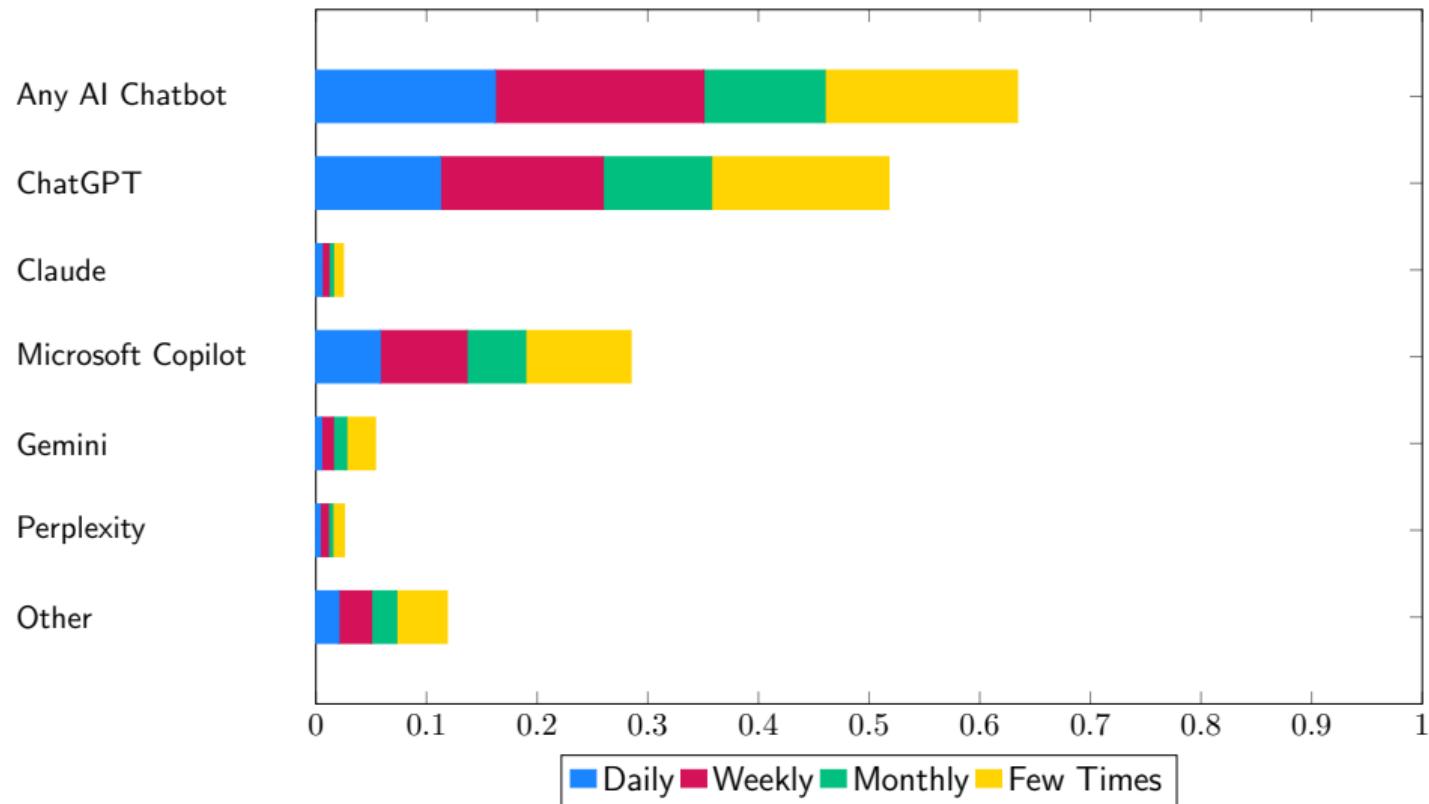
# AI Chatbots Are Widespread, Led by GPT

Figure: Use of AI Chatbots for Work (Nov '24)



# AI Chatbots Are Widespread, Led by GPT

Figure: Use of AI Chatbots for Work (Nov '24)



# Correlation Between Use of AI Chatbots for Work

$P(\text{Column}|\text{Row}) \text{ (Ever Used for Work)}$

	Any	ChatGPT	Claude	Copilot	Gemini	Perplexity	Other
Any	1.00	0.82	0.04	0.45	0.09	0.04	0.19
ChatGPT	1.00	1.00	0.05	0.39	0.10	0.05	0.17
Claude	1.00	0.94	1.00	0.66	0.39	0.23	0.39
Copilot	1.00	0.72	0.06	1.00	0.11	0.05	0.16
Gemini	1.00	0.91	0.18	0.56	1.00	0.15	0.32
Perplexity	1.00	0.90	0.22	0.56	0.32	1.00	0.36
Other	1.00	0.73	0.08	0.39	0.15	0.08	1.00
All Workers	0.64	0.53	0.03	0.29	0.06	0.03	0.12

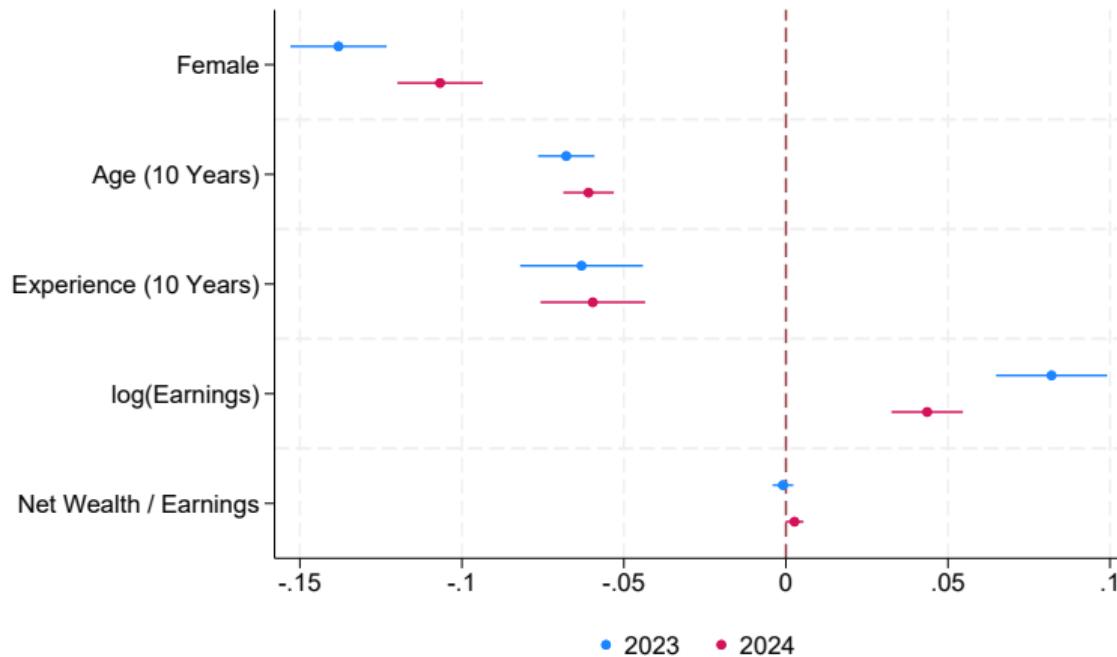
# Correlation Between Use of AI Chatbots for Work

$P(\text{Column}|\text{Row}) \text{ (Daily Use for Work)}$

	Any	ChatGPT	Claude	Copilot	Gemini	Perplexity	Other
Any	1.00	0.69	0.03	0.36	0.03	0.02	0.13
ChatGPT	1.00	1.00	0.03	0.20	0.04	0.02	0.07
Claude	1.00	0.63	1.00	0.38	0.09	0.10	0.20
Copilot	1.00	0.39	0.04	1.00	0.04	0.01	0.08
Gemini	1.00	0.84	0.10	0.43	1.00	0.08	0.26
Perplexity	1.00	0.66	0.14	0.22	0.10	1.00	0.20
Other	1.00	0.38	0.05	0.21	0.06	0.04	1.00
All Workers	0.16	0.11	0.01	0.06	0.01	0.00	0.02

# Young Men Lead the Adoption Curve ... But Gaps Are Narrowing

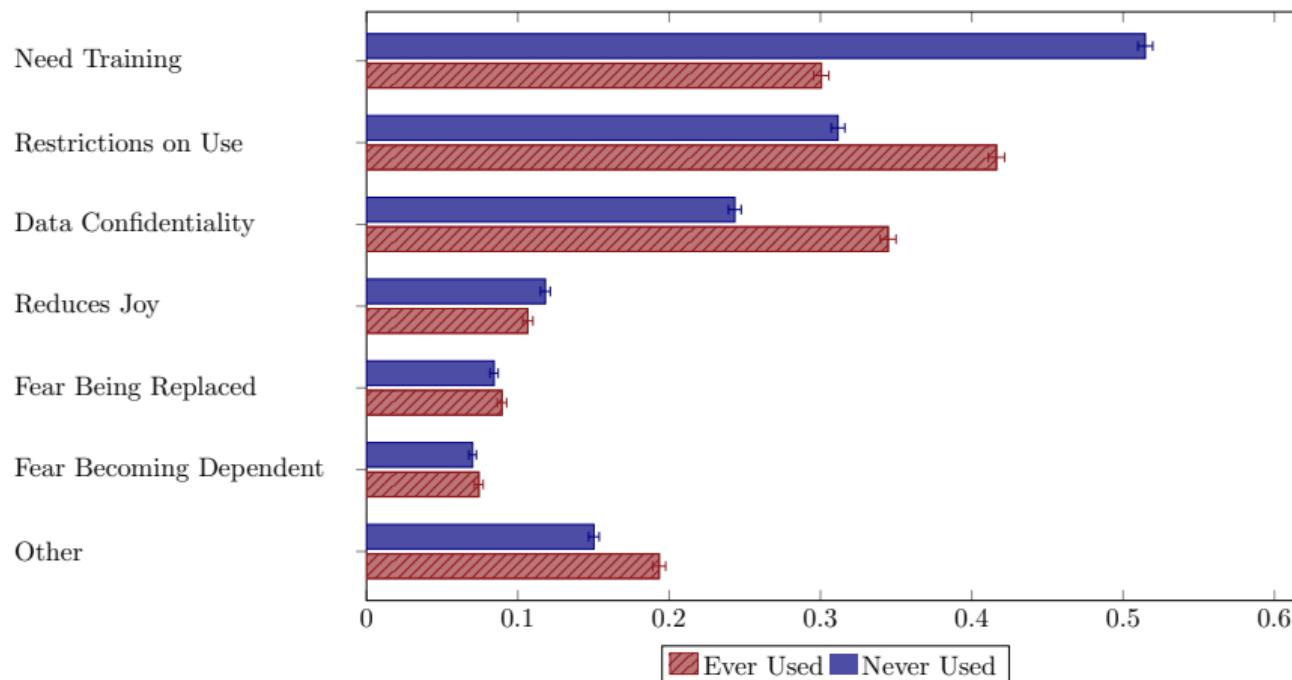
Figure: Use of ChatGPT for Work (Nov '23, '24)



Multivariate regression with occupation FEs. Adoption rate is 39.8% in 2023, 49.1% in 2024.

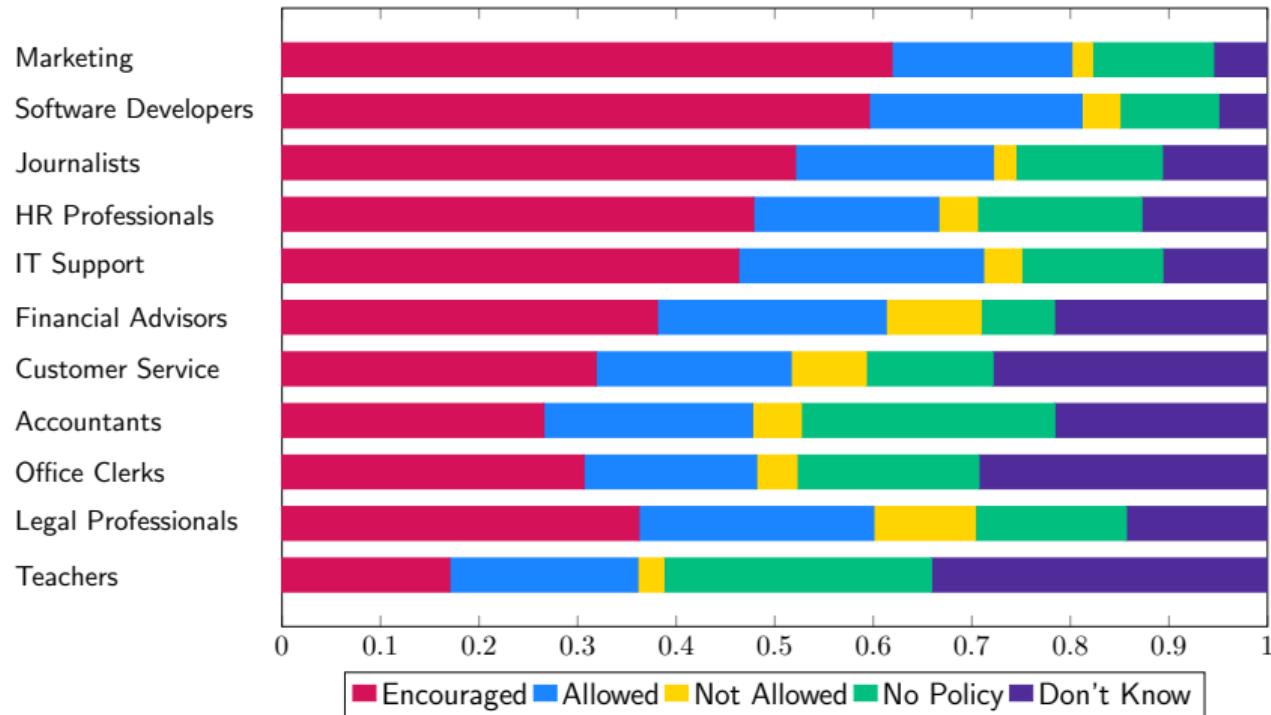
# Frictions to Adoption (2023 Survey)

Reasons for Not Intending to Use ChatGPT Despite Large Time Savings



# Most Employers Now Encourage AI Chatbots

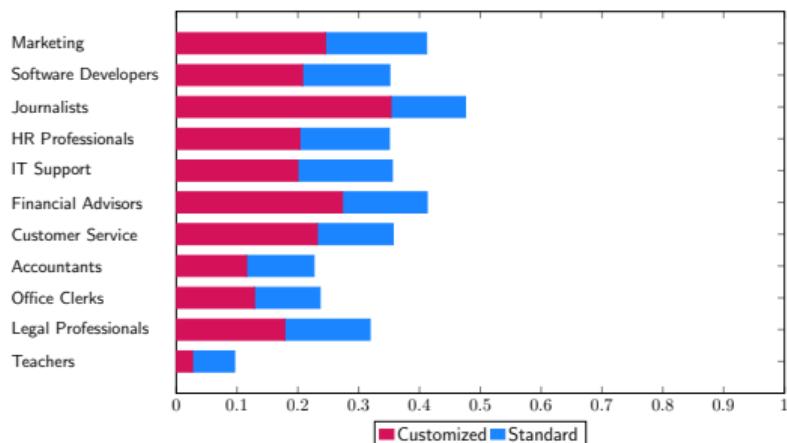
Usage Policies on AI Chatbots (Workplace Weighted)



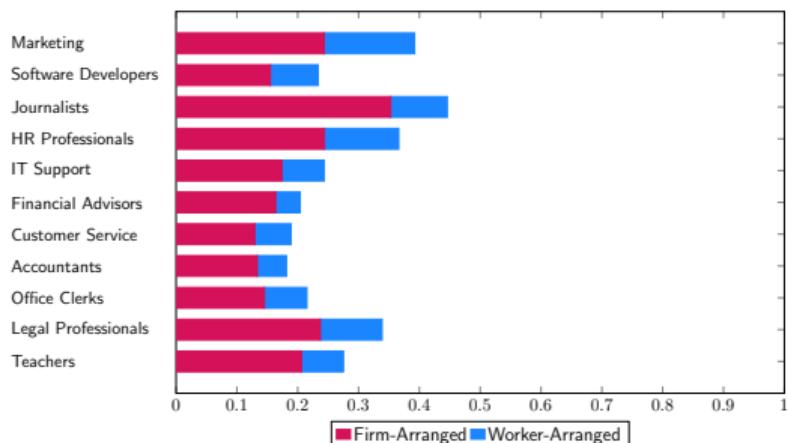
# ... Investing in Own Chatbots and Training Employees in Their Use

## Investments in AI Chatbots (Workplace Weighted)

Have In-House AI Chatbot

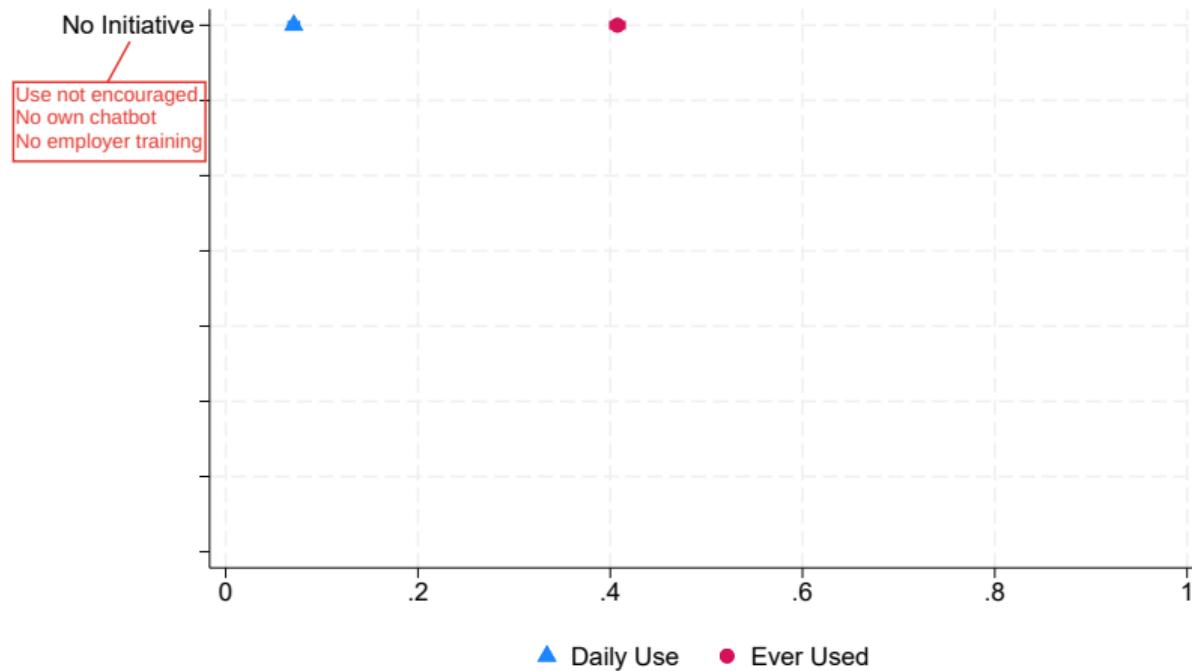


Received Training in AI Chatbots



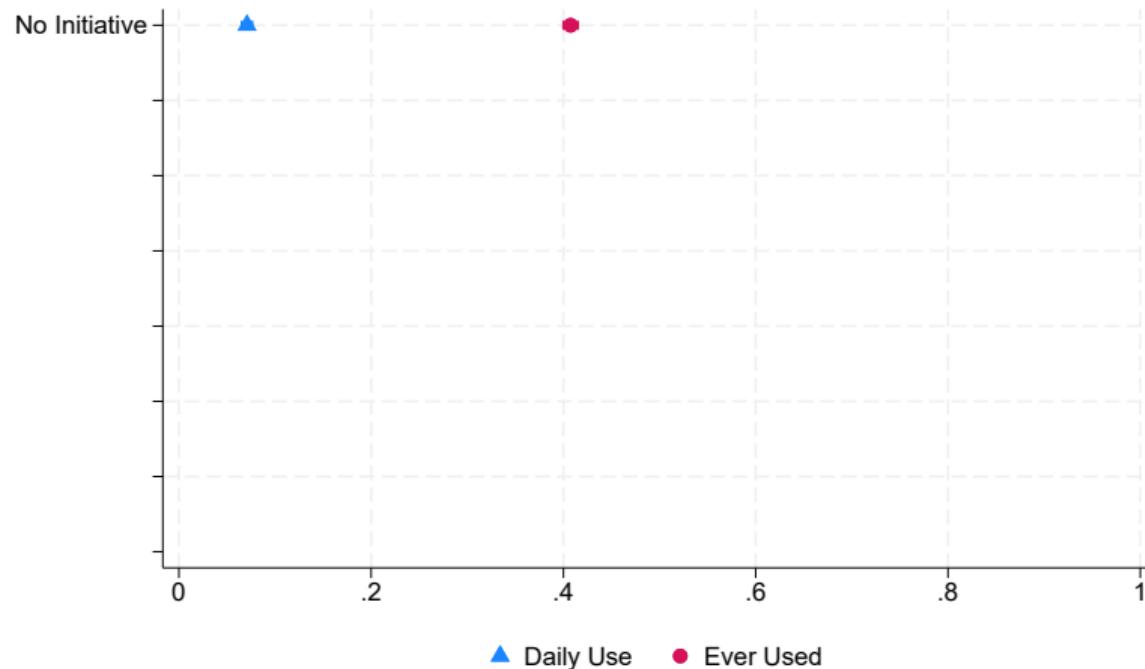
# Employer Initiatives and Chatbot Adoption

