

Generative AI as Seniority-Biased Technological Change: Evidence from U.S. Résumé and Job Posting Data

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Question

How does adoption of generative AI by firms affect employment of juniors vs. seniors?

Motivation

- **NYT, 2025 (May 2025):** “I’m a LinkedIn Exec. I See the Bottom Rung of the Career Ladder Breaking”
- **Dario Amodei (Anthropic, May 2025):** “AI could wipe out half of all entry-level white-collar jobs... Unemployment could spike to 10–20% in the next 1–5 years.”
- **WSJ, July 2025:** “AI Is Wrecking an Already Fragile Job Market for College Graduates”
- **Forbes, Sep 2025:** “As AI Reduces New Grad Hiring, Apprenticeships Will Become Essential”
- **NY Fed:** Since 2022, unemployment has risen *most* among recent college grads; more than any other young group.

Motivation

“... [about the effect of AI on employment] You are seeing some effects... A particular focus is on **young people** coming out of college. Companies may be able to use **AI** more than they had in the past ... Hard to say how big it is.”

— Chair Powell, FOMC Press Conference, 17 Sept. 2025

Outline

- Literature
- Data Source
 - U.S. LinkedIn résumés and job postings by Revelio Labs (through WRDS)
- Identifying AI Adoption
 - Text analysis of job postings
- Results
 - Following AI adoption, junior employment declines while senior employment is unaffected
 - Explore underlying mechanisms

Literature

- Experimental evidence
 - E.g., Brynjolfsson, Li, and Raymond 2025; Noy and Zhang 2023
 - Generative AI often complements less skilled/experienced workers
- Employment patterns of occupations by exposure to AI
 - E.g., Brynjolfsson, Chandar, and Chen 2025
- Studies using job postings and résumé data to identify firm-level AI adoption
 - Acemoglu et al. 2022; Babina et al. 2024; Hampole et al. 2025

Data—LinkedIn via Revelio Labs

- **Sample:** About 285,000 U.S. firms
 - 62M workers, 157M positions, 199M job postings
- **Job Posting:**
 - September 2021 to March 2025
 - Posting date
 - Raw job description (used to detect adoption)
- **Positions:**
 - January 2015 to March 2025
 - Start and end dates (used for firm-level employment)
 - Seniority level
 - Based on the worker's current job, employment history, and age
 - **Entry, Junior, Associate, Manager, Director, Executive, and Senior Executive**

Employment by Seniority

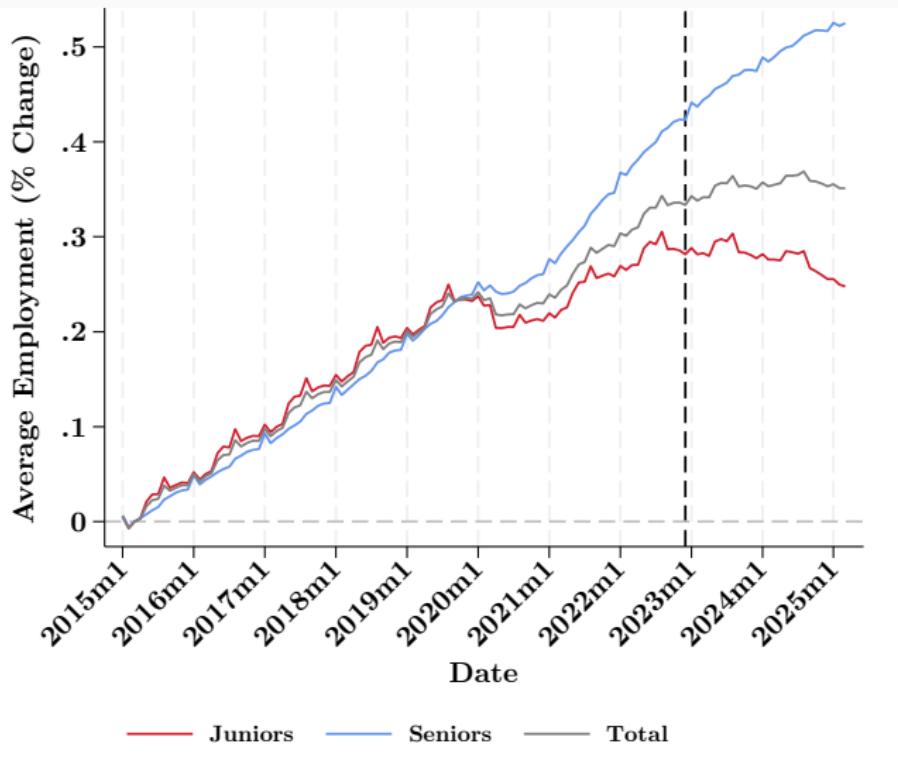
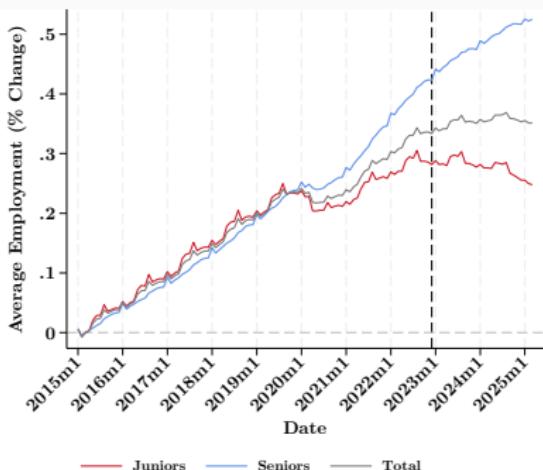
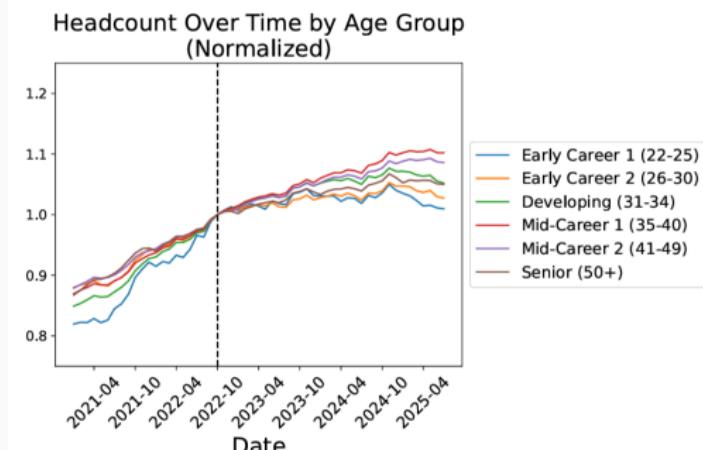


