Human Capital

EC 350: Labor Economics

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Winter 2022

Human Capital

What is it?

Human capital is set of **acquired skills and experiences** that a worker brings into the labor market.

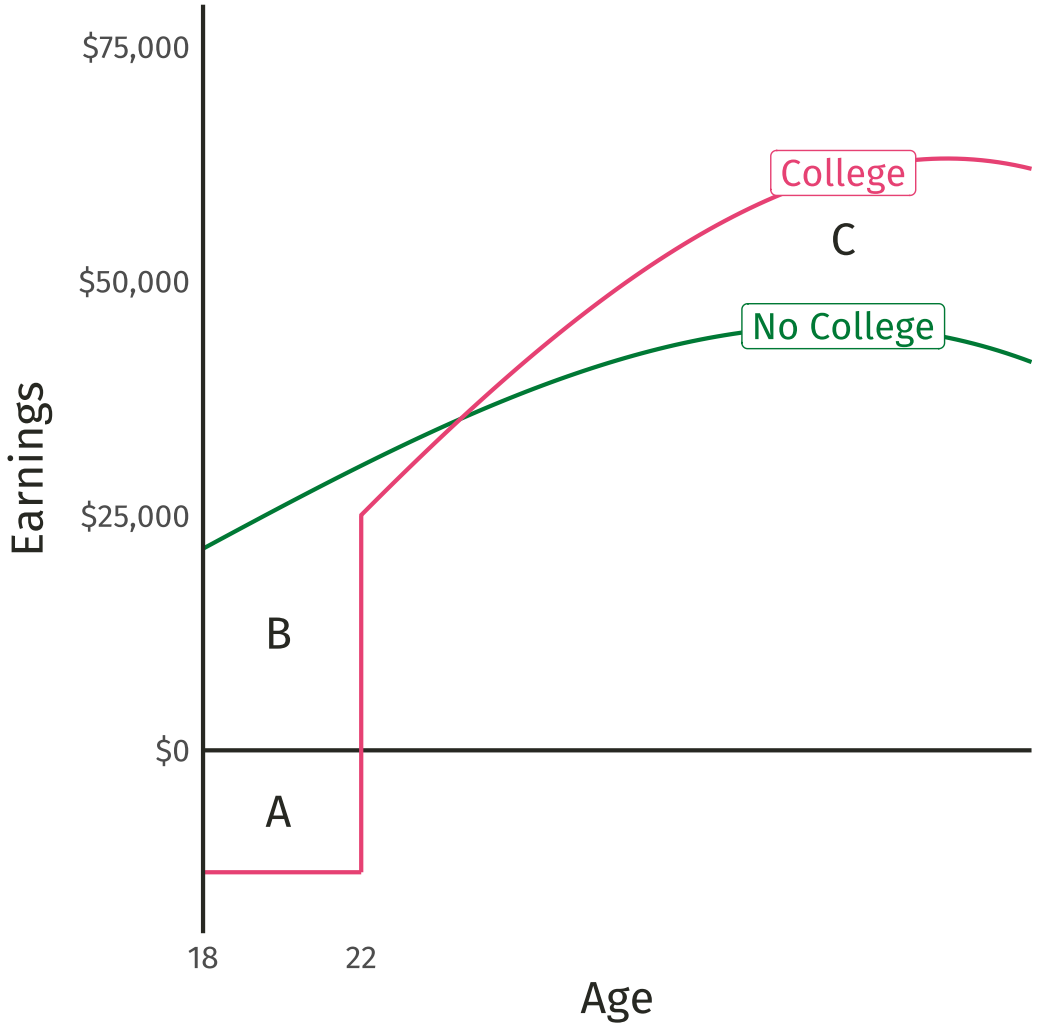
- **Increases productivity** beyond a worker's innate abilities
- Includes basic literacy and numeracy as well as more-advanced skills
- Non-transferable
- Varies in specificity (*e.g.*, knowing how to code *vs.* knowing how to code in an obscure language)

Why does it matter?