Use of AI chatbots for typical worker ( $\hat{\beta}' \text{EmployerInitiatives}_i + \hat{\gamma}' \bar{X}$ )



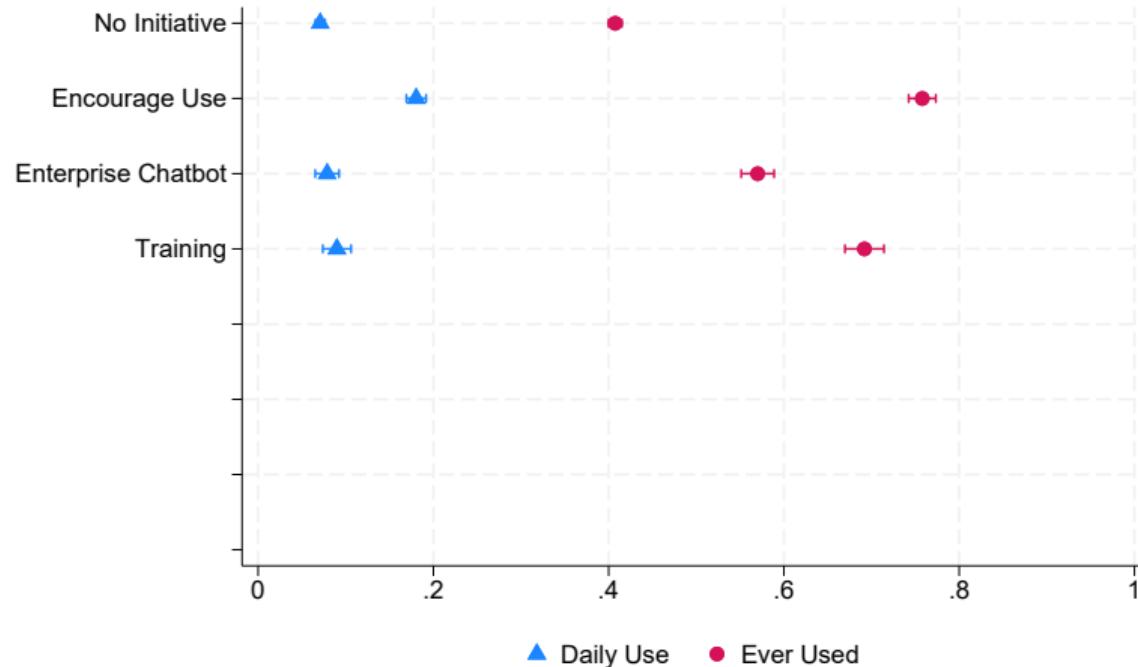
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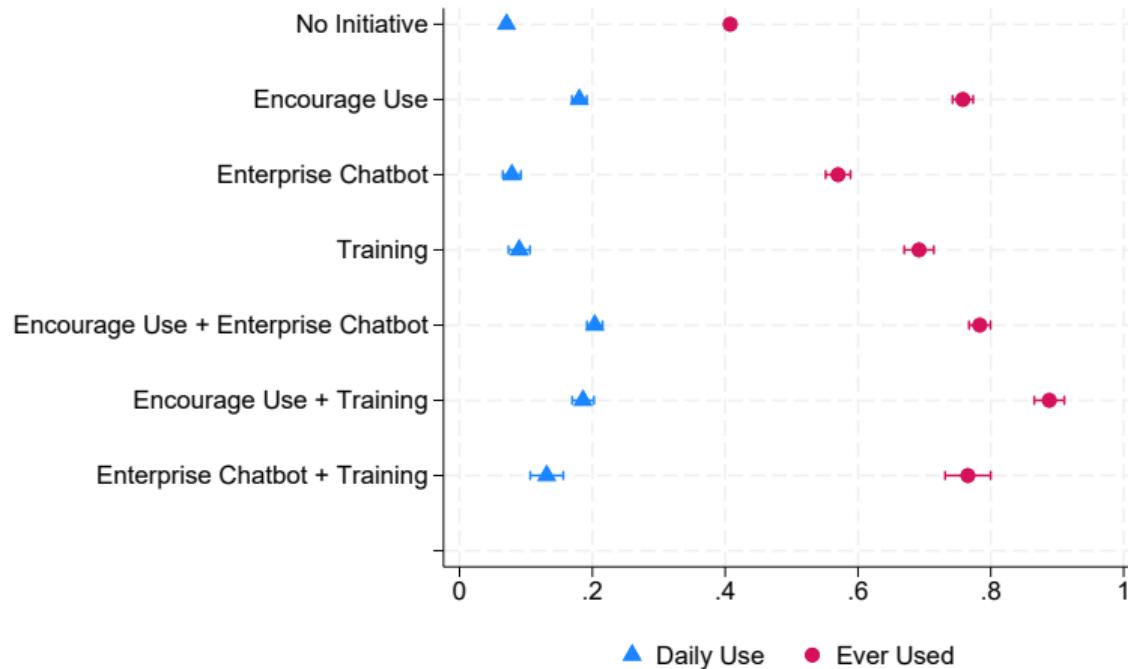
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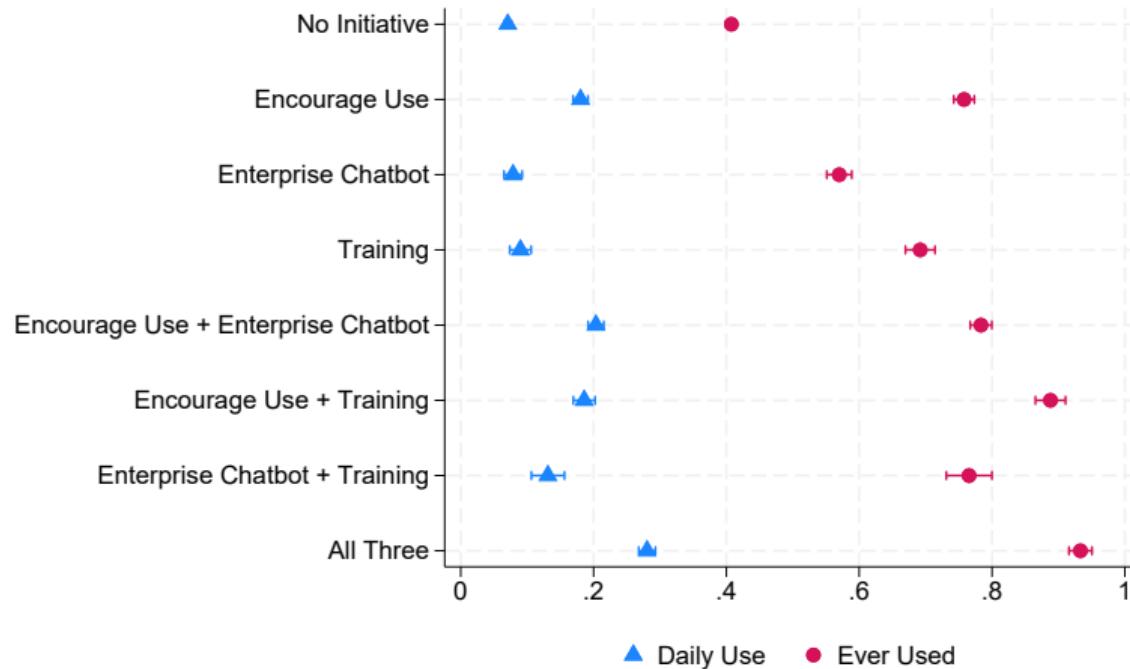
# Employer Initiatives and Chatbot Adoption

Use of AI chatbots for typical worker ( $\hat{\beta}' \text{EmployerInitiatives}_i + \hat{\gamma}' \bar{X}$ )



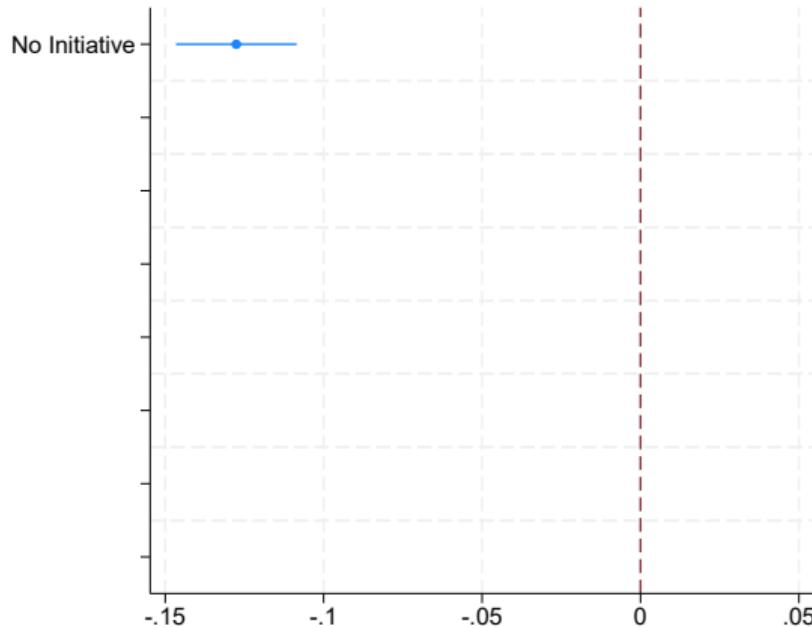
# Employer Initiatives and Chatbot Adoption

Use of AI chatbots for typical worker ( $\hat{\beta}' \text{EmployerInitiatives}_i + \hat{\gamma}' \bar{X}$ )



# Employer Initiatives and Gender Gaps in Adoption

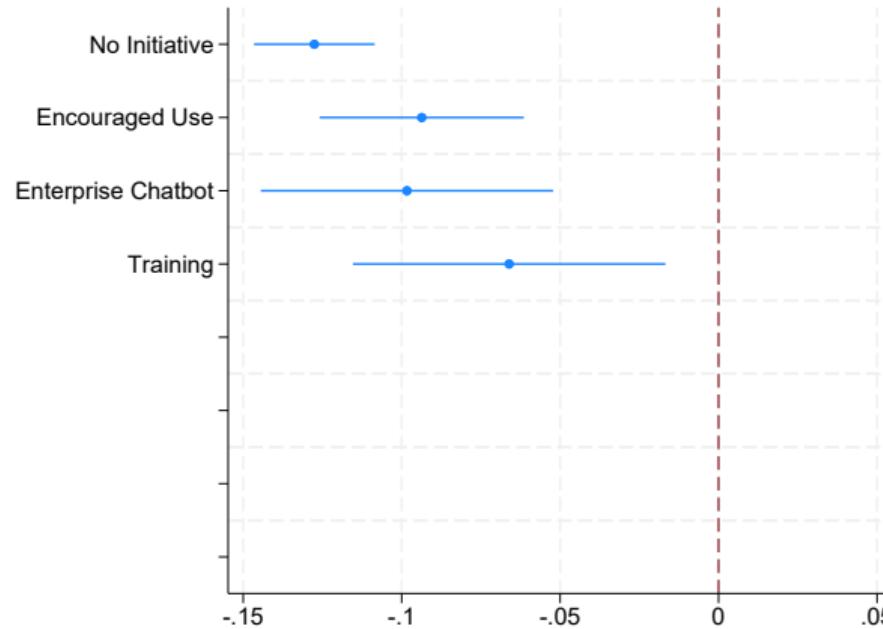
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation, age, experience, earnings, wealth

# Employer Initiatives and Gender Gaps in Adoption

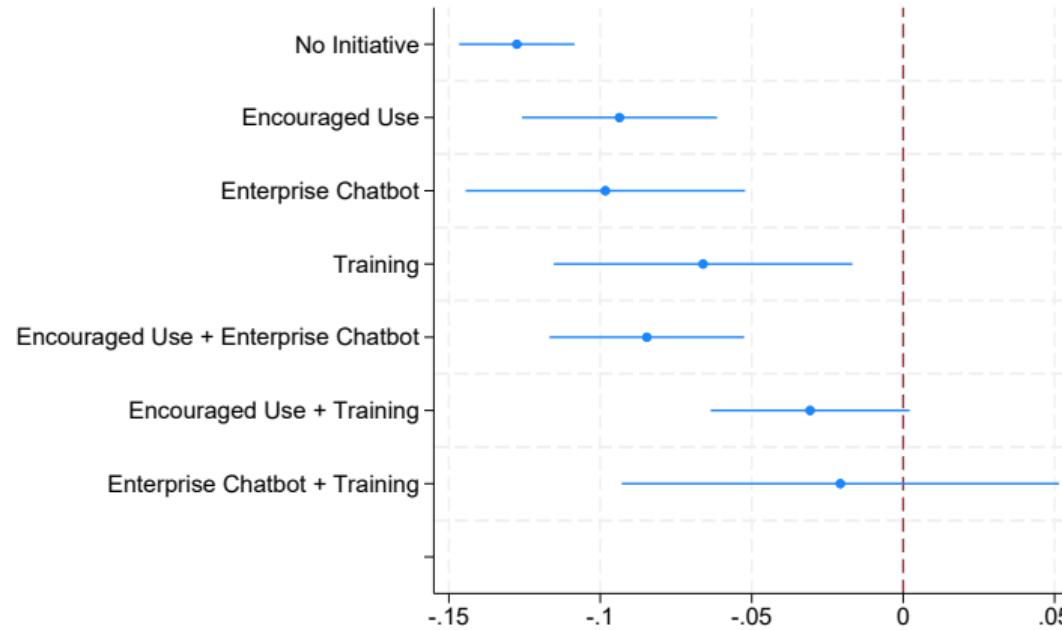
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation, age, experience, earnings, wealth

# Employer Initiatives and Gender Gaps in Adoption

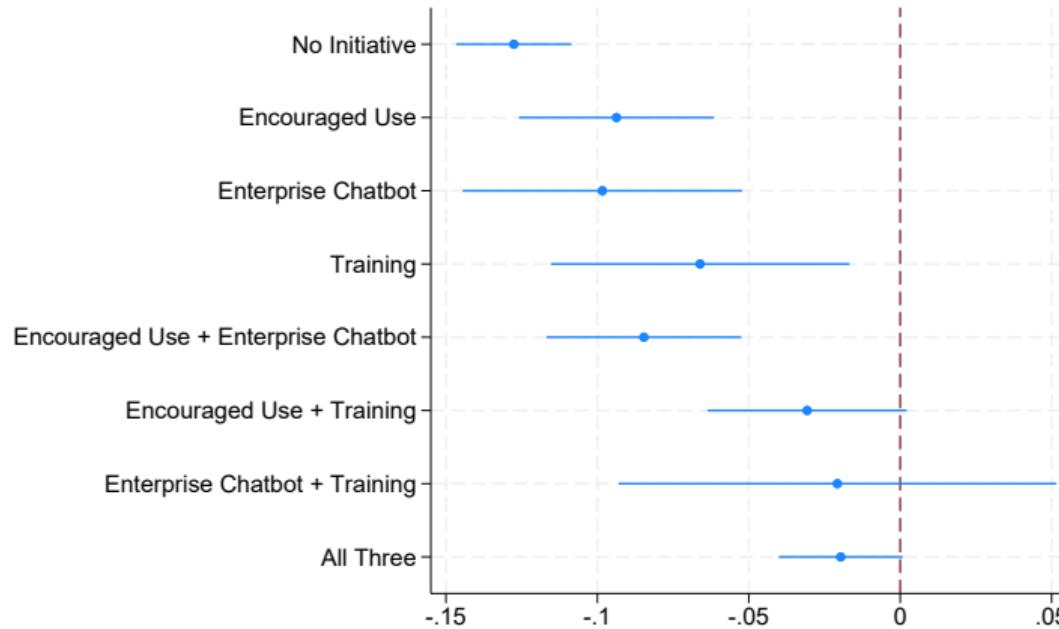
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation, age, experience, earnings, wealth

# Employer Initiatives and Gender Gaps in Adoption

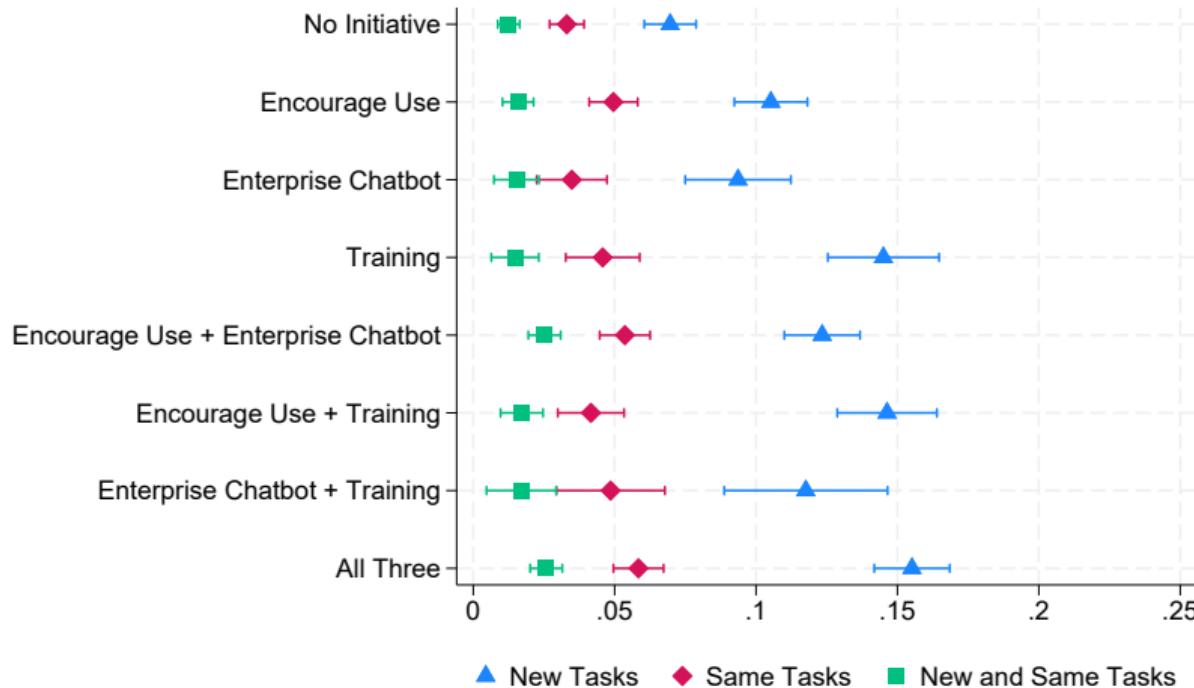
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation, age, experience, earnings, wealth

