WHY ARE WE HERE?

Why worry about externalities?

And what are they anyway?

Some Definitions

- Difference between environmental impacts and environmental costs
- Difference between environmental costs and external costs
- Our package permits estimation of all three

This is an introduction to some basic economic principles

Pricing Principles

- Manufacturers buy inputs (including labor) and produce/sell output
- Efficient suppliers price their products or services to cover costs
- Some inputs are not purchased but are used "free"
- It is the use of these "free" goods that give rise to externalities

An externality is an economic concept

- It is a cost or benefit to society that arises from an economic activity, but is not taken into account in the price/labor structure and is not reflected in market prices.
- It is called externality because these effects are outside or external to the price system

Why are external costs a problem

- Externalities are not a problem for the manufacturer but for society
- Externalities result in costs: inefficient pricing signals, production, consumption (of common or produced goods), investment
- Prices do not account for harm or benefit done to third parties, and so there is no incentive to change behavior

What is Efficiency

- Efficiency here is another economic concept
- Assumes efficient prices that reflect costs
- Assures least total cost use of all inputs in a production process--e.g. labor/capital split.
- Costs and efficiency for society and for manufacturer are different
- Free goods/externalities mess up the equation

Examples of externalities What are the inefficiencies?

- A coal washing plant dumps its sediment water in the stream.
- A downstream brewery must purify intake water.
- Occupational health hazards.
- The Freudenau/Sud-Ost Tangente--bridges
- What is happening here?

Why is There a Problem?

- From manufacturer's point of view this is a good deal--something for free
- From society's point of view this is not good--prices don't cover costs. Somebody has to pay for damages that they didn't make a free choice to incur, and over which they have no control
  - occupational health examples.

What is the solution?

- The economic term for the solution is to internalize the cost

- Again, efficiency is key--internalisation should only be done as long as it is efficient

Are There Remedies for Externalities?

- Sometimes. Sometime not.

- May be no chance to improve efficiency
  e.g., no consumer choice or input flexibility
  Some externalities will always exist---

How to Internalize

- This means making the manufacturer pay, as part of the regular cost of doing business, for the use of the free good, or for the costs he is imposing on society- PPP.
- Or, that the cost is otherwise compensated or freely accepted and borne

Criteria for Internalisation

- Was damage incurred unknowingly or accepted freely or with compensation
- Was damage unknown to all parties or was information withheld from affected ones
- Mobility internalises damages

Guidelines for Reducing Externalities

- Efficiency - Cost to manufacturer of fixing the problem shouldn't exceed cost of the problem to society-no $60 cure for $5 cost.
- PPP - MC pollution control = MC externality--example: cost of removing last 2% vs. removing the first 50%
- What efficiency can economy /technology achieve? What is already internalized?

What is Efficient Internalisation?

- Can be direct or indirect
- Depends on information, choice, markets
- Affected parties can take full account of damages and choose exernalities freely
  - Affected parties can be indirectly compensated
  - Mobility provides choice and internalisation
  - Not all external damage needs further controls
  - Some internalising impossible, some inefficient

Examples of Internalizing Externalities (or Not)

- A coal washing plant dumps its sediment water in the stream--it builds settling ponds.
- A downstream brewery must purify intake water - installs on-site purification--upstream town installs sewage treatment
- The Freudenau/Sud-Ost Tangente--bridges

Tools for Internalizing

- Options-taxes, standards (ends & means)
- Some more efficient/effective than others--taxing behaviour directly is best
- Regulator can never expect to know true costs accurately--be flexible.

