

Discussion of “Technology and Labor Markets: Past, Present and Future; Evidence from Two Centuries of Innovation”

BPEA Fall 2025 Conference

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A New Take on an Old Question

- This question is about as old as economics itself

A New Take on an Old Question

“That the substitution of machinery for human labour, is often very injurious to the interests of the class of labourers.”

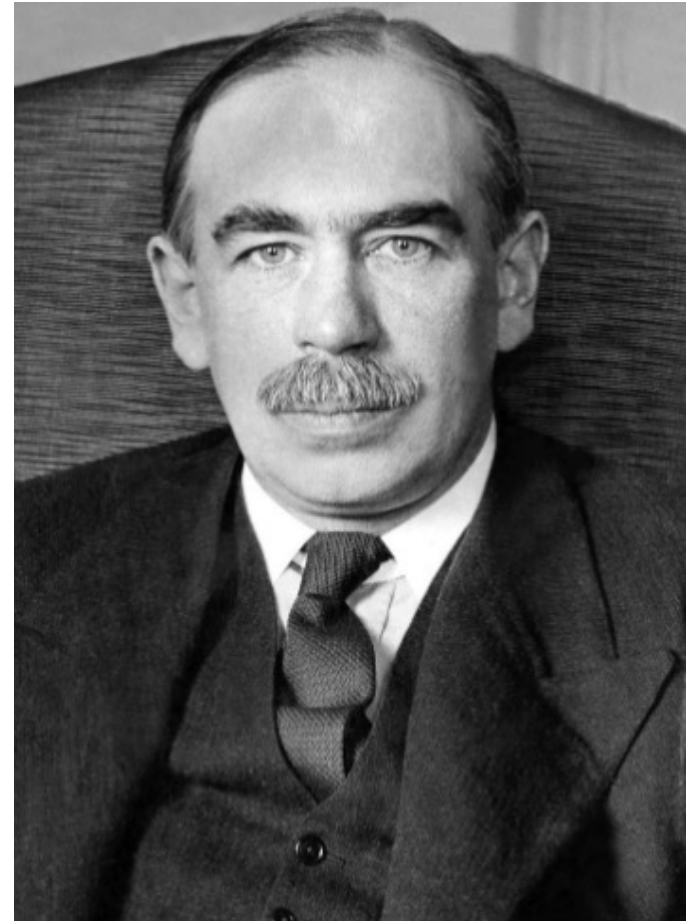
David Ricardo , 1821



A New Take on an Old Question

“We are being afflicted with a new disease of which some readers may not have heard the name, but of which they will hear a great deal in the years to come, namely, technological unemployment”

John Maynard Keynes, 1930



A New Take on an Old Question

- This question is about as old as economics itself
- The literature has explored this question across a range of frameworks
 - Skill-biased technological change (Katz & Murphy 1992; Autor, Katz & Krueger 1998)
 - Capital-Skill Complementarity (Krusell et al. 2000)
 - Task-based Frameworks (Autor, Levy & Murnane 2003; Acemoglu & Autor 2011, Autor & Dorn 2013)

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 - Task-based Frameworks (Autor, Levy & Murnane 2003; Acemoglu & Autor 2011, Autor & Dorn 2013)
- *This Paper*: unpacking black box of technological change with unified model and new data

This Paper: Three components of exposure

- The paper highlight 3 channels through which technology affects demand:
 1. Mean Task Exposure
 - Average exposure of each task to new task-related technologies
 2. Concentration in Task Exposure
 - The distribution of exposure across tasks
 3. Industry Spillover
 - The spillover effects of innovations on industry labor demand