Human capital is an important source of **economic growth** and **inequality**.

- Increasing human capital can improve living standards!
- Differences in human capital accumulation generate differences in earnings across workers.

"Typical" age-earnings profiles



Earnings increase with experience and eventually decrease with age.

- **Q:** How does going to college alter this relationship?

Q: What do areas A, B, and C represent?

- Area A represents the **explicit cost** of college (tuition, books, *etc.*).
- Area B represents the **opportunity cost** of college (forgone earnings).
- Area C represents the monetary **returns to education**.

The benefits of education

College is costly!

- Tuition, books, room and board, forgone earnings, stress, *etc.*

Q: Why did *you* **choose to incur the costs** of going to college?

- To live the life of the mind?
- To increase your earnings potential?
- To expand your social network?
- To accrue social prestige?
- To set yourself apart?
- To party?
- To find love?

While education may have consumption value, we will consider schooling decisions **as investments.**

Education as investment

Q: When is it "worth it" to go to college?

- **Benefits?** Going to college causes us to **earn more later in life**.
- **Costs?** Going to college forces us to **forgo earnings now** (and pay tuition, *etc.*).

Evaluating this tradeoff requires us to compare dollar amounts spent and received in different time periods.

- To do this, we will use the idea of **present value**, which tells us how much an amount of money received in the future is **worth today**.

Education as investment

Present value

$$\text{PV} = \frac{y}{(1+r)^t}$$

- y is the dollar amount received t periods in the future.
- r is the discount/interest rate.

The idea? Getting 100 dollars today is worth more today than getting 100 dollars next year.

- If you got 100 dollars today, you could invest it and end up with $100 \times (1+r)$ one year from now!

Education as investment

Present value

$$\text{PV} = \frac{y}{(1+r)^t}$$

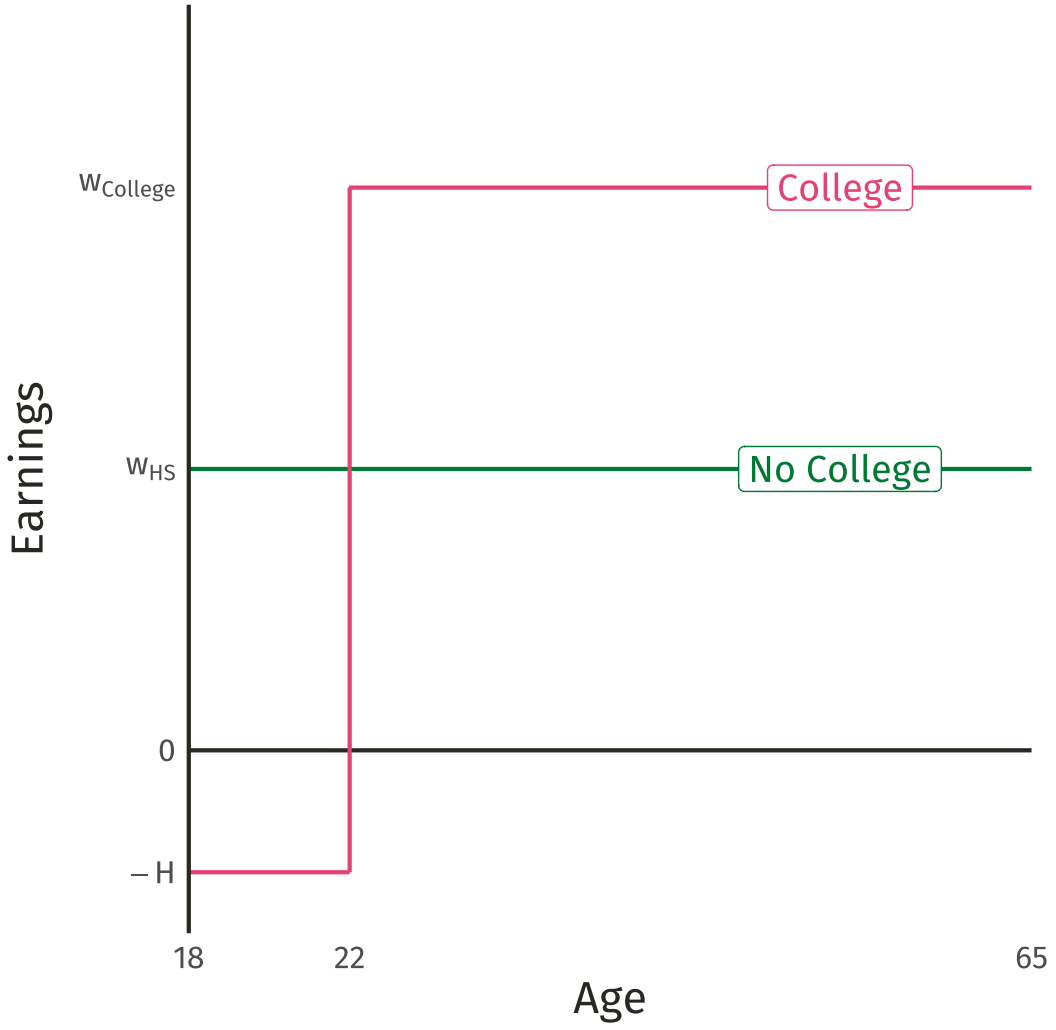
- y is the dollar amount received t periods in the future.
- r is the discount/interest rate.

