Principles of Macroeconomics

Lecture 1: Principles of Economics

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Outline

1) A Principled Approach to Economics
2) The Cost-Benefit Principle
3) The Opportunity Cost Principle
4) The Marginal Principle
5) The Interdependence Principle

Principled Approach to Economics

Question: What is Economics?

Common Answers: Money, The Stock Market, Inflation, Interest Rates, Government, Taxes

Real Answer: How scarce resources are allocated

Simple Answer: Economics is the study of choices

- Economics is a way of thinking
- It helps explain:
  - Why businesses and governments make the choices they do
  - Why *you* make the choices you make in everyday life
- Economists use a toolkit to understand how decisions are made by individuals, firms, and governments.
- Four core principles provide a systematic framework for analyzing these decisions.

The Cost-Benefit Principle

The Cost-Benefit Principle: Motivation

- Why are you in class right now?
- Why did you buy that $8 coffee this morning?
- Why do firms offer jobs and why do workers accept or reject them?
- Why do people volunteer?

We can answer these questions (in part) using the cost–benefit principle.

The Cost-Benefit Principle

Definition

Cost-Benefit Principle: People respond to *incentives*. Decisions are shaped by their expected costs and benefits.

- Before making a choice:
  - Identify all relevant costs and benefits
  - Choose the option where **benefits** $\geq$ **costs**

- Cost and benefit can be monetary and/or non-monetary

Example: Cost-Benefit Principle

Question: Should you go to class or stay at home?

Benefits

- Better understanding of the material
- Ability to ask questions and hear others' questions
- Information not included in slides
- Stay on track in the course
- Weekly assignments

Costs

- Time that could be spent sleeping, studying, or working
- Effort required to get ready and commute
- Uncomfortable classroom
- Schedule rearrangements

If you're in class, then you decided that the benefits were greater than the costs

Willingness to Pay

Definition

Willingness to Pay (WTP): The *maximum* amount a person is willing to give up to obtain a benefit or avoid a cost.

Ask yourself:

"What is the most I am willing to pay for this benefit?"

or

"What is the most I am willing to pay to avoid this cost?"

Example: Willingness to Pay

Example: Avoiding a Parking Ticket

Scenario: You park in one of the ramps on campus without paying the meter. There is a chance you could receive a \$20 parking ticket.

Question: What is the *maximum* amount you would be willing to pay to avoid the risk of getting a ticket?

- If you would pay up to \$5 to avoid the risk, your **WTP** is \$5.
- If parking legally costs \$3, you pay the meter.
- If parking legally costs \$8, you take the risk and park for free.

WTP reflects how much you value avoiding the expected cost and stress of a ticket.

Economic Surplus

"Wanting to Pay" is not the same as "Willingness to Pay"

Definition

Economic Surplus: The total benefits minus the total costs from a decision. It measures how much a decision improves your well-being.

Good decision-making is about maximizing economic surplus.

Example: Driving to class has a benefit of \$12.50 and cost of \$7.25.

$$\text{Economic Surplus} = \$12.50 - \$7.25 = \$5.25$$

That \$5.25 is the net gain from choosing to drive.

Example: Economic Surplus

Scenario: You are considering buying a cup of coffee at Haraz

- Benefit: It will increase your energy ($2)
- Benefit: It will warm you up ($1)
- Benefit: It will make you happy ($3)
- Cost: You have to pay for the coffee ($5)
- Cost: You have to walk across campus ($0.50)

Question: Do you buy the coffee?
Answer: Yes. The total benefit ($6) exceeds the cost ($5.50)

Question: What is your economic surplus?
Answer: Economics surplus $= \$6 - \$5.50 = \$0.50$

Example: Economic Surplus

Scenario: A firm is deciding whether to hire you as a financial analyst.

- Benefit: Your expected productivity is worth \$85,000 to the firm
- Benefit: They get to end the job search which would cost \$3,000 to continue
- Cost: You will only accept the position if offered \$70,000
- Cost: They have to pay \$5,000 to relocate you

Question: Should the firm hire you?
Answer: Yes. The total value of the hire (\$88,000) exceeds the cost (\$75,000)

Question: What is the firm's economic surplus?
Answer: Economic Surplus $= \$88,000 - \$75,000 = \$13,000$

Voluntary Exchange

- Both buyers and sellers benefit from **voluntary exchange**
- If both sides follow the cost-benefit principle:
  - Each party expects benefits at least as large as costs
  - Economic surplus is created
- This is the core idea behind most economic transactions

Internal Benefits

- Using money as the measuring stick allows us to account for both financial and non-financial costs and benefits
- This framework still allows for unselfish or prosocial decisions that generate internal benefits
  - Buying coffee for a friend $\rightarrow$ You value your friend's happiness
  - Donating old clothes $\rightarrow$ You value helping others
  - Volunteering at a food pantry $\rightarrow$ You value knowing your time has a positive impact
- Economics includes **all** costs and benefits – even emotional, social, or moral ones.

Framing and Decision-Making

Decisions should be based on costs and benefits, but people often fall victim to framing effects

- **Example:** Sale pricing in a store
  - A product is listed with an *original price* and a *sale price*
  - The sale price is the actual cost you must pay
- **Bad/Common reason to purchase:** "I'm saving so much money!"
- **Good reason to purchase:** "The benefit I will receive is greater than the sale price."
- **Other Examples:**
  - Restaurant menu design
  - Memberships and subscriptions

Example: Framing Effects

Scenario: You are the CEO of an insurance company that needs to cut costs. The current plan would lay off 6,000 employees.

On Monday, your CFO presents two alternative options:

Plan A

Save 2,000 jobs with 100% certainty

Plan B

1/3 chance of saving all 6,000 jobs
2/3 chance of saving no jobs

Which plan would you choose: A or B?

Example: Framing Effects Cont.

