

THE DETERMINANTS OF NUCLEAR FORCE STRUCTURE

ISA Annual Conference

April 4, 2012

Erik Gartzke
Jeff Kaplow
Rupal Mehta

University of California, San Diego

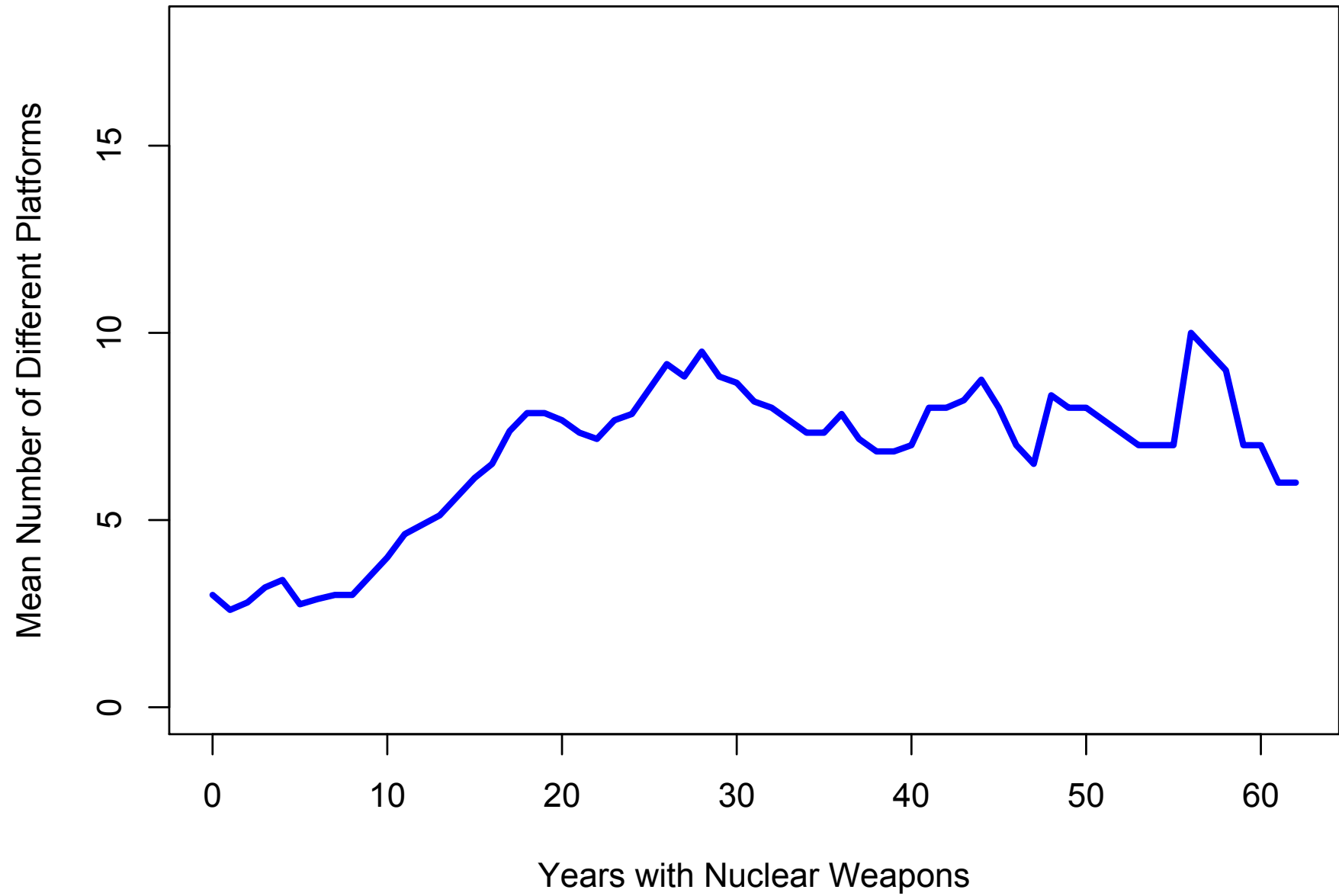
Nuclear force structure

- Why do nuclear states employ particular force structures?
 - Do states diversify their nuclear portfolios?
 - What leads states to invest in particular nuclear platforms?