Q: If the interest rate is 10 percent, what is the present value of receiving 1,000 dollars two years from now?

A: 826 dollars and 45 cents.

$$\text{PV} = \frac{y}{(1+r)^t} = \frac{1000}{(1+0.1)^2} = \frac{1000}{1.1^2} = \frac{1000}{1.21} = 826.45$$

Education as investment



Q: When is it "worth it" to go to college?

A: Assuming that your objective is to maximize the present value of your **lifetime earnings**, college is worthwhile when $\text{PV}_{\text{College}} > \text{PV}_{\text{HS}}$.

$$\text{PV}_{\text{HS}} = w_{\text{HS}} + \frac{w_{\text{HS}}}{(1+r)} + \frac{w_{\text{HS}}}{(1+r)^2} + \cdots + \frac{w_{\text{HS}}}{(1+r)^{46}}$$

$$\begin{aligned}\text{PV}_{\text{College}} =& -H - \frac{H}{(1+r)} - \frac{H}{(1+r)^2} - \frac{H}{(1+r)^3} \\ &+ \frac{w_{\text{College}}}{(1+r)^4} + \frac{w_{\text{College}}}{(1+r)^5} + \cdots + \frac{w_{\text{College}}}{(1+r)^{46}}\end{aligned}$$

Example: You are deciding whether to go back to school.

- You just turned 60, and it would take you 2 years to finish a master's program, which would cost you 10,000 dollars per year.
- You currently earn 80,000 dollars per year. With a master's degree, you could earn 83,000.
- Regardless of your decision, you are going to retire at 65.

Q: If your discount rate is 5 percent, will you choose to go back to school?