Figure 1: Average Employment by Seniority

Employment by Seniority



Average Employment by Seniority



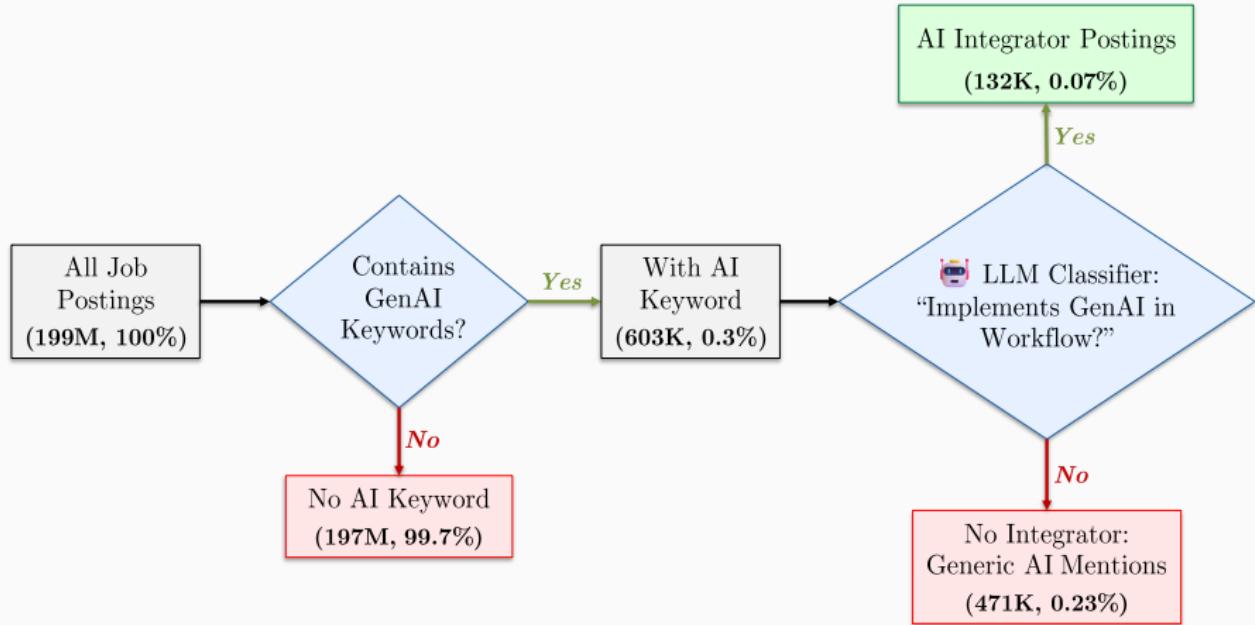
Average Employment by Age
(Brynjolfsson, Chandar, and Chen 2025)

How Can We Detect Firms that Adopt GenAI?

- Job postings: firms recruiting an “AI-Integrators”
 - Closely related to Hampole et al. 2025
- A worker that integrates GenAI into the firm’s workflow
- Firm that recruit AI integrators are very likely to be AI adopters
- Specific type of adoption (a high bar)
 - “Silent” adoption not captured



Identifying “AI Integrator” Postings (Hampole et al. 2025)



Illustrative Example: AI-Integrator Job Posting

Role: Generative AI Developer Consultant (IT Services and IT Consulting, Genesis10)

Summary: We are seeking a talented and motivated **Software Engineer** to join our team, focusing on developing innovative applications using **Generative AI technologies**. You will play a key role in **designing, building, and deploying** solutions that leverage AI to transform user experiences.

Responsibilities:

- Design and develop scalable applications utilizing **Generative AI models**.
- Collaborate with cross-functional teams to deliver solutions.
- **Integrate AI models** into existing systems and applications.
- Optimize and fine-tune AI algorithms for performance and accuracy.
- Conduct code reviews and mentor junior team members.

...

Illustrative Example: Not AI-Integrator (Generic AI Mention)

Role: Senior Security Engineer (Offensive Security, BytePlus)

Summary: The team builds infrastructures, platforms, and technologies to protect users, products, and systems. You will contribute to key security initiatives, developing scalable and secure-by-design solutions.

Responsibilities:

- Responsible for risk discovery and penetration testing of cloud products and infrastructure.
 - Conduct risk analysis and threat modeling; provide systematic solutions to business lines.
 - Research cutting-edge technologies including cloud-native, microservices, zero trust, big data, and **large language models**.
 - Support the development of secure business technologies and architectures.
- ...

AI Adopting Firms

- AI adopting firm = posted at least one AI integrator vacancy
 - 10,599 firms (3.72% of our sample of 285K firms)
 - 17.3% of all employment (positions)

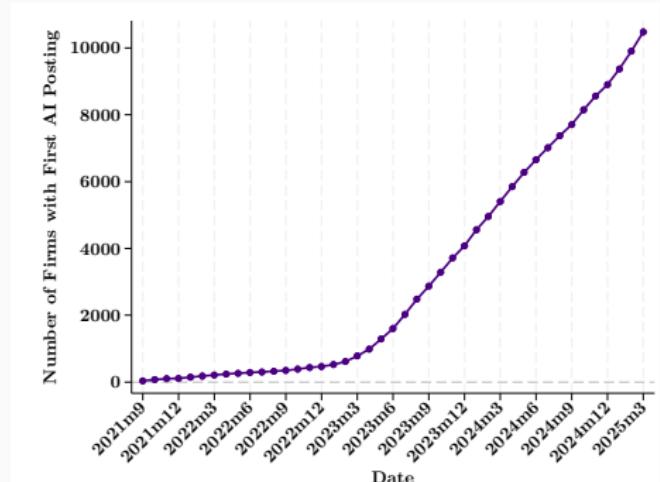


Figure 3: Number of Adopters Over Time

Median Size of Adopting vs. Non-Adopting Firms

Adoption is not random!

