Mutual Fear and Conflict

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Hobbes: Reasons for War

- Hobbes, Leviathan, Chapter 13, p. 57: [I]n the nature of man, we find three principal causes of discord. First, *competition (greed)*, secondly *distrust (fear)*, thirdly *glory (honor)*. The first makes men invade for *gain*; the second for *safety*; and the third for *reputation*.
- Thucydides Part 1, Chapter 1 at end: "The growth of Athenian power and the *fear* this caused in Sparta, made war inevitable."
- "When armies fight, there is on one side, or both, a running away..[T]o avoid battle... [is] cowardice," Hobbes, p. 270
- Fear causes escalation sometimes and deterrence at other times.

Hobbes: Definitions

- Hobbes Chapter 13, p. 57:
  - *Competition*: if any two men want a single thing which they can't both enjoy, they become enemies; and each of them on the way to his goal (which is principally his own survival, though sometimes merely his delight) tries to destroy or subdue the other.
  - *Distrust*: Because of this distrust amongst men, the most reasonable way for any man to make himself safe is to strike first...People who would otherwise be glad to be at ease within modest bounds have to increase their power by further invasions, because without that, in a purely defensive posture, they wouldn't be able to survive for long.
  - *Glory*: Every man wants his associates to value him as highly as he values himself; and any sign that he is disregarded or undervalued naturally leads a man to try, as far as he dares, to raise his value in the eyes of others....when there is no common power to keep them at peace, 'as far as he dares' is far enough to make them destroy each other.

Hobbes: Optimal (Individual) Strategies and Coordination

- Hobbes, Chapter 14, p. 60: The *First Law of Nature:* [A]s long as every man continues to have this natural right to everything—no man, however strong or clever he may be, can be sure of living out the time that nature ordinarily allows men to live. And consequently it is a command or general rule of reason that *every man ought to seek peace, as far as he has any hope of obtaining it*; and that *when he can't obtain it he may seek and use all helps and advantages of war*.

Summary

- *State of nature* suggests anarchy is a Prisoners' Dilemma because of *greed*. This is a standard interpretation and is applied to international relations:

  As an example of an actual situation where the state of nature still exists, Hobbes mentions the relationship between nations states....[I]n an armament agreement, one would have the same situation as the Prisoner's Dilemma; that is, an agreement to disarm, or to reduce arms, is very unstable," Rawls (2007, p. 77).

- *First Law of Nature* suggests peace is a best response to peace and war to war, a Coordination game. It suggests a channel through which *fear* may operate.

- Economics is pretty good vehicle for studying greed and fear. Honor could be studied via reputation but many key ideas hard to capture. In effect, in the models we study, each player practises *Raison d'état*, a cold calculation of costs and benefits without ideological or moral constraints.
- Cardinal Richelieu was a master of this practise. His enemy Emperor Ferdinand II believed that foreign policy should be based on the Catholic faith. This prevented him from making deals with Protestants, even when it could have been highly advantageous to his empire:

  "It would be a great folly for one to try to strengthen a kingdom, which God alone has granted, with means that God hates" (Ferdinand's adviser Lamormaini, quoted in Kissinger Diplomacy, p. 60)

- In contrast, Cardinal Richelieu (although himself a Catholic) supported the Protestant King of Sweden when he went to war against the Emperor.

Motivation: Schelling and Reciprocal Fear of Surprise Attack

- "Also because there be some, that taking pleasure in contemplating their own power in the acts of conquest, which they pursue farther than their security requires; if others, that otherwise would be glad to be at ease within modest bounds, should not by invasion increase their power, they would not be able, long time, by standing only on their defense, to subsist," Hobbes, p. 184).
- "[I]f I go downstairs to investigate a noise at night, with a gun in my hand, and find myself face to face with a burglar who has a gun in his hand, there is a danger of an outcome that neither of us desires. Even if he prefers to leave quietly, and I wish him to, there is a danger that he may think I want to shoot, and shoot first. *Worse, there is danger that he may think that I think he wants to shoot. Or he may think that I think he thinks I want to shoot. And so on*" (Schelling, 1960, p. 207).

- A state which does not desire an arms race may in any case acquire new weapons if it fears another state will acquire them:

  "Pakistan does not intend to aggress...[W]e are the victim of (Indian) aggressions." Foreign Minister Gohar Ayub Khan as reported by the Pakistan News Service, June 1999.

  "In India, one often hears that 'Pakistan understands' that India has no hostile designs on it..In Pakistan, however, there is strong sense that the nation's survival is potentially at risk in the event of a major Indian attack. Without a clearer understanding of India's defence doctrine, this could generate a catastrophic miscalculation," CSIS South Asia Monitor, February 1, 1999

"Whatever happens in India, they blame Pakistan. Whatever happens in Pakistan, we blame India...[N]either Pakistan nor India has gained anything from the conflicts and tensions of the past 25 years." Nawaz Sharif, then Prime Minister of Pakistan, Washington Post, Feb. 22, 1999.