On Tuesday, your CFO presents two new options:

Plan A

Lose 4,000 jobs with 100% certainty

Plan B

2/3 chance of losing all 6,000 jobs
1/3 chance of losing no jobs

Which plan would you choose: A or B?

The Framing Effect

These are identical decisions – they are just framed differently.

- Saving 2,000 jobs is the same as losing 4,000 jobs **(Plan A)**
- A 1/3 chance of saving all 6,000 jobs is the same as a 1/3 chance of losing no jobs **(Plan B)**

If you chose **Plan A** in the first scenario but **Plan B** in the second, your decision was influenced by framing, not by costs and benefits.

Definition

Framing Effect: occurs when a decision is influenced by how choices are described rather than by their underlying outcomes.

This psychological bias is a central topic in *behavioral economics*.

Key Takeaways

- Evaluate the full set of costs and benefits for any decision
- Choose options where benefits are at least as large as costs
- Ask: "How much am I willing to pay to enjoy this benefit (or avoid this cost)?"
- Include both financial and non-financial factors
- Be aware of framing effects that can distort judgment

The Opportunity Cost Principle

The Opportunity Cost Principle: Motivation

- Should you work or go to college out of high school?
- You hate your current major, do you switch?
- Why does college enrollment increase during recessions?

We can answer these questions using the Opportunity Cost Principle.

College or Work?

Question: Should you go to college or work after high school?

The cost-benefit principle says to choose the option where the expected benefit is greater than the expected cost

Option 1: College

Benefits

- Higher expected future earnings
- More career opportunities

Costs

- Tuition: \$80,000/year

Option 2: Work

Benefits

- Income: \$40,000/year

Something important is missing...

The Opportunity Cost Principle

Definition

Opportunity Cost: The true cost of a decision is the benefit/value of the next best alternative that must be given up.

- Opportunity cost forces us to think about trade-offs
- Many important costs do not involve direct payments
- We do not include costs that are incurred with both options (rent, food, phone bill, etc.)

College or Work? (Including Opportunity Cost)

Now let's include the opportunity cost

Option 1: College

Costs

- Tuition: $80,000
- Foregone earnings while in school ($40,000/year)

Benefits

- Higher expected future earnings
- More career opportunities and flexibility

Option 2: Work

Costs

- Foregone future earnings from a degree
- Foregone opportunities from a degree

Benefits

- Earn income immediately ($40,000/year)

Multiple Alternatives

Scenario: Suppose you have a 1-hour break between classes and must choose how to spend it

You rank the following options:

1) Homework
2) Meet friends
3) Eat
4) Music
5) Nap
6) Read

Question: Which option do you choose?
Answer: You choose to work on homework.

Question: What is the opportunity cost of working on homework?
Answer: Hanging out with friends.

Opportunity cost is the next best alternative not the value of all alternatives

Scarcity

Every decision has an opportunity cost, because all decisions involve allocating a scarce resource

Definition

Scarcity: Resources are limited. Using resources for one activity leaves fewer for others.

- **Examples:**
  - **Money:** What else could I spend it on?
  - **Time:** There are only 24 hours in a day
  - **Attention:** What do I focus on?
  - **Willpower:** I have limited energy and self-control
  - **Production resources:** What else could be produced with this labor and machinery?

Opportunity Cost: School vs. Work

Question: What is the opportunity cost of attending college?

Attending College	Working Full Time	Opportunity Cost
1) Tuition: \$80,000	1) No tuition cost	1) Tuition: \$80,000
2) No job thus no salary	2) Receive \$40,000 salary	2) Foregone salary: \$40,000
3) Apartment & food: \$24,000	3) Apartment & food: \$24,000	3) No opportunity cost
4) 10 hours per day studying	4) 10 hours per day working	4) No opportunity cost

Answer: If you attend college, then you are incurring \$120,000 a year in opportunity costs

Opportunity Cost: What Counts and What Doesn't

- **Out-of-pocket costs:**
  - Tuition of $80,000 is a direct financial cost
  - It is also an opportunity cost because you would not pay it if you chose to work instead
- **Non–out-of-pocket costs (implicit costs):**
  - The $40,000 salary you give up by not working
  - This money is not paid directly, but it is still an opportunity cost
- **Not all out-of-pocket costs are opportunity costs:**
  - $24,000 spent on rent and food is paid whether you work or go to school
  - Since this expense does not change, it is **not** an opportunity cost
- **Not all time costs are opportunity costs:**
  - You do not count all 10 hours of studying as an opportunity cost
  - A job would require a similar amount of time
  - Since time use does not differ, it is not an opportunity cost of school

Real-World Examples of Opportunity Cost

- **During the COVID-19 pandemic, streaming services had record profits**
  - **Why?** The opportunity cost of time was lower
- **During the 2008 recession, college enrollment increased**
  - **Why?** The opportunity cost of working was lower
- **When classes are recorded, lecture attendance drops**
  - **Why?** The opportunity cost of skipping class decreases
- **During finals week, campus gyms are emptier**
  - **Why?** The opportunity cost of working out increases
- **During recessions, fertility rates often fall**
  - **Why?** The opportunity cost of having a child increases
- **When unemployment is high, workers accept lower wages**
  - **Why?** The opportunity cost of waiting for a better job is higher
- **People with terminal illnesses seek experimental treatments**
  - **Why?** The opportunity cost of risk is lower

Example: Opportunity Cost

Scenario: You spent three years studying for a finance degree. You get a finance internship and discover you *hate finance*.

Question: Should you stay in finance or switch majors?

To answer this, we must apply the cost-benefit and opportunity cost principle

Example: Opportunity Cost Cont.

