Cooperation Problems: Definitions and Examples

**Uncertainty about behavior:** Uncertainty about behavior refers to uncertainty regarding the actions taken by others. Sometimes it is hard to know what other states are doing – in particular, if they are cooperating or defecting. Consider weapons of mass destruction. Whatever a state may say publicly, it is very difficult for others to ascertain whether it is pursuing technologies associated with the development of biological or chemical weapons. Particular sub-issues within the area of human rights are also subject to uncertainty about behavior – especially when the two-level game is operating. For instance, not only is it difficult to see whether certain human rights laws are being enforced in any particular state; if reliable data on noncooperation are readily available, one still cannot be sure whether it is the government who is violating human rights or soldiers in the field not following orders.

The 1997 multilateral “Convention on Human Rights and Biomedicine” (UNTS 37266) is an example of an agreement whose underlying cooperation problem is characterized by uncertainty about behavior. It is very difficult to see whether particular laws on access to healthcare and medical research are actually being enforced, and hence it is difficult to tell whether states are cooperating or not.

**Uncertainty about preferences:** Uncertainty about preferences refers to uncertainty regarding what your partners in the potential cooperation really want out of the deal. State A may want to try to solve a particular problem with State B, but State A may be unsure about what exactly State B wants. I assume states know their own preferences, but may or may not know the motivations or intentions of other states. For example, a key problem underlying arms competition (and therefore attempts at arms control) is determining whether another state is simply seeking its own security or is greedy and expansive. Is India's nuclear testing a result of its desire to aggrandize itself against Pakistan, or is it a defensive reaction against China? As another example, some EU members are unsure of Turkey’s true nature and are therefore hesitant about EU expansion in that direction. Of course, a major problem in determining states' preferences is that they may have incentives to misstate or misrepresent them.

Uncertainty about preferences is particularly acute in human rights agreements. Often, it is unclear what the intentions of the ratifying states are, and insincere ratifiers may try to enter human rights agreements as mere symbolic acts. An example is the “American Convention on Human Rights Pact of San Jose” (UNTS 17955), where the real intentions of all participants are not immediately discernible.

**Uncertainty about the state of the world:** Uncertainty about the state of the world refers to uncertainty regarding the consequences of cooperation. States may want to try to solve a particular problem but be unsure about the future consequences of their own actions, the actions of other states, or the actions of international institutions – including the institutions they create. The uncertainty can be scientific and technical or it can be about politics or economics. Consider the dispute over the Spratly Islands, which lie off the southern coast of China and have been claimed by a number of states. This dispute
has taken on a special urgency now that the area appears to hold significant oil deposits, although no one is sure how much oil is actually there or its future value. Thus if cooperation were attempted now, it would be characterized by uncertainty about the state of the world because the true distribution of benefits (i.e., who actually wins most, who loses most) could not be known until the future.

An example of an agreement for which the underlying cooperation problem is characterized by uncertainty about the state of the world is the 1980 “Agreement for the Promotion and Protection of Investments” (UNTS 19536) between the United Kingdom and Bangladesh. The uncertainty about the state of the world comes about because future political shocks can change the benefits accrued under such cooperation in unstable states. Given its tumultuous political history, including military coups in the 1970s, Bangladesh certainly was unstable. Put differently, what the future distribution of benefits will look like under such cooperation depends on whether certain political developments change the desirability of the cooperative terms. These developments cannot be predicted and hence are best modeled as shocks. States like Bangladesh are vulnerable to such shocks.

**Enforcement problem:** An enforcement problem is present when actors have incentives to defect from cooperation. Even if a cooperative arrangement makes everyone better off, some or all actors may prefer not to adhere to it because they can do better individually by cheating. Issues are characterized by enforcement problems when actors find (current) unilateral noncooperation so enticing that they sacrifice long-term cooperation. This, of course, is the predicament at the center of Prisoner’s Dilemma (PD) and public goods problems. At one extreme are cases with no enforcement problem: When states need to set technical standards, actors will have no incentive to defect once such an agreement has been reached; rather, all parties will find it in their best interest to honor the agreement since they lose nothing and gain compatibility with others. Within the context of repeated PD games, the enforcement problem may be minimal if incentives to defect are small relative to the shadow of the future. (The shadow of the future is the expectation of benefits from future interaction and their value. Thus a long shadow implies both that actors have a sufficiently high density of interaction and that they assign a sufficiently high value to the future.) But as incentives to defect are greater, or interactions are less frequent, enforcement problems emerge.

The 1925 “Convention Concerning Equality of Treatment for National and Foreign Workers as Regards Workmen's Compensation for Accidents” (UNTS 602) is an example of a human rights agreement for which the underlying cooperation problem is characterized by an enforcement problem. The enforcement problem is created by the Prisoner's Dilemma structure of the payoffs: A state wants its workers to be treated well in other states, but would prefer not to spend resources on foreigners working within its borders.