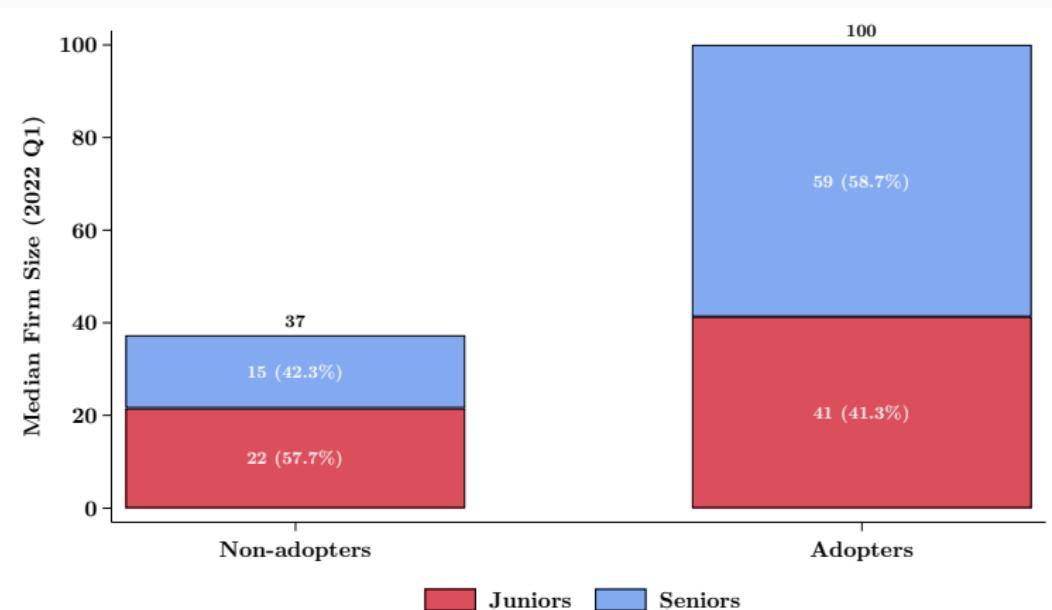


Figure 4: Median Size by Adoption

Distribution Across Industries

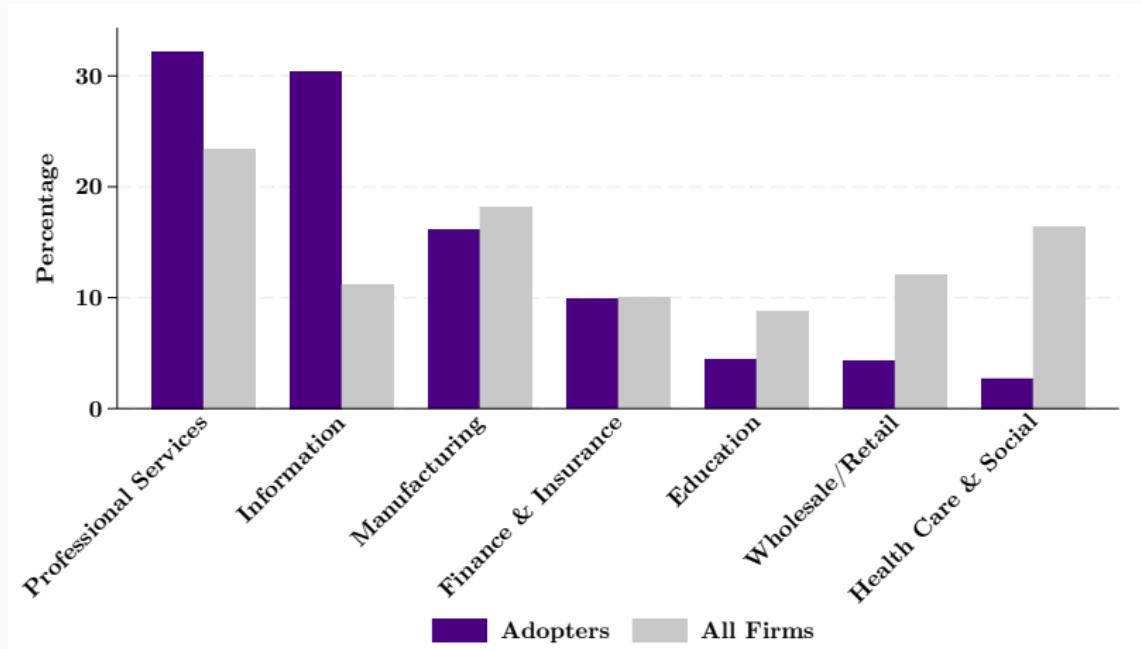


Figure 5: Distribution Across Industries

Employment by Adoption—Juniors

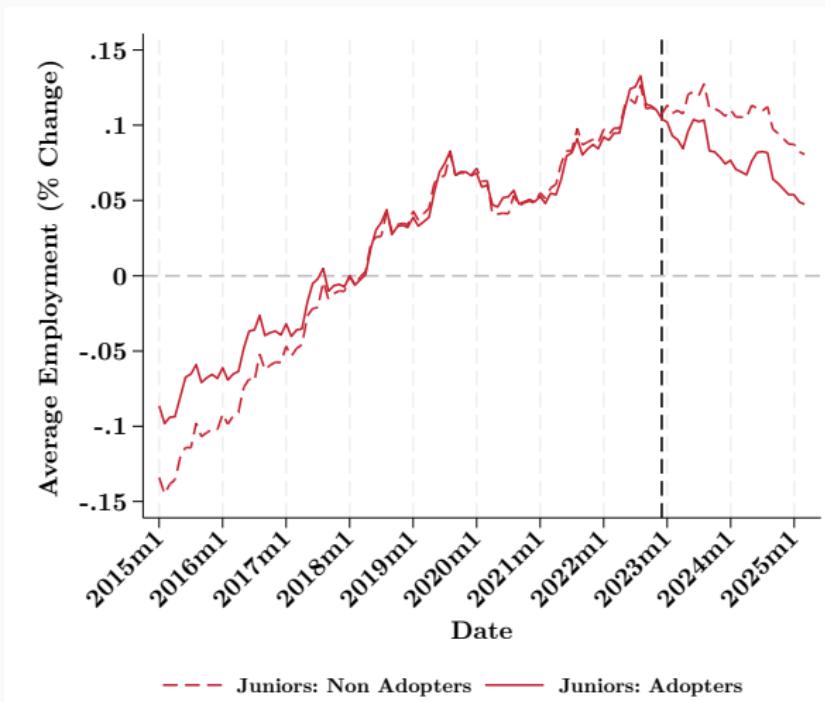
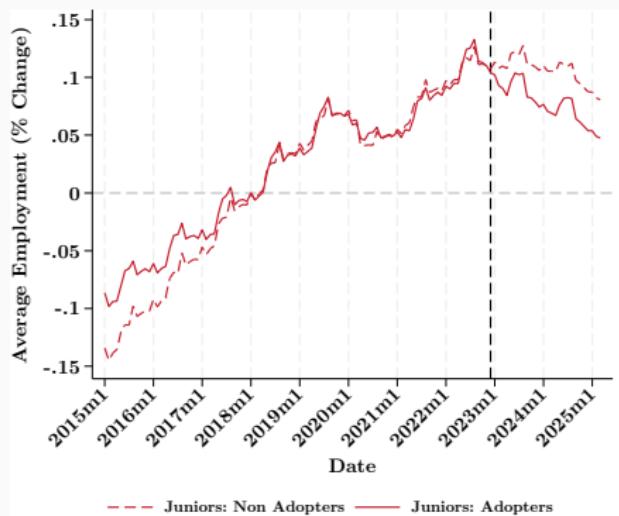
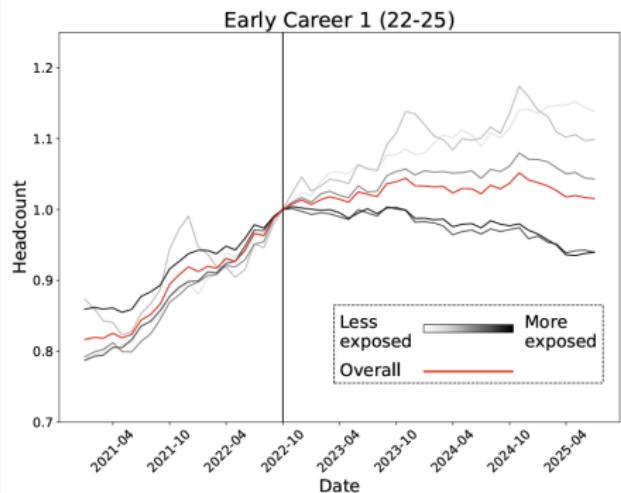


