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Economics of the Global Commons

15.023 Lecture

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Terms to Learn

- Externalities (positive and negative)
 - Uncompensated (non-market) interaction
- Tragedy of the Commons (Harding)
- Marginal Cost/Benefit

Outline

- Market Failure and Environmental Issues
- Working on the Margin
- Instruments to Correct Market Failures

Basic Assumptions of Markets

- Market efficiency depends on:
 - Perfect information
 - Perfect or complete competition
 - No single entity can influence prices
 - Clear and complete property rights
 - No transaction costs
 - Rational behavior

Market Imperfections

- Externalities
- Incomplete Property Rights
 - Non-exclusive/non-rival, eg. Public goods
 - Tragedy of the Commons
- Imperfect Competition
- Imperfect Information
- Transaction Costs

Public vs. Private Goods

	Excludable	Non-excludable
Rival	Private Goods	Common-pool resources (jogging path)
Non-rival	Club Goods (cable TV shows)	Pure Public Good (clean air, national defense)

Important: Free markets only optimize production of private goods w/ internalized costs

Tragedy of the Commons

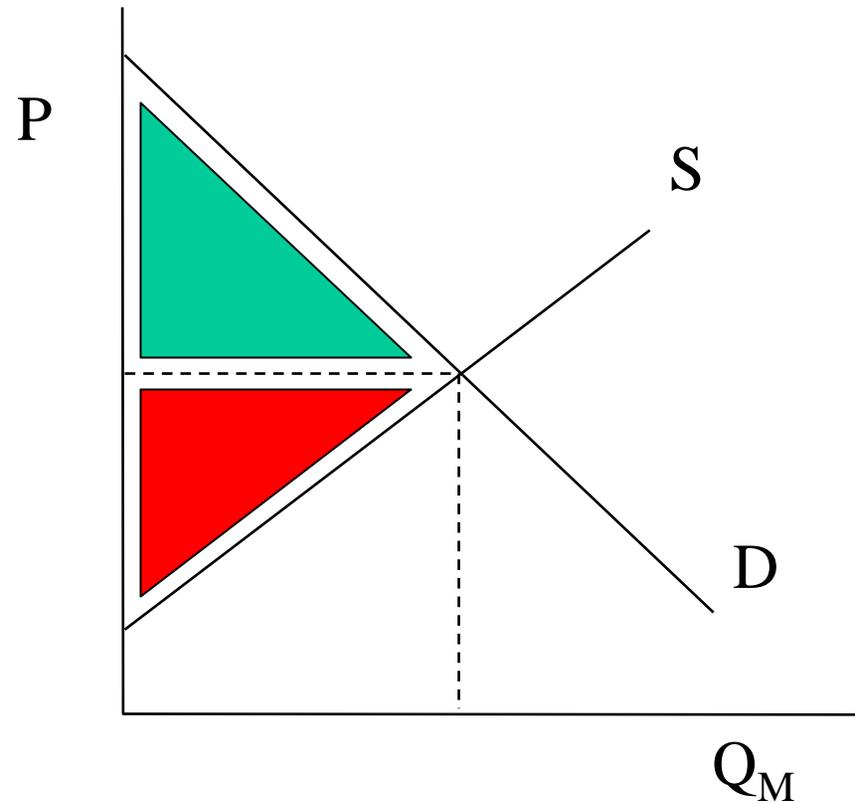
- Original Point: Population Growth.
- Original comparison: A “Commons” (or pasture):
 - Private benefit (PB) of grazing
 - Social cost (SC) of grazing (degradation of resource)
 - Even if $PB < SC$, people keep bringing cows because $PB > 0$!
- Solutions:
 - “Mutual Coercion” (e.g., regulation)
 - Privatization
- Other examples:
 - Free Christmas parking.
 - Fishing
 - ?