Before World War I, Britain and Germany engaged in a naval arms race, each side perceiving the other as the aggressor (Jervis, Wainstein and Sontag).

Motivation: Jervis

- The Stag Hunt game is a key metaphor for conflict. Payoffs for player i the row player are:

$$\begin{array}{lcc} & \textit{Hare} & \textit{Stag} \\ \textit{Hare} & -c_i & \mu - c_i \\ \textit{Stag} & -d & 0 \end{array} \tag{1}$$

with

$$\mu, d, c_i > 0 \text{ and } 0 > \mu - c_i > -c_i > -d.$$

Note that this implies $d - c_i > 0 > \mu - c_i$ so $\mu < d$.

- Other key games are Prisoner's Dilemma if $c_i < \mu$ and Chicken:

$$\mu - c_i > 0 > -d > -c_i.$$

Note this implies $d - c_i < 0 < \mu - c_i$ so $d < \mu$.

Motivation: Jervis and Stag Hunt

Jervis: This kind of rank-ordering is not entirely an analyst's invention, as is shown by the following section of a British army memo of I903 dealing with British and Russian railroad construction near the Persia-Afghanistan border: The conditions of the problem may . . . be briefly summarized as follows:
a) If we make a railway to Seistan while Russia remains inactive, we gain a considerable defensive advantage at considerable financial cost;
b) If Russia makes a railway to Seistan, while we remain inactive, she gains a considerable offensive advantage at considerable financial cost;

c) If both we and Russia make railways to Seistan, the defensive and offensive advantages may be held to neutralize each other; in other words, we shall have spent a good deal of money and be no better off than we are at present. On the other hand, we shall be no worse off, whereas under alternative (b) we shall be much worse off. Consequently, the theoretical balance of advantage lies with the proposed railway extension from Quetta to Seistan. W. G. Nicholson, "Memorandum on Seistan and Other Points Raised in the Discussion on the Defence of India," (Committee of Imperial Defence, March 20, I903). It should be noted that the possibility of neither side building railways was not mentioned, thus strongly biasing the analysis

Motivation: Prisoner's Dilemma

Every state is absolutely sovereign in its internal affairs. But this implies that every state must do nothing to interfere in the internal affairs of any other. However, any false or pernicious step taken by any state in its internal affairs may disturb the repose of another state, and this consequent disturbance of another state's repose constitutes an interference in that state's internal affairs. Therefore, every state-or rather, every sovereign of a great power-has the duty, in the name of the sacred right of independence of every state, to supervise the governments of smaller states and to prevent them from taking false and pernicious steps in their internal affairs. Paul Schroeder, *Metternich's Diplomacy at Its Zenith, 182-1823* (Westport, Conn.: Greenwood Press I969), I26.

Motivation: Prisoner's Dilemma or Stag Hunt?

Britain's geographic isolation and political stability allowed her to take a fairly relaxed view of disturbances on the Continent. Minor wars and small changes in territory or in the distribution of power did not affect her vital interests. An adversary who was out to overthrow the system could be stopped after he had made his intentions clear. And revolutions within other states were no menace, since they would not set off unrest within England. Austria, surrounded by strong powers, was not so fortunate; her policy had to be more closely attuned to all conflicts. By the time an aggressor-state had clearly shown its colors, Austria would be gravely threatened. And foreign revolutions, be they democratic or nationalistic, would encourage groups in Austria to upset the existing order. So it is not surprising that Metternich propounded the doctrine summarized earlier, which defended Austria's right to interfere in the internal affairs of others, and that British leaders rejected this view.

Motivation: Chicken

[T]he domestic costs of wars must be weighed. Even strong states can be undermined by dissatisfaction with the way the war is run and by the necessary mobilization of men and ideas. Memories of such disruptions were one of the main reasons for the era of relative peace that followed the Napoleonic Wars. Liberal statesmen feared that large armies would lead to despotism; conservative leaders feared that wars would lead to revolution. (The other side of this coin is that when there are domestic consequences of foreign conflict that are positively valued, the net cost of conflict is lowered and cooperation becomes more difficult.)

Motivation: Fear and the Security Dilemma

When Germany started building a powerful navy before World War I, Britain objected that it could only be an offensive weapon aimed at her. As Sir Edward Grey, the Foreign Secretary, put it to King Edward VII: "If the German Fleet ever becomes superior to ours, the German Army can conquer this country. There is no corresponding risk of this kind to Germany; for however superior our Fleet was, no naval victory could bring us any nearer to Berlin." The English position was half correct: Germany's navy was an anti-British instrument. But the British often overlooked what the Germans knew full well: "in every quarrel with England, German colonies and trade were . . . hostages for England to take." Thus, whether she intended it or not, the British Navy constituted an important instrument of coercion.

