Chapter 9
Investments in Human Capital: Education and Training.

Questions to be addressed:

1. What are the costs and benefits of obtaining a college degree?
2. What factors will affect the number of people attending college?
3. Why are earnings profiles “concave”?
4. Why do women receive less training than men and why has the gap shrunk over time?
5. Why do men and women pursue different types of college degrees?

MODEL OF COLLEGE ATTENDANCE.

If PV(Benefits) > PV(costs) ==> attend college.

Benefits:
- increase in earnings
- utility from different type of work.

Costs
- direct costs (tuition, books, etc.)
- foregone earnings

Factors influencing decision to attend college:
- wage premium for college graduates
- direct costs of attending college (tuition, availability of scholarships/financial aid, etc.)
- foregone earnings (the state of the economy will affect college attendance)
- Individual preferences/abilities: discount rates, ability, preferences regarding types of work.
- Age: PV(benefits) is higher when young since there are more years to receive benefit of earnings premium.
- Expected period of time in labor force:
  - PV(benefits) is lower if take more years out of labor force or stay in labor force for shorter period of time.
  - Women, childbearing, and career interruptions.

What factors determine which degree a person pursues?
- Preferences, ability.
- Expected period of time in labor force.
  - if expect to be out of labor force for significant periods of time, choose jobs where transitions are “less costly” -- low depreciation rates, general skills.
  - could explain different choices of men and women in choosing college majors.
ESTIMATING THE RETURN TO EDUCATION.

(Internal) rate of return: discount rate that equates PV(benefits) and PV(costs).

\[ \text{NPV} = \text{PV(Benefits)} - \text{PV(costs)} \]

- why does NPV curve slope down?
- if a person’s discount rate is less than the internal rate of return, would college be a “good” or “bad” investment?

Estimated **real** rates of return on college range from 5-12 percent.

Problems with estimating rates of return on college education.
- upward bias: higher ability may be more likely to go to college.
- downward bias:
  - most studies don’t include benefits other than earnings differentials (on or off the job).
  - most studies include value of benefits which tend to rise with education.
- selectivity bias:
  - For a given level of ability, the people that choose to go to college will be the ones that have a higher expected rate of return.
  - Tends to bias estimated rates of return upwards.

The human capital vs. signaling model of returns to education.
- human capital: education improves the productivity of workers.
- signaling: education doesn’t improve productivity; it signals to employers whether workers are capable of learning skills in the future.
Chart 4-3 College Completion Rates of 25- to 29-Year-Olds by Race and Ethnicity
Many more Americans finish college today than in 1940, but completion rates for African Americans and Hispanics remain well below that for whites.

Note: Annual data by race are available only since 1964; dots indicate previous years with available data. Before 1992, college graduates are defined as having completed 4 years or more of college. Since 1992, college graduates are those who have received a college degree.
Source: Department of Commerce (Bureau of the Census).
Chart 4-4 Median Weekly Earnings of Male Workers by Educational Attainment

Real earnings of non-college graduates remain lower today than in 1979, but wages for college graduates and non-college graduates have risen in recent years.

Note: Earnings are in 1998 CPI-U-RS adjusted dollars. Data are for men aged 25 and over working full-time. Before 1982, high school dropouts are defined as having completed less than 4 years of high school, high school graduates as having completed 4 years of high school but no college, and college graduates as having completed 4 years or more of college. Since 1992, data on educational attainment are based on the highest diploma or degree received, rather than the number of years of school completed.

Source: Department of Labor (Bureau of Labor Statistics).
Why have returns to education increased?

- institutions (minimum wage, unions)
- increases in international trade
- skill biased technological change (transition to service, growth of computing)
- NOT changes in relative supplies of college and high school graduates
Why do women and men choose different occupations?

- employer discrimination
- employee tastes
- penalties for interruptions (depreciation of skills, firm specific training)
- socialization in youth

### Table 4-1. Share of Women Employed in Selected Occupations in 1950 and 1999 [Percent]

<table>
<thead>
<tr>
<th>Occupation</th>
<th>1950</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architects</td>
<td>4.0</td>
<td>15.7</td>
</tr>
<tr>
<td>Biological and life scientists</td>
<td>29.2</td>
<td>43.3</td>
</tr>
<tr>
<td>Chemists, except biochemists</td>
<td>10.0</td>
<td>27.4</td>
</tr>
<tr>
<td>Clergy</td>
<td>4.1</td>
<td>14.2</td>
</tr>
<tr>
<td>Dentists</td>
<td>2.7</td>
<td>16.5</td>
</tr>
<tr>
<td>Dietitians</td>
<td>94.3</td>
<td>84.0</td>
</tr>
<tr>
<td>Economists</td>
<td>18.4</td>
<td>51.2</td>
</tr>
<tr>
<td>Editors and reporters</td>
<td>37.6</td>
<td>49.3</td>
</tr>
<tr>
<td>Engineers</td>
<td>1.2</td>
<td>10.5</td>
</tr>
<tr>
<td>Lawyers</td>
<td>3.5</td>
<td>28.8</td>
</tr>
<tr>
<td>Librarians</td>
<td>88.6</td>
<td>83.7</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>8.3</td>
<td>49.9</td>
</tr>
<tr>
<td>Physicians</td>
<td>6.1</td>
<td>24.5</td>
</tr>
<tr>
<td>Psychologists</td>
<td>43.8</td>
<td>64.9</td>
</tr>
<tr>
<td>Public relations specialists</td>
<td>10.5</td>
<td>61.9</td>
</tr>
<tr>
<td>Registered nurses</td>
<td>97.6</td>
<td>92.9</td>
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<tr>
<td>Social workers</td>
<td>69.2</td>
<td>71.4</td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>90.9</td>
<td>83.3</td>
</tr>
<tr>
<td>Secondary school</td>
<td>56.7</td>
<td>57.5</td>
</tr>
</tbody>
</table>

Sources: Department of Commerce (Bureau of the Census) and Department of Labor (Bureau of Labor Statistics).