Figure 6: Average Juniors Employment by Adoption

Employment by Adoption—Juniors



Average Juniors Employment by Adoption



Average Employment by Exposure, 22–25
(Brynjolfsson, Chandar, and Chen 2025)

Employment by Adoption—Seniors

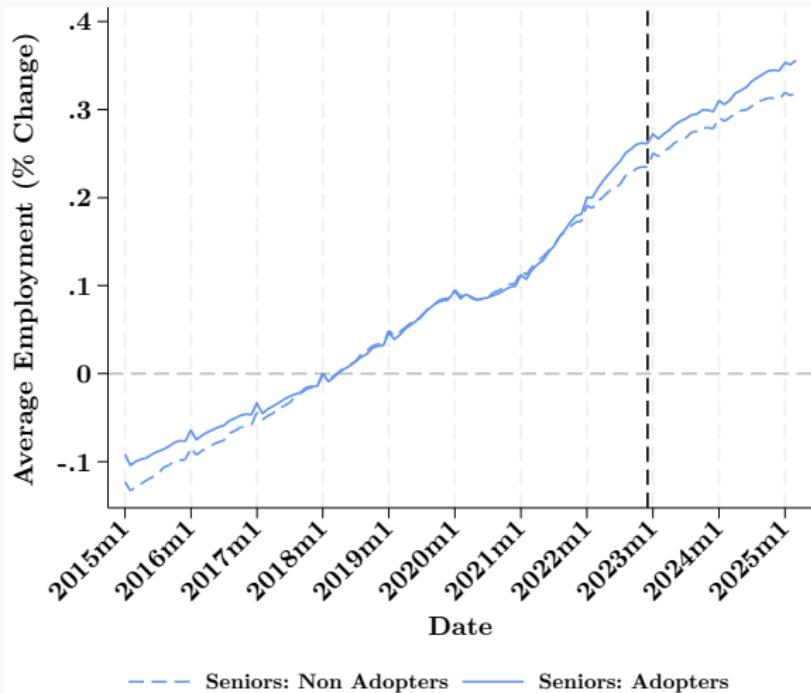
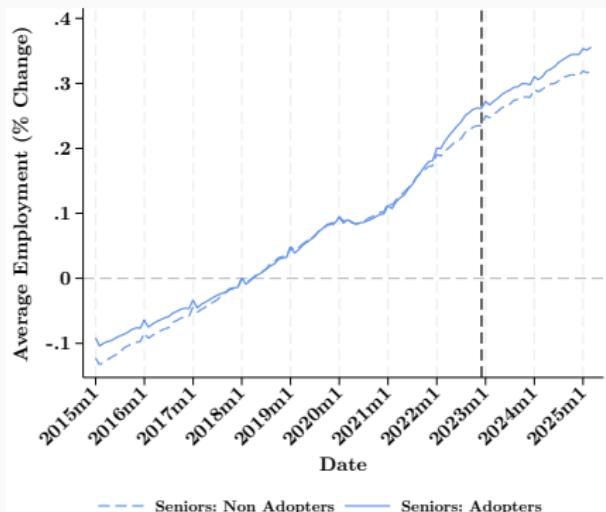
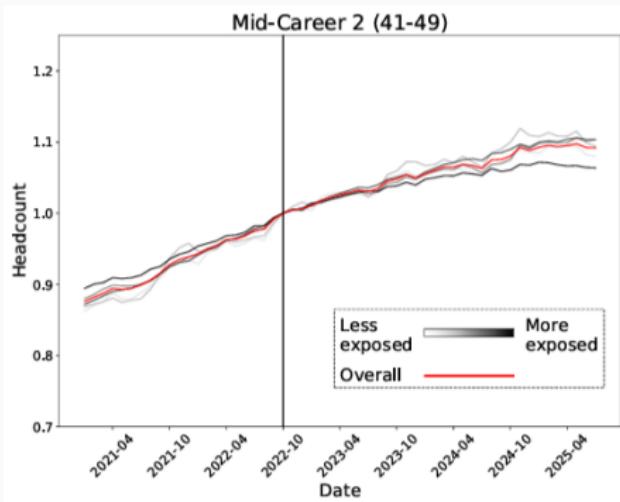


