Ahmad Alkhawaja

Homepage: www.ahmadalkhawaja.com
Email: ahmad.alkhawaja@stonybrook.edu
LinkedIn: www.linkedin.com/in/ahmadalkhawajagt
Phone: +1 (716) 513-4184

Education

Ph.D. in Economics, Stony Brook University, USA — 2019 - 2025 (expected)

M.Sc. in Economics, University at Buffalo, USA — 2017 - 2019

Master of Business Administration, American University of Sharjah, UAE — 2014 - 2016

B.Sc. in Computer Engineering, American University of Sharjah, UAE — 2007 - 2011

Research Interests

Political Game Theory, Industrial Organization, Applied Game Theory, Social and Economic Networks, and Artificial Intelligence and Machine Learning.

Working Papers

Strategic Conflict Between Two Groups of Players: The Non-Cooperative Approach (Job market paper).

Work In Progress

Strategic Conflict Between Two Groups of Players: The Quadratic-Cost Extension.

Strategic Conflict Between Two Groups of Players: The Cooperative Approach.

Teaching Experience

Instructor (Stony Brook University):

Mathematical Statistics, Game Theory (Online), Intermediate Microeconomic Theory (Upcoming).

Teaching Assistant (Stony Brook University):

Mathematical Statistics, Intermediate Microeconomic Theory, Data Science and Machine Learning in Economics, Intermediate Macroeconomic Theory, Introduction to Economics.

Teaching Assistant (American University of Sharjah):

Object-Oriented Programming for Business Applications, Advanced Digital System Design, Digital Systems, Introduction to Computer Science I, Introduction to Computer Science II.

Research Projects

Stony Brook University 2020 - 2023

- Development of dynamic model solutions and simulations using various techniques in both Python and MATLAB.
- Automated Driving using Deep Q-Learning.
- Cournot Competition and Firm Learning: algorithms for agent-based models.

American University of Sharjah 2014 - 2016

- Data collection and analysis of bankruptcy data of US companies using SAS and SQL.
- Strategic analysis of Amazon's forward integration.
- A study of talent management systems in the UAE and the GCC region.
- Integrating peer-to-peer inquiry-based learning with a crowd-sourcing platform (in EDULEARN14 Proceedings).

Working Experience and Service

Software Developer, Microsystems L.L.C., UAE 2011 - 2013

Administrator, Stony Brook Center for Game Theory October 2020 - December 2022

Skills

Software: C++, Python, MATLAB, R, C#, Java, VB, PHP, SAS, SQL, and LaTeX.

Languages: English (fluent), Arabic (native), and French (intermediate).

Conference Presentations

2024: 35th Stony Brook International Conference on Game Theory.

References

Yair Tauman (Main Advisor)
Department of Economics
Stony Brook University
E-mail: yair.tauman@stonybrook.edu

Pradeep Dubey (Co-Advisor)
Department of Economics
Stony Brook University
E-mail: pradeep.dubey@stonybrook.edu

Eran Shmaya
Department of Economics
Stony Brook University
E-mail: eran.shmaya@stonybrook.edu

Hugo Benìtez-Silva (Teaching Reference)
Department of Economics
Stony Brook University
E-mail: hugo.benitez-silva@stonybrook.edu

Abstracts

Strategic Conflict Between Two Groups of Players: The Non-Cooperative Approach

The paper studies a two-stage conflict game between two groups of players. In the first stage, each player independently of all other players chooses how much monetary effort to spend defending himself. In the second stage, each player decides how much effort to spend attacking players in the other group. Players can use their resources differently, and their effectiveness varies for the same dollar spent. The chance of winning a battle against a player in the other group depends on the effectiveness of the attackers and the defender. It increases with higher attack levels from other players in their group and decreases with the defense level of the attacked player. The outcome of this strategic conflict ranges from full-scale war to complete peace. A numerical measure of efficacy is introduced. In the case of linear effort costs, when attacking a specific player, only the most efficacious attacker expends effort on the attack, while less-efficacious allies free-ride on him. Using convex costs of effort mitigates the free-rider problem. The paper draws parallels with the ongoing Russo-Ukrainian War and the pharmaceutical industry's battles between generic and brand-name drugs.

Strategic Conflict Between Two Groups of Players: The Quadratic-Cost Extension

This project extends the model presented in my job market paper titled "Strategic Conflict Between Two Groups of Players: The Non-Cooperative Approach" to allow for strictly convex cost functions. Convex costs apply to more complex systems where action efficacy is diminished—often due to lengthy command chains and escalating costs with increased effort, as seen in military operations. Unlike the linear-cost model, the free-rider phenomenon is considerably mitigated with strictly convex costs, allowing multiple countries to band together for attacks. Specific examples using quadratic costs are currently being worked out, but the aim is to develop a more general, yet tractable, model.

Strategic Conflict Between Two Groups of Players: The Cooperative Approach

This project investigates a two-stage conflict game between two groups of players. In the first stage, each player determines the monetary effort to allocate towards defending themselves and *their allies*. In the second stage, each player decide how much effort to invest in attacking members of the opposing group. The cooperative version of the game allows players to form coalitions. The study aims to equitably distribute payoffs within each coalition by employing the Shapley value to address potential subsidization issues. By endogenously determining exchange rates, representing relative bargaining power or interpersonal utility weights, this project seeks to establish optimal weights based on each player's contribution to the total monetary effort expended by the coalition.