# Tasks and Work Force Polarization

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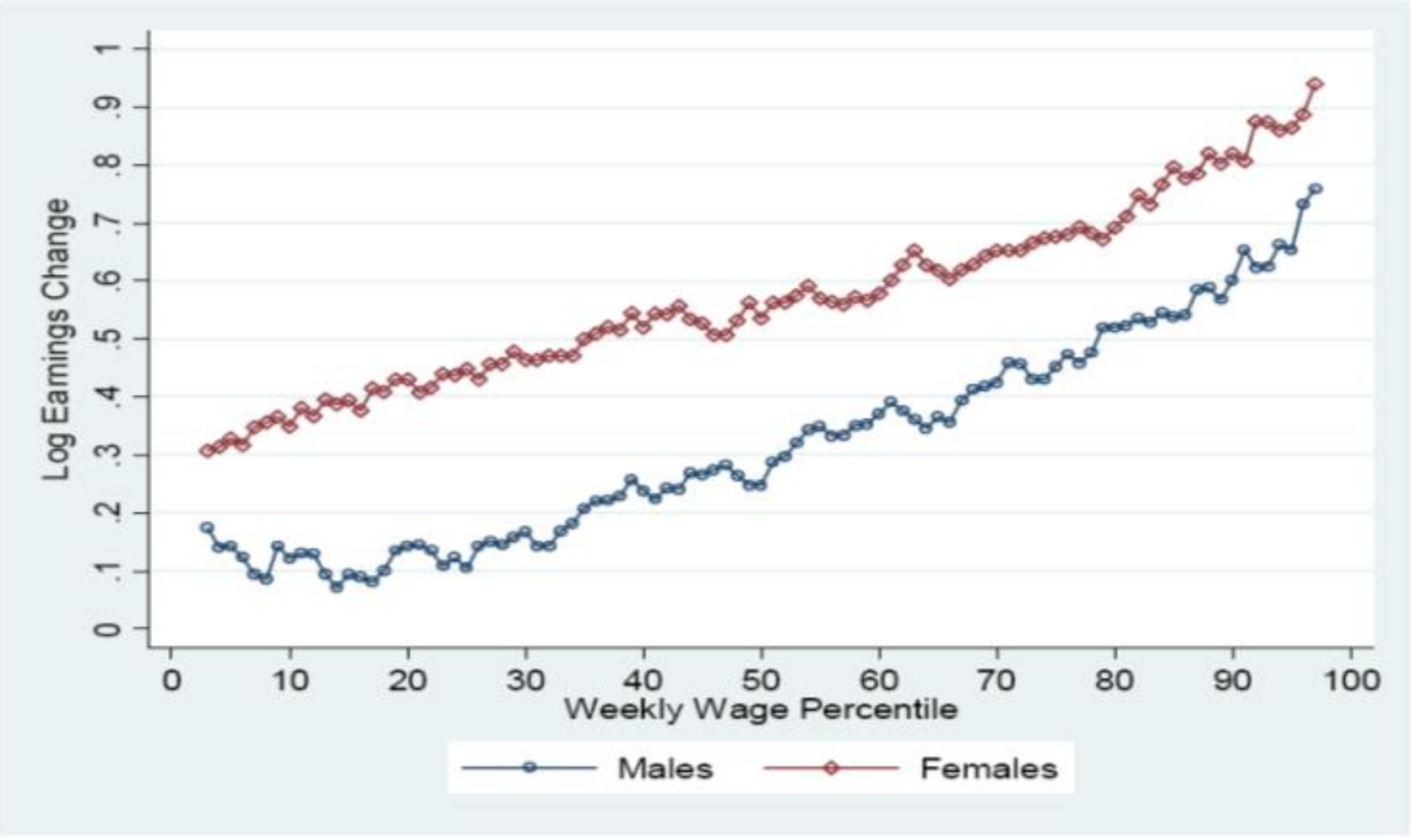
# Wage inequality has risen since 1960s




Change in Log Real Weekly Wage by Perecntile, Full-Time Workers, 1963-2005. (Autor, L. F. Katz, & Kearney, 2008)