Figure 8: Average Senior Employment by Adoption

Employment by Adoption—Seniors



Average Senior Employment by Seniors



Average Employment by Exposure, 41–49
(Brynjolfsson, Chandar, and Chen 2025)

Employment by Adoption—Diff-in-Diff

$$\log(\text{Employment}_{it}) = \sum_{j=2015Q2}^{2025Q1} \beta_j \mathbf{1}\{t = j\} \times \text{Adopt}_i + \delta_t + \text{Adopt}_i + \varepsilon_{it}, \quad (1)$$

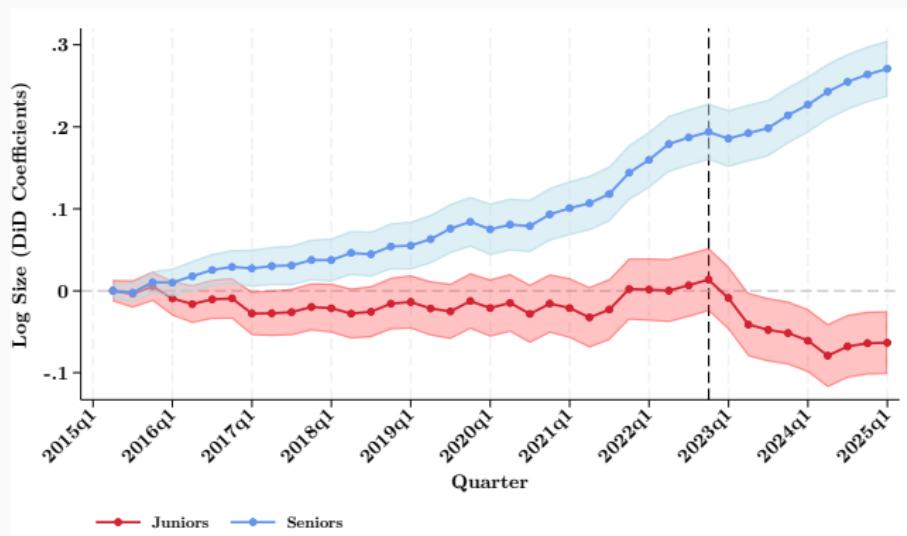


Figure 10: Employment Differences by Adoption

Employment by Adoption—Triple-Diff

$$\begin{aligned}\log(\text{Employment}_{ist}) = & \sum_{j=2018Q2}^{2025Q1} \beta_j \mathbf{1}\{t=j\} \times \text{Adopt}_i \times \text{Junior}_s \\ & + \sum_{j=2018Q2}^{2025Q1} \pi_j \mathbf{1}\{t=j\} \times \text{Adopt}_i + \sum_{j=2018Q2}^{2025Q1} \rho_j \mathbf{1}\{t=j\} \times \text{Junior}_s \\ & + \kappa (\text{Adopt}_i \times \text{Junior}_s) + \gamma_{it} + \varepsilon_{ist},\end{aligned}\quad (2)$$

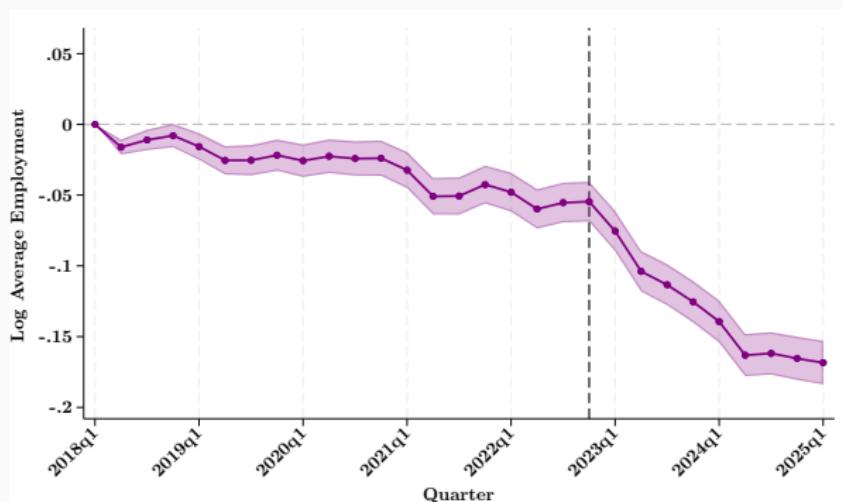


Figure 11: Triple Differences Results

Hires and Exits of Juniors

$$\text{Flows}_{it} = \beta (\text{Adopt}_i \times \text{Post}_t) + \gamma_i + \delta_t + \varepsilon_{it}, \quad (3)$$

Table 1: Effects of AI Adoption on Flows (Juniors)

	Hiring	Separation	Total Change
Adopt × Post	-3.694*** (0.227)	-0.788*** (0.173)	-3.436*** (0.146)
Observations	11,683,934	11,683,934	11,398,960
Clusters (firms)		284,974	

Notes: Standard errors clustered by firm in parentheses. We control for firm and time fixed effects in all columns.