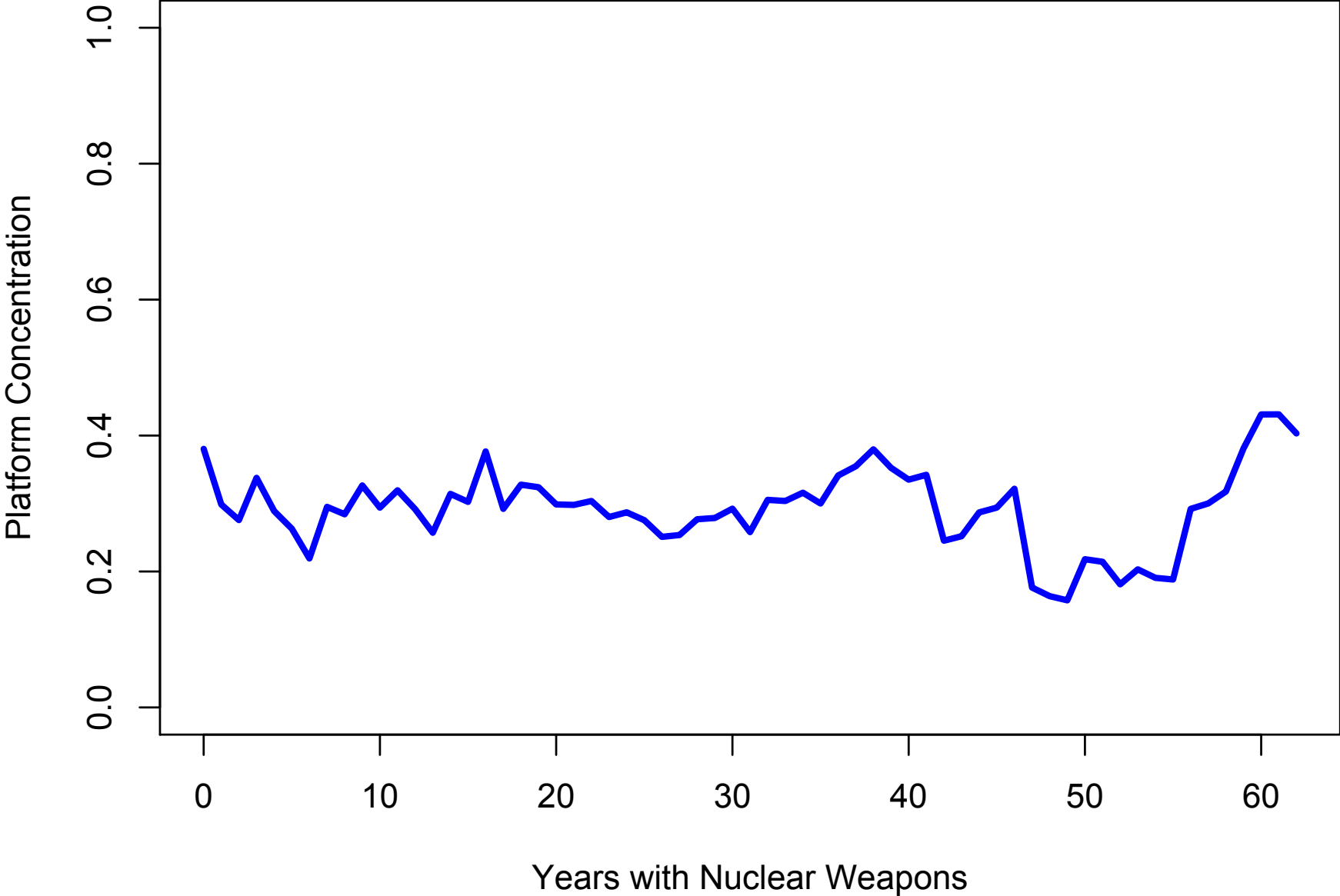
A new dataset

- Counts of numbers of nuclear platforms for nuclear weapons states.
 - United States, 1950-2000
 - Soviet Union/Russia, 1956-2000
 - United Kingdom, 1961-2000
 - France, 1961-2000
 - China, 1964-2000
 - Israel, 1972-2000
 - South Africa, 1982-1990
 - India, 1988-2000
 - Pakistan, 1990-2000
- Measure of overall platform diversification per state per year

