Until this point, most research works have focused on how bad design of legal rules may lead to opportunistic strategic behavior. This paper intends to show that even well-designed rules may lead to opportunistic strategic behavior due to bad communication of the "reasonability" of the legal rule, as well as to provide a definition of "reasonability" (i.e., good design) of the legal rules.

This paper also intends to show how the personal interpretation of each player with respect to the strategy set and payoff structure of a legal rule impacts social interaction producing suboptimal social outcomes.

GAME THEORY AND THE LAW:
RULE INTERACTIVE INTERPRETATION

Guillermo Flores Borda*

Before starting, I want you to ask yourself one single question: Is the government responsible for how the citizens interpret the law? In the next pages, I will intend to show you how the way a law is drafted may not even allow but promote opportunistic strategic behavior with respect to its "compliance", and how such opportunistic strategic behavior may be controlled by an appropriate application of game theory.

Every society will have a law forbidding the commission of murder by any individual. In this sense, please assume that the government has enacted a law with the following text, which will be called R1 hereinafter: *"Every individual is forbidden to commit murder"*.

In the eyes of almost every player, the set of strategies will only contain the following two:

(i) "To commit murder" (M), with a payment of -5, as the individual playing such strategy will receive five years of prison as a result.

(ii) "Not to commit murder" (NTM), with two potential payments: (a) A payment of 0, in case all players play strategy NTM, or (b) a payment of -1, in case at least one player plays strategy M, to represent the negative value of social insecurity.

Table 1		Player 2	
		M	NTM
Player 1	**M**	-5, -5	-5, -1
	NTM	-1, -5	0, 0

As you may note in the matrix above representing a two-person game, the strictly dominant strategy for both players would be NTM. Therefore, the solution of the game would be the only Nash equilibrium of the game (0, 0), which represents a state of social peace. However, this matrix does not represent such cases in which the players show opportunistic strategic behavior.

In the case players are aware of the possibility of applying opportunistic strategic behavior, a new set of strategies would apply:

(i) NTM, with a payment of 0 or -1.

(ii) Beating (B), with a payment of -2.

(iii) Non-Deathly Torture (NDT), with a payment of -3.

(iv) M, with a payment of -5.

Therefore: NTM > B > NDT > M.

Table 2

		Player 2			
		M	NDT	B	NTM
Player 1	M	-5, -5	-5, -3	-5, -2	-5, -1
	NDT	-3, -5	-3, -3	-3, -2	-3, -1
	B	-2, -5	-2, -3	-2, -2	-2, -1
	NTM	-1, -5	-1, -3	-1, -2	0, 0

As you may note in the matrix above, the strictly dominant strategy for both players is still NTM. Therefore, the solution of the game would be the only Nash equilibrium of the game (0, 0). However, players who are able to understand the possibility of opportunistic strategic behavior may interpret R1 in at least three different ways, as described in the following scenarios.

First Scenario: both players assume that every opportunistic strategic behavior with respect to R1 would not be allowed, under the conditions that NTM > {B, NDT, M} and B = NDT = M = -5.

Table 3

		Player 2			
		M	NDT	B	NTM
Player 1	M	-5, -5	-5, -5	-5, -5	-5, -1
	NDT	-5, -5	-5, -5	-5, -5	-5, -1
	B	-5, -5	-5, -5	-5, -5	-5, -1
	NTM	-1, -5	-1, -5	-1, -5	0, 0

Under this scenario, NTM is still the strictly dominant strategy for both players; thus the only solution for this game is the only Nash equilibrium (0, 0). However, note that the there is no difference among combinations as long as each player chooses to play any of M, NDT or B (-5, -5), which would imply that, in case NTM would not be available, both players would be indifferently play any of M, NDT or B.

Second Scenario: both players assume that every opportunistic strategic behavior with respect to R1 is allowed, under the conditions that NTM > {B, NDT, M} and B= NDT = -1.

Table 4

Player 1		Player 2			
		M	NDT	B	NTM
Player 1	M	-5, -5	-5, -1	-5, -1	-5, -1
	NDT	-1, -5	-1, -1	-1, -1	-1, -1
	B	-1, -5	-1, -1	-1, -1	-1, -1
	NTM	-1, -5	-1, -1	-1, -1	0, 0

Under this scenario, NTM is now a weakly dominant strategy for both players, but the only solution for this game still is the only Nash equilibrium (0, 0). However, note that there is no difference among combinations as long as each player chooses one of NDT or B (-1, -1).

In addition, please note that the difference between these combinations and the Nash equilibrium point (0, 0) is now minimal, which would imply that preferences may quickly change if needed.

Third Scenario: both players assume that every opportunistic strategic behavior with respect to R1 would not be allowed, under the conditions that NTM > B > NDT > M. However, they DO NOT consider NTM as part of their strategy sets.

Table 5

Player 1		Player 2		
		M	NDT	B
Player 1	M	-5, -5	-5, -3	-5, -2
	NDT	-3, -5	-3, -3	-3, -2
	B	-2, -5	-2, -3	-2, -2

Under this scenario, B is the strictly dominant strategy for both players, and the only solution for this game is the only Nash equilibrium (-2, -2). Therefore, when the players do not consider NTM as part of their strategy sets, no social peace is possible.

As you may note, in all the three scenarios described above, we have assumed that all players have incentives to use opportunistic strategic behavior when facing R1. However, the greater part of common citizens would never even analyze the payoff structure, as they have decided to play NTM in every stage of any game.

Notwithstanding, individuals with incentives not to comply with such R1 would: (i) Analyze the payoff structure for R1, and (ii) not think of NTM as part of their strategy sets. This is the case of every single society, as there will always be at least one player for which both prior conditions would apply.