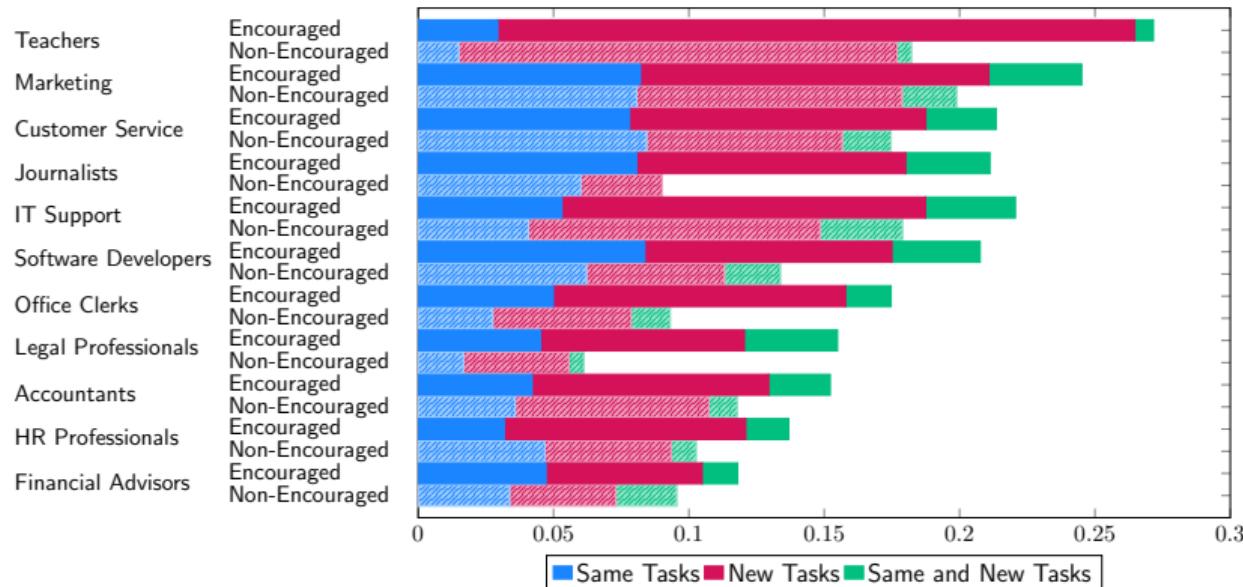
# AI Chatbots Create New Job Tasks

## Employer Initiatives and New Workloads From AI Chatbots (Adopters)



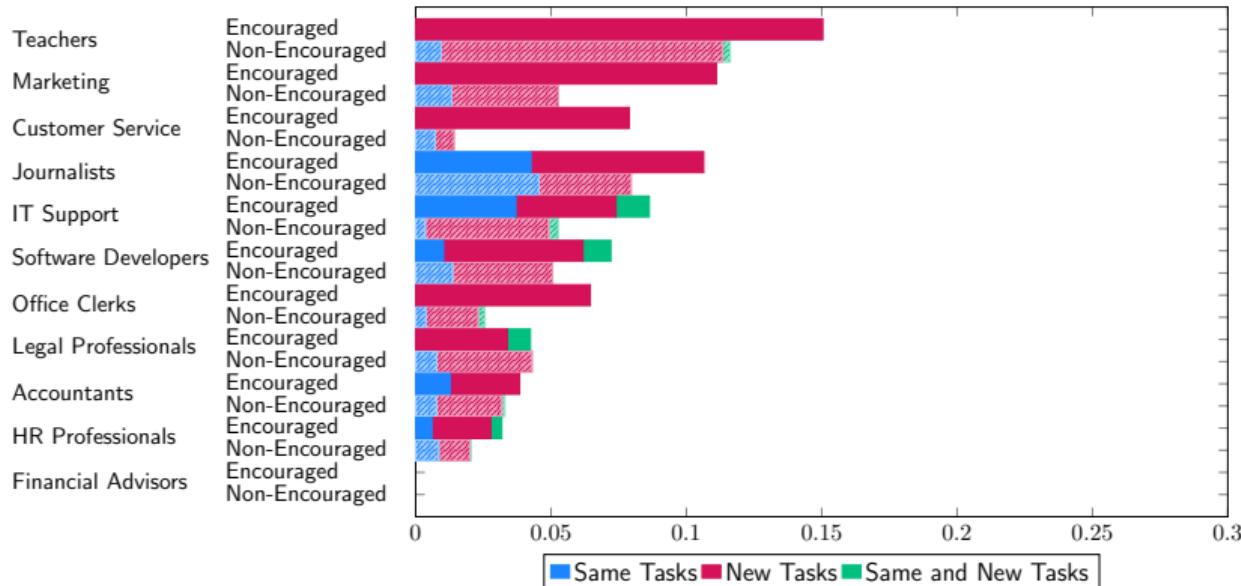
# AI Chatbots Create New Job Tasks

Figure: New Workloads from AI Chatbots (Adopters)



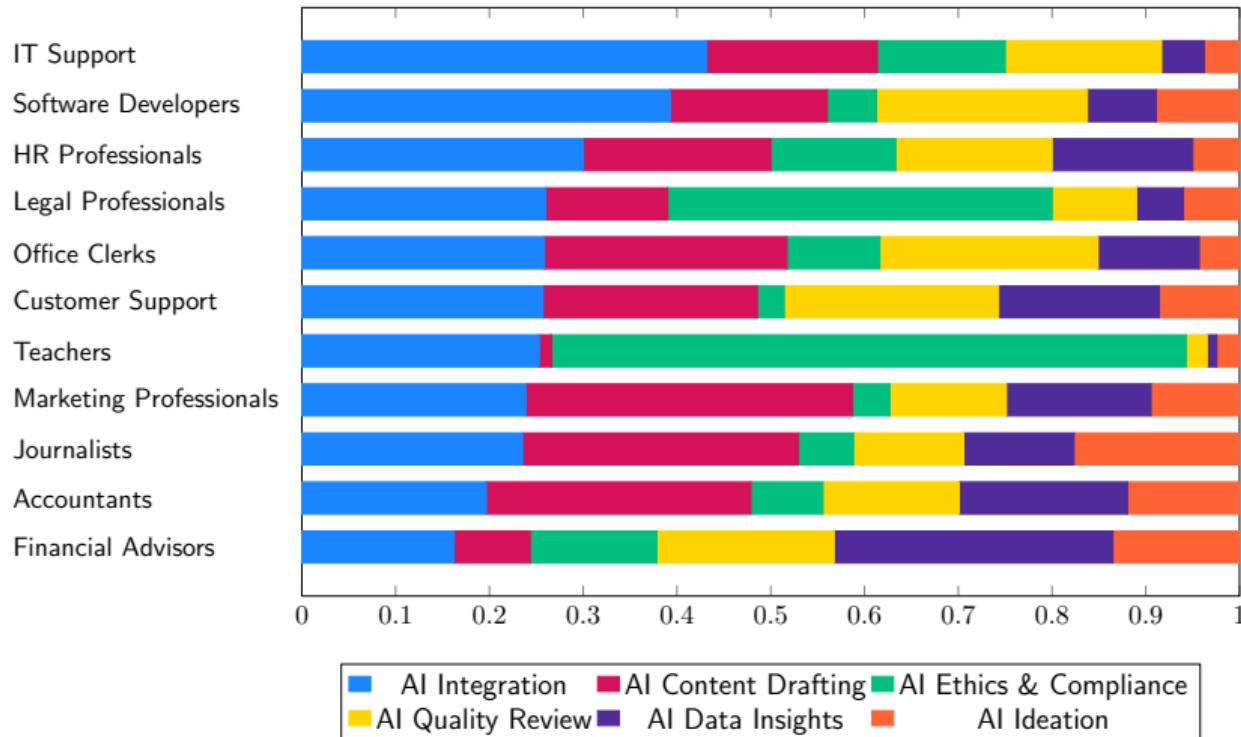
# AI Chatbots Create New Job Tasks

Figure: New Workloads from AI Chatbots (Non-Adopters)



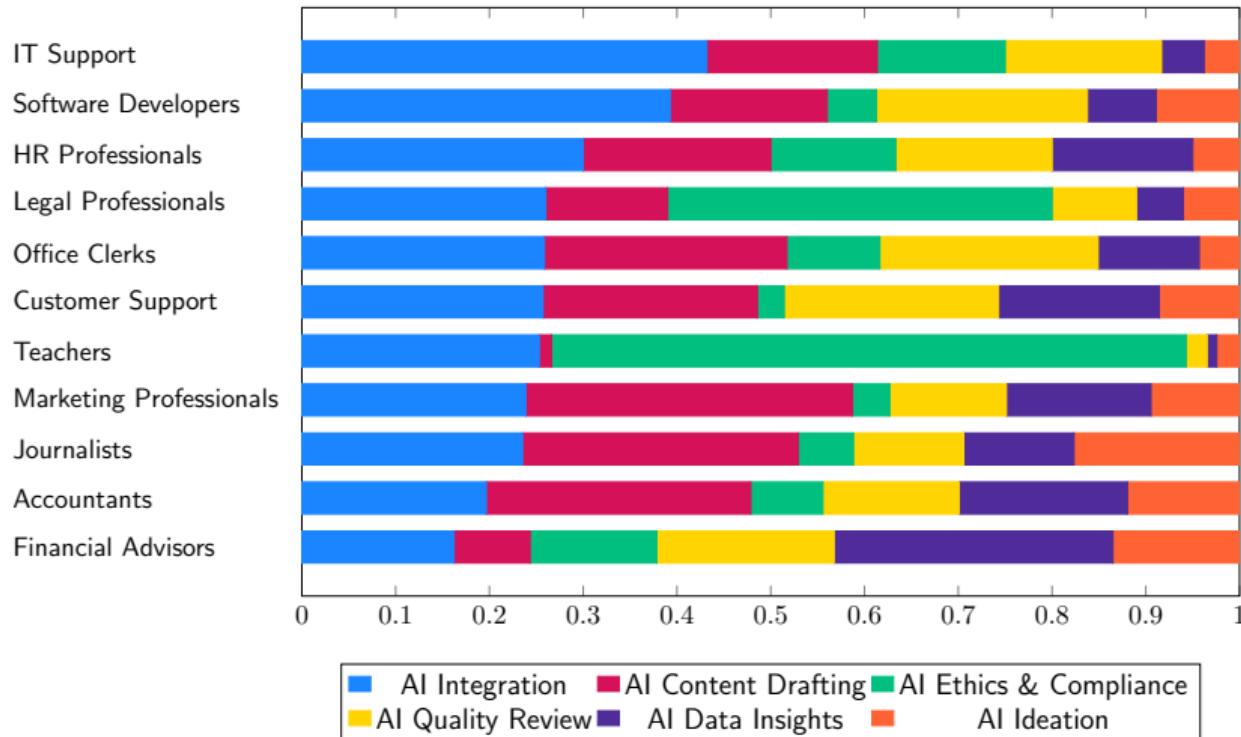
# AI Chatbots Create New Job Tasks

## Composition of AI Tasks

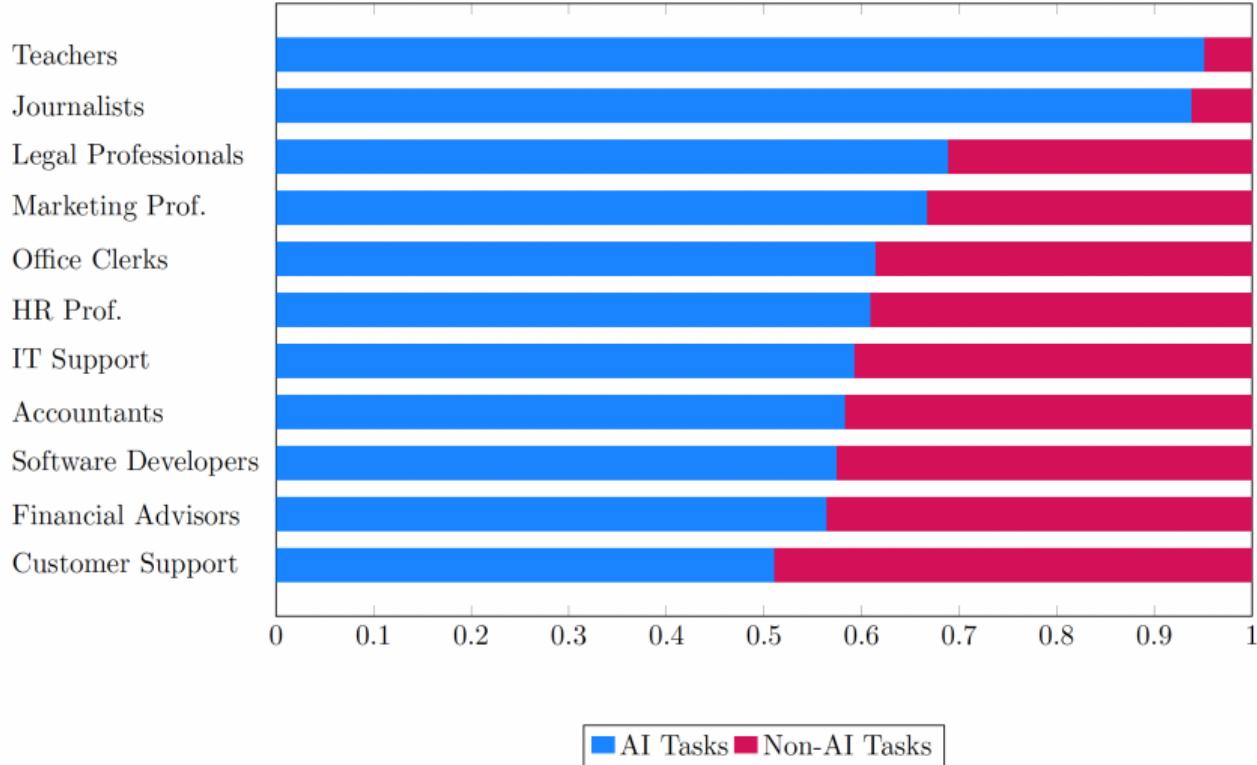


# Integration and Oversight Tasks Widespread

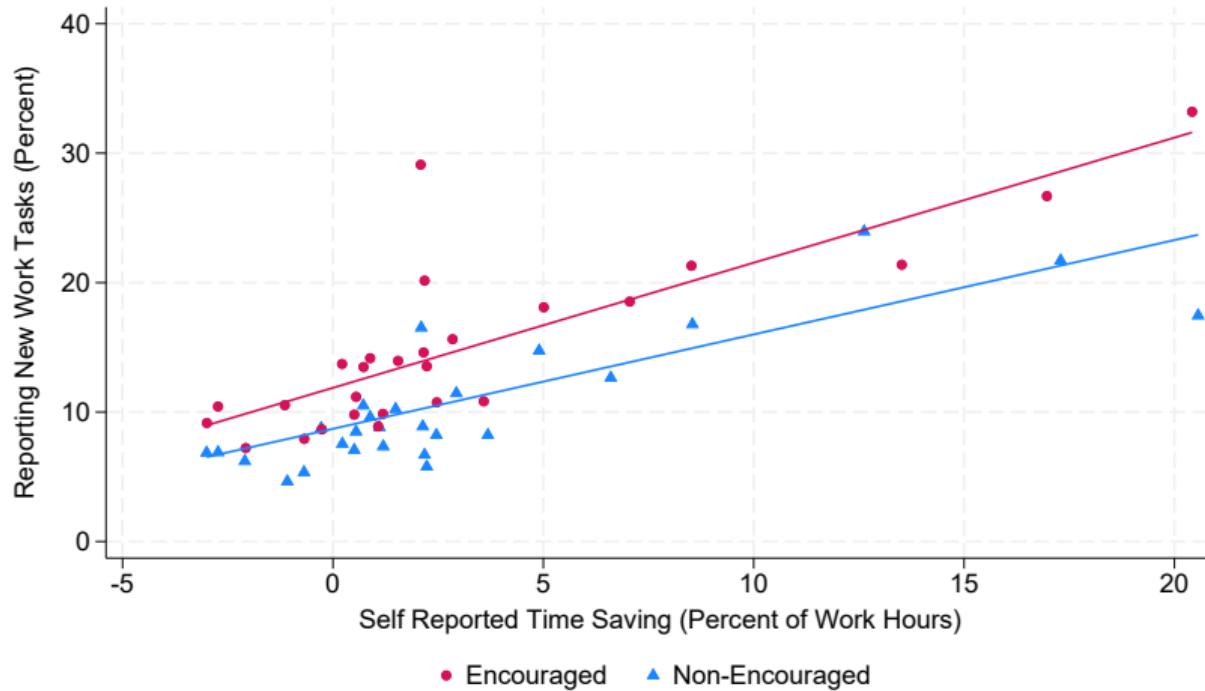
## Composition of AI Tasks



# Composition of New Job Tasks



# New Work and Reported Time Savings



## Coworker IV: First Stage Results

Table:  $\text{EmployerInitiative}_i = \pi' X_{j,-i} + \alpha \times \text{EmployerInitiative}_{j,-i} + \varepsilon_{1i}$

	Encouraged (1)
Coworker IV (Leave Out, EBS)	1.181*** (0.020)
Coworkers Share Female	-0.016 (0.011)
Coworkers Age	0.001 (0.001)
Coworkers Potential Experience	-0.001 (0.001)
Occupation FEs	✓
First Stage F-Stat	3644.56
Observations	16974

Note: Standard errors are clustered at the workplace level

## Coworker IV: Second Stage Results

Table:  $Y_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$

		(a) Adoption							
Ever Used		Monthly or More		Weekly or More		Daily			
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)	OLS (7)	IV (8)	
Encouraged	0.363 (0.007)	0.725 (0.022)	0.337 (0.007)	0.640 (0.022)	0.285 (0.007)	0.506 (0.021)	0.137 (0.005)	0.228 (0.017)	

Note: Standard errors are clustered at the workplace level

## Coworker IV: Second Stage Results

Table:  $Y_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$

		(b) Reported Benefits							
		Time Savings		Quality		Creativity		Job Satisfaction	
		OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)	OLS (7)	IV (8)
Encouraged		0.100 (0.008)	0.053 (0.031)	0.116 (0.009)	0.090 (0.033)	0.091 (0.009)	0.088 (0.031)	0.071 (0.007)	0.026 (0.025)

Note: Standard errors are clustered at the workplace level

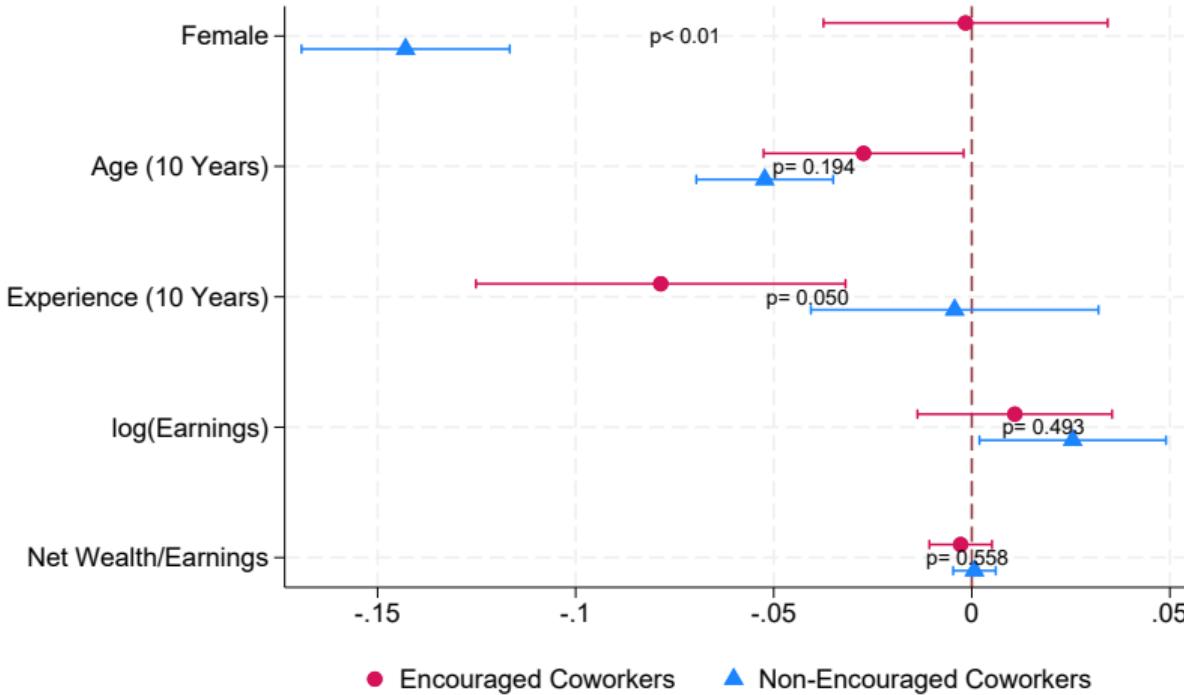
## Coworker IV: Second Stage Results

Table:  $Y_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$

(c) New Workloads from AI Chatbots (Adopters)					
	Same Tasks	New Tasks	Same and New Tasks		
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)
Encouraged	0.016 (0.004)	0.018 (0.012)	0.045 (0.006)	0.106 (0.021)	0.008 (0.002)
					0.014 (0.008)