Summary

- In international relations, Stag Hunt, Chicken and Prisoners' Dilemma represent canonical strategic interactions.
- Stag Hunt: aggression feeds on itself and escalates conflict (actions are *strategic complements*).
- Chicken: toughness deters aggression (actions are *strategic substitutes)*
- "World War I was an unwanted spiral of hostility"...."World War II was not an unwanted spiral of hostility-it was a failure to deter Hitler's planned aggression."(Joseph Nye (2007)).
- Stag hunt and chicken have multiple Nash equilibria. Jervis (*spiral model)*, Schelling (*reciprocal fear of surprise attack*): mutual fear and uncertainty determine the outcome.
- *We introduce private information into conflict games to capture reciprocal fear of surprise attack.*

Basic Model

- Two countries, A and B, with two leaders. Leaders can be interpreted as the pivotal decision-makers in the country, such as the median voter or dictator.
- Two actions: hawkish aggressive action (H) or dovish peaceful action (D). Cost of hawkish action for player i is c_i and payoffs for player i (the row player) are:

$$\begin{array}{ccc} & H & D \\ H & -c_i & \mu - c_i \\ D & -d & 0 \end{array} \tag{2}$$

  We assume $\mu > 0$ and $d > 0$. Action H may be an act of war, a vote for a hawkish political party or support for a hawkish faction. Action D is the reverse.
- The game has *strategic complements* if $d > \mu$ and *strategic substitutes* if $d < \mu$. Strategic complements (substitutes) captures the logic of escalation (deterrence).

- Player $i \in \{A, B\}$ has a type $c_i \in [\underline{c}, \overline{c}]$, $F'(c) > 0$ for all c.
- *Dominant strategy hawk*: H is a dominant strategy ($\mu \geq c_i$ and $d \geq c_i$).
- *Dominant strategy dove*: D is a dominant strategy ($\mu \leq c_i$ and $d \leq c_i$).
- *Coordination type:* H is a best response to H and D a best response to D ($\mu \leq c_i \leq d$).
- *Opportunistic type:* D is a best response to H and H a best response to D ($d \leq c_i \leq \mu$).
- Coordination types exist only with strategic complements, opportunistic types only with strategic substitutes.

	H	D
H	$-c_i$	$\mu - c_i$
D	$-d$	0

Assumption 1 Dominant strategy types of both kinds have positive probability: (1) If the game has strategic complements then $\underline{c} < \mu < d < \overline{c}$. (2) If the game has strategic substitutes then $\underline{c} < d < \mu < \overline{c}$.

Assumption 2 says that there is "enough uncertainty".

Assumption 2 $F'(c) < |\frac{1}{d-\mu}|$ for all $c \in [\underline{c}, \overline{c}]$.

(With a uniform distribution, Assumption 1 implies Assumption 2.)

Reciprocal Fear of Surprise Attack

- Aggressive *dominant strategy hawks* play H regardless of the opponent's actions. Let the probability of these types be ε. But this triggers a multiplier effect.
- Some fraction $\delta > 0$ of coordination types prefer to play H when the opponent arms with at least probability ε. These "almost dominant strategy hawks" will play H as they know the dominant strategy hawks will do so.
- But then, all "almost-almost dominant strategy hawks" that prefer to play H when the opponent plays H with at least probability $\varepsilon + \delta$ will also arm, etc. The contagion takes hold.
- Similar contagion in dove region.

Deterrence by Fear

- Opportunistic types in chicken want to *mis*-coordinate with the opponent's action, particularly if he plays H. Opportunistic types with high costs c are near indifferent between H and D if they are certain that the opponent plays D. But if there is positive probability that the opponent is a dominant strategy hawk, the "almost dominant strategy doves" strictly prefer to back off and play D.
- This in turn emboldens opportunistic types who are almost dominant strategy hawks to play H and the cycle continues.

- All equilibria will be in "cutoff strategies": if player i with cost type c_i is indifferent between H and D, then all cost types $c_i' < c_i$ strictly prefer to play H and all cost types $c_i' > c_i$ strictly prefer to play D.
- If player j uses cutoff x, then player i of type $\Gamma(x)$ is indifferent between H and D if

$$(1 - F(x))\mu - \Gamma(x) = -dF(x).$$

- We can take type who is indifferent to define a best-response function:

$$\Gamma(x) \equiv (d - \mu)F(x) + \mu. \tag{3}$$

- The best response function is upward (downward) sloping if actions are strategic complements (substitutes).