# Skill-Based Technical Change (SBTC)

- Model features:
  - Two skills, high ($H$) and low ($L$).
  - $H$ and $L$ are different, and imperfect productive substitutes: $\sigma > 0$.
  - Technology *factor-augmenting*: always raises productivity/wages.
  - Wages set on the demand curve
- Empirically successful. e.g.
  - Katz and Murphy, 1992
  - **CardLemieux2001**

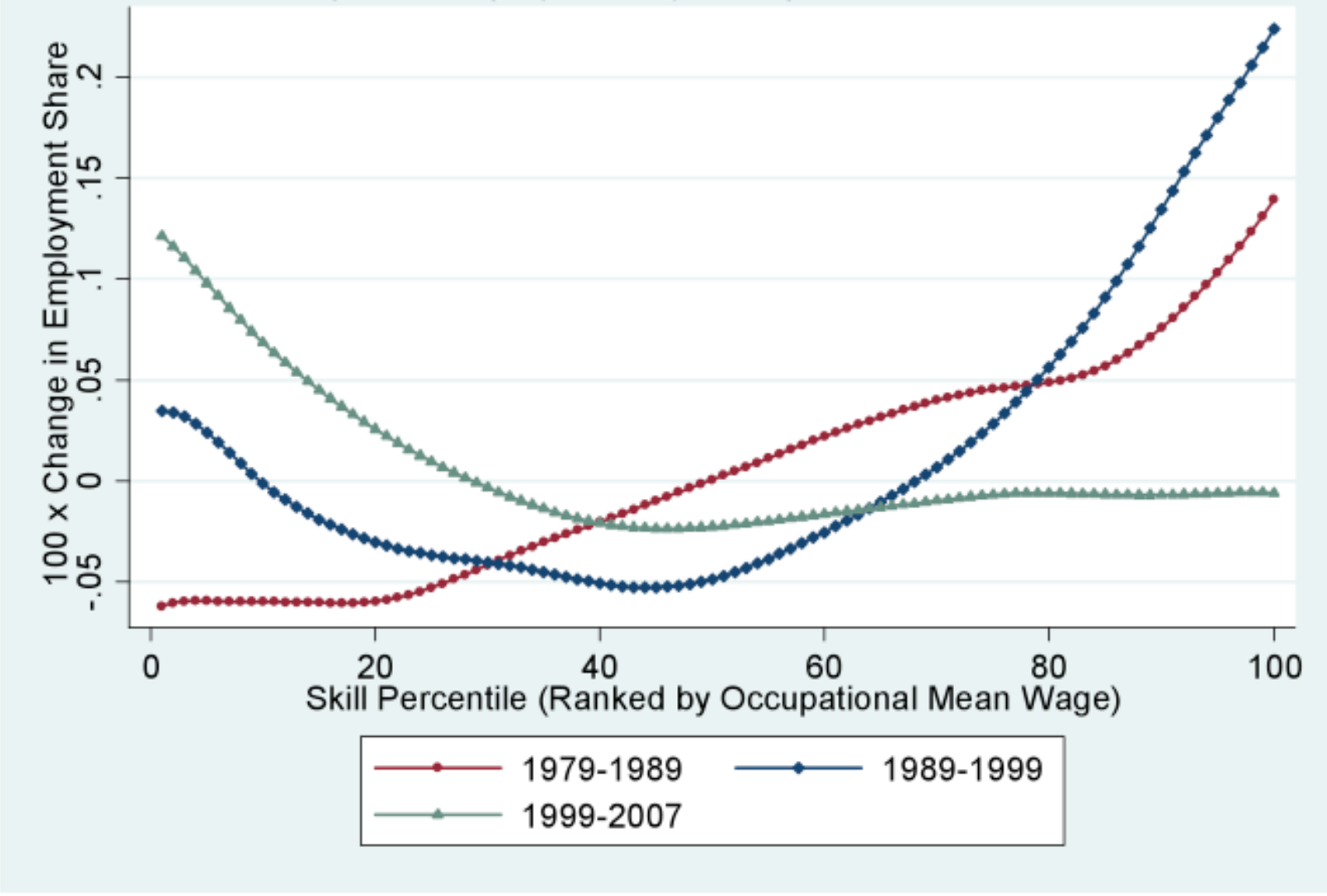
# The 'Canonical Model' of Skill-Based Technical Change

