War as Bargaining

POSC 3610 – International Conflicct

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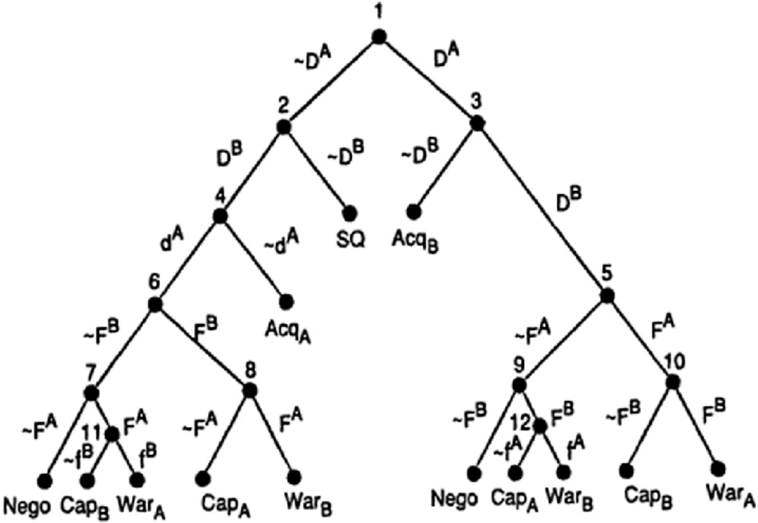
Goal for Today

Introduce students to thinking rationally and strategically in world politics.

International Interaction Game



Possible Outcomes of the Game

1. The status quo
2. A negotiated settlement
3. A (or B) acquiesces.
    - i.e. one side concedes the issue without being attacked.
4. A (or B) capitulates.
    - i.e. one side concedes the issue *after* a preliminary attack.
5. A (or B) retaliates to an attack.
    - i.e. both sides fight a war.

Assumptions of the Game

1. Decision-makers are rational and strategic (recall previous lecture).
2. p=1 or p=0 **only** for acquiescence, capitulation, or status quo.
    - i.e. the utility of all other outcomes is weighted by probability.
3. The utility of negotiation or war is a lottery
    - p_A, p_B = probability of “winning” the lottery
    - $1 - p_A, 1 - p_B$ = probability of “losing” the lottery.
    - Do note these are not identical variables.
4. Each state leader prefers negotiation over war.
    - This is also common knowledge.

Assumptions of the Game

5. Violence involves costs *not* associated with negotiations.
    - Capitulation: the capitulating state eats the costs of the attack.
        - This also implies a first-strike advantage.
    - Any attack: the attacking state incurs costs associated with failed diplomacy.
6. Both A and B prefer any policy change to the status quo, but: $SQ_i > ACQ_i$.
7. Foreign policies follow domestic political considerations.
    - These may or may not include consideration of international constraints.

Additional Restrictions of the Game

These assumptions imply the following preference restrictions.

- SQ > Acquiescence or capitulation by A (or B).
- Acquiescence (by the opponent) is most preferred outcome.
- Acquiescence by i > Capitulation by i.
- Negotiation > Acquiescence/capitulation/an initiated war by i.
- Capitulation by i > Initiated war from j
- War started by i > War started by j
- Capitulation by i > zero in negotiations
- War started by j > zero in negotiations.

Interesting Implications of IIG

War is the complete and perfect information equilibrium *iff* (sic):

1. A prefers to initiate war > acquiescence to B's demands.
2. A prefer to capitulate, but B has a first-strike advantage.
3. B prefers to fight a war started by A rather than acquiesce to A's demands.
4. B prefers to force A to capitulate rather than negotiate.

    - We call this a "hawk" in this game.
    - A "dove" prefers negotiations over a first-strike.

Interesting Implications of IIG

Uncertainty doesn't automatically lead to higher probability of war.

- If A mistakes that B is a dove (when, in fact, B is a hawk) and
- B mistakenly believes A would retaliate, if attacked. Then:
- A offers negotiation to B.
- B responds with negotiation to A.

War as Failed Bargain

However, even the IIG misses that wars are failed bargains

- States have numerous issues among them they try to resolve.
- They may use threats of force to influence bargaining.
- If bargaining fails, states, per our conceptual thinking, resort to war.

However, there is conceptually a range of possible negotiated settlements both sides would prefer to war.

A Simple Model of Crisis Bargaining

To that end, we devise a simple theoretical model of crisis bargaining.

- There are two players (A and B).
- A makes an offer ($0 < x < 1$) that B accepts or rejects.
    - If B accepts, A gets $1 - x$ and B gets x.
    - If B rejects, A and B fight a war.

A Simple Model of Crisis Bargaining

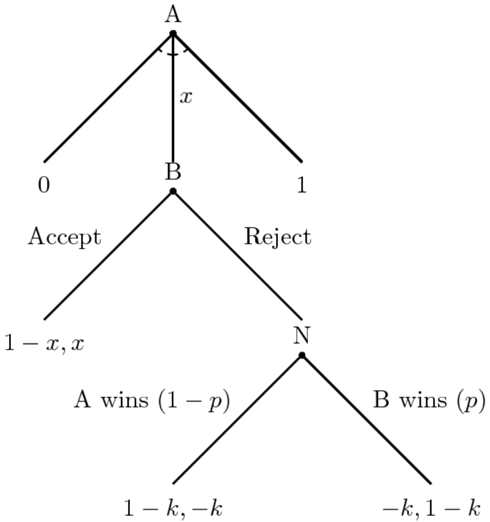
The war's outcome is determined by Nature (*N*)

- In game theory, Nature is a preference-less robotic actor that assigns outcomes based on probability.
- If (A or B) wins, (A or B) gets all the good in question minus the cost of fighting a war $(1-k)$
    - Assume: $k > 0$
    - Costs could obviously be asymmetrical (e.g. k_A, k_B), but it won't change much about this illustration.
- The loser gets none of the good and eats the war cost too ($-k$).