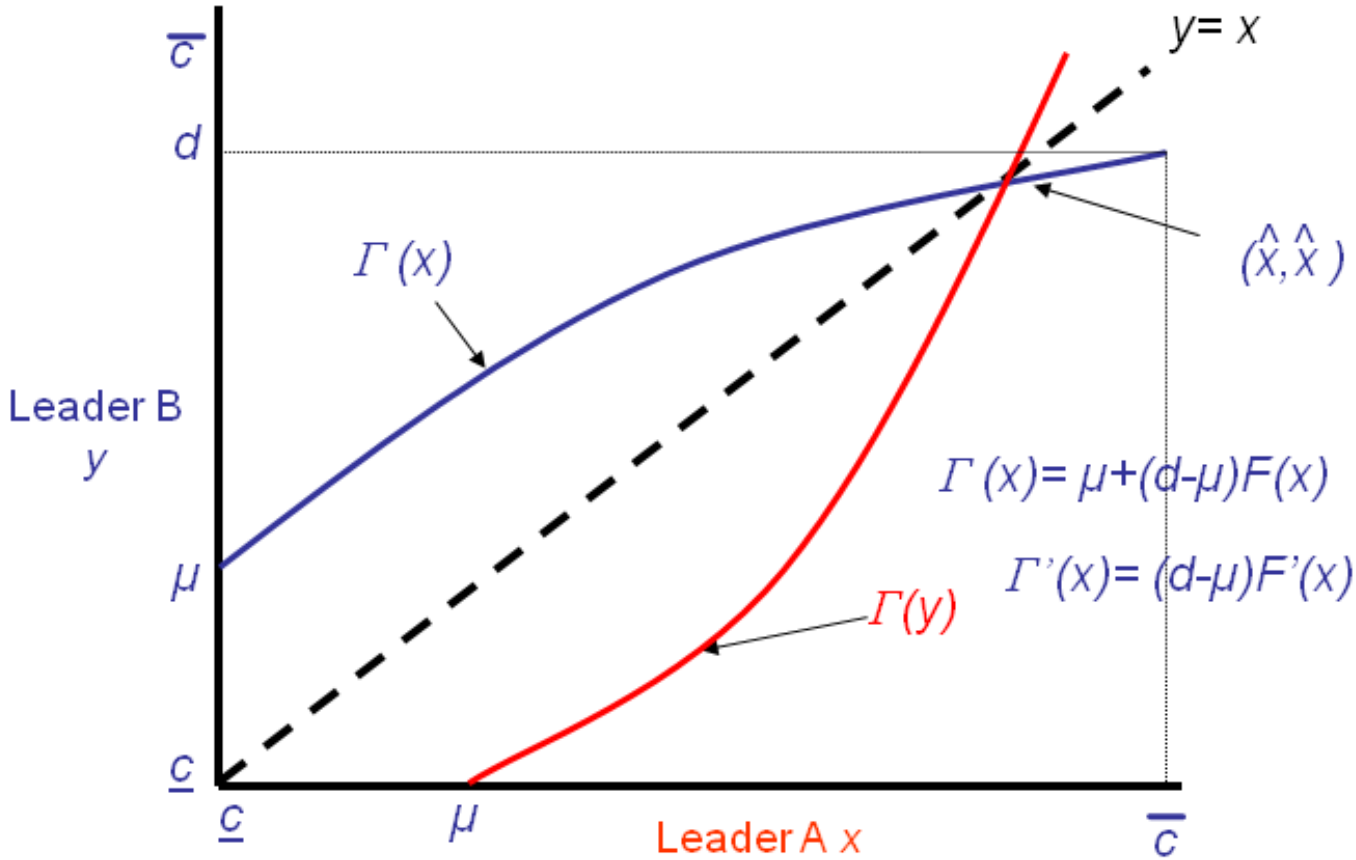
- In either case, a well-known sufficient condition for uniqueness is that best-response functions have slope strictly less than one in absolute value (see Vives's IO book). By Assumption 2, $1 > \Gamma'(x) > 0$ if $d > \mu$ and $-1 < \Gamma'(x) < 0$ if $d < \mu$. Hence, the best-response functions can cross at most once and there is a unique equilibrium.

Theorem

The conflict game has a unique Bayesian Nash equilibrium: Player i plays H iff $c_i \leq \hat{x}$.

- Technical aside: In global games, types are (highly) correlated rather than independent. Same kind of argument can be applied there.

Figure 1. Strategic Complements:
Uninformative Equilibrium



Microfounding Stag Hunt and Chicken.

- Simple Hawk-Dove game are used as metaphors for conflict and arms races. Intuitions depend on whether actions are complements or substitutes: For example, in his textbook, Nye observes, "World Wars I and II are often cast as two quite different models of war.. World War I was an unwanted spiral of hostility... World War II was not an unwanted spiral of hostility-it was a failure to deter Hitler's planned aggression."
- We provide "micro foundations" for Hawk-Dove games. Answer questions such as: When destruction caused by conflict increases, does that increase or decrease chance of war ("stability-instability paradox")? When are actions strategic substitutes or complements? What are the incentives to make ex ante strategic moves to change the parameters of the game (Fudenberg-Tirole)? How to changes in inequality impact the probability of conflict?

Objectives

1. Directly address questions in international relations.
2. Provide a framework to think through policy options.
3. Connect our approach to Schelling and Jervis.
4. Connect Fearon's bargaining approach to Schelling, Jervis and our approach.

