Lecture # 5 – Liability Law/Command and Control Policies

I. The Coase Theorem (continued)

- I began class summarizing some of the key issues with the Coase Theorem that came up during our e-mail discussion.
    - Policy implications of Coase
        - The Coase theorem suggests a limited role for government in environmental policy.
        - Coase argues that the key problem is an absence of property rights.
            - Once property rights are established and enforced, private parties can reach mutually beneficial agreements.
    - Limitations of the Coase Theorem.
        - Coase focuses on efficiency, but says nothing about equity.
            - For example, willingness to pay and willingness to accept are different.
                - Because of income effects, you may not be willing to pay as much to avoid damage as you would require in compensation to accept it.
                - May lead to differences in power among opposing parties
        - Costs of bargaining and transactions costs
            - Negotiation won't work when large numbers of people are involved, or when the victims aren't well defined (e.g. endangered species).
            - Similarly, different groups may have different bargaining power, affecting the distribution of the final outcome.
        - Uncertainty: Will it be difficult to establish the value of the harm? Do we know who causes the harm? Can it be addressed at all?
        - Information asymmetries: Will both sides know the best options available to each side? Can we identify the cause of the harm?

II. Liability Law

- An example of how the Coase Theorem applies to environmental policy is liability law.
    - If a firm will be held liable for the damages from its pollution, it has incentive to avoid pollution when the marginal abatement cost is less than the marginal damage.
        - By avoiding damage, the firm lowers its liability.
        - Note that the government does not need to know the marginal costs of the firm in order to achieve the desired level of pollution.
- Liability laws hold parties responsible for the negative consequences of their behavior.
    - As a result, liability laws internalize the externality.
- In theory, this can lead to an efficient solution.
    - Because we are dealing with uncertainty, we want to model the level of precaution taken, which affects the probability of an undesirable outcome.
    - Firms weigh the benefits of precaution (reduced marginal damages, which they must pay if held liable) versus the marginal cost of greater protection.
        - Note that these are social benefits, since the firms are held liable for all damages.
        - Thus, liability leads to the efficient level of precaution.
- Types of liability
    - Strict liability – the person doing damage is responsible, whether or not proper precautions are taken.
        - The liability faced by Pacific Gas and Electric in California is an example.
    - Negligence – the injurer is held responsible only if that person has taken less than the desirable level of precaution.
        - Requires the courts to determine what an appropriate level of caution is.
    - Joint and several liability – when the source of damages could be several parties, any one party can be sued for all the damages.
        - The theory behind this is that the party sued will have incentive to go after the other parties.

        - Joint and several liability is used in Superfund
            - Part of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)
            - EPA is to identify, evaluate, and remediate hazardous waste sites in the U.S.
            - Key features:
                1. A financial fund derived from a tax on chemical and petroleum feedstocks to be used for investigations and cleanups.
                2. A National Contingency Plan (NCP) for selecting sites for cleanup, including creation of a National Priorities List (NPL).
                3. Authority for the EPA to clean up sites itself or to identify responsible parties to clean up the sites.
                4. A liability provision to collect damages from responsible parties. Superfund uses joint and several liability.
                    - Leads to large legal costs
- Advantages of liability
    - It is very decentralized and requires less information.
        - To regulate, information must be known before regulation put in place.
        - For liability, don't need information until after damages are done.
        - Note that this helps deal with monitoring problems that can occur with toxins.
- Disadvantages of liability
    - If the hazard is common, it makes more sense to regulate than to have each case go to court.
    - Suits might not always be brought against violators.
    - Uncertainty about the legal process:
        - If penalties will push firms into bankruptcy, they will not have to pay, and thus will not take proper precautions.
        - Alternatively, if a firm is risk averse, they may take too much precaution, because they may fear an unfavorable court ruling.
        - The burden of proof may be difficult in court.
            - Need to know both who causes the harm and what the damages are.
    - Transaction costs may be high

