Discussion of "Skill Bundling and Skill-Price Inequality"

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Basic idea

Really interesting paper with both theoretical and empirical contributions.

This paper

- Formulates a multidimensional skills worker assignment problem in which individuals are treated as a bundle of skills.
- Instead of set partitions, it uses lottery representation which is more intuitive, tractable, and easily computable.
- Uses NLSY79 to evaluate skill-price equalization using three observable and one unobservable skills in routine and non-routine occupations.

Paper structure

Theretical framework

- Revisit skill bundling in a set partition representation of Heckman and Scheinkman (1987)
- Introduce skill bundling in a lottery assignment
  - Introduce choice probabilities to the skill bundling problem
  - With certain assumptions, derive skill prices from Lagrange multipliers
  - Earnings can be written as the sum of skill prices and skills endowment
  - Determine feasible sets of sectors and skills combinations and (relative) skill prices can be written analytically as a function of parameters in production function.
  - Put forward a strategy to test for skill price identification (weak and strong forms)

Empirical section

- Distinguish between stayers and movers to test the strong form of skill price equalization.
- Use empirical strategy to recover the skill prices.

1: What would happen if some sectors do not value certain skills?

- Proposition 2 says that 'Skill prices will be equalized across any pair of sectors if at least S different worker types with linearly independent skill vectors are assigned to both sectors.'
- Does this still hold if certain sectors only value specific skills?
- Consider the following example
  - **Skills:** math and linguistic
  - **Two workers:** "engineer" (math/linguistic = 10/5) and "language teacher" (math/linguistic = 5/10)
  - **Two sectors:** "construction" put all weights on math and "language school" put all weights on linguistic
  - **Expected hiring:** "engineer" $\rightarrow$ "construction", "teacher" $\rightarrow$ "school". However, "engineer" is not rewarded for her linguistic skill and "teacher" is not rewarded for her math skill.
  - Wage cannot be written as a linear combination of shadow prices and skills?
- Proposition 2 may also require all firms to reward all skills, at least slightly?

2: Determinants of earnings

- What is the definition of earnings? Hourly wage or monthly wage (hourly wage x number of hours)?
- Nominal or real wage? (Skill prices seem to increase over time)
- Earnings = f{time-invariant variables, time-variant variables, other variables}
  - time-invariant variables = initial skills, education, ...
  - time-variant variables = experience, technology, demand and supply structure, ...
  - other variables = job tenure, industry tenure, other job characteristics, ...
- Imperfect substitution between age groups and genders makes it hard to explain past phenomenon in wage change and occupation-specific demand shifts for different types of labor are important (Johnson and Keane, 2013)
- In the paper, skills are calculated from the test score in 1979-1980 (during age 14-22). These (observable and unobservable) skills may have changed over the study period?

3: Assumptions for skill prices identification

- Key assumptions are (i) constant observable and unobservable skills and (ii) cross-equation restrictions.
- However, some studies find that cross-equation restrictions may not hold.
- Switching between jobs may be driven by changes in wage or other factors:
  - Hahn et al. (2017) find that job-to-job flows have a modest positive effect on earnings in the US and Paweenawat et al. (2019) find that switching job leads to higher wages for fully formal workers in Thailand
  - Compensating differentials: people move for lower wage to get compensated for air quality, health insurance benefit, etc.
- Can we test this restriction empirically? Maybe by comparing wage before and after switching.
- How does the empirical exercise control for cross-equation restriction?
- If cross-equation restriction does not hold, can we still derive unique identification of skill prices?

4: Labor market frictions may exist

- Would the followings help explain the rejection skill price equalization?
  - Imperfect mobility: Significant earnings differences-both in the level and shape of earnings profiles-exist across local labor (Hanuschek, 1980).
  - Abstract from unemployment and search costs?
  - Labor market regulations, e.g., minimum wage and employment protection registration.
  - Occupational-specific demand and supply shifts (quantitatively and qualitatively).
- Empirical test may not be able to distinguish between the above factors and actual skill price premium?

5: The model implicitly assumes symmetric information

- The model implicitly assumes symmetric information, i.e., workers and firms have the same knowledge regarding skills and skill prices.
- In the empirical test, proxies of skills (verbal, math, and social) are calculated using a principal component analysis (PCA) on ASVAB test. But this may not be what firms can observe nor use to recruit or determine wages?
- Likewise, the empirical test implicitly assumes that workers observe prices of these three skills from different firms.
- Perhaps provide additional explanation/justification on data limitation/selection

Would be nice to explain more on

- The connection between the theory part and the empirical part?
- Why choose routine vs non-routine occupation as sectors?