

Payment in Accordance with Product

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Guest Lecture
Price Theory
Winter 2011

Introduction

Today we'll talk about another classic market failure

- 1 Idea of an externality
 - Missing market price, target specifically to solve
 - Deep principle, but risk creates problems
- 2 Surprising externalities and non-externalities
 - Pecuniary externalities, internalities and non-identity
- 3 Public policy solutions to externalities
 - Pigouvian taxes, cap and trade and the legal system
 - Trade-offs between different approaches
- 4 Stigler's Coase Theorem and bargaining solutions
 - With property rights, parties bargain to efficiency
 - In some cases, this or other private solution works but...
- 5 Flaws in the Coase Theorem and the information problem
 - Many exist because some authority can get better info

Missing prices and the externality problem

Consider most classical example, N people in world:

- $u(m, t) + i$: i income, t temperature, m miles driven
- Global warming: $t = f(\bar{m})$ where $f' > 0$, \bar{m} average miles
- Miles driven have price based on cost of oil p_m
- Everyone chooses $p_m = u_m$; price equals marginal utility
- But everyone better off if...?

$$\underbrace{p_m}_{\text{price=private marginal cost}} + \underbrace{f' u_t}_{\text{externality}} = \underbrace{u_m}_{\text{private marginal benefit}}$$

- $u_t < 0$, *negative externality*, $u_t > 0$, *positive externality*
- Decentralized outcome *no longer optimal*:
 - No market price for the global temperature
 - Means people *fail to take an effect into account*

Pigou's Principle

More generally, if people are different, maximize total

- Can always redistribute income i
- Take into account *average externality* $f'\bar{u}_t$
- Pigou's Principle of Payment in Accordance with Product:
 - 1 People must pay average externalities of their actions
 - Not just economics, but common sense
 - Pay for all the (average) consequences of actions to others
 - Markets make you do this for many things
 - Externality policy forces when market missing
 - Only way to insure you generally have the right incentive
 - 2 Solutions to externalities should *focus on missing price*
 - Do not just do anything which addresses problem somewhat
 - Focus specifically on the problem
 - Contrast: fiscal policy gives people money, hope they spend
 - Instead money *for spending it*: cyclically varying sales tax

Risk and problems with Pigou's Principle

Powerful as always right incentive, but problematic with risks

1 Risk-aversion

- Suppose you paid for all harm caused in your car
- If you had terrible, complete accident, pay for other's life
 - With your own life or enormous payment
- This eye-for-eye justice, when unintentional, seems crazy
- Gives "right incentives" but creates horrible risk
- This is why you have car insurance, traffic regulations
- We'll return to redistribution in a later lecture

2 Judgement-proofness/limited liability

- You may not have enough to pay for harms you cause
 - Certainly the case when you kill someone in car
- ⇒ Payment in accordance with product impossible
- Other methods necessary to stop misbehavior

3 Similar to incentive issues show up all over

Pecuniary externalities should not be “internalized”

Imagine I discover a giant hoard of gold

⇒ Gold prices fall, other people who own gold worse off

- Is this an externality?
 - In some sense, but for each owner harmed, buyer gains
 - Because *mediated through price system* no net loss
 - Unlike a “real” or “technical externality, no inefficiency
 - Thus we *should not* internalize *pecuniary externalities*
- Common misapplication of theory of externalities:
 - 1 Competition harms existing firms by lowering price
 - What if takes profitable sales without lowering price?
 - 2 Free trade with China causes steel workers to lose job
 - 3 Polluting a lake harms consumers as price of fish rises
 - Who is the real victim of the externality?
 - 4 Brilliant roommate getting stoned helps you beat curve
 - 5 Selective abortion benefits women as now scarce

Physical v. pure economic damages

This distinction shows up in damages distinction:

① *Physical damages:*

- You hit doctor with a car, burn down house
- You defame someone's character with libel
- These are *direct (if not physical) harms*

② *Pure economic loss:*

- Patients no longer have doctor, home values rise
 - If other home values fall because house beautiful?
- These are *indirect, price-mediated economic harms*

Major issue during Deep Water Horizon; classify:

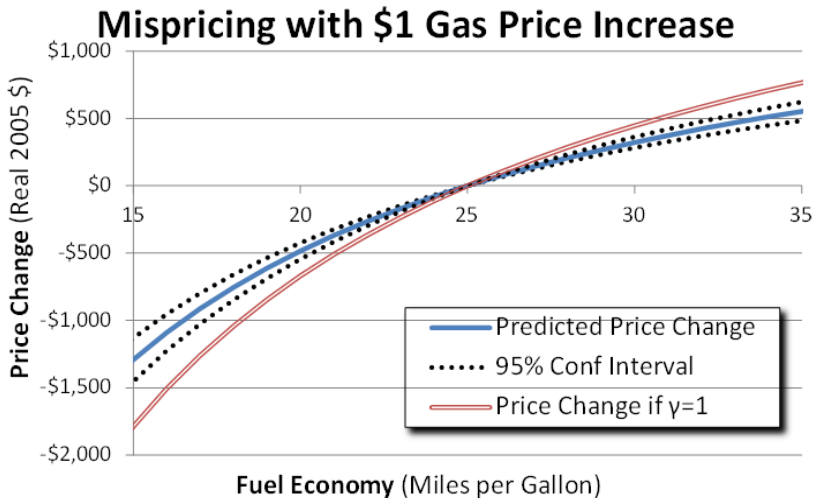
- ① Shrimping employees who lose their job?
- ② Government conservation agencies in charge of birds?
- ③ Louisiana hotels serving industry?
- ④ Disrupted shippers through the port?

Internalities and paternalism

So not everything across people is real externality

- Conversely, not everything within people is “fine/efficient”
- Individuals neglect/ignore/impose costs on (future) self
- These are called *internalities* and policy called *paternalism*
- Same idea as market: not fully/properly accounted for
- Large areas of policy determined by these considerations?
 - 1 Addiction and drugs
 - Many believe addicts would be better off quitting
 - This justifies a range of sin taxes, prohibitions, etc.
 - 2 Forced savings and social security
 - “Tempted” not to save, but better off saving
 - 3 Energy efficiency and CAFE standards
 - Alcott-Wozny (11): consumers don't respond to energy costs
 - Efficiency mandates good, and bigger than externality
 - 4 Suicide, organ donation and prohibitions on markets

Allcott-Wozny (2011) on effect of gas on car prices



The Happy Child and other problems

Another difficult case for externalities:

- Imagine net externalities to all living of child \$0
- Child will have good, happy life
- Is there an inefficiency here to be corrected?
 - Externality on the child?
- When you drive drunk on the road...
 - 1 Is there an externality to others in the car?
 - 2 Is there an externality to others on the road?
 - 3 Is there an internality to yourself?
 - 4 Is there an externality on family, those who depend on you?
 - 5 Is there an externality to the children you might have?
- How different is your future self from child?
 - How much do you really internalize future utility?
 - Is reckless sex externality on responsible and future self?

Pigouvian subsidies and taxes

Most economists' favorite response to externalities

- If external harm, tax the activity; external benefit subsidize
 - Simple solution directly creates prices for activity
 - Tax must be *marginal externality at optimal level*:
 - Otherwise doesn't play same role as price
 - However, constant at this level may be inadequate; why?
 - Consider platforms like we discussed last week
 - The more people that use them, the more valuable they are
 - Long time to take-off: too costly absent other people
- ⇒ Better to subsidize more early on
- This ensures that optimal number get on
 - Later you can offer just marginal optimal subsidy
 - This is exactly what many internet companies do
 - Lose money early, make it up later: *insulating tariff*
 - Avoid coordination failures, implements optimum