- We ended this section discussing the links between the Coase Theorem, liability law, and wildfires in California.
    - Note that federal and local governments bear many of the costs of firefighting.
        - Building homes in the WUI increases both the risk of wildfires (because power lines are needed in more areas prone to fires) and the damage from fires when they occur
        - But homeowners alone are not responsible for the higher risk due to climate change
        - In addition to firefighting costs, the liability costs borne by PG&E may be passed on to consumers through higher electricity rates.
    - What can people in the WUI do to reduce risk?
        - Maintenance of land
        - Solar and energy storage as backup power for when electricity is off
            - One study says consumers in high-risk counties could meet 95% of their electricity needs for $1500 using solar PV and battery storage
                - ***Note how this relates to the last lecture on MAC.***
                - Residents in this area may have a low-cost option to help prevent fires.
    - Who should bear the costs of wildfire damages?
        - Note that higher costs to PG&E may be passed on to ratepayers.
        - One student noted that people may move to the WUI because housing is unaffordable elsewhere. Perhaps a broader response to housing in general is needed.

III. Command and Control (CAC) Regulation

- Command and control regulation uses the setting of standards.
    - A standard is a mandated level of performance that is enforced in law.
    - A standard simply makes excessive amounts of pollution illegal.
- Setting the standard
    - For any environmental policy, the first question to be addressed is what level of protection is desired.
    - Here, it is important to note that zero pollution is not a reasonable goal. Some pollution will result from daily activities. The question is how much pollution is acceptable.
    - There are several criteria that can be used.
    - Efficiency standard
        - Here, the goal is to maximize economic welfare, accounting for the economic costs of pollution.
        - To do so, the marginal benefits of increased environmental quality should equal the marginal costs of reducing pollution.
        - If done at an aggregate level, distributional issues will be ignored.
    - Health-based
        - Here, the primary goal is protecting human health.
        - Zero-risk
            - Zero-risk requires protecting everyone, no matter how sensitive, from damage.
            - Appropriate for cases in which there is a threshold.
        - Allow "reasonably small" damages
            - Raises the question of how to decide what is reasonable.
            - Should abatement costs be considered?
            - Consider a recent Supreme Court case (*American Trucking Company v. Browne*r):
                - The Clean Air Act requires the EPA to consider public health, but not economic costs.
                - On February 27, 2001, the U.S. Supreme Court unanimously ruled that the CAA rules were valid.
                - They noted that the Clean Air Act did not give the EPA limitless discretion, but rather instructed the agency to set standards that "allowing an adequate margin of safety, are required to protect the public health."
        - Many U.S. environmental laws use health effects as the criterion for setting environmental standards.
            - The Clean Air Act says that standards should be set to "provide an adequate margin of safety to protect the public…from any known or anticipated adverse effects associated with such air pollutants in the ambient air."
                - But what is an adequate margin of safety?
                - Left to EPA to interpret.

    - Ethical standard
        - Here, ethical considerations take precedence.
        - “It is wrong to damage the habitat of an endangered species.”

IV. Types of Standards

- Ambient Standards
    - Regulates the amount of pollutant present in the surrounding (ambient) environment.
    - Examples:
        - Parts per million (ppm) of dissolved oxygen in a river
        - Sulfur dioxide (SO_2) in an airshed
        - Ground level ozone levels (ppm)
    - Measures are often an average (e.g. over a 24 hour period, or per year)
        - This is important, as concentrations vary by time of day and by season (e.g. due to changes in weather)
    - Note that the level itself cannot be directly enforced.
        - Rather, the sources of the pollution must be found and regulated to be sure that the ambient standard is met.
        - A good example is the U.S. Clean Air Act.
            - The federal government sets ambient standards for six criteria pollutants in a region.
            - If a region is in violation, they must come up with a plan to attain compliance.
- Emission standards
    - Regulates the level of emissions allowed
    - Examples
        - Emissions rates (pounds of SO_2 per hour)
        - Concentration (ppm of biochemical oxygen demand (BOD) in wastewater)
        - Total quantity of a pollutant
        - Residuals per unit of output (SO_2 per kWh of electricity)
        - Residual content per unit of output (sulfur content of coal)
        - Percentage removal of pollutant (90% of SO_2 scrubbed)
    - Note that emissions standards do not guarantee a specific ambient level of pollution
        - Weather conditions affect the concentrations
        - Human behavior affects pollution levels