For instance, let's assume that an individual with a strategy set containing only NTM (who would represent the greater part of society, including reader and me) meets an individual with a strategy set not containing NTM and revisit the three abovementioned scenarios.

First Scenario: Player 2 assumes that every opportunistic strategic behavior with respect to R1 would not be allowed, under the condition that B = NDT = M = -5. Player 1 always plays NTM.

Table 6		Player 2		
		M	NDT	B
Player 1	NTM	-1, -5	-1, -5	-1, - 5

There is no dominant strategy for player 1 or player 2 and no Nash equilibrium point in player 2's eyes exists as well. In the eyes of player 2, M, NDT and B are all available and equally ranked strategies.

Second Scenario: Player 2 assumes that every opportunistic strategic behavior with respect to R1 is allowed under the conditions that {B, NDT} > M and B = NDT = -1. Player 1 always plays NTM.

Table 7		Player 2		
		M	NDT	B
Player 1	NTM	-1, -5	-1, -1	-1, - 1

As you may note, although two equal Nash equilibriums exist in player 2's eyes, both lead to a suboptimal social outcome. In the eyes of player 2, although all M, NDT and B are available, NDT and B are weakly dominant. Therefore, player 2 would be indifferent between NDT and B, but would not be indifferent between any of those and M.

Third Scenario: player 2 assumes that every opportunistic strategic behavior would not be allowed, under the conditions that B > NDT > M. Player 1 always plays NTM.

Table 8		Player 2		
		M	NDT	B
Player 1	NTM	-1, -5	-1, -3	-1, -2

In this case, although there are no Nash equilibriums in player 2's eyes, B is a strictly dominant strategy. However, even the combination (NTM, B) leads to a social suboptimal outcome.

After comparing all three scenarios, it seems that the Second Scenario may cause the least social prejudice due to the assigned payments. However, please note that in such scenario player 2 would be indifferent about playing NDT or B, being NDT a more socially dangerous conduct than B.

The main point of this comparison is to show that strategic interaction regarding legal rules is not only determined by (i) the interpretation of the strategy set that the government had in mind at the moment of enacting R1 (which only comprised M and NTM), but also by (ii) the different interpretations of the strategy set that each player may have (which could be comprised by M, NDT, B and MTN or just the M, NDT and B).

Although the government drafted R1 to have a strategy set only including M and NTM, the way in which R1 has been drafted may allow the players to interpret it as providing for other strategy sets.

In order to ensure that players interpret R1 as providing for the full strategy set and the full payoff structure the government had in mind at the moment of enacting the rule, a new approach must be taken.

Therefore, the task for the government is to draft the legal rule in such a way that:

(i) All players will be able to see the full strategy set *S* and the full payoff structure for the game.

In the case of R1, such strategy set will be defined as S= {MTN, B, NTD, M}. The payoff structure will be the one represented in Table 2.

As you may note, the existence of a socially desirable Nash equilibrium (represented by (0, 0)) is only possible when the full payoff structure is recognizable.

Although the payoff structures represented in Tables 3 and 4 also contain the Nash Equilibrium (0, 0), Table 2 is the only one where the ordinal order of preferences is M < NTD < B < MTN.

(ii) All players will be able to see the set of "permitted strategies" *P(r)*.

As it is obvious, the government would prefer that players only play strategy MTN. Therefore, R1 shall make clear that the set of "permitted strategies" for R1 only comprises NTM and is represented as P(r) = {NTM}.

However, if there were other strategies in *S* leading to a similar socially desirable Nash Equilibrium, such strategies should also be included in *P(r)*. In the case of R1, there are no other additional strategies to be included.

P(r) currently includes <u>not only</u> the strategies leading to such Nash equilibrium, <u>but all</u> the strategies leading to such equilibrium.

As a first conclusion, R1 should only be considered "reasonable" if it complies with the two conditions described above. If so, the

"reasonability" of R1 will lead to its "theoretical stability" due to the existence of a socially desirable Nash equilibrium.

In addition, the government shall communicate the "reasonability" of the legal rule not making emphasis on the "socially desirable outcome" (the socially desirable Nash equilibrium), as such outcome is only possible when all players understand that NTM is the only strategy leading to social peace. However, as we noted above, some players will not consider the existence of NTM as part of their own strategy sets (please refer to Tables 5, 6, 7 and 8).

Therefore, the governments shall communicate the "reasonability" of the legal rule making emphasis on the "negative social outcomes" as all players are able to see at least the other strategies as part of their strategy sets.

However, when communicating such "reasonability", the government shall comply with at least the following two conditions:

(i) **Non-hyperbole**: The government shall not emphasize the combination (M, M) with a payoff of (-5, -5) which is the worst social outcome, as this scenario of total anarchy would be seen by the players as a "ridiculous exaggeration" of not complying with R1.

Focusing on the other combinations leading to suboptimal outcomes would lead to a better understanding of R1 "reasonability" by the players. Therefore, for purposes of communication, the government shall focus on the payoff structure without containing the payoff (-5, -5), as it would change how the players interpret the rule.

(ii) **Credible authority**: The government shall ensure that the communication of the "reasonability" of R1 makes clear

that only players and not the government is benefited from the players playing strategy NTM.

Although in this case it is clear that only the citizens would benefit from combination (NTM, NTM), other payoff structures for different rules may require the government to "explain" how it is not benefitting from some combination when the payoff structure shows that it is in fact benefitting from it.

Therefore, *as a second conclusion, compliance with a legal rule does not only depend on the players knowing the full strategy set and the full payoff structure of such rule, but also on how the government communicates the "reasonability" of the legal rule.*