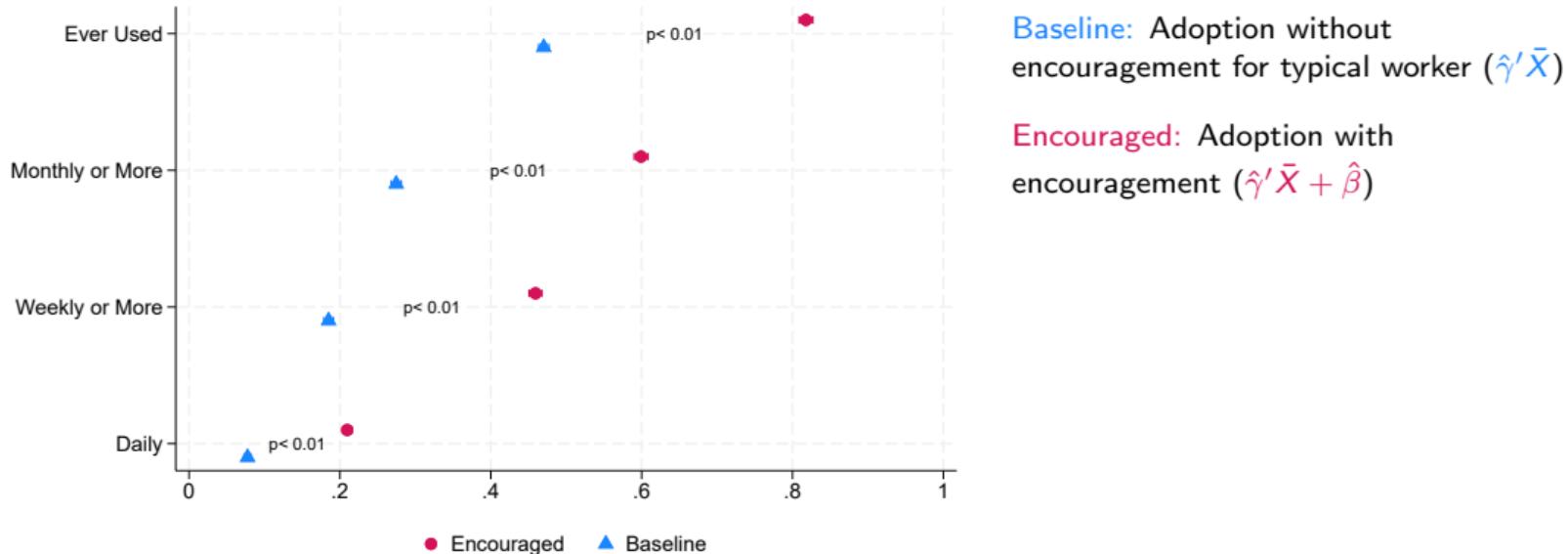
Note: Standard errors are clustered at the workplace level

# Encouragements Narrow Gaps in Adoption



# Employer Policies Boost Adoption (Controlling for Task Mixes)

$$\text{Adoption}_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$$



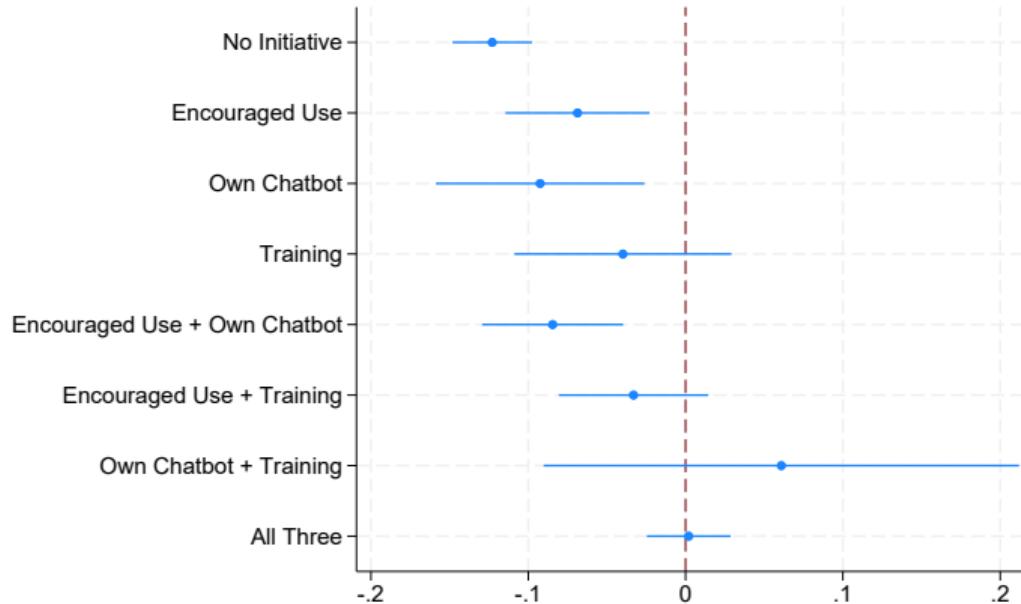
**Baseline:** Adoption without encouragement for typical worker ( $\hat{\gamma}' \bar{X}$ )

**Encouraged:** Adoption with encouragement ( $\hat{\gamma}' \bar{X} + \hat{\beta}$ )

Controls  $X$ : Occupation FEs, gender, age, experience, task importance FEs

# Employer Initiatives and Age Gaps in Adoption (Controlling for Task Mixes)

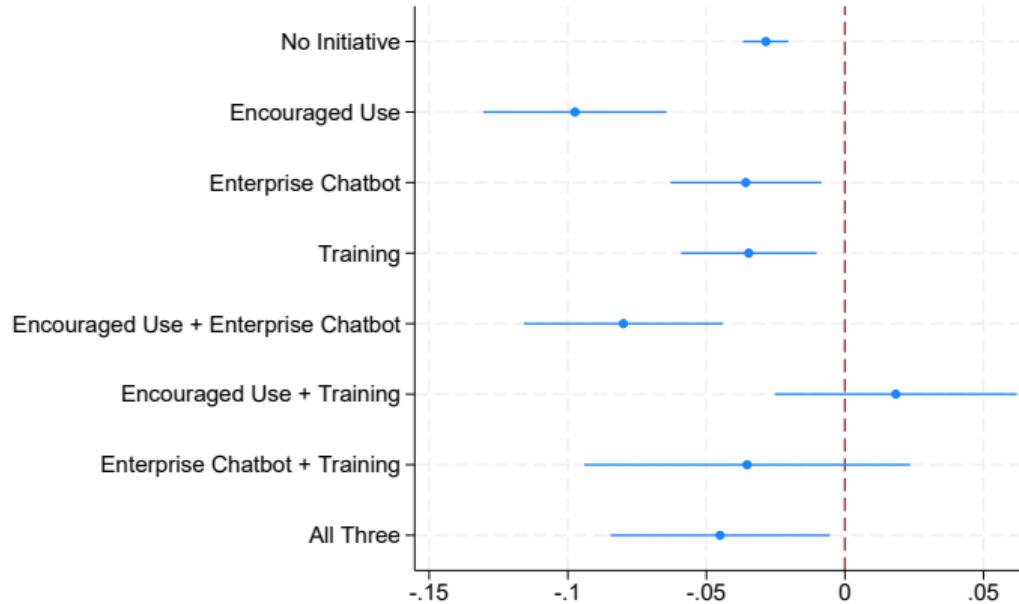
Estimate separately by employer policies:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation FEs, task importance FEs

# Employer Initiatives and Gender Gaps in Adoption (Daily Use)

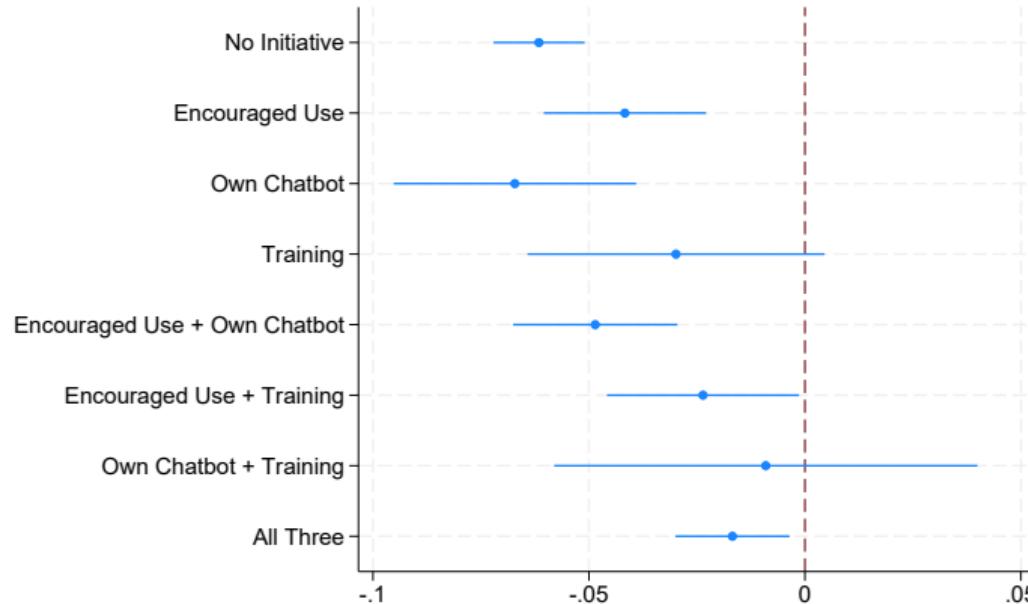
Estimate separately by employer initiatives:  $\text{DailyUse}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation FEs, age, experience, earnings, wealth

# Employer Initiatives and Age Gaps in Adoption

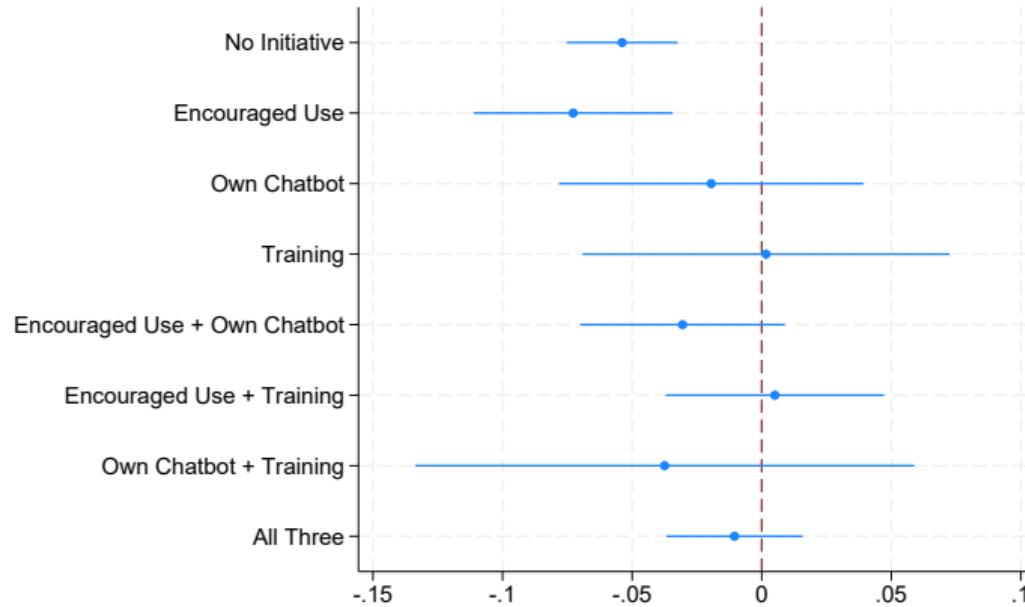
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation FEs, gender, experience, earnings, wealth

# Employer Initiatives and Experience Gaps in Adoption

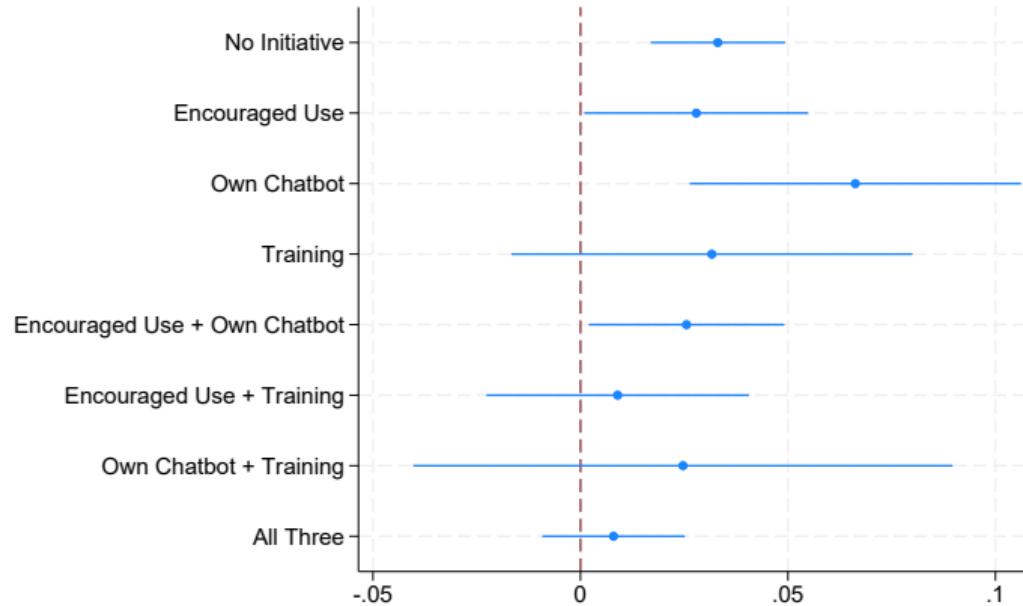
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation FEs, gender, age, earnings, wealth

# Employer Initiatives and Earnings Gaps in Adoption

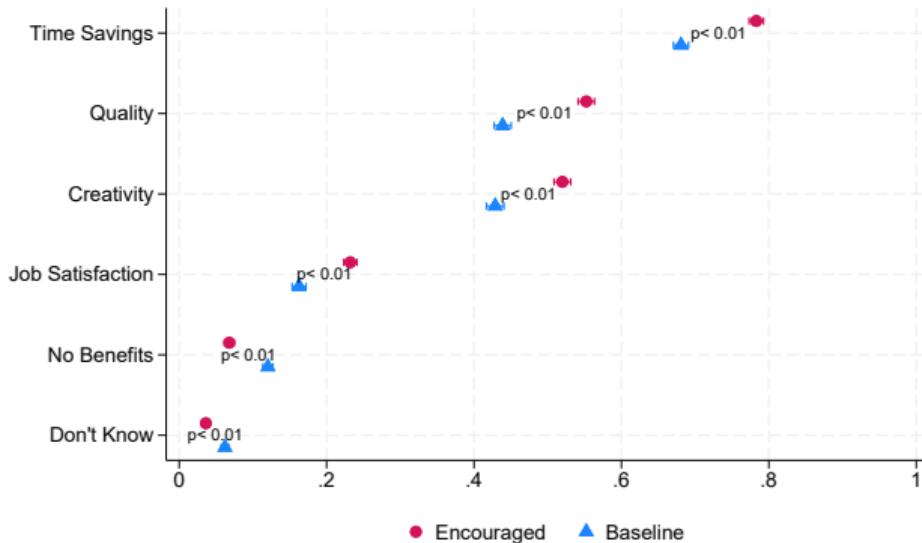
Estimate separately by employer initiatives:  $\text{EverUsed}_i = \beta' X_i + \varepsilon_i$



Controls: Occupation FEs, gender, age, earnings, wealth

# Encouragements Boost Benefits (Controlling for Task Mixes)

$$\text{Benefit}_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$$



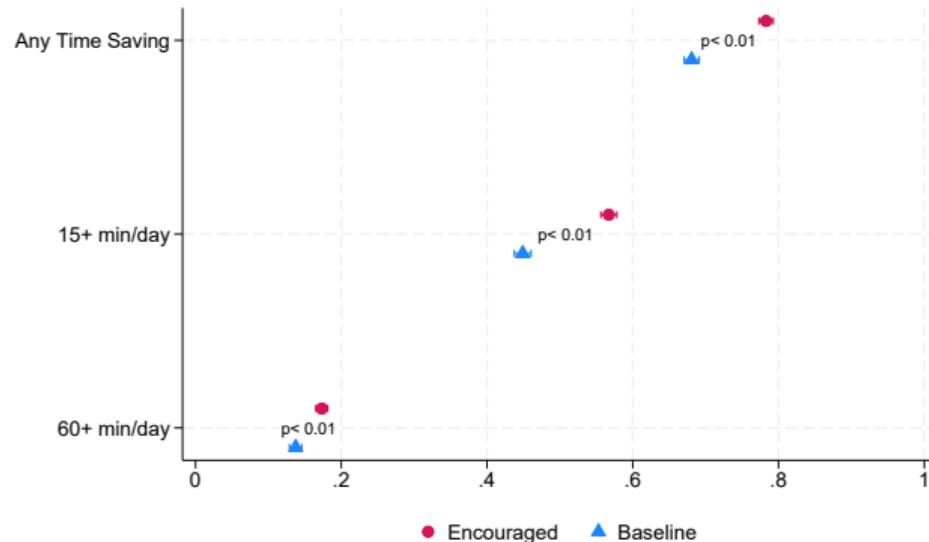
**Baseline:** Benefits without encouragement for typical worker ( $\hat{\gamma}' \bar{X}$ )

**Encouraged:** Benefits with encouragement ( $\hat{\gamma}' \bar{X} + \hat{\beta}$ )

Controls  $X$ : Occupation FEs, gender, age, experience, task importance FEs

# Large Time Savings Are Rare (Controlling for Task Mixes)

$$\text{Benefit}_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$$



**Baseline:** Benefits without encouragement for typical worker ( $\hat{\gamma}' \bar{X}$ )

**Encouraged:** Benefits with encouragement ( $\hat{\gamma}' \bar{X} + \hat{\beta}$ )

Controls  $X$ : Occupation FEs, gender, age, experience, task importance FEs

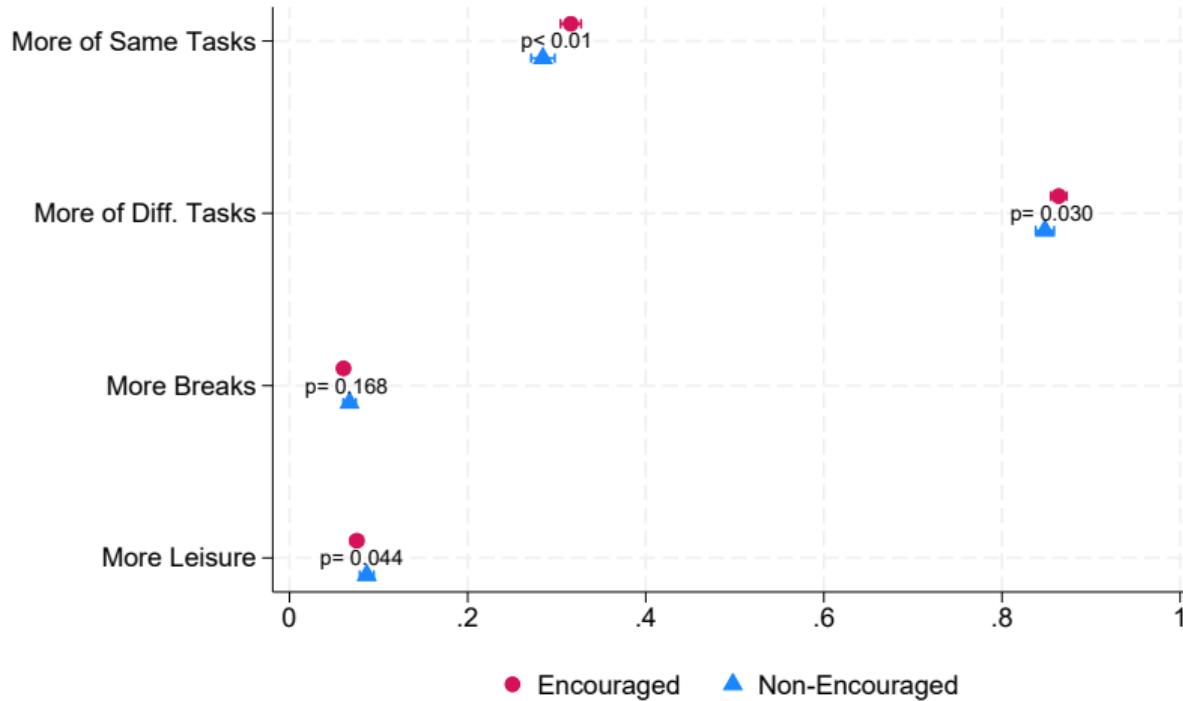
# ... Reshaping Work for Non-Adopters, Too

