Job Tasks, Worker Skills, and Productivity

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*The views expressed herein do not necessarily represent the position of the Federal Reserve Bank of Philadelphia, the Federal Reserve System, or the Federal Reserve Board of Governors.

What the Paper Does

- Links establishments in the Census of Manufacturers / ASM / LBD to the OEWS.
  - Census of Manufacturers / ASM has data necessary to compute productivity.
  - OEWS has information on the occupations associated with establishments' employees.
- Computes indices of task intensity at the occupational level.
- Links establishment productivity to their workers' task intensities.

What the Paper Finds

- Occupational mix has little explanatory power in explaining differences in productivity.
  - Exception is at the top of the distribution for analytic/non-routine tasks and for certain high-tech industries.
- Occupational mix has somewhat more explanatory power in explaining differences in capital intensity.

Aims for this discussion

1. Discuss what we already know
    1. … using job ad data from the United States.
    2. … using administrative data from other countries.

2. Suggest additional exercises – likely for future work – to exploit the richness in the Census of Manufacturers and related surveys.

What do we know using alternate data from the US?

Deming and Kahn (2017): “Skill Demands Across Firms and Labor Markets”

- Link firms' demand for specific tasks (as measured in job ad data, from Burning Glass) to firm performance.
  - Caveat: Cannot see which workers firms actually end up hiring.
- Results:
  - Lots of variation in task measures within occupations.
  - Among publicly traded firms, up to 13 percent of the variation in revenue per worker is explained by the frequency of mentions of social, cognitive, and eight other tasks
  - Among all firms, skills mentioned in job ads predicts the probability of being publicly traded.

Low explanatory power in current paper might reflect the fact that we don't observe within-occupation variation in task demand.

What do we know using data from other countries?

Irarrazabal, Moxnes, Ulltveit-Moe (2013): “Heterogeneous Firms or Heterogeneous Workers?”

- Matched employer-employee data in Norway
- Worker quality is either
  - (a) estimated as a function of education, tenure at the firm, years in the labor market
  - (b) “a” + worker fixed effect from an AKM-type-regression
- Paper is interested in whether TFP is higher for exporters; 25-40 percent when accounting for worker quality.

Harrigan, Reshef, and Toubal (2021, 2024): “March of the Techies” and “Techies and Firm Level Productivity”

- Uses firm-level info on employment by occupation (from France).
- “Techies:” workers are in occupations intensive in R&D, IT installation, and engineering.
- Firms that hire “techie” workers have faster employment and productivity growth.

Comparative advantage of the Census of Manufacturers/ASM is in its detail on the production process and of organizational practices

1. 2022 Census of Manufacturers measures…
    1. use of new business technologies (robotics, RFID, additive manufacturing, etc…)
    2. extremely detailed information on the mix of products produced, materials used, and services purchased.
2. 2010, 2015, 2021 Management and Organizational Practices Survey
    1. … has the ASM sample frame;
    2. … measures how employees are hired, evaluated, renumerated, promoted;
    3. … use of artificial intelligence and other statistical models.