Lecture 2a: A Recap of Economic Theory, Markets, and Willingness to Pay

Prof. Theising

Environmental Economics

Econ 4075

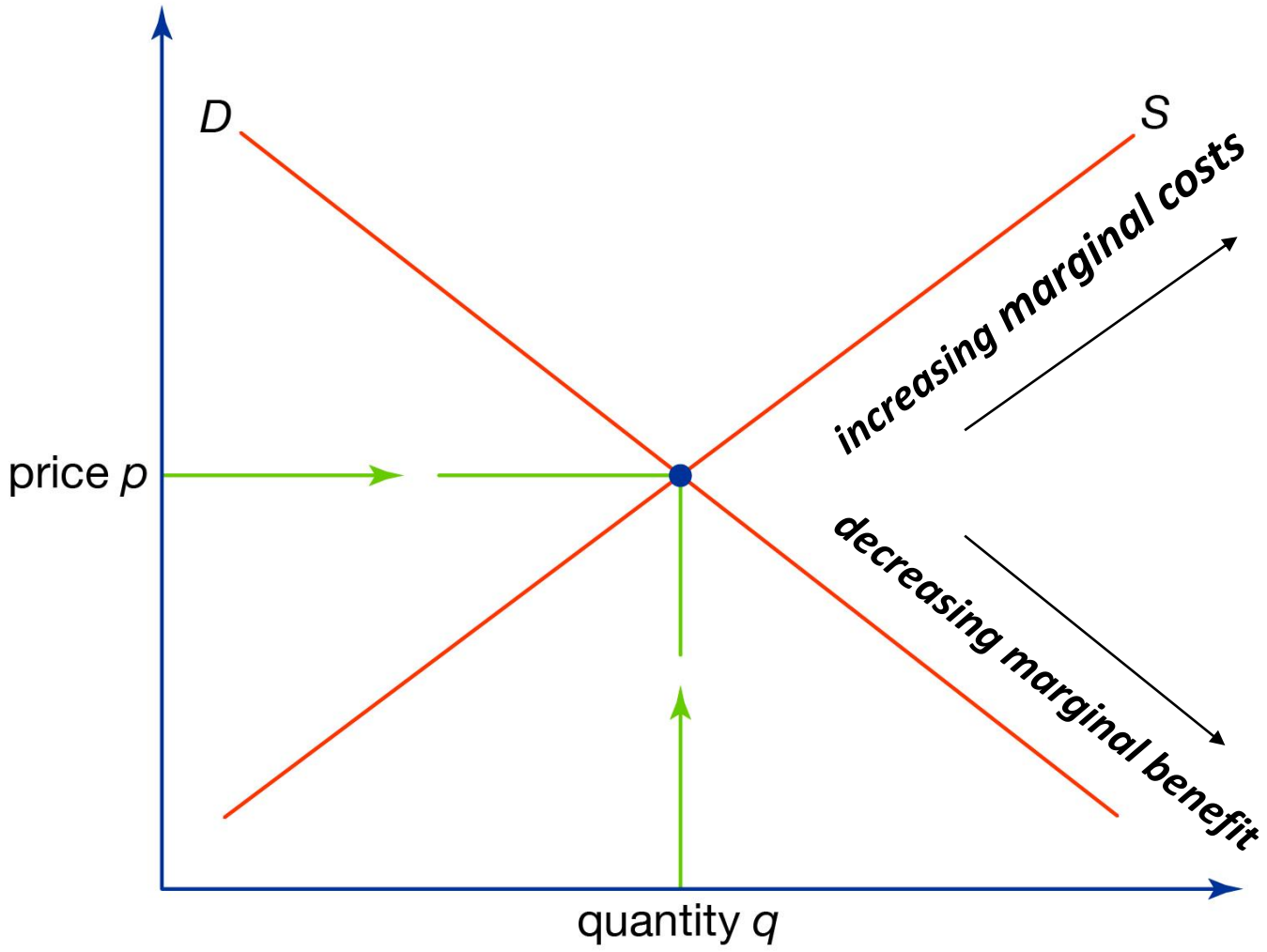
Demand and Supply

A "market" for "something"…

1. Demand for something slopes downward… why?
   a. If something is more expensive, the quantity demanded will be less
      i) substitution
      ii) income
      iii) decreasing marginal benefit

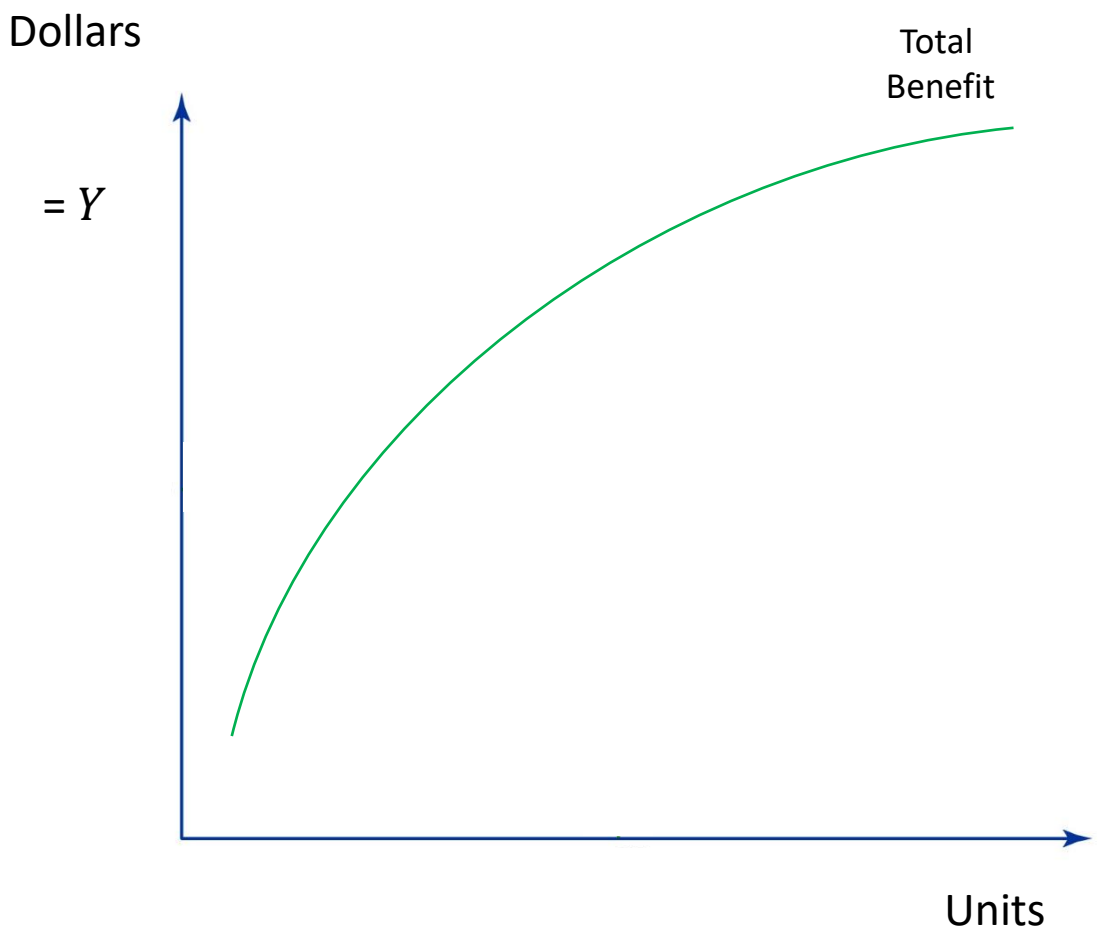
2. Supply of something slopes upward… why?
   a. As a "supplier" produces more of something it becomes more expensive to supply one more unit of that something
      i) *increasing marginal costs*

