

Empirical Economic Modeling

Labor

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Lecture plan

Central research question in labor: What determines earnings?

Theory

- Labor demand: monopsony power, unintended policy consequences, ...
- Labor supply: returns to skill, amenities/compensating differentials, luck, ...

Empirics

- Mincer earnings function
- The AKM model

Journal quality is a good (not perfect!) proxy for paper quality

Rankings are subjective—this is mine

Top 5

American Economic Review (AER)
Econometrica (ECMA)
Journal of Political Economy (JPE)
Quarterly Journal of Economics (QJE)
Review of Economic Studies (REStud)

Top field—labor

American Economic Journal: Applied Economics (AEJ:Applied)
American Economic Journal: Economic Policy (AEJ:Policy)
Journal of Labor Economics (JOLE)

2nd tier general interest

Economic Journal (EJ)
European Economic Review (EER)
Journal of the European Economic Association (JEEA)
Review of Economics and Statistics (REStat)
etc.

2nd tier field—labor

Journal of Human Resources (JHR)
Labour Economics (LE)
etc.

Mincer earnings function

Mincer, Jacob (1958). Investment in Human Capital and Personal Income Distribution. *Journal of Political Economy* 66(4), 281–302.



Mincer earnings function

Mincer (1958 JPE). Investment in Human Capital and Personal Income Distribution



Mincer earnings function

Mincer (1958 JPE). Investment in Human Capital and Personal Income Distribution

Research question: How does schooling vs. experience shape earnings?

Theory:

- Single equation model: for worker i ,

$$\ln w_i = \beta_0 + \beta_1 \text{schooling}_i + \beta_2 \text{experience}_i + \beta_3 \text{experience}_i^2 + u_i$$

- No microfoundation (i.e., no behavior captured in a decision model)

Empirics:

- Estimate model on Census data
- R^2 was later found to be low

Long-lasting impact (c.f. Society of Labor Economists, Jacob Mincer Award)

Decomposing wage dispersion

Abowd, John M., Francis Kramarz and David N. Margolis (1999). High Wage Workers and High Wage Firms. *Econometrica* 67(2), 251-333.



Decomposing wage dispersion

Abowd, Kramarz and Margolis (1999 ECMA). High Wage Workers and High Wage Firms



Decomposing wage dispersion

Abowd, Kramarz and Margolis (1999 ECMA). High Wage Workers and High Wage Firms

Research question: Are workers or firms the source of wage differences?

AKM regression: for worker i at time t at firm $j(i, t)$,

$$y_{it} = \underbrace{\alpha_i}_{\text{worker FE}} + \underbrace{\phi_{j(i,t)}}_{\text{firm FE}} + x_{it}\beta + u_{it}$$

Nests the Mincer equation ($x_{it}\beta$)

Identified off job-to-job movers (largest connected set)

Need lots of data! AKM popularized the use of linked employer-employee data

Decomposing wage dispersion (cont'd)

Abowd, Kramarz and Margolis (1999 ECMA). High Wage Workers and High Wage Firms

Variance decomposition:

Decomposing wage dispersion (cont'd)

Abowd, Kramarz and Margolis (1999 ECMA). High Wage Workers and High Wage Firms

Variance decomposition:

$$\begin{aligned}\text{var } y_{it} = & \text{var } \alpha_i + \text{var } \phi_{j(i,t)} + \text{var } x_{it}\beta \\ & + 2 \text{cov}(\alpha_i, \phi_{j(i,t)}) + 2 \text{cov}(\alpha_i, x_{it}\beta) + 2 \text{cov}(\phi_{j(i,t)}, x_{it}\beta) + \text{var } u_{it}\end{aligned}$$

Commonly found estimates (Lopes de Melo, 2018 JPE):

$$\frac{\text{var } \alpha_i}{\text{var } y_{it}} \approx 0.6 \quad \frac{\text{var } \phi_{j(i,t)}}{\text{var } y_{it}} \approx 0.2 \quad \frac{\text{var } x_{it}\beta}{\text{var } y_{it}} \approx 0.1$$

⇒ differences across workers capture more wage variation than firms

Covariance terms capture sorting between workers and firms

Where is the theory?