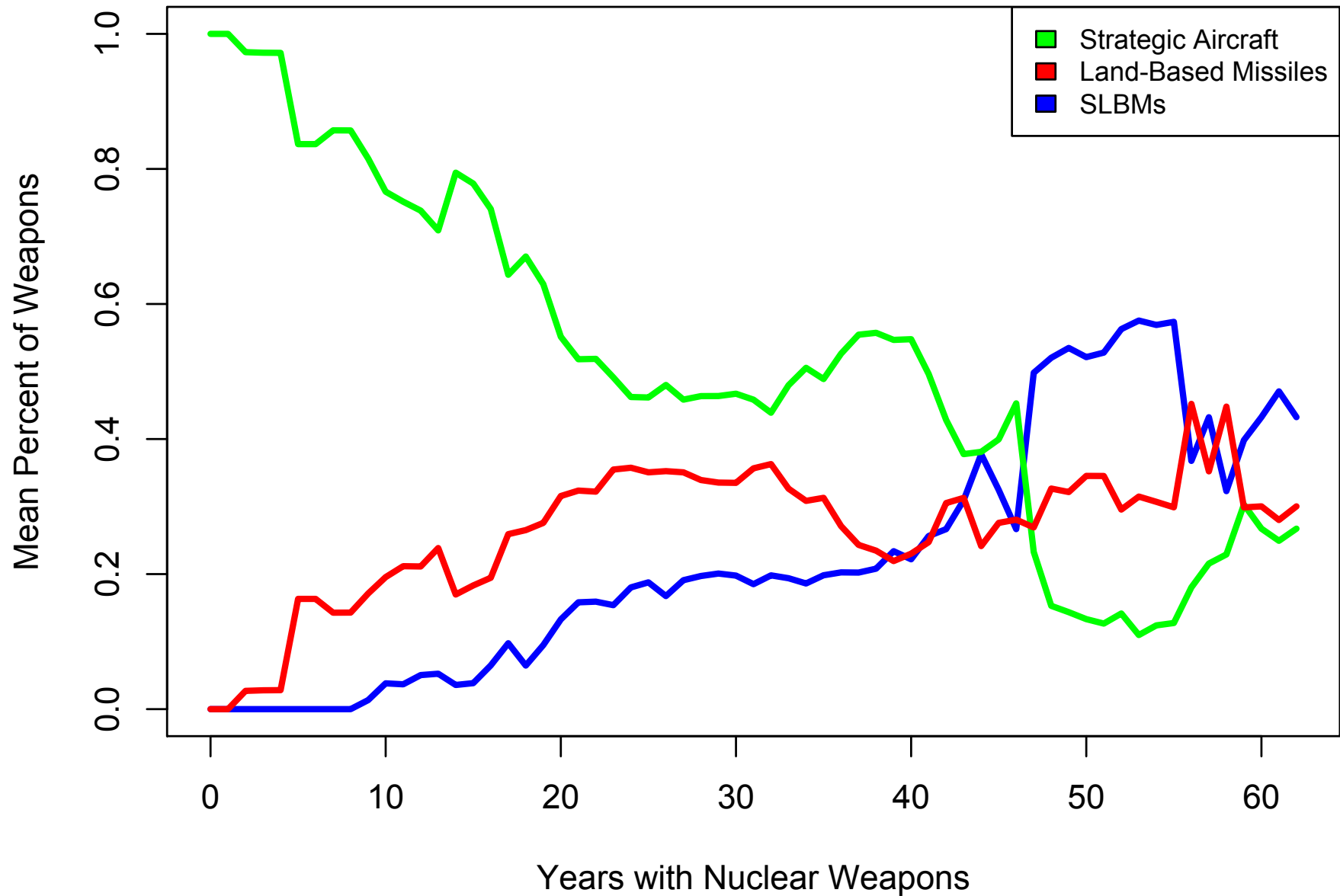
Unique Platforms All Nuclear States



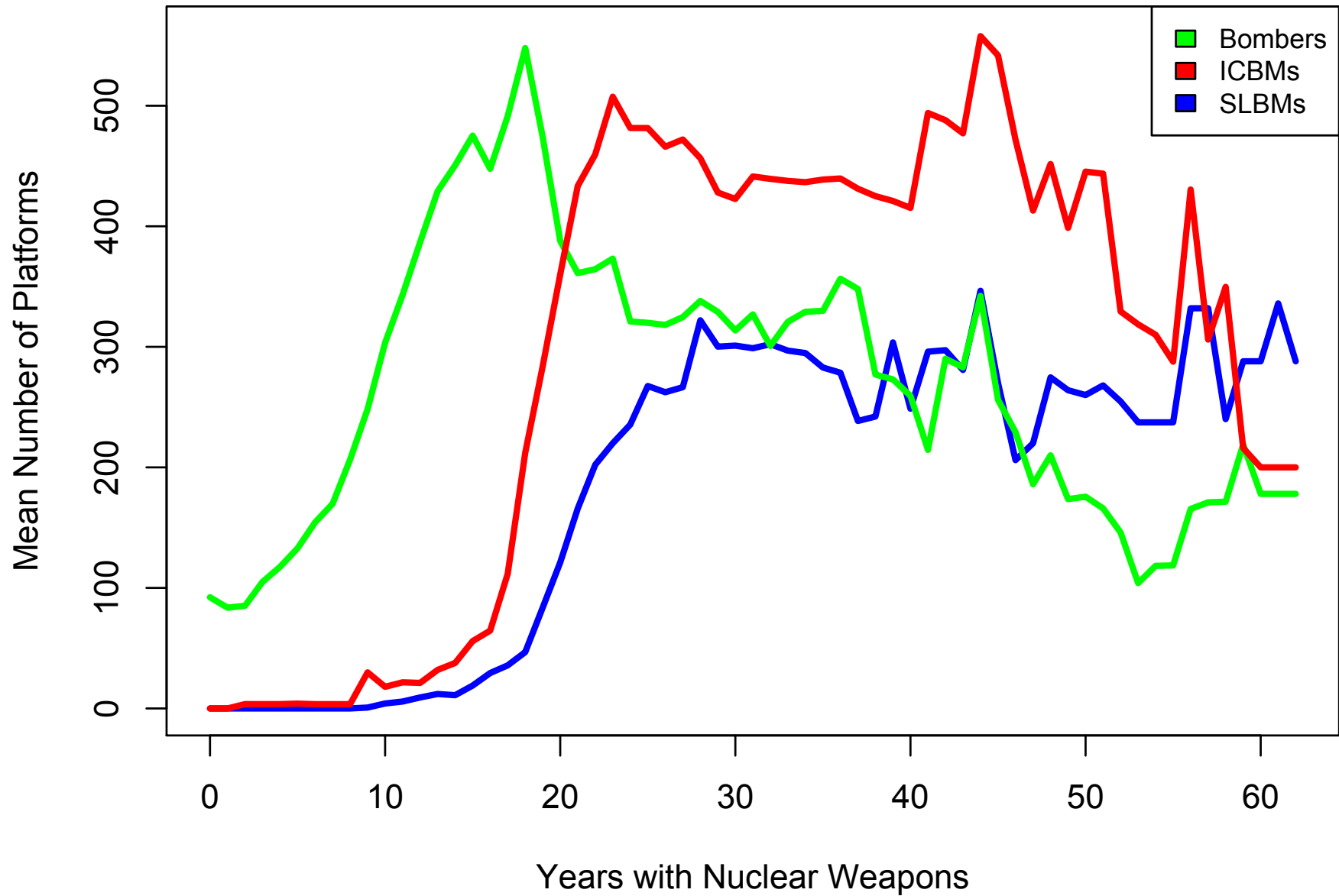
Platform Concentration
All Nuclear States



Platform Mix All Nuclear States



Platforms by Triad Type All Nuclear States



What determines nuclear force structure?

- Other weapons platforms
- Economic capacity
- Nuclear capacity
- Military capacity
- Nuclear maturity
- Ability to conduct nuclear tests
- Regime type
- Geography
- International threats
- Nuclear rivalry
- Crisis/détente
- Nuclear alliances
- Maintenance of a nuclear umbrella
- Arms control treaties