Demand and Supply

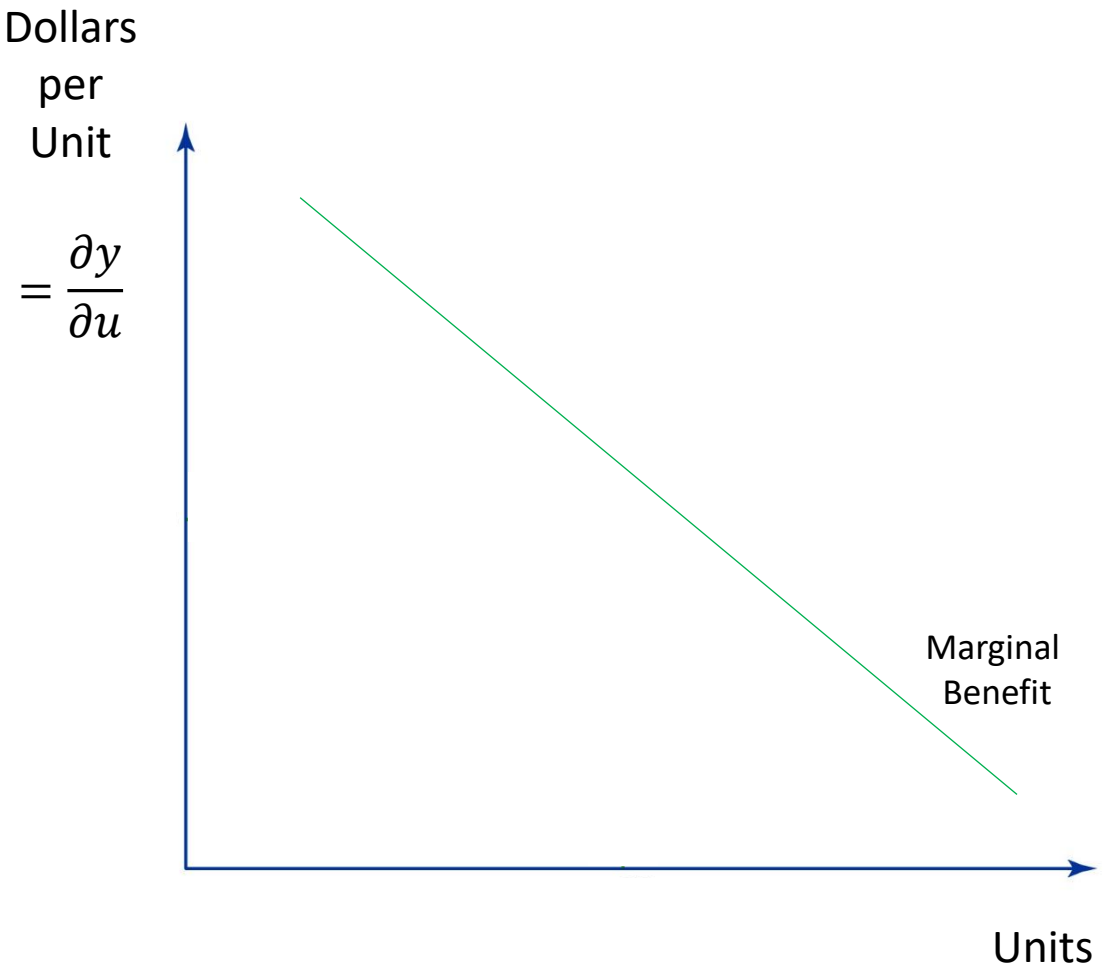


Demand

Total Benefits

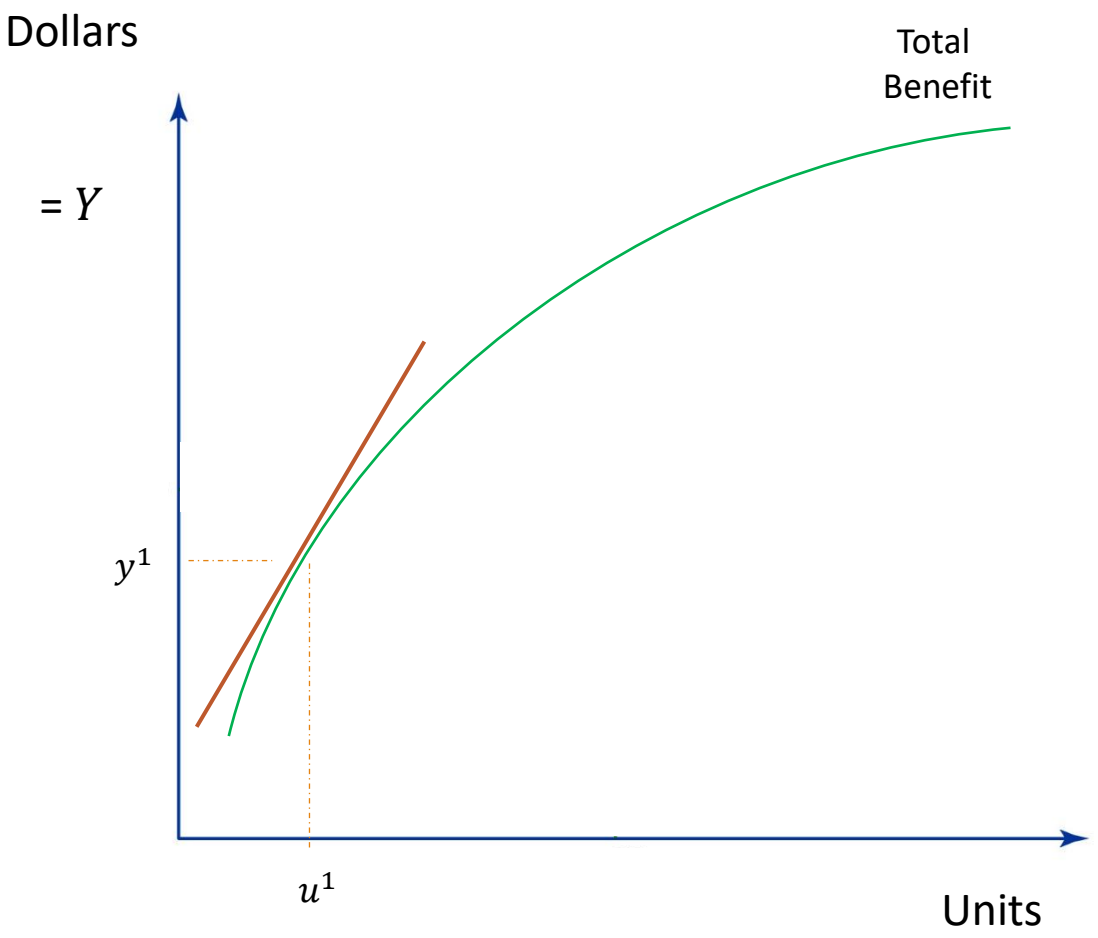


Marginal Benefits

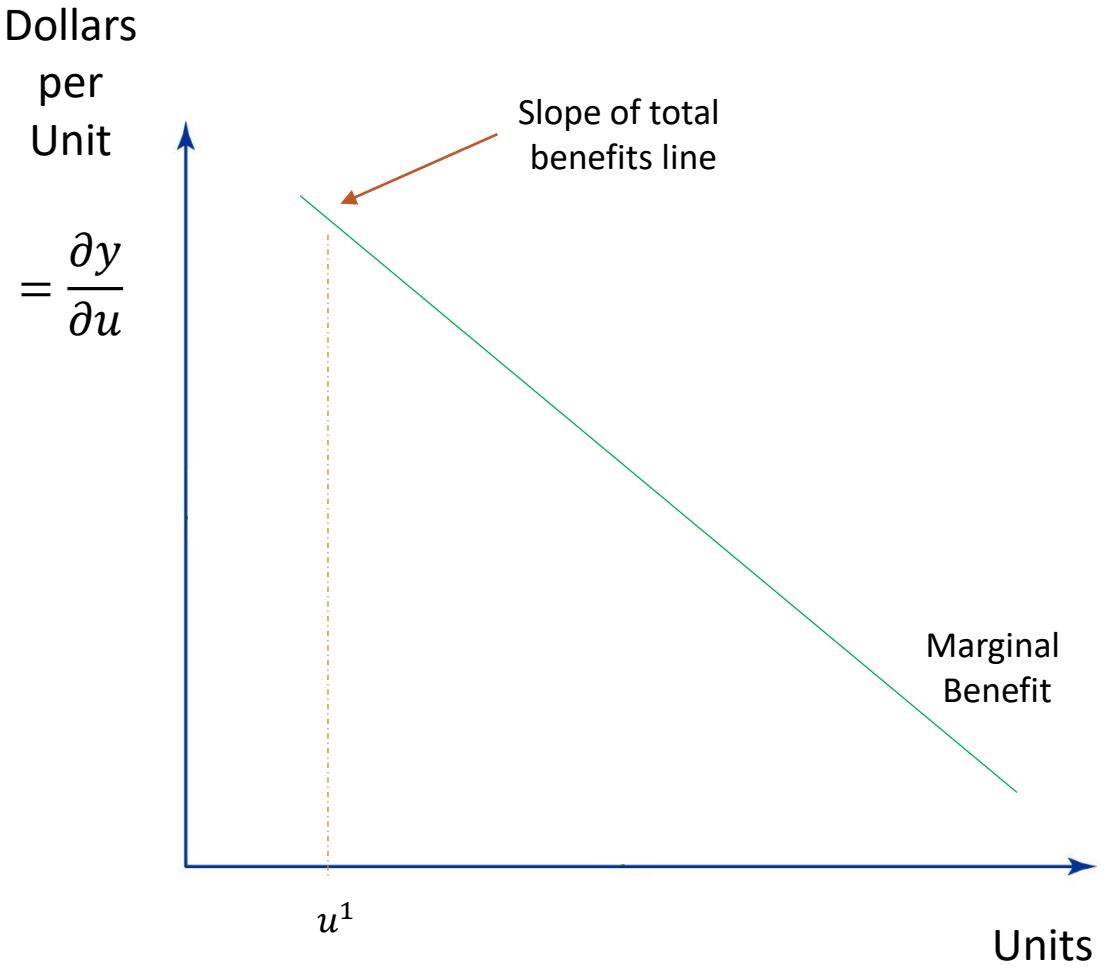


Demand

Total Benefits

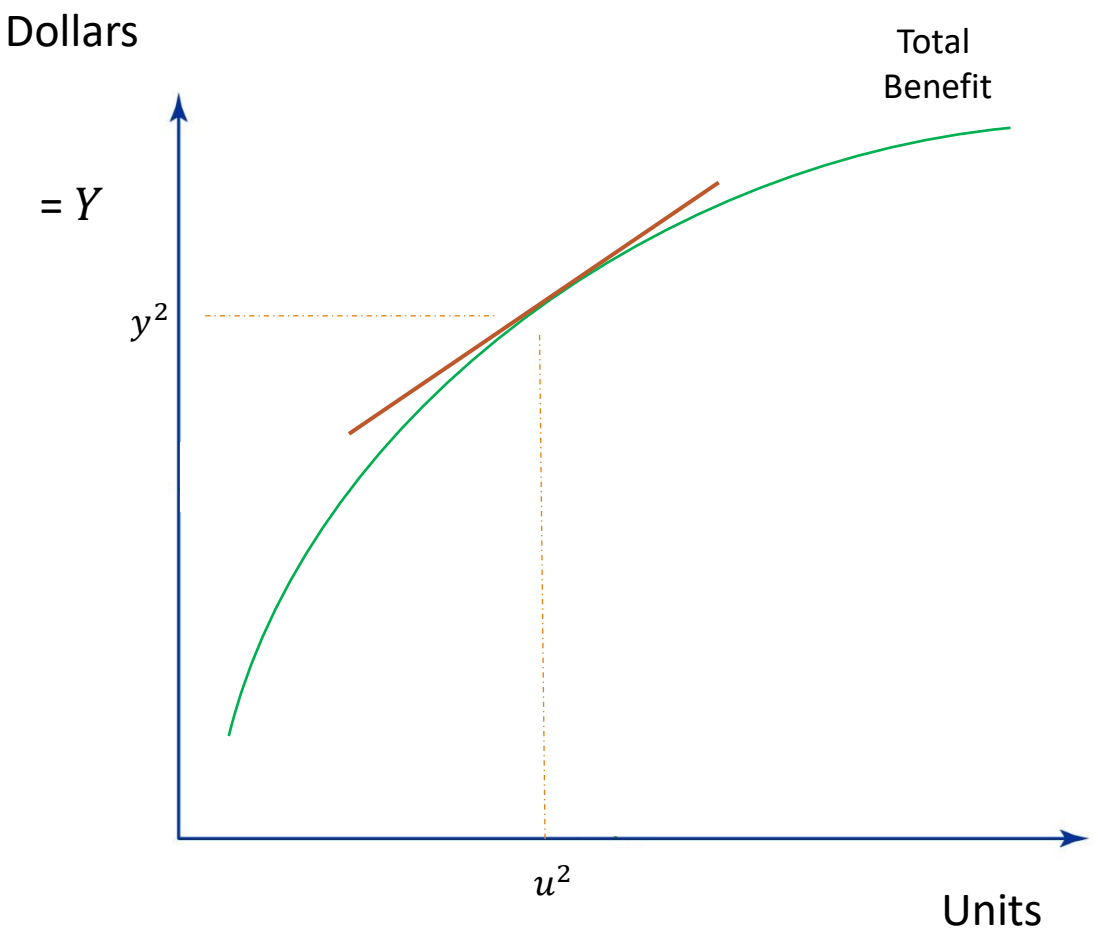


Marginal Benefits

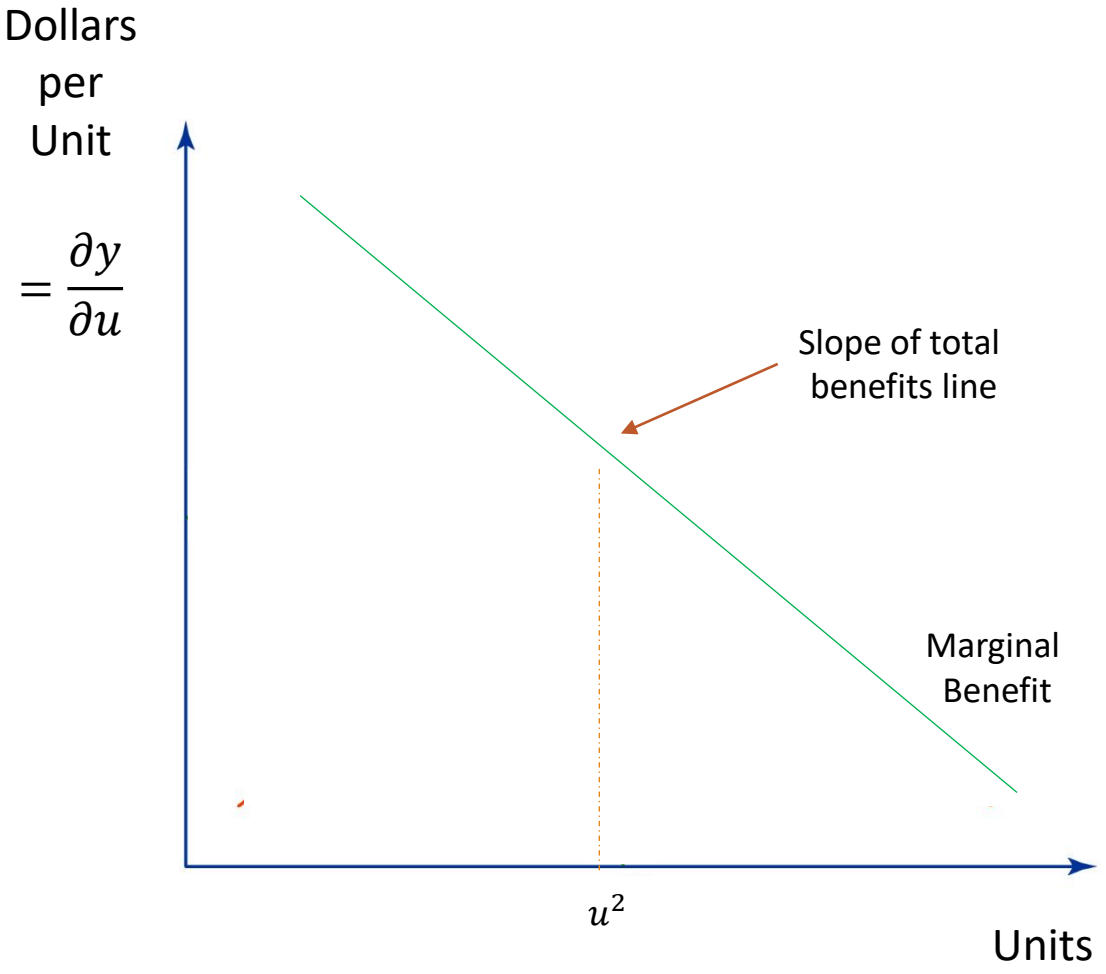


Demand

Total Benefits



Marginal Benefits

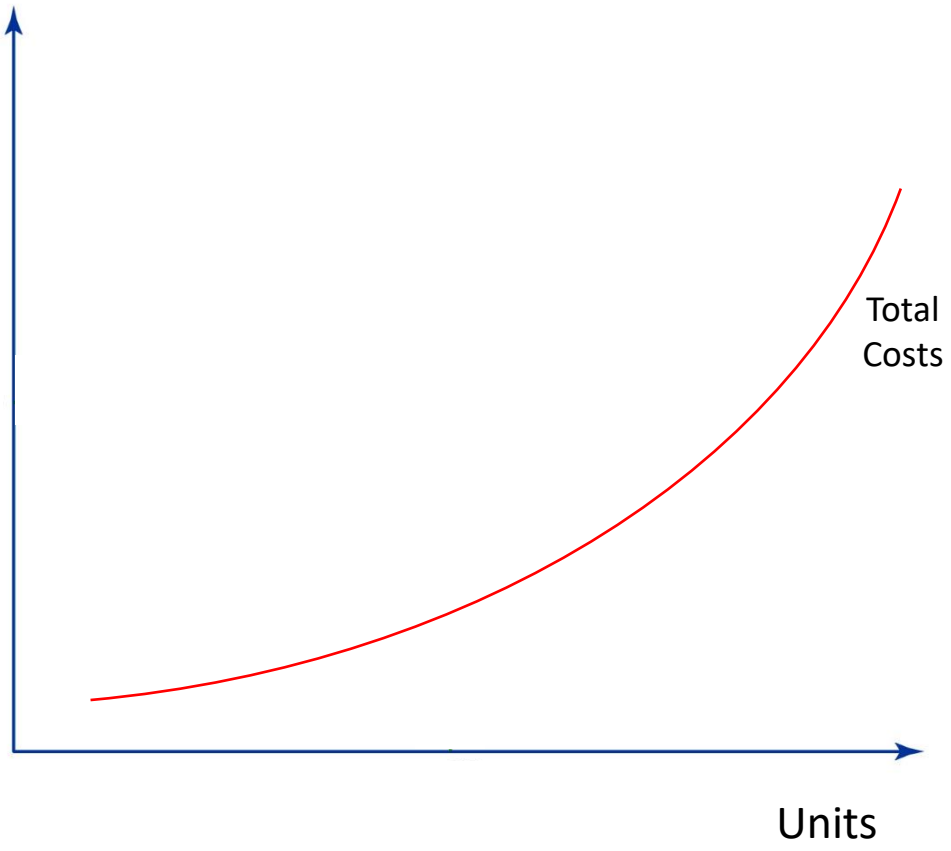


Supply

Total Costs

Dollars

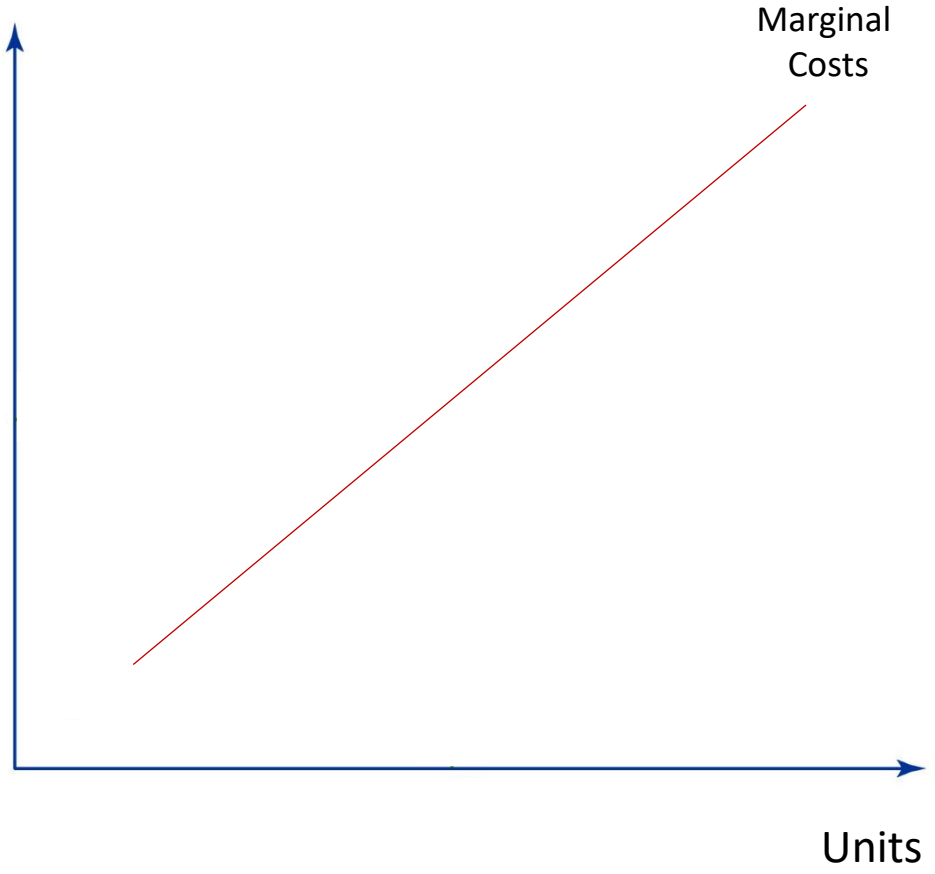
$= Y$



Marginal Costs

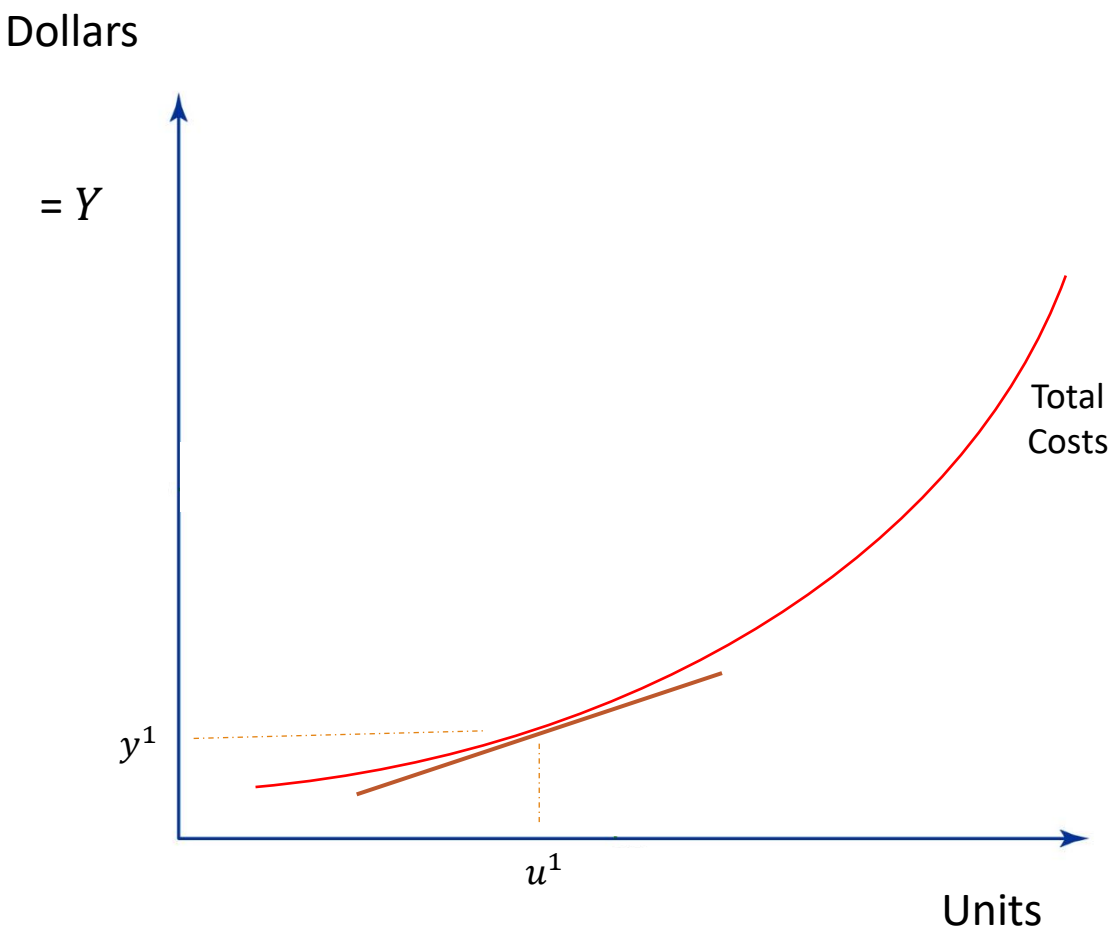
Dollars per Unit

$= \frac{\partial y}{\partial u}$

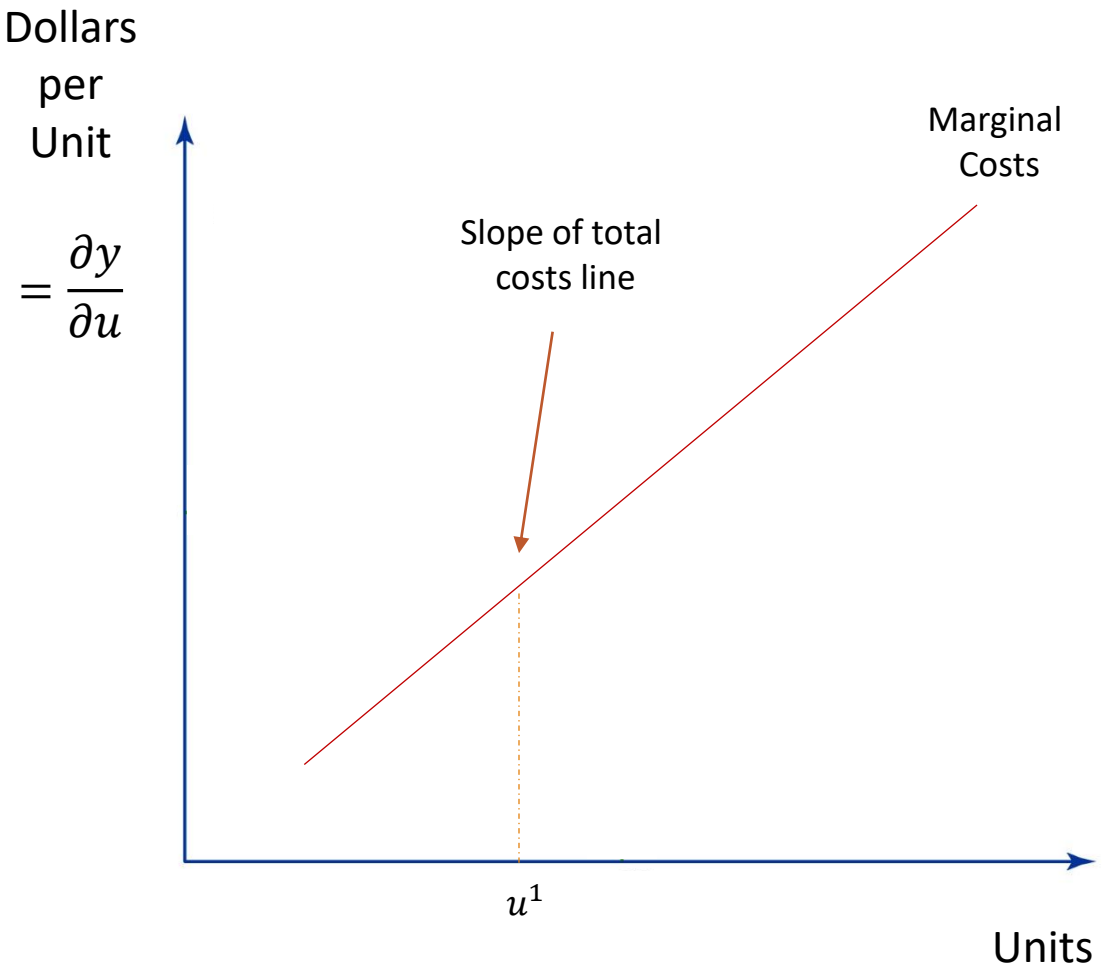


