Labor Economics, Week 4
Wage inequality, labor demand,
Competitive model, and monopsony

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- Earned income is the largest source of household incomes (ca. 60%).
- $\Rightarrow$ Wage inequality matters for income inequality.
- Many factors might affect the wage distribution:
  1. Labor **supply** of different "types" of workers
     1.1 Education
     1.2 Demographic change
     1.3 Migration
  2. Labor **demand**
     2.1 Technology
     2.2 Trade
  3. **Institutions** and policy
     3.1 Collective bargaining
     3.2 Social norms
     3.3 Minimum wages
     3.4 Tax system

What is the impact of labor supply on wages?

Large, controversial literatures on:

- What is the impact of immigration on native wage inequality?
- What is the impact of expanding / stagnating access to higher education on wage inequality?

Setup

- Types of workers $j = 1, \ldots, J$
  by level of education, country of birth, ...
- Cross-section of labor markets $i = 1, \ldots, n$
  e.g., metropolitan areas
  (some papers: time series $t = 1, \ldots, T$, or panel i, t)
- Wages w_{ij}
- Labor supply N_{ij}

A typical regression

- Many papers estimate regressions such as:

$$\log\left(\frac{w_j}{w_{j'}}\right) = \mathit{controls} + \beta \cdot \log\left(\frac{N_j}{N_{j'}}\right) + \varepsilon_{j,j'},$$

- possibly instrumenting for labor supply.
- We will discuss economic models justifying this regression.
- But don't need to believe models for general interpretation!

Questions for you

Interpret this regression.
What is the meaning of β?

Assumption 1

- Output Y_i in region i is described by an aggregate production function:

$$Y_i = f_i(N_{i1}, \ldots, N_{iJ}).$$

- Marginal productivity theory of wages:

$$w_{ij} = \frac{\partial f_i(N_{i1}, \ldots, N_{iJ})}{\partial N_{ij}}$$

- Justified by competitive, profit maximizing firms

Reasons marginal productivity theory might not hold

- If effort / the qualification of applicants depend on wages, employers will not set wage = marginal productivity.
- If employers face upward sloping labor supply (search frictions!) they depress wages below marginal productivity, acting as a "monopsony."
- With search frictions, there is match specific surplus, leaving room for bargaining.
- Who knows what the marginal productivity is, esp. in large, complex firms?
- Social norms for remuneration.
- Collective bargaining.
- Labor markets do not clear.
- ...

Assumption 2

- Constant elasticity of substitution (CES) production function:

$$f_i(N_{i1}, \ldots, N_{iJ}) = \left(\sum_{j=1}^{J} \gamma_j N_{ij}^{\rho} \right)^{1/\rho}$$

- Restricts the way different types of labor interact
- $\rho - 1$: "inverse elasticity of substitution"
  (we will see why)
- γ: type-specific productivity

Questions for you

- Combine assumptions 1 and 2 to derive w_{ij}.
- Take the ratio of w_{ij} and $w_{ij'}$.
- Take logarithms on both sides of the equation.

Answer: The wage equation

- Combining assumptions 1 and 2:

$$w_{ij} = \frac{\partial f_i(N_{i1}, \ldots, N_{iJ})}{\partial N_{ij}} = \left(\sum_{j'=1}^{J} \gamma_j N_{ij'}^{\rho} \right)^{1/\rho - 1} \cdot \gamma_j \cdot N_j^{\rho - 1}$$

- Taking ratios:

$$\frac{w_{ij}}{w_{ij'}} = \frac{\gamma_j}{\gamma_{j'}} \cdot \left(\frac{N_{ij}}{N_{ij'}} \right)^{\rho - 1}$$

- Taking logs:

$$\log\left(\frac{w_j}{w_{j'}}\right) = \log\left(\frac{\gamma_j}{\gamma_{j'}}\right) + \beta_0 \cdot \log\left(\frac{N_j}{N_{j'}}\right),$$

where $\beta_0 = \rho - 1$.

Aside: Capital, labor, and the long run evolution of capitalism

- Aggregate production functions show up in many debates
- More general form with capital goods K, technology A:

$$Y = f(N_1, \dots, N_J, K_1, \dots, K_M, A)$$

- Wages and rates of return:

$$w_j = \frac{\partial f}{\partial N_j}$$

$$r_m = \frac{\partial f}{\partial K_m}$$

- Wealth (market value of capital), given interest rate r:

$$\sum_m \frac{r_m}{r} \cdot K_m$$

Long standing debates

- Does technical change lead to increased inequality?
- What's the distributional impact of international trade / globalization?
- Does the production function *determine* wages and profits, or leave room for power / collective action?
- What is the relationship between capital and wealth (capital times market prices)?
- Does an increase in K lead to a fall in profit rates?
  cf. Marxist discussions about capitalist crises, imperialism.
  Answer depends on elasticities of substitution, technical change.

References

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- Technical change:
  Autor, D. H., Katz, L. F., and Kearney, M. S. (2008). Trends in US wage inequality: Revising the revisionists. The Review of Economics and Statistics, *90(2):300–323.*