Game Analysis in International Anti-terrorism strike

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Abstract—**in the international counter-terrorism strike, different countries have different country interests due to the influences of many factors. It leads to some bifurcation. The purpose of this paper is to study efficient measures applications of game theory to combat terror. The thesis has analyzed the international joint counter-terrorism strike restricted by different factors by applying the game theory. Our study show that country having terrorism shall actively join in counter-terrorism strike to cope with the terrorism in any case. Only take the joint counter-terrorism strike any country facing to the terrorism can provide the safeguard for the safety and development**

Keywords-counter-terrorism cooperation; game analysis; counter-terrorism policies

1. Introduction

In the aftermath of September 11, the consensus on the international joint counter-terrorism cooperation has been made, and many states have actively played a role in the international counter-terrorism strike. But some countries considered their own country benefit, which the benefit unbalance has directly resulted in the non-cooperation among different governments, wherein the non-cooperation damages the counter-terrorism cooperation efficiency. The main reason is that different country face different degree terrorism intimidating. Some countries can gain great fortune by providing various resources for the terrorisms in the counter-terrorism strike; moreover, the national profit composition is diversified and complicated [1]. The purpose of the paper study is to take the game analysis in the international counter-terrorism cooperation

2. The Model

2.1 Baseline Model

Consider a case that illustrates general information in a counter-terrorism process. Assume that there are two choices to make an intentional attack or not attack terrorism in Country A and Country B. During the strike, if the outcome for cracking down the foreign terrorism, the government lose and pay C_A for the attack and personal loss , obtain a benefit B_E for a successful attack, the model is made as followings; this general-cooperative game is shown in Table 1 . To simplify the analysis, assume. $B_E > 0$, $C_A > 0$, $2B_E - C_A > 0$, $C_A > B_E$. The probability distribution for the A country's actions is $(\alpha, 1-\alpha)$, while that for B country's action is $(\beta, 1-\beta)$. The objective is to find the probabilities α and β for which

$$\beta(2B_E - C_A) + (1-\beta)(B_E - C_A) = B_E \cdot \beta + (1-\beta) \cdot 0$$, therefore, $B_E - C_A = 0$

Table.1 simultaneous model

		B		Not attack
		Attack		Not attack
A	Attack	$2B_E - C_A , 2B_E - C_A$		$B_E - C_A , B_E$
	Not attack	$B_E , B_E - C_A$		$0 , 0$

This result leads to some useful conclusion for international counter-terrorism cooperation. In the following analysis, we assume $B_E = 10$, $C_A = 15$ for convenience of analysis and study.

2.2 Symmetrical game

According to the above assumption, when Country A and Country B join in the counter-terrorism strike, the earning benefits received by each country is 5($2 \times 10-15$). For the state hitching a free ride, the security benefits of 10 can be gotten. So, the game between Country A and Country B is as Table.2. The result means even if the two countries face the same international terrorism threat, hitching a free ride will destroy the international counter-terrorism cooperation. In accordance with the theory of Nash Equilibrium, the both parties cannot take the unilateralism counter-terrorism action in any case. Only the unanimous joint action can reach the purpose of counter-terrorism.

Table.2 symmetrical game

		B	
		Attack	Not attack
A	Attack	5, 5	-5, 10
	Not attack	10,-5	0 ,0

2.3 Asymmetric Game

Because of the limitation of many factors, every country faces the different threats. In the following analysis, if the terrorism threat to Country A and Country B is asymmetric (as stated in Table.3), the asymmetry game will be appear. If A country face more serious threat, the security benefits for attacking the international terrorism is not 10, maybe 15; while the terrorism threat to country B is relatively fewer. Against this background, Country A prefers to the unilateralism, because it is difficult to cooperate with Country B.

		B	
		Attack	Not attack
A	Attack	15, -7	0, 4
	Not attack	15,-11	0 ,0

3 Conclusion

The equilibrium analysis gives interesting, helpful results that will aid the government in making decisions to combat terrorism. In the international counter-terrorism action, so the joint counter-terrorism action is an important countermeasure to attack the international terrorism.

Reference

[1] Arce, D.G., Sandler, T. Counterterrorism: A game-theoretic analysis [J]. Journal of Conflict Resolution, 2005(49):183-200.