Carbon and other pollution taxes

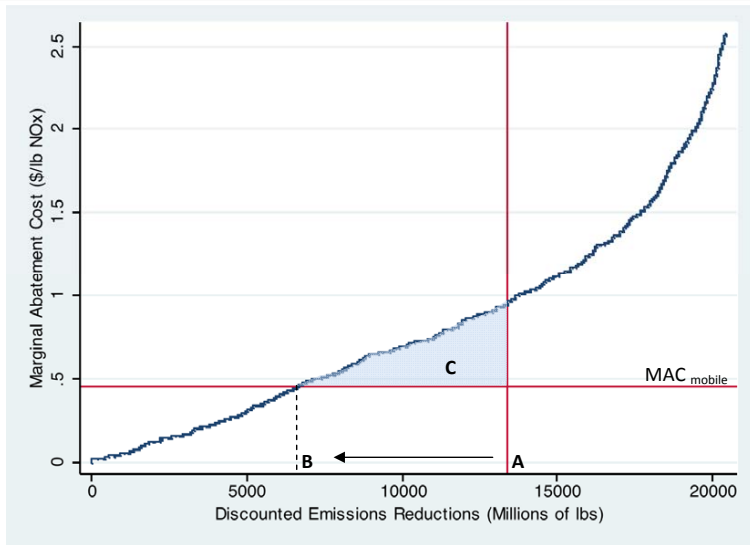
Most common practical application is taxes for pollution

- 1 Effluent tax (inspections) proposed by Lawrence White
 - All cars have clean technology, but only relevant in cities
 - Why not have localities charge local average Pigouvian tax?
- 2 French pollution taxes
 - In France, all power plants/other polluters pay
 - Measured from smoke stacks, price for each category
- 3 Carbon tax
 - We'll talk much more Thursday, but used in Europe

Economists almost always prefer to direct regulation; why?

- Regulation more costly because doesn't target issue
- Some much more efficient at reducing than others
- Fowlie et al. (Forthcoming): save \$2b on NOx reduction
 - Cars unregulated, while fixed source highly regulated

Fowlie et al. (Forthcoming) data on NOx



Collecting Pigouvian taxes through the legal system

In US many (most) Pigouvian taxes through legal system

- When a firm or individual causes harm, they get sued
- Court assesses how much harm was caused
- Individual causing harm must pay:
 - 1 Compensatory damages
 - These directly redress harms caused
 - 2 Punitive damages
 - These deal with imperfect detection
 - Also may deal with lack of care by plaintiff
 - Not all paid to plaintiff, some to the state
- Anglo-Saxon system incorporates Pigou!
 - Not everything can be covered in statutes
 - Greater litigiousness v. Europe reflects PIAWP
 - Most paid by negotiation, settlement

Negligence and strict liability

Europe: more direct behavior control; but negligence spectrum

- Liability rarely for *anything that goes wrong*
- Usual standard is some degree of *negligence*
 - Some sort of a standard of “due care”
 - If you do less than this, you must pay for consequences
- Combines direct mandate on behavior with PIAWP
 - Otherwise, too many lawsuits, too much risk
 - Fireworks and train station case
- Classic example is medical malpractice
 - Doctor has responsibility to take “due care”
 - If not, must bare consequences for patient
 - Huge source of cost and especially risk for doctors
 - Private insurance helps solve risk problem, monitor doctors
 - Contrast with more regulated, less litigious systems

Cap and trade: equivalent solution

Instead you can mandate quantity of activity, allow trade?

- Put maximum on pollution, auction (or assign) rights
 - Or minimum if positive externality
- Allow people to trade, price for right to pollute
 - Most efficient mitigators sell permits to least
- If set at efficient level, price must be same as tax
 - ⇒ Equivalent, for most intents and purposes
- Particularly obvious with an auction
 - But often proposed instead of tax for politics
 - To buy political support, pay off those hurt
 - Hard to do with taxes, because looks like blatant giveaway
 - Giving out credits seems more just, cover for bribes
 - ⇒ Cap and trade more popular for global warming
- Putting aside such politics, economic logic favoring one?