AKM is purposely atheoretical

Yet it is a very influential tool, used everywhere in economics

Canned estimation packages (Stata: `reghdfe` by Correia, 2016)

Microfoundations?

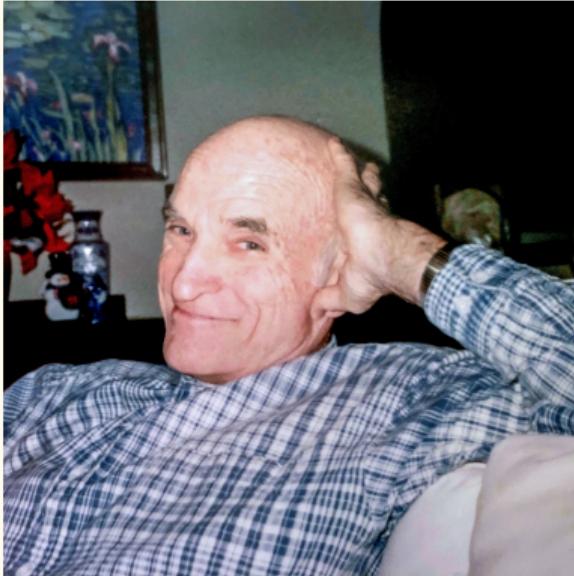
- Firms: product market power (Wong, 2023 WP AER R&R)

Academic economics publication process

- Workers: half of the labor economics literature
⇒ we cover one possible explanation next

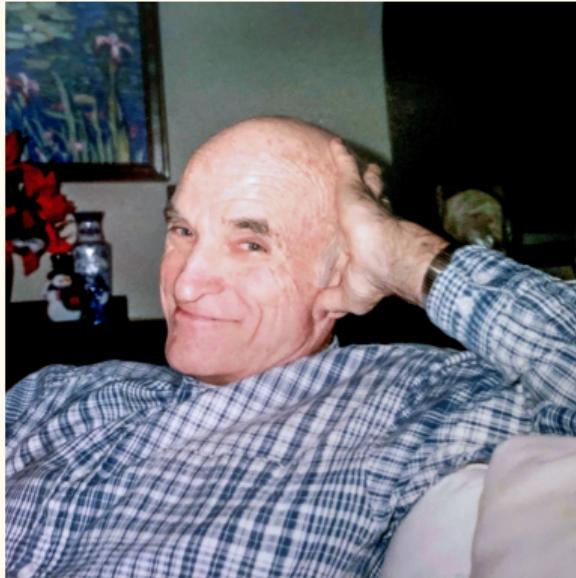
The role of luck

McCall, John J. (1970). Economics of Information and Job Search. *Quarterly Journal of Economics* 84(1), 113–126.



The role of luck

McCall (1970 QJE). Economics of Information and Job Search



The role of luck

McCall (1970 QJE). Economics of Information and Job Search

Research question: Why do ex ante identical workers earn different wages?

Some workers are lucky to get good job offers

Unemployed get UI benefit b , draw a job offer at rate λ that pays $w \sim F$

$$(\lambda + \rho)V(b) = b + \lambda \mathbb{E} \max_w [w/\rho, V(b)] = b + \lambda \max \left[\frac{1}{\rho} \int w dF(w), V(b) \right]$$

Solution: reservation wage strategy (accept offer if $w \geq b$)

The Diamond paradox

Diamond, Peter A. (1971). A Model of Price Adjustment. *Journal of Economic Theory* 3(2), 156-68.



The Diamond paradox

Diamond (1971 JET). A Model of Price Adjustment



The Diamond paradox

Diamond (1971 JET). A Model of Price Adjustment

Research question: Can wage dispersion arise in equilibrium?

Wages do not fall from the sky, firms choose them

⇒ wage offers reduce to a point

⇒ no equilibrium wage dispersion!

Resolving the Diamond paradox: on-the-job search

Burdett, Kenneth and Dale Mortensen (1998). Wage Differentials, Employer Size, and Unemployment. *International Economic Review* 39(2), 257-73.