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Supply and Demand

- An ideal market maximizes societal surplus

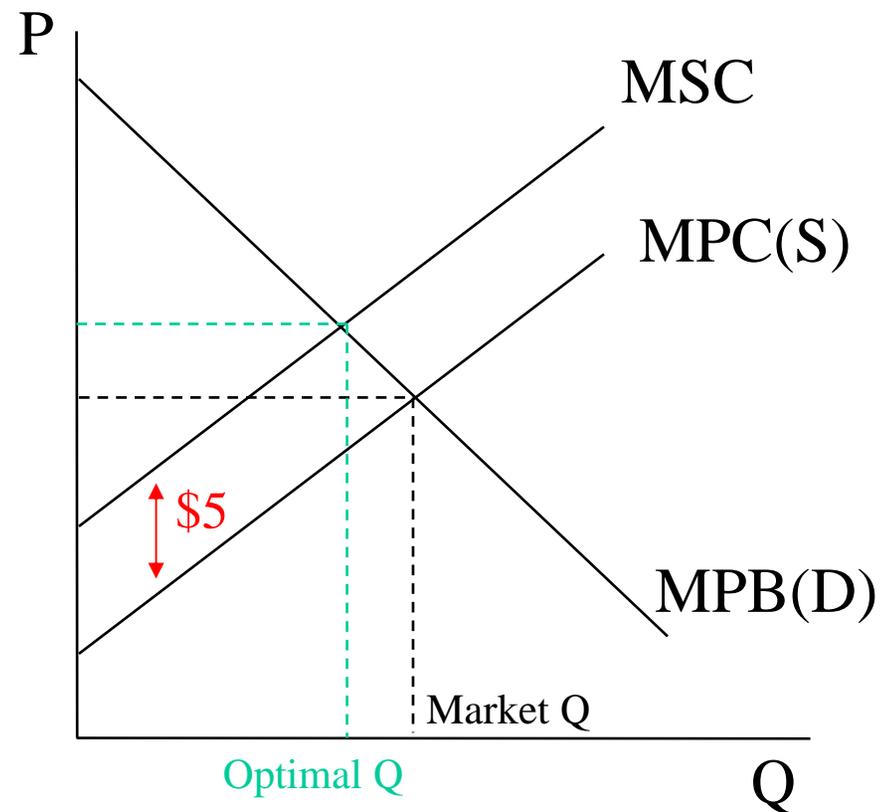


Externalities in the Market

An externality is an impact outside the transaction.

Example: For every unit produced, particulates are emitted causing \$5 of health damage

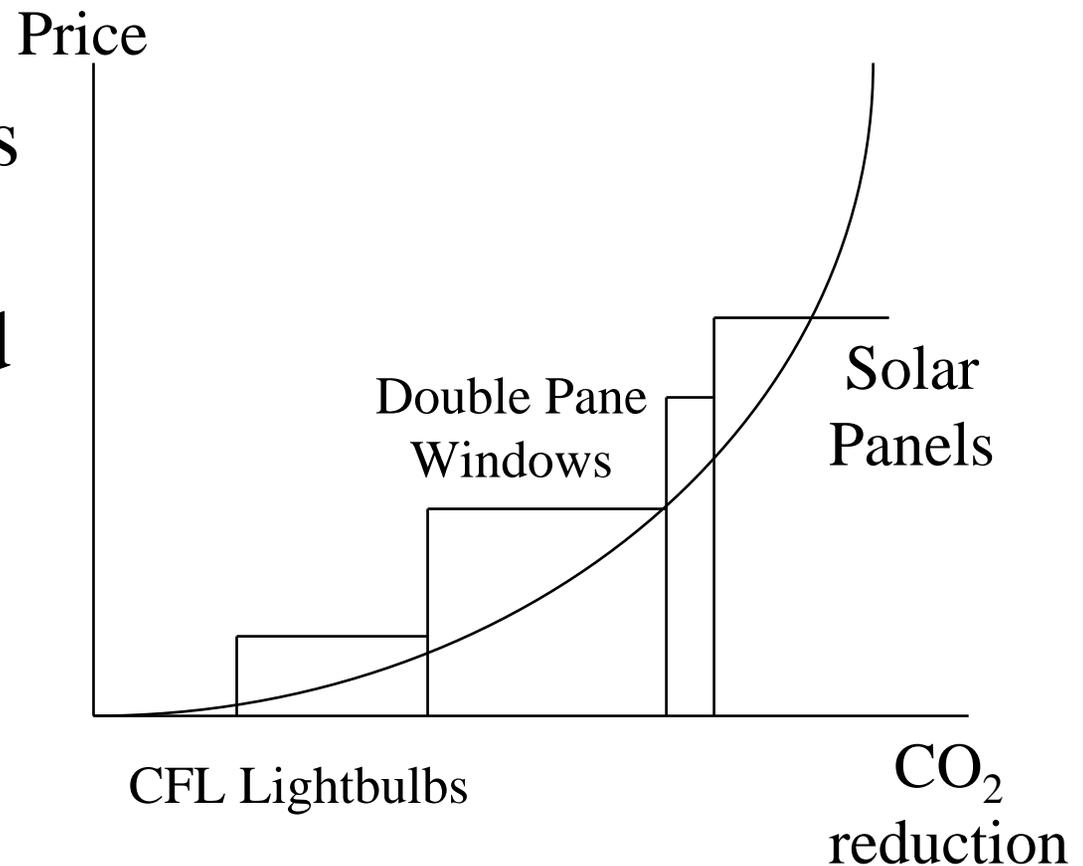
We can “internalize” the externality by using a tax or a quota system. This achieves optimal Q , but there are still distribution questions...



