I. Rational Choice and the Mutual Gains from Collective Action.

A. There are some kinds of activities that can be undertaken without involving any others, but these make up a relatively small part of life in a modern society.

B. Some social activities can be undertaken without significant "collective action" because personal interests are well aligned in the sense that acting in one's immediate self interest tends to make oneself better off as well as others.

C. An example of such behavior is voluntary exchange.

i. Ordinary economic exchange is in many respects an ideal form social interaction.of interactions between individuals.
- Exchange is a voluntary transation.
- Exchange only takes place when both parties expect to benefit--that is to say when each person values the thing received more than the thing given up.
- (Of course, the voluntary nature of the exchange assumes that "property rights" are enforced and accepted as legitamate by the individuals.)

D. In a pure barter economy, exchange requires what is called a coincidence of wants.

i. This sounds like a demanding requirement, but it is not.
- The usual diagrammatic representation of the mutual gains from trade is the Edgeworth box (see lecture notes or previous economics courses).
- Most points in the Edgeworth box have this property
- (Mutual gains from exchange exist in all cases in which the "initial endowment" is off the "contract" curve).

ii. If mutual gains to trade are recognized by the two persons in the Edgeworth box, exchange is a relatively easy form of collective action.
- Each "trader" simply maximizes his own utility by attempting to get the best deal possible from the other.
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Voluntary Exchange as a Game

Al	Bob:Trade Y for X	Do Not Trade Y for X
Trade X for Y	2, 2	0,0
Don't trade X for Y	0,0	0,0

(Payoffs are net benefits: (Al's, Bob's))

-
- Given a distribution of property rights, that are either mutually respected (or enforced by some third part), the "trade game" tends to increase the welfare of all participants.

iv. Of course the "voluntary exchange game" neglects a number of important questions, such as how the individuals come to recognize the existance of unrealized gains to trade, where the property rights come from, and what kinds of bargaining will take place.
- But it does illustrate an important point.
- Many beneficial forms of "social action" require not sacrifice on the part of individuals and are, in principle easy to realize, given appropriate institutions and information.

E. Indeed, in the abstract models used by economists, the price system is completely sufficient to solve all the coordination problems between individuals.

i. Prices induce sellers to bring products to the market in the pursuit of profit (Π). Prices also induce buyers to allocate their money (budget) among goods to maximize their personal gains from trade (CS).

ii. Illustration: one can easily show CS and Profit (Πsr) on the same diagram, and see that social net benefits are maximized in competitive markets (ignoring externalities).

II. However, there are a wide range of situations in which an individual's immediate interests conflict with his own long term interests, and that of other individuals in his society. .

A. That is to say, there are situations in which attempting to advance one's direct interests actually makes one worse off.

i. This can happen in private activities as when one eats all the pastry one wants to every day, and engages in just that level of study which one finds immediately gratifying.
- The result would be a rather fat and ignorant person.
- And, insofar as salaries are roughly correlated with what one knows, a rather poor person as well.
- In such cases, "optimality" requires individuals to "indirectly" optimize, or to take their long term interests into account.

B. The same sort of problem is often associated with social settings.

i. In such cases, if each person attempts to advance his own immediate objectives,
- the end result is something which no one does as well as he or she might have.

ii. In such cases, achieving a privately desired result will require coordinating several person's activities.

iii. In many cases, this will require formal political and legal institutions.

C. The classic representation of a setting in which private decisions do not achieve the best outcome (in the eyes of the players themselves) is the **Prisoner's Dilemma (PD).**

i. The classic PD game involves two criminals who are promised shorter sentences if they describe the other person's crimes.
- Since each person has an interest in minimizing their own time spent in jail, each has an incentive to testify against the other.
- Regardless of what the other person does, each is privately better off testifying than not testifying.
- Testifying is said to be the **dominant strategy** of this game insofar as it is maximizes a "player's" payoffs (minimizes his or her losses) no matter what the other person does.
- In the end, both criminals are convicted of relatively nasty crimes, and although each gets a bit of "time off" for providing information, they each wind up in jail for a far longer time than they would have if they had just "kept quiet."

ii. The PD-result (testify, testify) is said to the **Nash equilibrium** of this game. Neither player can improve his own position by changing his strategy alone (from testify to not testify, in this case).
- A Nash equilibrium exists at state Z, if and only if, no player can make himself better off by changing his strategy (in state Z), given the strategies of other players in the game (the ones that generate state Z).
- A Nash equilibrium can be attractive (Pareto optimal) as in the trade game above, or it can be unatractive as in the case of the prisoner's dilemma game.
- The PD dilemma is that **each criminal would have been better off if they had cooperated**, and neither had testified against the other!

iii. (It bears noting that the PD game is productive for society as a whole insofar as more guilty criminals are punished for their crimes, and, potential criminals seeing this, choose to avoid criminal activities because the risks seem to be too high.)

iv. However, many games share the PD game's incentive structure without generating such socially worthy outcomes.