The logic of prices v. quantities

Problem: decisions on prices v. quantities locked in

- Problem: uncertain about value, policy inflexible
- $MPV = p^* - a(q - q^* - \epsilon)$, $MSC = p^* + b(q - q^*)$
- Optimum solves, $q^{**} = q^* + \frac{a}{a+b}\epsilon$
- DWL is then Harberger triangle $\frac{1}{2}(a + b)(q - q^{**})^2$
⇒ Quadratic loss, make quantity as close as possible
- If we impose price optimally at p^* then $q = q^* + \epsilon$
- If quantity optimally at q^* then q^*
- Which is closer?
 - If $a > b$ then prices, if $b > a$ quantities
 - Inelastic private value, elastic social: tax
 - Local externalities/torts (flat), smoking (steep mitigation)
 - Inelastic social, elastic private: cap and trade
 - Congestion (steep externality), lead in gas (flat mitigation)

Graphical illustration of price-quantity trade-off

Property rights and the bargaining solution

These are all public, “government led” solutions

- But some have suggested such are not needed
- As long as *property rights* clear, bargain to efficiency
 - Your neighbor makes lots of noise at night
 - Efficient outcome is a little bit of noise, but not much
 - If he has right to make as much noise as he wants...
 - You can pay him to shut it off
 - If you have right to quiet...
 - He can pay you for noise he makes
 - Either way reach (effectively same) efficient bargain
 - Why any need for government solution?
 - In fact, always some *de facto* property rights
 - So shouldn't externalities solve themselves?

Stigler's Coase Theorem

This logic is “Stigler's Coase Theorem”

- Unclear that Coase really believed in this version but...
- Also called “Coase's Theorem” or “The Coase Theorem”

Stigler's Coase Theorem

If there are no “transactions costs of bargaining”, then efficiency always results. If income effects are small, the outcome is independent of the assignment of property rights.

- What is a transaction cost of bargaining?
 - Basically, anything that impedes efficiency
 - ⇒ Just a tautology, reminder to think of bargaining
 - “All is for the best in the best of all possible worlds”
- Nonetheless, useful guide in some cases

When do bargaining and merging work?

Bargaining usually works well when?

- 1 Small number of people
- 2 Have relevant info (or more than government/courts)
- 3 Know/can find one another

Often bargaining facilitated by long-term relationship (merger)

- 1 Condominium associations, company towns
- 2 Cooperative firms and European Union

But such “mergers” obviously don't always work

- Still internalities, conflicts within firms and organizations

And not always good: also pecuniary externalities

- Particularly when one side concentrated, other diffuse
 - 1 Mergers by competing firms
 - 2 Industry-wide lobbying groups
 - 3 Packs of popular girls in high school

Monopolistic “private” solution

Sometimes the private sector can also solve by monopoly

- Monopoly provision of platforms does exactly this
 - Fax might have established faster if someone had interest
 - Newspapers offered free to consumers
 - Helps internalize externalities to advertisers
 - Useful in short-run, if monopolist knows something
 - Helps market get over the hump
 - 1 Platforms
 - 2 Spillovers in production (knowledge, ideas and cities)
 - But in long-run cannot overall lower price
 - Monopolist always wants to make a profit
 - Will never produce at or below average cost
 - Competitive market will often produce at average cost
- ⇒ In long-run, monopoly always supplies less

Information and the failure of bargaining

Despite potential benefits, Coase Theorem mostly misleading?

- ➊ Adding good Pigouvian intervention can only help
 - Bargaining still possible (settlements for lawsuits)
 - When bargaining fails, Pigouvian intervention backstops
 - ➋ Many externalities very diffuse, bargaining impossible
 - How could everyone bargain over harms to climate?
 - ➌ Most importantly, *information* usually diffuse
 - Consensus of experts much better on climate change
 - Each individual affected has very little information
 - Even with bargain, unlikely to reach very efficient outcome
- ⇒ At best bargaining only as good as information
- Always ask, “who knows best about this market failure?”
- ⇒ Coase Theorem says little (if anything) against intervention
- Reminds us there are many solutions, bargaining may help

The externality problem as a problem of information

Thus real problem is how to obtain right information

- This is theme of our next class
- Typically: some information diffused, some expertise
 - ① Scientific and technical information better centralized
 - Stern review, benefit cost analysis, epidemiology
 - Combine with economic analysis of costs and benefits
 - Usually carried over from other areas: value of human life
 - ② Private, subjective, personal information held by individuals
 - Can be important in many contexts, but hard to extract
 - Simple approach contingent valuation by works poorly
 - Particularly sensitive to strategic considerations
 - Haiti and *The Economist*
 - But “incentive compatible mechanism” often tough
- Problem of externality design: how to combine these well