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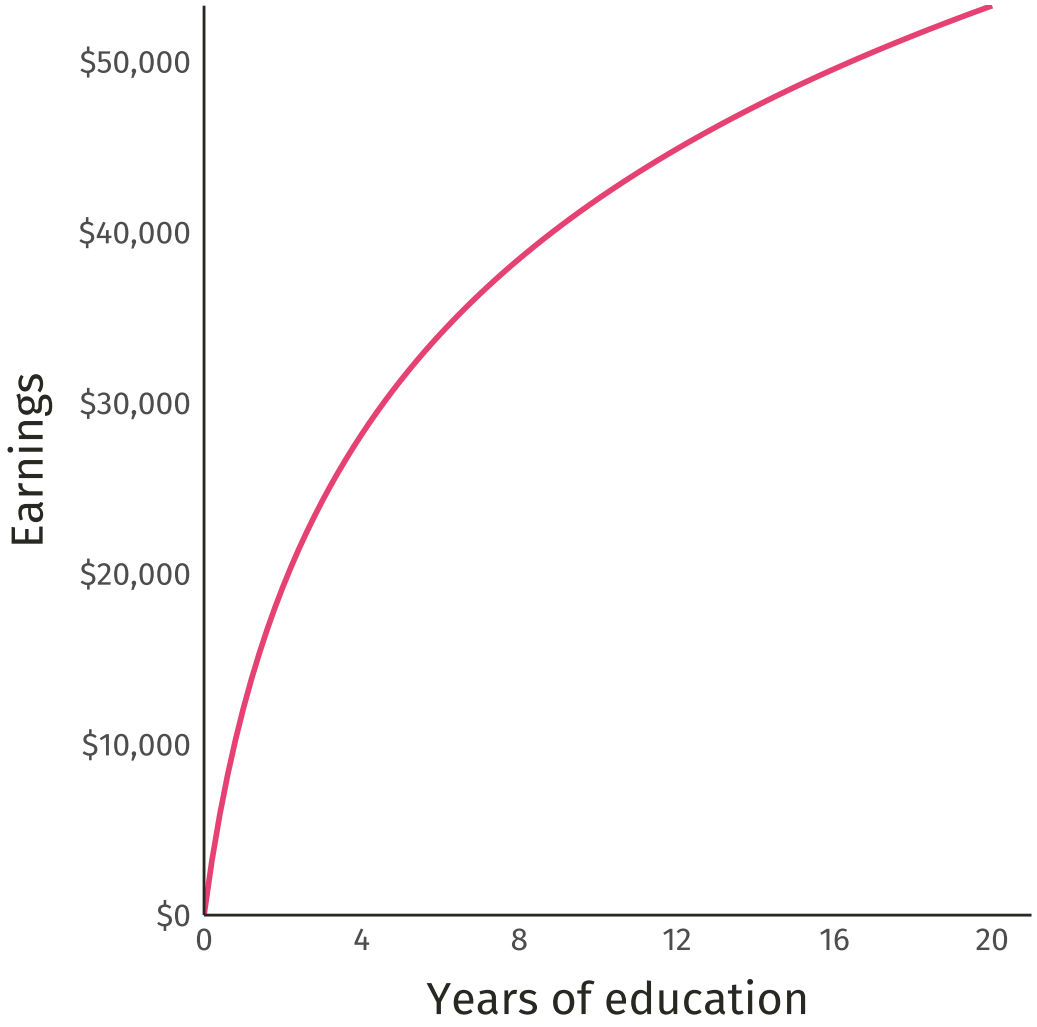
Q: How would the following change your odds of going back to school?

- Your discount rate increases?
- Your post-master's earnings increase?
- Tuition increases?
- You plan to postpone your retirement?