Supply

Total Costs

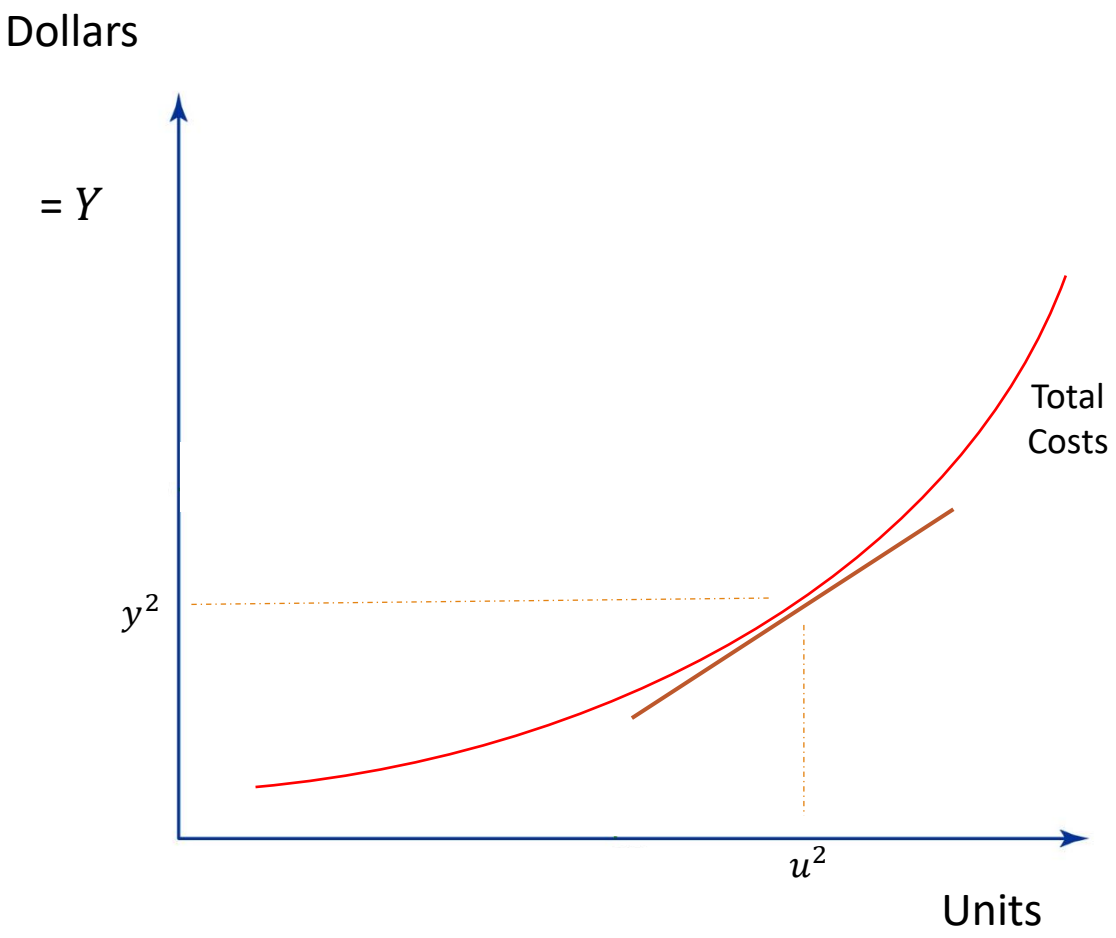


Marginal Costs

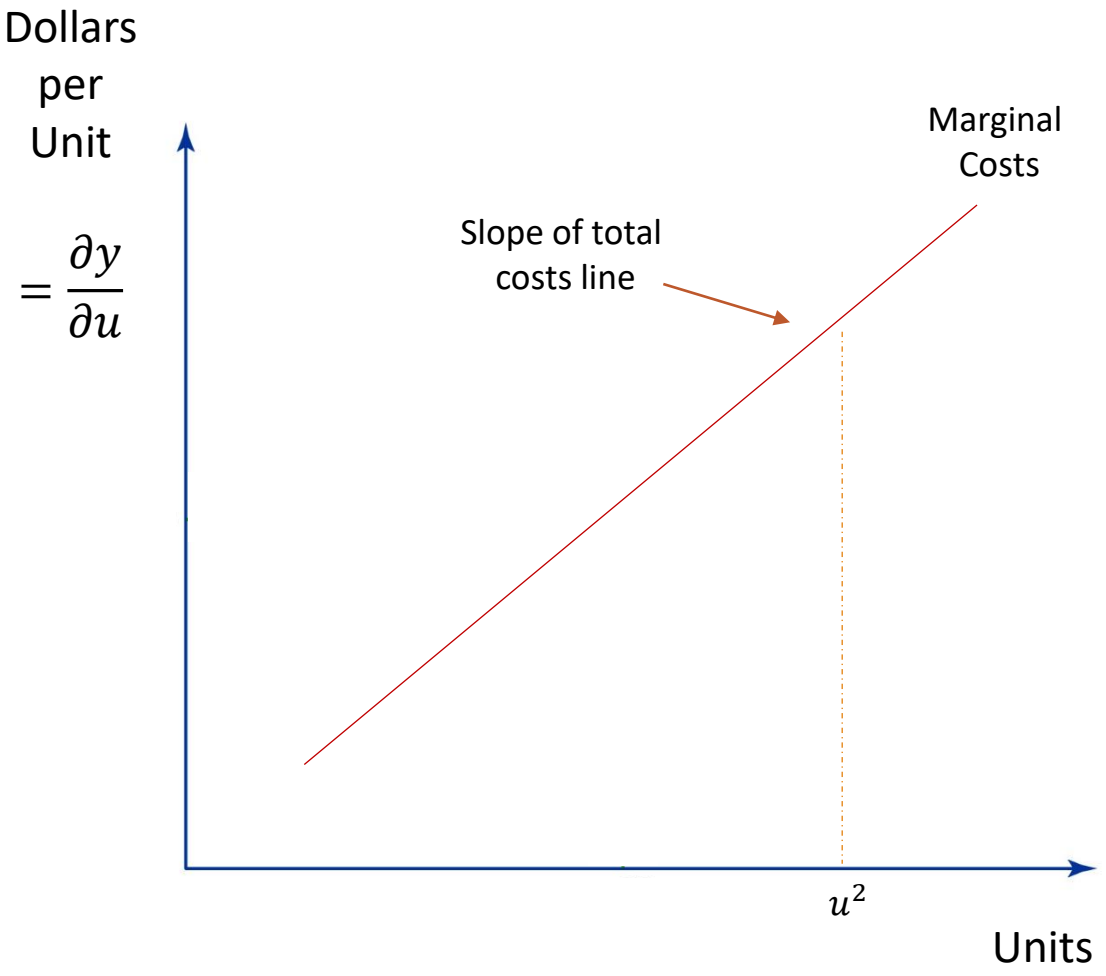


Supply

Total Costs

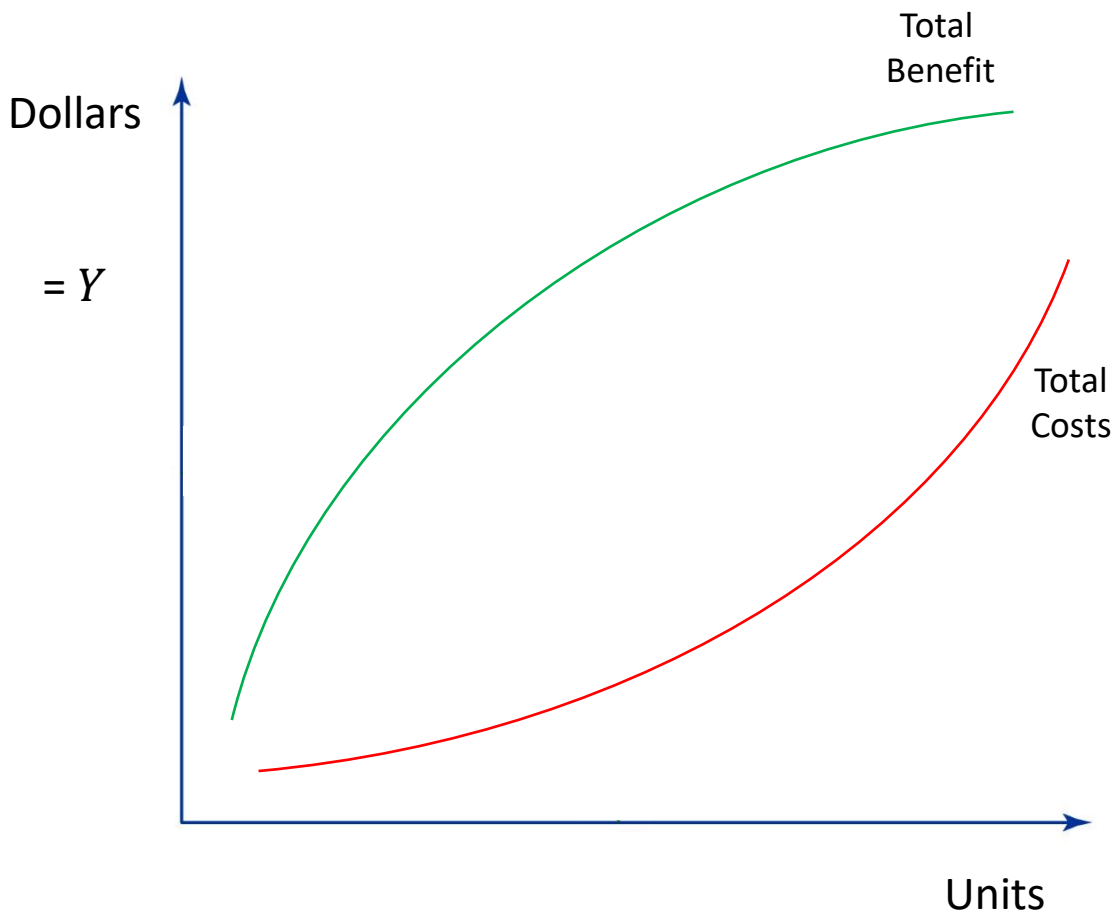


Marginal Costs

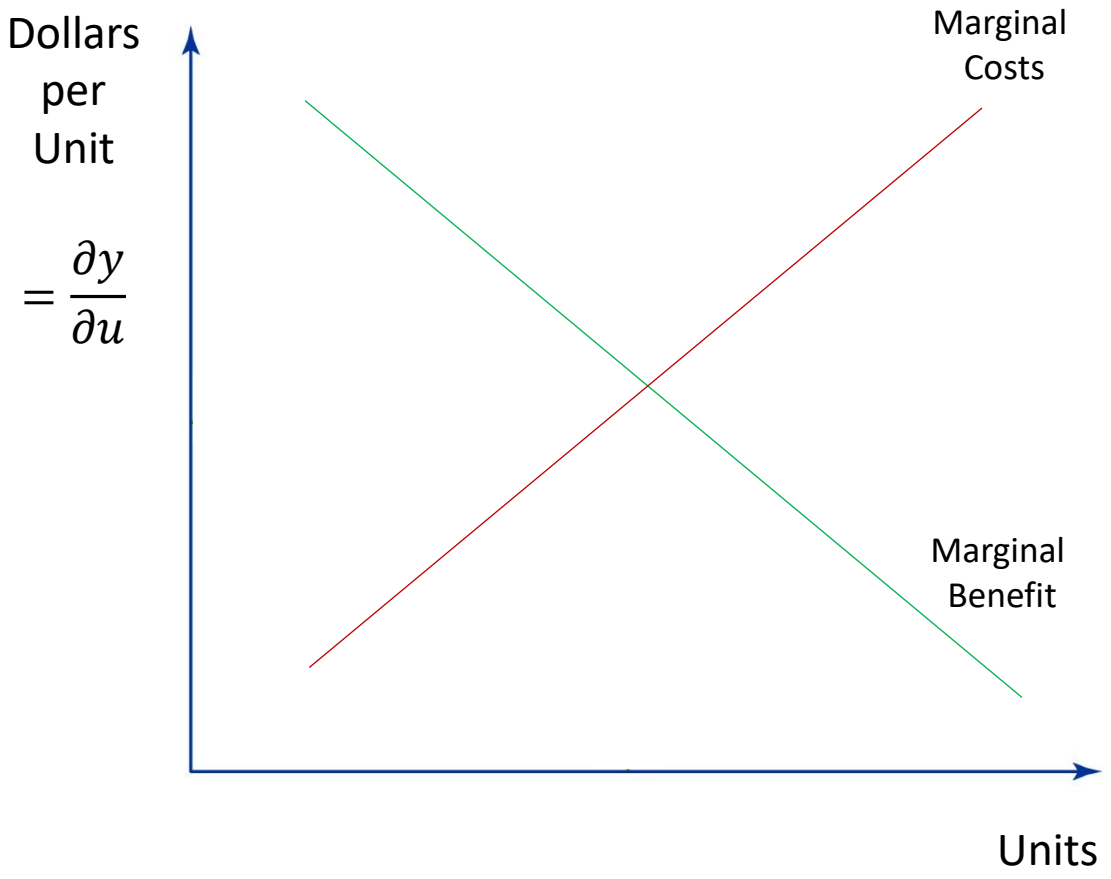


Demand and Supply

Total Benefits and Total Costs

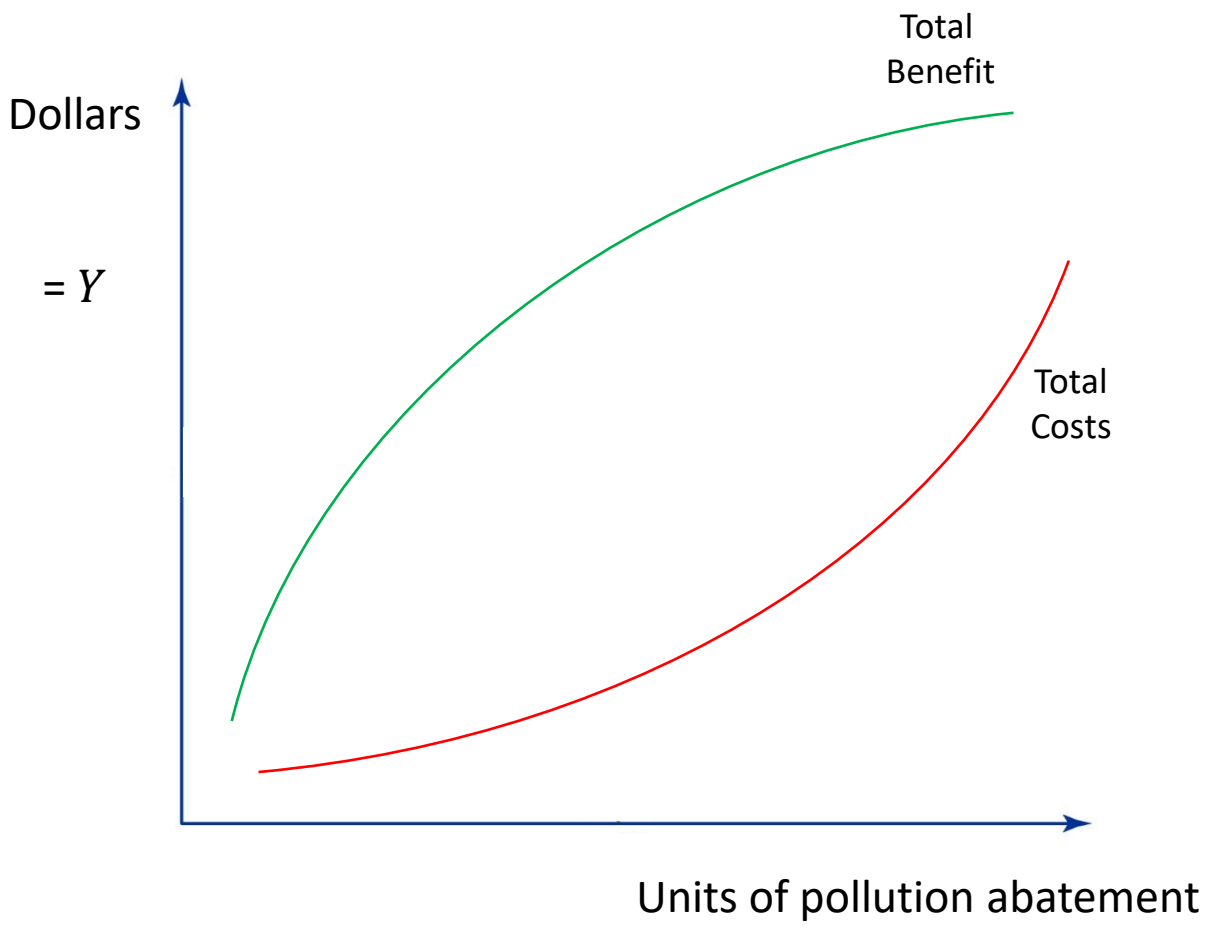


Marginal Benefits and Marginal Costs

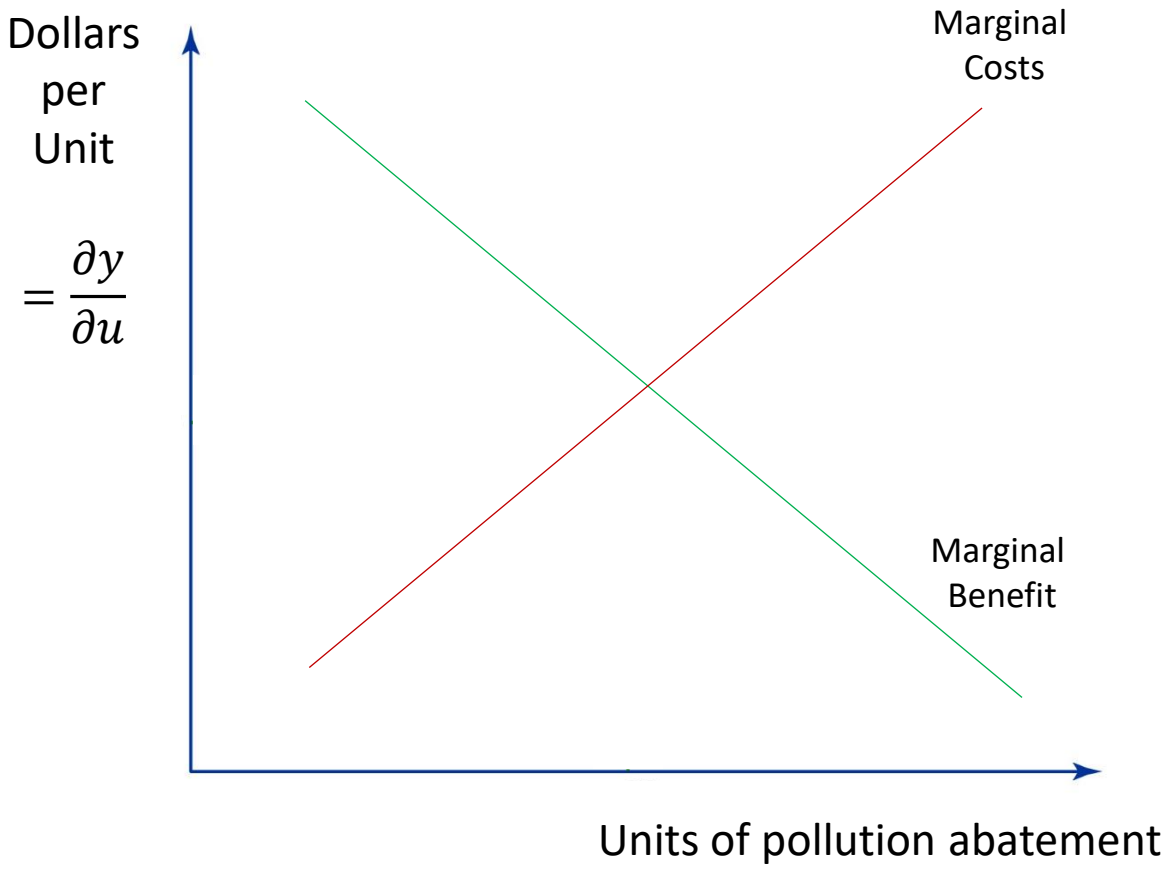


Market for Pollution

Total Benefits and Total Costs

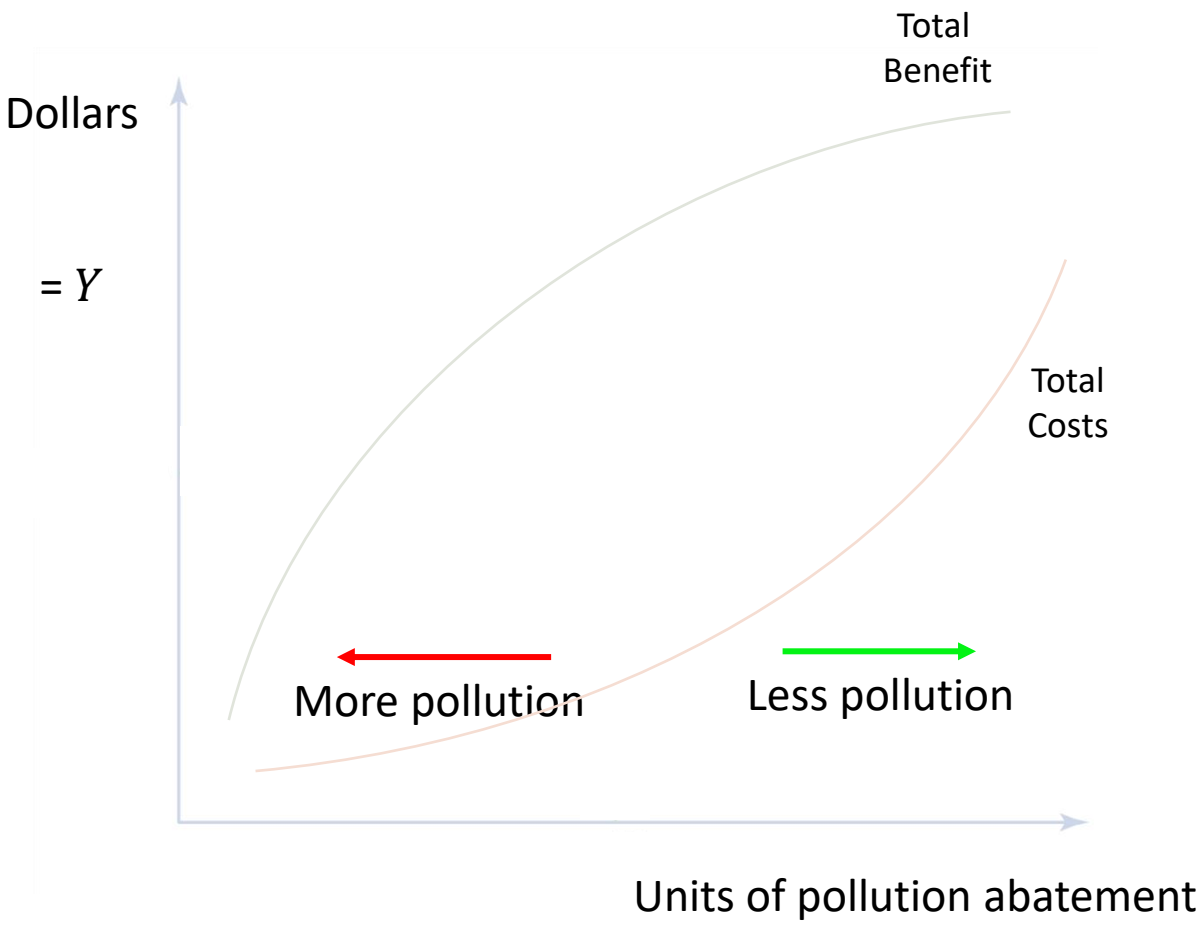


Marginal Benefits and Marginal Costs

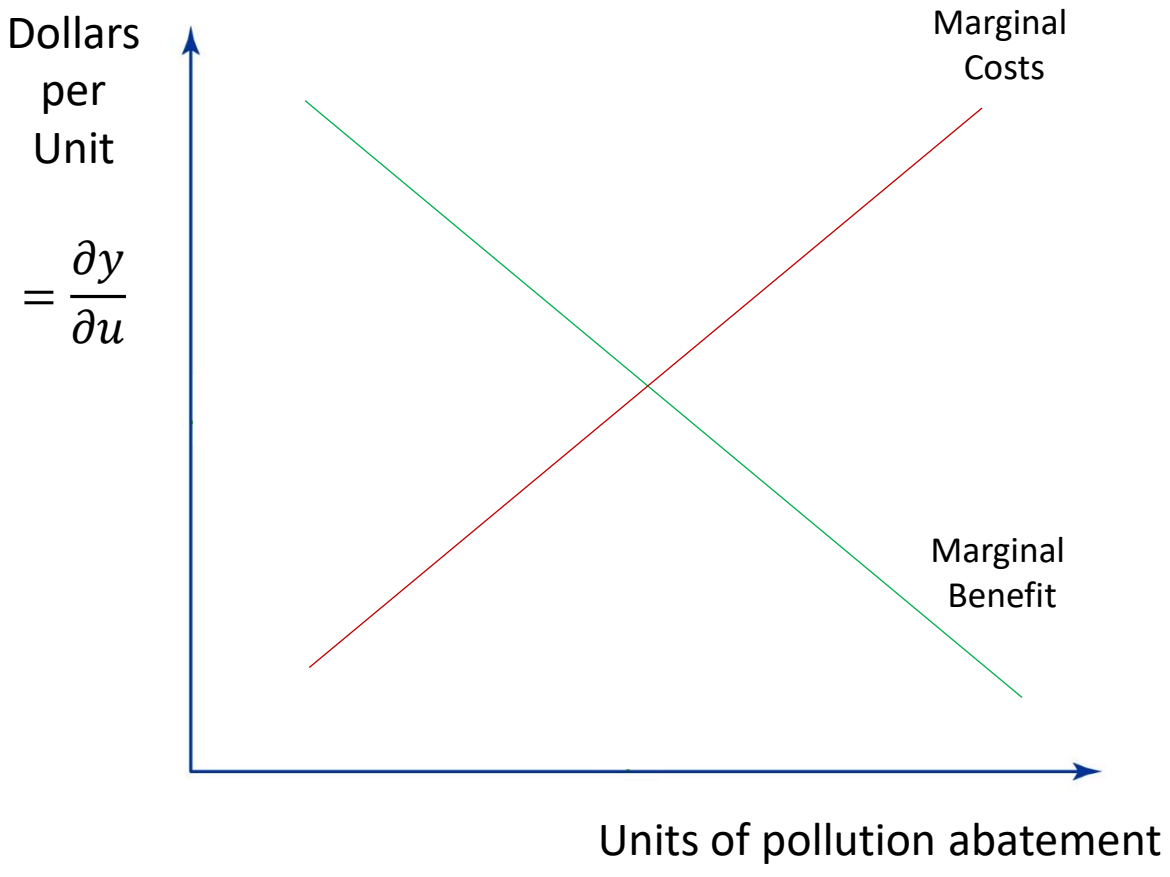


Market for Pollution

Total Benefits and Total Costs