D. Of greater interest for the purposes of this course are instances when society at large suffers from the PD outcome.

i. Examples include the establishment of property rights themselves, commons problems, and the provision of public goods.

ii. Escape from such prisoner's dilemma games will require some method of collective choice.
- "Escaping from the dilemma" requires individual to behave in a way that runs counter to their immediate incentives.
- For example, institutions might be constructed to change the incentives of the game, or to alter the strategy set of the game.
- In some cases, this can be done informally, in others formal institutions will have to be established to (i) decide what to do, and (ii) create institutions that fundamentally change the nature of these "unproductive" games.

E. Illustration: the Dilemma of Thieves: Hobbesian Anarchy

the Dilemma of Thieves

Al	Bob: Steal from Al	Do not steal from Al
Steal from Bob	2, 2	4, 1
Do not steal from Bob	1, 4	3, 3

(Payoffs are net gains from theft. It is assumed that stealing 2 units from the other, costs the thief one unit of his own resources. Initially, both Bob and Al have 3 units of the goods of interest.)

ii. In this case, stealing is a **dominant strategy**. [**Def**: Strategy S is a dominant strategy for player "A", if and only if, it generates the highest payoff for "A" given all possible strategies by the other player(s).]
- No matter what the Bob does, Al is better off stealing from Bob than not stealing.
- Similarly, no matter what Al does, Bob is better off stealing from Al than not stealing.
- (That is to say, stealing in this game always increases an individuals net payoffi, 2>1 and 4>3)
- Note, however, that both are worse off at the Nash equilibrium (steal, steal) than if neither had engaged in theft.

iii. Note that the Al and Bob could affort to pay up to 2 units of the good in total if theft could be eliminated.

F. Definition: let A and B be "states" of the world (distributions of income, production, locations etc...) A is said to be *Pareto Superior* to B if and only if at least one person prefers A to B and no one prefers B to A.

i. A **Pareto superior move** makes at least one person better off and no one worse off.

ii. State A is said to be **Pareto Optimal** (or Pareto Efficient) if and only if no Pareto Superior moves are possible given state A.

iii. A state of the world is Pareto efficient if and only if there is no way to make one person better off without making someone else worse off.

G. Note that in the PD game, the PD solution (Nash equilibrium) is not Pareto Optimal for the participants in the game, because a Pareto superior move exists.

H. Collective solutions to unproductive PD-like settings can be in the interest of all participants in the game, if "cost-effective" institutions exist that can change the nature of the PD game.

i. For example, one such solution to the "dilemma of the theives" is to hire an honest policeman.

- Suppose that an honest policeman punishes thieft by simply returning the stolen goods to its rightful owner.
- Recall that engaging in theft is a costly activity (it costs 1 unit of the good to steal 2 units of the good).
- Note that if each player pays 0.5 units to hire an honest policeman, each would be better off in the sense that the **new game is preferred to the old**.
-

the Dilemma of Thieves after Hiring an Honest Policeman

Al	Bob: Steal from Al	Do not steal from Al
Steal from Bob	1.5, 1.5	1.5, 2.5
Do not steal from Bob	2.5, 2	2.5, 2.5

(Payoffs are again net gains. Taxes of 0.5 are paid by each player in every outcome. Attempting theft still costs the thief one unit of his own resources, but in this case nothing is obtained. Prior to the 0.5 unit tax, both Bob and Al have 3 units of the goods of interest.)

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- Note that the Nash equilibrium of the new game is "non stealing." (2.5, 2.5)

ii. *Given a choice of these two games, and their predictable results, it is clear that Bob and Al are both better off paying the tax for the honest and effective policeman than in the origional Dilemma of Theives.*

- Note that each person's contribution to "law enforcement" can be thought of as voluntary, insofar as each person benefits from the final result: no theft and after tax incomes of (2.5, 2.5).
- *Three is a cost to this solution, but it is an unavoidable cost if no other solution exists that can solve the original dilemma at a lwoer cost.*

iii. The possibility of such solutions implies that a "productive government." is possible, and desirable

- However, it bears noting that some governmental solutions can cost too much to be worth while!

iv. Institutional solutions to PD problems and coordination games are commonplace in well-functioning societies.

