Uncertainty and Conflict

Due Beginning of Class March 31, 2015

No Late Work Accepted

Bonus. In class, we discussed how the International Olympic Committee creates rules to promote competitive play, but the structure of the tournament created perverse incentives to *not* play competitively. Find another rule or incentive structure that unintentionally undermines its creator's desires. Your example could from sports, work, IR, or everyday life. The value of the bonus is up to a point (10% of this problem set's grade), depending on the detail and originality of the perverse incentive you write about.[1]

1) Reducing Uncertainty and Mediation. In class, we saw in a game with one-sided uncertainty about the probability of victory that the government makes the aggressive offer if $q > \frac{c_R+c_G}{p'_R-p_R+c_R+c_G}$, where p'_R is the probability the rebels win if they are strong, p_R is the probability the rebels win if they are weak, c_R is the rebels' cost of war, c_G is government's cost of war, and q is the probability that the rebels are weak. Under such conditions, the probability of war is positive. If $q < \frac{c_R+c_G}{p'_R-p_R+c_R+c_G}$, however, the government always makes the safe offer and the probability of war is 0.

Note that one measure of the government's uncertainty is the difference between the two possible probabilities of victory, or $p'_R - p_R$. When this value is large, there is great variation between the types of rebels; when it is small, the rebels appear close to being identical.

a) As $p'_R - p_R$ decreases, what happens to the probability of war? Interpret this finding in light of what we know about the outcome of the game with complete information.

b) Suppose a third-party like the United States or the United Nations could credibly reveal information about a rebel group's type. What does your answer above say about that third-party's ability to reduce the chances of war? How does this differ from the results of Fey and Ramsay 2010? What accounts for that difference?

2) Efficiency-Promoting Institutions. Suppose the government and rebel group are playing the game with one-sided incomplete information. Let $q = .5$, $c_G = .75$, $c_R = .25$, $p'_R = .75$, and $p_R = .25$.

a) What is the outcome of the game? Show all your work. Specifically, do *not* use the cutpoint from class. Rather, derive the outcome step-by-step.

[1] Writing about something covered in another class—particularly PSC/IR 106—is decidedly *not* original.

b) What is the expected inefficiency of the game? (Expected inefficiency is the probability of war multiplied by the costs of fighting.)

c) Suppose the international community becomes concerned about the costliness of civil wars and begins taking measures to limit the damage to the participants. Imagine that such damage-limiting institutions only reduce the costs of war; they do not influence the outcome. Specifically, the institution will eliminate three-fifths of the costs of war for both parties. What is the outcome of this new game?

d) What is the expected inefficiency of the game?

e) Is the institution successful? If so, explain why. If not, explain why not.

3) Crisis Bargaining with Three Types. Consider a slight variation on the crisis bargaining game with one-sided uncertainty. Before, the rebels' probability of victory could have been p'_R or p_R. Now suppose it could be p''_R, p'_R, or p_R, where $p''_R > p'_R > p_R$. For simplicity, let $p_R - c_R > 0$. Show that, if an optimal offer exists, that offer is $p_R - c_R$, $p'_R - c_R$, or $p''_R - c_R$. (Hint: You can prove this by showing instead that any other offer is *not* optimal. Hint within a hint: You can prove that an offer is *not* optimal by showing that another offer generates a strictly greater payoff for the government in expectation.)

4) Signals that Are Costly. Suppose G(overnment) is deciding whether to challenge T(hird-party intervener). G calculates that restarting a war is only worth it if T will back down at least 40% of the time.

There are two possible types of T: an unresolved type that values peace worth \$5 billion and a resolved type that values peace at \$10 billion. Intervention will certainly be successful but costs \$7 billion regardless of T's type.

a) Suppose G knew that T was unresolved. Would G challenge T? Why or why not?

b) Suppose G knew that T was resolved. Would G challenge T? Why or why not?

For the remaining questions, suppose G is uncertain of T's type but thinks that each is equally likely (i.e., it believes T is unresolved with probability 1/2 and resolved with probability 1/2). T, of course, knows its type.

c) Under what conditions would the resolved type be willing to pay a costly signal of \$4 billion? The unresolved type?

d) Suppose G observes a costly signal of \$4 billion. Should G concede? (Hint:

Consider T's incentives if G were to concede under these circumstances.)

e) Do all signals that are costly convey important messages? Why or why not? What does this say about interpreting a signal purely based on its costliness?

5) Relatively Cheap Signals. Suppose G is deciding whether to challenge T. G calculates that restarting a war is only worth it if T will back down at least 60% of the time.

There are three possible types of T: an unresolved type that finds peace worthless, a middling type that values peace worth $1 billion, and a resolved type that values peace at $10 billion. Intervention will certainly be successful but costs $5 billion regardless of T's type.

a) Suppose G knew that T was unresolved. Would G challenge T? Why or why not?

b) Suppose G knew that T was middling. Would G challenge T? Why or why not?

c) Suppose G knew that T was resolved. Would G challenge T? Why or why not?

For the remaining questions, suppose G is uncertain of T's type but thinks that each is equally likely (i.e., it believes T is unresolved with probability 1/3, middling with probability 1/3, and resolved with probability 1/3). T, of course, knows its type.

d) Under what conditions would the resolved type be willing to pay a costly signal of $0.01? The medium type? The unresolved type?

e) Suppose G observes a costly signal of $0.01. In light of the above, what is the G's updated belief that the third-party is the unresolved type? The medium type? The resolved type? Is such a cost an unambiguous signal that T is the resolved type?

f) Given that the G observes a costly signal of $0.01, should G challenge? Explain your answer.

g) When the United States launches interventions, hawkish domestic opponents often complain that the deployments are very small and send a message of weakness to our opponents. Is this inherently true? If so, explain why resolved types should always send the strongest signals possible. If not, explain why a "weak" message is not inherently a message of weakness. That is, why would resolved types not want to send strong messages?