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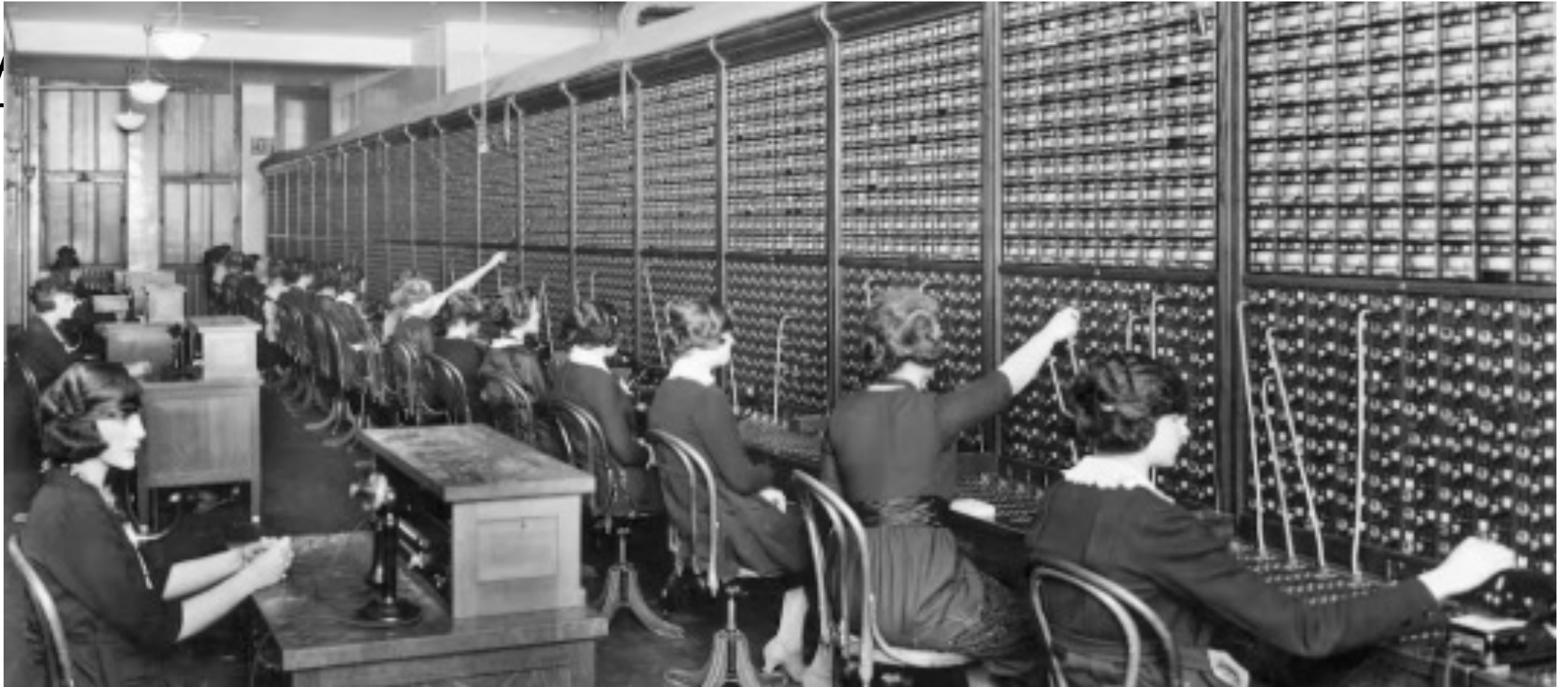
- Data: Unweighted variance

$$C(\epsilon) = \frac{1}{|J(o, T)|} \sum_{j \in J} (\epsilon(j) - m(\epsilon))^2$$

Comment 1: What is the unit of a task?

- ChatGPT creates an average of 14 tasks per occupation

Example: Tasks for Telephone Operators in 1920



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1. Connect long-distance calls by plugging cords into switchboard jacks.
2. Answer local calls and connect callers to requested numbers.
3. Watch switchboard lights for incoming or completed calls.
4. Ring subscribers' phones using switchboard controls.
5. Disconnect calls by removing plugs and resetting circuits.
6. Log long-distance calls with time, duration, and charges.
7. Provide directory assistance to callers.
8. Route emergency calls to police, fire, or medical services.
9. Explain delays or charges politely to customers.
10. Monitor connected calls and fix crossed or unclear lines.
11. Report line or switchboard problems to repair staff.
12. Enforce company rules on unauthorized or unpaid calls.