Option 1: Stay in Finance

Relevant Costs

- Future years working in a field you dislike
- Lower job satisfaction
- Potential burnout or career switching later

Relevant Benefits

- Faster graduation
- High expected earnings

Option 2: Switch Majors

Relevant Costs

- Extra time in school
- Additional tuition going forward
- Delayed entry into the labor market
- Lower earnings

Relevant Benefits

- Higher job satisfaction
- Better long-run career fit
- Lower risk of switching careers later

Sunk Costs

The following should **not** influence your decision:

- Three years already spent studying finance
- Tuition already paid
- Effort already exerted

Definition

Sunk Cost: A cost that has been incurred and cannot be recovered

- Sunk costs exist in whatever choice you make, thus it is not an opportunity cost
- Only future costs and benefits matter for decision-making.
- **Examples:** Movie Tickets, Buffet Price, R&D, Relationships, Infrastructure

Production Possibilities Frontier (PPF)

Opportunity costs can be shown visually

Definition

Production Possibilities Frontier (PPF): Shows the combinations of output that are attainable given limited (scarce) resources

- **In other words:**
  - The PPF illustrates the trade-offs you face when allocating scarce resources
  - Such as your time, money, energy etc.

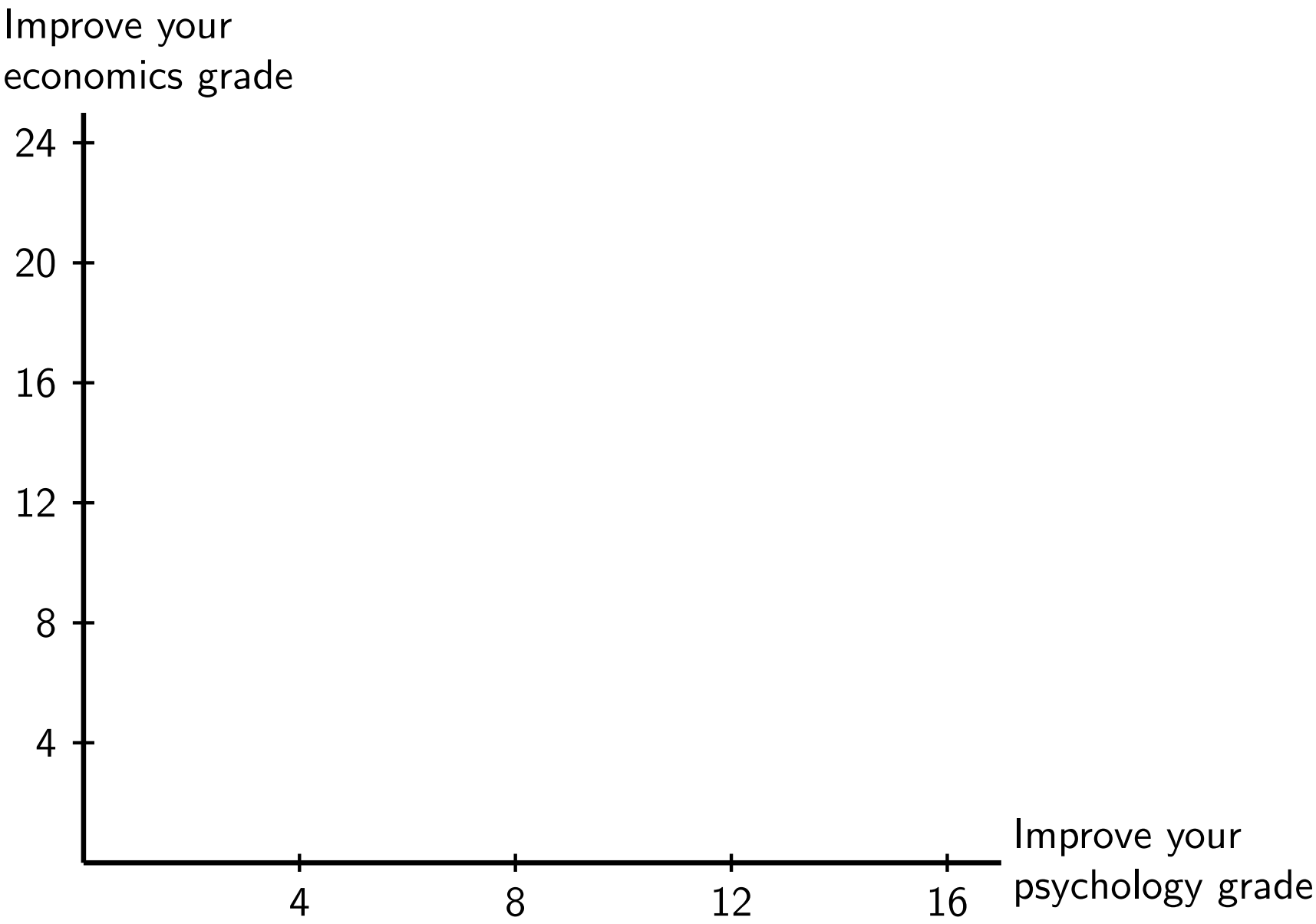
Example: Production Possibility Frontier

