



# **BENEFITS OF ENVIRONMENTAL QUALITY**

# LESSON OBJECTIVES

01

Define and categorize economic benefits

02

Define the different methods of non-market valuation

# ECONOMIC EFFICIENCY

$$MC=MB$$

## PROBLEM:

How do we  
quantify marginal  
benefits and  
costs?

**01**

**DEFINE AND CATEGORIZE  
ECONOMIC BENEFITS**

# HOW MUCH FOR A SNICKERS BAR?



- What are the benefits?
- How could we quantify the benefits?
- How could we evaluate policy that makes them cheaper/more expensive?

# APPLIED TO ENVIRONMENT: PARCEL OF WOODED LAND

Do you or others care about it?

- What would you be willing to give up in exchange? (WTP)

Is the value from the wooded land higher than the value from development?

- How would the developer know?

People do not pay for the environment (incomplete market), so how do we determine demand?



# HOW ECONOMISTS MEASURE VALUE...

Economists typically measure value by what you would be willing to give up, or, your *willingness to pay*.





## **5 POINTS ABOUT WTP**

- 1. WTP IS A MAXIMUM VALUE**
- 2. NO PAYMENT REQUIRED**
- 3. VALUE IS HUMAN CENTERED**
- 4. VALUE DEPENDS ON THE  
INDIVIDUAL**
- 5. WTP IS NOT ALWAYS EQUAL TO  
WTA**

# I. WTP IS A MAXIMUM VALUE

WTP measures the point at which you are indifferent or the maximum you would be willing to pay

Example: I would be just as happy with a snickers bar as I would to have \$2.50.

## **2. NO PAYMENT REQUIRED**

If my WTP for a parcel of wooded land outside my apartment is \$1,000, I do not actually have to pay the \$1,000.

WTP is just a concept of value.

### 3. VALUE IS HUMAN CENTERED

Value, as economists measure it, is about the satisfaction *humans* derive

- Only human satisfaction matters
- No right or wrong in what people derive satisfaction from

## 4. VALUE DEPENDS ON THE INDIVIDUAL

Value is determined by one's own perception.

There is no "right" value as determined by others.

Example: Hummer vs. Prius driver

## 5. WTP IS NOT ALWAYS EQUAL TO WTA

*Willingness to Accept (WTA)* measures the least you would accept for the loss of a good or service

Example: If I owned a snickers bar, I would be just as happy with \$2.50

## 5. WTP IS NOT ALWAYS EQUAL TO WTA

The distinction of WTP vs. WTA depends on property rights

WTP for parcel

- You pay developer, so developer has rights

WTA for parcel

- Developer pays you, so you have rights

## 5. WTP IS NOT ALWAYS EQUAL TO WTA

Property right assignment often determined by status quo

WTA oil drilling in Alaskan Wildlife Refuge

- You have property rights (WTA future loss)

WTP clean up 1989 *Exxon Valdez* spill

- You don't have property rights (WTP for gain)



## 5. WTP IS NOT ALWAYS EQUAL TO WTA

Say you value a snickers bar at \$2.50

If you have the snickers bar what is your WTA?

- \$2.50

If you don't have the snickers bar what is your WTP?

- \$2.50

In theory  $WTP=WTA$ , but not always in practice...

## 5. WTP IS NOT ALWAYS EQUAL TO WTA

Why might WTP not equal WTA in practice?

How much would you be WTP to prevent the destruction of the Great Barrier Reef?

- \$100?, \$1,000?, \$10,000?

How much would you be WTA for the destruction of the Great Barrier Reef?

- No amount large enough (Infinite)

## 5. WTP IS NOT ALWAYS EQUAL TO WTA

Why might WTP not equal WTA in practice?

1. Income Effect

WTP is constrained by income

2. Endowment Effect

People have an aversion to loss

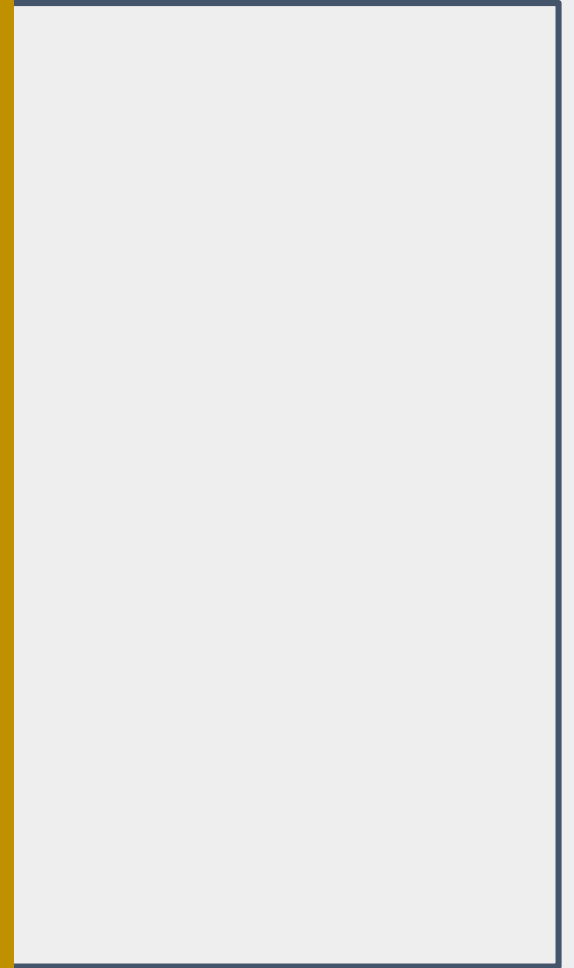
## 5. WTP IS NOT ALWAYS EQUAL TO WTA

While WTA might be a more accurate representation of value, we will focus on WTP

- Easier to measure
- More often used



**WHAT DO PEOPLE DERIVE  
VALUE FROM?**



# WHY WOULD YOU BE WILLING TO PAY TO PRESERVE WOODLANDS?

1. Enjoy going through walks through them
2. Regulates weather and climate conditions
3. Like knowing you could go for a walk through them
4. Want others (maybe your future children) to be able to walk through them
5. Like knowing it preserves biological diversity

