PLS 540 – Environmental Policy and Management
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Topic: Rationales for Government Intervention

- **Policy analysis from an economic perspective**
  - *Perfectly competitive economy*: Under certain assumptions, the self-motivated behaviors of economic actors lead to patterns of production and consumption that are efficient in the special sense that it would not be possible to change these patterns in such a way as to make some person better off without making some other person worse off
    - *Market failures*: commonly occurring circumstances associated with private choice that violate the basic assumptions of the idealized competitive economy and therefore interfere with the efficiency of production or consumption
    - Free markets are based on four drastic assumptions
      - Numerous buyers and sellers
      - There is perfect entry to and exit from the market
      - There is a perfect flow of information
      - There is no externality such that no one is affected by the activities of any other person
    - Two fundamental assumptions of the *competitive model*
      - Participants in markets behave competitively
      - Individual preferences can be taken as fixed, exogenous, and fully rational
    - Some of the assumptions don't always hold about the behavior of consumers. For example,
      - Are preferences really unchanging?
      - Do consumers make the right choices when faced with complexity and risk?
    - Are all preferences equally legitimate?
      - The competitive model treats all preferences as equally legitimate
      - Most would agree that certain preferences resulting in direct harm to others should not be considered legitimate from the social perspective
      - Our laws and customs also prohibit the exercise of preferences that do not seem to directly harm others (e.g., bestiality, restrictions on prostitution)
    - *Advice*: tread carefully when using perceived problems with preferences to justify public policies
  - This mode of policy analysis is rooted in welfare economics
    - *Utility*: each person derives *utility* from consuming various quantities of all possible goods including things, services, and leisure. Assumptions include:
      - Other things being equal, the more of any good, the greater that person's utility
      - Additional units of the same good give ever-smaller increases in utility – that is what economists call *declining marginal utility*
      - Firms attempt to maximize profits by buying factor inputs (labor, land, capital, materials) to produce goods for sale
      - It becomes more costly in terms of resources to produce each additional unit of the good

- People maximize their well being by using their incomes to purchase combinations of goods that increase their utility
- In this simple world, a set of prices arises that distributes inputs to firms and goods to persons in such a way that is not possible to find a reallocation that makes at least one person better off without making at least one person worse off
  - Economists refer to this distribution as *Pareto efficient*
  - It is a concept with intuitive appeal:
    - Shouldn't we be dissatisfied if it is possible to find a way to make someone better off without making someone else worse off?
- *Marginal analysis*: Marginal means additional unit, not average. We are often interested in what the marginal cost or benefit is with producing or consuming one more unit of stuff.
  - Marginal cost is the cost of producing one more unit of output
  - First rule of consumption efficiency is to stop consuming at the point where your marginal utility of the good is equal to its marginal cost
  - Producers produce until their marginal revenue equals the marginal cost
- *Opportunity costs*: resources diverted from other uses to make a policy or program possible. These include tangible and intangible costs.
- *Collective action*: arises from voluntary agreements among people (e.g., families, organizations, and exchange relationships)
  - Policy analysts are concerned with collective action involving the legitimate coercive powers of government
  - Policy analysts also bear the burden of providing rationales for any governmental interference with private choice and markets

- **Market failures**
  - The utility maximizing behavior of persons and profit maximizing behavior of firms will, through the "*invisible hand*" distribute goods in such a way that no one could be better off without making someone worse off
    - *Pareto efficiency* arises without any need for public policy – thus government should be cautious about getting involved in markets
    - Economic reality rarely corresponds to the assumptions of the idealized competitive model – these violations of assumptions constitute market failures
  - *Market failures*: situations that violate the basic assumptions of the idealized competitive economy and interfere with efficiency in production or consumption. Traditional market failures include:
    - Public goods
    - Externalities
    - Natural Monopoly
    - Information Asymmetries

