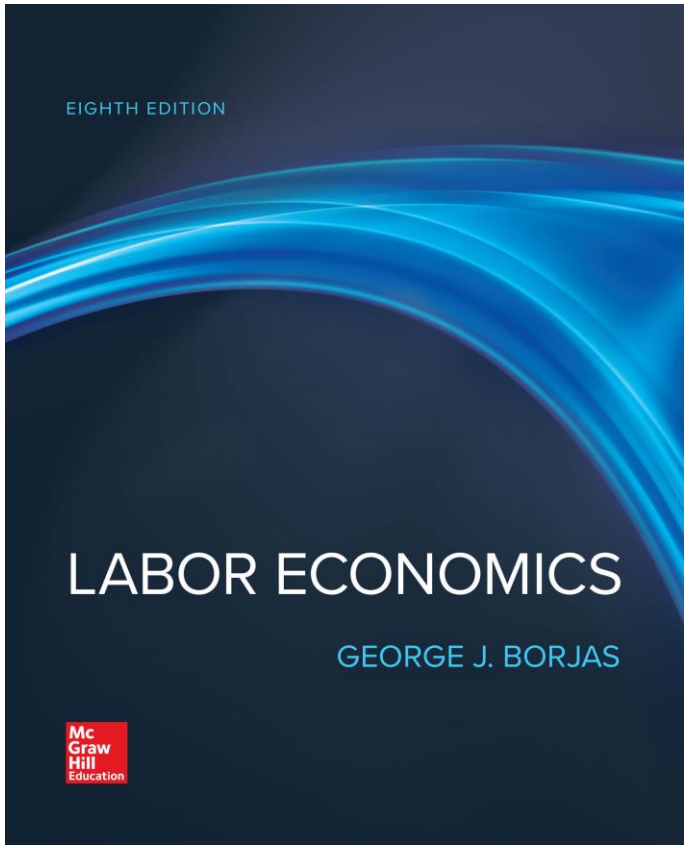
Chapter 6

Human Capital



“If you think education’s expensive, try ignorance.”
-Derek Bok

Introduction

People bring into the labor market a unique set of abilities and acquired skills known as human capital.

Workers add to their stock of human capital throughout their lives, especially via job experience and education.

Education: Stylized Facts

Education is strongly correlated with:

- Labor force participation rates
- Unemployment rates
- Earnings

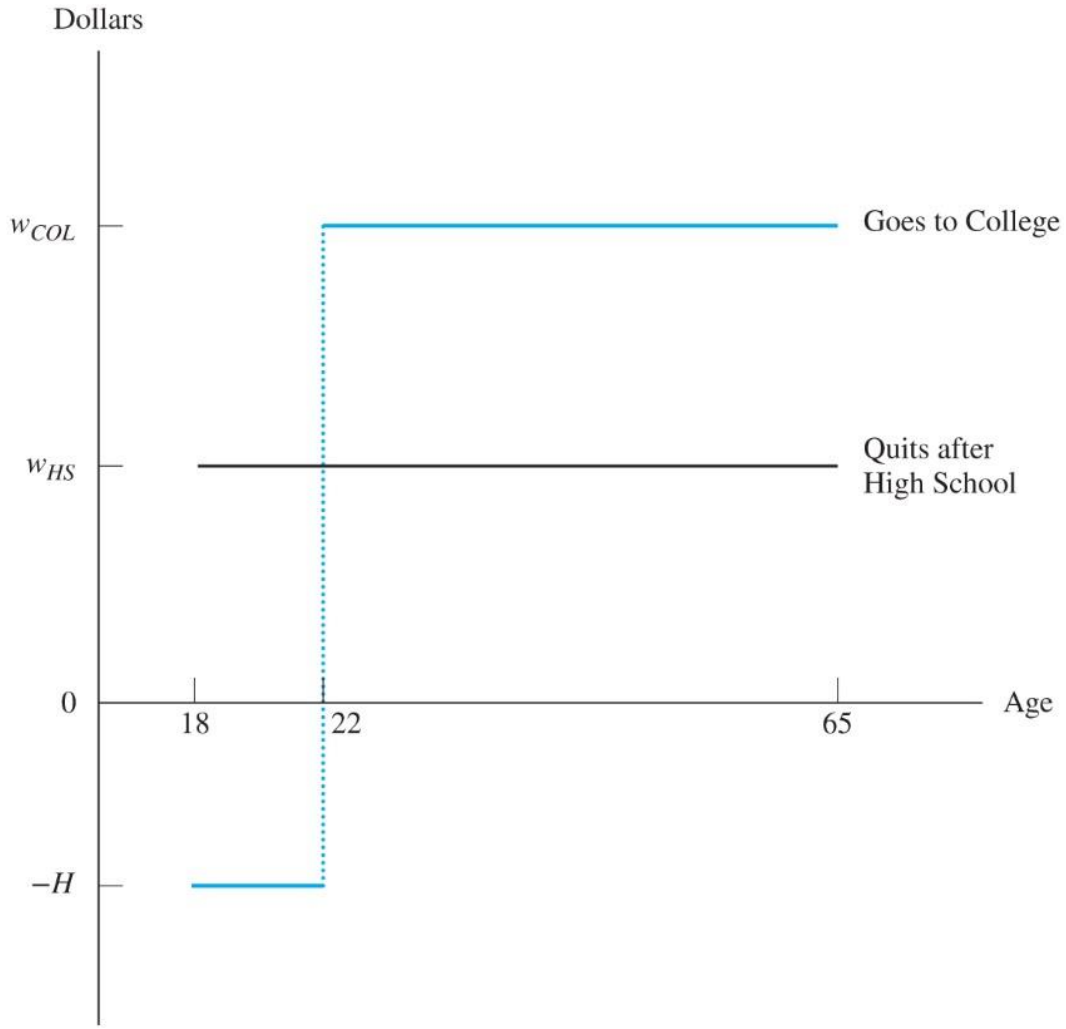
Present Value Calculations

Present value allows comparison of dollar amounts spent and received in different time periods. (An idea from finance.)

Present Value = PV = $y/(1+r)^t$

- r is the per-period discount rate.
- y is the future value.
- t is the number of time periods.

Potential Earnings Streams Faced by a High School Graduate



A person who quits school after getting her high school diploma can earn w_{HS} from age 18 until retirement. If she decides to go to college, she foregoes these earnings and incurs a cost of H dollars for 4 years and then earns w_{COL} until retirement.

