Gun Control in Counterinsurgency: A Game Theory Analysis

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Application of populace and resources control measures in counterinsurgency is often more art than science, and in Iraq's Salah Din Province in 2006 the battlespace commander's attempts to reduce the number of weapons available to insurgents actually caused residents otherwise uninvolved in insurgency to violate the law, while effectively ensuring that the population had no means to resist insurgent theft of supplies or forcible recruitment. Game theory offers a means to analyze the options available to different actors in a conflict, and to help identify courses of action more beneficial to all.

Throughout 2006, Multi-National Corps-Iraq (MNC-I) coalition forces and the farmers of the al Jazeera Desert of Iraq struggled to cooperate while pursuing separate goals. Consistently, the desire by MNC-I to impose populace and resource control measures to limit use of the area by insurgents clashed with the needs of the populace to survive and care for their families. One issue in particular resulted in the repeated arrest of farmers who intended no crime but to protect their families and left the farmers with no choice but to support the insurgents—the coalition's policy for gun control. Game theory provides commanders and policy officials a methodology to analyze the options available to disparate actors within a competitive situation or conflict, to predict likely adversary and population reaction to plans or policy, and to help develop courses of action beneficial to all.

The al Jazeera Desert is a sparsely populated region, bordered by Lake Thar Thar to the west and Main Supply Route (MSR) Tampa between Samarra and Tikrit to the east. Because of the coalition's top-down method of controlling Iraq, this rural area hosted no coalition forces. Coalition patrols instead focused on protecting MSR Tampa and the pipeline between the population centers of Samarra and Tikrit. Because the area was without cell coverage, residents could not call on security forces for assistance when threatened by insurgents or criminals, providing insurgent forces an ideal area for hiding, training, and reconstituting before traveling back into the larger population centers to resume direct conflict. Criminals flocked into the desert to remain out of the reach of government forces and prey upon the isolated farms.

In 2006 the coalition's populace and resources control measure for management of privately owned weapons was to allow each Iraqi household to maintain one AK-47 or AK-74, with two magazines with 60 rounds of ammunition. Ostensibly, this would allow the family to protect itself against local criminals and insurgents, while limiting the number of armed individuals who

might oppose the forces of the coalition and the Government of Iraq. Instead this policy ensured that local residents were left helpless to resist the insurgents, who cared little about limits on gun ownership and generally travelled in armed groups of four to twenty.

Because of the dry conditions, the farmers were reliant upon diesel-powered pumps to bring water up from the deep slant wells cut into the desert. Without diesel fuel, the farmers were unable to grow the crops necessary to support themselves. The insurgents were able to take whatever they needed from the comparatively unarmed farmers, and generally helped themselves to whatever fuel the farmers had unless the farmers were willing to provide other support.

Figure 1. A Typical Slant Well in the Al Jazeera Desert.

Had the farmers, insurgents, and coalition forces been the only actors active in this desert, the situation would have been predictable. The relatively unarmed farmers would have supported the insurgents in return for being allowed to keep some of their fuel and a portion of their crops, at the risk of an occasional week or two of detainment at a coalition facility under charges of providing support to insurgents (in the unlikely event they were caught doing so). However, the presence of the criminals made the situation unstable. The criminals were not interested in the farmers' support and took anything they wished, often murdering the farmers and leaving their bodies near Lake Thar Thar with instructions to the residents not to bury the bodies under penalty of death as a message to others not to resist.

Criminals were no more likely to follow the coalition's gun control limits than the insurgents. Many farmers recognized that the coalition forces traveled through the area extremely infrequently, so in order to protect their homes and fuel supply stocked enough firearms and ammunition for each male member of the family to defend the house. This had little effect upon MNC-I operations unless coalition forces happened to conduct a raid into the desert, where they cleared not just the target house, but the houses near it as well. Predictably, some houses were found to have more than one rifle, and coalition forces responded by seizing the surplus weapons and issuing the family a warning, or seizing the weapons and detaining all male adults for several weeks.

