1 Introduction

- The income distribution at any one time is a simple snapshot.
- However, individuals’ position may change over time.
- We will explore three dimensions of mobility
  - Job turnover
  - Income mobility
  - Intergenerational mobility
- Look at the first two topics today.

2 Job Turnover

Stylized facts: Demographic and cyclical factors

- Probability of job change decreases with age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of New Employers during interval</th>
<th>Cumulative Number of Employers</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>30-39</td>
<td>2.1</td>
<td>5.2</td>
</tr>
<tr>
<td>40-49</td>
<td>1.4</td>
<td>6.6</td>
</tr>
<tr>
<td>50-59</td>
<td>0.9</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Table 1: Number of employers for whom an employee works from ages 20 to 60 (From Ehrenberg and Smith)

- Women are more likely to change jobs than men.
- Quits are low when the unemployment rate is high.

Fig 10.4 from Ehrenberg and Smith
2.1 The Job Match and Specific Training

The Job Match

- Workers and firms are not perfectly informed about each others’ characteristics.
- Hence they learn about each other after the employment starts.

**Definition.** *Job-match.* A particular pairing of a firm and a worker.

- Some matches are revealed to be good – these employments continue.
- Other matches are revealed to be not-so good – they are terminated.

**Insight.** Turnover can be efficient by generating better matches.

Specific Training

**Definition.** *Specific training.* Training that enhances productivity on in the firm where it is acquired.

Specific training $\Rightarrow$ worker’s productivity higher in current firm than in alternative employment $\Rightarrow$ Surplus shared by the worker and the firm.

**Implications:**

1. Worker’s productivity exceeds his wage
2. The wage exceeds the wage the worker could earn at other firms.

- Note that (1) implies that the firm has low incentives to lay off the worker
- Note that (2) implies that the worker has low incentives to quit

**Conclusion.** Firm-specific human capital reduces the probability of job-turnover.

- Suppose that specific human capital builds up gradually during the employment relationship.
- Then the probability of job-separation should depend negatively on tenure.
- It would also be consistent with many jobs terminating very early.

2.2 Turnover and Tenure

**Stylized facts:** Turnover and Tenure

1. Long-term employment relationships are common;
2. Most new jobs end early;
3. The probability of a job ending decreases with tenure;

- Table 1 from Farber (1999) shows the fraction of employed reporting more than 10 years of tenure with current employer.
Table 1 from Farber (1999)

- Figure 3 from Farber shows the probability that a new job is still active after $x$ months.

Figure 3 from Farber

- Fig 5 (panel C) from Farber shows the probability of job ending in the $x$th month of employment (conditional on the employment having lasted that long)

Fig 5 (panel C) from Farber

**Insight:** The specific human capital hypothesis can account for these stylized facts.

**Question:** Can this be taken as evidence for the existence of specific human capital?

- The problem is that it is nearly impossible to measure specific human capital.
- The above stylized facts do not necessarily imply the existence of specific human capital as we will show next.

**Heterogeneity**

**Insight:** The relationship between turnover and tenure may be driven by heterogeneity.

In fact I can re-use a previous example

- 100 workers start employments at time 0 and we follow them over time.
- Two types of workers in equal proportions
  - “Movers”: Leave job with probability with 1/2 in every period.
  - “Stayers”: Leave job with probability with 1/5 in every period.
- After one period
  \[ 50 \times \frac{1}{2} + 50 \times \frac{1}{5} = 35 \]
  workers will ended their jobs. Thus the turnover rate in the first period is 35 percent.
- In the second period, there are 65 workers left (25 “movers” and 40 “stayers”). Of them
  \[ 25 \times \frac{1}{2} + 40 \times \frac{1}{5} = 20.5 \]
  end their jobs in the second period. Hence the average turnover rate in the second period is \( \frac{20.5}{25+40} \) i.e. 31.5 percent.
- Thus the average job turnover rate decreases with tenure!!
- And yet, for no individual worker is there a negative relationship between tenure and turnover!!

**Conclusion:** Turnover decreasing with tenure in a cross-section of workers does not necessarily imply that the same is true for individual workers.
Testing the Specific Capital Model Using the Return to Tenure

Idea: If specific capital is built up during the employment ⇒ Surplus increases with tenure ⇒ Wage increases with tenure.

Approach: Include tenure in wage regression.

\[ \ln W = \alpha + \beta_1 Ed. + \beta_2 Exp. + \beta_3 \text{Tenure} \]

Typical finding: Some degree of “returns to tenure”, \( \beta_3 > 0 \) (see e.g. Altonji and Shakotko, 1987).

• There is a basic problem with this approach – tenure may be endogenous.
• This can be argued both from a job-search model and from an agency-model.

Problem 1: Suppose that some workers were lucky and got a high wages while some were unlucky and got low wages; if the unlucky workers are more inclined to quit (to find better employment elsewhere), observed wages will increase with tenure. Then:

High wage generates tenure (endogeneity)

Problem 2. Wage-tenure profile may be chosen by firm to encourage low turnover! (Similar to Lazear)

In this case:

Steep wage-tenure profile generates low turnover (endogeneity)

Conclusion: Observing “returns to tenure” is not conclusive evidence for the existence of specific human capital.

3 Earnings Mobility

• The income distribution at one point in time is a simple snapshot.
• Does not capture individual’s movements within the income distribution.

