Lecture 5: Solving Social Dilemmas Introduction

(1) This lecture begins part II of the course (which is based on part I of the textbook). Part II explains how a subset of ethical rules of conduct can solve problematic choice settings that would otherwise inhibit social, economic, and political development.

(2) Part I, which we have just completed, demonstrated that ethical ideas are not all just "gut reactions" that are part of human nature. Rather they are a subset of the rules that people internalize. Many are implied by religious or philosophical principles that characterize a "good" life or "good" society. Others are simply maxims of various kinds that are believed to induce praise worthy behavior.

(3) Many such rules and principles are possible, and thus they tend to vary by time and place.

(4) However, not all ethical rules or principles help ameliorate as many social dilemmas as others—as will be demonstrated in Part II of the course. Thus, some ethical systems can be said to be more "helpful", "useful" or "productive" in the sense focused on in this course.

Review and Introduction

- (5) From part I of the course, you should come away with a mental list of philosopher-economists, their theories, and their main conclusion about the role of commerce in a good life and good society. You should also understand that arguments in support of commerce became more common and less concerned about the ill effects of commerce during the period from 1600 to 1900—the time of the "great acceleration."
- (6) From part II of the course, you should come away with a mental list of social dilemmas, their main characteristics, how to represent them with a game matrix and how internalized ethical rules of conduct can solve or ameliorate those problems.
- (7) The social dilemmas covered are illustrated with 2-person versions of the dilemmas, that in reality often involve dozens, hundreds or thousands of individuals. The same logic would hold for larger versions of these choice settings. Indeed, large scale dilemmas tend to both harder to recognize and more difficult to solve.
- (8) The dilemmas are normally presented as one-shot games. However, the same logic would apply to any finitely repeated versions of the games used to illustrate the dilemmas that need to be solved or ameliorated for human progress to take place.
- (9) Noncooperative game theory is used to characterize the choices and equilibria likely to emerge in the problematic choice settings examined.
- (10) There are hundreds or thousands of variations of the problematic choice settings examined and each tends to impede or slow human progress.

One Interpretation of Chapter 2: From Hobbes to Locke

- Two visions of the Natural State:

- **Thomas Hobbes (1651)**. Whatsoever therefore is consequent to a time of War, where every man is Enemy to every man; **the same is consequent to the time, wherein men live without other security, than what their own strength,** and their own invention shall furnish them withal. **In such condition, there is no place for Industry; because the fruit thereof is uncertain; and consequently no Culture of the Earth; no Navigation, nor use of the commodities that may be imported by Sea; no commodious Building; no Instruments of moving, and removing such things as require much force; no Knowledge of the face of the Earth; no account of Time; no Arts; no Letters; no Society**; and which is worst of all, continual Fear, and danger of violent death; **And the life of man, solitary, poor, nasty, brutish, and short.** (*Leviathan*, pp. 70–71).

  - **John Locke (1690): The state of nature has a law of nature to govern it**, which obliges everyone, and reason, which is that law, **teaches all mankind**, who will but consult it, that being all equal and independent, **no one ought to harm another in his life, health, liberty, or possessions.** (*Two Treatises on Government*, KL: 3286).

- Locke assumed that such rules had divine origin, but his analysis also goes through if such internalized rules were products biological evolution or social evolution. The important new factor in Locke's account of the natural state is the existence of widely internalized norms that reduce conflict.

- **Part II of this course can be thought of as describing the social evolutionary path from Hobbes to Locke. It explores how norms can ameliorate or solve several critical social dilemmas.**

A short introduction to game theory

- A game matrix characterizes the outcomes (payoffs) of choice settings in which the outcomes are jointly determined by the decisions (strategy choices) of two or more persons.
- Payoffs can be in terms of utility, net benefits, net profits, income, or goods.
- The **Nash equilibria** of a game (their can be more than one) occur when no player can change their strategy and improve their own payoff—given the choices of all other players in the game.
- **The easiest way to find the Nash equilibrium** is (1) to determine what each player's best strategy is for each strategy choice of the other player. (2) Underline the payoff realized. (3) Do this for one player and then the other(s). (4) The **equilibria are cells in which both player's payoffs are underlined.** **(2, 2.5)**

The outcome is a social dilemma if the sum of the payoffs is not maximized at the equilibrium—Or if different strategy choices could have made at least one player better off without making any other worse off (Pareto Superior Move).