The Schooling Model

Real earnings (earnings adjusted for inflation).

Age-earnings profile: the wage profile over a worker's lifespan.

The higher the discount rate, the less likely someone will invest in education (since they are less future oriented).

The discount rate depends on:

- the market rate of interest.
- time preferences: how a person feels about giving up today's consumption in return for future rewards.

The Wage-Schooling Locus

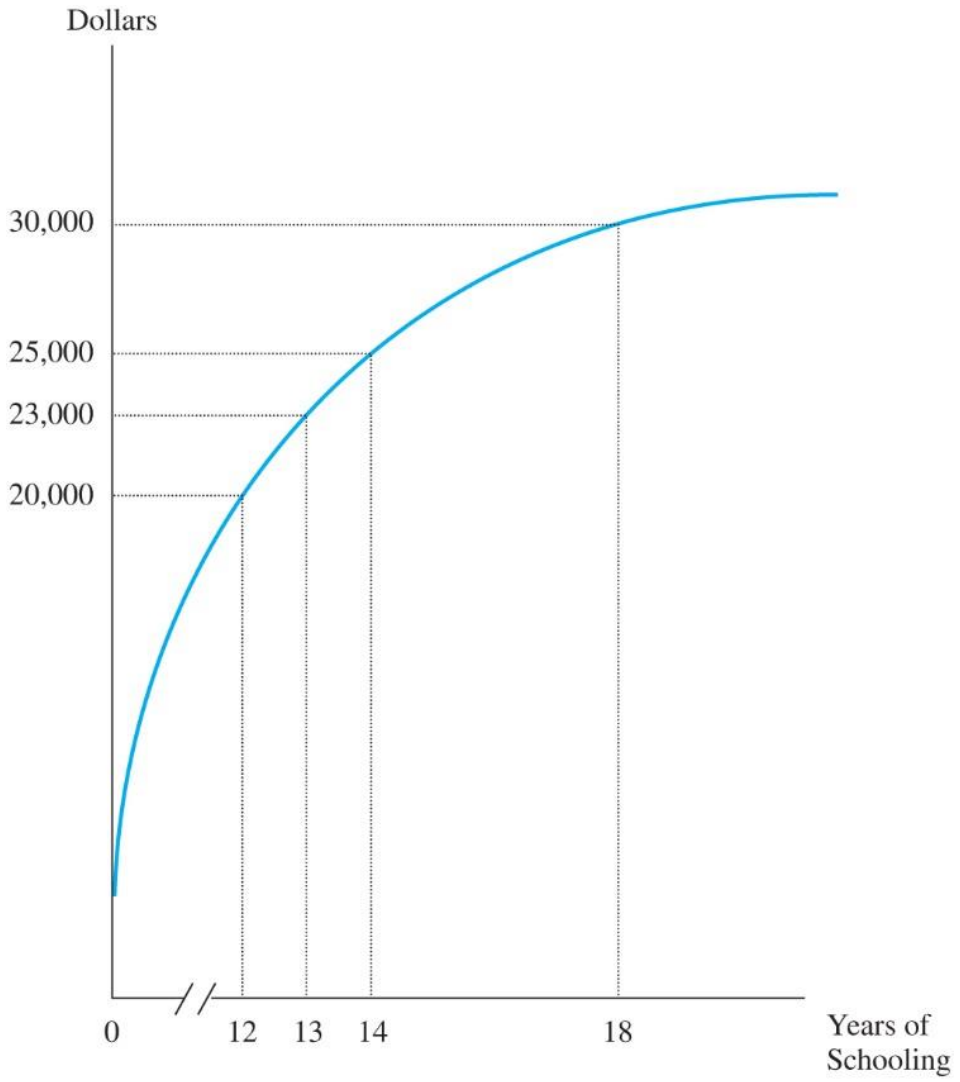
The salaries firms are willing to pay workers depend on the level of schooling.