**Distribution problem:** When more than one cooperative agreement is possible, each actor naturally prefers the one giving it the greatest (expected) payoff. This leads to distribution problems — differences over which alternative cooperative agreement to
implement. The size of a distribution problem depends on how each actor compares its preferred alternative to other actors’ preferred alternatives. In a pure coordination game, where both actors prefer the same coordination point(s), there is no distribution problem. Distribution problems are greater when actors want to coordinate in a “Battle of the Sexes” games, and these problems increase with the intensity with which the players prefer alternative coordination points. In repeated Prisoners’ Dilemma-type games for which there are multiple efficient equilibria, the distribution problem depends on actor’s differences “along the Pareto frontier.” Finally, in a zero-sum game, the problem is strictly distributive since a better outcome for one leaves less for the others. In allocating quotas for harvesting West Coast salmon, for example, Canada and the United States know how many fish will be caught in total; the only question is how many will be caught by each country’s fishermen, hence the distribution problem.

An example of an agreement for which the underlying cooperation problem is characterized by a distribution problem is the 1971 “Agreement concerning the Compensation of Netherlands Interests” (UNTS 11868) between Egypt and the Netherlands. At the time, Egypt owed the Netherlands some compensation because Egypt had nationalized private assets. The issue was how much compensation, which is essentially a distribution problem.

**Commitment problem:** The term commitment problem refers to a domestic commitment problem or a time-inconsistency problem. A time-inconsistency problem describes a situation in which an actor's best plan for some future period will not be optimal when that future period arrives; in other words, the plan is inconsistent over time. The most popular example of this kind of problem is a government’s policy toward inflation. It is optimal for the government today to promise low inflation in the future, but when the future arrives, it is politically difficult to lower inflation because unemployment will most likely go up. The US government solves this problem by delegating inflation policy to an independent central bank. A more mundane example that most of us face revolves around dieting. We can eat chocolate cake today and say that starting tomorrow we will not eat it; nevertheless, tomorrow or the next day, when that cake is within reach, we usually cannot resist eating it.

An agreement for which the cooperation problem is characterized by a commitment problem is the 1980 “Agreement for the Promotion and Protection of Investments” (UNTS 19536) between the United Kingdom and Bangladesh. Given its tumultuous political history, including military coups in the 1970s, Bangladesh has a credibility problem regarding the safety of outside investments. Hence it needs to tie its hands in the present so that it will not cave into possible future pressures to nationalize or expropriate outside investments. This is especially important given outsiders’ perception of the likelihood of a regime change in Bangladesh, and these potential investors will not likely invest without some credible commitment on the part of Bangladesh to uphold its promise.

**Negative externalities:** An externality occurs when a decision (for example, to pollute the atmosphere) causes costs or benefits to persons other than the decision-maker. In
other words, the decision-maker does not bear all of the costs or reap all of the gains from her action. As a result, in a competitive market too much or too little of the good will be consumed from the point of view of society. Put simply, when self-interested actions have impose costs on or provide benefits to others, we have an externality. If the effect on others is negative, we have a negative externality. Common examples include smoking, pollution, and ordering a very complicated coffee drink (and thereby making others wait in line longer).

An example of an agreement for which the underlying cooperation problem is the need to limit negative externalities is the 1969 multilateral “International Convention on Civil Liability for Oil Pollution Damage” (UNTS 14097). Oil can spill from one state’s ships into other states’ territories and also pollute waters more broadly. This agreement, among other things, will make states and their ship owners more responsible at sea.

Positive externalities: An externality occurs when a decision (for example, to pollute the atmosphere) causes costs or benefits to persons other than the decision-maker. In other words, the decision-maker does not bear all of the costs or reap all of the gains from her action. As a result, in a competitive market too much or too little of the good will be consumed from the point of view of society. Put simply, when self-interested actions impose costs on or provide benefits to others, we have an externality. If the effect on others is positive, we have a positive externality. Common examples include planting an attractive garden in front of your house (in back wouldn’t count because others could not enjoy it), dancing first at a party, and investing in research to fight cancer.

A cooperation problem is characterized by positive externalities when the states have as one of their goals the production of something that will have positive externalities. An example of an agreement for which the underlying cooperation problem is the need to encourage positive externalities is the “Exchange of notes constituting an agreement on the project Soil management and conservation in East Amazonia” between Germany and Brazil concluded in 1984 (UNTS 23031). In addition to being a vehicle for Germany to help Brazil, this agreement brings together German scientific expertise and the raw conditions in Brazil; thus scientific knowledge concerning agriculture in humid places is promoted, which can benefit other states as well.