MPC/MPB: marginal private cost/benefit
MSC: marginal social cost

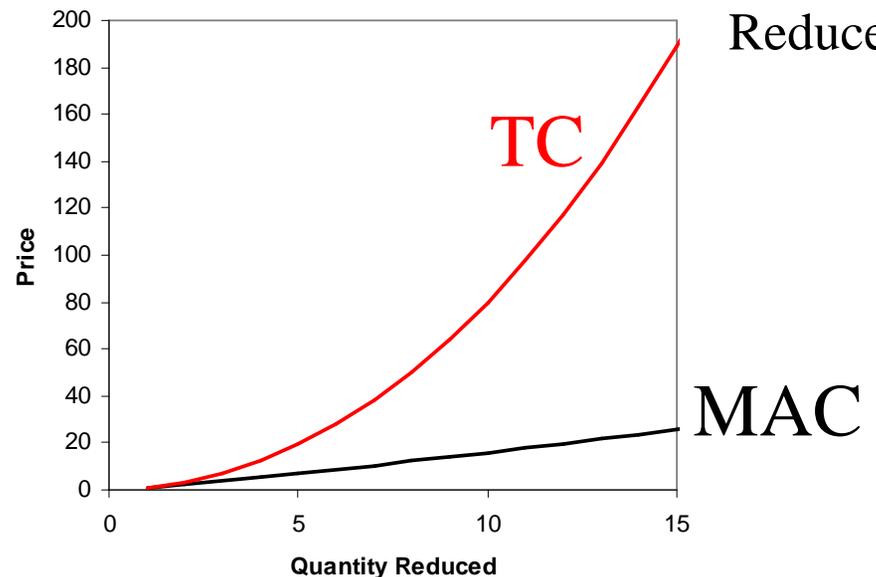
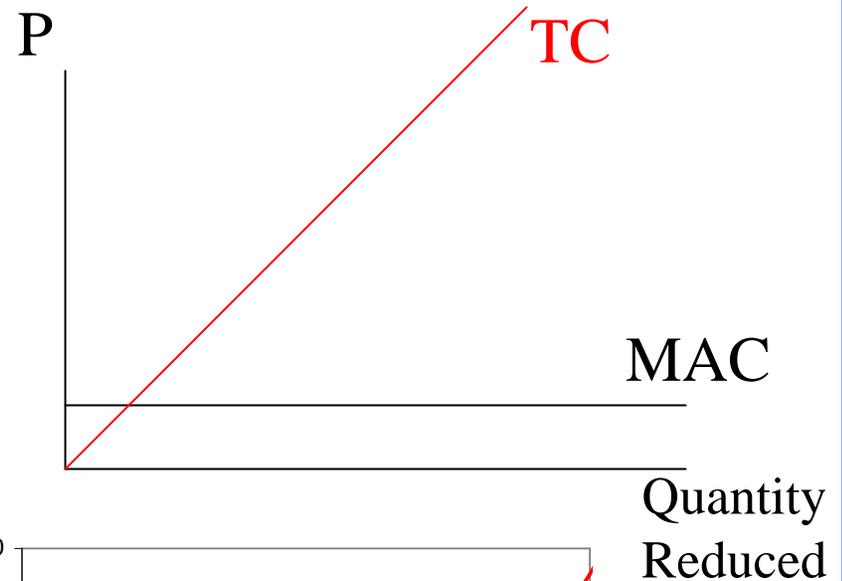
Marginal Abatement Cost

- “MAC curve”
- Include all options for emission reduction, ordered by price, with quantity available at that price



Marginal Costs/Benefits

- The marginal cost is the cost of the next unit produced (or next ton of emission reduced). It is equal to the slope of the total cost.