- *Public or collective goods*: term is used frequently in the literature of policy analysis and economics, but there are a variety of public goods and they result in different types of market failures and therefore differ in the appropriate policy responses
    - *Private goods* are rivalrous in consumption and have excludable ownership or use of the good. All goods that are not private are a form of public good (see three types below)
    - For public good market failures to exist, there must be the presence of either *nonrivalry* or *nonexcludability*
    - *Rivalrous consumption (subtractability)*: what one consumes cannot be consumed by another. A private good is characterized by complete rivalry in consumption.
    - *Excludable ownership and use*: one has control over the use of the good (legal and/or physical).
        - *Excludability* implies that some individual can exclude others from using the good
            - Power to exclude others from use of a good is dependent on property rights granted and enforced by the state and its judicial organs
        - *Property rights* are relationships among people concerning the use of things.
            - Property rights can be partitioned in complex ways (right to use water from a stream for only part of the year – you may not "own" it but it is treated as such)
            - Effective property rights are characterized by clear and complete allocation of claims and high levels of compliance
            - *De jure* property rights: granted by the state and typically clear though sometimes incomplete. They may be violated by extralegal behaviors – trespass, squatting, etc. Sometimes as a result of new technology or relative prices create new goods that fall outside of new allocations (e.g., fetal tissue)
            - *De facto* property rights: the claims that actually receive compliance from duty bearers. They may or may not present excludability problems, though they often involve substantial costs to claimants if they must employ protection systems, vigilance, stealth, or retaliation mechanisms to enforce them.
    - *Congestibility*: a good is congested if the marginal social cost of consumption exceeds the marginal private costs of consumptions. At some level of demand, the consumption of a good by one person raises the marginal costs of others consuming the good
        - Imagine a hiking trail with an increasingly large number of hikers such that each new hiker reduces the others' enjoyment of the wilderness experience
        - Whether a good is congested depends on the demand for a good at that time. Changes in technology, population, income, or relative prices can shift demand from levels that do not involve externalities to levels that do.
        - Many goods that display nonrivalry in consumption also display "*lumpiness*" in supply – you cannot add small units of a new bridge
    - Key things to consider when applying these concepts
        - The two factors can be determined by the physical nature or properties of the good

- The two factors can also be determined by the institutional rules in place and the feasibility of enforcing those rules
- *Private goods*: are defined in terms of their *rivalry in consumption* and *excludability* in ownership or use
  - EX: shoes, books, bread, and other things we purchase and own
  - When a private good is congested, the market supply is generally not efficient and leads to consumption externalities – consumers respond to price rather than marginal social cost
  - More common to treat these problems under the heading of externalities
- *Pure and ambient public goods*: are defined in terms of their *nonrivalry in consumption* and their *nonexcludability* in ownership or use
  - When they are uncongested they are *pure public goods*.
    - Pure public goods will not be provided by markets because of the inability of private suppliers to exclude those who do not pay for them.
      - EX: national defense, light houses, street light, mosquito control
    - Free rider problem
      - My contribution to national defense is small so if I don't provide it and everyone else does the level of defense necessary to protect me will still be provided. Since I cannot be excluded, I'll benefit even though I didn't contribute.
      - On the other hand, if I contribute and others do not, national defense will still be provided, so either way I am better off not contributing.
      - It turns out free riding tends not to occur at levels predicted by theory – probably because other things like fairness enter into decision making
    - Number of persons who benefit can vary enormously (street light is a few/national defense many).
    - Can occur at the local, state, national, international level.
  - Another problem is that if contributions for the public good are based on benefit levels, then individuals have an incentive to understate their benefit levels
  - *Ambient public goods with consumption externality*: air and large bodies of water are prime examples of public goods provided exogenously by nature. Consumption of the resource (e.g., through pollution) poses no Pareto-relevant impact until some threshold or ambient carrying capacity is reached.
    - Relatively few goods fall into this category because once congestion sets in it becomes economically feasible to exclude users. Efficiency problems can also be viewed as market failures due to externalities
- *Toll goods*: are defined in terms of their *nonrivalry in consumption* and their *excludability* in ownership or use
  - EX: bridges, wilderness areas, lakes.
  - Because exclusion is economically feasible, a private supplier might actually come forward to provide the good. These costs are usually covered with user fees.
    - Market failure results because the fees exclude users who could obtain higher marginal benefits than the social costs they impose
    - Market failure results because facilities are built too small
    - Underconsumption at any positive price