What is our focus and why

- Environmental externalities - important for energy
- They are easiest to measure--income, employment, social, economic are trickier
- We look primarily at externalities from ordinary operations--not accidents

The logic of externalities
A Summary

- Why measure? To internalize
- Why internalize? To increase efficiency
- DAM helps to show the possibilities

- What are the practical applications

Energy Planning

- Traditional planning has been least cost planning--now add externalities to the cost equation to be minimized.
- Comparing options for external effects

Plant Management

- Planning is not on basis of external costs but on abatement costs to meet standards.
  - Energy planners/managers don't care about externalities per se but about cost of reducing them to mandated levels and whether cost of abatement is less than external cost
  - Fiscal planners care about investing wisely to avoid retroactive compliance costs and which options have better externality/abatement ratio

Environmental Planners

- Need to know external costs to set appropriate standards or advise efficient environmental protection measures
- Note difference between regulation by standards (known outcome, unknown costs) and by use of economic instruments (known cost, unknown outcome)

Comparative Assessment of Normal Operations

- For comparative assessment of generating options we need to measure and compare the different levels/kinds of externalities.
- Normal operations of nuclear plants tend to have low emissions or externalities
- Normal operations of thermal plants have higher emissions or externalities, so focus will first be on these - hydro/nuclear later

How to Measure Effects

- Make simplifying assumptions
- Orders of magnitude are sufficient given uncertainties
- Orders of magnitude may not be sufficient for setting MC pollution control = MC of externalities. Maybe nothing is this exact.

How to Value

- Many ways to value
- Make simplifying assumptions
- Society already sets values implicitly through wages and budgets for health care--don’t need “willingness to pay” polls
- Transferability

Important to Remember

- Not every cost is an externality and not every externality is a cost

The end product--TOOLS

- Estimating tools to measure and value externalities
- Comparing external costs with control costs is a tool for decision-making
- Efficient internalization is the final goal - including externalities in energy pricing

SOME PRELIMINARY IDEAS ON VALUATION

WHY VALUE IMPACTS

- Not always necessary - sometimes impacts is enough for the decision maker
- Reducing everything to a single denominator - money - is often helpful
- Useful for deciding on mitigation approach

HOW TO VALUE IMPACTS

- Many different ways - we explore some common ones
  - Willingness to pay
  - Willingness to accept/with compensation
  - Mitigation costs
  - Costs incurred
  - Preferences/expert opinion

VALUES AND COSTS

- Valuation (willingness to pay or to accept) includes more than costs - welfare/sense of wellbeing
- Costs include expenditures and inefficiencies, and can include mitigation costs

TRADE-OFFS

- Society trades off willingness to pay, willingness to accept, compensation and mitigation costs.
- Society not always willing to mitigate the externality -
  - May suffer damage rather than pay mitigation
  - May not value damage highly in mix of societal preferences/trade-offs

HOW TO ASCERTAIN VALUES

- Directly - ask people or experts or decision makers

- Indirectly - use proxy measures, such as property values,wage rates, etc.

ASCERTAINING COSTS

- Costs are measurable - expenses, efficiency losses
- Costs differ between economies according to purchasing power parity - on average, doctors/houses cost more in rich countries
- Opportunities and expenditures for damage avoidance/correction vary with income.

FACTS ABOUT COST VARIATIONS

- The fact is that costs differ across income classes
- We may not like this, but it is a fact of life
- Fact holds true within a country and across national boundaries
- A strong basis for trade and investment

ADJUSTMENTS FOR COST VARIATIONS

- Within a country tend to use national or regional averages
- For cross country comparisons, can use purchasing power parity to lend perspective
- Can also use GDP ratios, similar to purchasing power parities, but based on income vs cost/inflation differences - allows some estimation of willingness values

THE POLITICS OF COSTS

- What is the value of a human life?
  - There is no single answer even in one country
  - Depends on who is valuing and how
- Our approach avoids as much as possible this impossible debate
  - Uses measurable costs, expenditures, proxies
  - Permits valuation in physical terms
  - Uses neutral economic ratios

FUTURE COSTS AND VALUES

- Today is more important than tomorrow
  - $1000 today is better than a promise
  - potential future damages are less fearsome
- This time preference is expressed as a discount rate - discounting the value of future /possible gains and losses vs. real money now
- No single or “correct” discount rate