Resolving the Diamond paradox: on-the-job search

Burdett and Mortensen (1998 IER). Wages, Employer Size, and Unemployment



Academic economics publication process 2

Resolving the Diamond paradox: on-the-job search

Burdett and Mortensen (1998 IER). Wages, Employer Size, and Unemployment

Research question: Can wage dispersion arise in equilibrium?

Some workers are lucky to get good job offers **on the job**

Unemployed get UI benefit b , draw a job offer at rate λ_u that pays $w' \sim F$

Employed get w , are fired at rate δ , draw a job offer at rate λ_e that pays $w' \sim F$

Resolving the Diamond paradox: on-the-job search

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Employed get w , are fired at rate δ , draw a job offer at rate λ_e that pays $w' \sim F$

$$(\lambda_u + \rho)V_u(b) = b + \lambda_u \mathbb{E} \max_{w'} [V_e(w'), V(b)]$$

$$(\lambda_e + \delta + \rho)V_e(w) = w + \delta V_u(b) + \lambda_e \mathbb{E} \max_{w'} [V_e(w'), V_e(w)]$$

This is only the worker side! But framework yields equilibrium wage dispersion

Taking stock

Central research question in labor: What determines earnings?

AKM: unobserved differences between workers are to blame for wage dispersion

Theory: luck could play a role

- Equilibrium search and matching (2010 Nobel to Diamond–Mortensen–Pissarides)
- Huge literature (wage bargaining, directed search, amenities, ...)

Empirics: how important a role does luck play?

- Fundamental identification issue: we do not observe rejected offers \Rightarrow structure!
- Calibration: 4–29 percent (Taber and Vejlin, 2020 ECMA)
- Computationally intensive, black box

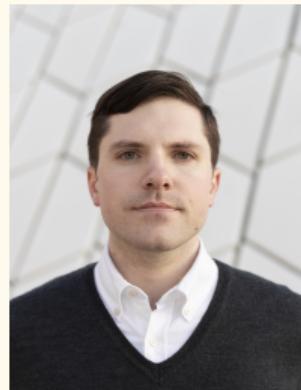
Empirics of job search

Arcidiacono, Peter S., Attila Gyetvai, Arnaud Maurel and Ekaterina Jardim (2023). Identification and Estimation of Continuous-Time Job Search Models with Preference Shocks. NBER Working Paper 30655, R&R at the *Review of Economic Studies*.



Empirics of job search

Arcidiacono, Gyetvai, Maurel and Jardim (2023 NBER WP). CCP Search



Empirics of job search

Arcidiacono, Gyetvai, Maurel and Jardim (2023 NBER WP). CCP Search

Research question: How to identify the structural parameters of search models?

Key idea: draw wage $w' \sim F$ and preference shock $\varepsilon \sim \text{Logistic}$

$$(\lambda_u + \rho)V_u(b) = b + \lambda_u \mathbb{E}\max_{w', \varepsilon} [V_e(w') + \varepsilon, V(b)]$$

$$(\lambda_e + \delta + \rho)V_e(w) = w + \delta V_u(b) + \lambda_e \mathbb{E}\max_{w', \varepsilon} [V_e(w') + \varepsilon, V_e(w)]$$

Structural parameters are expressed in terms of conditional choice probabilities:

$$p_{ww'} = \frac{\exp(V_e(w'))}{\exp(V_e(w)) + \exp(V_e(w'))}$$

Empirics of job search (cont'd)

Arcidiacono, Gyetvai, Maurel and Jardim (2023 NBER WP). CCP Search

Research question: How to identify the structural parameters of search models?

Conditional choice probability (CCP) methods (IO literature, c.f. Rust, 1987)

Key difference: CCPs are not observed \Rightarrow we use the logit structure

Estimation is much easier than calibration before

Gyetvai (2024 WP): application to occupational mobility

Academic economics job market

Frontiers of labor

Central research question in labor: What determines earnings?

- Luck: we got to one point on the frontier
- ...

Other central questions:

- What determines employment status?
- What determines firms' organization structure?
- ...

Extensive vs. intensive margin

Things we do not cover:

- Human capital formation/education
- Scarring effect of unemployment, motherhood, health shocks, ...
- Household decisions, matching on the marriage market
- Networks
- Minimum wage debate
- Labor market power
- ...