- *Toll good with crowding*: often a fixed capacity so it is possible that demand exceeds capacity. At high demand, the marginal cost of consumption at zero toll imposes marginal costs on all users. If I cross a bridge and create traffic delays for myself and others, the cost of my trip is my delay plus that for all other travelers
  - Peak load pricing required if congestion is variable
  - Private supply can be efficient if priced at marginal social cost
- Problem isn't supply
  - Private supplier may not efficiently price the facility provided. In the absence of congestion, any price that is charged will inappropriately discourage use of the facility (e.g., Parking garage in the GT case #13 in Patton and Sawicki 1993).
  - Private supplier may not provide the correct facility size to maximize social surplus. Firms maximize profits by charging fees that restrict demand so that it can be accommodated by a smaller facility. So incentives lead to facilities built too small when viewed from a social perspective
- *Open access, Common pool resources, and free goods*: are defined in terms of their *rivalry in consumption* and their *nonexcludability* in ownership or use
  - EX: trees, fish, buffalo, oil, and pasture land – there is open access to the good
  - Open access means that anyone who can seize the good controls its use. It can be unrestricted entry of new users or unrestricted use by a fixed number of users
  - *Free goods*: when anyone can take the good without interfering with anyone else's use. From an efficiency perspective there is no problem as long as there is excess supply
  - *Open access resource* occurs when there is no excess supply at zero price and to limit on new entrants. It is a congestion problem.
    - Threat of new entrants effectively eliminates the possibility of self-governance
    - Market failure results from the "infeasibility" of exclusion – it is often the institutional features rather than the physical nature of the goods that makes exclusion infeasible
    - Naturally occurring resources are especially susceptible to open access problems
  - *Common property ownership* occurs when access or entry is restricted and the users own the good in common.
    - Limiting access to a defined number of persons opens up the possibility of self-governance to reduce or eliminate inefficiencies
  - *Common property resource problem*: individually rational behavior by members of a group (open access or common property) leads to inefficiency. It is also a congestion problem.
    - Natural resources have the possibility of yielding scarcity rents. In the absence of exclusion, these rents will be dissipated
      - The question of how rent should be distributed is usually a contentious issue in public policy – how should catch limits be divided among, native, commercial, and recreational fishermen?
      - Open access often led to rapid depletion or destruction of fisheries before effective exclusion could be achieved

- *"Feasible" exclusion* – many are not inherently nonexcludable
  - *Structural*: where aspects of the good preclude economically feasible exclusion mechanisms
  - *Institutional*: where economically efficient exclusion mechanisms are feasible but the distribution of property rights precludes their implementation
  - *Spatial stationarity*: often a crucial factor in making distinctions between structural and institutional exclusion. If stationary, you can often assign property rights to efficiently allocate the resource
- *Externality* is any valued impact (positive or negative) resulting from any action, whether related to production or consumption, that affects someone who did not fully consent to it through participation in voluntary exchange
  - Four types: Producer to producer, producer to consumer, consumer to consumer, and consumer to producer
  - One can think of externality problems as a *missing market*
  - *Negative externalities*
    - Two parties interact in a market and a s a result of this interaction a third party is harmed and is not compensated for the harm
    - EX: air and water pollution generated by production activities, cigarette smoke that non-smokers are forced to breathe in public places, a dilapidated house or poorly kept yard.
    - People place different values on externalities (e.g., how long would you wait for a table in the nonsmoking section of a crowded restaurant?)
  - *Positive externalities*
    - Two parties interact in a market and a s a result of this interaction a third party benefits and does not have to pay for it
    - EX: vaccinations that reduce everyone's risk of infection, the benefits a neighbor gets from a home owner's nice yard and newly painted house, email addresses which enlarges the whole network's ability to communicate
- *Natural Monopoly*
  - Occurs when fixed costs of providing a good are high relative to the variable cost so that the average cost declines over the relevant range of demand. It is more than just *economies of scale*.
    - Inherently involves the problem of undersupply by the market
    - Forcing it to price inefficiently can drive it out of business while allowing it to maximize profits imposes costs on society
  - Availability of substitutes greatly limits the economic inefficiency associated with the natural monopoly (satellite TV & cable TV are close substitutes) – if there are close, available substitutes the problems are reduced