Examples

- Schelling explained first-mover advantages by the fact that it is the second-mover who has to either concede, or run the risk of a military confrontation. The United States stationed its soldiers in Western Europe after World War II. These soldiers represented "the pride, the honor, and the reputation of the United States government and its armed forces". There would have been no graceful way for these soldiers to retreat, leaving "the Soviet Union in no doubt that the United States would be automatically involved in the event of any attack on Europe". Symmetrically, at the Yalta conference in February 1945, it was agreed that the Soviet Union would recover the territory it had lost after 1941. Elsewhere, there would be free elections and democratic governments. But the Soviets occupied all of Eastern Europe. Now, Putin in Crimea!
- Siege warfare changed dramatically with advent of cannon and then again with invention of the *trace italienne.*
- Despite threat of mutually assured destruction, Khrushchev assisted Cuban revolution.

Bargaining Problem

- Two players A and B contest a divisible resource of size 1, perhaps a disputed territory.
- Let $x_i \in [0, 1]$ denote player i's share, valued at $u(x_i)$. u is concave.
- *Status quo endowment*: The resource is shared equally, $(x_A, x_B) = (1/2, 1/2)$.
- *Disagreement point*: A conflict where each player suffers a cost of fighting $\phi > 0$. The winner takes all of the resource, the loser gets nothing.
- Each player i can challenge the status quo (claim more than $\frac{1}{2}$) at a cost c_i, independently drawn from a distribution F with support $[\underline{c}, \overline{c}]$ and density F'.
- c_i is player i's privately known type.

Bargaining Game

- Two stages.
- In stage 1, each player i either claims a share $x_i > 1/2$ of the resource (a *challenge to the status quo*) or makes no claim. A challenge incurs the cost c_i. (Physical cost, loss of goodwill, etc.).
- **Rule 1.** If nobody challenges in stage 1, then the status quo remains in place.
- Stage 2 is reached if only one player makes a challenge.
- **Rule 2.** If only player i challenges, then move to stage 2: player j can concede, in which case player i gets x_i and player j gets $1 - x_i$. If player j does not concede, there is a conflict. With probability σ, player i wins. With probability $1 - \sigma$, player j wins. Assume $\sigma \geq 1/2$. (A high σ indicates a big first-mover advantage.)
- **Rule 3**. If both players challenge the status quo in stage 1 then there is a conflict. Each player wins with probability $1/2$.

Nash and Schelling

- Resembles Nash demand game. Main differences are status quo, costly demands and outcome function.
- Echoes Schelling on two-sided vs. one-sided commitments:

"If each party knows the other's true reservation price, the object is to be first with a firm offer. Complete responsibility rests with the other, who can take it or leave it as he chooses (and who chooses to take it). Bargaining is all over; the commitment (that is, the first offer) wins. Interpose some communication difficulty. They must bargain by letter; the invocation becomes effective when signed but cannot be known to the other until its arrival. Now when one person writes such a letter the other may already have signed his own or may yet do so before the letter of the first arrives. There is then no sale; both are bound to incompatible positions"

Stage 2

- In stage 2, player j will always concede if the cost of conflict ϕ is very high.
- If ϕ is not very high, he will concede (and take $1 - x_i$) if he is offered at least η, where

$$\underbrace{\sigma u(0) + (1-\sigma)u(1) - \phi}_{\text{Expected payoff from conflict}} = u(\eta).$$

This equation says that player j is indifferent between a conflict and receiving the share η. Note, $\eta < 1/2$ as $\sigma \geq 1/2$, $\phi > 0$, u concave.

Strategy Reduction

- If player i challenges, he should demand $1-\eta$: If player j has challenged, game is in Rule 3 and size of demand is irrelevant. If player j has not challenged, then it is optimal to drive him down to his outside option.
- Of course, player i might also not challenge at all.

- Notice that if ϕ increases, $1-\eta$ increases. Since the opponent is willing to concede more when conflicts become more costly, challenges become more profitable!

Stage 1

- Player i's payoff matrix:

	Hawk ($x_j = 1 - \eta$)	Dove (no challenge)
Hawk ($x_i = 1 - \eta$)	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi - c_i$	$u(1-\eta) - c_i$
Dove (no challenge)	$u(\eta)$	$u(1/2)$

- With complete information, there will typically be multiple Nash equilibria.
- But we assume c_i is private information and consider Bayesian Nash equilibria. Then, under same conditions as above, there is a unique equilibrium.