Figure: New Workloads From AI Chatbots (Non-Adopters)



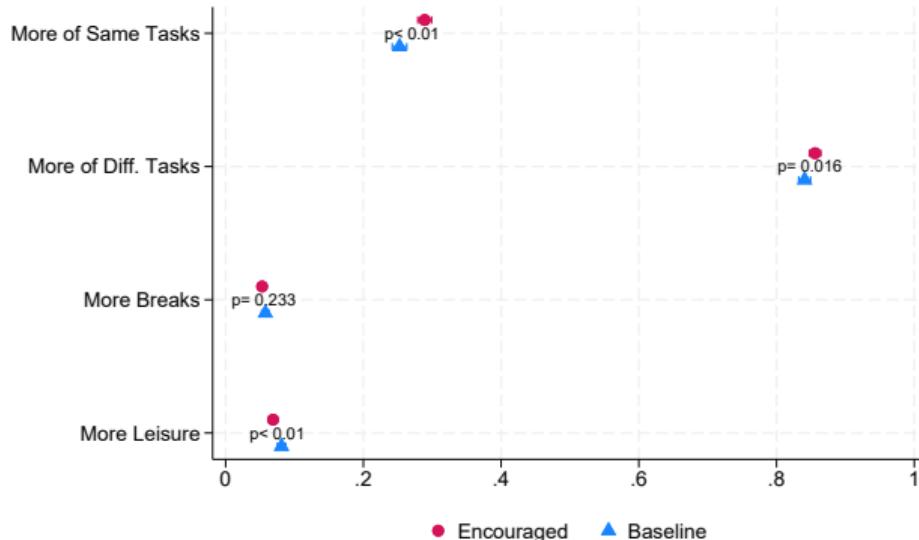
# Saved Time Is Used for Other Tasks

Figure: Allocation of Time Savings



# Saved Time Is Used for Other Tasks (Controlling for Task Mixes)

$$\text{Benefit}_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$$



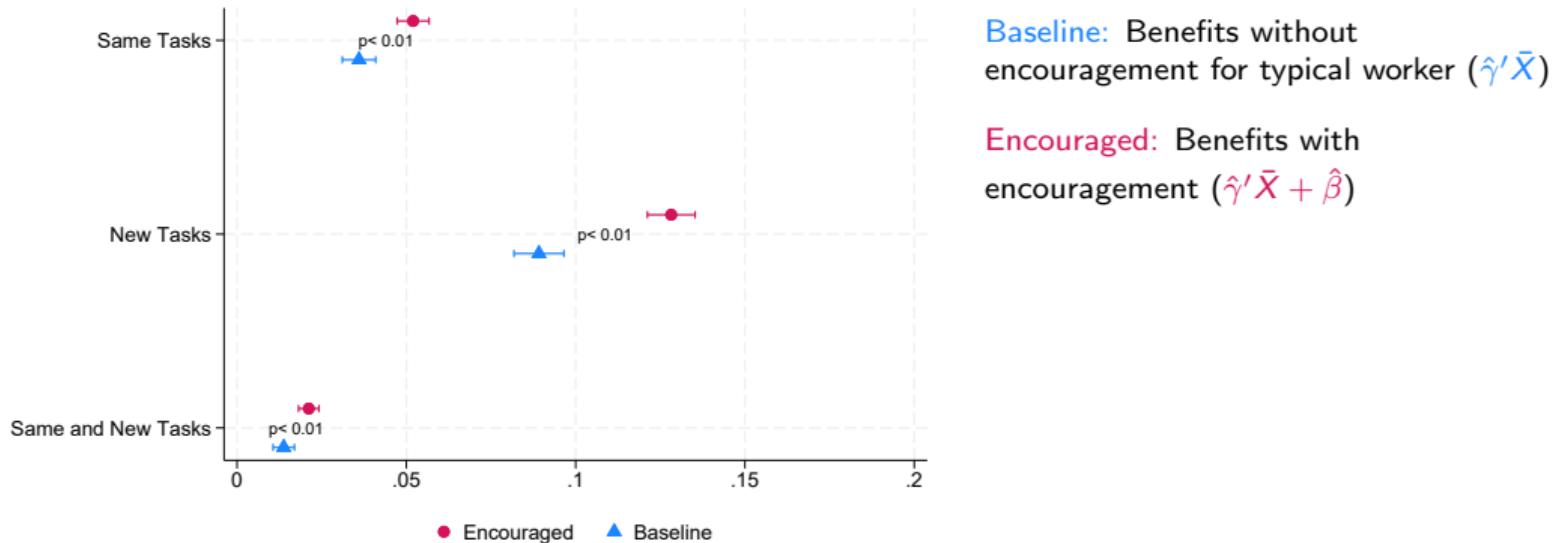
**Baseline:** Benefits without encouragement for typical worker ( $\hat{\gamma}' \bar{X}$ )

**Encouraged:** Benefits with encouragement ( $\hat{\gamma}' \bar{X} + \hat{\beta}$ )

Controls  $X$ : Occupation FEs, gender, age, experience, task importance FEs

# AI Chatbots Create New Job Tasks: Adopters(Controlling for Task Mixes)

$$\text{Benefit}_i = \gamma' X_i + \beta \times \text{Encouraged}_i + \varepsilon_i$$



Controls  $X$ : Occupation FEs, gender, age, experience, task importance FEs

## New Tasks from AI Chatbots

Importance of task creation aligns with theoretical models (Acemoglu & Restrepo, 2018)

1. We asked respondents to describe their new job tasks from AI chatbots
2. Received 2,500 free text responses
3. Categorize into broad AI-related categories and occupation-specific subtasks

# Examples of New Tasks from AI Chatbots

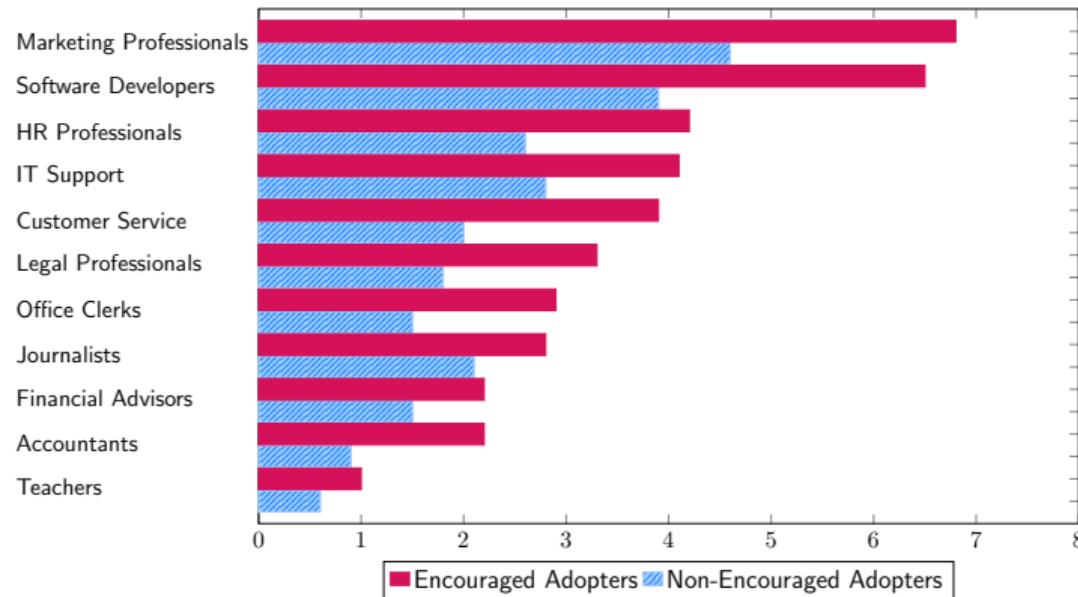
- ▶ **Teachers:** Detecting AI-generated homework (*AI Ethics & Compliance*)
- ▶ **Customer Support:** Reviewing AI responses for accuracy and tone (*AI Quality Review*)
- ▶ **IT Support:** Integrating AI assistants into support systems to automate routine help requests (*AI Integration*)
- ▶ **HR Professionals:** Drafting job postings, policy documents, or employee communications using AI (*AI Content Drafting*)
- ▶ **Financial Advisors:** Analyzing market trends and client data with AI to inform advice (*AI Data Insights*)
- ▶ **Journalists:** Using AI to draft article outlines, summaries, or initial news reports (*AI Content Drafting*)
- ▶ **Legal Professionals:** Ensuring AI tools and outputs uphold legal ethics and confidentiality (*AI Ethics & Compliance*)
- ▶ **Marketing Professionals:** Generating marketing copy, social media posts, or product descriptions with AI (*AI Content Drafting*)
- ▶ **Software Developers:** Implementing AI and writing prompts (*AI integration*)

# Categories of New Tasks from AI Chatbots

1. **AI Ideation:** Leveraging AI to spark or expand creative ideas—such as concepts, strategies, or solutions. The human selects and builds on the most promising suggestions.
2. **AI Content Drafting:** Using AI tools to generate initial drafts of text or media (e.g., documents, emails, code). The human professional prompts the AI, then edits and refines the output for accuracy and tone.
3. **AI Quality Review:** Reviewing AI-generated content for accuracy, clarity, and relevance. The human fact-checks, corrects errors, and ensures the output meets required standards.
4. **AI Data Insights:** Using AI to analyze data or documents and surface patterns, summaries, or key insights. The human then interprets and applies these findings to decisions.
5. **AI Integration:** Embedding AI into workflows to automate or enhance tasks. Professionals design prompts, refine workflows, correct outputs, and fine-tune systems based on feedback.
6. **AI Ethics & Compliance:** Ensuring AI use follows ethical, legal, and institutional standards. This includes setting guidelines, monitoring for bias or misuse, and reviewing outputs for compliance.

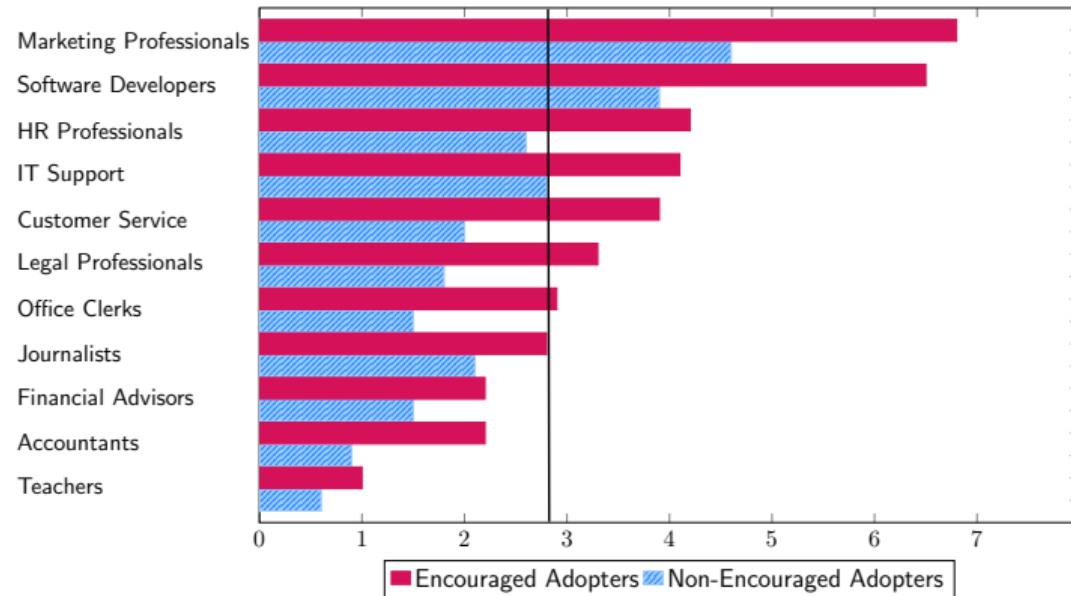
# Total Time Savings Are Modest

Time Savings from AI Chatbots in % of Work Hours (Ever Used)



# Total Time Savings Are Modest

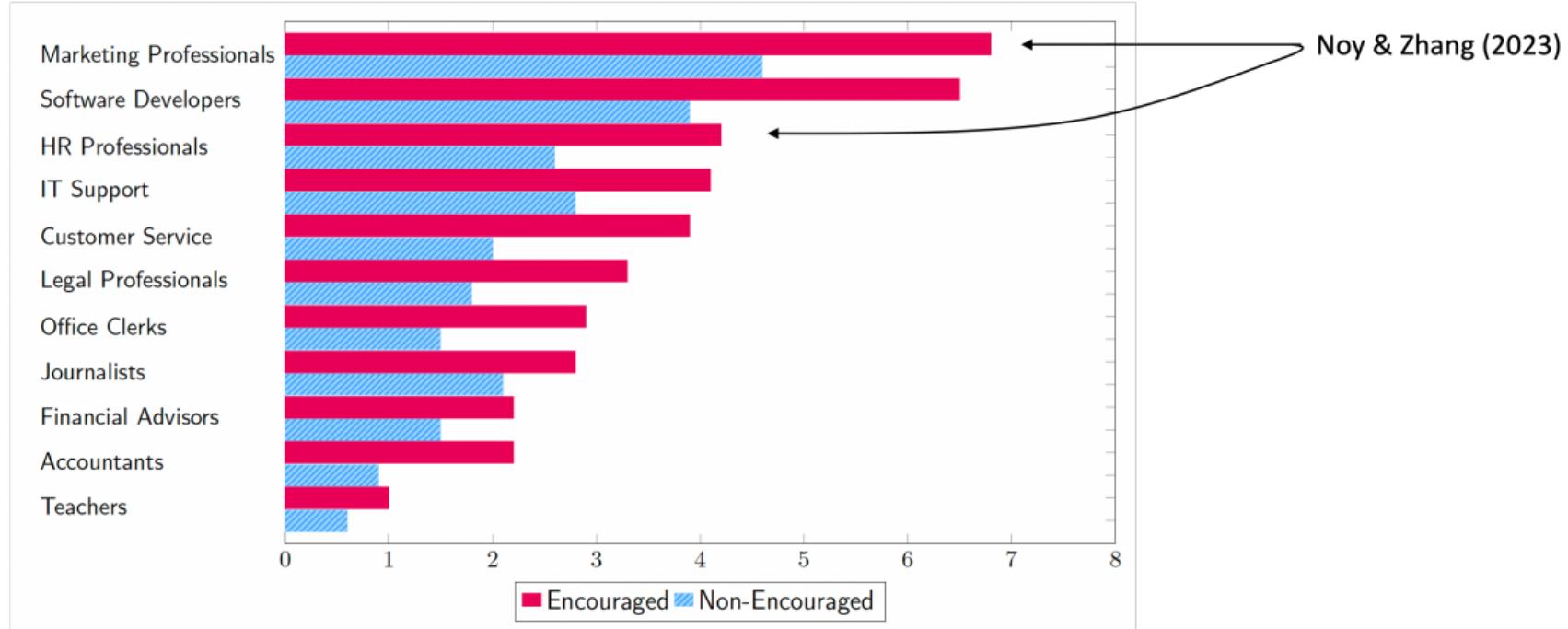
Time Savings from AI Chatbots in % of Work Hours (Ever Used)



$$E\left[\frac{\text{Time Savings}}{\text{Work Hours}}\right] = \underbrace{E\left[\frac{\text{Time Savings Per Day Used}}{\text{Daily Work Hours}}\right]}_{6.2\%} \times \underbrace{E\left[\frac{\text{Days Used}}{\text{Work Days}}\right]}_{28.3\%} + \underbrace{\text{Cov}\left[\frac{\text{Time Savings Per Day Used}}{\text{Daily Work Hours}}, \frac{\text{Days Used}}{\text{Work Days}}\right]}_{0.9\%} = 2.8\%$$

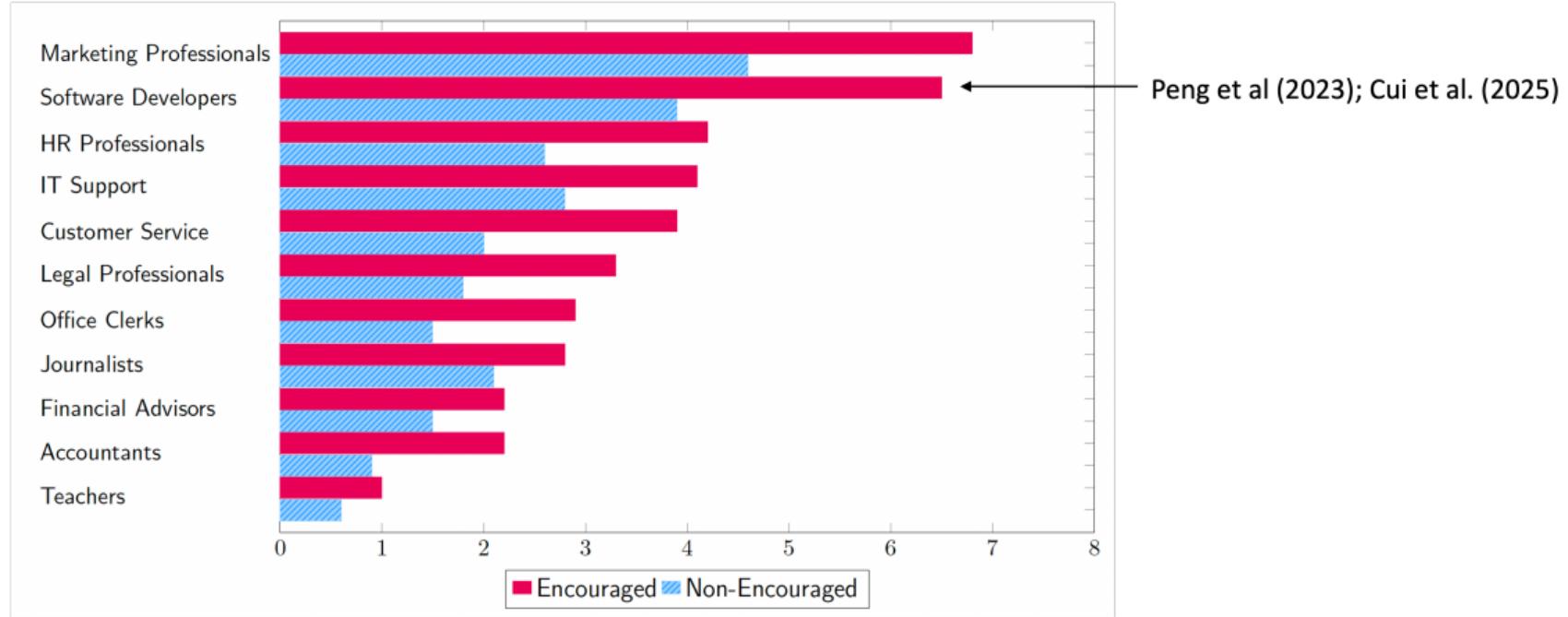
# Reconciling with the Literature

Time Savings from AI Chatbots in % of Work Hours (Ever Used)