Scenario: You have 3 hours per night to study

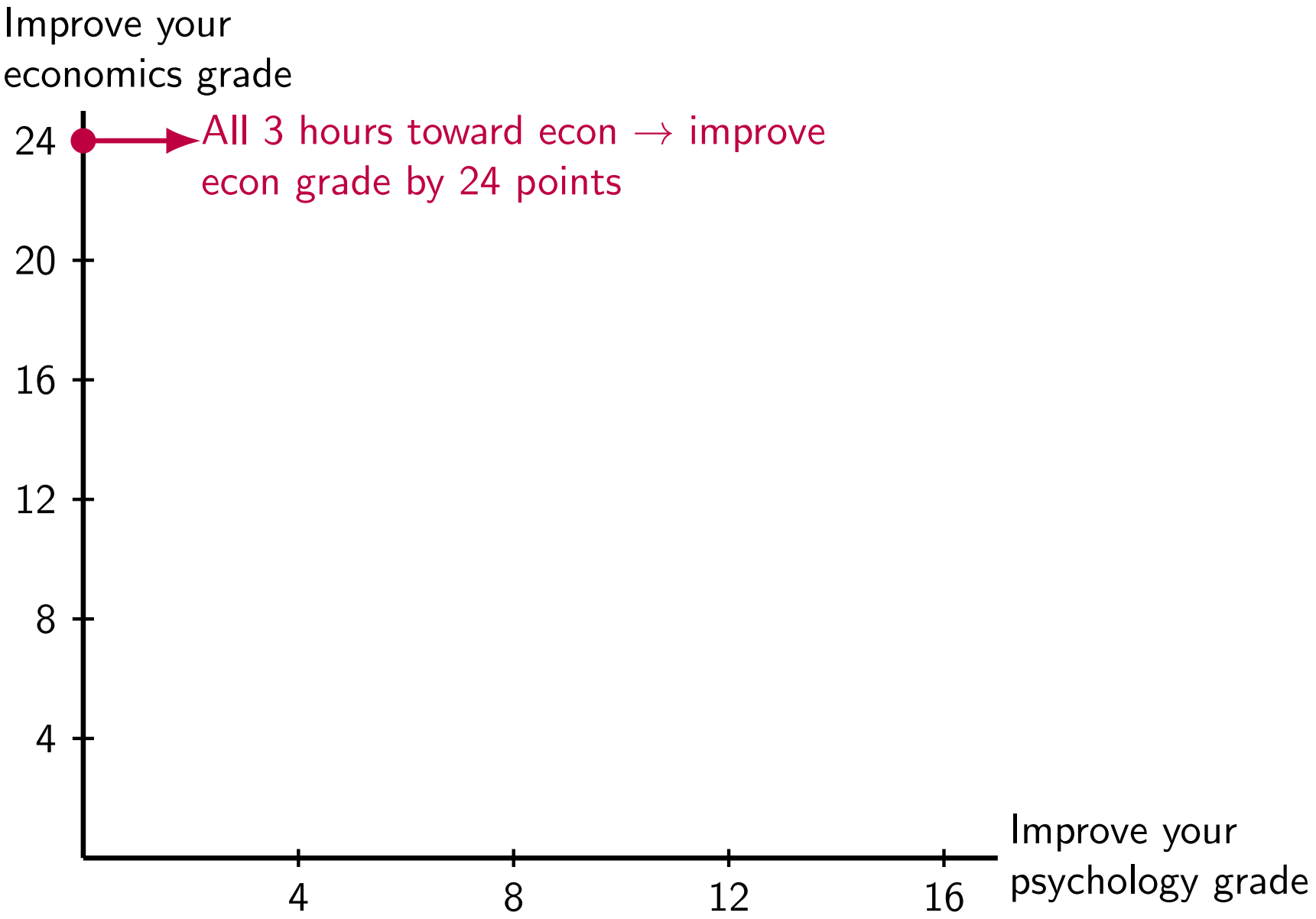
- Each hour spent studying economics raises your grade by 8 points
- Each hour spent studying psychology raises your grade by 4 points

Hours Studying Econ	Hours Studying Psych	Econ Points Gained	Psych Points Gained
0	3	0	$3 \times 4 = 12$
1	2	$1 \times 8 = 8$	$2 \times 4 = 8$
2	1	$2 \times 8 = 16$	$1 \times 4 = 4$
3	0	$3 \times 8 = 24$	0

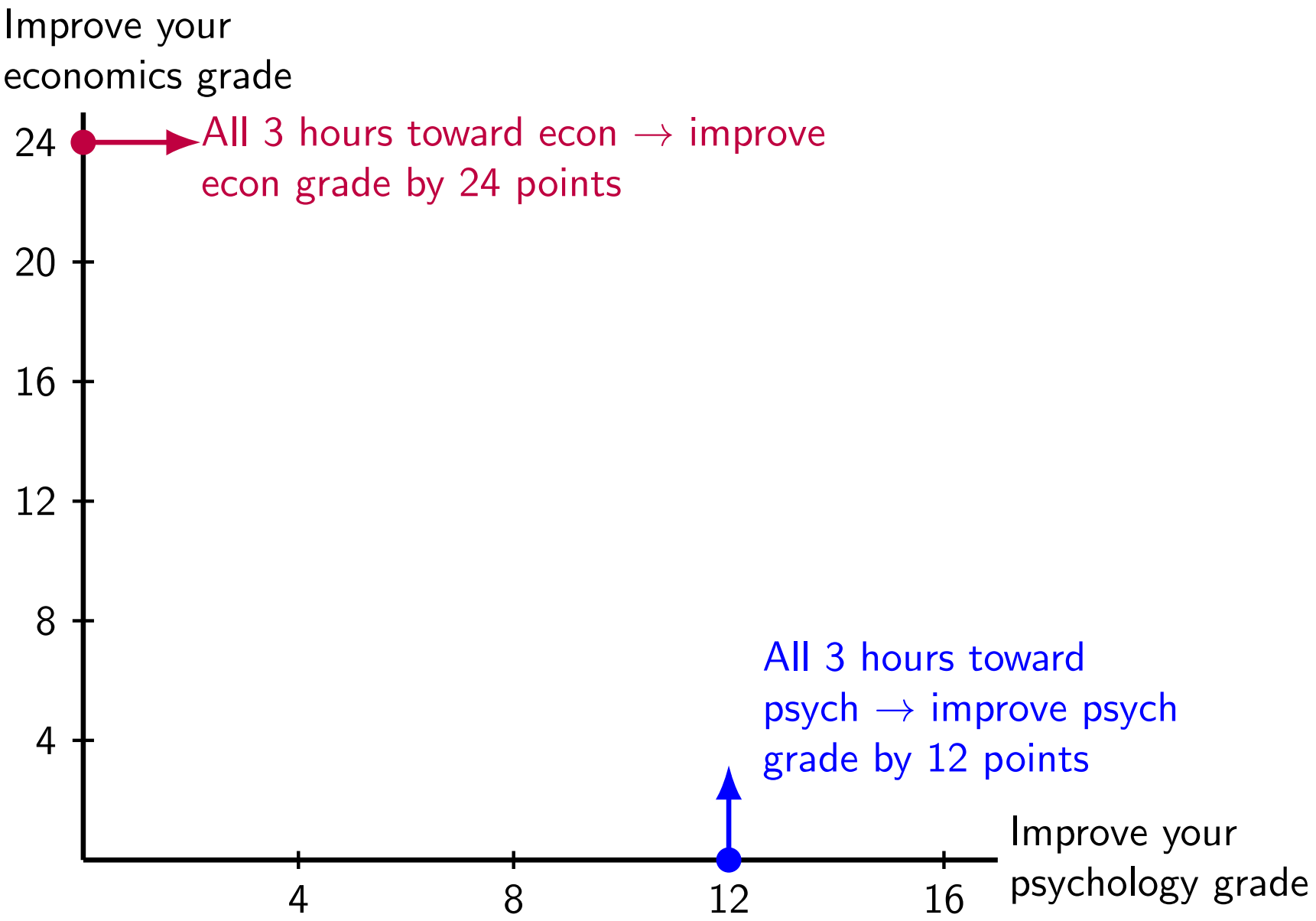
Example: Production Possibility Frontier Cont.