Renormalization

- Subtract $u(1/2)$ from all entries:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0)+\frac{1}{2}u(1)-u(1/2)-\phi-c_i$	$u(1-\eta)-u(1/2)-c_i$
Dove	$u(\eta)-u(1/2)$	0

- Relabel costs so

$$c_i' \equiv c_i + \phi + u(1/2) - \frac{1}{2}u(0) - \frac{1}{2}u(1).$$

- Then

$$\begin{aligned} -d &= u(\eta) - u(1/2) \\ \mu &= u(1-\eta) - \left(\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi\right) \end{aligned}$$

"Stability-Instability Paradox"

- Recall:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi - c_i$	$u(1-\eta(\phi)) - c_i$
Dove	$u(\eta(\phi))$	$u(1/2)$

- Recall $\sigma u(0) + (1-\sigma)u(1) - \phi = u(\eta)$ so when $\eta > 0$, $\frac{d\eta}{d\phi}u'(\eta) = -1$. Therefore, the only marginal effect is to increases the payoff to HD : $-u'(1-\eta(\phi)).\frac{d\eta}{d\phi} > 0$.
- Therefore, when the cost of conflict increases from an initially low level, the players become *more* aggressive, trying to exploit the increased first-mover advantage.

"Stability-Instability Paradox"

- But when the cost of conflict becomes so high that the second-mover would surrender the whole resource rather than fight, further increases in the cost of conflict makes the players less aggressive. We summarize this as follows

Theorem

Suppose the players are symmetric ex ante. An increase in the cost of conflict ϕ increases the probability of conflict if $\phi < (1-\sigma)\,(u(1)-u(0))$, but reduces the probability of conflict when $\phi > (1-\sigma)\,(u(1)-u(0))$.

Strategic Substitutes or Complements?

- Actions are strategic complements if best response functions slope up, and substitutes if they slope down. [Compare IO: Strategic complements = price competition, strategic substitutes = quantity competition.]
- Intuitively, conflicts with strategic complements are driven by *fear* (I choose Hawk because I think my opponent will choose Hawk). Conflicts with strategic substitutes have instead the flavor of deterrence (I choose Dove if I think my opponent will choose Hawk).
- Strategic complements or substitutes is a key *assumption* in many papers (e.g. Baliga and Sjöström 2012) but the bargaining model allows us to *derive* this from underlying parameters.

Strategic Substitutes

- **Proposition:** if $\phi > u(1/2) - \frac{1}{2}u(0) - \frac{1}{2}u(1)$, then the game has strategic substitutes.
- Intuition: if conflict is very costly (ϕ big), its a game of chicken.
- Player i's payoff matrix:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi - c_i$	$u(1-\eta) - c_i$
Dove	$u(\eta)$	$u(1/2)$

- Argument:
$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi - u(\eta) - [u(1-\eta) - u(1/2)] = u(0) + u(1) - u(1-\eta) - u(\eta) + \left(u(1/2) - \frac{1}{2}u(0) - \frac{1}{2}u(1) - \phi\right) <$ 0 by concavity and assumption in Prop.

Strategic Substitutes/Complements

- **Proposition:** If $\phi < u(1/2) - \frac{1}{2}u(0) - \frac{1}{2}u(1)$ then the game has strategic substitutes if $\sigma < \sigma^*$ and strategic complements if $\sigma > \sigma^*$. Thus, if conflicts are not very costly, the game has strategic complements if there is a large first-mover advantage (σ big).
- Player i's payoff matrix:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi - c_i$	$u(1 - \eta(\sigma)) - c_i$
Dove	$u(\eta(\sigma))$	$u(1/2)$

- Intuition: two opposing effects. With a large first-mover advantage, the cost of choosing Dove when the opponent chooses Hawk is high – but so is the benefit from choosing Hawk when the opponent chooses Dove. The first effect dominates if utility functions are concave, so the cost of losing territory exceeds the benefit of acquiring more.

Strategic Investment

- Player A's payoff matrix:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \boxed{\phi_A} - c_A$	$u(1-\eta_B) - c_A$
Dove	$\boxed{u(\eta_A)}$	$u(1/2)$

The fall in ϕ_A equals the increase in $u(\eta_A)$. These two effects cancel out, so player A is neither made tougher nor softer.

- Player B's payoff matrix:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \phi_B - c_B$	$\boxed{u(1-\eta_A)} - c_B$
Dove	$u(\eta_B)$	$u(1/2)$

Since η_A increases, $u(1-\eta_A)$ falls. Therefore, player B becomes softer. This is always beneficial for player A. Therefore, player A will *overinvest*.

- Traditional Schelling style logic: When actions are substitutes, overinvest in activities that make you tough; when actions are complements, underinvest in activities that make you tough.
- Here investment does not affect a player's own payoff but makes the *other player* softer. This is good whether actions are complements or substitutes.

Strategic Investment

- Suppose ϕ_A is high so $\eta_A = 0$ (ϕ_B is also large). Investment reduces ϕ_A.
- Player A's payoff matrix:

	Hawk	Dove
Hawk	$\frac{1}{2}u(0) + \frac{1}{2}u(1) - \boxed{\phi_A} - c_A$	$u(1-\eta_B) - c_A$
Dove	$u(0)$	$u(1/2)$

The fall in ϕ_A makes player A tougher. If ϕ's are so high that actions are strategic substitutes, he should *overinvest* as in traditional FT analysis ("top dog"). If ϕ's are intermediate so actions are complements, he should *underinvest* as in traditional FT analysis ("puppy dog").