Properties of the wage-schooling locus.

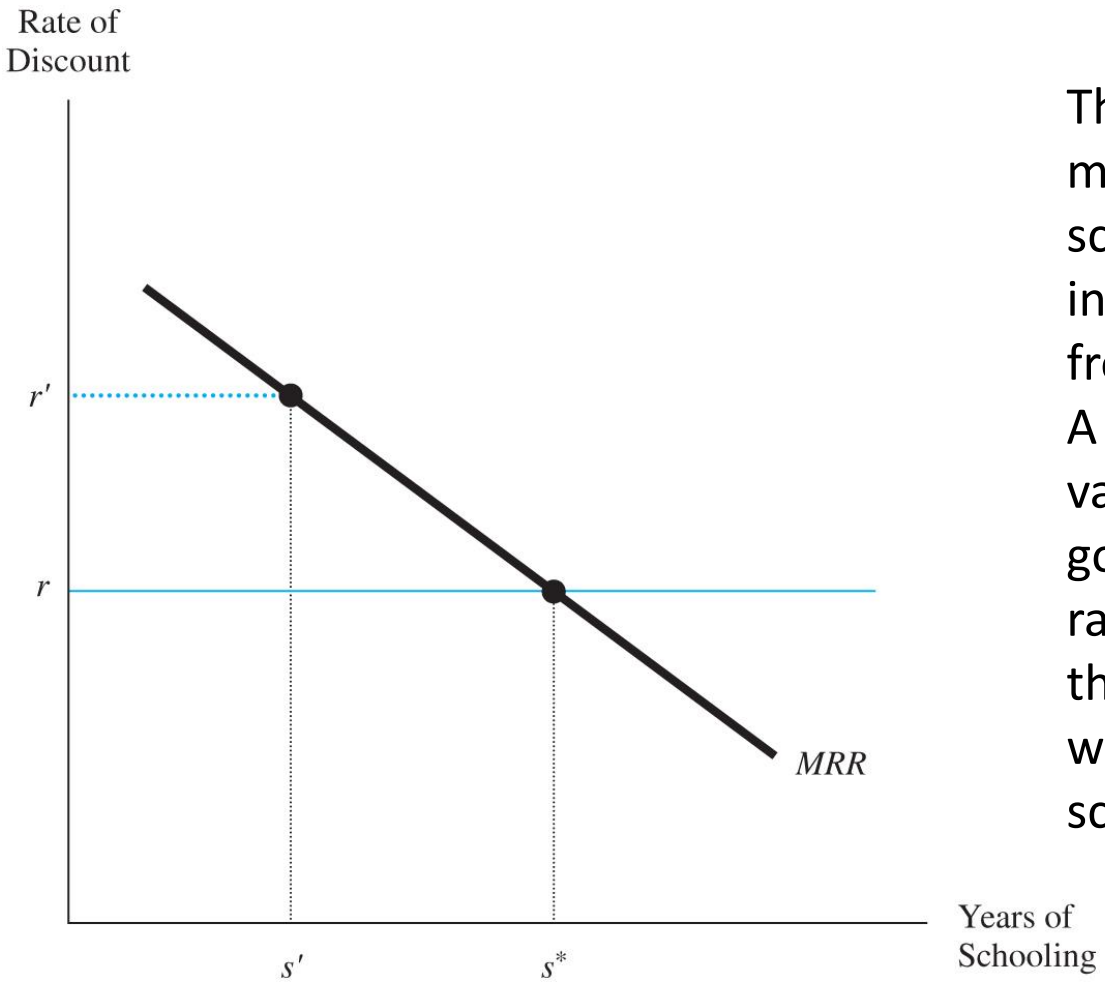
- The wage-schooling locus is upward sloping.
- The slope of the wage-schooling locus indicates the increase in earnings associated with an additional year of education.
- The wage-schooling locus is concave, reflecting diminishing returns to schooling.

