SCHOLARLY DEBUT
by Scholarly Review
Fall 2025

APPENDIX A

US-China's Chance of Collaboration under Prisoner's Dilemma Lens

Prisoner's Dilemma Lens

The U.S.–China space relationship can be understood through the lens of the **Prisoner's Dilemma**, a game-theoretic model in which two actors must independently choose whether to cooperate or defect. Mutual cooperation yields moderate benefits for both, but the incentive structure often drives actors to defect, producing suboptimal collective outcomes. Applied to U.S.–China space cooperation, the model highlights the difficulty of sustaining collaboration in a strategically sensitive domain.

As shown in Table 1, both the U.S. and China face four possible outcomes when deciding whether to collaborate on space programs.

- If both cooperate, each gains moderately (+3).
- If one cooperates while the other defects, the cooperating state suffers a loss (–1) by exposing technology without reciprocal benefit, while the defector gains substantially (+4).
- If both defect, neither gains nor loses (0).

Because the risk of unilateral exploitation is high—sharing sensitive technology without guarantees of reciprocity—each state's dominant strategy is non-cooperation. For China, cooperating risks handing advanced space technology to the U.S. without equivalent returns; for the U.S., cooperation risks accelerating China's technological rise. Given that space technology has both military and civilian applications, the costs of exploitation are particularly acute. As a result, the most rational outcome is mutual defection, which aligns with the current lack of U.S.–China collaboration in space.

At first glance, the enduring U.S.–Russian partnership on the ISS may appear to contradict this logic. However, the structural conditions were different. When cooperation began in the early 1990s, the Soviet Union had collapsed, and Russia's overall national capability had sharply declined. This asymmetry reduced U.S. concerns about empowering a strategic rival. At the same time, Russia retained deep domain-specific expertise in human spaceflight and station construction, making it an indispensable partner without posing the same long-term threat as China.

In short, the Prisoner's Dilemma framework helps explain why the U.S. and China have failed to cooperate in space: the strategic costs of unilateral cooperation outweigh the benefits. By contrast, U.S.–Russia cooperation reflected a different calculus shaped by power asymmetry and complementary capabilities, demonstrating that the model has limits and must be conditioned by broader structural factors.

Table 1

		US	
		collaborate	not collaborate
China	collaborate	3, 3	-1, 4
	not collaborate	4, -1	0, 0