



A Game Theoretic Analysis of Cooperation and Conflict in the India-China LAC Dispute

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Abstract-

This paper examines the ongoing dispute at the Line of Actual Control (LAC) between India and China through the lens of the Prisoner's Dilemma with a twist: Pakistan's involvement. We analyze the strategic options for India and China, considering the potential benefits and drawbacks of cooperation or defection, with two scenarios: Pakistan supporting China and Pakistan remaining neutral.

Keywords- Prisoner's dilemma, Game, Strategy, LAC.

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I. INTRODUCTION

The Prisoner's Dilemma, a popular model in social sciences, struggles when applied to real-world scenarios with multiple players. Researchers discovered these situations, despite resembling the dilemma, have incompatible incentive structures. A substantial yet confusing category of models is comprised of video games that are based on the Prisoner's Dilemma series [3].

The India-China border dispute, particularly the recent standoff at the LAC, presents a complex strategic situation. Game theory, specifically the Prisoner's Dilemma, offers a framework to understand the underlying dynamics. However, the presence of Pakistan as a significant player in the region adds another layer of complexity.

The conflict between China and India in 1962 served as the impetus for China's western border areas to expand. This enlargement happened

all the way through the circumstance [11]. It controlled and could manipulate the whole Aksai Chin region. After the battle, it was discovered that the area in question was a line of actual control (LAC), where both forces were positioned. This was the place where the altercation happened. The number of ponds in the area and the steepness of the mountains made it impossible to trace the line precisely and error-free. This particular scenario arose due to the existence of the mountains. The Ladakh autonomous territory, often known as the LAC, is made up of the four states of Ladakh, Himachal Pradesh, Uttarakhand, and Arunachal Pradesh. In the LAC region, both nations are busily building roads, phone lines, and airstrips. These are ongoing initiatives. As a result, there has been conflict between the two nations as they periodically assert their claim to sovereignty over LAC. A disagreement has arisen between the two nations as



a result of this issue. The two countries are at odds as a result of these conditions. Ever since the conflict began, there has been a great deal of discussion over the border separating China and India. Both nations have made great efforts, but as of right now, neither has been able to reach a mutual understanding with the other. One of the most well-known instances of a prisoner's dilemma is undoubtedly the border dispute between China and India [2].

On the other hand, despite the fact that both countries regularly become linked with one another as a result of this, they rarely accomplish complete triumph over one another by themselves. This is not happening at the moment, despite the fact that there is the potential for the two parties to engage in dialogue with one another in order to resolve the dispute that is occurring at the border. Pakistan will be the focus of India's attention in the event that a confrontation between China and India cannot be avoided. This is due to the fact that Pakistan plays a role in the situation. The conduct of an examination that takes into account the likelihood of Pakistan adopting a position that is favourable to China is something that needs to be done.

II. WHAT IS THE MATTER?

The Johnson line, which extended all the way to the Kunlun Mountains, was proposed by the British as a potential beginning point for the struggle that was taking place over the western boundary. It was suggested by the British that you take this line. It

was at that time period when the princely state of Jammu and Kashmir was the location where Aksai chin was kept. The location where it was stored was in this area. In order to establish a claim to Aksai chin, the independent government of India utilised the Johnson line as a territorial boundary [10]. This was done in order to assert this claim. In the years that followed, China never made any compromises regarding the Johnson line, despite the fact that it was the first country to acknowledge the Johnson line. Prior to the two countries' decision to withdraw from the conflict, they strengthened their claims to the Aksai chin [2].

1951 was the year that China asserted that India had taken control of the Tawang route [3]. This assertion was made by China. Before the McMahon line was established, China was the dominant power in the western zone, while India was the dominant power in the eastern zone. Both of these divisions were established before the McMahon line was established. The conflict was initially ended for a short period of time after the Indo-China war of 1962, which China won by conquering India. However, this state of affairs did not last long. Despite this, it was not resolved in a lasting manner. In light of this, this is the reason why the disagreement occasionally escalates to a greater degree than it was at in the past [12]. The situation that the two countries are currently facing is identical to the one that they were in in the past. This is the case even in the present day.

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Fig-1 Source: The Economist 2012

III. SomeKey Terminology

A. Nash Equilibrium

Game theory's cornerstone, Nash Equilibrium, analyses how players in a game choose actions that lead to stable outcomes. It



considers situations where multiple players make decisions simultaneously, with each player's choice influenced by the anticipated choices of others. This concept, developed by American mathematician John Nash (awarded the 1994 Nobel Prize in Economics), allows us to predict players' decisions in such scenarios.

B. Pareto-optimal solution

A solution is considered Pareto-optimal [7, 8] if improving one aspect wouldn't be possible without sacrificing another. In other words, all goals are balanced and no further improvements can be made without drawbacks elsewhere. Without additional preferences, all Pareto-optimal solutions are viewed as equally good.

IV. PRISONER'S DILEMMA IN A BORDER DISPUTE BETWEEN INDIA AND CHINA

The game of prisoner's dilemma pits two players against one other [1]. When two people, two groups, or two countries are faced with a dilemma; they often have more than two possibilities for solving their situation. For their border issue, India and China have more than two options. It is the best alternative for you without considering the opponent's intentions [5,9]. Various options for the India-China boundary conflict have been considered in this study.