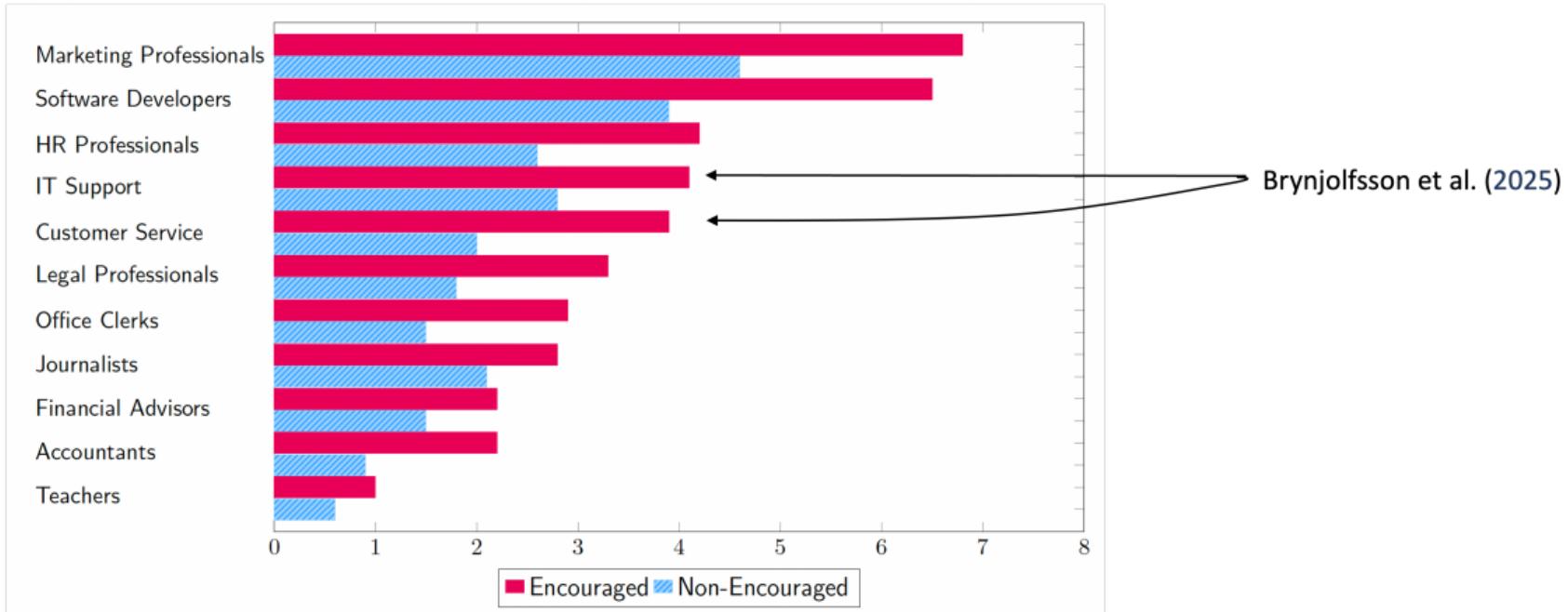
# Reconciling with the Literature

## Time Savings from AI Chatbots in % of Work Hours (Ever Used)



# Reconciling with the Literature

Time Savings from AI Chatbots in % of Work Hours (Ever Used)



# Regression Specifications

Dynamic difference-in-differences of adoption indicator  $A$

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\sum_{\tau \neq 2022M11} \beta_{\tau} A_i \mathbf{1}_{\{t=\tau\}}} + \beta_0 A_i + \varepsilon_{it}$$

Pooled difference-in-differences

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\lambda_3 t + \lambda_4 A_i t}_{\text{Time Trends}} + \sum_{y=2023}^{2024} \underbrace{\beta_y A_i \mathbf{1}_{\{y(t)=y\}}}_{\text{Pooled Diff-in-Diff}} + \beta_0 A_i + \varepsilon_{it}$$

# Regression Specifications

Dynamic difference-in-differences of adoption indicator  $A$

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\sum_{\tau \neq 2022M11} \beta_{\tau} A_i \mathbf{1}_{\{t=\tau\}}} + \beta_0 A_i + \varepsilon_{it}$$

Pooled difference-in-differences

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\lambda_3 t + \lambda_4 A_i t}_{\text{Time Trends}} + \sum_{y=2023}^{2024} \underbrace{\beta_y A_i \mathbf{1}_{\{y(t)=y\}}}_{\text{Pooled Diff-in-Diff}} + \beta_0 A_i + \varepsilon_{it}$$

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Dynamic difference-in-differences of adoption indicator  $A$

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\sum_{\tau \neq 2022M11} \beta_{\tau} A_i \mathbf{1}_{\{t=\tau\}}} + \beta_0 A_i + \varepsilon_{it}$$

Pooled difference-in-differences

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\lambda_3 t + \lambda_4 A_i t}_{\text{Time Trends}} + \sum_{y=2023}^{2024} \underbrace{\beta_y A_i \mathbf{1}_{\{y(t)=y\}}}_{\text{Pooled Diff-in-Diff}} + \beta_0 A_i + \varepsilon_{it}$$

# Regression Specifications

Dynamic difference-in-differences of adoption indicator  $A$

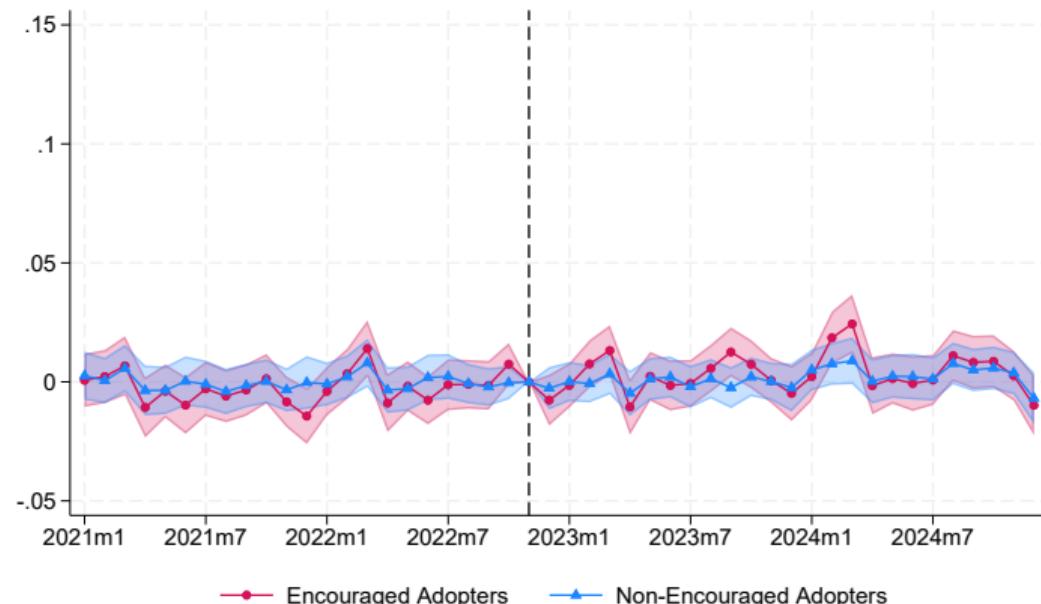
$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\sum_{\tau \neq 2022M11} \beta_{\tau} A_i \mathbf{1}_{\{t=\tau\}}} + \beta_0 A_i + \varepsilon_{it}$$

Pooled difference-in-differences

$$Y_{it} = \underbrace{\sum_{\tau} \lambda_{1\tau} X_i \mathbf{1}_{\{t=\tau\}}}_{\text{Pre-Determined Controls}} + \underbrace{\sum_m \lambda_{2m} \mathbf{1}_{\{m=m(t)\}}}_{\text{Seasonality}} + \underbrace{\lambda_3 t + \lambda_4 A_i t}_{\text{Time Trends}} + \sum_{y=2023}^{2024} \underbrace{\beta_y A_i \mathbf{1}_{\{y(t)=y\}}}_{\text{Pooled Diff-in-Diff}} + \beta_0 A_i + \varepsilon_{it}$$

# Have Adopters Fared Differently?

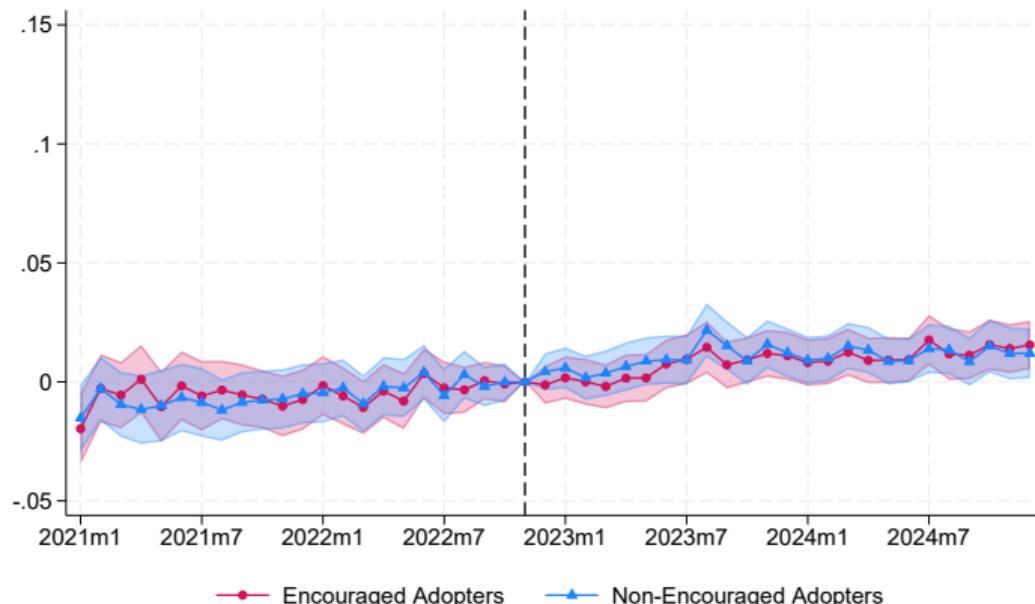
Log Hourly Wage of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender

# Have Adopters Fared Differently?

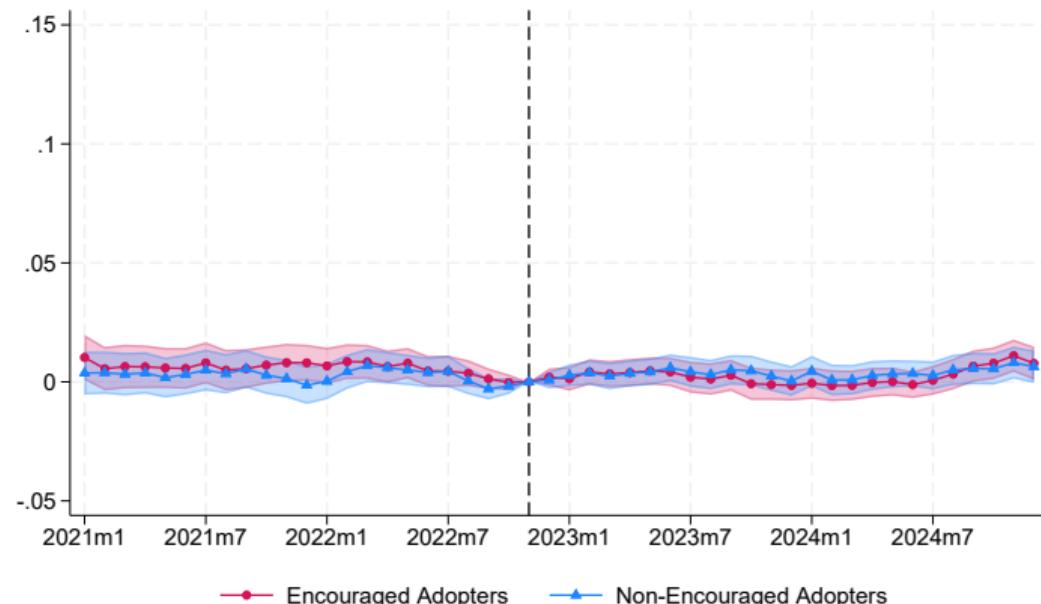
Log Hours of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender

# Have Adopters Fared Differently?

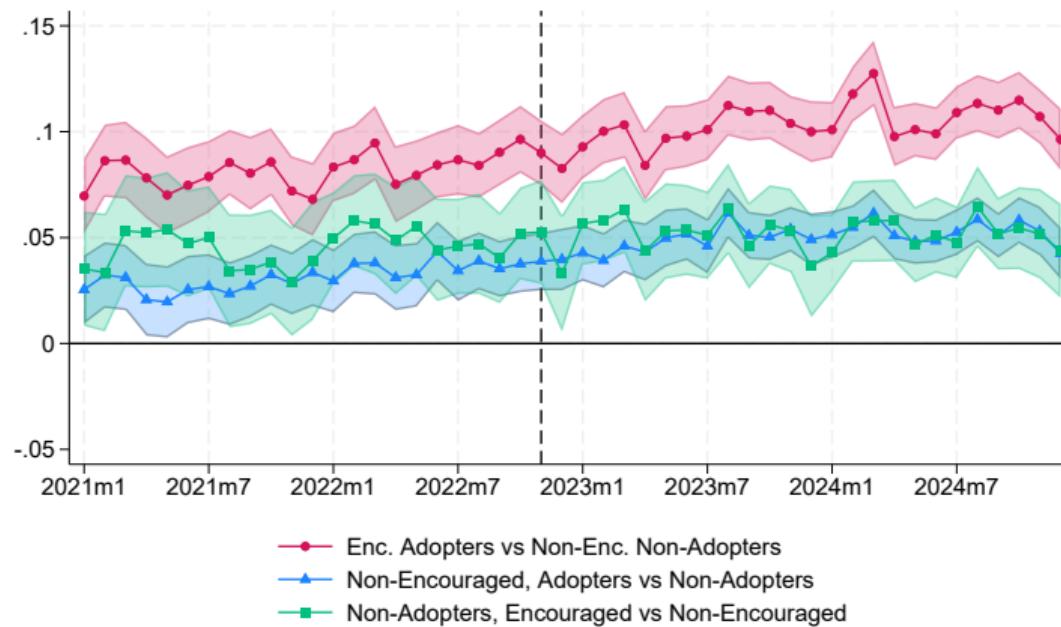
Extensive-Margin Employment of Adopters  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender

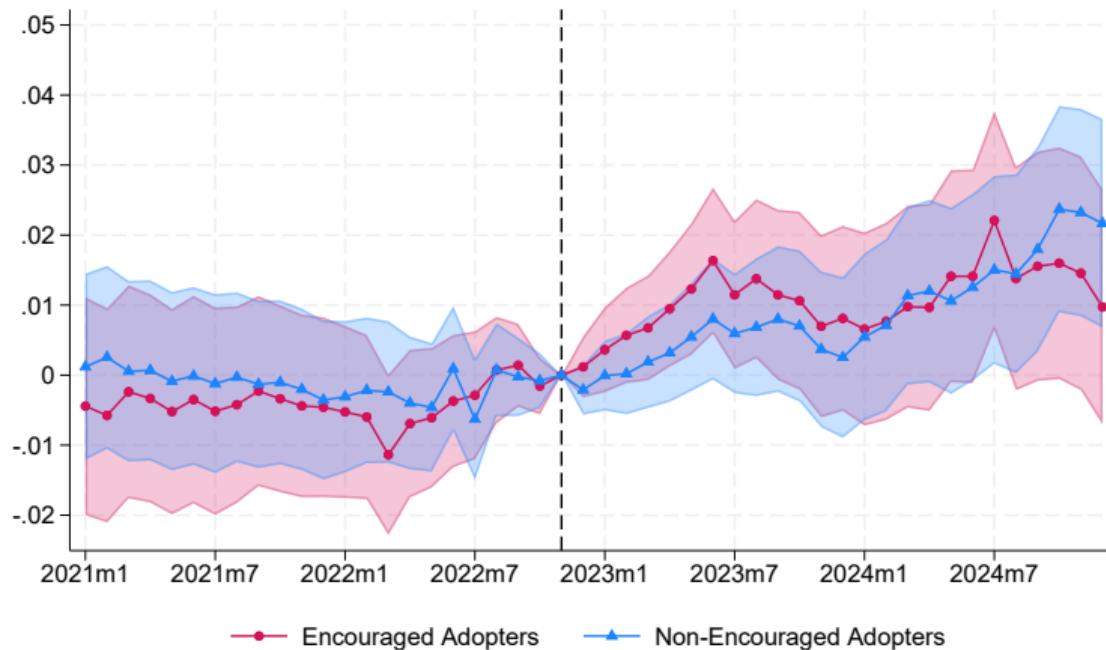
# Worker Earnings by Encouragement and Adoption Status

Log Earnings Relative to Non-Encouraged Non-Adopters)



# Have Adopters Experienced Greater Workplace Mobility?

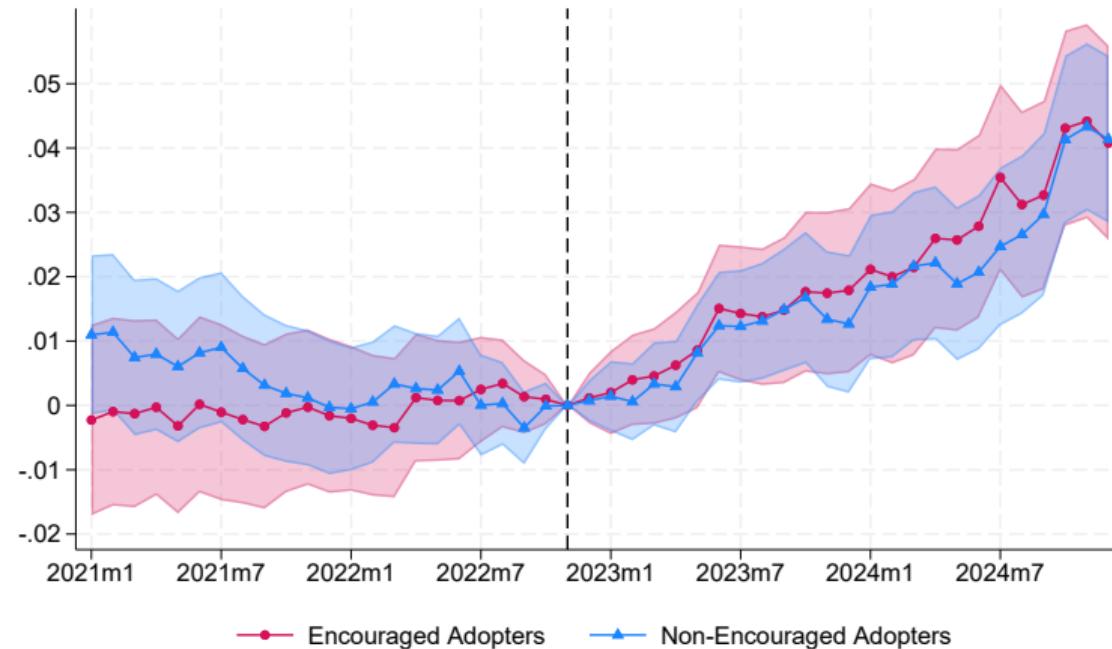
FTE Employment in Latest Workplace  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

# Have Adopters Experienced Greater Occupational Mobility?

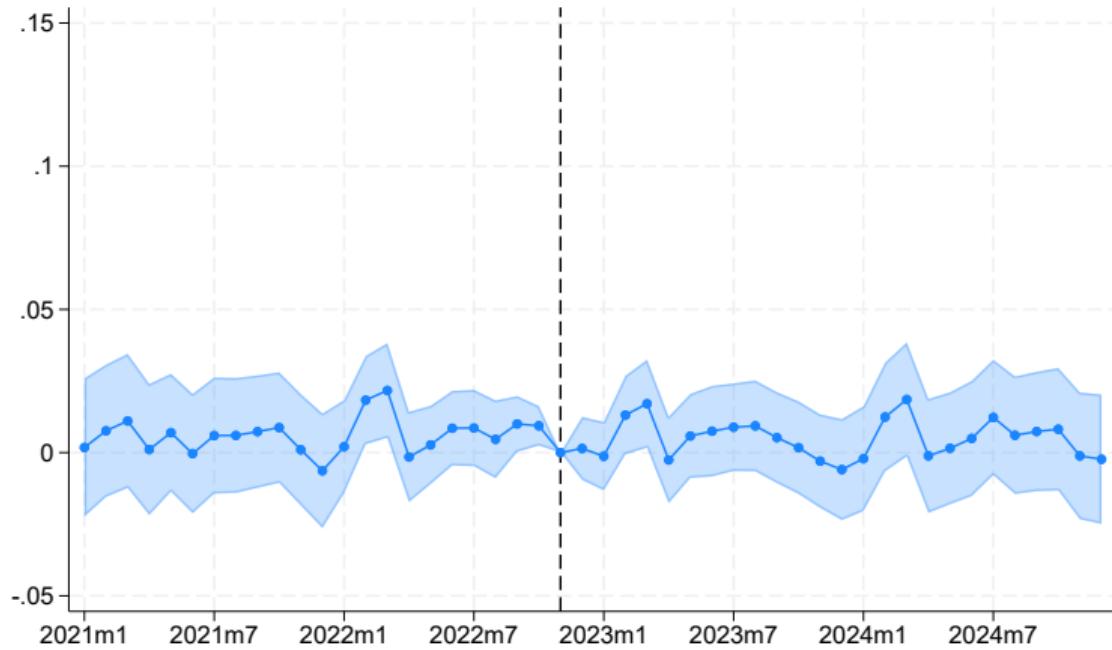
FTE Employment in Latest Occupation  
(Diff-in-Diff Relative to Non-Encouraged Non-Adopters)



Controls: occupation, age, experience, gender, seasonality

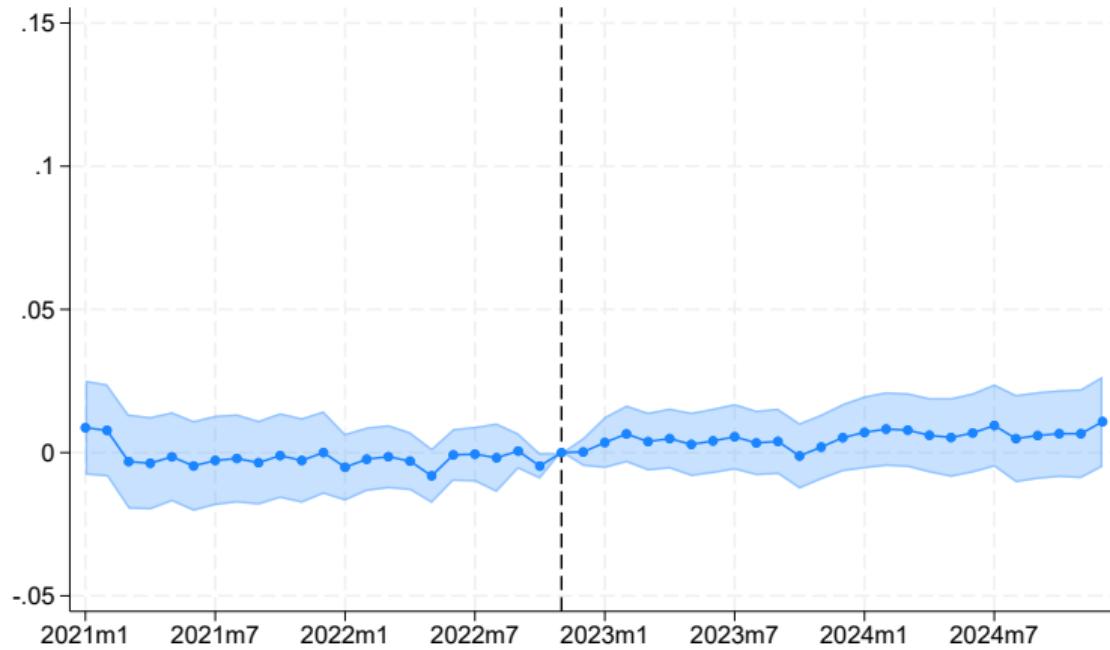
# Have Encouraged Workplaces Fared Differently?