Returns to education

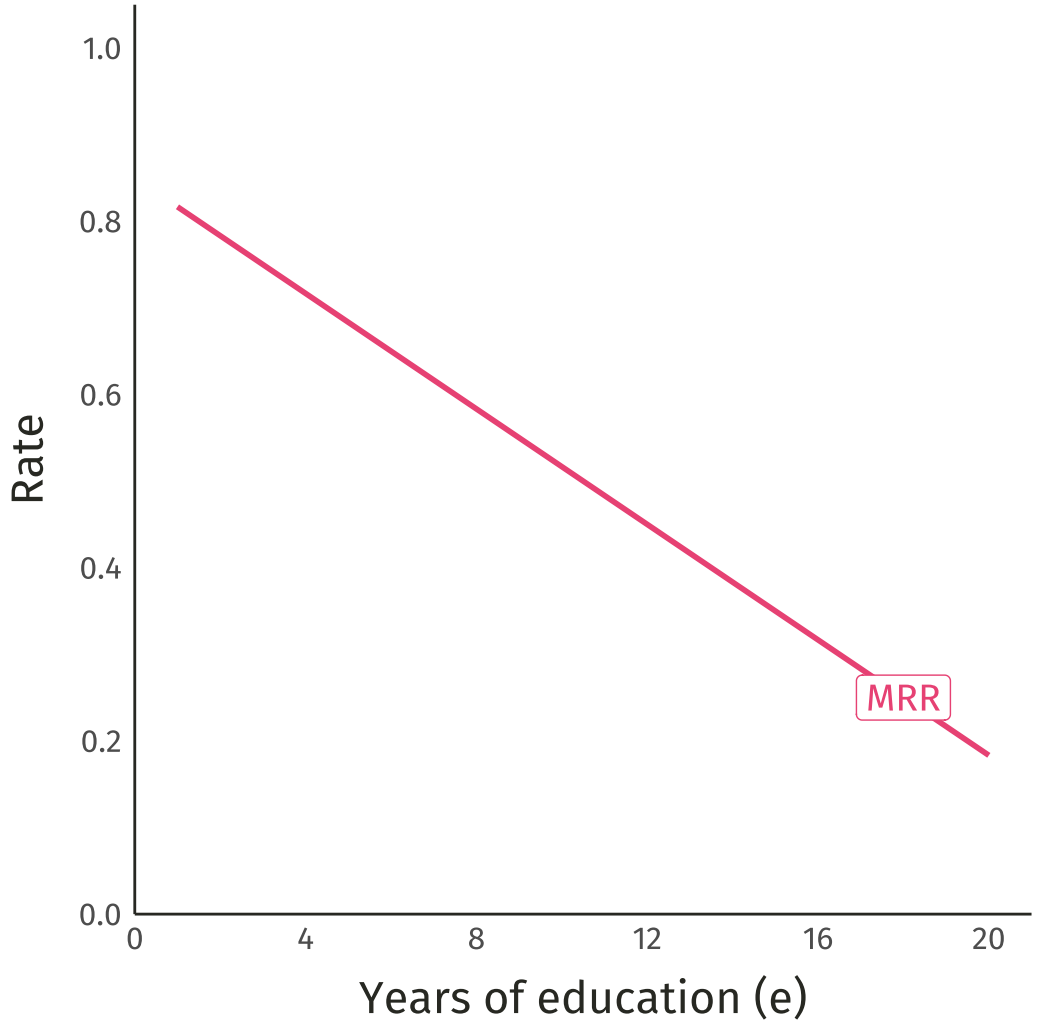


Wage-schooling locus

> The amount of money that employers are willing to pay *a particular worker* at every level of schooling.

1. Upward sloping ⟶ more school, more money.
2. Slope at a given point ⟶ marginal return of an additional year of schooling.
3. Concave ⟶ diminishing returns to schooling.

Returns to education



Marginal rate of return

> The percentage increase in earnings from an additional year of schooling:

$$\text{MRR} = \frac{\%\Delta w}{\Delta e}$$

Schooling decisions

The stopping rule

Q: How does a worker choose the optimal[†] amount of schooling?