	Bob chooses strategy 1	Bob chooses strategy 2	Bob chooses strategy 3	Bob chooses strategy 4
Al chooses Strategy 1	A, B (3, 3)	A, B (2, 4)	A, B (1, 5)	A, B (0, 6)
Al chooses Strategy 2	(4, 2)	(2.5, 3.5)	(2, 3)	(1.5, 4)
Al chooses Strategy 3	(5, 1)	(3, 2)	(2.5, 1)	(2, 2.5)

The Hobbesian Dilemma

- In Thomas Hobbes' classic work, the *Leviathan (1651)*, he argues that without government, the result would be a war of every man against every other. The result would be lives that were poor, brutish and short. The following game matrix illustrates his idea, and in a sense generalizes it.
- It characterizes a choice setting where "taking" or "attacking" the other is more fruitful for the attacker than engaging in productive activity, with the result that nothing (or little) is produced and the attack/defend efforts of the two party largely offset each other. The equilibrium result according to game theory is at the lower righthand cell with the payoffs (2,2). Note that their payoffs are much lower than the upper righthand one.

Table 2.1: The Hobbesian Dilemma

		Thomas	
		Produce	Attack
John	Produce	(J, T) (12, 12)	(J, T) (0, 14)
	Attack	(14, 0)	(2, 2)

Ethical Dispositions as a Hobbesian Solution

- If the individuals were inhibited by normative or ethical theories, they might feel guilty if they attacked. If the feeling of guilt is strong enough, here G>2, this would solve their immediate dilemma, and reduce the number of such choice settings with the Hobbesian equilibrium.
- Notice that there will be conflicts that nonetheless exist because the temptations to attack/steal from the other are too great. (But keep in mind also that the idea of "theft" may not be present, because the concept of ownership had not yet emerged and been internalized.)

Table 2.2: Solving the Hobbesian Dilemma with Ethical Dispositions

		Thomas	
		Don't	Attack /Steal
John	Don't	(J, T) (12, 12)	(J, T) (0, 14−G)
	Attack/Steal	(14−G, 0)	(2−G, 2−G)

The Hardinian Dilemma: The Tragedy of the Commons

- In a setting without property, conflict may be reduced through a number of norms dealing with use-rights. If every one has the "right" to use a common piece of property (a forest, field, pasture, pond, etc.) They may avoid conflict (the Hobbesian dilemma), but tend to over use the commons.
- Garret Hardin (1968) called this problem the "tragedy of the commons."
- The choice setting below is one in which a small common pasture is being used to graze cattle. Note that the equilibrium (here the lower right hand cell, with the payoff [7,7]) is the Hardin problem.
- (When you study these games, be sure to remember the process that one uses to find the equilibrium, not simply the particular cell the equilibrium typically occurs in. A problem may exist in some cases even if the more moderate central cell emerges--although it does not in this particular case.)

Table 2.3a: The Tragedy of the Commons

		Garrett	
Elinor	One Head	Two Head	Three Head
One Head	(A, B) 5, 5	(A, B) 4, 9	(A, B) 2, 12
Two Head	9, 4	7, 7	4, 8
Three Head	12, 2	8, 4	5, 5

Internalized Rules as a Solution to the Tragedy of the Commons

- There are many solutions to this dilemma, not all of which involve "limiting" use rights to the common, although this is one possibility. Violating a community's use limits (here more than 2 head on the village commons) might elicit sufficient guilt to solve the problem, as G>3 would in this case.
- Another would be privatization. Dividing the commons up so that each village member (initially) receives the "right" to graze as many head of cattle as he or she wishes on some non-overlapping subset of the village commons. (However, non-trespass norms are more complex than bounded sharing norms and so were not always used. And, there are some resources that are difficult to divide up, and so can not be privatized.)

Table 2.3b: The Tragedy of the Commons

		Garrett	
Elinor	One Head	Two Head	Three Head
One Head	(A, B) 5, 5	(A, B) 4, 9	(A, B) 2, 12-G
Two Head	9, 4	7, 7	4, 8-G
Three Head	12-G, 2	8-G, 4	5-G, 5-G

The Public Goods/Free Riding Dilemma

- After a community's Hobbes and Hardin problems are solved, an attractive village or community may emerge. It will be pretty peaceful and communal property will not be grossly over used.
- However, such communities would benefit from some public services (services available to all residents) such as a network of paths, a meeting building, defense of the community from raiders and conquerers.
- Unfortunately, in most cases, the provision of such services suffers from "free rider" or "public goods" problems that are unlikely to be spontaneously solved, unless (most) members of the community have internalized norms that do so.
- The game matrix below illustrates that problem for the smallest possible community.

Table 2.4: The Public Goods Dilemma

		Paul	
		Contribute	Free Ride
Alfred	Contribute	(A, P) (3, 3)	(A, P) (−2, 8)
	Free Ride	(8, −2)	(0, 0)

An Ethical Solution to the Public Good Dilemma

- The source of the public good problem is that if an individual or small group provides the public service, they bear all of the costs but realize only a subset of the benefits, whereas the free riders benefit from their efforts while paying none of the costs. This generates incentives (payoffs) with a pattern similar to that in the game matrix.
- (Again, be sure to understand the process that generates the equilibrium rather than simply "where" the equilibrium normally is in a game matrix. You may have to fill out a matrix that has the necessary properties.)
- A village that has a strong civic norm (anti-free riding) norm may avoid this problem in many cases.
- In the case below, something like "village pride" is assumed to be commonplace in the community. Note that V>5 solves this dilemma.