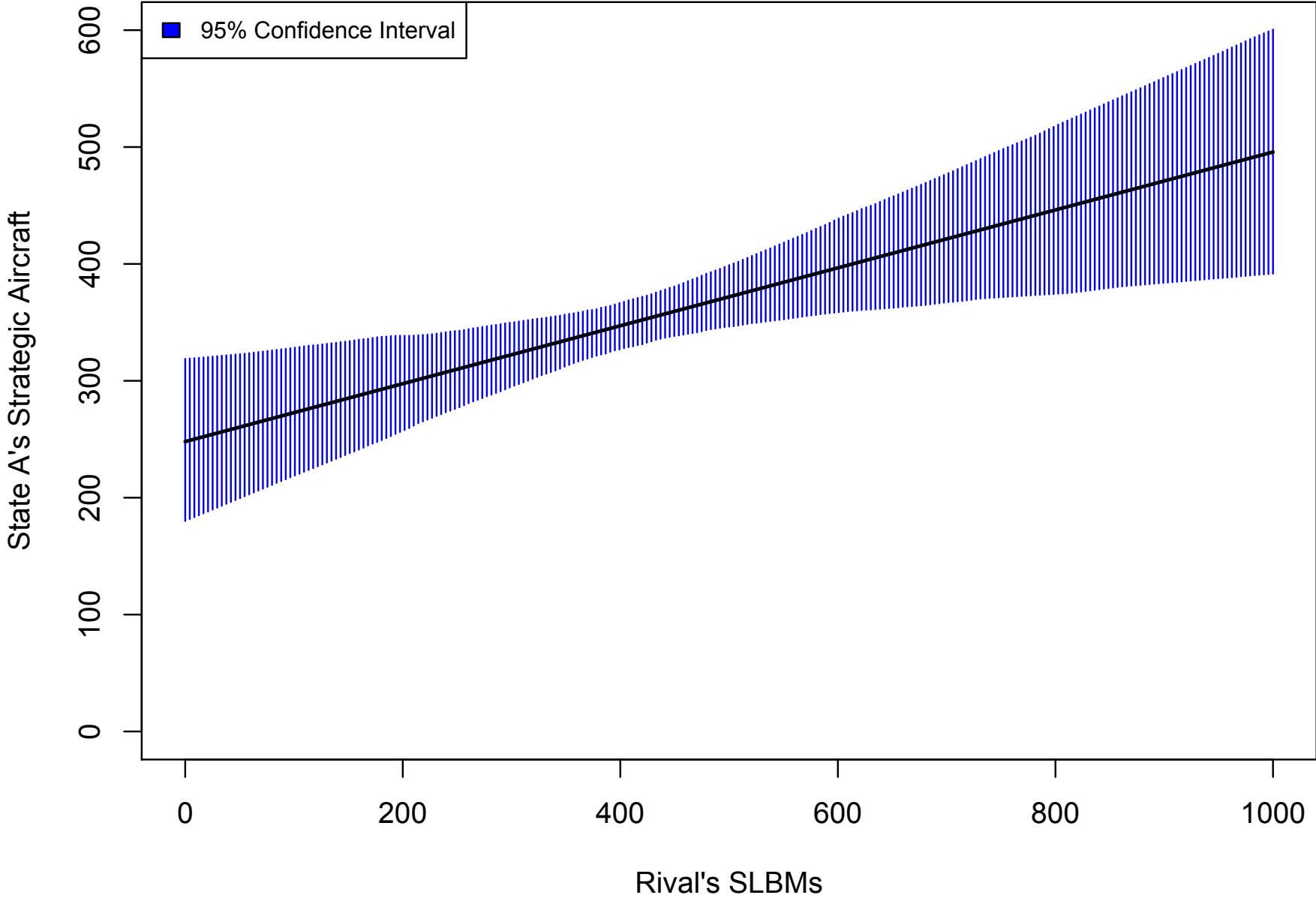
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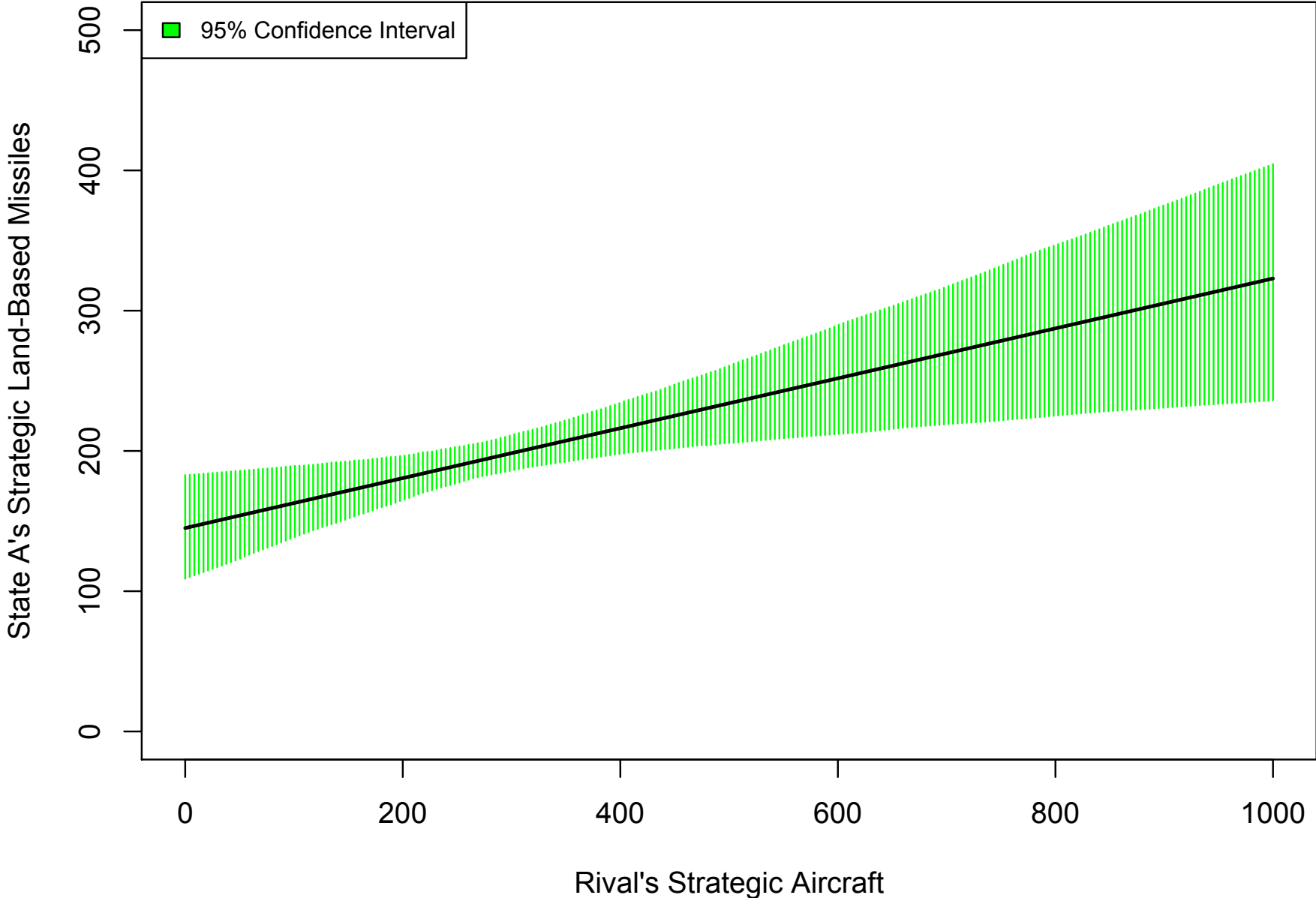
Rivalries and nuclear force structure