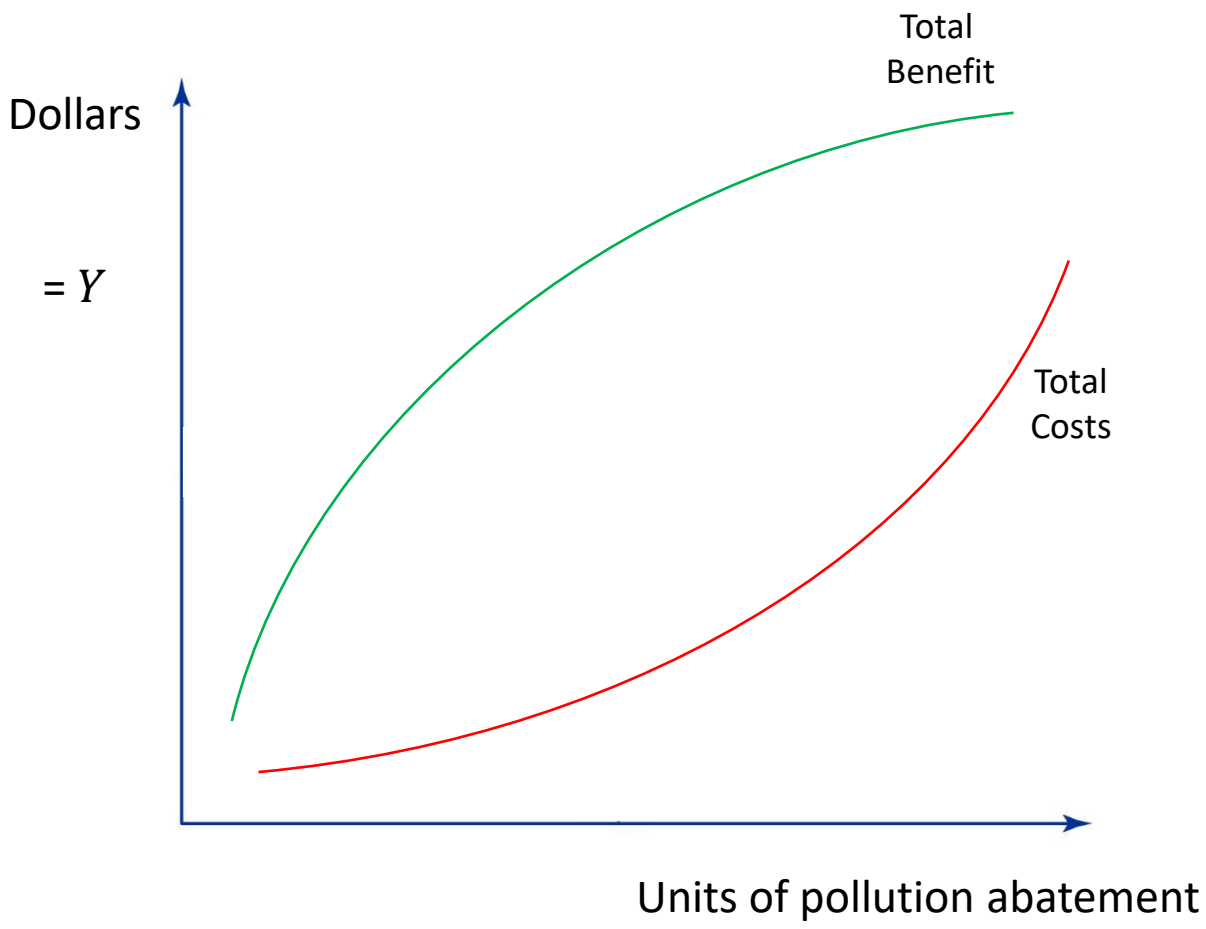


Marginal Benefits and Marginal Costs

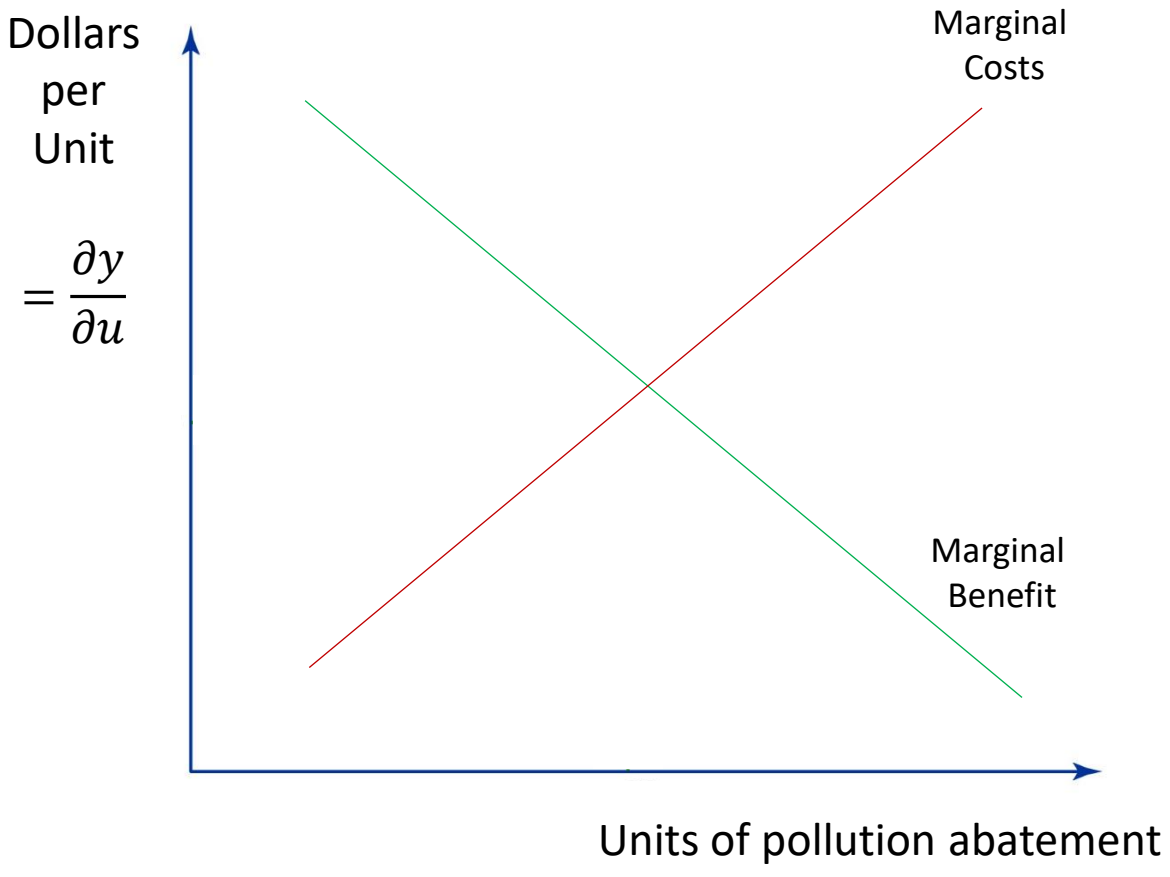


Market for Pollution

Total Benefits and Total Costs



Marginal Benefits and Marginal Costs



Market for Pollution

A "market" for "pollution"…

- There are ***benefits*** from decreasing pollution

  Benefits are decreasing in the amount of pollution abatement

- There are ***costs*** of decreasing pollution

  Costs are increasing in the amount of pollution abatement

Lecture 2b: Why Markets Fail

Prof. Theising

Environmental Economics

Econ 4075

We all have *that* friend

1. *"Anyone who has taken Econ 101 knows…"*