Heterogeneity by Sector

$$\text{Hires}_{it} = \beta (\text{Adopt}_i \times \text{Post}_t) + \gamma_i + \delta_t + \varepsilon_{it}, \quad (4)$$

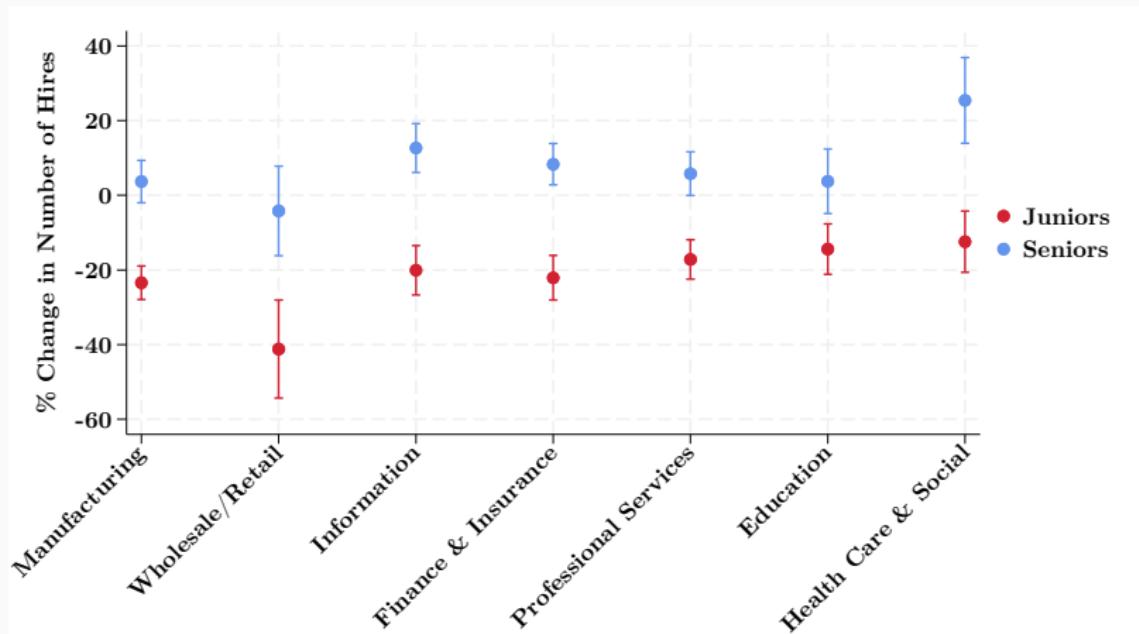
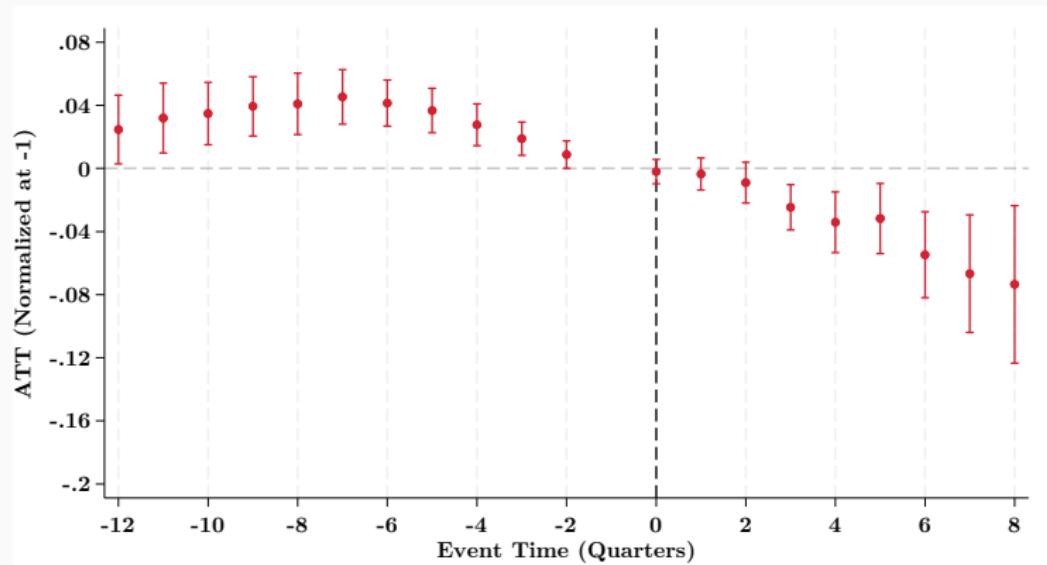


Figure 12: Distribution Across Industries

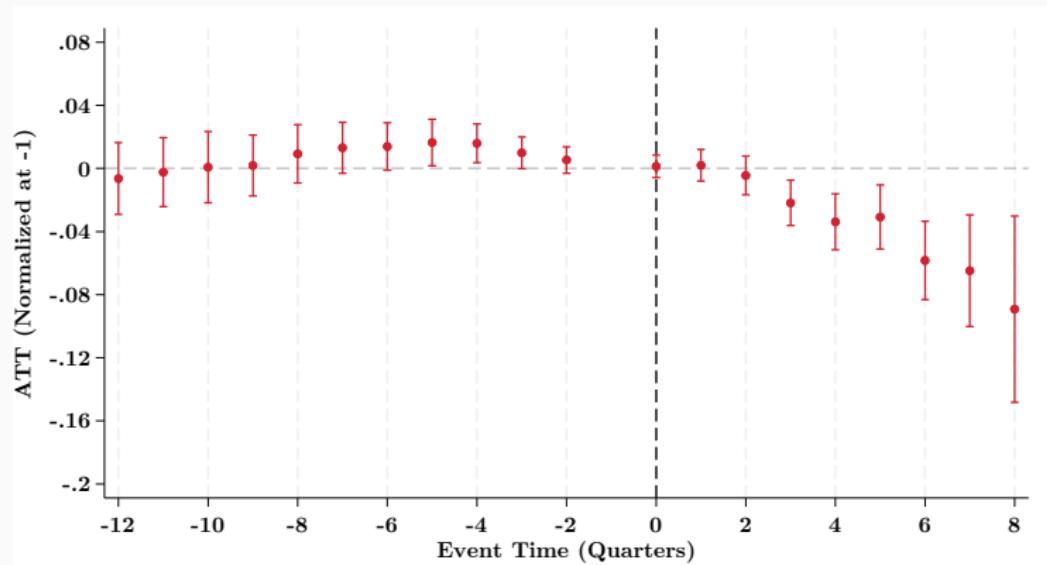
Results—Event Study (Juniors)

$$\log(\text{Employment}_{it}) = \sum_{j=2}^J \beta_j (\text{Lag}_j)_{it} + \sum_{k=1}^K \gamma_k (\text{Lead}_k)_{it} + \mu_i + \lambda_t + \varepsilon_{it}. \quad (5)$$