Strategy of Manipulating Conflict

- What is the strategy of terror and how should targets of terror respond? What are the welfare implications of effective terror?
- We study "pure" logic of terrorism as information transmission and ask: "What is the strategic message of international terrorism?"
- Results depend critically on whether actions are *strategic substitutes* or *strategic complements*.

- According to *The Management of Savagery* (a document apparently composed by strategic thinkers within Al Qaeda) provoking U.S. will: "Force America to abandon its war against Islam by proxy and force it to attack directly so that the noble ones among the masses....will see that their fear of deposing the regimes because America is their protector is misplaced and that when they depose the regimes, they are capable of opposing America if it interferes."
- Symmetrically, pacifists may try to convince moderates to become doves rather than hawks.
- Bertrand Russell founded the Campaign for Nuclear Disarmament (C.N.D.) which advocated unilateral nuclear disarmament. The slogan of this "ban the bomb" movement was "Better Red than Dead": "If no alternative remains except Communist domination or the extinction of the human race, the former alternative is the lesser of two evils."

- We allow an extremist to communicate information about the leader of their country to the other side. What is the effect of such cheap-talk on the probability of conflict? How does it depend on whether the extremist is a hawk or a dove?

Basic Model

- Two countries, A and B, with two leaders. Leaders can be interpreted as the pivotal decision-makers in the country, such as the median voter or dictator. Two actions: hawkish aggressive action (H) or dovish peaceful action (D). Cost of hawkish action for player i is c_i and payoffs for player i (the row player) are:

$$\begin{array}{ccc} & H & D \\ H & -c_i & \mu - c_i \\ D & -d & 0 \end{array} \tag{4}$$

  We assume $\mu > 0$ and $d > 0$. Action H may be an act of war, a vote for a hawkish political party or support for a hawkish faction. Action D is the reverse. The game has *strategic complements* if $d > \mu$ and *strategic substitutes* if $d < \mu$. Strategic complements (substitutes) captures the logic of escalation (deterrence).
- We add incomplete information as above to ensure there is a unique equilibrium: **Theorem** The conflict game has a unique Bayesian Nash equilibrium: Player i plays H iff $c_i < \hat{x}$.

Cheap Talk

- Add a third player, player E, the leader of an extremist group in country A. His payoff function is similar to player A's, with one exception: player E's cost type c_E differs from player A's cost type c_A.
- Two possibilities. Player E is a *hawkish extremist* ("terrorist") if $c_E < 0$. Player E is a *dovish extremist* ("pacifist") if $c_E > d + \mu$. His true type is commonly known.
- The hawkish extremist always wants player A to choose H. The dovish extremist always wants player A to choose D. Both want player B to choose D.

- *Player E knows c_A*. A terrorist or pacifist leader might know how likely it is that his extremist group will be able to influence the leader of his country. However, player E and A do not know c_B. Example: Pakistan's secret service ISI.

- Naji (p. 20): "[N]ote that the economic weakness resulting from the burdens of war or from aiming blows of vexation (al-nikāya) directly toward the economy is the most important element of cultural annihilation since it threatens the opulence and (worldly) pleasures which those societies thirst for. Then competition for these things begins after they grow scarce due to the weakness of the economy. Likewise, social iniquities rise to the surface on account of the economic stagnation, which ignites political opposition and disunity among the (various) sectors of society in the central country."
- Russell quote already motivated pacifist preferences.

- As $\mu > 0$ and $d > 0$, extremist wants player B to play D, whatever action player A chooses himself:

$$\begin{array}{cc} H & D \\ H \quad -c_i & \mu - c_i \\ D \quad -d & 0 \end{array}$$

- Aumann (1990) suggested that coordination on the efficient Nash equilibrium might then be hard.

Time Line

1. The cost type c_i is determined for each player $i \in \{A, B\}$. Players A and E learn c_A. Player B learns c_B.
2. Player E sends a (publicly observed) cheap-talk message $m \in M$.
3. Players A and B simultaneously choose H or D.

Cheap-talk is *effective* if there is a positive measure of types that choose different actions at time 3 than they would have done in the unique communication-free equilibrium. A PBE with effective cheap-talk is a *communication equilibrium*. For cheap-talk to be effective, player E's message must reveal some information about player A's type.

Monotonicity: for any message $m \in M$, there is a cut-off $c_j(m)$ such that if player j hears message m, then he chooses H if and only if $c_j \leq c_j(m)$.

Lemma. In a communication equilibrium, it is without loss of generality to assume $M = \{m_0, m_1\}$, where $c_B(m_1) > c_B(m_0)$. Player B is more likely to play H after m_1 than after m_0.