III. Other Prisoners Dilemmas: Team Production, Externalities and Public Goods

A. The PD-type of game matrix can be used to illustrate a wide variety of social dilemmas, which can be used to justify collective action, and in many cases actions by a government with coercive power (our policeman above had coercive power).

B. Examples include:

i. The **shirking problem** associated with team production: team members may choose the "shirk" or "work."

- In cases were each person's marginal product is affected by the efforts of other team members, there are often incentives for all to shirk (to work less hard than would be mutually advantageous).

ii. The **tragedy of the commons**, in which a productive communal resource is over utilized in equilibrium.

iii. The case of "**reciprocal" externalities,** in which several persons *both* bear external costs themselves and impose them on others.

- DEF: An activity is said to generate an **externality** if it imposes costs on third parties not directly involved in determining the activity level in question. An externality is said to be Pareto relevant, if there are external benefits or costs at the margin (at the activity level chosen).
- Illustrate the **reciprocal externality problem** with a PD game.

iv. Note that the externality problem can also be illustrated in a more general way using a "continuous strategy set" and private Marginal Benefit (MB) and Marginal Cost (MC) curves together with an "external" MB or "external? MC curve.

- (The usual result for negative externalities is excessive usage relative to that which would have been , e.g. a greater use level than is Pareto optimal.)
- Social surplus losses or unrealized gains to trade (net benefits) exist at the "uncoordinated" private choice equilibrium, because external costs or benefits are ignored by the key decision makers.

C. (Unrealized gains to trade, if any, can be calculated from an externality diagram.

i. Social Total Benefits (STB(Q)) can be calculated by adding up all the MB curves to determine the Social Marginal Benefit Curve. STB(Q) is the area under the Social Marginal Benefit (SMB) curve from 0 to the quantity Q of interest.

ii. Similarly, Social Total Costs (STC(Q)) can be by adding up all the marginal cost curves to determine Social Marginal Costs (SMC), and then finding the area under the SMC from 0 to the quantity (Q) of interest.

iii. The difference between STB(Q) and STC(Q) is the social net benefit (SNB(Q))associated with activity level Q for the activity being analyzed.

iv. Social net benefits are "normally" maximized at the quantity where SMC = SMB
- If there is a "positive" (beneficial) externality, than too little of hte activity tends to be undertaken.
- If there is a negative (costly) externality, then too much of the activity tends to be undertaken to maximize social net benefits.

v. DEF: A **pure public good** is a good that can be simultaneously consumed by many people.
- A pure public good is perfectly sharable in the sense that no one's satisfaction is reduced if another person shares the good.
- Examples include national defense, national parks (over some range of use), gravity, broad cast radio and TV, etc.

vi. The case of producing (unexcludable) **public goods** is similar to that of engaging in an activity that creates a positive externality. In such cases, external benefits are conferred on all other persons as the public good is produced, and those "external benefits" are not ordinarily accounted for by the person creating them.
- The result tends to be, as for other postive externality generating activities, that the pure **public goods are under produced**.
- Illustrate an abstract public good problem with PD game.
- Illustrate the discrete "free riding" problem using defense of the village, barn building, swamp draining etc. with a PD game matrix.
- Illustrate with a continuous version of the free riding problem.

D. The PD game and its collective solutions, thus, provide a fairly general basis for a productive theory of the state.

i. There are many social dilemmas in which the result of private optimization is less than the best that can be achieved by all affected parties.

ii. Collective action--governance--can potentially solve many of these dilemmas.

iii. A standing organization created to enforce property rights and to provide public goods, can be described as a "productive state."

IV. Public Economics and the Productive State.

A. Public economists have devised a number of public policies that can solve commons, externality, and public goods problems.

i. Most involve the use of the coercive power of government.

ii. Regulations may be imposed and backed up with penalties.

iii. Incetives may be alterred by imposing the "right" (Pigovian) taxes.

iv. Property rights of one kind or another may be created to "meter" the use of a commons, the production of negative externalities, etc. (as with our honest and effective policeman above)

B. Such solutions, evidently, require the creation of a government to address the various PD and coordination problems.

C. The theory of the "productive state" argues that people notice that independent private decision making is not generating as good a result as they can imagine. So they band together and coordinate their activities through some method of collective decision making and enforcement.

i. In many cases, the required coordination can be achieved without formal penalties or other sanctions, because informal sanctions--status, honesty and self discipline--are sufficient to induce cooperative behavior .

ii. In other cases, especially those there are many people involved or where the costs are very great compared to individual advantage, some form of collective coercion (punishment) will be necessary to achieve the desired result.