Results—Event Study (Juniors)

$$\log(\text{Employment}_{it}) = \sum_{j=2}^J \beta_j (\text{Lag}_j)_{it} + \sum_{k=1}^K \gamma_k (\text{Lead}_k)_{it} + \mu_i + \lambda_t + \varepsilon_{it}. \quad (5)$$



Conclusion

- Data Source
 - U.S. LinkedIn résumé and job posting data by Revelio Lab (through WRDS)
- Detecting AI adoption by firms using text analysis of job postings
 - “AI-integrator” postings using LLM
- Results
 - Following AI adoption, firms reduce junior employment while senior employment was unaffected
 - Junior reduction is driven by hiring slowdown, not exits
 - Consistent across most sectors
 - Consistent also with analysis of the trends around “adoption period” (event study)

Appendix: AI-Related Keywords

Copilot, Claude, Gemini, large language model, LLM, generative AI, ChatGPT, Gen AI, GPT, LangChain, RAG, retrieval-augmented generation, vector embeddings, vector database, transformer-based model, prompt engineering, prompt design, LlamaIndex, Pinecone, Weaviate, Milvus, OpenAI API, Anthropic Claude API, Azure OpenAI, Google Vertex AI Generative, HuggingFace Transformers, and RetrievalQA

Appendix: AI Postings Identification Prompt

SYSTEM = "'''

You are a precise classifier for job postings. Output ONLY compact JSON.

We distinguish two categories:

A) LLM INTEGRATOR = roles that build/operate LLM-powered systems or embed LLMs into workflows. Signals: RAG (retrieval-augmented generation), embeddings/vector DB (FAISS/Milvus/Pinecone), prompt engineering at system level, orchestration/agents/LLMOps, LangChain/LlamaIndex, fine-tuning/adapters, model serving/inference, evaluation/guardrails/red-teaming, API integration of LLMs into products or internal processes.

B) LLM USER = roles primarily using LLM tools (ChatGPT, Gemini, Copilot, etc.) to perform tasks such as drafting, summarizing, coding assistance, customer responses—without building systems.

NOT in-scope for integrator unless integration is explicit:

- Foundation-model pretraining/research scientist roles at model labs (OpenAI/DeepMind/etc.).
- Generic ML/NLP with no explicit LLM signals.
- Pure labeling/annotation.

Edge rules:

- If both integration and user aspects appear, set role_type="both".
- If acronyms like "RAG" appear, assume the LLM meaning unless context contradicts.
- Prefer TRUE for integrator/user when listed signals appear.
- Output JSON only; no prose.

"''"

Distribution of Adopters Across Industries

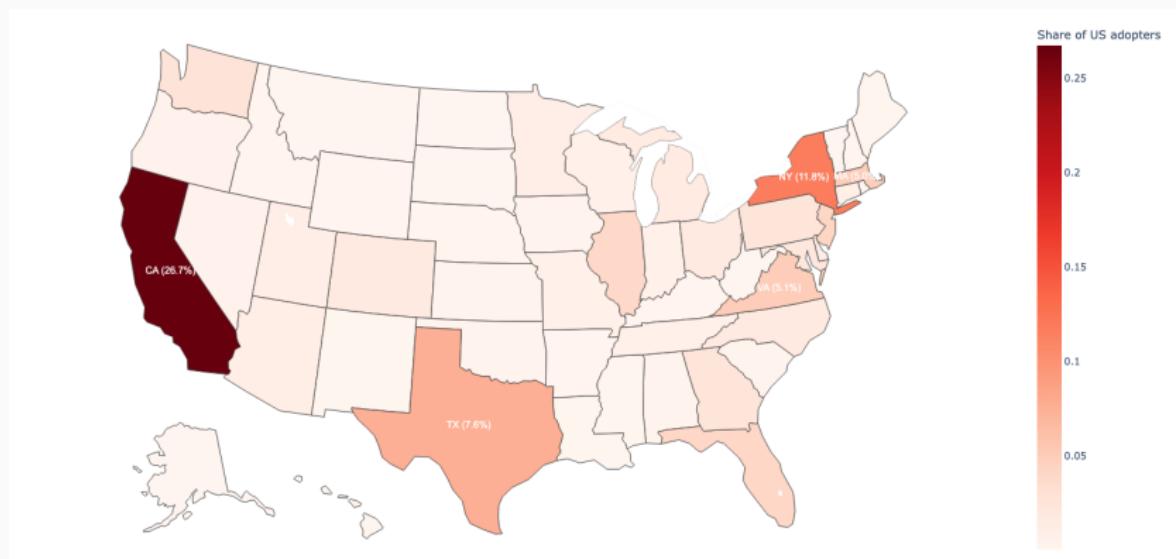
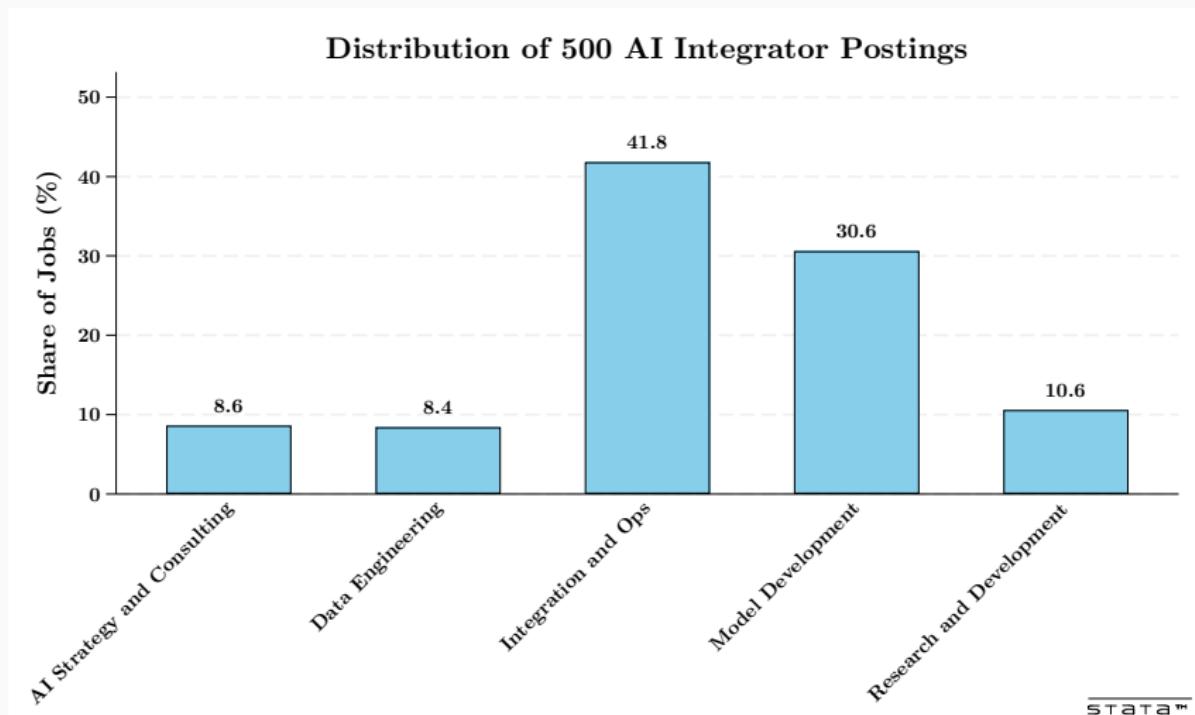


