

EDITORIAL

From Hunter to Prisoner: Hurricane *Katrina* and the Social Contract

Michael R. Powers*

“If it was a matter of catching a stag, everyone well understood that he must keep his position faithfully; but if a hare came to pass within reach of one of them, undoubtedly he went after it without scruple, and having caught his prey did not worry much about having made his companions lose theirs.”

– Jean-Jacques Rousseau (*A Discourse on Inequality*, 1755)

In the aftermath of the destruction and suffering visited upon New Orleans by Hurricane *Katrina*, numerous politically charged accusations have been directed at all levels of government in the United States. At the state and local levels, some have asked why the city’s evacuation plan, which could have employed hundreds of available school buses, was not followed before the levees broke. At the federal level, others have asked why the unevacuated residents had to endure days of life-threatening privation before the Federal Emergency Management Agency (FEMA) and armed forces intervened. But it was not just government that failed to live up to expectations. Many ordinary citizens in New Orleans responded to the disaster by engaging in looting, and armed gangs roamed the Superdome and other parts of the city, resulting in an undetermined number of assaults and homicides. And where was law enforcement while all of this was going on? Certainly it wasn’t the fault of any government agency that well over two hundred city police officers decided, individually and unilaterally, to abdicate their responsibility to protect the public.

Had the destruction of New Orleans been the result of a terrorist attack, it would have been the most successful such act in history – not because of the number of innocent lives lost or

* Editor, *Journal of Risk Finance*; Professor and Director, Advanta Center for Financial Services Studies, The Fox School, Temple University; e-mail: michael.powers@temple.edu.

property destroyed, but rather because of the breakdown of the social order. What better possible outcome could a terrorist envision than planting seeds of doubt regarding the willingness and ability of individuals and government to fulfill their respective roles in the “social contract”?

Some Game Theory

The concept of the social contract is traceable to Socrates (the *Crito*), and was developed in its modern form by Enlightenment philosophers Thomas Hobbes, John Locke, Jean-Jacques Rousseau, and others. In the late twentieth century, writers such as John Rawls and David Gauthier used game-theoretic reasoning – and particularly 2×2 matrix games – in their analyses of social-contract theory. Perhaps the most instructive such 2×2 game is the “Stag Hunt,” named after a passage from Rousseau (reproduced above) in which the Swiss philosopher describes how the idea of cooperative effort may have developed among our human ancestors.^[1]

		Player B	
		Hunt Stag (Cooperate)	Hunt Hare (Defect)
Player A	Hunt Stag (Cooperate)	4, 4	1, 3
	Hunt Hare (Defect)	3, 1	2, 2

Table I. The Stag Hunt

Essentially, Rousseau’s observation is that by cooperating, human beings may be able to achieve better results than by working alone. In the case at hand, if two hunters work together, then they can kill a stag – an objective that cannot be realized by either hunter working by himself. This outcome is best for both hunters because each maximizes the amount of meat he takes home (and thus obtains the maximum ordinal score of “4” in the payoff matrix).^[2] If both hunters choose not to cooperate, then each relinquishes the possibility of killing a stag, and has to

compete for a hare (with an ordinal payoff of “2”). Finally, if one hunter agrees to cooperate but the other is faithless, then the former hunter comes up empty-handed (obtaining the worst payoff of “1”), whereas the defector is able to find a hare faster than he could if the two hunters were competing against each other (obtaining a payoff of “3”).

The Stag Hunt possesses two pure-strategy Nash-equilibrium^[3] solutions: one in which both hunters choose to cooperate (which we will denote by [C, C]), and the other in which both hunters choose to defect (to be denoted by [D, D]). By definition, each of these solutions is stable in the sense that one player cannot gain by a unilateral deviation in strategy. However, since solution [C, C] yields a better payoff than [D, D] for both players, it is reasonable for the players to try to coordinate on the former outcome. This mutual understanding of the optimal solution provides a simple model of the social contract.

The problem with the social contract as thus formulated is that it is sensitive to small changes in the payoff structure of the game. Consider, for example, what happens to the Stag Hunt if the payoff level for cooperation (i.e., “4”) switches places with the payoff level for defection when the other hunter has chosen to cooperate (“3”). Suddenly, the original game is transformed into the “Prisoner’s Dilemma,”^[4] an even more celebrated 2 × 2 game.