    a. If someone starts a sentence with this, anything that follows is likely to be an incomplete picture of whatever the topic is.

We all have *that* friend

1. *"Anyone who has taken Econ 101 knows…"*
   a. If someone starts a sentence with this, anything that follows is likely to be an incomplete picture of whatever the topic is.

2. Markets are great! But they are *not perfect*.

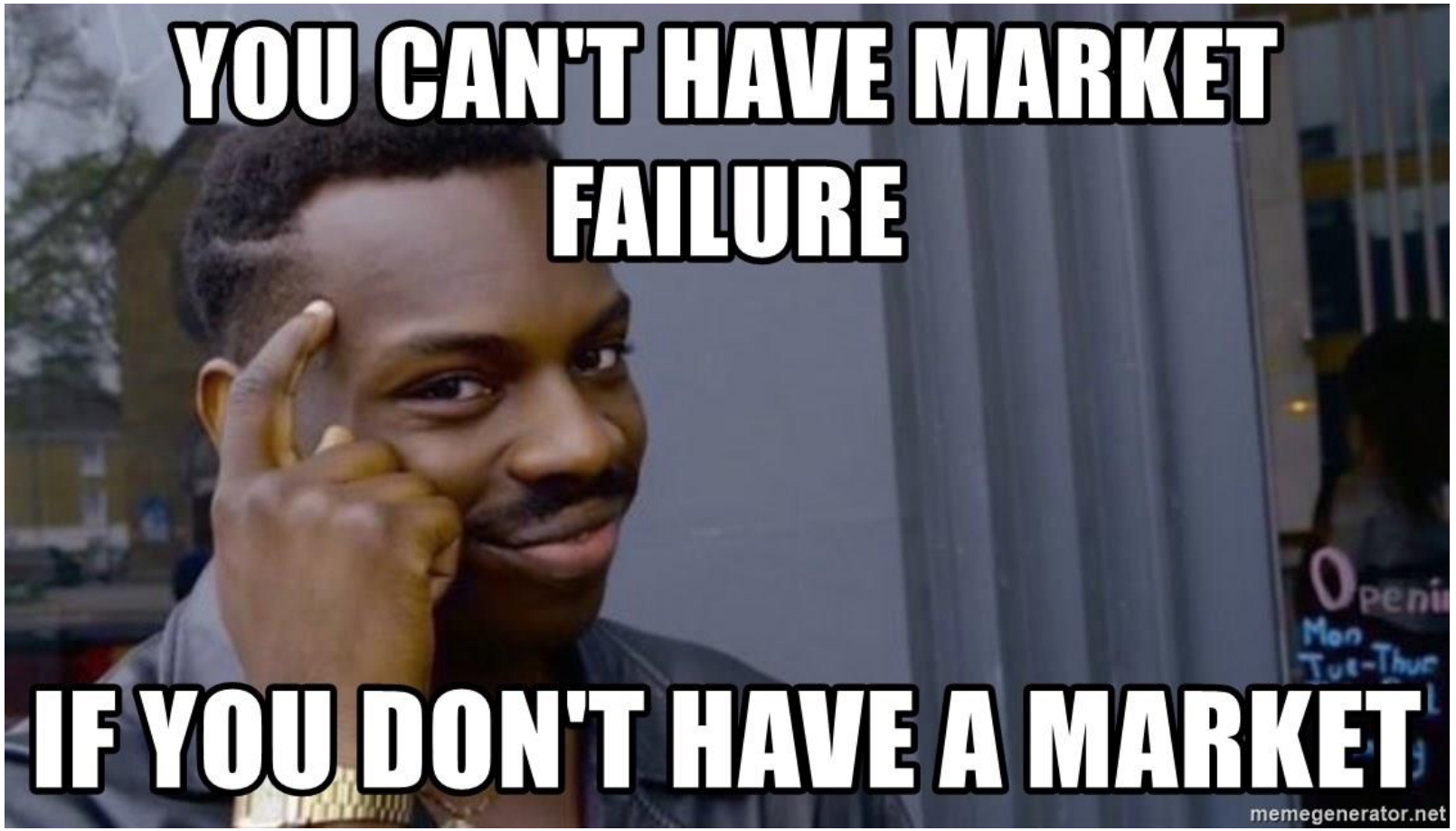
We all have *that* friend

1. *"Anyone who has taken Econ 101 knows…"*
   a. If someone starts a sentence with this, anything that follows is likely to be an incomplete picture of whatever the topic is.