We assume minimal offers that equal the utility of war induce a pre-war bargain.

A Simple Model of Crisis Bargaining

Here's a simple visual representation of what we're talking about.



Solving This Game

How do we solve this game? How do A and B avoid a war they do not want to fight?

- The way to solve extensive form (i.e. “tree”) games like this is **backwards induction**.
- Players play games ex ante (calculating payoffs from the beginning) rather than ex post (i.e. hindsight).
- They must anticipate what their choices to begin games might do as the game unfolds.

In short, we can solve a game by starting at the end and working back to the beginning.

Solving This Game

For our purpose, we need to get rid of Nature.

- Nature doesn't have preferences and doesn't "move." It just assigns outcomes.
- Here, it simulates what would happen if B rejected A's demand.

We can calculate what would happen if Nature moved by calculating the expected utility of war for A and B.

Expected Utility for A of the War

$$
\begin{aligned}
EU(\text{A}|\text{B Rejects Demand}) &= (1-p)(1-k) + p(-k) \\
&= 1 - k - p + pk - pk \\
&= 1 - p - k
\end{aligned}
$$

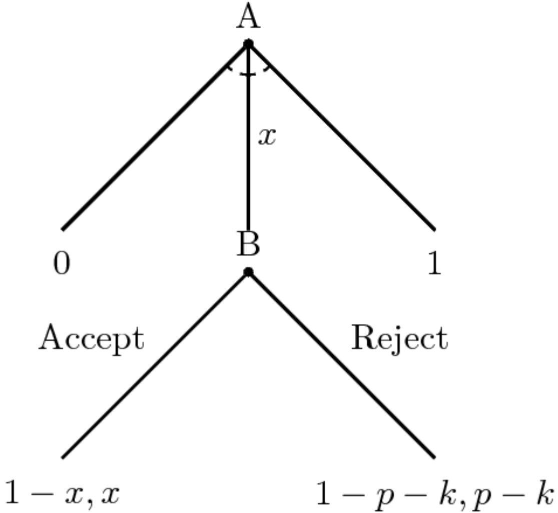
In plain English: A's expected utility for the war is the probability (1 - p) of winning the war, weighting the value of the good (i.e. 1), minus the cost of war (k).

Expected Utility for B of the War

$$\begin{aligned} EU(\text{B}|\text{B Rejects Demand}) &= (1-p)(-k) + p(1-k) \\ &= -k + pk + p - pk \\ &= p - k \end{aligned}$$

In plain English: B's expected utility for the war is the probability (p) of winning the war, weighting the value of the good (i.e. 1), minus the cost of war (k).

The Game Tree, with Nature Removed



Solving This Game

Now, continuing the backward induction, we focus on B.

- B ends the game with the decision to accept or reject.
- B does not need to look ahead, per se. It's now evaluating whether it maximizes its utility by accepting or rejecting a deal.

Solving This Game

Formally, B rejects when $p - k > x$.

- It accepts when $x \geq p - k$.
- Notice A has a "first-mover advantage" in this game.
  - This allows it to offer the bare minimum to induce B to accept.
  - It would not offer anymore than necessary because that drives down A's utility.

We say A's offer of $x = p - k$ is a minimal one for B to accept.

Solving This Game

Would A actually offer that, though?

- In other words, are $x = p - k$ and $1 - x \geq 1 - p - k$ both true?

Recall: we just demonstrated $x = p - k$. From that, we can say $1 - x \geq 1 - p - k$ by definition.

- The costs of war (k) are positive values to subtract from the utility of fighting a war.

The Proof

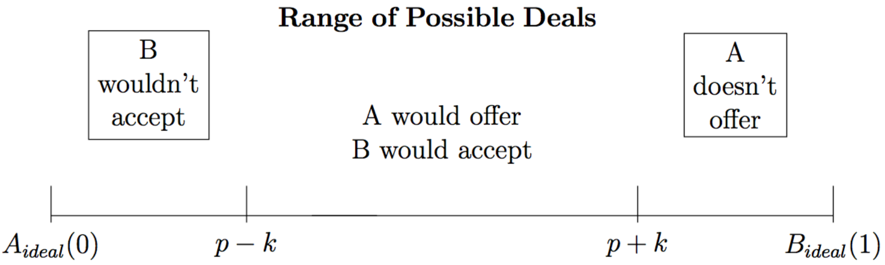
What A would get (1 - x) must at least equal 1 - k - p. Therefore:

$$\begin{aligned} 1 - x &\geq 1 - k - p \\ 1 - 1 + k + p &\geq x \\ p + k &\geq x \end{aligned}$$

Solving This Game

We have just identified an equilibrium where two states agree to a pre-war solution over a contentious issue.

- There exists a bargaining space where A and B resolve their differences and avoid war.


Range of Possible Deals
B wouldn't accept
A would offer
B would accept
A doesn't offer
$A_{ideal}(0)$
$p-k$
$p+k$
$B_{ideal}(1)$

Conclusion

War is a form of bargaining failure. It never happens in a world of complete/perfecct information, except for:

- Issue indivisibility
- Incomplete information
- Commitment problems

Table of Contents