Marginal Costs/Benefits

- The advantage of using the marginal cost is that decisions are “made at the margin”:
 - So comparing marginal benefit with marginal cost will tell you what decision to make
 - Difference between “private” marginal cost/benefit and “social” marginal cost/benefit

Setting the Target

- Cost/Benefit Analysis (MAC = Marginal Damage)
- Valuation
 - Non-material goods and Public Goods have no property rights: Therefore there exists a need to determine “WTP”: Willingness to Pay
 - “Contingent Valuation” Surveys
 - Surrogate Markets (travel costs to parks, noise impact on price)
 - Experimental economics
 - Replacement Costs
 - “Existence value”

Outline

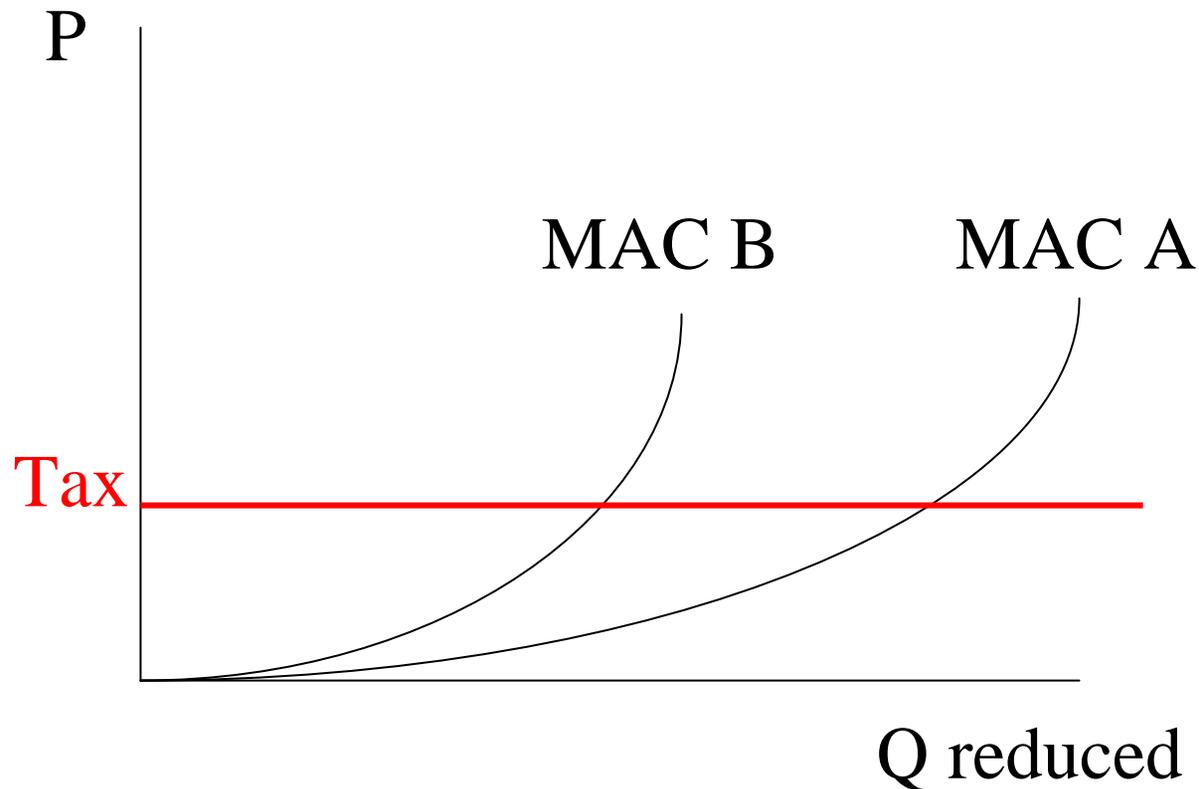
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Instruments to Correct Externalities