- Production function representation:

$$F(L,H) = \left[ (A_L L)^{\frac{\sigma-1}{\sigma}} + (A_H H)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{(\sigma-1)}} \tag{1}$$

- Empirical implications depend on $\sigma$. SBTC implies
  - Rise in $A_H/A_L$ if $H$ and $L$ are gross substitutes ($\sigma > 1$)
  - Fall in $A_H/A_L$ if $H$ and $L$ are gross complements ($\sigma > 1$)
- Predicts
  - Increasing inequality, driven by skill demand.
  - Rising college/education premium.
  - Monotone wage growth in skills.

# Non-monotone increases in wage by skill percentile (USA)




Smoothed changes in employment by occupational skill percentile, 1979-2007 (Acemoglu & Autor, 2011)

# Autor, Levy, and Murnane, 2003

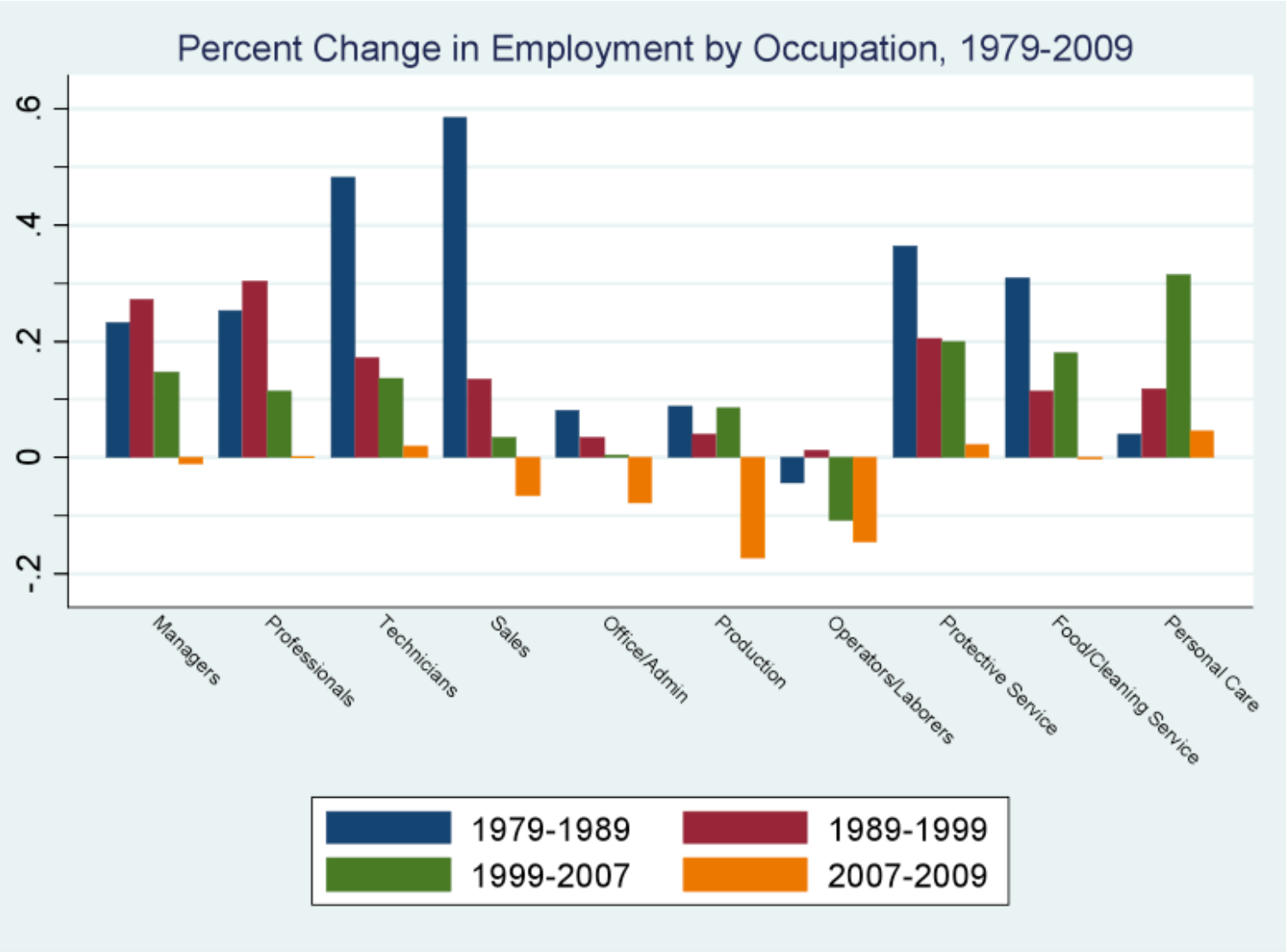
"The skill content of recent technological change: An empirical exploration." *The Quarterly Journal of Economics*, 118(4), 1279–1333.

