

Game Theory Analysis of Super-Relative Relations

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Abstract

This paper explores the strategic dynamics among five actors: the Colonialist, Colonist, Separatist, Terrorist, and Nationalist, within a game theory framework based on a prisoner's dilemma model. By analyzing their super-relative interactions, we derive an ordered lemma list that explains the possible outcomes of cooperation and defection between each pair of actors. This analysis aims to capture the complexities of political, social, and economic relationships among these actors.

1 Introduction

The relationships between colonialists, colonists, separatists, terrorists, and nationalists have often been characterized by conflict, cooperation, and mutual interdependence. Using game theory, specifically the prisoner's dilemma framework, we can model these complex interactions to understand better the strategic decisions made by each actor.

2 Methodology

The game-theoretic model employed here is a super-matrix, representing the possible outcomes when each actor chooses to cooperate (C) or defect (D) in their interactions with others. We translated this super-matrix into a super-ordered lemma list, detailing the values and strategic outcomes for each interaction pair.

3 Super-Ordered Lemma List

This section presents the ordered lemma list that captures the strategic dynamics between each pair of actors.

3.1 Colonialist Interactions

3.1.1 Colonialist Colonist (CO)

- **Lemma 1.1.1 (C, C):** The colonialist and colonist cooperate, resulting in moderate stability. **Payoff:** (4, 4)
- **Lemma 1.1.2 (C, D):** The colonialist cooperates, but the colonist defects. **Payoff:** (1, 2)
- **Lemma 1.1.3 (D, C):** The colonialist defects, and the colonist cooperates. **Payoff:** (2, 1)
- **Lemma 1.1.4 (D, D):** Both defect, leading to conflict. **Payoff:** (0, 5)

3.1.2 Colonialist Separatist (S)

- **Lemma 1.2.1 (C, C):** Rare cooperation. **Payoff:** (2, 0)
- **Lemma 1.2.2 (C, D):** The separatist gains independence momentum. **Payoff:** (0, 5)
- **Lemma 1.2.3 (D, C):** Colonialist dominance is maintained. **Payoff:** (5, -1)
- **Lemma 1.2.4 (D, D):** Intense conflict ensues. **Payoff:** (-1, -1)

3.1.3 Colonialist Terrorist (T)

- Lemma 1.3.1 (C, C): Possible ceasefire. **Payoff:** (0, 0)
- Lemma 1.3.2 (C, D): Terrorist disrupts colonial control. **Payoff:** (-5, 5)
- Lemma 1.3.3 (D, C): Colonialist crackdowns prevail. **Payoff:** (5, -5)
- Lemma 1.3.4 (D, D): Ongoing violence. **Payoff:** (-5, -5)

3.1.4 Colonialist Nationalist (N)

- Lemma 1.4.1 (C, C): Limited autonomy granted. **Payoff:** (3, 1)
- Lemma 1.4.2 (C, D): Nationalists gain leverage. **Payoff:** (0, 4)
- Lemma 1.4.3 (D, C): Colonialist maintains control. **Payoff:** (3, 0)
- Lemma 1.4.4 (D, D): National resistance increases. **Payoff:** (-2, 5)

3.2 Colonist Interactions

3.2.1 Colonist Separatist (S)

- Lemma 2.1.1 (C, C): Peaceful transition possible. **Payoff:** (2, 1)
- Lemma 2.1.2 (C, D): Separatist gains strength. **Payoff:** (0, 3)
- Lemma 2.1.3 (D, C): Colonist retains power. **Payoff:** (1, 0)
- Lemma 2.1.4 (D, D): Prolonged conflict. **Payoff:** (-1, 5)

3.2.2 Colonist Terrorist (T)

- Lemma 2.2.1 (C, C): Concessions reached. **Payoff:** (1, 0)
- Lemma 2.2.2 (C, D): Terrorist attacks colonial assets. **Payoff:** (0, 2)
- Lemma 2.2.3 (D, C): Colonist triggers terrorism. **Payoff:** (-2, 4)
- Lemma 2.2.4 (D, D): Escalating violence. **Payoff:** (-3, 4)

3.2.3 Colonist Nationalist (N)

- Lemma 2.3.1 (C, C): Gradual integration. **Payoff:** (3, 2)
- Lemma 2.3.2 (C, D): Nationalist gains concessions. **Payoff:** (0, 4)
- Lemma 2.3.3 (D, C): Colonist maintains control. **Payoff:** (2, 0)
- Lemma 2.3.4 (D, D): Protests erupt. **Payoff:** (-1, 5)

3.3 Separatist Interactions

3.3.1 Separatist Terrorist (T)

- Lemma 3.1.1 (C, C): Alliance formed. **Payoff:** (2, 2)
- Lemma 3.1.2 (C, D): Terrorist undermines separatist. **Payoff:** (1, 3)
- Lemma 3.1.3 (D, C): Separatist gains advantage. **Payoff:** (3, 1)
- Lemma 3.1.4 (D, D): Mutual damage. **Payoff:** (-1, 2)

3.3.2 Separatist Nationalist (N)

- Lemma 3.2.1 (C, C): United independence front. **Payoff:** (3, 2)
- Lemma 3.2.2 (C, D): Nationalist gains more influence. **Payoff:** (0, 5)
- Lemma 3.2.3 (D, C): Separatist weakens nationalist. **Payoff:** (2, 0)
- Lemma 3.2.4 (D, D): Weak independence movement. **Payoff:** (0, 5)

3.4 Terrorist Interactions

3.4.1 Terrorist Nationalist (N)

- Lemma 4.1.1 (C, C): Temporary truce. **Payoff:** (2, 2)
- Lemma 4.1.2 (C, D): Nationalist outmaneuvers terrorist. **Payoff:** (0, 5)
- Lemma 4.1.3 (D, C): Terrorist destabilizes nationalist. **Payoff:** (1, 0)
- Lemma 4.1.4 (D, D): Escalating chaos. **Payoff:** (-1, 5)

3.5 Nationalist Interactions

3.5.1 Nationalist Nationalist (N)

- Lemma 5.1.1 (C, C): Unity. **Payoff:** (3, 3)
- Lemma 5.1.2 (C, D): Internal strife. **Payoff:** (0, 5)
- Lemma 5.1.3 (D, C): Factional dominance. **Payoff:** (3, 0)
- Lemma 5.1.4 (D, D): Civil war. **Payoff:** (-2, 5)

4 Conclusion

The ordered lemma list highlights the complexities and potential outcomes of interactions among these actors. It provides insight into how cooperation, defection, and power dynamics shape the behavior and outcomes of political entities.