The Wage-Schooling Locus

The wage-schooling locus gives the salary that a particular worker would earn if he completed a particular level of schooling. If the worker graduates from high school, he earns $20,000 annually. If he goes to college for 1 year, he earns $23,000. And so on.

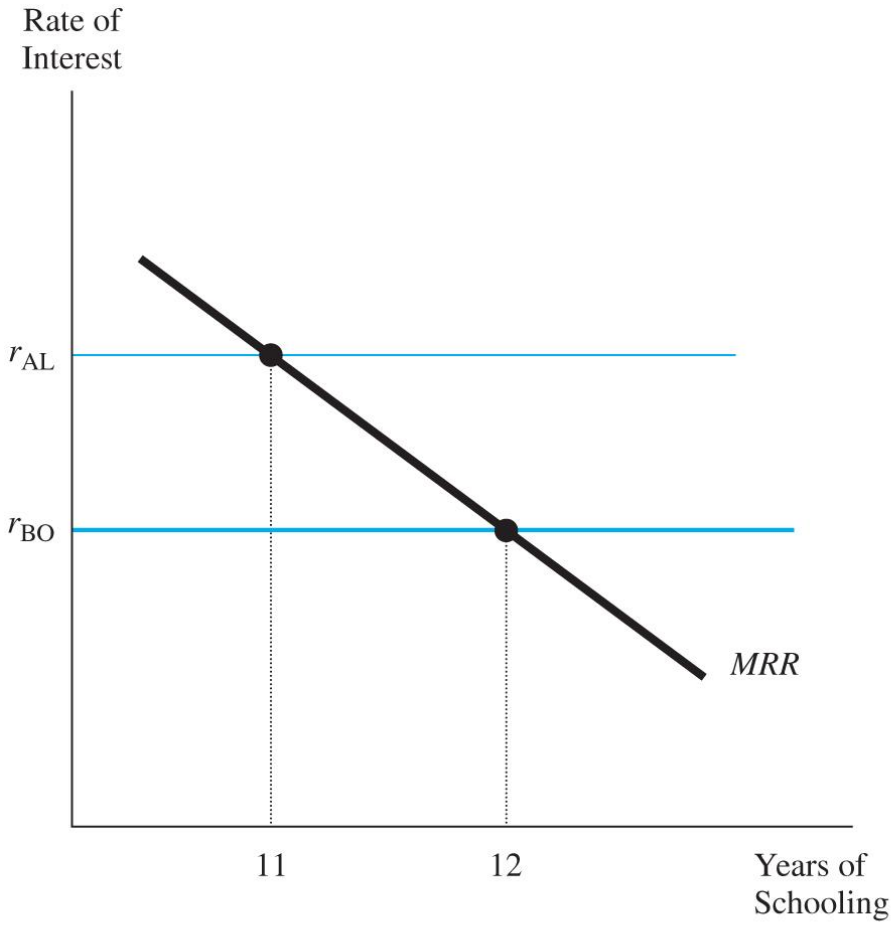


The Schooling Decision

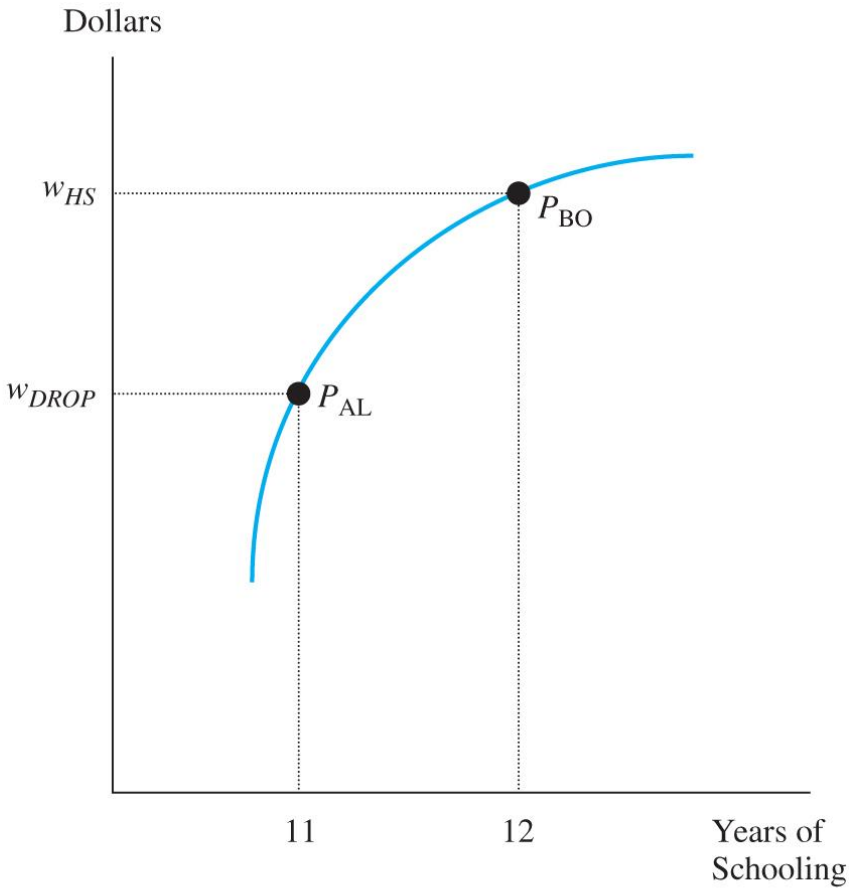


The *MRR* schedule gives the marginal rate of return to schooling, or the percentage increase in earnings resulting from an additional year of school. A worker maximizes the present value of lifetime earnings by going to school until the marginal rate of return to schooling equals the rate of discount. A worker with discount rate *r* goes to school for *s** years.