This put the residents of al Jazeera into an unenviable position. They could follow coalition gun control restrictions and maintain only one weapon per house and leave themselves at the mercy of the criminals, or they could maintain enough weapons to protect themselves and risk seizure of the weapons and detention.

Game theory uses a simple math structure to analyze and predict the behavior of actors or competitors in strategic situations—where the success of an actor is dependent upon how his course of action interacts with his competitor's courses of action. The players, expected payoffs, and available moves or strategies form the game, and the analyst uses rows and columns in a grid format to show how the players' preferred outcomes result from player interaction. The analyst can then use the outcome of the game to better conceptualize and predict the effects of planned operations or policy upon the operational environment.

From interviews with farmers of the al Jazeera Desert in 2006, an analyst or commander could rate the farmers' preferred outcomes of interaction with coalition forces on a scale descending from 4 to 1. The farmers would rather be allowed to maintain one rifle per male in order to best protect themselves, their property, and their fuel. Because coalition forces rarely patrolled the area, the farmers were willing to risk detention to protect themselves against raiding criminals. As long as the farmers did not directly engage in insurgent activity, they were only likely to be detained if their closest neighbors' house was raided. As the probability of coalition forces raiding the house was less than the probability of insurgents and criminals attacking the house (and because detention usually lasted only a week or two), the farmers preferred to take the risk and maintain as many weapons as they could to defend their homes. The farmers' third preference was to maintain one weapon per family and entrust their safety and property to the overly occupied security forces. The farmers' last preference was to be allowed to maintain one weapon per male family member, but maintain fewer while the security situation remained unstable. This order of preference is depicted in Figure 2.
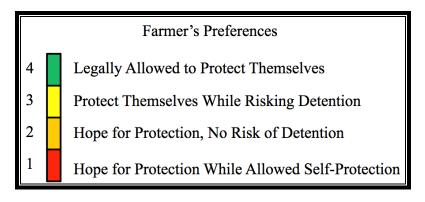

Figure 2. Farmer's Preferred Outcomes.

The local commanders preferred to limit the number of weapons held by actors outside their direct control throughout Iraq, and their highest preference was for each household to comply with all MCI-I restrictions. Failing that, they were willing to detain individuals for non-compliance as necessary. The commander's least favorite options were to raise the limit on number of weapons per family, and if they had to do so they would still prefer each family to have as few weapons as possible, shown in Figure 3.
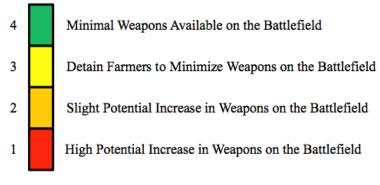
Coalition Commander's Preferences

4	🟩	Minimal Weapons Available on the Battlefield
3	🟨	Detain Farmers to Minimize Weapons on the Battlefield
2	🟧	Slight Potential Increase in Weapons on the Battlefield
1	🟥	High Potential Increase in Weapons on the Battlefield

Figure 3. Coalition Commander's Preferred Outcomes.

The interaction between the farmers and coalition force commander's preferences is depicted in Figure 4. The number on the left in each box indicates the farmers' outcome preference and the number on the right indicates the MNC-I commander's preference for that intersection of policy. For example, in the upper left box the farmers receive their most preferred outcome if they maintain one weapon per male family member while the coalition commander allows them to maintain one weapon per male.

		Multi-National Corps-Iraq	
		Limit 1 Rifle per Male	Limit 1 Rifle per Family
Al Jazeera Farmers	Maintain 1 Rifle per Male	4,1	3,2
	Maintain 1 Rifle per Family	1,4	2,3

Figure 4. Interaction of Preferred Outcomes.