- *Thin markets*
  - Markets with either few sellers or few buyers result in imperfect competition that can lead to prices that differ from the competitive equilibrium and therefore results in Pareto-inefficient allocations
  - *Natural monopoly* is one example of a thin market – the single firm if allowed to maximize its profits will produce too little output from the standpoint of economic efficiency
  - *Monopsony*: a single buyer faces competitive suppliers and therefore can influence price by choosing purchase levels. The monopsonist can therefore extract rent that would otherwise go to suppliers
  - *Oligopoly*: two or more firms account for a significant fraction of the output (four firm concentration ratio – 4 firms comprise about 40% of sales) – cartels such as OPEC are examples
- *Information Asymmetries*
  - To have perfect competition, buyers and sellers must have all of the information they need to enter into a transaction or exchange. Information failures occur when the information needed is not fully or easily available
  - Information is involved in market failures in at least two ways
    - Information itself has public good qualities.
      - Consumption is nonrivalrous.
      - The relevant question is whether exclusion is possible.
      - Here we are interested in the production and consumption of information itself (public good)
      - This would include *information costs* and *imperfect information*
    - There may be situations in which the amount of information about a good varies in relevant ways across persons (*information asymmetry*)
      - We are interested in the nature of information that two parties have about a good
      - Market failure occurs when the producer does not supply the amount of information needed such that the consumer overestimates or underestimates the quality of a good
- *Search goods*
  - Consumers determine its characteristics prior to purchase
    - EX: a chair – you can inspect it prior to purchase
  - Searching is a sampling process where consumers incur costs to inspect units of a good
  - If search costs are small relative to the expected purchase price or the distribution is homogenous, or the frequency of purchase is high relative to the rate of change in combinations of price and quality, then information asymmetry is unlikely to produce great inefficiencies
  - Inefficiencies result when search costs are high, the distribution of price and quality is heterogeneous, and the frequency of purchase is low
  - From the perspective of public policy, intervention in markets for search goods can rarely be justified on efficiency grounds

- *Experience goods*
    - Cannot determine fully its characteristics until purchased
        - EX: meals, hair styling, concert, legal services
    - The more *heterogeneous* the quality of an experience good, the greater the potential for inefficiency due to information asymmetry
    - *Reputation* is an important way of reducing information asymmetries – chain restaurant vs. mom and pop establishment
    - *Reliability* and *warranties* are ways of reducing the consequences of information asymmetries
    - Producers and consumers sometimes turn to third parties to resolve information asymmetries – certification services, agents, etc. Insurers provide health information to consumers to reduce their costs.
    - Problems arise in two circumstances
        - When quality is heterogeneous, branding is ineffective, and agents are either unavailable or expensive relative to the price of the good
        - The distribution of quality is unstable so consumers and agents have difficulty learning effectively
- *Post Experience goods*
    - Hard to determine fully the characteristics of a good until after you have begun consumption
    - EX: a drug – you may not know the adverse health consequences until after you have purchased and experienced the drug.
    - Experience goods involve uncertainty and repeated consumption does not necessarily lead to accurate estimates of risk
- Factors which help determine whether information asymmetry exists include
    - *Heterogeneity*: variance in the quality of units of a good
        - The more heterogeneous the combinations of price and quality, the more likely the consumer will fail to discover a more favorable choice for any given sample size
        - If they are *homogenous*, even a small sample will eliminate information asymmetries
    - Frequency consumers make purchases
    - Potential costs of the information asymmetry to consumers depends on the extent to which they perceive the full price of the good, including the imputed harm from use
    - Cost of searching for candidate purchases and the full price determine how expensive and potentially beneficial it is for consumers to gather information