Log Workplace Wage Bill  
(Encouraged Diff-in-Diff)



# Have Encouraged Workplaces Fared Differently?

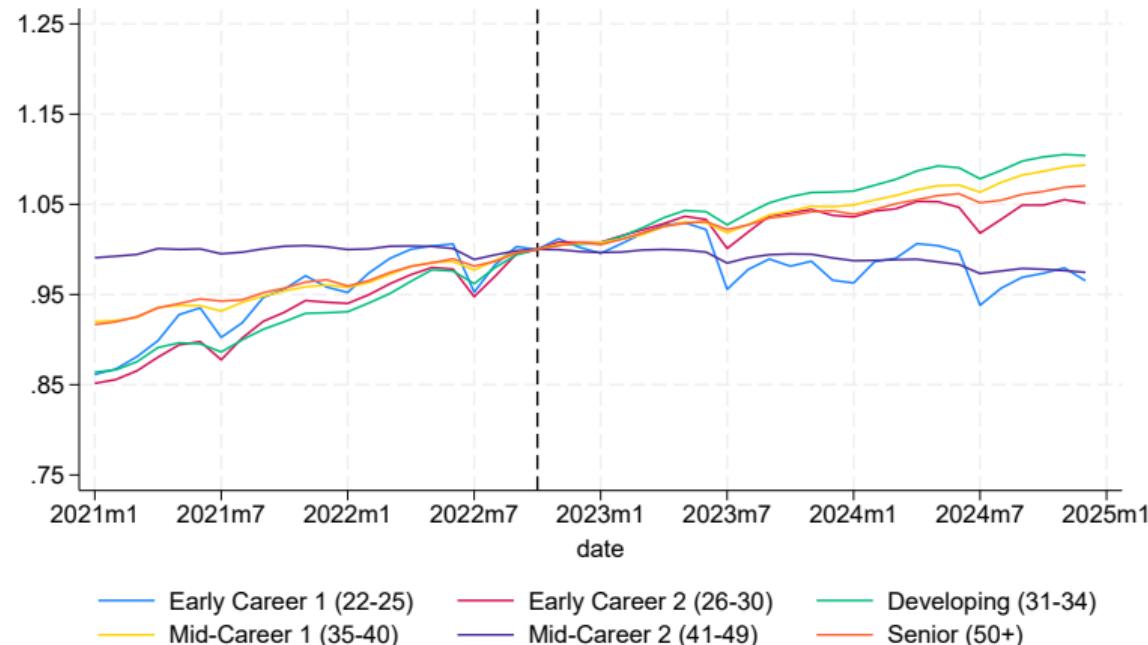
Log Total Employment  
(Encouraged Diff-in-Diff)



# Labor Market Trends (Brynjolfsson et al. 2025)

Figure: Employment Trends by Occupation and Age Groups (October 2022=1)

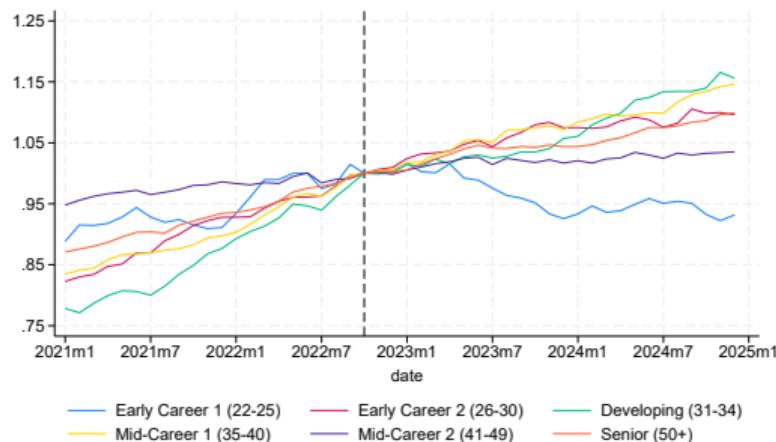
Pooled Across Our 11 Occupations



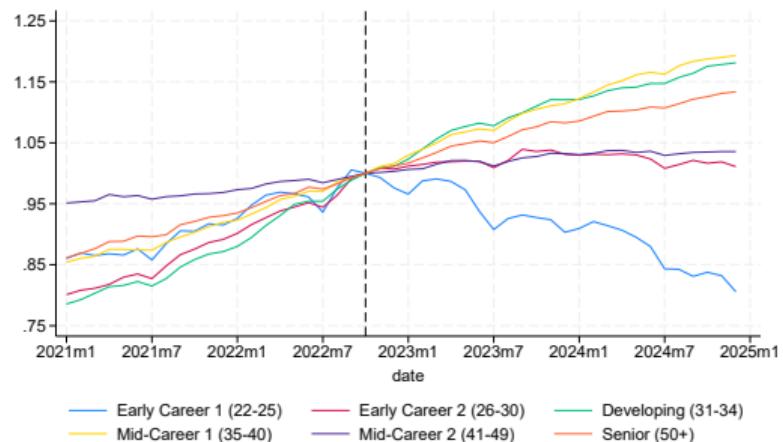
# Labor Market Trends (Brynjolfsson et al. 2025)

## Employment Trends by Occupation and Age Groups (October 2022=1)

IT support



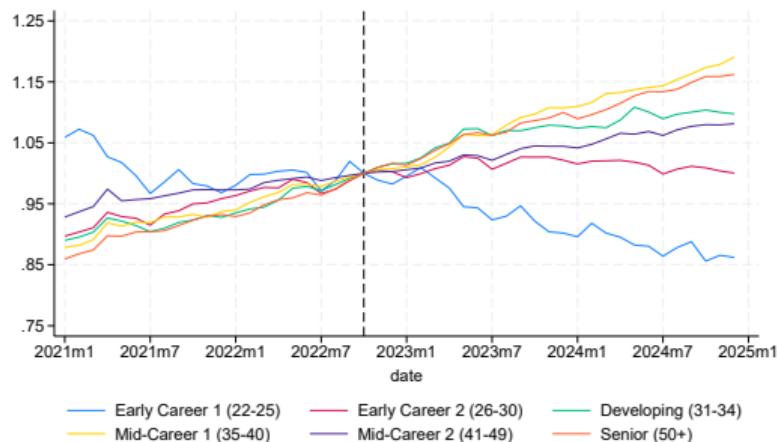
Software developers



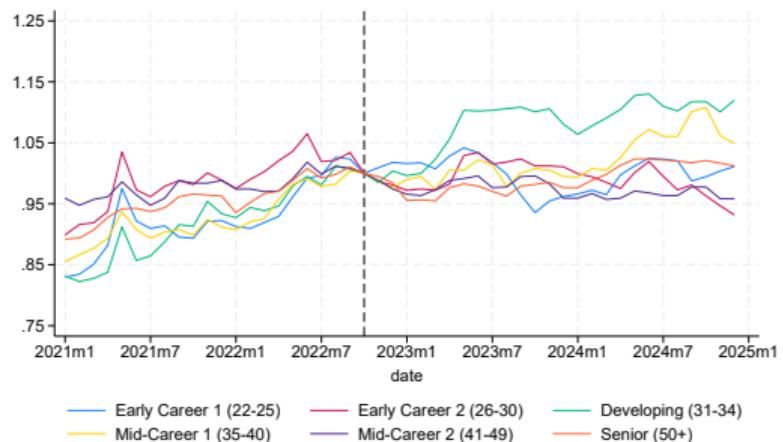
# Labor Market Trends (Brynjolfsson et al. 2025)

## Employment Trends by Occupation and Age Groups (October 2022=1)

Legal Professionals



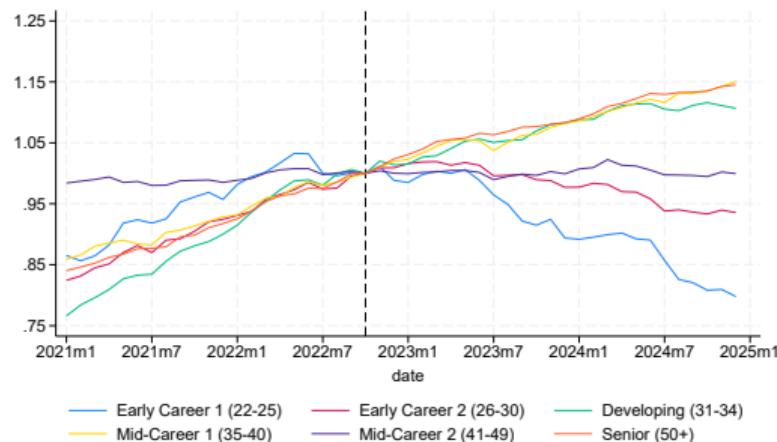
Customer Service



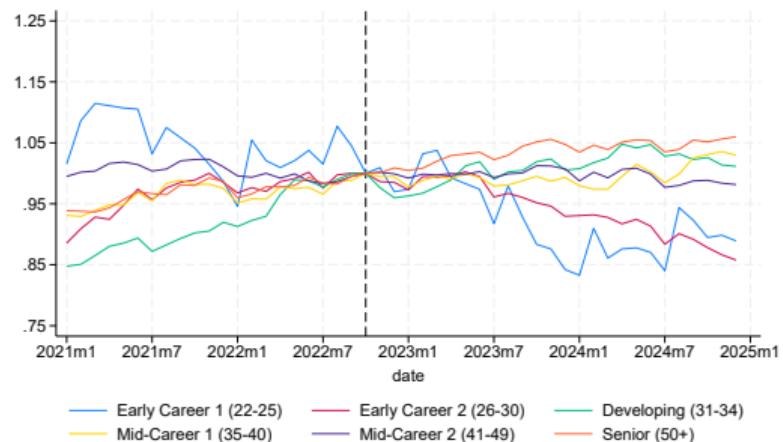
# Labor Market Trends (Brynjolfsson et al. 2025)

## Employment Trends by Occupation and Age Groups (October 2022=1)

Marketing Professionals



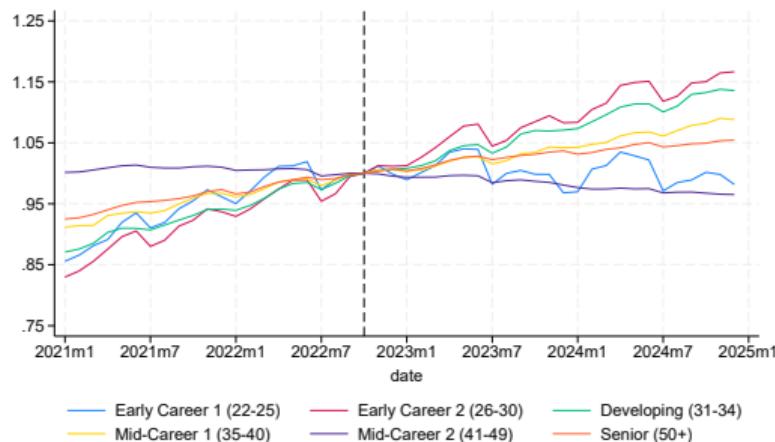
Journalists



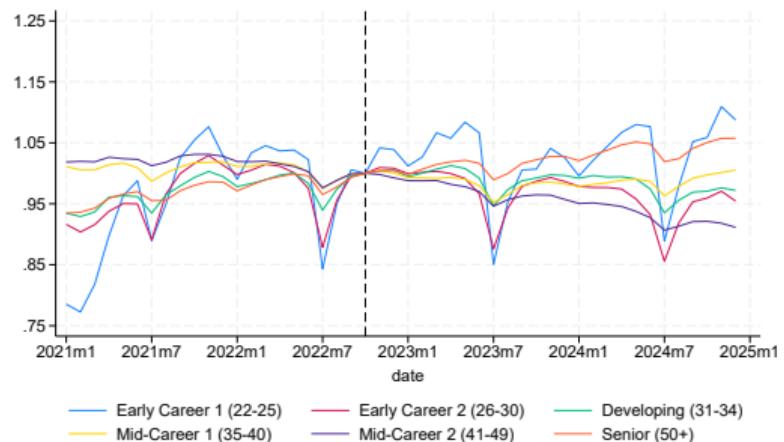
# Labor Market Trends (Brynjolfsson et al. 2025)

## Employment Trends by Occupation and Age Groups (October 2022=1)

Office Clerks



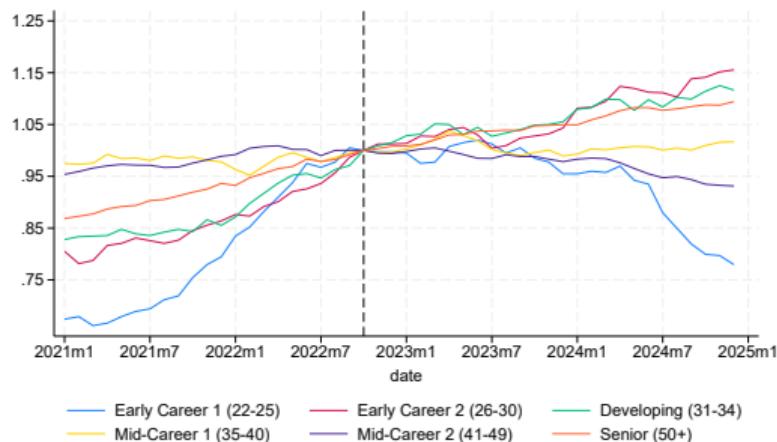
Teachers



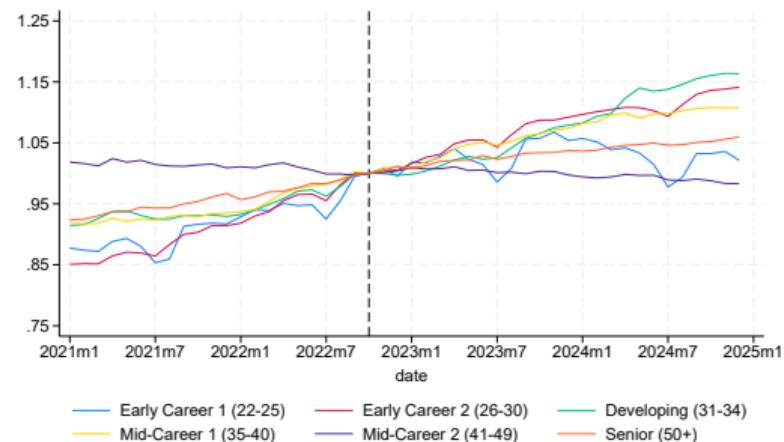
# Labor Market Trends (Brynjolfsson et al. 2025)

## Employment Trends by Occupation and Age Groups (October 2022=1)

HR Professionals



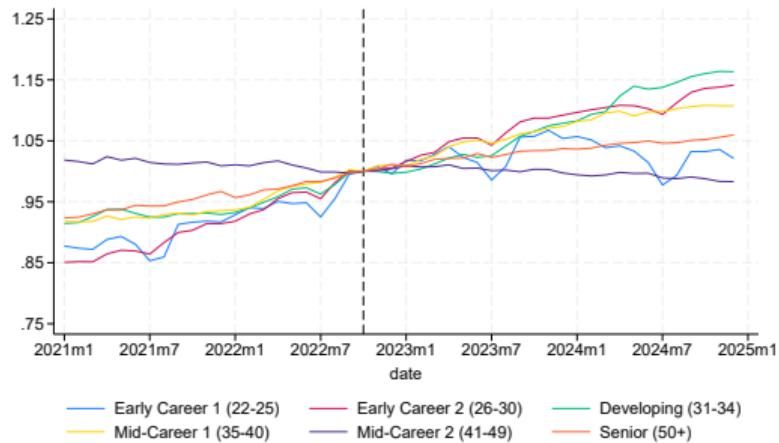
Financial Advisors



# Labor Market Trends (Brynjolfsson et al. 2025)

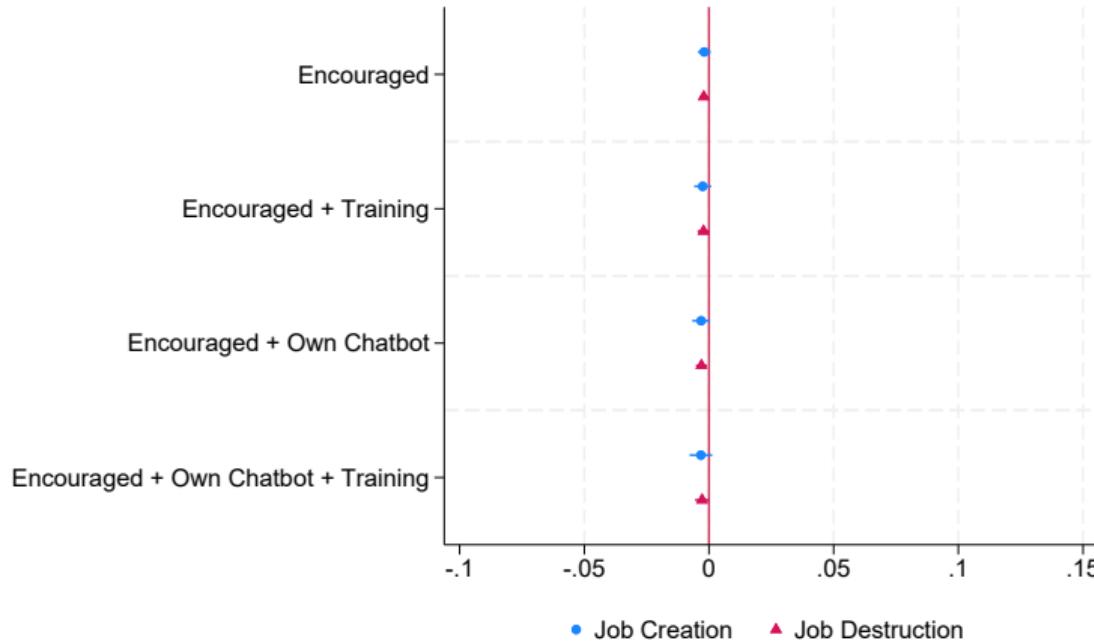
Employment Trends by Occupation and Age Groups (October 2022=1)