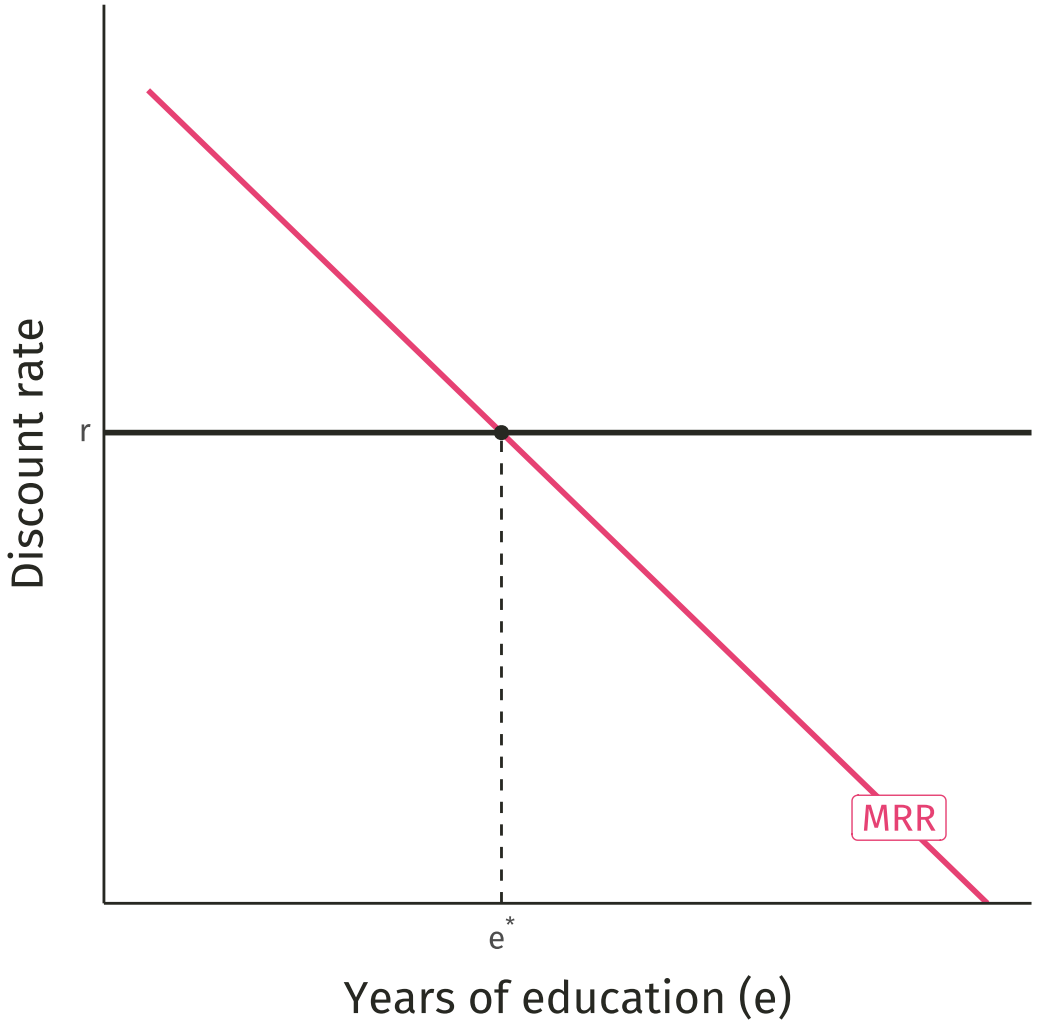
A: A worker chooses the optimal amount of schooling e^* where the marginal rate of return equals the discount rate:

$$\text{MRR} = r$$

- If $\text{MRR} > r$, then schooling education would increase the present value of lifetime earnings.
- If $\text{MRR} < r$, then the worker has "gone too far"—she could had a higher present value of lifetime earnings if she had completed less schooling.

[†] "Optimal" in the sense of maximizing the present value of lifetime earnings.