D. The **social contract theory** of collective action argues that individuals may agree to be coerced (taxed, or other wise penalized for free riding) as a necessary part of over coming free riding problems in the team production and in the production of public goods.

i. Here a productive joint enterprise is formed by a voluntary agreement of all affected parties.

ii. As with the "Den of Thieves dilemma" above, which demonstrates that enforcable property rights might be voluntarily accepted by all parties (even thieves!), although it requires the existance of an organization with coercive power (the government).

V. Some Quotes on the Emergence of Organization out of Individualistic Anarchy: the Productive State and the Social Contract:

A. On the nature of anarchy: from Thomas Hobbes, *Leviathan* (1651)

i. "Whatsoever therefore is consequent to time of Warre, 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 invention shall furnish them withal. In such condition .. the live of man [will be] solitary, poor, nasty, brutish and short.

B. From James Buchanan, *Limits to Liberty*, 1975.

i. "The state serves a double role, that of enforcing constitutional order and that of providing "public goods." This duality generates its own confusions and misunderstandings. "Law," in itself, is a "public good," with all the familiar problems in securing voluntary compliance. Enforcement is essential, but the

unwillingness of those who abide by law to punish those who violate it, and to do so effectively, must portend erosion and ultimate destruction of the order that we observe. These problems emerge in modern society even when government is ideally responsive to the demands of citizens. When government takes on an independent live of its own, when Leviathan lives and breathes, a whole set of additional control issues cone into being. "Ordered anarchy" remains the objective, but ordered by whom? Neither the state nor the savage is noble, and this reality must be squarely faced.

C. From Mancur Olson, "Anarchy, Autocracy and Democracy" (1991)

i. "The conqueror of a well defined territory has an encompassing interest in that domain given by the share of any increase in the territorial income that he collects in taxes. This encompassing interest gives him an incentive to maintain law and order and to encourage creativity and production in his domain. Much of the economic progress since the discovery of settled agriculture is explained by this "incentive."

VI. The State as a Voluntary Club

A. The above model of public goods and collective action provide the basis for a theory of the productive state.

i. Individuals voluntarily agree to create an organization with the power to coerce certain forms of behavior to solve various "PD" like problems of collective action and perhaps also coordinatrion problems.
- Collective enforcement of property rights can mitigate "the den of theives" dilemma.
- Taxation can provide the resources necessary to finance the production of desired public goods are produced (national defense, law enforcement, transport system right a ways, etc).
- Regulations backed by sanctions can reduce externality and commons problems (pollution, high way speeds, and so forth).

B. *Any form of collective action requires a method for making collective decisions.*

C. Obviously, if a group undertakes to form a state, they must also make some decisions about how collective choices will be made.

i. Even if there is unanimous agreement to provide a particular service, or enforce some property right or rule, there may not be unanimous agreement about the level of service or enforcment that is appropriate, or best.

ii. Appointing one person--a "leader," king, or dictator--to make decisions in a particular area is one such collective decision procedure.
- However, the person appointed "leader" still has to be chosen.
- And, some method for replacing him or her would, in most cases, be another collective concern.

iii. Majority rule is another possible rule for making such choices.

iv. We will analyze implications of that rule beginning next lecture.

VII. An Alternative Theory: the "fairly" Productive State as a Stationary Bandit

A. Before moving on, it is worth considering another theory of the emergence of the state and state services.

B. Mancur Olson notes that most governments have not been voluntary clubs but rather are results of conquest and superior arms.

C. He proposes an alternative model of the state, based on the different incentives of what he calls "roving" and "stationary" bandits. The argument is based as follows:

i. Suppose that initially, there are a several roving bandits, each with sufficient power to sweep through a farm, village, or town, and steal what ever they want to.
- This may be thought of as a pleasant life for the travelling bandit: of considerable riches travel and comradery.
- Although their lifestyles might be pleasant or not, the existance of multiple groups of roving bandits creates a number of problems for the bandit groups, themselves, and also for their victems.

ii. The victems might organize for their own defense.
- That is to say, potential victems may form a productive state, to errect high walls, and guard the gates, to keep the bandits out.

iii. If potential victems do not succeed in protecting themselves (or fail to organize) from roving bandits, **incentives for investment and saving are limited**.
- Why save if you know that whatever you put asside for the future will be taken by a roving bandit before you get to use it?
- Thus, farmers, merchants, and other productive people, would produce and save less than they would have in the absence of some form of protection from the roving bandits.
- (Show this with an expected benefit expected cost diagram.)
- Life for both bandits and their victems would be poor!
- Another, Hobbesian PD game tends to exist in a world of roving bandits.

iv. A non-contractual escape from the roving bandit dilemma is suggested by Mancur Olson.
- If no productive state or defense organization can be put together by the victems, it is possible that a very clever Bandit might realize that if he were to take over an area and exclude other groups of roving bandits from that area he or shee would be wealthier.
- Rather than ten bandits "sharing" the "take" from a village in say differnt months of the year, a stationary victem can take it all.