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Core task:
manually connecting
and managing calls

Comment 1: What is the unit of a task?

- ChatGPT creates approximately 14 tasks per occupation
- ChatGPT has little discipline on task aggregation
 - “Core tasks” tend to get split up into many tasks
 - e.g. toll booth operator has as many tasks as a dentist

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- ChatGPT creates approximately 14 tasks per occupation
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 - “Core tasks” tend to get split up into many tasks
 - e.g. toll booth operator has as many tasks as a dentist
- A technology that affects a core task will produce low concentration
 - “Concentrated” exposure likely correlates with peripheral task exposure

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All affected by
automatic telephone
exchange system

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- *The model's interpretation:*
 - Worker reallocation across tasks has been a quantitatively meaningful offsetting force
- *Core-peripheral interpretation:*
 - Smaller employment losses happen when core tasks are not affected

→ *Important to distinguish when applying estimates to AI scenarios*

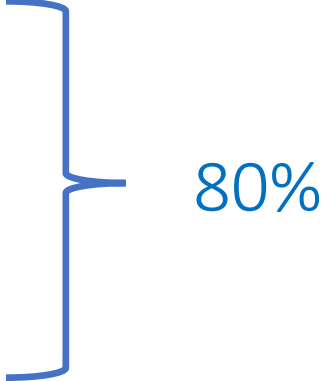
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One suggestion: Ask LLM for task importance weights

Example: Tasks for Telephone Operators in 1920

- Connect long-distance calls by plugging cords into switchboard jacks — 20%
 - Answer local calls and connect callers to requested numbers — 30%
 - Watch switchboard lights for incoming or completed calls — 15%
 - Ring subscribers' phones using switchboard controls — 5%
 - Disconnect calls by removing plugs and resetting circuits — 10%
 - Log long-distance calls with time, duration, and charges — 7%
 - Provide directory assistance to callers — 4%
 - Explain delays or charges politely to customers — 3%
 - Route emergency calls to police, fire, or medical services — 3%
 - Monitor connected calls and fix crossed or unclear lines — 2%
 - Report line or switchboard problems to repair staff — 1%
 - Enforce company rules on unauthorized or unpaid calls — <1% ($\approx 0.5\%$)
- 
- 80%

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Comment 2: Unpacking Spillover Terms

- **Model:** two sources of spillovers
 - Spillovers from labor-saving technologies
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- **Model:** two sources of spillovers
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 - TFP shocks to the industry
- **Data:** includes all patents mapped to the industry

Technological Growth in Telephones

- Telephone operators were directly exposed to “Automatic Telephone Exchange Systems” (Patented in 1890s, adopted 1910-1950) Feigenbaum and Gross (QJE 2024)
- Many concurrent technological innovation in telephone:
 - **Long-distance repeaters (1910s):** Vacuum-tube amplifiers enabled clear coast-to-coast calling
 - **Network capacity expansions (1920s–1930s):** Multiplexing and coaxial cables allowed more simultaneous calls
 - **Integrated desk sets (late 1920s–1930s):** One-piece handsets and compact desk sets improved appeal
 - **Improved audio quality (1930s):** Anti-sidetone circuitry reduced echo and made calls better

→ Spillover term captures the effect of all these

Comment 2: Unpacking Spillover Terms

- Why this distinction is potentially important?
 1. Not just about automation
 - Informs the effect of overall technological growth on employment, not the spillovers from task-related technology
 - Consider separating 2 types of patents
 2. Potentially masks polarization
 - Do innovation spillovers apply evenly to all occupations in an industry?

Conclusion

- Ambitious paper opening the black box of technological change
- Many opportunities ahead to use this methodology/data
 - Between-occupation reallocation is important next step
 - E.g. telephone operators: worker-level employment effects were substantially more muted due to reallocation across jobs (Feigenbaum and Gross QJE 2024)