Figure 13: Share of U.S. Adopters by State

Appendix: What do integrators do?

Ask LLM to classify to 5 categories



Appendix: What do integrators do?

Integration & Ops

- Deploy AI platform integrated with cloud services
- Automate sales/support/comms via AI

AI Strategy & Consulting

- Define/execute GenAI roadmaps, governance, ROI
- Drive adoption; translate vision into initiatives

Model Development

- Design, train, deploy LLM/deep-learning models
- Implement GenAI architectures; train/debug

Research & Development

- Prototype & experiment with novel methods
- Transfer findings into tools/PoCs

Data Engineering

- Build pipelines/infra (ETL, embeddings, vector DB)
- Data warehousing, SQL, reporting

Appendix: Hires and Exits of Juniors

$$y_{it} = \sum_{j=2015Q2}^{2025Q1} \beta_j \mathbf{1}\{t = j\} \times \text{Adopt}_i + \delta_t + \gamma_i + \varepsilon_{it}, \quad (6)$$

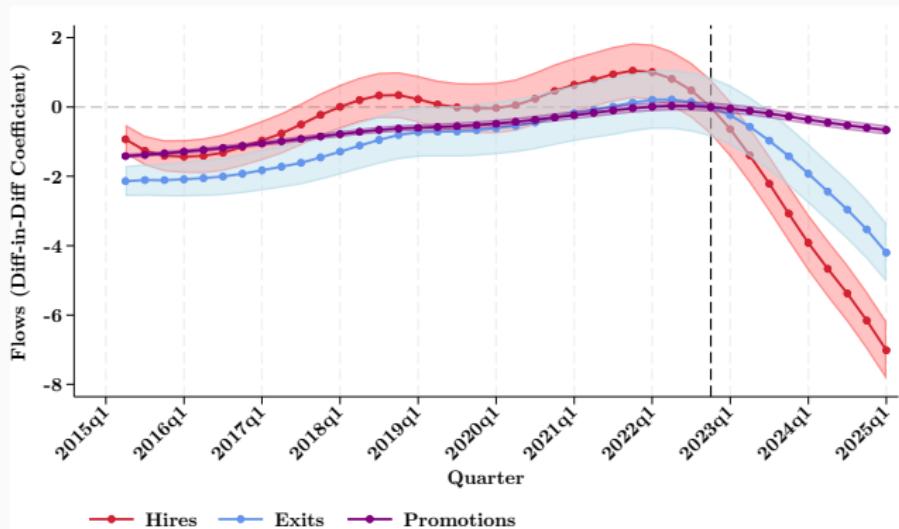


Figure 14: Hires, Exits, and Promotions (Juniors)

Appendix: Heterogeneity by Sector

$$\text{Hires}_{it} = \sum_{j=2018Q2}^{2025Q1} \beta_j \mathbf{1}\{t = j\} \times \text{Adopt}_i + \delta_t + \lambda_i + \varepsilon_{it}, \quad (7)$$

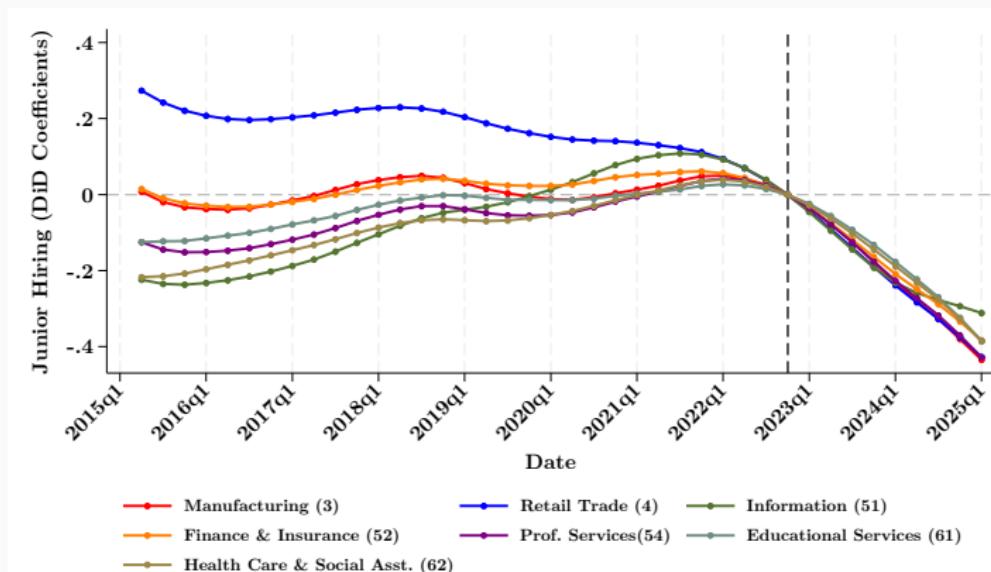


Figure 15: Hiring Diff-in-Diff by Sector