Example: Production Possibility Frontier Cont.



Production Possibility Frontier



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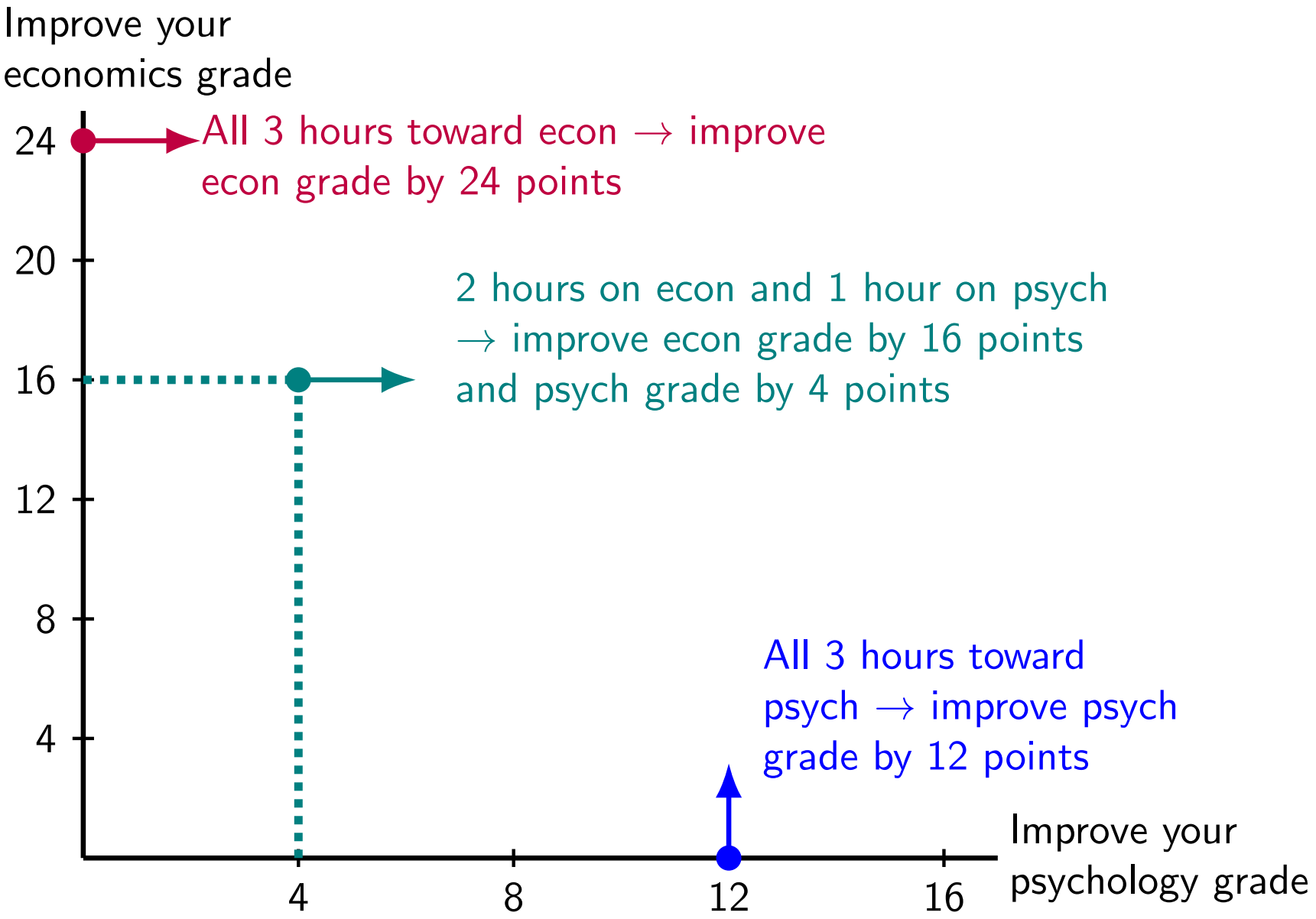
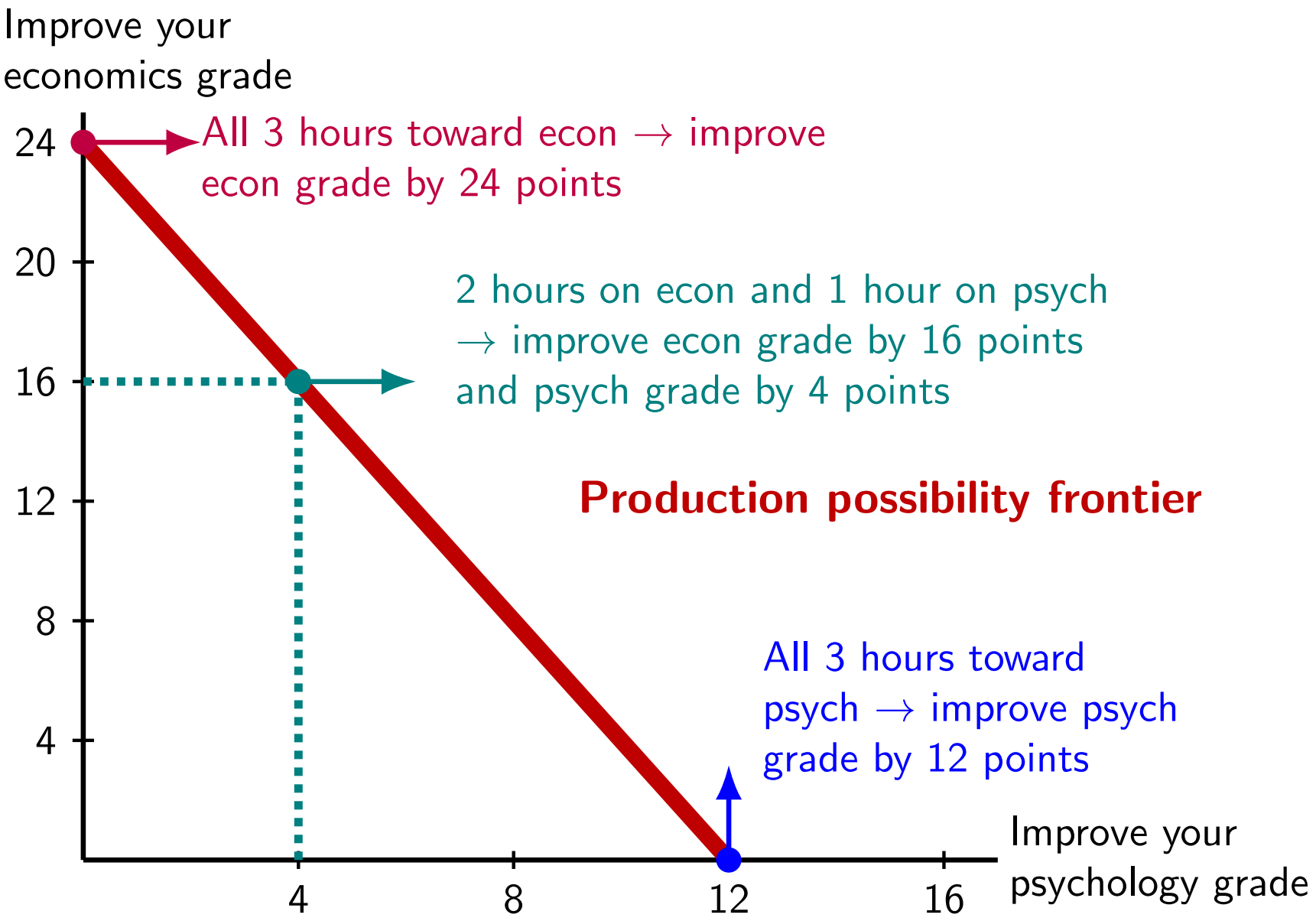