Schooling and Earnings When Workers Have Different Rates of Discount

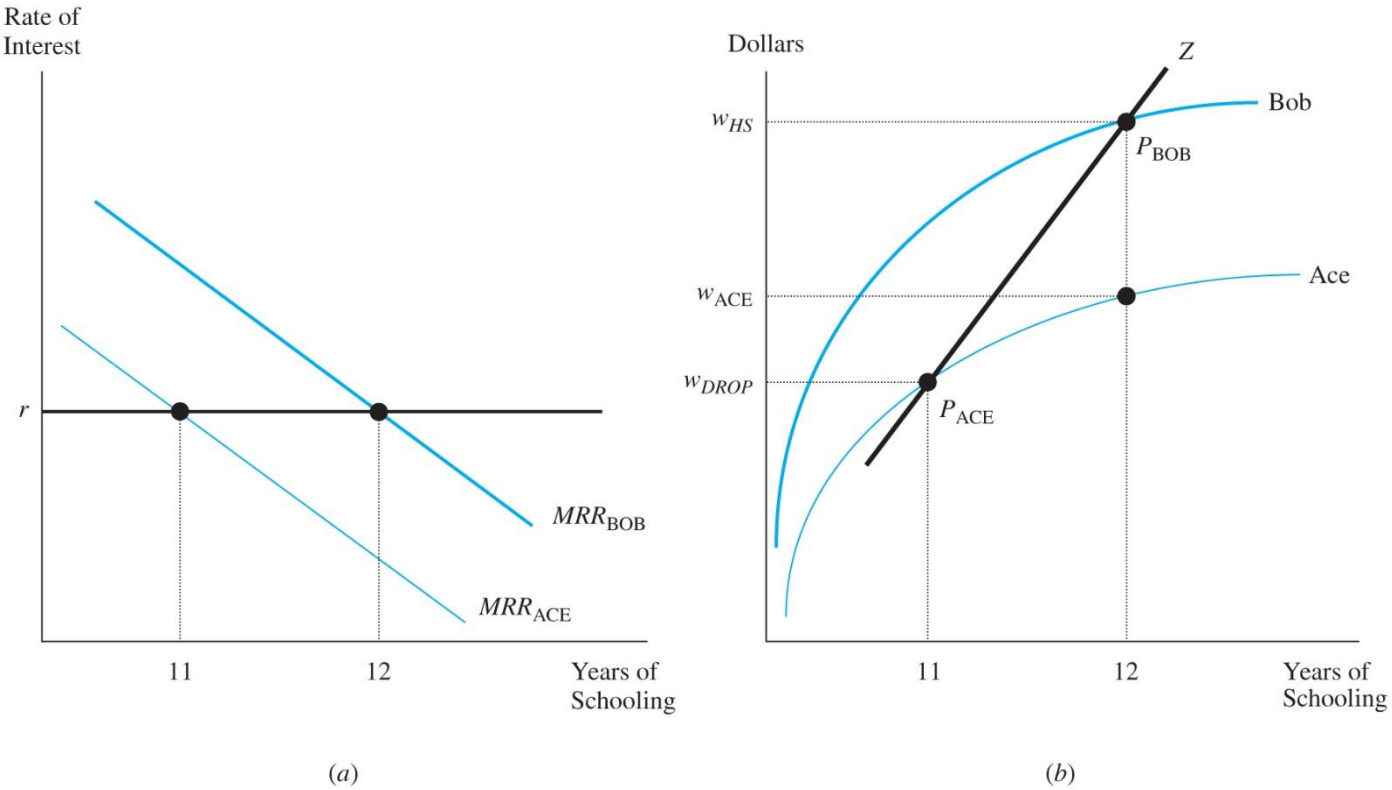


(a)



(b)

Schooling and Earnings When Workers Have Different Abilities



Ace and Bob have the same discount rate (r) but each worker faces a different wage-schooling locus. Ace drops out of high school and Bob gets a high school diploma. The wage differential between Bob and Ace (w_{HS} - w_{DROP}) arises both because Bob goes to school for one more year and because Bob is more able. As a result, this wage differential does not tells us by how much Ace's earnings would increase if he were to complete high school (w_{ACE} - w_{DROP}).

Education and the Wage Gap

Observed data on earnings and schooling does not allow us to estimate returns to schooling, because more able persons tend to get more education.

Ability bias: The extent to which unobserved ability differences exist affects estimates on returns to schooling, since the ability difference may be the true source of the wage differential.

Estimating the Rate of Return to Schooling

A typical empirical study estimates a regression of the form:

$$\text{Log}(w_i) = a + b \cdot s_i + \text{other variables}$$

- w is the wage rate
- s is the years of schooling
- b is the coefficient that estimates the rate of return to an additional year of schooling
- a is the constant