Using arrows to depict how each actor would react given the action of the other, the analyst can predict the dominant strategies of each actor. The farmers, shown in Figure 5 with red arrows, moved from a lower preference to a higher preference by maintaining one rifle per male family member, regardless of MNC-I's gun control policy. While they would prefer not to risk detention, the farmers weighed the risk of being victims of murder or theft higher than a chance home search by coalition forces.
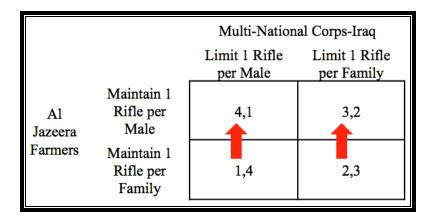
Figure 5. Farmer's Preferred Responses to MNC-I Policy.

The coalition commander's preferences, shown in Figure 6 with blue arrows, indicate that the commander did not have a dominant strategy. If the security situation in the al Jazeera Desert were to become secure enough that the farmers did not need to protect themselves, and coalition forces were in no danger while conducting operations within the region, the commander would have been willing to lower the number of population control measures enforced, to include gun control. However, given the lack of forces necessary to correct the security situation, so long as the farmers needed the weapons coalition forces were unlikely to allow them.
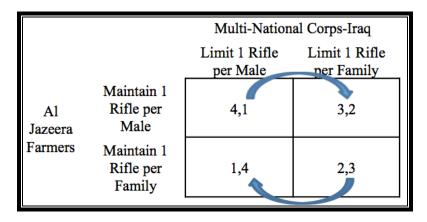

Figure 6. MNC-I Commander's Preferred Responses to Farmer's Level of Compliance.

Both side's preferences interact in Figure 7. The box where no arrows exit indicates that the most likely outcome of this scenario is that the farmers will choose to maintain as many weapons as they can use, while coalition forces will detain or confiscate weapons as they find them. This represents the Nash Equilibrium, wherein neither side can unilaterally improve its outcome. Neither side receives its optimal result, but the farmers come closest to doing so even though the coalition sets the policy.
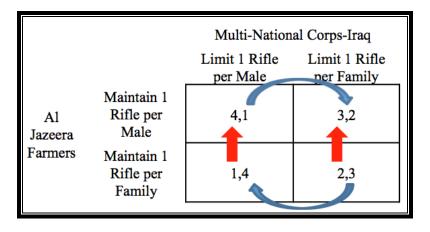
Figure 7. Interaction of Farmers and MNC-I Preferred Courses of Action.

Using game theory to determine potential strategic moves for this dilemma yields little positive result. The farmers have no viable strategic moves in this situation. Threatening coalition commanders that they will arm themselves with one weapon per male family member if MNC-I continues its policy of allowing only one weapon per household is simply impractical and counterproductive. While it appears that the farmers can promise to maintain only one rifle per family if commanders will allow them to maintain one rifle per male, and this does meet the requirement of hurting the farmers preferences while helping the commander, commanders would be unlikely to believe the farmers would disarm given their preference for defending themselves against criminals, providing the farmers with their most preferred option through defection.

Coalition commanders have no viable strategic moves in this situation either. Unit commanders are already threatening the farmers with detainment if the farmers are found with more than one weapon per household. If the commander acted upon a threat (to choose a course of action contrary to what he would normally select), choosing to allow the family to maintain additional rifles is exactly the outcome the farmers hope for. Like the farmers, the commander theoretically has a promise available—to tell the farmers that it will raise the limit on weapons per household if the farmers will agree to keep just one. However, the commander knows that the farmers will have a high motivation to defect to achieve their preferred outcome.

Not surprisingly, this describes exactly what occurred in the al Jazeera Desert in 2006. The farmers chose to maintain as many weapons as they could, and coalition forces detained farmers on when they found extra weapons. Local coalition force commanders attempted to break this impasse by exercising some discretion, and allowed some families to maintain their weapons. However, the rapid rotation of coalition forces ensured that the policy was inconsistent. As there was no single security force with control over this area, any nearby unit with a tip about insurgent or criminal activity launched a raid, and farmers who had been told they could maintain their weapons on Monday had them seized by a different unit on Friday.

The player receiving the least favorable result in any situation has the greatest impetus to change the game. Because the coalition forces were getting the less favorable outcome from this interaction, it was up to the commander to change the game to get a more favorable result.

