At beginning: Hand out Odwalla bars

PASTURE 1: OVERVIEW

Question: What is the key feature of an environmental good?

Answer: there is no price

Right Board 1

Say that we're drawing MWTP for pollution

Question: Is MWTP positive or negative?

Answer: Negative: pollution is a bad, not a good.

- Draw downward sloping negative MWTP curve for pollution.

Question: Who can tell a story about the concavity of this function?

Question: How is this influenced by income?

Answer: Higher income => higher MWTP. (Environmental quality is a *normal good*.)

Question: How do I get the marginal damage function from this?

MD = negative of MWTP.

- Draw MD function

Question: Let's say we have a policy that takes pollution from e0 to e1.

What is the MWTP?

What is the WTP for this policy?

What is the change in consumer surplus generated by the policy?

What's the price of pollution?

-0

-Although the optimal (Pigouvian) charge is p(e1) if e1 is the social optimum.

MWTP vs. MWTA

- Write down how much you'd accept for the Odwalla bar (if you have one)
- How much you'd pay for the Odwalla bar (if you don't have one)

Typically you find that WTA>WTP. (Although we might not get that with a small sample in this class.)

Question: What explanations for this?Left Board 1:

- o Endowment effect
- o Income effects
- o WTP limited by income
- o Non-marginal changes – the closer to marginal, the closer that WTP and WTA have to be
- o Not perfect substitutes. If pollution and the numeraire good are perfect substitutes, then the MWTP curve is flat and MWTP = MWTA at all points.

Different types of values: See PowerPoint slide.
Question: Does non-use value exist for non-environmental goods?

PASTURE 2: HEDONICS
PowerPoint slides: Love Canal overview

Left Board 2: Hedonic Theory
- Draw one consumer with indifference curves
- Draw one producer with isoprofit lines
- Draw the price
- First draw homogeneous consumers with heterogeneous firms. This would trace out a MWTP function.
    - Emphasize: This MWTPis what is needed to estimate welfare (consumer surplus). Refer back to
- Now allow heterogeneous consumers and sorting.
- Draw a new high-environmental quality location.

From this, we can get the hedonic price schedule (HPS).
Question: Is the HPS useful for welfare?
Push question: Imagine that we improve everybody's environmental quality by one inch to the right. Can we compute the welfare gains?
Answer: No. We want the slope of consumers' MWTP curves. And we want this for all consumers.

Right Board 2: Cleaning up Love Canal
Question: What happens if we clean up Love Canal? Refer to the graph: We are making Love Canal like Palos Verdes.
- Assume that consumers can move costlessly:Consumers re-sort back to their original equilibrium.
- Price of land increases (unless supply is perfectly elastic)
- Supply of land increases – commercial land transformed to residential

Question: What if moving isn't costless?
Answer: Re-sorting is attenuated.

Question: What are the welfare gains?
- Ignore wages – this is a transfer from firms to consumers
- All consumers' utility is the same – they resort back to their original loci. So all gains flow through property values.

- If quantity perfectly inelastic: all welfare gains accrue to current owners. Welfare gains are A1 + A2.
- If quantity perfectly elastic: No change in prices. Gain is consumer surplus: B2 + A2 + B1.

Welfare gains through other channels (not housing market):
- Also potential welfare gains to people who don't live nearby
- Ecosystem
- Ground water

Question: What if consumers didn't know about the health consequences until the cleanup?
Answer: if the Love Canal market believed it was Palos Verdes, then you could see no changes in prices but large changes in welfare! Alternatively, if Love Canal knows it's worse but under appreciates the health implications, then you could also see small price changes compared to welfare.

Question: Can we just compare Low and High pollution areas to get the HPS?
Push question: What factors vary between Love Canal and Palos Verdes?
Answer: Omitted variables bias.

- PowerPoint slide: Takeaways on Hedonics

PASTURE 3: SUPERFUND AND HOUSING VALUES: GREENSTONE AND GALLAGHER
See PowerPoint slides on Greenstone and Gallagher (2008)

PASTURE 4: VALUE OF A STATISTICAL LIFE
Question: How do we trade off money with risk of death?
- Jobs: Do you take a risky job
- Cars: would you pay another $1000 for a Volvo?
- Air pollution: would you visit a polluted city?

Question: When does the government make decisions on our behalf?
- Speed limits
- Air traffic safety regulations
- Food safety regulations
- Motorcycle helmet laws and seatbelt laws

Draw the VSL graph:
$$VSL = \Delta w / \Delta \pi$$

Problems in estimating VSL:

- Whose risk estimate do we use? Subjective risk (in the mind of the worker) or objective risk (injury stats)
- Heterogeneity: Different ages and risk types sort into these jobs. Their VSL may not reflect the average individual's VSL
- Do we have an omitted variables bias problem here? Risky jobs may also be less desirable for other reasons.
- This is still the market valuation of risk – not the MWTP for risk reduction. So it's not obvious what this means in any structural sense.

Other ways to estimate VSL?
- Speed limit laws:
- Willingness to pay for different types of vehicles.

14.42 / 14.420 Environmental Policy and Economics
Spring 2011