A Methodological Impasse

The Bargaining Model of War

- According to Fearon, 1995, the central puzzle for rationalist theories of war is: Why do states go to war when a peaceful settlement is less costly for both parties?
- This bargaining model of war posits asymmetry of information as the chief "general mechanism or causal logic" that solves this puzzle.
  - Asymmetry of information occurs when privacy of information is combined with incentives to misrepresent.
  - States bluff to obtain more favorable outcomes in negotiation or war.
  - States may exaggerate capabilities to cut a better bargain.
  - States may conceal capabilities to maintain a strategic advantage.
  - Strategic misrepresentation of private information conceals otherwise potentially available peaceful settlements.

The Bargaining Model of Maybe War

- Gartzke, 1999 argues that the bargaining model of war does not actually explain war.
  - Specifically, "asymmetry of information" poses a necessary, but not sufficient, condition for war.
- In Fearon’s words, asymmetry of information is "a constant feature of international politics," but “[cannot] explain why states fail to strike a bargain preferable to war in one instance but not another.”
- Thus, the bargaining model fails to meet the positivist criterion of "a functional relationship between cause and effect."
- Without general principles of causation, for the bargaining model the onset of war remains stochastic, or "in the error term."

Unpacking the Error Term

- Subsequent treatments of Fearon’s bargaining model of war have:
  - questioned the relevance of the central mechanism of asymmetric information;
  - removed the distinction between negotiation and war;
  - These treatments have extended or critiqued the bargaining model. However, we still lack a methodological solution to the problem posed by Gartzke that works within the boundaries of the original bargaining model.
- We propose agent-based modeling (ABM) as this solution:
  - An agent-based model is an array of units ("agents") that interact according to simple, theoretically specified rules. An ABM generates macro-level patterns unpredictable at the outside by deductive reasoning alone.
  - Agent-based models can be used to produce a distribution of non-linear and individually traceable causal chains.
- A hybrid model may be designed to connect the critical components of Fearon’s bargaining theory with a lower-level agent-based framework.
  - A hybrid model can provide a surrogate dataset that simulates the conditions under which the theory predicts war to be possible, but not inevitable.
  - By drilling into the small set of individually traceable futures featuring war onsets, we can locate common causal mechanisms across cases.
  - This means modeling the international level of analysis on which the bargaining theory exists, and then systematically linking variables to their causal counterparts at the lower level of analysis from which the "error term" is produced.

A Two-Level Model

Sub-National Level: An Agent-based Model

Our two-level agent-based model is adapted from a generic model called "Ethnland." It is a 64x64 grid with 20 "identities." An agent may be activated on only one identity at a time, but may be subscribed to multiple identities. Activation on and subscription to identities motivate agent behavior in different ways.

The images here show an example Ethnland model at the first timestep. The image to the left shows each agent’s activated identity. The images below show subscription on identity 10 (orange) and identity 5 (purple). In this model, the differing composition of the southeast quadrant is meant to represent an ethnic enclave.

Dynamic Political Hierarchy and Power

The Dynamic Political Hierarchy (DPH) module operationalizes authority in the ABM landscape. It is a 64x64 grid with 20 "identities." An agent may be subscribed to the dominant identity plus the number of agents activated on the dominant identity. This operationalizes power as the internal margin of superiority of the ruling group, linking a key ABM variable with one in the higher-level bargaining theory.

Results

These visuals drill down into two timesteps of our model. The landscapes show the activated identities for each side. The line charts above them show, for each side, that sides' own power and its estimate of its opponent's power in the first image, we see that red is significantly stronger than black, and black is experiencing protest (gray agents) that threaten to change the dominant identity. On the right, a few time steps later, the purple identity has become dominant in black, increasing the power of black significantly, just short of black risking war. Despite the large increase in power by black, the historical difference in power between the two sides was great enough, and therefore estimates correct enough, to avoid war.

Unpacking the Error Term

- The bargaining model of war has been shown to provide only necessary, not sufficient, conditions for war. Subsequent treatments have failed to explicitly and directly address the issue of war appearing "in the error term."
- Agent-based modeling is naturally suited to this problem because it can produce a distribution of non-linear and causal trajectories, which can provide a surrogate error term for study. This research demonstrated the viability of this method with a hybrid, two-level model.
- Preliminary work with this method identified two notable findings: that war was correlated with relative evenness in power, and with large increases in power by one state. Thus, under conditions of asymmetric information, the correct estimation of power is more difficult when there is a sudden change in power or when the two sides are evenly matched.
- This research is a first step towards the larger objective of developing ABM as a methodological treatment for the type of problem posed by the bargaining model of war.

References


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Works Cited