Example: Production Possibility Frontier Cont.



Key Takeaways

- The opportunity cost is the most valuable alternative you had to give up to pursue your choice
- Even if the choice has no direct financial cost, there is always a cost because every choice has an opportunity cost associated with it
- Scarcity makes opportunity costs (trade-offs) inescapable
- Good decision makers ignore sunk costs
- The production possibilities frontier (PPF) can be used to visualize the opportunity costs we face

The Marginal Principle

The Marginal Principle: Motivation

- How many classes should you take?
- How many workers should you hire?

We can answer these questions using the marginal principle.

The Marginal Principle

Definition

Marginal Principle: decisions about quantities are best made incrementally

- We should break "how many" questions into a series of smaller, or marginal, decisions and compare the marginal benefits and marginal costs

Definition

Marginal Benefit: The extra benefit from one more "something"

Definition

Marginal Cost: The extra cost from one more "something"

Example: Marginal Principle

Scenario: You're trying to decide how many classes this semester and you need to enroll in at least 4 classes to keep your scholarship.

Question: How many classes should you enroll in? $\rightarrow$ Should you enroll in 5 classes?

- You value the total benefit of four classes at \$5,000 and total cost ar \$2,000
- If you add a fifth class, you gain an extra \$2,000 in benefit and \$1,000 in cost
- If you add a sixth class, you gain an extra \$1,000 in benefit and \$1,500 in cost

Question: Do you add the fifth class?
Answer: Yes! The extra(marginal) benefit (\$2,000) is greater than its extra (marginal) cost (\$1,000)

Rational Rule

Definition

Rational Rule: If something is worth doing, keep doing it until your marginal benefits equal your marginal costs or marginal surplus decreases

- Every additional "something" you acquire using the marginal principle will increase your economic surplus
  - **Recall:** Economic Surplus = Benefits – Costs
  - Marginal Economic Surplus = Marginal Benefits – Marginal Costs
- Economic surplus is maximized when the marginal benefit equals the marginal cost

Example: Rational Rule Cont.