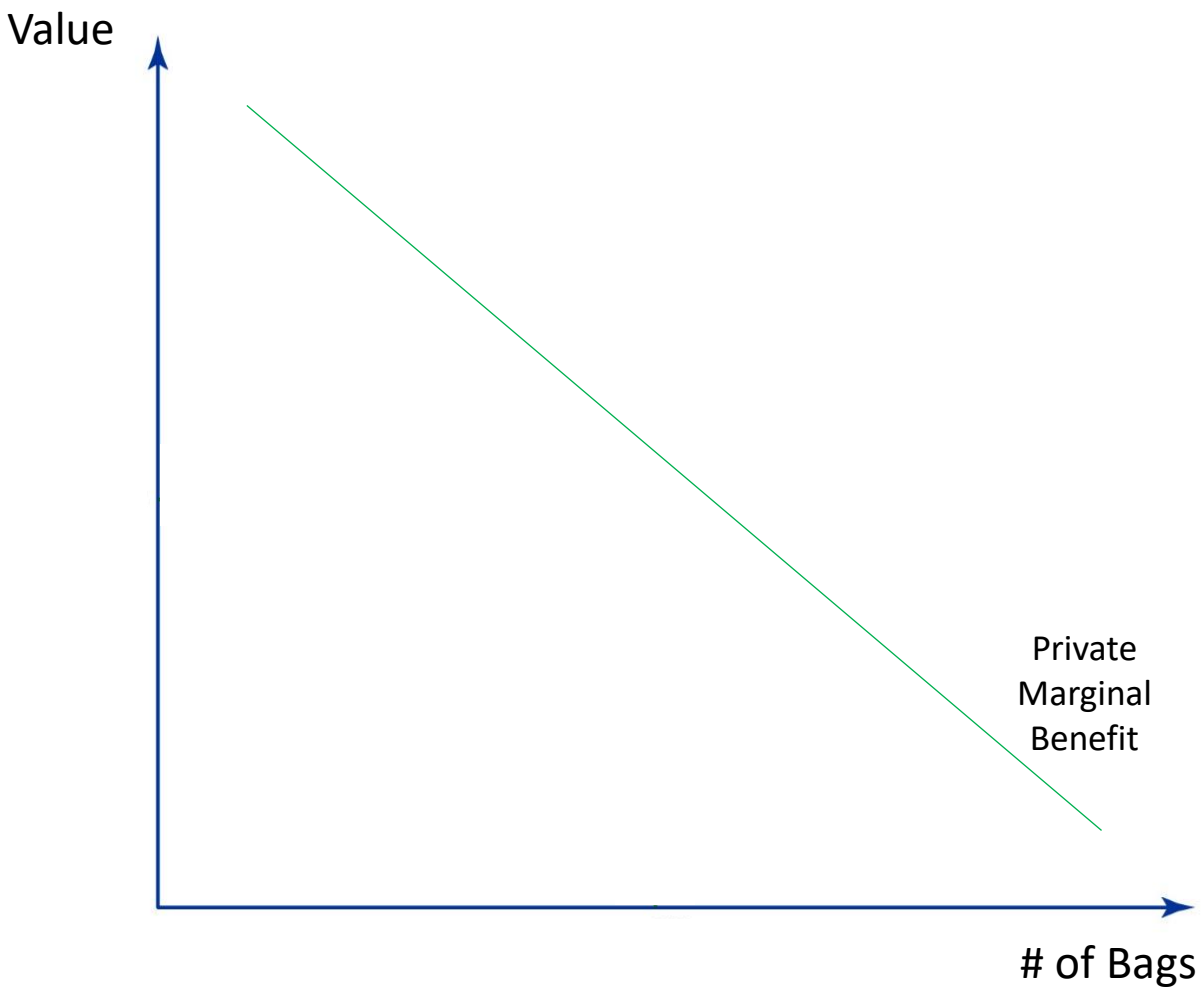
2. Markets are great! But they are *not perfect*.

3. Markets provide powerful incentives for innovation, production, price discovery, a ***general move towards economic efficiency,*** and many more desirable outcomes that improve the wellbeing of societies (note, "wellbeing" is a general term that is used to describe more than just income!)

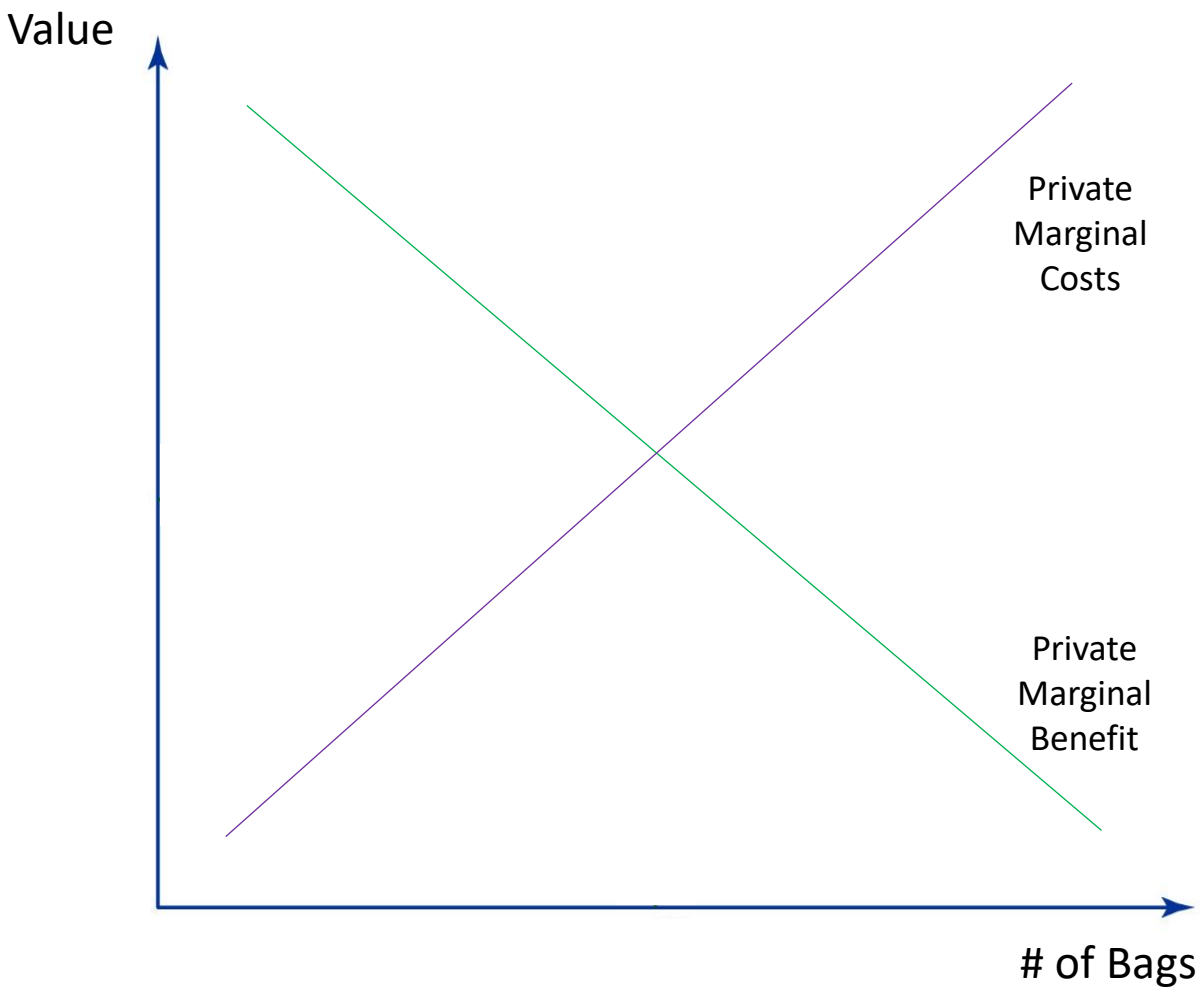
So, “free markets” are bad?



