New Skills, Higher Pay? Evidence from Job Postings

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Outline

Motivation

The Evolution of Work

- Work evolves not just through new occupations, but through changing **skill content** within jobs.
- Traditional data (household surveys, administrative records) miss these granular changes.

Research Questions

- When new skill requirements emerge, how does the labor market price them?
- How do these returns vary across occupations and skill types (e.g., AI)?
- Are wage premia driven by genuine skill value or merely new job titles?

Data Source: Lightcast Job Postings

- **Coverage:** Near-universe of U.S. online job postings (2010–2024).
- **Scale:** Over 53 million postings with wage, skill, and firm data.
- **Granularity:** Detailed skill requirements, occupation (ISCO-08), industry (NAICS), and location (County).

Defining "New Skills"

Methodology (Following Atalay et al., 2020)

- A skill is classified as **"New"** if:
  1. It was rarely requested in the base period (2010–2011).
  2. specifically, $< 1\%$ of its total 2010–2024 postings appeared in 2010–11.
  3. It subsequently surged in prevalence.
- **Result:** Identified $\sim$2,000 new skills (approx. 7% of taxonomy).
- By 2024, roughly **1 in 10 postings** request at least one new skill.

AI Skills Classification

- **AI Developers:** Building AI tools (e.g., PyTorch, TensorFlow).
- **AI Users:** Using AI tools (e.g., ChatGPT, Midjourney).

Where do New Skills Cluster?

Skill Domains

- Heavily concentrated in **Computer** and **Analytical** domains.
- Specific fields: Information Technology, Business & Data Analysis.
- Very little emphasis on routine work.

Occupational Intensity

- **High Intensity:** Managerial and Professional occupations.
- **Low Intensity:** Elementary and Clerical occupations (which focus more on social/administrative skills).

Estimating the Wage Premium

Baseline Regression Specification:

$$\log(wage)_i = \beta \cdot \text{NewSkill}_i + \delta_{FE} + \gamma \cdot \#\text{Skills}_i + \epsilon_i$$

- NewSkill_i: Indicator if posting i lists at least one new skill.
- $\#\text{Skills}_i$: Control for the total number of skills listed.

Identification Strategy

- Compare postings within strictly defined cells to isolate the "novelty" premium.
- **Fixed Effects (δ_{FE}):**
  - Firm $\times$ Year
  - Occupation $\times$ Industry $\times$ Region $\times$ Year (Saturated)
  - Pay-period $\times$ Year

The Price of Novelty

Key Finding 1: Positive Wage Premium

- Postings with at least one new skill offer **2–4% higher wages**.
- Baseline Estimate: $\approx 4.4\%$
- Saturated FE Estimate: $\approx 2.3\%$ (within same firm, job, and location).

Key Finding 2: Intensity Matters

- The premium increases monotonically with the number of new skills.
- **1 New Skill:** $\sim 1.6\%$ premium.
- **4+ New Skills:** $\sim 6.0\%$ premium.

Winners and Losers

By Occupation

- **Managers & Professionals:** Largest premium ($\sim 6\%$).
- **Clerical & Elementary:** Smallest premium ($\sim 2\%$).

By Skill Domain

- **Positive Premium:** Information Technology ($\sim 9\%$), Data Analysis.
- **Negative Premium:** Service, Administrative, Media & Communications.
- *implication:* "New" does not always mean "High Value"—some new skills may signal task standardization.

The Role of AI

AI Skill Premium

Postings requiring AI skills command significantly higher wages than non-AI new skills.

Developer vs. User

- **AI Developer Skills:** $\approx$ **9%** premium.
- **AI User Skills:** $\approx$ **4%** premium.

Interpretation: The economic gains are concentrated in scarce, production-side expertise rather than broad tool adoption.

Job Titles vs. Skills

Is the premium driven by rebranding jobs with fancy new titles?

Findings:

- **New Job Titles alone: Zero** wage premium (-0.3%).
- **New Skills alone:** Robust positive premium ($\sim 2.2\%$).
- **New Title + New Skills:** Highest premium ($\sim 3.6\%$).

Conclusion: New titles are only a signal of value when backed by substantive new skill content.

Technological Innovation (Patents)

Linking Skills to Breakthrough Patents

- We link skills to breakthrough patents using textual similarity.
- **Finding:** The premium is driven by skills linked to frontier innovation.

Instrumental Variable (IV) Estimates

- **Instrument:** Pre-determined exposure to breakthrough patents (2010–2016).
- **Result:** IV estimates are substantially larger (**24%** – **63%**).
- Suggests OLS estimates are conservative; the return to technology-driven skill demand is very high.

Conclusion

1. **New Skills Pay:** Emerging skills command a robust 2–4% wage premium within narrowly defined jobs.
2. **Technology Drives Value:** The premium is concentrated in IT, AI Developers, and skills linked to breakthrough patents.
3. **Substance Over Style:** Job titles alone do not generate value; specific skill capabilities do.
4. **Implication:** Labor markets efficiently price the expertise required to adopt frontier technologies.