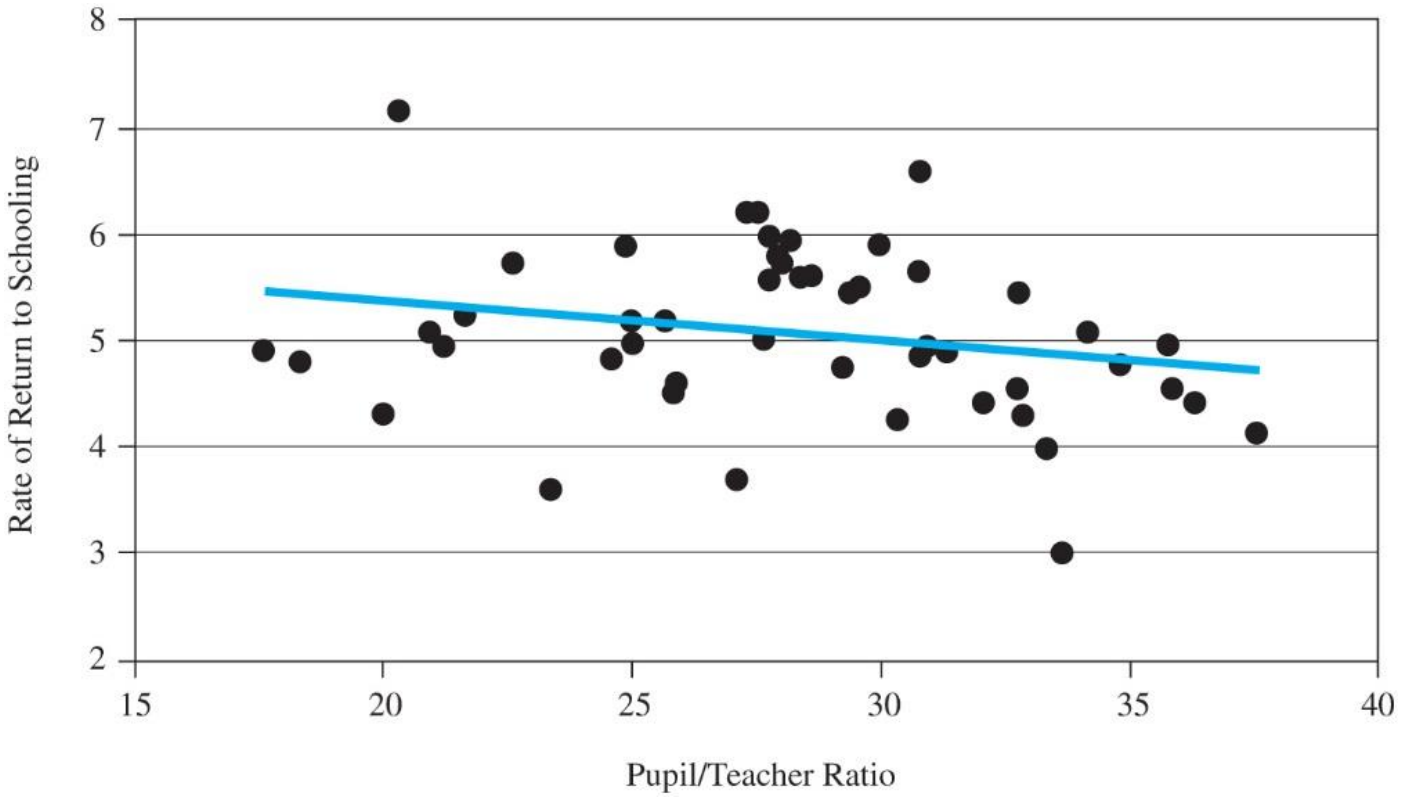
Evidence

In studies of twins, presumably holding ability constant, valid estimates of rate of return to schooling can be estimated.

- Estimates range from 3% to 15% annual return to a year of education.

Generally, the rate of return to schooling is higher for workers who were born in states with well-funded education systems.

School Quality and the Rate of Return to Schooling



Source: David Card and Alan B. Krueger, "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States," *Journal of Political Economy* 100 (February 1992), Table 1. The data in the graph refer to the rate of return to school and the school quality variable for the cohort of persons born in 1920-1929.

Do Workers Maximize Lifetime Earnings?

The schooling model assumes that workers select their level of education to maximize the present value of lifetime earnings.

To test this hypothesis directly, we must observe the age-earnings profile at two points in time.

- Unfortunately, once a choice is made, we cannot observe the earnings associated with the non-choice.
- Thus, using the observed wage differential to determine if the worker selected the "right" earnings stream yields meaningless results.

