Conflicts that Leave Something to Chance: Establishing Brinkmanship Through Conventional Wars

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EPSA 2022

“Discussions of troop requirements and weaponry for NATO have been much concerned with the battlefield consequences of different troop strengths and nuclear doctrines. But the battlefield criterion is only one criterion, and when nuclear weapons are introduced it is secondary[... A] main consequence of limited war, and potentially a main purpose for engaging in it, is to raise the risk of larger war.”

Schelling, Thomas C. Arms and Influence

Conventional Conflict and Nuclear Deterrence

- Strategic nuclear weapons deter through background risk.
- **What states cannot do:** issue credible nuclear threats against nuclear opponents.
  - Can't say "If you seize West Berlin, I will nuke you."
- **What states can do:** engage in a conventional conflict, which raises background nuclear risk.
  - Can say "We have troops in W. Berlin, they will fight back."
- Conventional conflict between nuclear states is like "rocking the boat;" raises risk of getting soaked.
  - Credit to Schelling.

Conventional Arming and Nuclear Deterrence

- What is the relationship between conventional arming and nuclear risk?
  - Arbitrated by conflict duration; relies on three steps.
- (1) Adding conventional arms leads to more or less military parity between opponents.
- (2) Evenly matched armies fight for longer.
  - Bennett (1996; 2009), Slantchev (2004), Chiba (2019)
- (3) Longer conflicts generate more nuclear risk.
  - Accidents (Sagan) or inadvertent escalation (Posen).
  - More time “rocking the boat.”
- **Together, adding conventional arming can generate more or less nuclear risk.**

Conventional Conflict and Nuclear Deterrence

- Formally, non-monotonic relationship between arming and nuclear risk is new.
- Other work assumes relationship is monotonic.
  - Powell: more conventional arming $\rightarrow$ more nuclear risk.
  - Branislav: arming generates better conflict outcomes (here only sometimes).
  - Reich: costly signalling action generates costs (here only sometimes).
- And this true relationship matters for how conflict plays out in the nuclear era.

Model: Challenger and Defender.

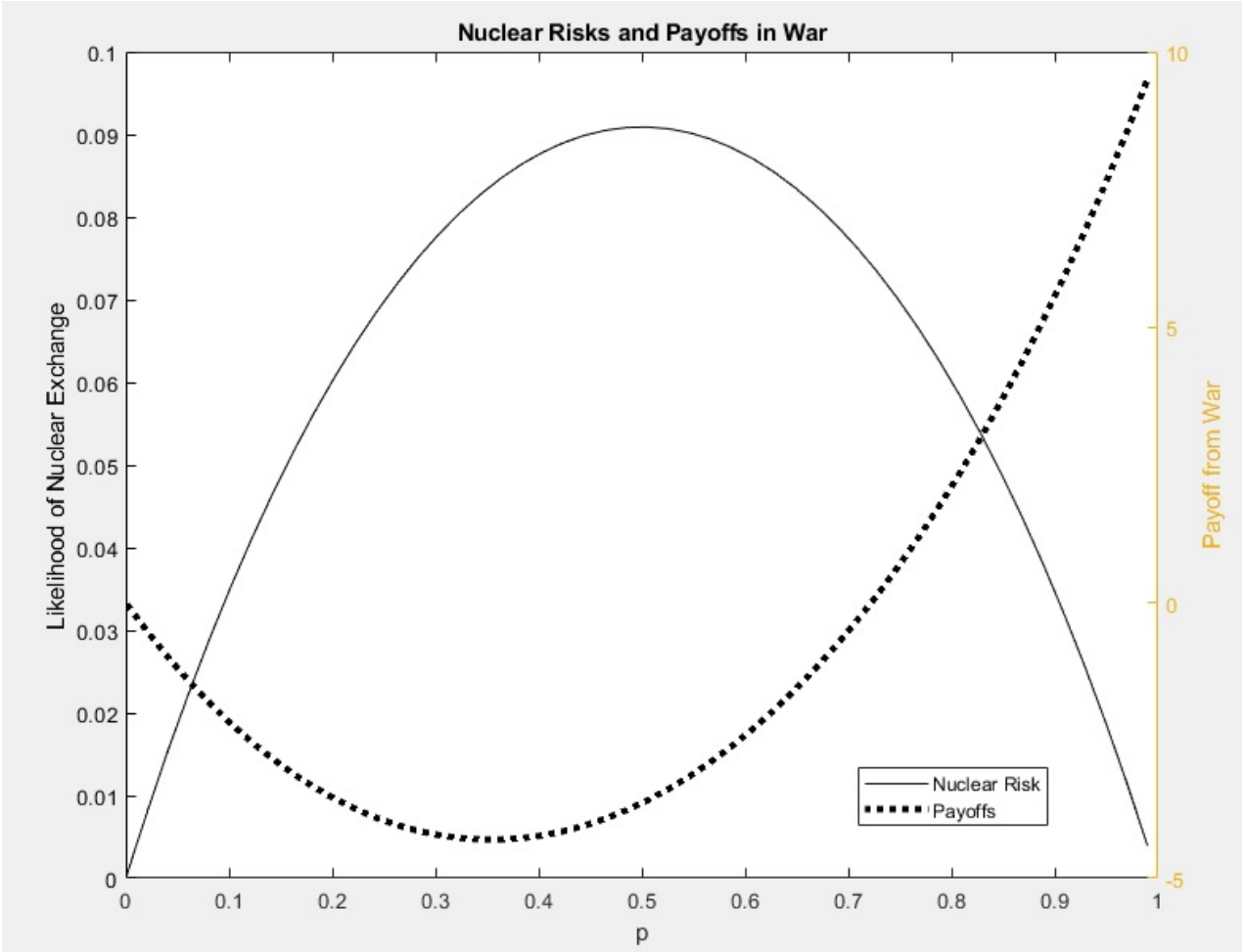
1. Nature designates D's resolve $v_D \in \{\underline{v}_D, \bar{v}_D\}$.
2. D selects conventional force level $p \in [p_0, p_1]$.
3. C selects whether to challenge or not.
   - If C does not challenge, the game ends.
   - $U_C = 0$, $U_D = v_D - K(p)$, with $K(p) =$ costs of arming.
4. D acquiesces or escalates.
   - D Acquiesces: $U_C = v_C$, $U_D = -K(p)$
   - D Escalates: conflict payoffs (next slide)