- Technology standards
    - Require polluters to use certain technologies, practices, or techniques.
    - Whereas emissions standards require polluters to meet a goal for the level of pollution, but give the polluter freedom to choose the technology used, technology standards require a specific technology.
    - Examples
        - Until 1990, electric utilities were required to install scrubbers with 90% efficiency ratings.
        - U.S. requires catalytic converters in autos
        - The 1972 Water Pollution Control Act Amendments set a goal of zero discharges by 1985.
            - Used technology based effluent standards (TBES)
                - EPA determines the “best practicable technology” and sets standards assuming that firms are using that standard.
            - For enforcement, polluters must have a discharge permit issued by an EPA-backed state permitting program.
    - Often, as in the Clean Air Act, the government mandates that the Best Available Control Technology (BACT) be used.
        - However, BACT is often not clearly defined.
- The Clean Air Act shows how different types of standards work together
    - Title I uses ambient standards to set overall air quality goals for each airshed
    - State Implementation Plans (SIPs)
        - State governments are responsible for monitoring air quality within the state.
        - Monitoring is done in various Air Quality Control Regions (AQCRs) set up in each state.
            - There are 247 in the U.S.
    - States are required to develop a plan, the SIP, for achieving the national ambient air quality standards by the EPA.
        - Although the EPA has the authority to review a state’s SIP, each state was given freedom to choose how it would attain the emissions goals required by the NAAQS.
            - Criteria for review are technology based.
                - Proposals to use new technologies are reviewed by the EPA.

- Regulations for non-attainment areas:
  - Existing sources must use reasonably available control technology (RACT).
  - New sources must achieve the lowest achievable emissions rate (LAER)
  - To allow new sources in areas violating air quality standards, the EPA established offset trading in 1977.
    - No new emission source can be located in areas where air quality standards are not met unless existing emissions are reduced at least as much.
  - To avoid states simply shifting pollution from non-attainment to attainment areas, AQCR's in compliance were designated as areas targeted for Prevention of Significant Deterioration (PSD).
    - To maintain air quality in these regions, new sources must use BACT.

V. Economic Analysis of Standards

- Incentives matter, as what is regulated affects behavior
  - ***Example***: fuel economy regulations lower the cost of driving, leading to more driving (rebound effect)
- Aldy/Pizer (2015) provide an example of how different types of standards provide different incentives. They discuss the implications of different types of targets
- Economists typically assess commitments relative to a no-policy reference case
  - That is, what would have happened without any intervention?
  - Depends on other factors besides the policy, such as the general state of the economy.
  - Goals for a good measure
    - Comprehensive: covers all related policies
    - Measurable: focus on observable characteristics
      - Most emissions from a country are straightforward. Depend on energy consumption.
      - But, some are more challenging:
        - Land-use changes
        - How to account for offsets in international systems (e.g. Clean Development Mechanism)?
    - Replicable: others should be able to recreate the metric
      - Ensures legitimacy
    - Universal: applies to a broad set of countries
- Emission metrics
  - Types of targets
    - Compare emissions to a historical base year
      - Setting a base year before the regulation eliminates gaming of the system
        - E.g. 1995 Kyoto Protocol set reduction targets relative to 1990 levels

        - But, this still creates issues:
            - Does this punish early actors?
            - Emissions vary for other reasons
            - Russia is the best example
        - Emissions rose 1997-2012, but relative to 1990, emissions are 22% less.
            - Thus, the reductions occurred during restructuring of the economy after the fall of the Soviet Union.
- Emission intensity
    - Defined as tons of CO_2 per GDP
    - Pros:
        - Compared to a base year target, avoids penalizing economic growth.
        - Straightforward to measure
    - Cons:
        - Emissions will grow unless reduction in emission intensity exceeds growth rate of the economy
        - Business as Usual may be different
            - Countries that are growing often have falling emission intensity simply due to structural changes in the economy (e.g. more services) and better technology
            - Thus, would these emission reductions have happened anyway?
        - Target becomes more stringent if country grows slower than expected
            - Inverse also true, but this could be a particular challenge for a struggling economy
            - Suggests using an index that accounts for deviations from expected economic activity
                - But that requires defining expected activity
    - Measurement challenges
        - To compare across countries, need to convert GDP into a common currency
            - Thus, exchange rate fluctuations affect performance
- Emission reductions relative to forecasted future emissions
    - Proposed by some large emerging economies
    - Requires subjective judgements about future economic performance
    - May be easier to game the system