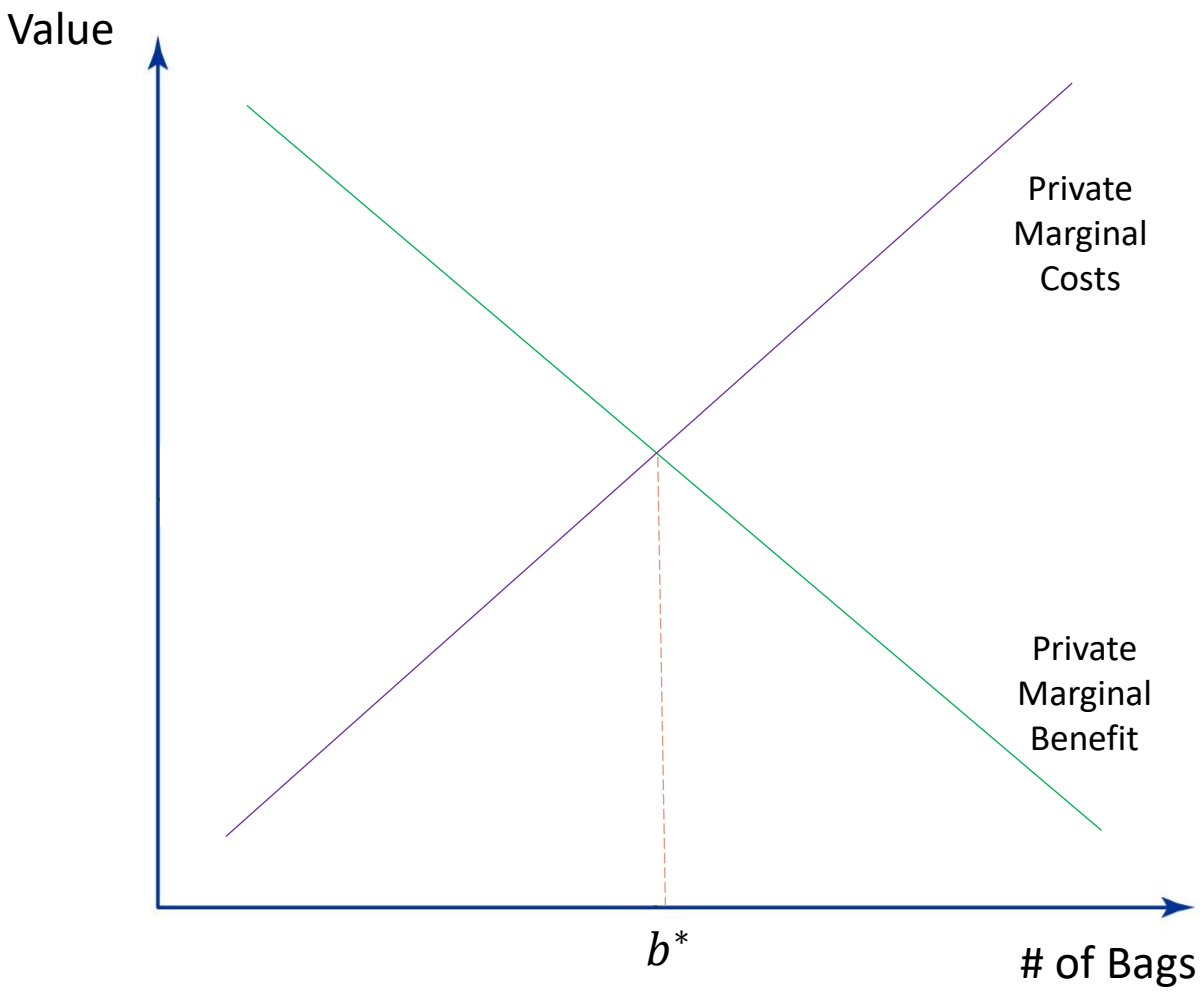
An Example:
The Market for Plastic Bags



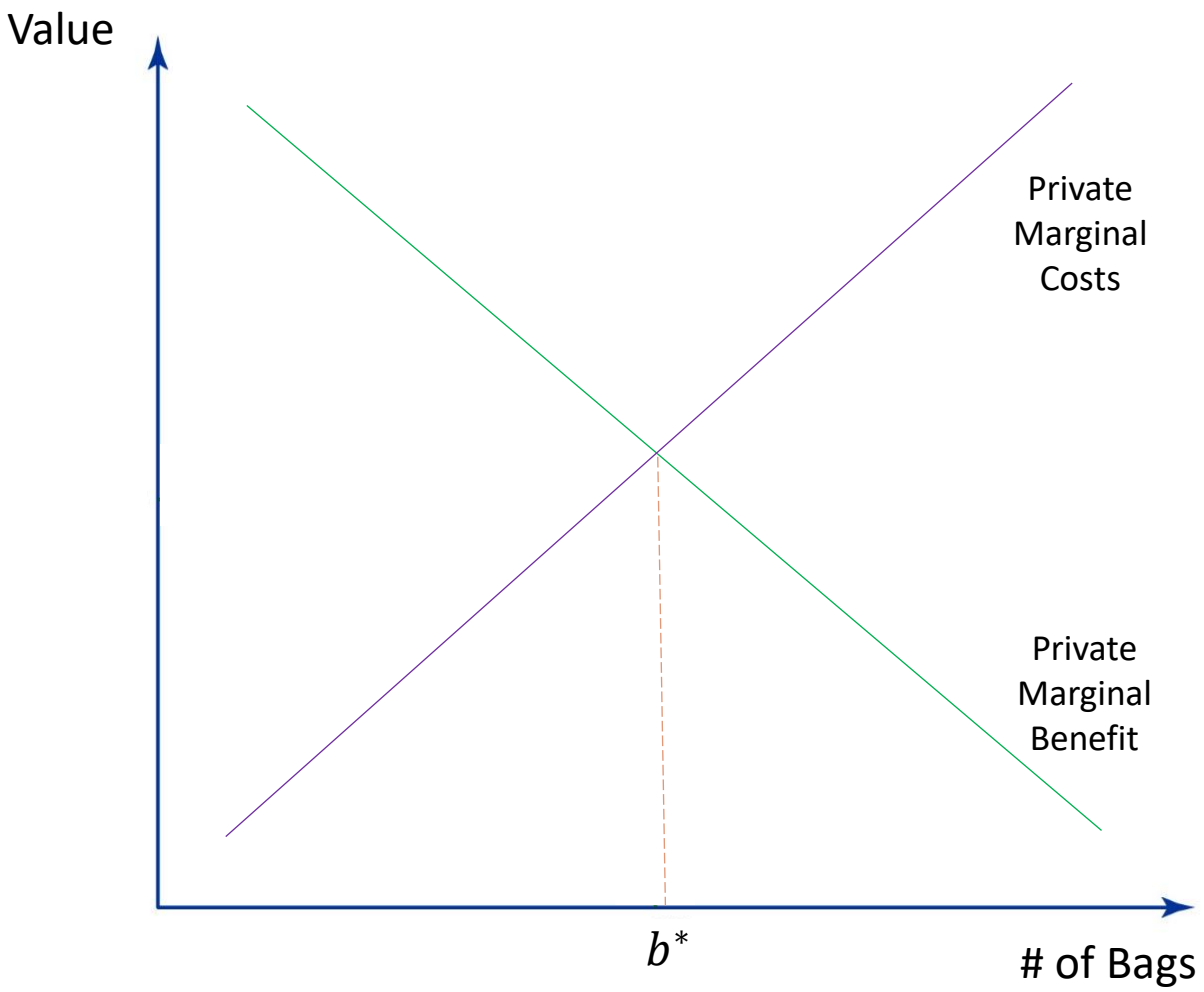
An Example:
The Market for Plastic Bags



An Example:
The Market for Plastic Bags

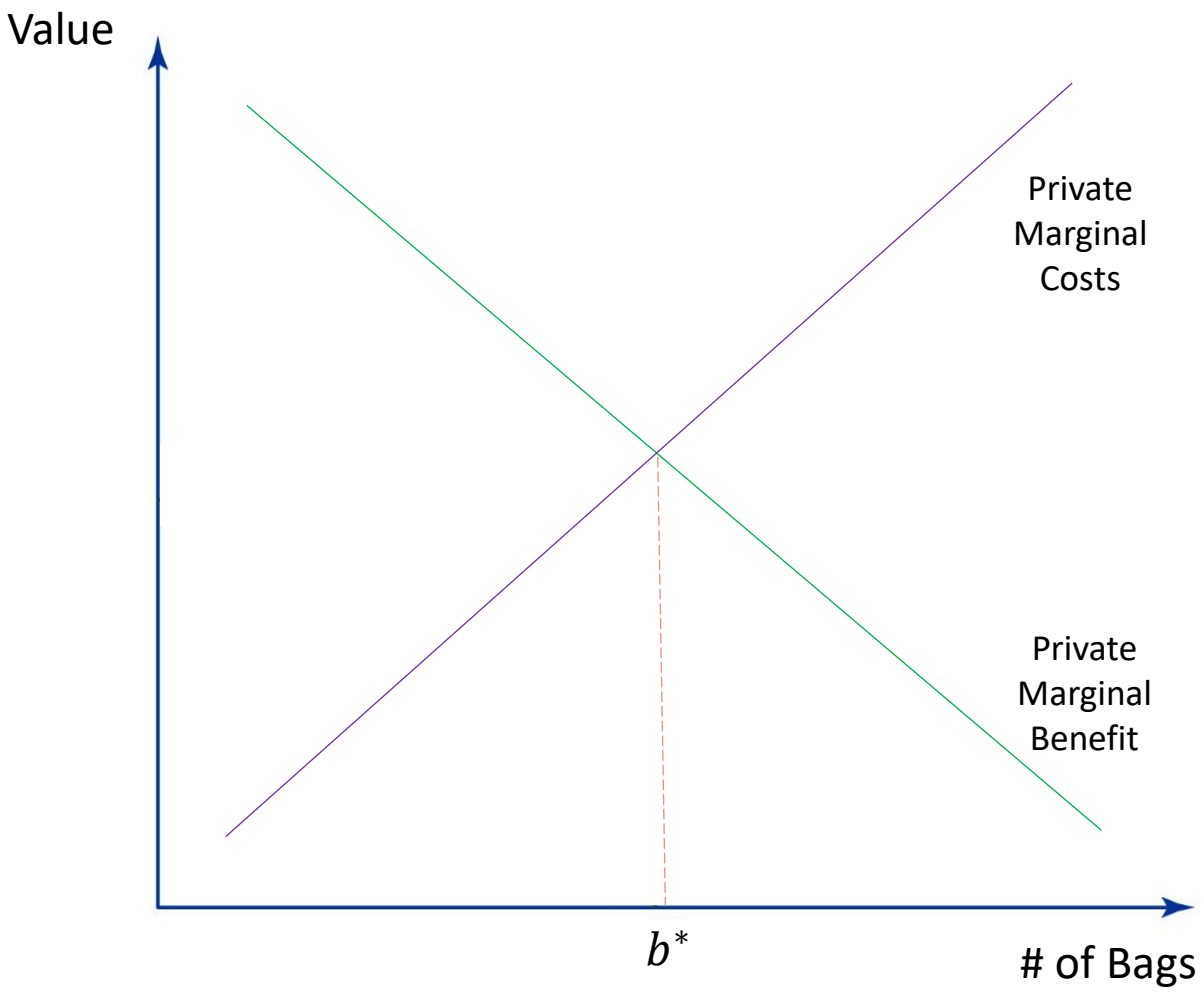


An Example:
The Market for Plastic Bags



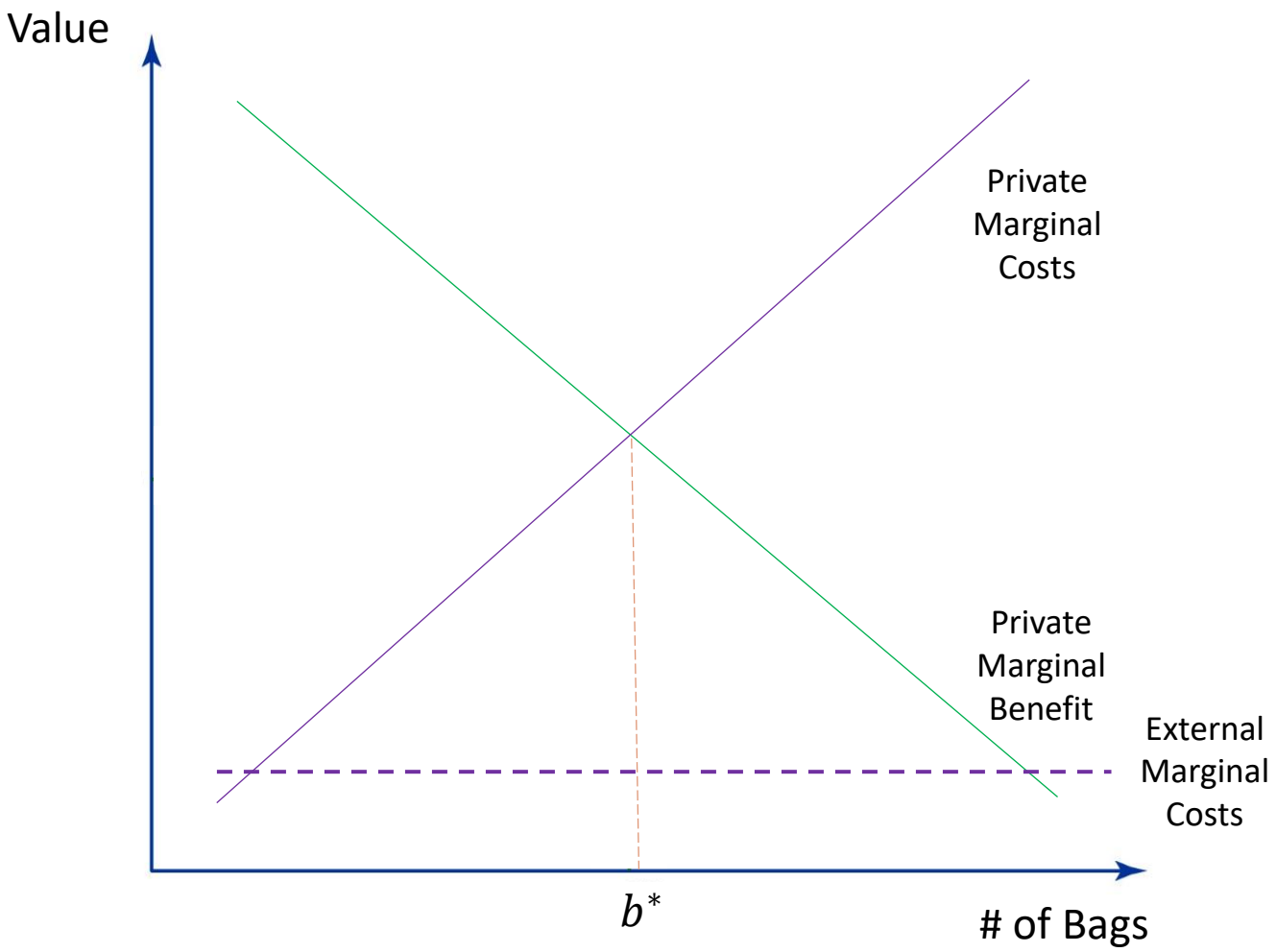
- What's missing?

An Example:
The Market for Plastic Bags



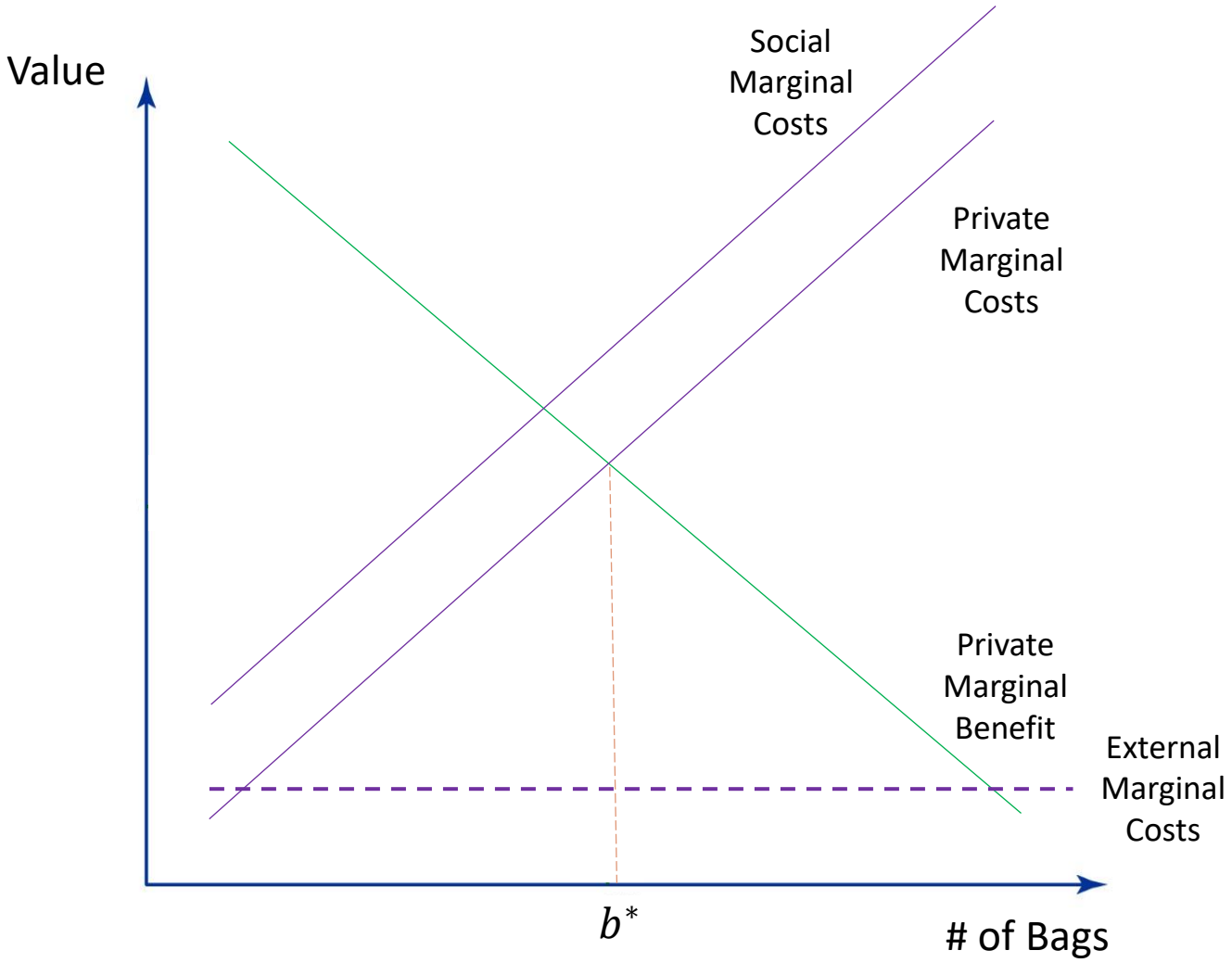
- What's missing?
  - The external marginal cost

An Example:
The Market for Plastic Bags



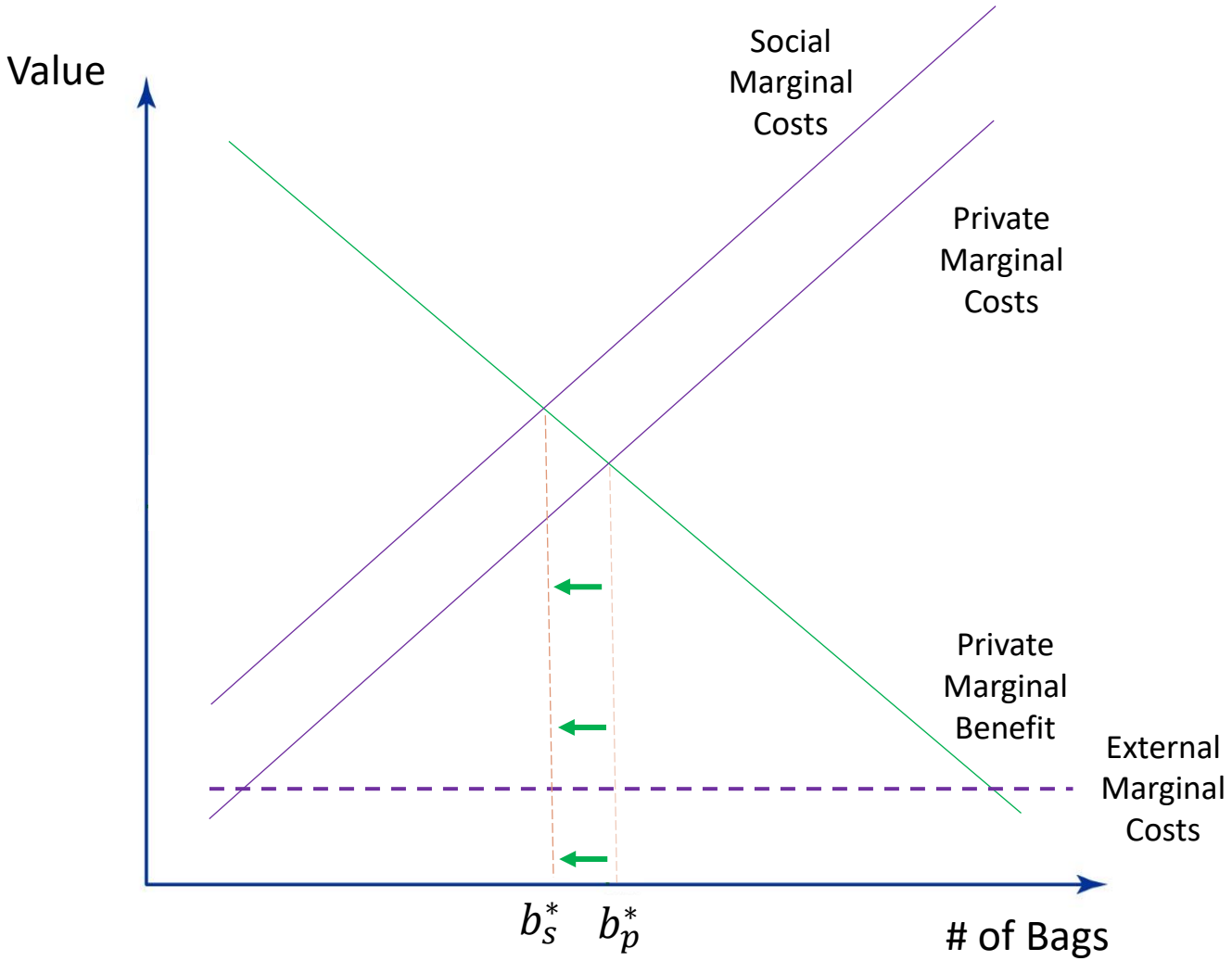
- What's missing?
  - The external marginal cost