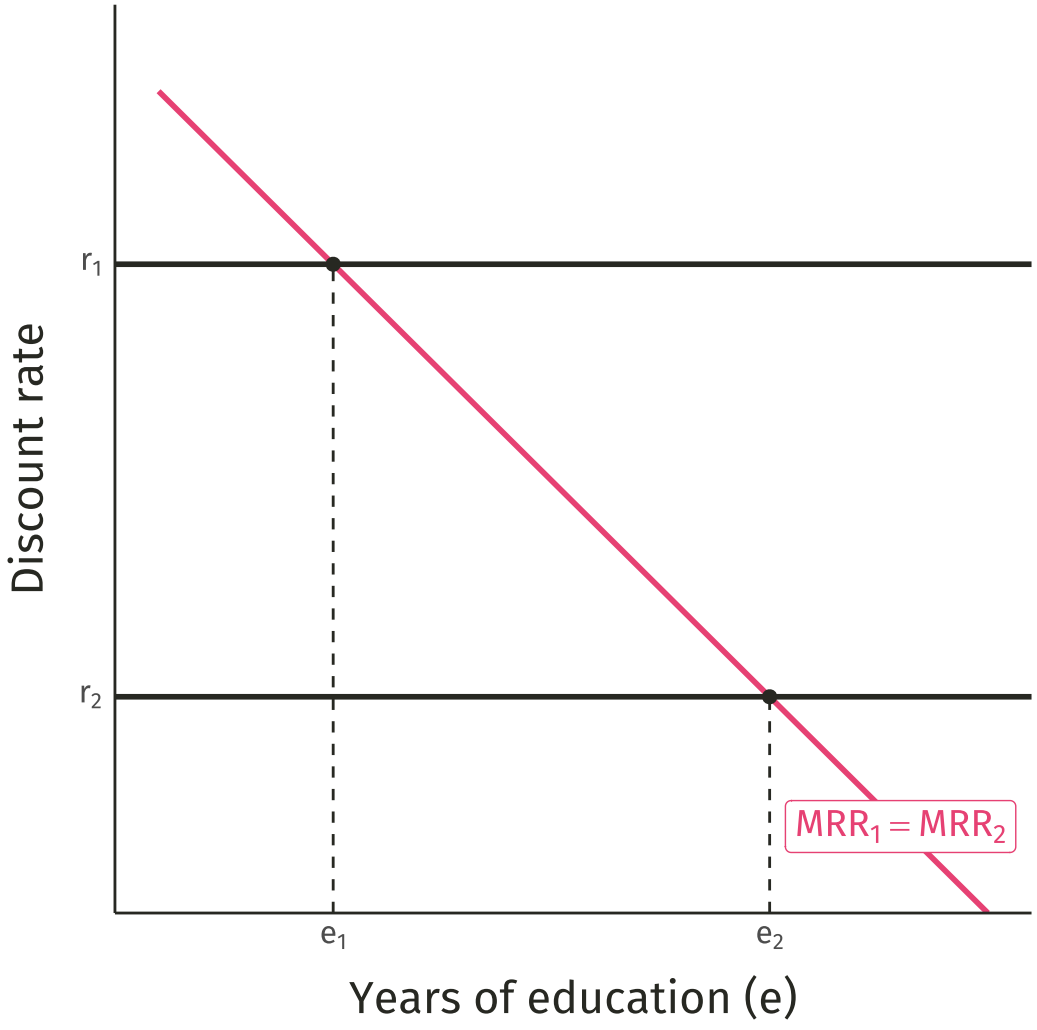
Schooling decisions



The stopping rule

A worker chooses the optimal amount of schooling where the marginal rate of return intersects the discount rate.