## USE VALUE

*Use values* involve direct enjoyment or consumption of an environmental good

## NONUSE VALUE

*Nonuse values* involve benefits derived from the existence of an environmental amenity but not from its direct use



Can be separated into two categories:

1. Direct use

Values people hold for consumptive and non-consumptive use

2. Indirect use

Values people hold for the services provided by species and ecosystems

**USE VALUE**

# NONUSE VALUE

Can be separated into two categories:

1. Bequest  
Values people hold for satisfaction of knowing that other people have access
2. Existence  
Values people hold for satisfaction of knowing it exists

# OPTION VALUE

Value of knowing you or others have the option.

Not a distinct element of total value, but a component of other elements

# TAXONOMY OF TOTAL VALUE

USE VALUES		NONUSE VALUES	
Direct-use value	Indirect-use value	Bequest Value	Existence Value
Benefits of recreation	Maintain Soil Fertility	Preserving for future generation	Maintain biodiversity
Provide Visual Amenities	Regulate climate and weather conditions		Maintain culture and heritage

# ATTENDANCE ACTIVITY

Categorize the following as use or nonuse and then as direct use value, indirect-use value, existence, bequest, or option values

1. Enjoy going through walks through them
2. Regulates weather and climate conditions
3. Like knowing you could go for a walk through them
4. Want others (maybe your future children) to be able to walk through them
5. Like knowing it preserves biological diversity

# ATTENDANCE ACTIVITY

Categorize the following as use or nonuse and then as direct use value, indirect-use value, existence, bequest, or option values

1. Enjoy going through walks through them
  - Direct-use Value
2. Regulates weather and climate conditions
  - Indirect-use Value
3. Like knowing you could go for a walk through them
  - Option Value
4. Want others (maybe your future children) to be able to walk through them
  - Bequest Value
5. Like knowing it preserves biological diversity
  - Existence Value

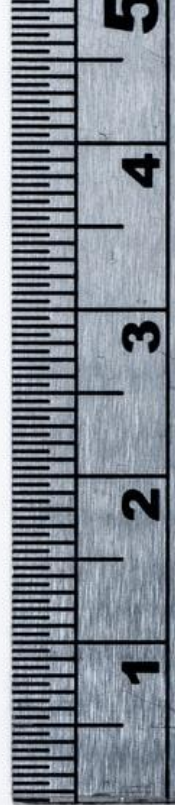
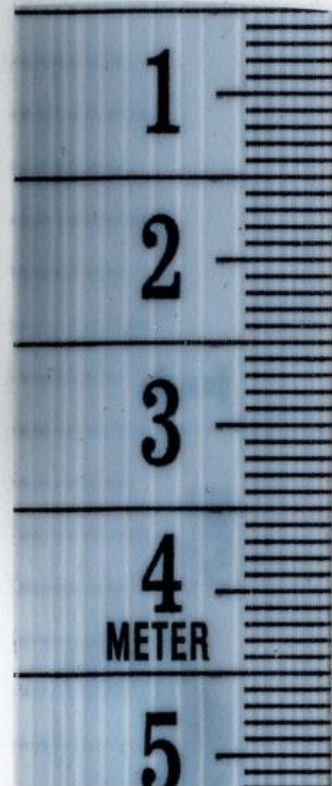


**02**

**DEFINE METHODS OF  
MEASURING BENEFITS**



HOW DO WE  
MEASURE THESE  
VALUES?



## LET'S RETURN TO THE SNICKERS BAR...

What can I do to determine consumer's WTP for a Snickers bar?

I could gather data on prices and quantities and construct a demand curve.

This requires observations of *many* exchanges of Snickers bars.

## LET'S RETURN TO THE SNICKERS BAR...

What if I wanted to know the value of Yellowstone National Park?

How often does the government sell National Parks?

If markets exist for an environmental good, we can measure benefits using the market outcomes.

**Example:** effect of reducing acid rain on timber harvests

## **PROBLEM:**

Many environmental goods and services are not traded in markets

Only captures use value

**HOW DO WE MEASURE BENEFITS IN THE  
ABSENCE OF A MARKET?**

**THIS IS WHERE ECONOMISTS COME IN!**

## TWO APPROACHES TO MEASURING BENEFITS

1. *Revealed Preference*  
Observe behavior indirectly  
in related markets.
2. *Stated Preference*  
Just ask!

# TAXONOMY OF METHODS:

	Observed/Revealed Values	Stated/Hypothetical Values
Direct Method (Directly observe value)	Market prices	Contingent Valuation
Indirect Method (have to infer value)	Travel Cost Models Hedonic Models Averting Behavior Models	Choice Experiments

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