- Command and Control (Quantity and/or tech)
 - E.g., install scrubbers, catalytic converters, etc.
 - Either specific technology, emissions rate, or emissions level for each emitter.
- Tax (price)
 - Price per quantity emitted
- Cap and Trade (market)
 - Total quota: participants allowed to sell allowances back and forth

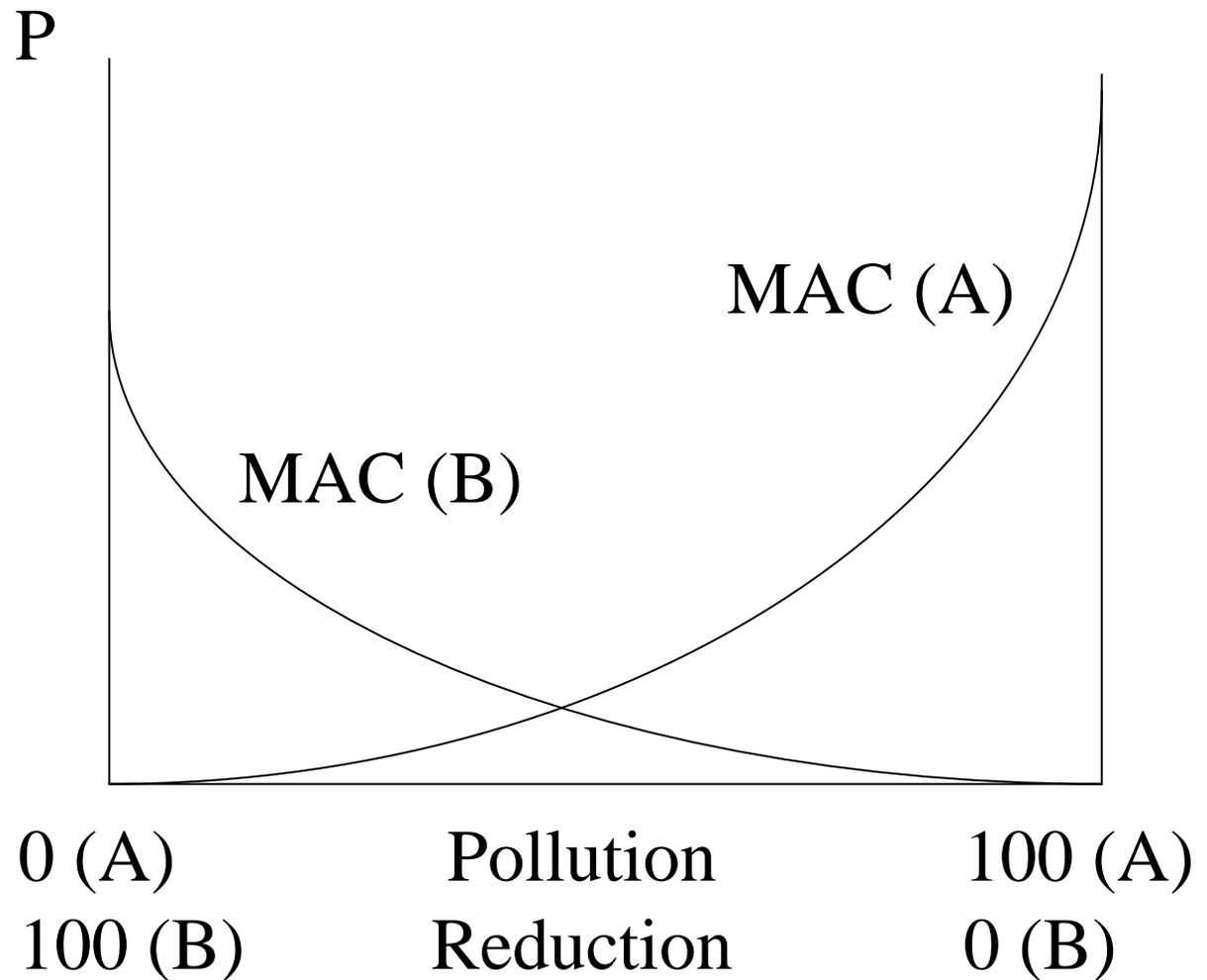
Taxes and MAC Curves

A tax (as opposed to “command and control”) ensures “efficient” abatement allocation