Comparing schooling decisions



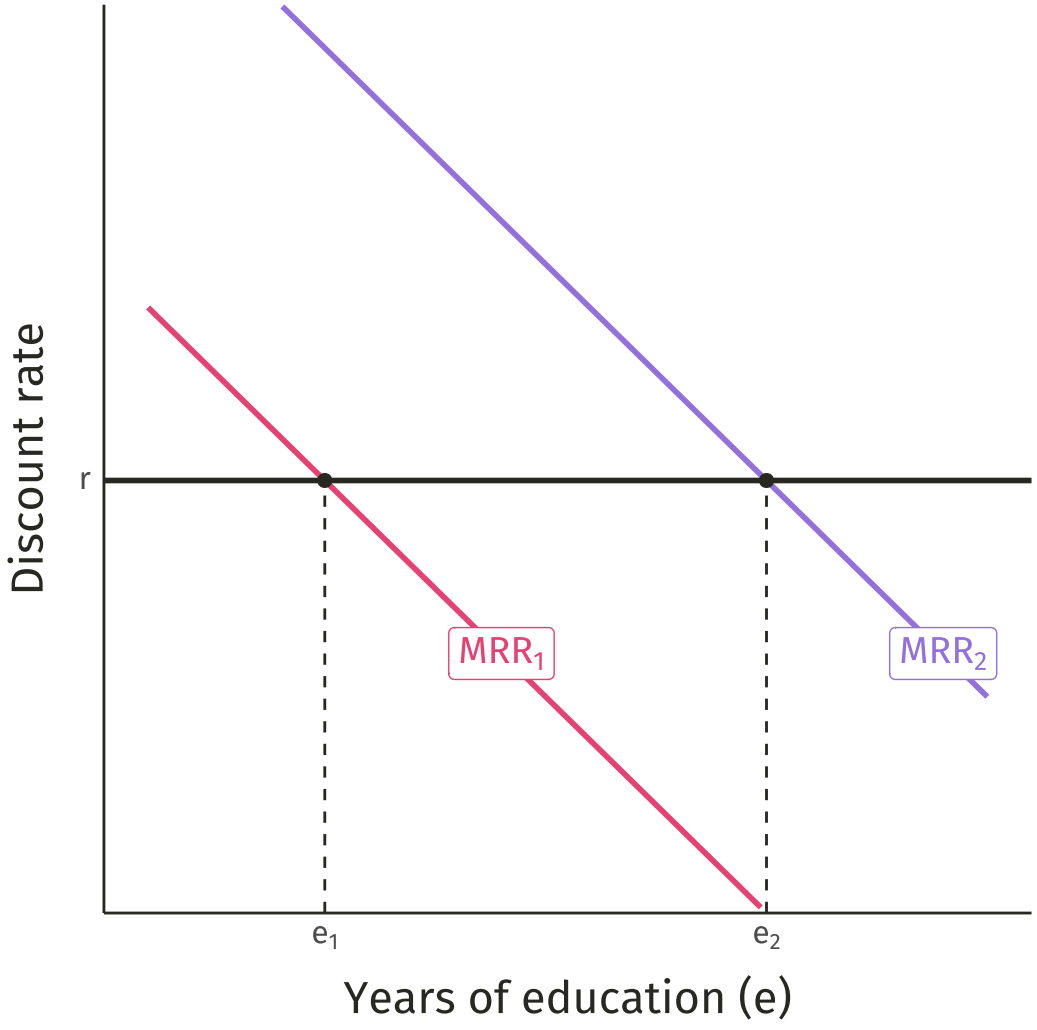
Differences in discount rates

Higher discount rate $\longrightarrow$ less access to credit or stronger preferences toward immediate payoffs.

- Given two individuals with the same ability, the person with a **higher discount rate** will complete **fewer years** of schooling.
- In either case, the person with the higher discount rate will earn less money.

Implications for policy? Expanding educational opportunities to person with the higher discount rate will close the earnings gap!

Comparing schooling decisions



Differences in ability

A higher-ability individual "gets more" out of the same amount of schooling than a lower-ability individual ⟶ higher marginal rate of return.

- Given the same discount rate, then the **higher-ability individual** will complete **more schooling** and earn **more money**.

Implications for policy? Closing the schooling gap won't close the earnings gap!

Implications for data analysis?

Arteaga (2018)

Discussion

Q_1: What is the research question? Why does it matter?

Q_2: What is the research design? What are the comparison groups?

Q_3: What are the main results? What story do they convey?

Housekeeping

Problem Set 3 is due by ~~**Friday, February 25th**~~ **Monday, February 28th at 11:59pm**.