- This reduction in the number of other bandits is the direct advantage of being a stationary bandit.

v. **There are also indirect advantages associated with being a stationary bandit.**

- Note that roving bandits have incentives to take all the wealth that they can lay their hands on. (There is a PD game involving roving banditry.).
- Anything left behind simply goes to the next bandit that comes through the village.

vi. A stationary bandit profits by taking less than "all that can be carried away," because because he or she can always return another day and collect it at a later time. Taking less than "all that can be carried away" has a very important incentive affect.

- Letting potential "victems" keep part of their harvest, livestock, gold, and so forth, of course has an effect on their incentives to accumulate such capital. Instead of expecting to lose all of their wealth to roving bandits, they now expect to be able to keep *and enjoy* at least part of it (at least for a longer time period than before).
- This encourages potential victems to be more productive, to make more long term investments, to work harder, etc. etc. which increases the "tax revenue" that the stationary bandit can obtain.

D. Indeed, a clever stationary bandit will realize that he or she **should encourage economic growth** in "his or her" village as a means of increasing the tax base and his or her personal wealth.

i. He or she may invest in a legal system, in roads, and even in education as a method of making his village wealthier and thus a better source of tax revenues.

ii. That is to say, the stationary bandit becomes richer becasue his potential victems become richer.

- (Show figure of a Laffer curve, linking tax/take rates with work and output level.)
- (The incentive to provide public services can be characterized in a *diagram* that shows the "tax revenue" maximizing service level.)
- (Note that the optimal service level varies with the tax rate.)
- (The greater the tax rate at the margin, the greater is the "encompassing interest" of the dictator in the wealth of his domain.)

E. A stationary bandit, has what Mancur Olson calls an **encompassing interest** in the welfare (at least wealth) of his potential victems because he can profit by making them wealthier.

i. Mancur Olson, "Anarchy, Autocracy and Democracy" (1991) argues that:

ii. "The conqueror of a well defined territory has an encompassing interest in that domain given by the share of any increase in the territorial income that he collects in taxes. This encompassing interest gives him an incentive to maintain law and order and to encourage creativity and production in his domain. Much of the economic progress since the discovery of settled agriculture is explained by this "incentive."

F. (One **major problem** with the Olsonian model of dictatorship is that it ignores the security problems that dictators face. Sometimes there is a trade off between increasing the wealth and welfare of "his or her" citizenry, and the risk that "he or she" will be over thrown.)

VIII. Encompassing Interests and Institutional Design

A. The idea of an emcompassing interest is very important in other applications as well.

B. Clearly, a person whose own direct interest is advanced whenevery "your" welfare improves will be a better representative/zar/agent than one whose interest runs at cross purposes.

i. The elected leader of a democracy may be said to have an encompassing interest in his country if his or her prospects for reelection increase as the nation prospers.

ii. A Mafia Don may have an interest in "law and order" within his domain. (Protection fees can be higher when the value of commercial activity increases.)

C. Although the smaller one's share in the fruit of a collective enterprise, the smaller is one's encompassing interest, it may also be applied to understand some behavior by individual members of a family, clan, club, interest group, or society.

i. Encompassing interest explains, for example, why some forms of employee stock options and other forms of ownership as in a cooperatives may work.

ii. (Again the encompassing interest would generally not be complete, so other incentive problems would remain.)

- Politically, it may partially explain why citizens often care about such abstract ideas as GNP or average income, insofar as their own income is correlated with those macro-economic variables.
- To the extent that voters behavior "altruistically" or with "civic responsibility," voters will have an encompassing interest. They will tend to cast votes for politicians and policies that seem likely to advance welfare of their fellow citizens.
- The latter may also explain, or at least help explain, some forms of publically oriented behavior by individuals in may walks of life whose interest is somehow tied to the interest of a larger organization.

D. Of course, institutions may also align private interests with public interests, without requiring "altruism" or "a social conscience." This is one aim of good constitutional design.