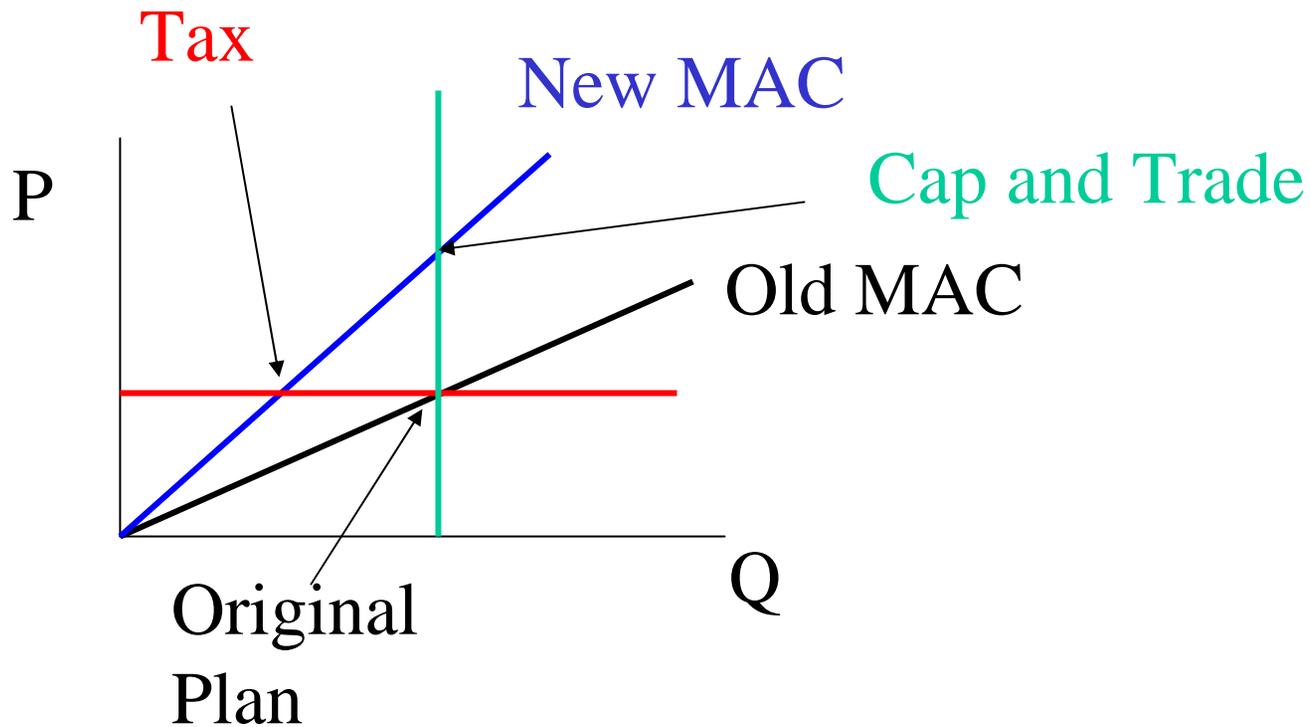
Cap and Trade and MAC curves

100 Units of
Reduction, 2
companies:



Marginal Abatement Curves

Tax vs. Cap+Trade



Constant Cost or Constant Quantity?

More on Cap and Trade

- Safety Valves
- Intertemporal Trading
 - SO₂ market, early reduction credits
- Initial Allocations
 - Grandfathering
 - Auctions

Other Topics

- How do you choose an instrument (monitoring, enforcement, etc.)?
- Upstream vs. Downstream instruments
- Social justice movement
- Polluter Pays Principle
- Discount Rate
- Pareto Efficient Improvements
- Free Rider
- Coase Theorem

Questions

Discount Rate

- Composed of:
 - Rate of Time preference
 - Marginal productivity of capital * marginal utility of money
- Discount Rate is not Inflation: we use “constant” dollars
- Usual expression:

$$B_t = (1 + r)^{-t}$$

- Net Present Value = sum of all time periods, appropriately discounted.
- Value judgment? Revealed preference? Long time horizon?