## Accountants



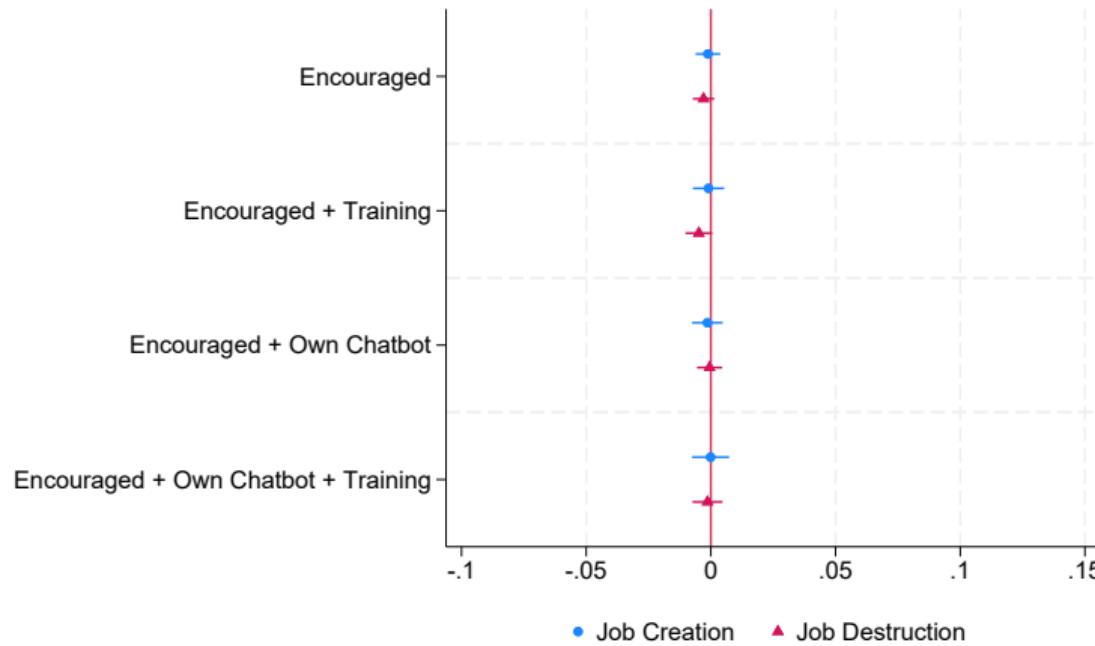
# Heterogeneity by Strength of Treatment

Workplace Job Churn  
(Encouraged Diff-in-Diff)



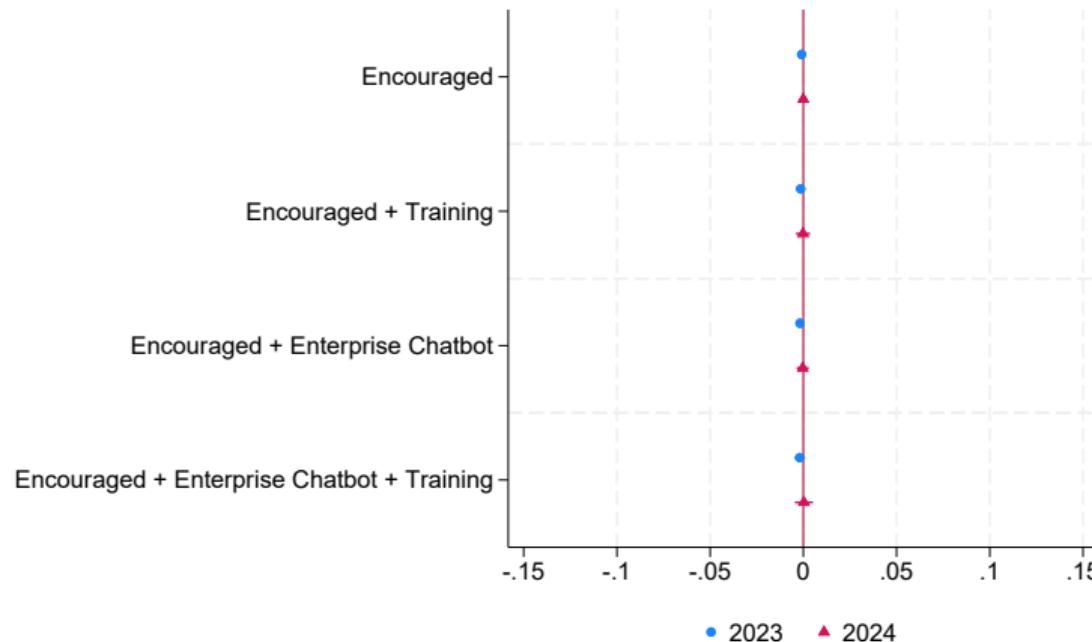
# Heterogeneity by Strength of Treatment

Adopter Propensity of Hires and Separations  
(Encouraged Diff-in-Diff)



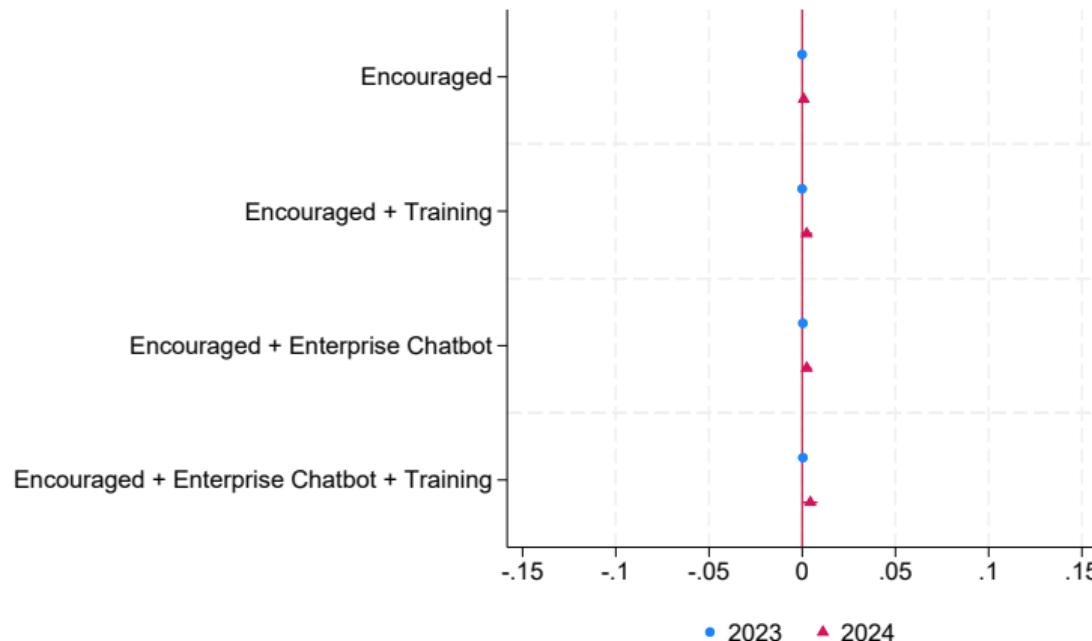
# Heterogeneity by Strength of Treatment

## Job Creation: New Hires as Shares of Employment (Encouraged Diff-in-Diff)



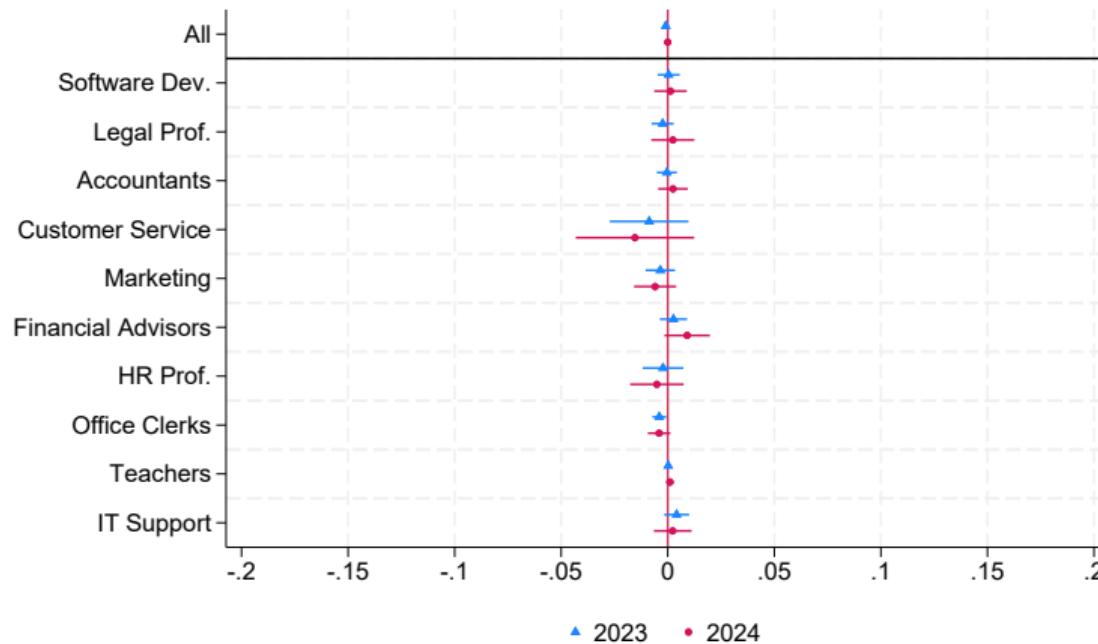
# Heterogeneity by Strength of Treatment

Job Destruction: Separations as Shares of Employment  
(Encouraged Diff-in-Diff)



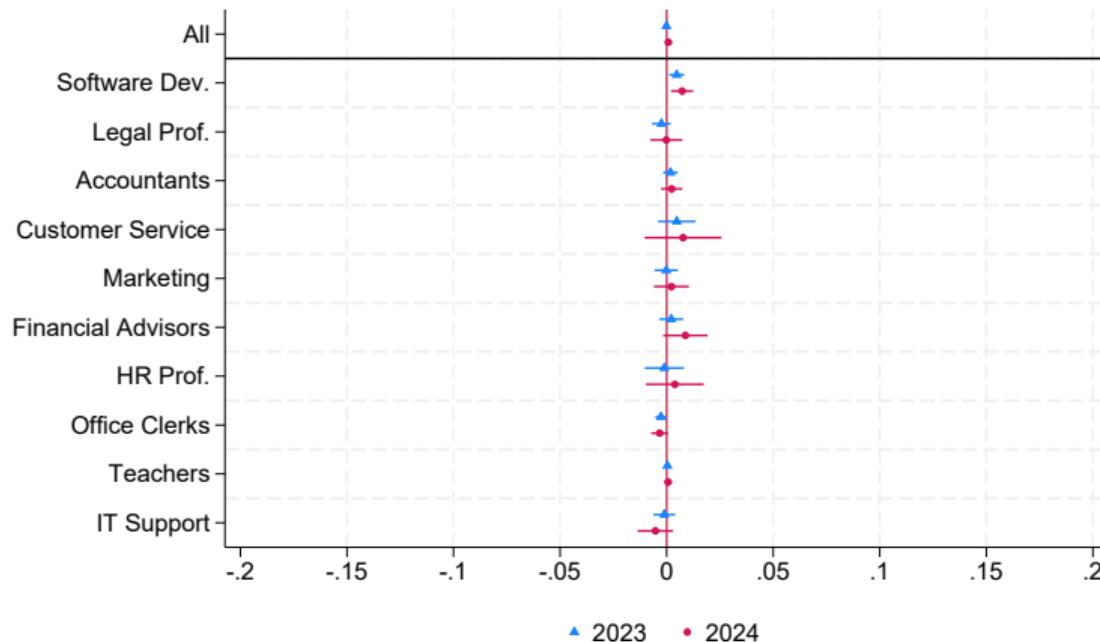
# Occupational Heterogeneity

## Job Creation: New Hires as Shares of Employment (Encouraged Diff-in-Diff)



# Occupational Heterogeneity

## Job Destruction: Separations as Shares of Employment (Encouraged Diff-in-Diff)



## Estimating Adopter Propensity

We measure **adopter propensity of job creation/destruction** as the predicted adoption rate among hires/separations at workplace  $j$  in month  $t$  based solely on workers' pre-determined individual characteristics:

1. Estimate adoption propensity:

$$\text{Adopt}_i = \gamma' X_i + \beta' \text{EmployerInitiatives}_i + \varepsilon_i, \quad (2)$$

where  $X_i$  includes predetermined worker characteristics (occupation, gender, age, experience, and earnings)

2. Among workplaces  $j$  with positive hires/separations in month  $t$ , measure the adopter propensity of their job creation/destruction as:

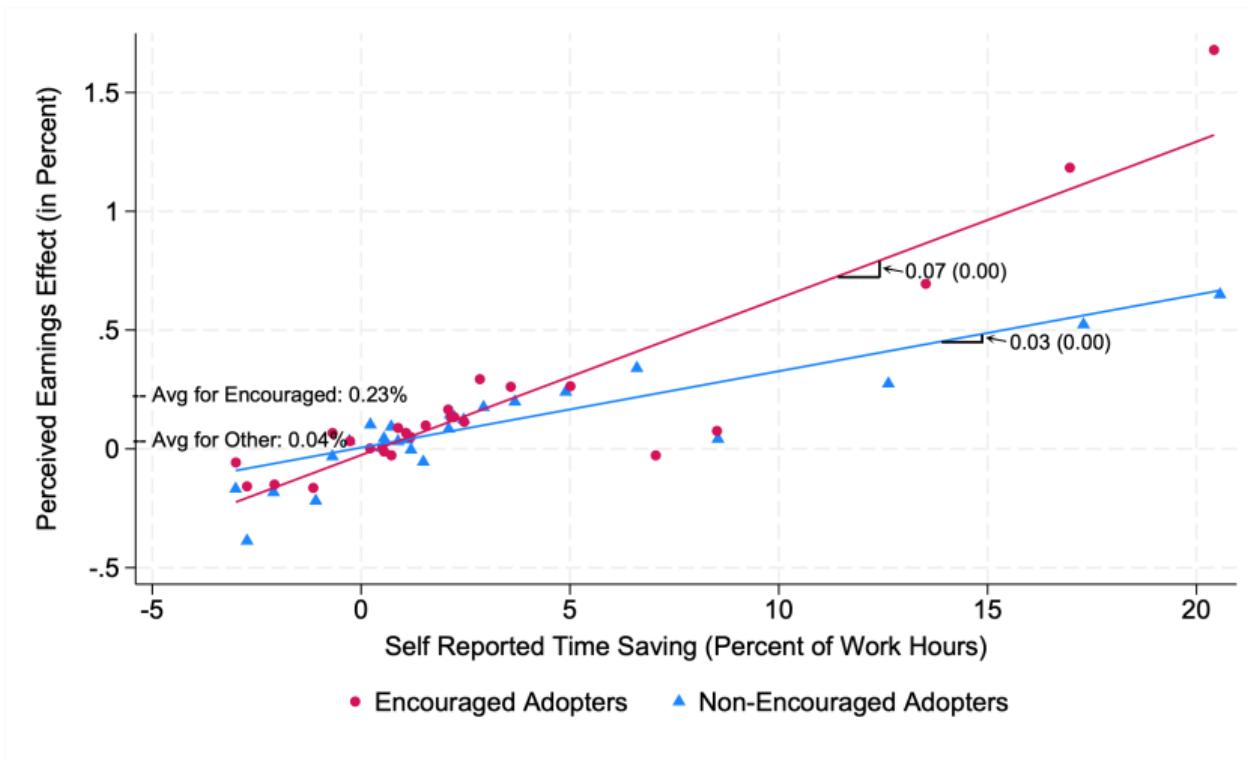
$$\text{JobCreationAdopterPropensity}_{jt} = \hat{\gamma}' \mathbb{E}[X_i | j_t(i) = j, j_{t-1}(i) \neq j] \quad (3)$$

$$\text{JobDestructionAdopterPropensity}_{jt} = \hat{\gamma}' \mathbb{E}[X_i | j_t(i) \neq j, j_{t-1}(i) = j], \quad (4)$$

where  $j_t(i)$  is the workplace of worker  $i$  in month  $t$ .

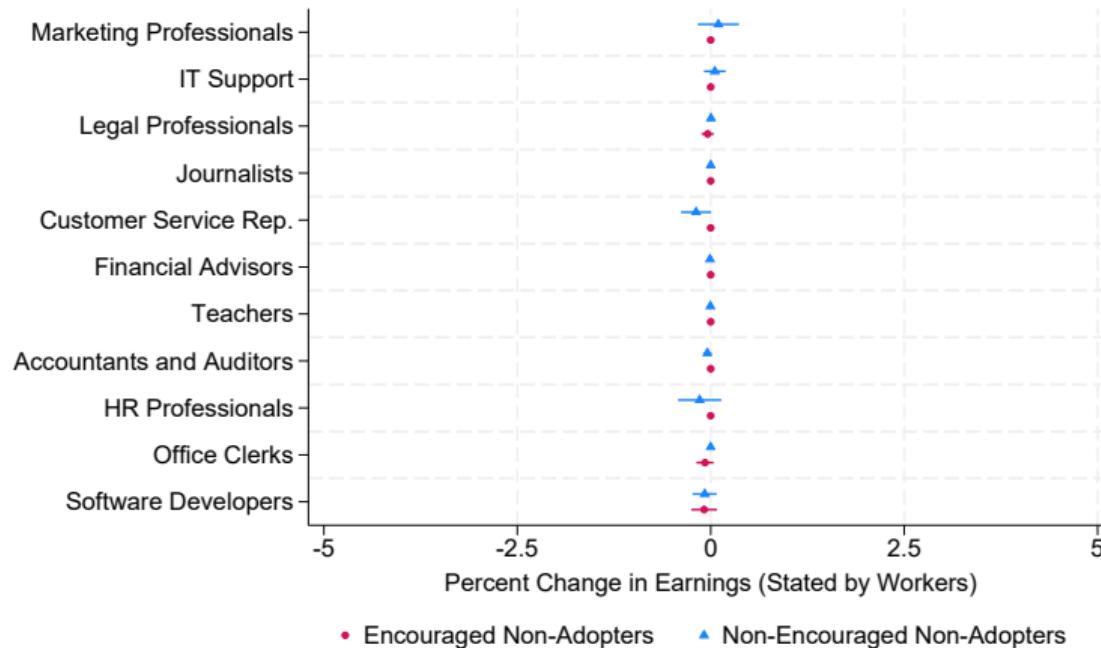
# How Do Workers' Earnings Impacts Relate to Their Time Savings?

Pass-Through of Time Savings to Earnings (Binscatter)



# Workers Confirm Zero Spillover Effects on Earnings

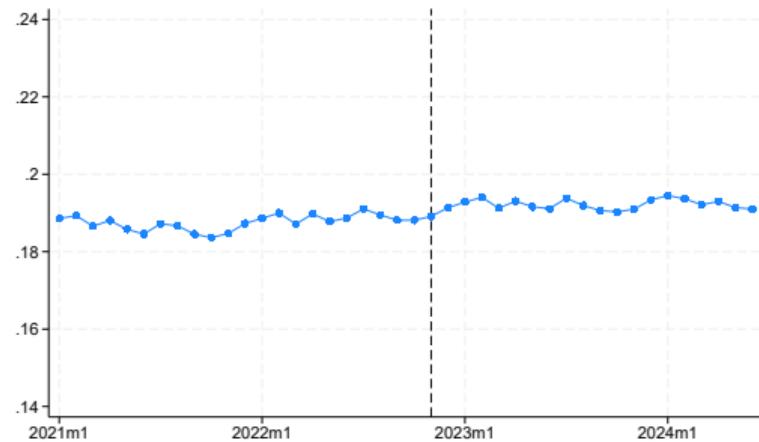
Perceived Effect of AI Chatbots on Earnings (Non-Adopters)



# Aggregate Trends

## Share of Study Occupations in Aggregate Danish Employment

Hours



Earnings