Counterinsurgency doctrine indicates that the ideal solution for the coalition was to protect the populace. Without the threat of attack the farmers would have weighed the probability of detainment as not worth the risk of being caught maintaining multiple weapons, and with the safety of their families ensured would likely spend their money on other goods. Unfortunately, the limited numbers of coalition forces not confined to a forward operating base were focused on maintaining control of the major cities.

An Iraqi Soldier after Finding a Weapons Cache.

Allowing local commanders to set the gun control policy for their areas may have provided one option more palatable to MNC-I while still garnering the support of the farmers. Local commanders could have allowed families to maintain additional arms as part of a mixed strategy. Commanders could maintain the one weapon per household policy in areas not yet under coalition force influence, but begin allowing selected families to maintain additional arms. The unit would maintain a list and map of which houses were authorized additional weapons and were organized for mutual support as an informal civilian defense force.

Allowing the local commander to implement gun control policy for his area of operation would result in a different interaction table. Coalition commanders would still prefer the farmers to maintain minimal arms and rely on the local security forces for protection, but a close alternative would be to expand the unit's area of influence by encouraging local farms to maintain their arms in support of mutually supporting neighborhood watch programs, coordinated through the commander's unit. The third preference would be to maintain the limit on weapons to one per family, knowing that farmers outside the unit influence would still maintain additional weapons. This policy would allow commanders to confiscate weapons and detain likely suspects of insurgent or criminal activity as needed. The commander's last preference should be to have helpless farmers outside the sphere of influence, subject to the whims of criminals and insurgents. While the farmers would still have the same preferences, the commander's new preference list is shown in Figure 8.
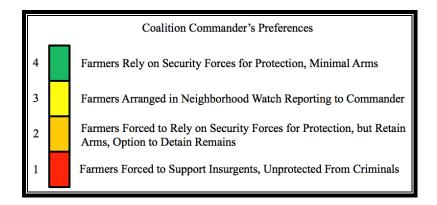
Figure 8. Coalition Commander's Modified Preferences.

This new preference list results in a different outcome, wherein both sides improve their outcomes in order of preference. Both sides maintain dominant strategies, but the outcome now benefits both sides. The dominant strategy for coalition forces becomes to allow the farmers to maintain one weapon per male family member whenever possible as a matter of preference, while maintaining a limit to be utilized in the event that a farm has a suspicious number of weapons or questionable contacts. The coalition commander is now able to achieve an outcome much more in line with his preferences, a three out of four, as opposed to the two out of four under the old strategy. He no longer has to detain individuals who are merely prepared to defend themselves, and large enough groups may even begin to deny the insurgents support if so motivated. The Nash Equilibrium now results in the farmers obtaining their most favorable result while the coalition receives its second choice, depicted in Figure 9.
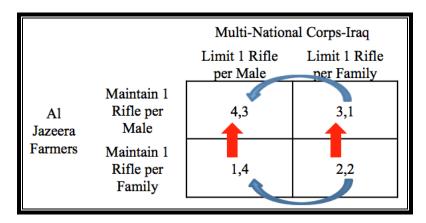

Figure 9. Modified Outcome after Revising Coalition Strategy.

In conclusion, whenever any authority criminalizes a legal activity in an attempt to reduce the incidence of an illegal activity, second and third-order effects are generated which may result in an outcome not only less effective than hoped for, but even counter to the desired effect. In the case of the al Jazeera desert in Iraq during 2006, the coalition forces' attempt to minimize the number of weapons available to the insurgents operating in the area contributed to the insurgents' means of support. The farmers were unable to do anything but support the insurgents regardless of whatever preference they might have for a functioning Government of Iraq. The presence of criminals and the coalition forces' inability to protect the population resulted in a

lack of support for both the legitimacy of the Government of Iraq and coalition forces, and provided the farmers no incentive to follow the rules of an authority that made criminals of a group without criminal intent. By analyzing the options available to the farmers, local commanders could have shifted policy to provide incentive to the farmers to protect themselves, perhaps eventually resulting in less of a need for weapons at all, and a willing reduction of arms.

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