- *Uncertainty and Incomplete Insurance Markets*
  - *Uncertainty* involves contingencies with unknown probabilities
  - *Insurance*
    - For many events, insurers can estimate the probabilities of certain contingencies because events happen frequently enough to get these measures and can offer actuarially fair rates
    - The bigger problem is estimating the probabilities of uncertain events (hurricanes, earthquakes, etc.). So they likely have to include a *risk premium* which is the addition to the actual cost that reflects their lack of confidence
    - *Law of large numbers*: if the probabilities of an accident are independent of the probabilities of other policy holders having an accident, then as the number of policy holders increases, the variance in the average loss per policy falls so that smaller risk premiums are required
    - Breaks down when individual probabilities are not independent – during a hurricane large numbers of policy holders have losses
    - Insurance companies offset this problem through diversification
  - Behavior responses to insurance
    - *Adverse selection*: within each category of policyholders, some will have higher-than-average and lower-than-average probabilities of loss. Those that are higher-than average find insurance attractive and those with lower-then-average do not find it attractive. As more of the former buy and more of the latter opt out, the rates will rise. It is a problem of *hidden information*.
      - This is a rationale used for mandatory insurance programs
      - It is also a problem when insurance companies cover the low risk but not the high risk
    - *Moral hazard*: reduced incentive for insurees have to prevent loses. They can make themselves better off and society worse off by spending less of their own resources on loss prevention than they would if they didn't have insurance. It is a problem of *hidden action*.
      - Insurers try to minimize through co-payments and deductibles that require you to pay a fraction of losses
      - Underinsuring irreplaceable commodities – in a world filled with irreplaceable goods like your pet, insurance companies may be unwilling to cover losses because of fears of moral hazard
    - *Advice*: Public insurance may be justified when private coverage is significantly incomplete
  - *Risk* involves contingencies with known probabilities
    - Subjective perception of risk
      - People tend to employ *heuristics* (rules of thumb) that sometimes lead to correct decisions, but nonetheless involve predictable biases
      - People estimate the probabilities of events by the ease with which occurrences can be brought to mind. However, recall depends on factors such as the personal salience of events that tend to systematically bias results
        - More likely to buy flood insurance if you know someone who suffered a flood

- People tend to overestimate the likelihood of rare events (airplane crash) but underestimate the risks of something common (driving a car)
  - You think something with a small probability has a larger probability and something with a large probability has a smaller risk
  - People tend to make bad choices when confronted with risk perception

- **Other Rationales for Government Intervention**
  - Substantive values other than efficiency
  - Human dignity: people have intrinsic value and our own dignity as human beings requires that we respect the dignity of others
    - While it is important to respect one's freedom to choose how one lives, a good society must have mechanisms that limit the extent to which any person's choices interfere with the choices of others
    - It should also facilitate broad participation in the institutions that determine the allocations of private and public goods
    - Competitive markets is based on the premise that individuals have a set of endowments such as ownership of labor and other inputs. If you have a small set of endowments people have limited choices and are unable to participate in markets
    - Don't want a pareto-efficient allocation that results in premature deaths of people
  - As a result, government often pursues policies that focus on
    - Equity of opportunity
    - Floors on consumption
    - Increasing the equality of outcomes
      - Horizontal equity – those in similar circumstances are treated equally
      - Vertical equity – those who are different are treated differently
    - Preserving institutional values
      - There is often social value in preserving or strengthening important social institutions like the family
      - The problem arises when people hold divergent views about the intrinsic value of social institutions
    - Certain problems and circumstances may dictate that government should be involved for moral or ethical reasons because it is seen as the right thing to do even without public pressure

- **Limits to Public Intervention**
  - Government failures
  - Just as individual choice and markets fail to promote social values in desired predictable ways, so to does collective choice
  - Government intervention needs to be informed not only by an understanding of market failure but by an understanding of government failure too.

- Several sources of government failure
  - Problems in direct democracy
    - Arrow's paradox of voting: Voting rules can often produce illogical results that thwart the "will of the people" – even with the fairest voting rules, the outcome of an election may not reflect the true preferences of the community
    - Tyranny of the majority: a permanent majority inflicts costs upon the minority
    - Minority with intense preferences
  - Many well known problems with representative government
    - Rent seeking – lobbying to use government to restrict competition or unfairly capture concentrated benefits
    - Shortened time horizons
    - Posturing to public agendas
    - Problems with geographic representation
    - Incorrectly viewing sunk costs by using past spending to justify future spending
  - Implementation problems and institutional analysis
    - Many well known implementation problems
    - Programs often get adapted and work in unanticipated ways
    - Principle-agent problems
    - Centralization vs. decentralization, top-down vs. bottom up programs
    - Transaction costs
    - Institutional design and choice of policy instruments