Table 2.5: Solving the Public Goods Dilemma through Internalized Civic Duties

		Paul	
		Contribute	Free Ride
Alfred	Contribute	(A, P) (3+V, 3+V)	(A, P) (−2+V, 8)
	Free Ride	(8, −2+V)	(0, 0)

Coordination Problems

- Another type of less troublesome, but still useful problem to solve involves, choice settings where uniform behavior (language, weights and measures, rules of the road) is useful and heterogeneous behavior problematic. Such choice settings can be characterized as coordination games.

Table 2.6: Coordination Problems and Conventions: Walking on Community Pathways

		Harold	
		Pass on Left	Pass on Right
Duncan	Pass on Left	(D, H) (1, 1)	(D, H) (−1, −1)
	Pass on Right	(−1, −1)	(1, 1)

Internalized Conventions as Solution to Coordination Problems

- These settings have multiple equilibria, each of which is “good” or “useful” but which may some time to emerge. Norms can speed up the emergence of an equilibrium insofar as they generalize across existing and new coordination problems. They tend to make one equilibrium more likely than the others.

Table 2.7: Internalized Convention for Walking on Community Paths and Sidewalks

		Harold	
		Pass on Left	Pass on Right
Duncan	Pass on Left	(D, H) (1+V, 1+V)	(D, H) (−1+V, −1−G)
	Pass on Right	(−1−G, −1+V)	(1−G, 1−G)

Social Dilemmas as Externality Problems

- All of these problematic choice settings are what economists call “externality problems” And one might think that once this common characteristic (imposing costs on others) is recognized that it would make social dilemmas easier to solve. It does make them easier to recognize but does not necessarily make them easier to solve.
- The reason for this is that the solutions are not always simple to motivate and, moreover, the types of behavior one has to motivate tends to vary with the problem.
- Even fairly simply problems such as externalities associated with chicken farming within a village can be tricky to get right.

Table 2.8: An Externality Problem

		James		
		1 Chicken	10 Chickens	50 Chickens
Craig	1 Chicken	(C, J) (4, 4)	(C, J) (3, 6)	(C, J) (1, 8)
	10 Chickens	(6, 3)	(5, 5)	(2, 6)
	50 Chickens	(8, 1)	(6, 2)	(3, 3)

Internalized Rules as Solutions to Externality Problems

- The problem here (excessive noise, odors, waste products, etc.) varies to some extent with the community and with the technology of farming used.
- Moreover, as behaviors that take place over a continuum (as true of many of the other problems examined above) the "best" solution varies with the people and places and animals involved. The best rules for urban pig farming may be quite different than for chickens, rabbits, etc. It also varies with understandings of the "the best" way to move toward a "good society."
- Thus, the norms have to be in a sense graduated, so that the "externalities are internalized." O-1 types of solution are rarely "optimal" in such cases.
- Note that in the case illustrated, an intermediate rather than extreme outcome is "best" according to most economic norms.

Table 2.9: Solving the Externality Problem

		James		
		1 Chicken	10 Chickens	50 Chickens
Craig	1 Chicken	(C, J) (4, 4)	(C, J) (3, $6-G_{10}$)	(C, J) (1, $8-G_{50}$)
	10 Chickens	($6-G_{10}$, 3)	($5-G_{10}$, $5-G_{10}$)	($2-G_{10}$, $6-G_{50}$)
	50 Chickens	($8-G_{50}$, 1)	($6-G_{50}$, $2-G_{10}$)	($3-G_{50}$, $3-G_{50}$)

From Hobbes to Lockean Anarchy

- Ethical solutions to all the above problems vary in their effectiveness according to the "size" of the dilemmas faced and the strength to which norms that ameliorate the problems are internalized.
  - **The smaller the problems and more strongly useful norms are internalized, the more effective are norms as solutions.**
- In realistic settings, the strength to which norms are internalized varies among individuals and so "crime" (violation of norms) occur occasionally—the weaker the norms and stronger the temptation, the more often such rules are violated.
- Societies in which norms that ameliorate the above social dilemmas exist and are mostly followed **tend to be more prosperous and attractive than societies in which they have not—and so more likely to survive.**
  - They are more peaceful, more productive, less polluted, better protected, and in general more attractive than those that do not have such norms.
- Locally successful societies, thus, all have such norms—although they do necessarily have exactly the same norms, nor do they necessarily work equally well.