- How does rivalry influence force structure?
 - Arms race hypothesis:
 - Changes in one state's nuclear forces (increase or decrease) should lead to a corresponding change (increase or decrease) in the rival's nuclear forces
 - Deterrence hypothesis:
 - Changes in one state's nuclear forces should lead to changes in the rival's nuclear forces designed to better defend those forces or better hold those forces at risk

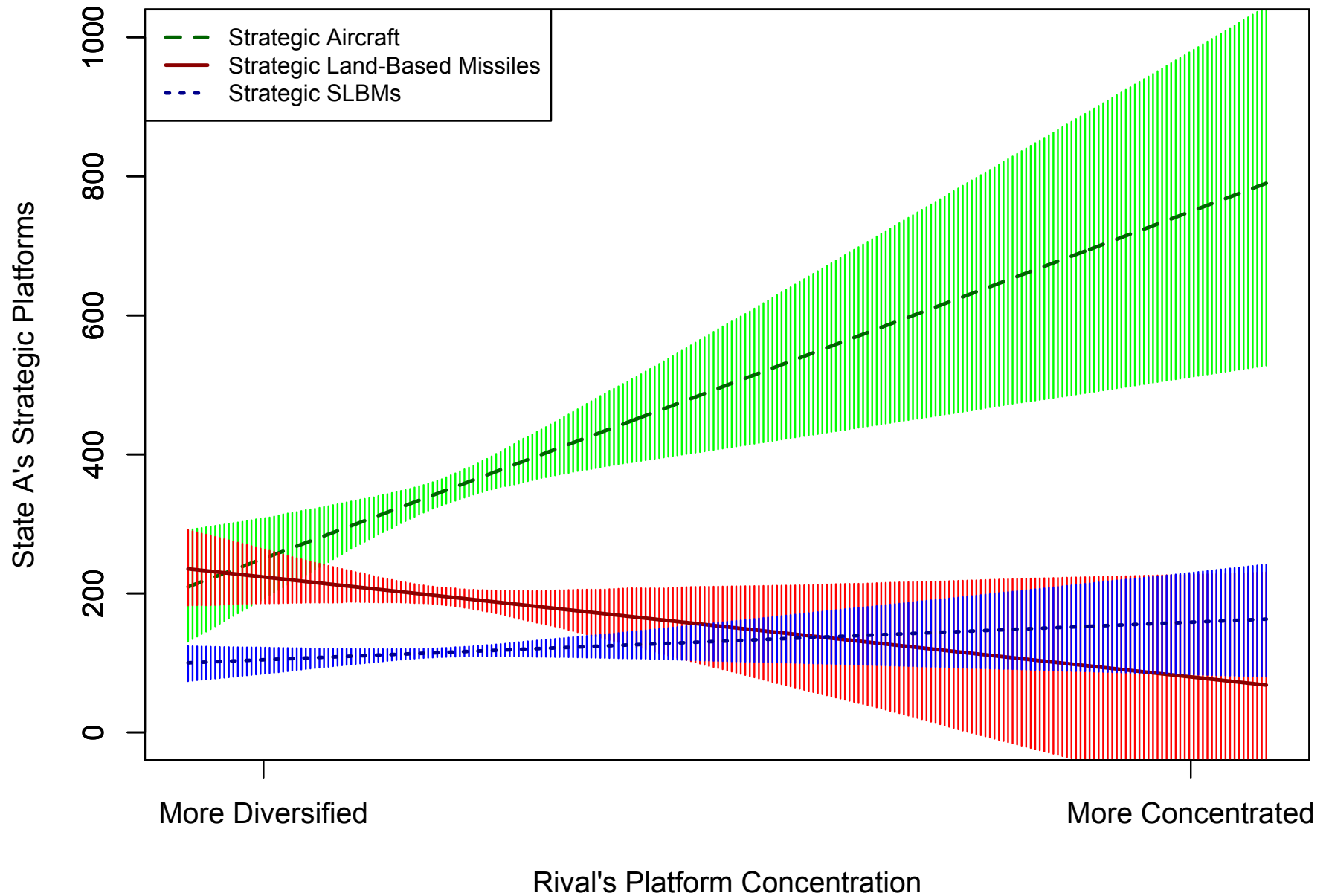
Rival Nuclear Force Structures