Cheap talk equilibria: Strategic Complements

Proposition. Doves can't Communicate Effectively.
Intuition: (Aumann intuition) With strategic complements, the message m_0 which makes player B more likely to play D must also make player A more likely to play D. But the dovish extremist will send m_0 even when player A is a dominant strategy hawk so separation is impossible.

Proposition. If player E is a hawkish extremist and the game has strategic complements, then there exists a communication equilibrium. The hawkish extremist E uses cheap-talk to increase the risk of conflict above the level of the communication-free equilibrium. All types of players A and B are made worse off by this. If $F'(c) < \frac{1-F(\Gamma(d))}{d-\mu}$ for all $c \in (\underline{c}, \overline{c})$ then the communication equilibrium is unique.

- Recall that $M = \{m_0, m_1\}$. Interpret message m_1 as "terrorism". Terrorism occurs when c_A is an intermediate range (player A is a coordination type). In communication-free equilibrium, these types choose D. Terrorism causes them to switch to H for sure. Terrorism also makes player B more likely to choose H.
- If either c_A is very small or very large, then terrorism is counter-productive, because player A is not responsive to it. Because terrorism only occurs for intermediate values of c_A, it is an informative message.
- [Carlo Pisacane's] *"propaganda of the deed..recognized the utility of terrorism to a deliver a message to an audience other than the target and draw attention and support to a cause"*

- Interpret message m_0 as "no terrorism".
- "Curious incident of the dog in the night-time" (Conan Doyle): the terrorist in country A knows leader A's type. When the terrorist does not trigger a terror act, it can be because leader A is known to be a sympathizer with preferences aligned with the terrorist. After all, the terrorist "barks" when leader A is a weak type who plays D in the uninformative equilibrium.
- Hence, a terrorist who does not bark signals a greater likelihood that leader A is actually facing a dominant strategy hawk who plays H. This increases the incentive of leader B to play H and the logic of the reciprocal fear of surprise attack then implies the continuation equilibrium is more aggressive than the uninformative equilibrium.
- Separation of some types via terror acts triggers *greater* escalation.
- Overall, welfare goes down for all types of leader A and B relative to the uninformative equilibrium. It goes up for terrorists in some states of the world.

Strategic substitutes

- Many results are simply reversals of complements case.
- Only pacifists can speak informatively in equilibrium. They stage a peace protest when their leader is a strong opportunistic type who plays H in the uninformative equilibrium. Then, leader B plays H unless he is a dominant strategy dove and leader A backs off and plays D.
- When there is no peace protest, leader B learns there are no strong opportunistic types and becomes more aggressive. Leader A backs off and plays D more than in the uninformative equilibrium.
- It is not possible to determine if conflict goes up or down as leader B becomes more aggressive and leader A more dovish. But net effect can imply that pacifist action reduces probability of peace (D, D).
- The informative equilibrium has the "better red than dead" property: probability of leader B playing H and leader A playing D increases.

Conclusion

- Hawkish extremists are either bad for peace (when actions are strategic complements) or irrelevant (when actions are strategic substitutes). Dovish extremists are either irrelevant (strategic complements) or have an ambiguous impact because they make one country more aggressive while the other backs down. In all cases, informative cheap-talk has a non-convex structure: it identifies a subset of moderate (intermediate) decision makers.

[1] Sandeep Baliga, David Lucca and Tomas Sjöström (2011): "Domestic Political Survival and International Conflict: Is Democracy Good for Peace?", *Review of Economic Studies,* 78, 458–486.

[2] Sandeep Baliga and Tomas Sjöström (2012): "The Strategy of Manipulating Conflict", *American Economic Review,* October 2012, 102(6): 2897-2922.

[3] Sandeep Baliga and Tomas Sjöström (2020): "The Strategy of Conflict and the Technology of War", *Journal of Political Economy.*

[4] James Fearon (1995): "Rationalist Explanations for War", *International Organization*, Vol. 49, No. 3, pp. 379-414.

[5] Drew Fudenberg D and Jean Tirole: "The Fat-Cat Effect, the Puppy-Dog Ploy, and the Lean and Hungry Look," *American Economic Review*, 74, 361-6.

[1] Thomas Hobbes (1651): *Leviathan, or the Matter, Forme, and Power of a Commonwealth, Ecclesiasticall and Civil*, http://www.earlymoderntexts.com/f hobbes.html

[2] Robert Jervis (1978): "Cooperation Under the Security Dilemma," *World Politics* 30, 167-214.

[3] Joseph Nye (2007): *Understanding International Conflict (6th Edition). Longman Classics in Political Science.* Longman: New York City [Undergraduate introduction to conflict studies]

[4] Thomas Schelling (1963): *The Strategy of Conflict*, London and New York, Oxford University Press.

[5] Thucydides (1972). *The History of the Peloponnesian War*, Penguin Classics, London. [Chapter 1 is a classic]