- Jobs have different *task content*, so technology can be factor-augmenting or a substitute.
- Two kinds of labor: routine ($L_R$), and non-routine ($L_N$). Capital is perfectly substitutable for non-routine tasks:

$$F(R, N) = (L_R + C)^{1-\beta} L_N^{\beta}, \quad \beta \in (0, 1)$$

- Workers are endowed with a fixed set of skills, inelastically supply 1 unit of labor.
- 'Ricardian' model: assignment of workers to tasks is endogenous (as in **Roy1951**).

# Job Polarization: United States




Percentage change in employment level, by occupation group, USA, 1979-2009 (Acemoglu & Autor, 2011)

# This Project

1. Has employment in Australia polarized in terms of routine and non-routine tasks as it has overseas?
   - If not, why is Australia special?
2. Does ICT capital investment explain this trend?

# Data

1. O*NET: Occupational task database
   - Developed by US Department of Commerce
   - Detailed break-down of activities, skills and abilities by occupation
2. Australian Bureau of Statistics
   - Labor Force Survey (LFS)
   - Survey of Income and Housing
   - Census of Population and Housing
   - National accounts: ICT and Machinery investment, capital stock

Questions?

# References


- Acemoglu, D., & Autor, D. H. (2011). Skills, Tasks and Technologies: Implications for Employment and Earnings. In D. Card & O. Ashenfelter (Eds.), *Handbook of labor economics, volume 4, part b* (Chap. 12, Vol. Volume 4, pp. 1043–1171). Elsevier
- Autor, D. H., Katz, L. F., & Kearney, M. S. (2008). "Trends in US wage inequality: Revising the revisionists." *The Review of Economics and Statistics*, *90*(2), 300–323.
- Autor, D. H., Levy, F., & Murnane, R. J. (2003). "The skill content of recent technological change: An empirical exploration." *The Quarterly Journal of Economics*, *118*(4), 1279–1333.
- Katz, & Murphy, K. J. (1992). "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *Quarterly Journal of Economics*, *107*, 35–78.

Spare Slides

# O*NET Data Example

| Job Title | Get Data | Analyze Data | Think Creatively | Handle Moving Objects |
|---|---|---|---|---|
| CEOs | 5.03 | 4.82 | 5.1 | 1.1 |
| Economists | 5.88 | 6.58 | 5.38 | 0.54 |
| Dancers | 3.88 | 1.96 | 4.37 | 2.63 |
| Programmers | 4.91 | 5.05 | 5.96 | 0.44 |
| Tellers | 2.91 | 2.65 | 2.21 | 2.74 |
| Surgeons | 5.72 | 5.49 | 4.67 | 3.62 |
| Bakers | 2.8 | 3.29 | 2.93 | 5.06 |
| Receptionists | 3.1 | 2.45 | 2.54 | 2.88 |
| Typists | 4.35 | 1.52 | 3.9 | 1.43 |

Table : O*NET Work Activity Example (Levels, Scale 0–7)