Rival Nuclear Force Structures



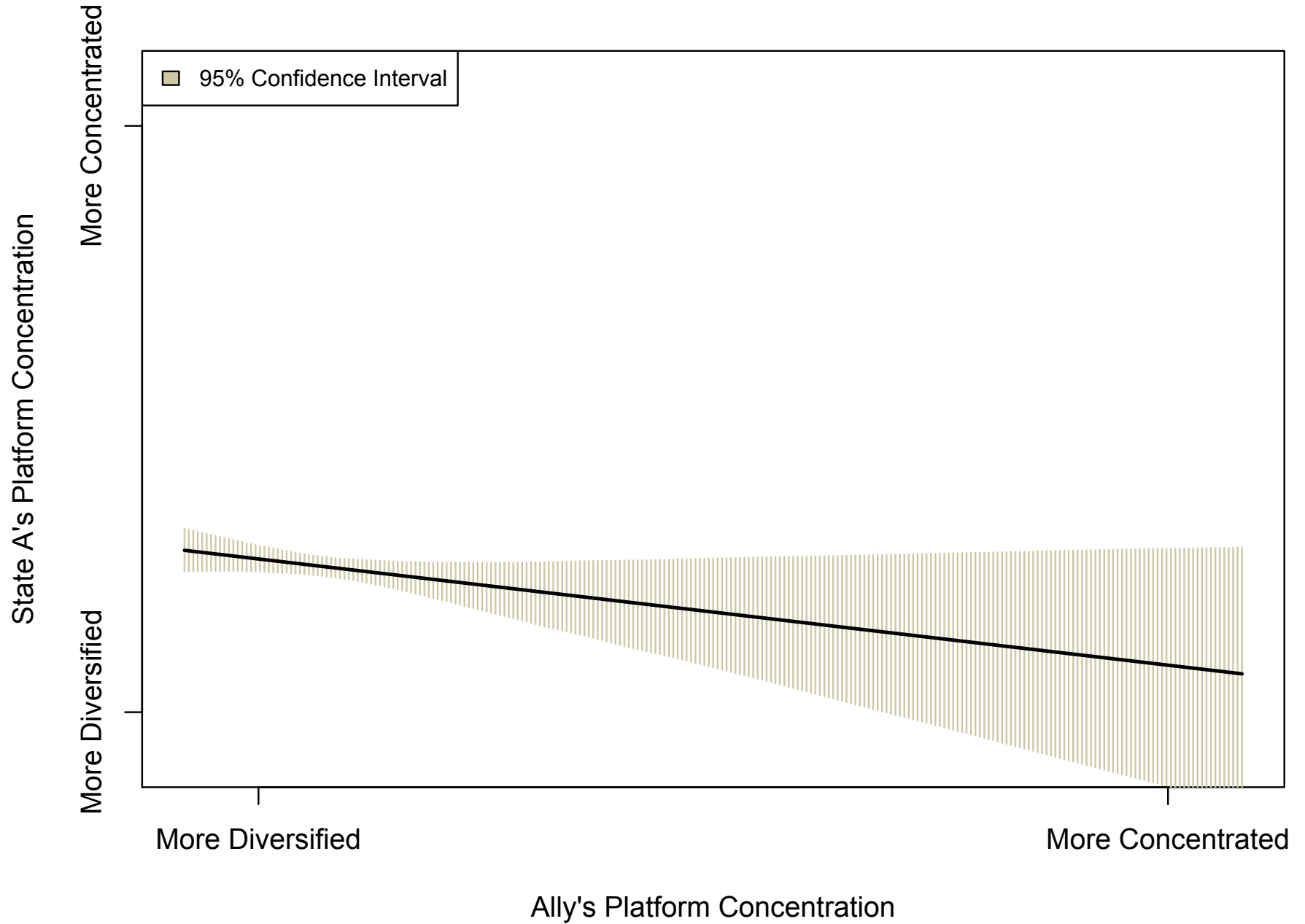
Rival Nuclear Force Structure



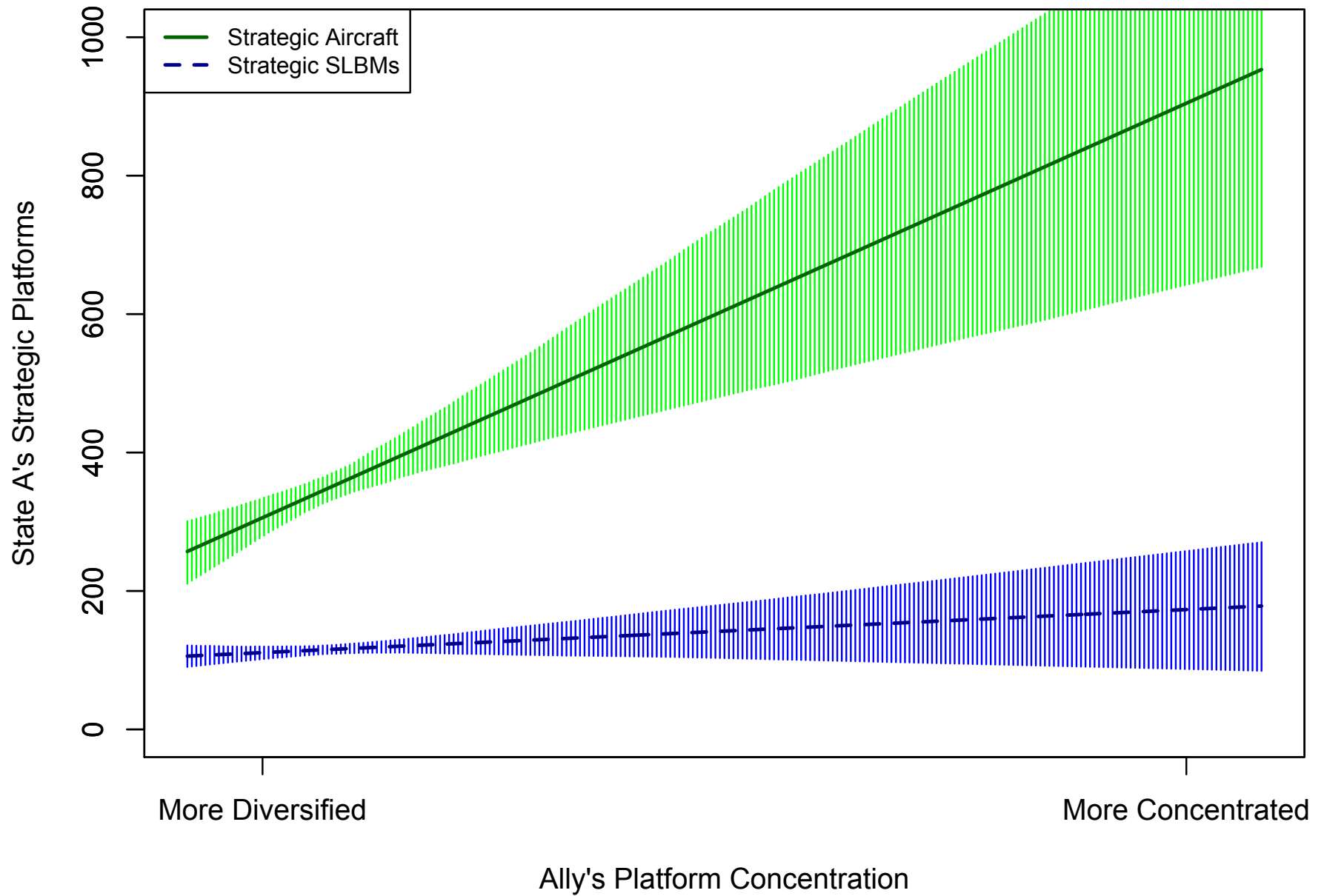
Alliances and nuclear force structure

- How do nuclear alliances influence force structure?
 - Complements hypothesis:
 - States will seek to complement the force structure of allies by pursuing different weapons platforms or by compensating for the platform concentration of allies
 - Technology transfer hypothesis:
 - States will pursue similar weapons platforms and have similar platform concentrations as their allies

Allied Nuclear Force Structure



Allied Nuclear Force Structure



Conclusions

- The determinants of nuclear force structure are complex
 - No support for simple arms race logic, or simple alliance portfolio logic
- Nuclear force structure does seem to respond to more complex deterrence considerations
- States seem to see their own force structures as part of a larger allied portfolio, but these may interact in complex ways