Deadlock: Deadlock usually refers to a situation where each player prefers not to cooperate; hence when both (all) players simply do what they prefer, the outcome is one that neither would want to change. When deadlock characterizes the preferences of the players, it is not of great strategic interest because not only do they have dominant strategies not to cooperate, but (in contrast to the Prisoner’s Dilemma) the outcome is in the Pareto set. It becomes an interesting cooperation problem when other actors have an interest in changing the incentives of the deadlock parties to encourage a different outcome. For example, we can imagine two siblings engaged in a deadlock situation – that is, they both like fighting with each other and have no interest in being nice; that is, they prefer mutual fighting over mutual cooperation. Their parent, on the other hand, wants to live in a home where the situation is not constant fighting and therefore has an
interest in changing the preferences of the children (perhaps through increased scope – that is, rewards or punishments). Thus from the parental point of view, *deadlock* is a strategic problem. We can imagine the US or the EU as a third party wanting to change the incentives of two states involved in a *deadlock* situation with dire consequences for their neighbors and/or the environment – not to mention the citizens who don’t agree with their *deadlocked* governments. Finally, for the purposes of this study, if one of the parties prefers mutual defection as its most preferred outcome, I consider the situation to be one of *deadlock* (see the example below).

An example of an agreement for which the underlying cooperation problem is *deadlock* is the 1972 “Interim Agreement on certain measures with respect to the limitation of strategic offensive arms” (UNTS 13445) between the Soviet Union and the U.S. With respect to the issue of offensive arms, it has been argued that at the time the Soviets preferred mutual defection to mutual cooperation. The U.S. had the opposite preferences. In the end, the deadlock was broken by linking offensive arms with defensive arms during the SALT I negotiations.

**Coordination problem:** While all agreements require “coordination” on agreement text, COIL has a very specific definition of a *coordination* problem. In situations characterized by underlying coordination problems, actors must coordinate on exactly one outcome to be better off cooperating. The worse it is to ‘miss’ some specific solution, the more severe the coordination problem. In terms of utility functions, coordination problems would be characterized by utility functions that are steep around an outcome. If not hitting one specific outcome is not too bad, then there is no *coordination* problem. A utility function with some satiation point, e.g. a simple quadratic one, helps illustrate the problem. The wider the curve, the less important becomes coordination on a specific outcome, because being slightly off doesn’t diminish utility by much.

An example of an agreement for which the underlying cooperation problem is characterized by a *coordination* problem is the New START Treaty, recently ratified by the US Senate, and superpower arms control treaties, more generally. Suppose a superpower arms control agreement simply stipulated “reduce ballistic weapons.” Then reducing by any amount would constitute compliant behavior. But if the two sides reduce weapons to different degrees, in such a competitive and sensitive issue area, it could be argued and has been by many US senators that at least one side is hurt very badly. Importantly, that state which reduced more would prefer not to have had any agreement at all. By contrast, consider a human rights agreement that calls for the abolition of child labor. If some states define child as someone under 18 and act as accordingly while others define child as someone under 15, as long as both are reducing child labor however they define it, both states are better with the agreement than without it. Sure, the state that defines as under 18 would prefer the other state to act in a similar fashion, but it still prefers the other state reducing child labor for those under 15 than not reducing at all.

Not surprisingly, 2x2s are only so helpful. Coordinating on an exact movie (or ballet) is
not mentioned as a necessary condition of one of the Pareto outcomes of the Battle of the Sexes. Yet, most would agree that, in such a situation, coordinating on different movies is worse than no coordination at all!

**Exporting/Reinforcing Norms:** The cooperation problem underlying certain human rights agreements is one of creating or spreading norms. Since the establishment of norms is at least partially about preference change, it is not best characterized as like the typical strategic cooperation problems; the other strategic problems in this study take preferences as given.

The 1997 multilateral “Convention on Human Rights and Biomedicine” (UNTS 37266) is coded as having an underlying cooperation problem characterized by exporting/reinforcing norms, i.e., the establishment of a norm of equitable access to healthcare. (This agreement is also characterized by the strategic problem of uncertainty about behavior.)

**Aid(foreign/military):** Aid refers to a cooperation problem that is not a strategic problem in the game-theoretic sense as are the rest of the cooperation problems used in this study. Certain actions that are of a humanitarian nature, such as giving earthquake or hurricane aid, are best captured in this category. Military aid agreements are also characterized by this cooperation problem, but they also tend to be characterized at times by other problems as well.

An example of a security agreement for which the underlying cooperation problem is to give assistance and establish good will is the 1981 “Co-operation Agreement on civil defense and security,” between France and Morocco (UNTS 20783); there is no underlying strategic problem here; hence this agreement is coded as having a cooperation problem of aid and nothing else.