- You value the total benefit of four class at \$5,000 and total cost as \$2,000
- If you add a fifth class, you gain an extra \$2,000 in benefit and \$1,000 in cost
- If you add a sixth class, you gain an extra \$1,000 in benefit and \$1,500 in cost

Question: Do you add the sixth class?
Answer: No! The marginal benefit (\$1,000) is less than its marginal cost (\$1,500)

Question: What is the marginal surplus of adding the sixth class?
Answer: Marginal Surplus $= \$1,000 - \$1,500 = -\$500$

Enrolling in 5 classes maximizes your surplus

Economic Surplus: (\$5,000+\$2,000)-(\$2,000+\$1,000)=\$4,000
Marginal Surplus: \$2,000-\$1,000=\$1,000

Example: Rational Rule

Scenario: You own a restaurant and are deciding how many workers to hire.

Benefits of an additional worker (marginal benefit):

- Allows you to prepare and serve more meals per week
- Each meal sells for \$25
- Marginal revenue $=$ \$25 $\times$ (additional meals served)

Costs of an additional worker (marginal cost):

- Additional wages: \$300 per week
- Additional ingredients: \$10 per additional meal

Costs that do not depend on the number of workers (fixed costs):

- Rent: \$500 per week
- Opportunity cost of your time: \$1,000 per week

Question How many workers should you hire?

Example: Rational Rule Cont.

Total Benefits = \$25× meals
Total Costs = \$10 per meal +\$300 per worker +\$500 rent +\$1,000 Opp. Cost

Workers	Meals	Total Benefits	Marginal Benefit	Total Costs	Marginal Cost	Marginal Profit / Surplus
0	0	\$0		\$1,500		
1	100	\$2,500		\$2,800		
2	160	\$4,000		\$3,700		
3	210	\$5,250		\$4,500		
4	250	\$6,250		\$5,200		
5	280	\$7,000		\$5,800		
6	300	\$7,500		\$6,300		
7	310	\$7,750		\$6,700		

Example: Rational Rule Cont.

Total Benefits = \$25× meals
Total Costs = \$10 per meal +\$300 per worker +\$500 rent +\$1,000 Opp. Cost
Marginal Benefit: Additional benefit from the additional worker

Workers	Meals	Total Benefits	Marginal Benefit	Total Costs	Marginal Cost	Marginal Profit / Surplus
0	0	\$0	–	\$1,500		
1	100	\$2,500	\$2,500	\$2,800		
2	160	\$4,000	\$1,500	\$3,700		
3	210	\$5,250	\$1,250	\$4,500		
4	250	\$6,250	\$1,000	\$5,200		
5	280	\$7,000	\$750	\$5,800		
6	300	\$7,500	\$500	\$6,300		
7	310	\$7,750	\$250	\$6,700		

Example: Rational Rule Cont.

Total Benefits = \$25× meals
Total Costs = \$10 per meal +\$300 per worker +\$500 rent +\$1,000 Opp. Cost
Marginal Benefit: Additional benefit from the additional worker
Marginal Cost: Additional cost from the additional worker

Workers	Meals	Total Benefits	Marginal Benefit	Total Costs	Marginal Cost	Marginal Profit / Surplus
0	0	\$0	–	\$1,500	–	
1	100	\$2,500	\$2,500	\$2,800	\$1,300	
2	160	\$4,000	\$1,500	\$3,700	\$900	
3	210	\$5,250	\$1,250	\$4,500	\$800	
4	250	\$6,250	\$1,000	\$5,200	\$700	
5	280	\$7,000	\$750	\$5,800	\$600	
6	300	\$7,500	\$500	\$6,300	\$500	
7	310	\$7,750	\$250	\$6,700	\$400	

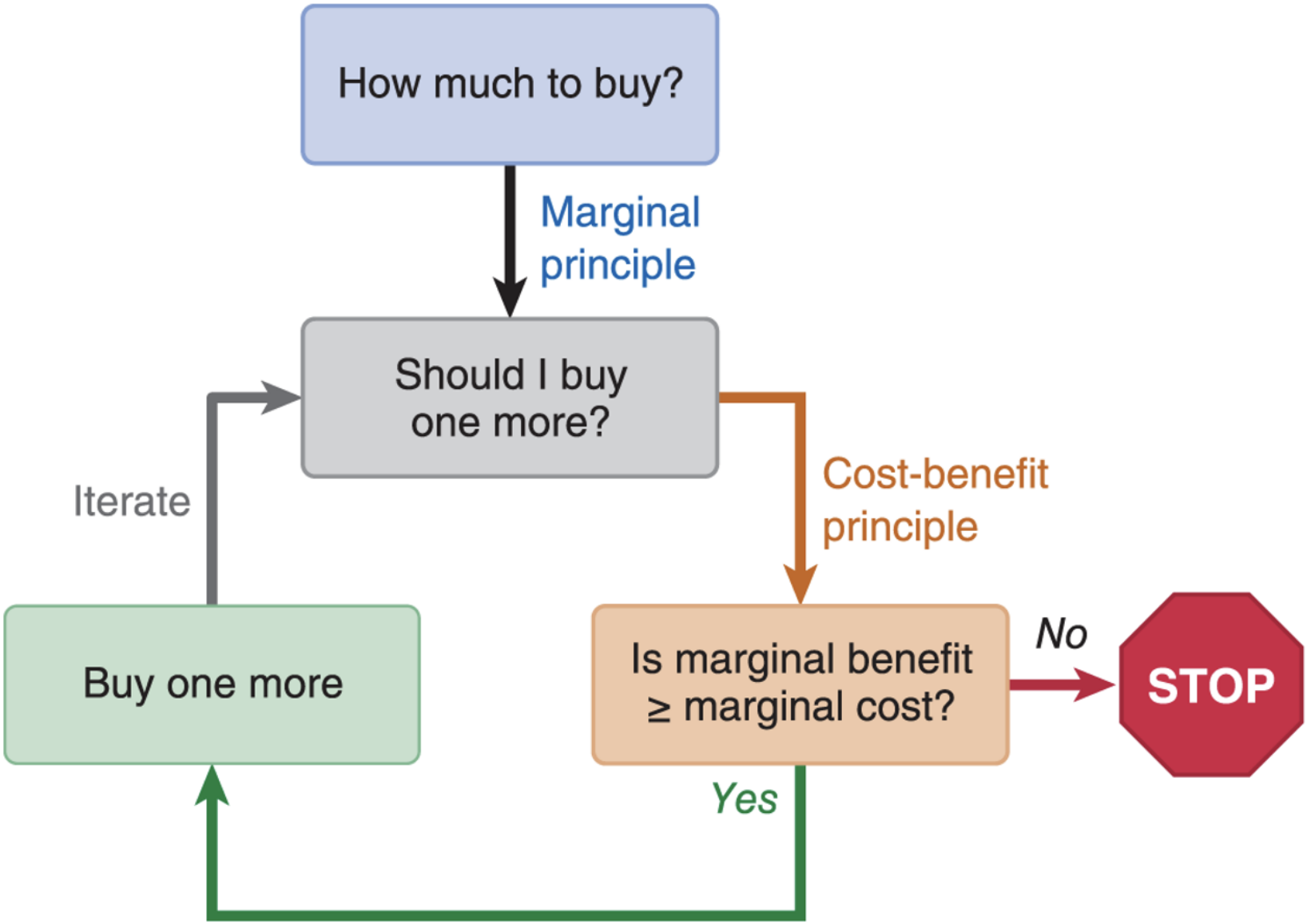
Example: Rational Rule Cont.