		Player B	
		Don't Confess (Cooperate)	Confess (Defect)
Player A	Don't Confess (Cooperate)	3, 3	1, 4
	Confess (Defect)	4, 1	2, 2

Table II. The Prisoner’s Dilemma

Unfortunately, the Prisoner’s Dilemma offers a much less benign solution than the Stag Hunt. Rather than two Nash equilibria, one of which provides the optimal outcome for both

players, the Prisoner's Dilemma possesses one Nash equilibrium, formed by both players' choosing to defect. In this [D, D] outcome, the payoffs for both players are clearly lower than the payoffs in [C, C]. However, the latter outcome is not in equilibrium. What is particularly disquieting about the Prisoner's Dilemma is that the suboptimal equilibrium [D, D] is even more stable than an ordinary Nash equilibrium, because the defect strategy is *dominant* for both players.[⁵]

Back to Reality

So what happened in New Orleans in the aftermath of Hurricane *Katrina*? Can the descent from social order to chaos really be explained by an analysis as simple as the transformation of the Stag Hunt into the Prisoner's Dilemma?

From the perspectives of individual citizens and law enforcement officers, I believe the answer to the second question is clearly "Yes". Cut off from the normal sources of food, water, and medicine, many individuals found the payoff associated with looting to be greater than that associated with respecting private property. Immune from the restrictions of law enforcement, others found gratification in violent crime. Faced with universal flooding, power outages, and a near absence of effective communication and transportation, many law enforcement officers decided that the payoff from taking care of themselves, their families, and their property was greater than the payoff associated with doing their public duty. Essentially, both citizens and police officers found themselves transformed from "hunters" to "prisoners" as a result of discrete changes in incentives.

And what about the various levels of government? Can their feckless behavior be explained by the above argument?

In this case, we do not need the elegant structure of game theory to explain what happened. Although the absence of government planning and aid were a direct cause of the changes in incentives for individuals and law enforcement officers, government itself was not a strategic player. Institutional inattention and incompetence provide a simple and cogent explanation of their unfortunate behavior.

Finally, then, what can be learned from the *Katrina* tragedy?

First and foremost, I would argue that government (at all levels) must expressly recognize the social contract as a fragile but indispensable defense against chaos. Along with – and perhaps even prior to – rescuing the trapped, treating the ill and injured, and feeding the hungry, disaster relief efforts must focus on maintaining society’s confidence in its most fundamental asset: cooperation.

References

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[¹] See Jervis (1978). Powers and Shubik (1991) provide an alternative motivation for this game in which a young man and young woman, whose romance is new and tentative, have to decide whether or not to send each other a Valentine’s Day card. In this formulation, both young people would prefer the outcome in which each sends a card to the other, but each would be embarrassed if he/she were to send a card that were not reciprocated.

[²] In a two-person matrix game, each player may choose among different *strategies*, and the *payoffs* associated with each pair of selected strategies (known as the *outcome*), are presented in the appropriate matrix cell. The first payoff is the reward to the row player (often called “Player A”), whereas the second payoff is the reward to the column player (often called “Player B”).

[³] In a two-person game, a Nash equilibrium consists of a pair of strategies selected by Players A and B, respectively, with the property that if Player A selects his/her equilibrium strategy, then Player B cannot benefit from deviating from his/her own equilibrium strategy, and *vice versa*.

[⁴] The story behind the Prisoner's Dilemma is that two individuals have been arrested for their participation in a major crime, and are interrogated separately by police. Each prisoner knows that if neither prisoner confesses to the crime, then each will be charged with a lesser offense, involving less jail time. However, if both prisoners do confess, then both will serve longer jail sentences. If one prisoner refuses to confess, but the other prisoner does, confess, then the former will serve an even longer than normal jail sentence for the major crime, whereas the latter will serve no jail time. (See Tucker, 1950.)

[⁵] In a two-person game, a strategy is dominant for a given player if that strategy is the player's best response to any strategy selected by his/her opponent.