Conventional War W/ Nuclear Risk Payoffs

- p denotes conventional arming/likelihood D wins in war.
- v_D is D's valuation of asset.
- n **is "nuclear instability" (increases likelihood war ends w/ nuke exchange).**
- α is weight parameter for conventional conflict.
- N_D is cost of nuclear exchange, c_D is cost of conventional conflict, $K(p)$ is arming costs to D.

$$U_D = \frac{np(1-p)}{\alpha + np(1-p)}(-N_D - \frac{c_D}{n}) + \frac{\alpha}{\alpha + np(1-p)}(pv_D) - K(p).$$

Conventional Conflict and Nuclear Deterrence



Conventional arming p increases left-to-right, nuclear risk and war payoffs (w/out $K(p)$) plotted.

Equilibria Behavior

- D will sometimes arm to p_0 and acquiesce.
- D will sometimes arm to fight.
- D will sometimes arm to deter C.
- Low-type D will sometimes bluff.
  - Mimic high-types w/ arming and C doesn't challenge.
- High-type D's will sometimes signal.
  - Arm to a level where low-types won't arm.
- Across wide set of actions, we get a lot of results...

Result 1: Increasing nuclear instability parameter *n* has ambiguous effects on D's arming.

- For D to deter C, (a) D must be willing to fight when challenged, (b) C must not want to fight.
  - (a) and (b) represent constraints on *p*; only one binds.
- W/ increased nuclear instability *n*, both D and C are less willing to fight. For deterrence...
  - Either D may have to select a greater *p* to be willing to fight (condition (a)),
  - ...or D can select a lower *p* and still deter because C is less willing to fight (condition (b)).

Result 1: Increasing nuclear instability parameter *n* has ambiguous effects on D's arming.

- Why it's interesting: sometimes D must arm more.
- Nuclear instability isn't a substitute for conventional arming.
- Even if nuclear instability doesn't lead to nuclear war, it can be welfare decreasing.
- Caveat on Waltz (Waltz v Sagan on Nuclear Weapons):
  - "Some countries may find nuclear weapons a cheaper and safer alternative to running economically ruinous and militarily dangerous conventional arms races. **Nuclear weapons may promise increased security and independence at an affordable price.**"
  - Not quite...

Result 2 (Nuclear Peace): Increasing nuclear instability parameter *n* shrinks parameter set where war occurs.

- When D goes to war, it's a constrained optimization problems.
  - Optimize how they do in war.
  - Over the set of arming levels that would result in war.
- As *n* increases, objective function drops down and war becomes more costly.
  - War has greater catastrophic risk.
- As *n* increases,the set where C and D fight shrinks.
  - Both sides prefer walking away or successful deterrence.
- Why it's interesting: this is the nuclear peace.

Result 3 (Stability/Instability Paradox): Increasing nuclear instability parameter n or costs of nuclear war (N_D) generally leads to more decisive conflicts.

- Increasing n and N_D results in D selecting p's closer to $p = 0$ and $p = 1$.
- We should observe longer, drawn out conflicts where n is low and decisive conflicts where n is high.
- Different from some Stability-Instability Paradox accounts.
  - It's not that great powers compete @ low levels in nuke era.
  - We only see protracted competition where stakes are low.
  - Key issues (where n is high) will be resolved decisively.

Result 3 (Stability/Instability Paradox): Increasing nuclear instability parameter n or costs of nuclear war (N_D) generally leads to more decisive conflicts.

- Examples.
- Kargil War (1999)
  - India deliberately "pulled its punches" to avoid a bigger conflict.
  - Consistent with existing "stability-instability" logic.
- Hungarian Revolution (1956)
  - USSR deliberately applied a lot of force to decisively end the conflict rather than risk a bigger conflict.
  - More surprising: aggressive actions despite Eisenhower's comments on E. Europe.

Conclusion

- Novelty: conv. arming can bid nuclear risk up or down.
  - This puts nuclear deterrence in the realm of an interesting signalling model.
- This treatment generates a series of results on nuclear deterrence that haven't been formalized in the past.
  - Non-substitutability of nuclear/conventional forces, nuclear peace, stability-instability paradox.

Scope Conditions

- Where is the model a best fit? Where does Sagan/Posen logic really hold?
  - Proximity to USSR/NATO are areas where accidents/inadvertent escalation can happen.
  - Eastern Europe yes, Vietnam/Afghanistan less so.
    - (Though this can be baked-in to *n*).
- Where is this model a bad fit?
  - Where crises (not war) generate nuclear risk.
  - Where one side can credibly manipulate nuclear risk in a crisis.
  - Areas where central decision makers aren't internalizing these effects.
  - Ex. Cuban missile crisis.

Thank you! petervschram@gmail.com