Question: Are people persistently low (alt. high) paid or are low earnings largely transitory?

Question: Does the degree of mobility differ by age, gender, race etc.?

• Why should we care?
  – Given a cross-sectional income distribution, lower earnings mobility implies greater inequality in terms of lifetime earnings.
  – It also matters for policy directly, e.g. for pensions that are linked to lifetime earnings.
• Let’s start by thinking about how to model earnings dynamics.
3.1 Transitory vs. Permanent Components

- Suppose that individual i’s earnings have

1. A *permanent* component $x_i$ (which does not vary over time).
2. A *transitory* component $u_{it}$ (which varies over time).

- Her earnings at time $t$ is

$$y_{it} = x_i + u_{it}$$

- $u_{it}$ is an (independent) random draw in each period (pure transitory earnings).

- Thus individuals differ in earnings partly due to the fact that they differ in permanent income (i.e. different $x_i$s), and partly due to transitory component.

**Question:** How much of the variance in earnings is due the permanent component and how much is due to transitory earnings fluctuations?

- The correlation between an individual’s in earnings from one period to the next, $r[y_{it}, y_{it+1}]$, turns out to be

$$r[y_{it}, y_{it+1}] = \frac{\sigma_x^2}{\sigma_x^2 + \sigma_u^2} \equiv \theta$$

where $\sigma_x^2$ is the variance in permanent income (across the population) and $\sigma_u^2$ is the variance in transitory earnings.

- Hence, by empirically estimating the correlation $r[y_{it}, y_{it+1}]$ in earnings from one period to the next, we calculate $\theta$, the *fraction of the variance in total earnings in the population* that is due to permanent income differences.

3.2 Regression Towards the Mean

- A different approach is to model earnings shocks as being partially persistent

- Suppose that

$$y_{it} = \beta y_{i,t-1} + \varepsilon_{it}$$

- Given that $\beta > 0$, shocks have a degree of persistency

- Useful to interpret $y_{it}$ as deviation from the population average wage $\overline{y}$; in this case

$$y_{it} - \overline{y} = \beta (y_{i,t-1} - \overline{y}) + \varepsilon_{it}$$

with $E[\varepsilon_{it}] = 0$ (i.e. the average value of the earnings-shock $\varepsilon_{it}$ is zero)

- Then

$$E[y_{it}] = \overline{y} + \beta (y_{i,t-1} - \overline{y})$$

thus, given that $\beta < 1$, earnings regress towards the mean.
3.3 Transition Approach

**Alternative**: Look at transition among *discrete ranges* on incomes.

- Two justifications for using this discrete approach
  1. Focus on particular groups: e.g. “low-paid” vs. “not low-paid”.
  2. Flexibility: e.g. does not impose regression towards the mean.

**Example**: Low-paid vs. not-low paid.

- Determine a bound \( y \) and denote anyone with earnings \( y_{it} < y \) as “low-paid” (denote by index 0)
- Let \( p_{00} \) be the probability of being low-paid at time \( t + 1 \) conditional on being low-paid at time \( t \).
- Let \( p_{01} \) be the probability of not being low-paid at time \( t + 1 \) conditional on being low-paid at time \( t \), etc.
- Collecting all the probabilities in a matrix we have
  \[
  P = \begin{bmatrix}
    p_{00} & p_{01} \\
    p_{10} & p_{11}
  \end{bmatrix}
  \]
- The row indicates “initial state” and column indicates “terminal state”.
- Note that it must be that \( p_{00} + p_{01} = 1 \) and \( p_{10} + p_{11} = 1 \).
- If there is no mobility, then \( p_{00} = p_{11} = 1 \).

3.4 Measuring Mobility

- We then have three ways of quantifying mobility.
  1. Calculate the correlation in earning \( r[y_{it}, y_{it-1}] \); the gives us the fraction of the variance in earning which is permanent.
  2. Regress \( y_{it} \) on \( y_{it-1} \) in order to estimate \( \beta \) – the degree of regression to the mean.
  3. Estimate the transition matrix \( P \).

3.5 Empirical Findings

- Estimates by Jarvis and Jenkins (1998)
- Data: BHPS 1991-1994 (four years)
- Look at disposable income (see next seminar for details).

- Compute
  1. Income correlations \( r[y_{it}, y_{it-1}] \)
  2. Regress \( \ln y_{it} \) on \( \ln y_{it-1} \) to estimate \( \beta \)
  3. Compute transition for deciles.
Results

Table 1 From Jarvis and Jenkins

- The income correlation falls in the range of 60 - 70 percent

Implication: About 2/3 of total earnings variable can be considered as permanent.

- The regression estimates of $\beta$ are around 0.7.

Implication. Take two individuals $A$ and $B$ and suppose that $A$’s earnings are 10 percent higher than $B$’s earnings in year $t$; then, in year $t + 1$, $A$’s earnings are on average 7 percent higher than $B$’s.

- When doing transition matrix analysis, they look at average earnings 1991-92 and compare with average earnings 1993-94, and look at transitions between decile groups.

  - Finding: Large numbers on the diagonal (staying in the same decile) and one cell above or below (moving one decile)

Table 2 From Jarvis and Jenkins

Implication. There is substantial movement, but most mobility is short-distance.

References