An Example:
The Market for Plastic Bags



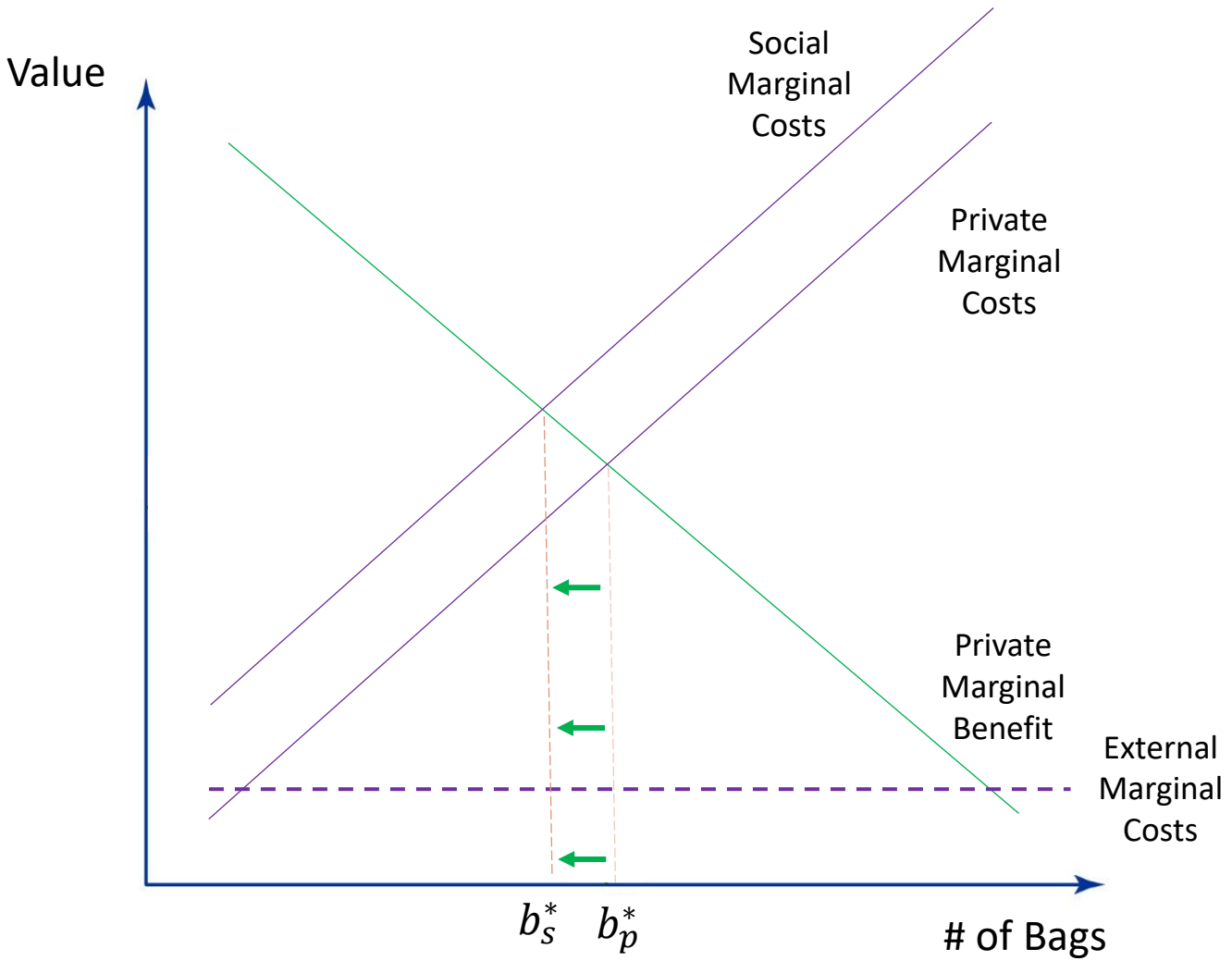
- What's missing?
  - The external marginal cost
- Adding the external cost to the private recovers the (true) social marginal cost

An Example:
The Market for Plastic Bags



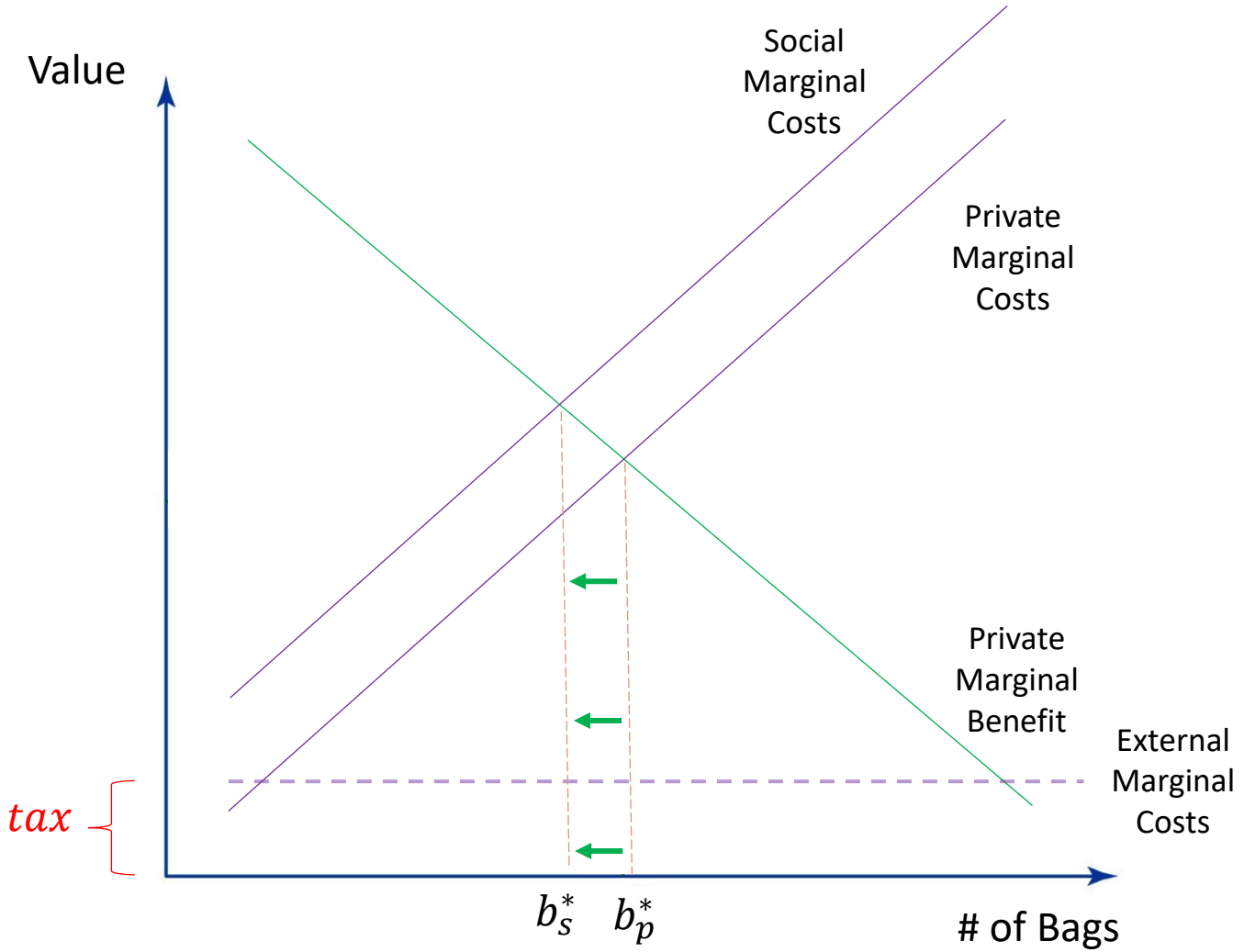
- What's missing?
  - The external marginal cost
- Adding the external cost to the private recovers the (true) social marginal cost
- The socially optimal number of bags is fewer than the private

An Example:
The Market for Plastic Bags



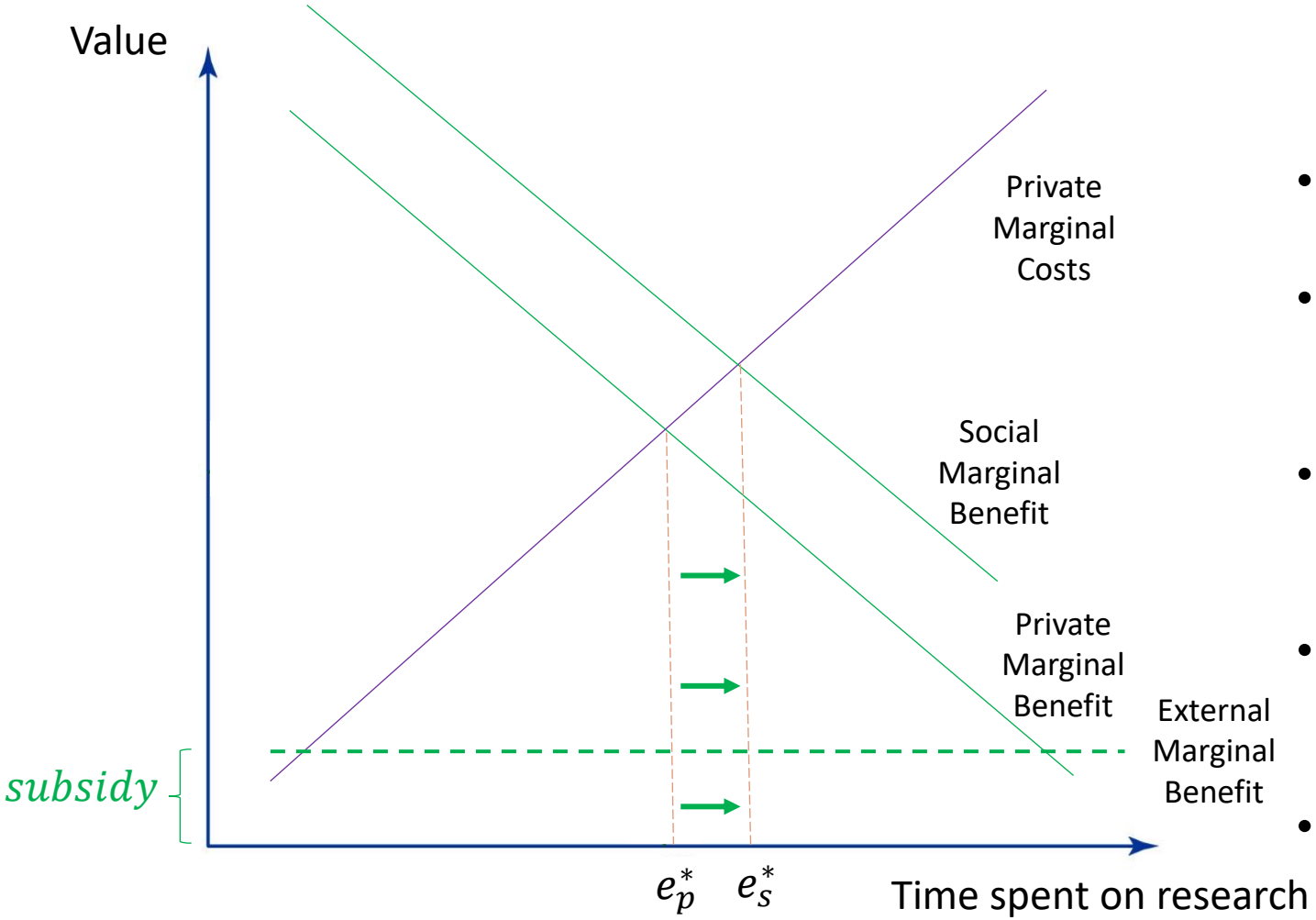
- What's missing?
  - The external marginal cost
- Adding the external cost to the private recovers the (true) social marginal cost
- The socially optimal number of bags is fewer than the private
- What is a possible fix?

An Example:
The Market for Plastic Bags



- What's missing?
  - The external marginal cost
- Adding the external cost to the private recovers the (true) social marginal cost
- The socially optimal number of bags is *fewer* than the private. The private market *overprovides* bags
- What is a possible fix?
  - A *tax* equal to the external marginal cost

An Example:
The Market for Basic Research



- Basic research: scientific research largely driven by curiosity, without an immediate "real-world application" in mind.
- Here: the externality is a "good".
- The private market typically *underprovides* basic research.
- A government *subsidy* (often in the form of grants) can help correct this market failure
- In this context, is the external marginal benefit actually fixed (flat)?
- Try drawing an example of what you think external marginal benefits are

Example from Game Theory: a Static Externality

Person A \ Person B	Mouth Shut	Tattle
Mouth Shut	A: 3 years in jail B: 3 years in jail	A: 10 years in jail B: 2 years in jail
Tattle	A: 2 years in jail B: 10 years in jail	A: 8 years in jail B: 8 years in jail

Another Example from Game Theory: Dynamic Externalities

- Let's play a game…
- Everybody is going to pick a number between 0 and 100, and write it on a piece of paper. (But read the rules below before choosing!)
- The person whose chosen number, X, is closest to 75% of the class average gets **X/20 extra credit points** on the midterm.
  - E.g. if the class's average number is 80, the person who guesses closest to 60 wins 3 extra credit points (60/20)
  - Any ties determined by coin flip, or drawing straws

Game #2: Public good provision

- Note: **the winning player will be randomly selected after you submit your bids.** (This is called incentive compatibility: it means it's in your interest to play for real ☺)

- In this game, you are endowed with 5 units of "labor"
  - You can allocate this time, in one unit increments, either to your "private" use or contribute it to the "public project".
  - You start with 0 extra credit points earned.

- For every hour of labor donated by the class to the public project, you can **add 0.05 extra credit points** to your score on the midterm exam
  - E.g. there are ~45 students. If everyone contributes 5 hours, you can add up to 11.25 extra credit points to your score on the midterm

- BUT: your labor is privately costly… for every unit of labor that you contribute to the public project, **subtract 2 extra credit points** from your midterm exam. (Yes, you could go negative here…)

- On your piece of paper, write down the # of labor units you contribute to public project.
  - (This should be an integer between 0 and 5)

Market Failures

There are many different types or root causes of market failures. Think of some examples under each of these categories.

1. Information Asymmetries
   - One party in a transaction knows more than the other

2. Market Structure/Power
   - One party can influence the market equilibrium

3. Public Goods
   - Nonrival and nonexcludable

4. Externalities
   - Private actions have unintended effects

Resources for Learning R
(and other useful tools for data science)

1. Note: These are some references for those who are eager to start using R or anxious about the prospect of coding. Not required!

2. Introduction to R for Economists
    i) Great video series (with links and replication code!) for just getting started (i.e., if you've never even installed R before)
    ii) He has many other advanced videos (masters, Phd, etc.) that are well done. With replication code and data.

3. Data Science for Economists
    i) PhD-level data science course, but very accessible once you learn the basics of R.
    ii) Lecture 4 specifically covers R. But the whole course covers the necessary pieces for building a reliable and efficient data science ecosystem.
    iii) Having *some* experience programming experience is useful, but not required.