V. APPLYING THE PRISONER'S DILEMMA TO THE LAC

- *Cooperation:* Both India and China benefit from de-escalation at the LAC. This allows for peaceful resolution of border disputes, increased trade, and regional stability.
- *Defection:* However, both nations are tempted to assert dominance. China might escalate military presence, and India might respond with similar actions. These actions, while showcasing strength, ultimately increase tensions and raise the risk of military conflict.

VI. ANALYSIS OF ACTIONS BY BOTH THE COUNTRIES

(i) Step 1: The Mission

The Chief of Army Staff (COAS) informed the Indian Army that the Chinese army would be unable to cross the LAC into India [2].

(ii) Step 2: Situation and courses of action

On the LAC, India and China have deployed their whole military forces. In the face of rising tensions along the LAC, India is preparing for a protracted winter standoff. The Indian Army has taken up positions along the LAC at critical heights, fully prepared for the winter months. The Chinese army is similarly prepared, having completed all of their training in LAC. To distract the Indian troops, the Chinese army is employing loudspeakers. This is an old Chinese strategy that it employs in every conflict.

(iii) Step 3: Analysis of opposing forces of action

China is attempting to divert India's attention with a variety of suggestions. Thousands of army soldiers with strong tanks and weapons have been assembled in China.

(iv) Step 4: Comparison of available courses of action

There are two options available to the Indian Army. The first option is to reach a peace agreement with China and share LAC. The second option is to fight the Chinese army and prevent them from crossing the LAC.

China has two options as well. The first option is to reach an agreement with India and share LAC without conflict. The second option is attacking the Indian army and cross the LAC.

(v) Step 5: The decision

Maintaining peace across the LAC in accordance with previous discussions and agreements is the best option for both countries.

VII. The Third Player: Pakistan's Role

Pakistan might either side with China against India or take a diplomatic attitude of neutrality [4].

VIII. DISCUSSION

Over the course of several years, India and China have been taking steps to establish their authority over LAC. There is a conflict between the two countries at the moment. Both India and China are influenced, either directly or indirectly, by Pakistan, which is a neighbouring country to both of these countries. We analyze two scenarios:

Table -I: Scenario-1If Pakistan Supports China

		Chinese Strategy	
		Co-operate	Defect
	Co-operate	(10 10 10) I C P (PEACE-PARETO)	(3 7 7) I C P (LAC GOES TO CHINA)



India's Strategy		OPTIMAL SOLUTION)	
	Defect	(7 3 3) I C P (LAC GOES TO INDIA)	(1 1 1) I C P (NASH EQUILIBRIUM)

Here I=India, C= China, P= Pakistan

Scenario 1: Pakistan Supports China

- *China Cooperates:* If China chooses to cooperate with India, it might reduce military presence at the LAC to signal peaceful intent. However, with Pakistan's support, China might feel less pressured to compromise.
- *China Defects:* If China chooses to escalate tensions, Pakistan's support strengthens its position. This scenario poses a significant security threat for India.
- *India Cooperates:* India cooperating becomes riskier. While it seeks de-escalation, a united China-Pakistan front could embolden China to make further demands.
- *India Defects:* India might choose to counter China's escalation by deploying additional troops or seeking alliances with other regional powers. This intensifies the conflict but potentially deters China from further aggression.

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Table -II: Scenario-2If Pakistan is neutral

India's Strategy		Chinese Strategy	
		Co-operate	Defect
	Co-operate	(777) I C P (PEACE-PARETO OPTIMAL SOLUTION)	(3 5 7) I C P (LAC GOES TO CHINA)
	Defect	(5 3 7) I C P (LAC GOES TO INDIA)	(1 1 7) I C P (NASH EQUILIBRIUM)

Here I=India, C= China, P= Pakistan

Scenario 2: Pakistan Remains Neutral

- *China Cooperates:* China might be more willing to cooperate with India if Pakistan remains neutral. This reduces the pressure of a two-front war and incentivizes a peaceful resolution.
 - *China Defects:* Even with Pakistan's neutrality, China might escalate tensions. However, the lack of Pakistani support weakens China's overall position.
 - *India Cooperates:* India can cooperate with a less confident China, potentially seeking international mediation or proposing confidence-building measures.
 - *India Defects:* India might be more inclined to counter China's escalation if Pakistan is not involved, potentially leading to a more intense military standoff.
- According to the Nash Equilibrium, a negative strategy is one in which both India and China have agreed to go to war, while Pakistan either supports China or acts neutral (Nash Equilibrium). A positive approach is one in which India and China have reached an agreement for peace, in which Pakistan either side with China or maintains a neutral stance.
 (PEACE: Pareto-optimal solution).



IX. CONCLUSION

The LAC dispute presents a complex Prisoner's Dilemma with Pakistan acting as a crucial variable. While both India and China have incentives to cooperate, the presence of a potential ally (Pakistan for China) creates a situation where defection can seem strategically advantageous in the short term. Long-term stability, however, necessitates both nations prioritizing cooperation and seeking peaceful solutions. The people of India, China, and Pakistan, as well as their respective leadership, are unquestionably very important players, and as a result, they cannot be excluded from the matrix of the game under any circumstances. As a Pareto optimal solution, it provides a basis for peace, which is an even more substantial benefit. It is necessary for both India and China to abandon their conventional dominating strategy in order to accomplish this goal. The implementation of peace along the LAC is the most effective solution that can be found for them.

CONFLICT OF INTEREST

The authors confirm that there is no conflict of interest to declare for this publication.

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