Schooling as a Signal

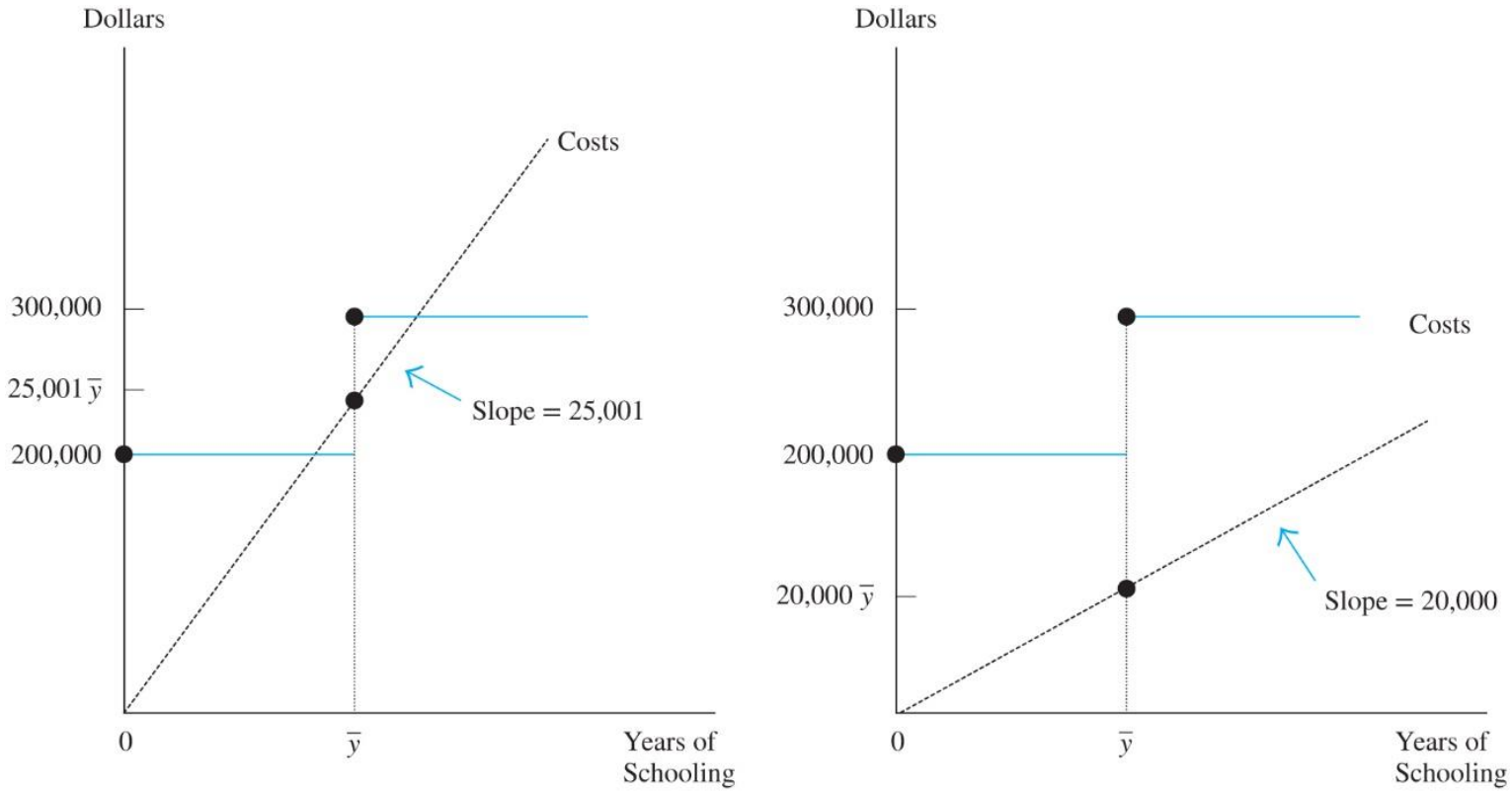
Education reveals a level of attainment which signals a worker's qualifications or innate ability to potential employers.

Information that is used to allocate workers in the labor market is called a signal.

There could be a "separating equilibrium."

- Low-productivity workers choose not to obtain X years of education, voluntarily signaling their low productivity.
- High-productivity workers choose to get at least X years of schooling and separate themselves from the pack.

Education as a Signal



(*a*) Low-Productivity Workers

(*b*) High-Productivity Workers

Workers get paid $200,000 if they get less than $\bar{y}$ years of college, and $300,000 if they get at least $\bar{y}$ years. Low-productivity workers find it expensive to invest in college, and will not get $\bar{y}$ years. High-productivity workers do obtain $\bar{y}$ years. As a result, the worker's education signals if he is a low-productivity or a high-productivity worker.

Implications of Schooling as a Signal

For schooling to act as a signal, schooling must be more "costly" for low-ability workers compared to high-ability workers.

Social return to schooling (percentage increase in national income) is likely to be positive even if a particular worker's human capital is not increased.

Although education may incorporate a signaling aspect, it is well-accepted that education is more than a signal. Education is at least partially an investment in human capital.