Total Benefits = \$25× meals
Total Costs = \$10 per meal +\$300 per worker +\$500 rent +\$1,000 Opp. Cost
Marginal Benefit: Additional benefit from the additional worker
Marginal Cost: Additional cost from the additional worker
Marginal Surplus/Profit: Marginal Benefit − Marginal Cost

Workers	Meals	Total Benefits	Marginal Benefit	Total Costs	Marginal Cost	Marginal Profit / Surplus
0	0	\$0	–	\$1,500	–	-
1	100	\$2,500	\$2,500	\$2,800	\$1,300	\$1.200
2	160	\$4,000	\$1,500	\$3,700	\$900	\$600
3	210	\$5,250	\$1,250	\$4,500	\$800	\$450
4	250	\$6,250	\$1,000	\$5,200	\$700	\$300
5	280	\$7,000	\$750	\$5,800	\$600	\$150
6	300	\$7,500	\$500	\$6,300	\$500	\$0
7	310	\$7,750	\$250	\$6,700	\$400	-\$150

You should hire 6 workers since that results in marginal benefit=marginal cost and maximizes your surplus

Decision Rule: Marginal Analysis



Key Takeaways

- The marginal principle tells you to break "how many" decisions into a series of smaller, marginal decisions
- If the marginal benefit exceeds the marginal cost, then buy that additional unit
- Continue to buy additional units as long as the marginal benefit is at least as large as the marginal cost (rational rule)
- Stop when the marginal benefit equals the marginal cost.
- Economic surplus is maximized when marginal benefit equals marginal cost

The Interdependence Principle

The Interdependence Principle: Motivation

- Why do popular majors sometimes add prerequisites or GPA cutoffs?
- How do your classmates' course choices affect competition for internships?
- What happens is wages rise in one industry?
- If many people delay retirement, what happens to job opportunities for younger workers?

We can answer these questions using the interdependence principle.

The Interdependence Principle

Definition

Interdependence Principle: Your best choice depends on your other choices, the choices others make, developments in other markets, and expectations about the future

- When any of these factors changes, your best choice might change
- You are not making decisions in isolation; You are part of a larger network
- **Example:** By taking this class,
  - You can't take other classes offered at the same time
  - There is now one less spot available to others
  - You are a more attractive intern/employee in the labor market.
  - You fulfill a prerequisite needed for enrollment in future classes.

Dependence Between Individual Choices

Your choices are connected because you face scarcity

- Your decision about how much to spend on clothes affects how often you can eat out
  - Because your income is limited
- Your decision about how much time to study affects how much time you have to stream
  - Because time is limited
- With only one oven, you may not be able to cook the main dish and all side dishes at once
  - Because production capacity is limited

Interdependence within a person comes from limited resources.

Dependence Between Economic Actors

Your choices depend on the choices made by other people, firms, and institutions

- If Microsoft hires the most talented software engineers in Seattle
  - Fewer talented engineers are available for other tech firms
- If many classmates choose the same major
  - Competition in that field increases
- If your friends all have chosen to buy iPhones
  - You may also want to buy an iPhone to maximize OS compatibility across phones
- If a classmate is hired for an internship at a firm
  - Your probability of being hired by that same firm falls

Individual outcomes depend on the choices of others.

Dependence Between Markets

Changes in one market affect choices and outcomes in other markets.

- Declining interest rates make borrowing cheaper
  - Increasing demand in the housing market
- The availability of affordable child care
  - Affects labor force participation decisions
- Rising wages in one industry
  - Attract workers away from other industries

Markets are linked through prices and incentives.

Dependence Through Time

Is it better to act today, or tomorrow?

- Should I buy gas today or wait until next week?
  - My decision depends on whether I think gas prices will fall or not next week.
- Should I buy a hybrid car now or wait for better technology?
  - The decision depends on expected future benefits

Decisions today also shape future outcomes.

- If many people delay retirement
  - Fewer jobs are available for younger workers today
- Choosing to attend graduate school
  - Affects future earnings and career options