

Game Theory and Deterrence in the Law

Taylor Godwin

Oklahoma State University

### Abstract

Game theory involves studying and analyzing how people behave in interactive situations. One aspect within game theory is strategic moves. Strategic moves can be threats, promises, or commitments. Threats are used to stop your opponent from doing something you do not want them to do. If your opponent does what you do not want them to do, you punish them. Threats are what deterrence is based on. Deterrence can be used in households by parents, political threats, or fines for breaking the law. One large application of deterrence is within the law. Whether it is used to deter one person, the entire population, or another country, deterrence can be utilized. Deterrence can be successful, or it can fail depending on several factors. Deterrence can be seen on a larger scale when looking at the international world today. At the core of deterrence, including deterrence in the law, is the use of threats in game theory.

### Game Theory and Deterrence in the Law

Suppose you and another person are playing a game of chess. Throughout the whole game, you are trying to figure out what your opponent is going to do and how to respond; your opponent does the same. You and your opponent are utilizing game theory. Game theory can be applied to something as small as a game of chess to something as large as political relations to punishments in the law. With the law, game theory can be applied to nearly every aspect. The law is interactive; game theory analyzes interactions, so the possibilities of studying the connections are endless. Deterrence is one of the larger connections between law and game theory. Deterrence in the law can be seen when looking at the punishments for repeat offenders or the game played between international politicians with each player utilizing threats and promises.

### **Game Theory**

Game theory is a complex idea based around actions and reactions. Unknowingly, people have been using the ideas behind game theory since childhood. As children, playing games like Rock-Paper-Scissor, we used game theory. Adults use game theory when playing poker or other games at a casino. Game theory can be defined as the science of rational behavior in interactive situations. Another way of defining it is the analyzation of how two or more people will react to another's moves during a situation. In simple terms, game theory is the study of how and why people make decisions when interacting with one another. With game theory, one can study, analyze, and then predict strategic behavior.

There are several key components within a game. Before players can begin, rules must be set. The rules include the players, the strategies available, and the players' payoffs for all possible strategy combinations. The rules might be given in a short statement or even a long, elaborate backstory. Strategies are the choices available to the players. In simultaneous games, the players'

strategies are the actions they can take in that one move. In sequential games, the strategies are the moves the players make depending on the moves of the player before them or their own previous moves. For example, a player's strategy in a sequential game could be, "If they play A then I will play C, but if they play B then I will play D". For each possible combination of strategies, the players will receive a certain payoff. The payoffs are determined by the players' preferences for each outcome; higher payoffs represent more preferred outcomes. Payoffs include everything a player cares about within that game. When a player can possibly receive different outcomes, the payoff is calculated by the average of the payoffs associated with each possibility, weighted by the probability. This is referred to as the expected payoff. There is also the core assumption of rational behaviors. This can be summarized in two key aspects. The players' goals are to achieve as high a payoff for themselves as possible, and each player can rank their payoffs consistently and will utilize the strategy that best serves their interests (How to Think about Strategic Games).

The game has its rules, the players have their strategy, but what happens? This is determined by the equilibrium. An equilibrium occurs when each player is using their best strategy in response to the other players' strategies. Reaching an equilibrium does not mean that each player receives their highest payoff. A game can have one or more equilibriums. Equilibriums can also change depending on additional moves or strategies, additional information, strategic moves, or other added factors. While an equilibrium may not happen instantly or be easily identified, they are essential to game theory and understanding what will happen within a game (How to Think about Strategic Games).

## Strategic Moves

Strategic moves can be the difference between getting your lowest payoff and highest payoff during a game. Strategic moves are one of the few ways players can manipulate a game. If a strategic move is effective, the player will benefit and receive a higher payoff. There are two main categories of strategic moves, conditional and unconditional moves. With unconditional moves, a player will play the same move regardless of what the other player does. Conditional moves depend on the other player's behavior. A player will do something or not do something depending on the other player's move. There is one type of unconditional strategic move and two types of conditional strategic moves. Commitments are an unconditional strategic move. A player can commit to making the same move no matter what. With this, the player gains a first-mover advantage. However, for a player to use a commitment, the commitment must be stated explicitly. Threats and promises are the two types of conditional strategic moves. Threats are used when a player wants to stop the other player from doing something. For example, if player B wants player A to do something player B may state, "If you do not do this, then I will respond in a way that will punish you". Promises are like threats except instead of punishing the other player, they will reward the other player for doing what the player wanted. Threats and promises can be explicit or implicit. The move is implicit if the player does not need to say they are going to do something. If the move goes against what a player would rationally do to receive a higher payoff, the move must be stated explicitly. As stated before, commitments always need to be explicit. Promises typically are implicit, and threats typically need to be explicit (Strategic Moves).

Credibility is the determining factor in whether a strategic move is successful. Some strategic moves automatically have credibility. If playing B will result in a higher payoff for a

player, the opponent will already assume the player will play B. With implicit moves like this, there is no need to establish credibility. With explicit moves, the move goes against the rational behavior assumption of game theory. This means that the opponent will need to decide whether the strategic move has credibility. A player can utilize an explicit strategic move, and it may not be successful if the opponent decides it lacks credibility (Strategic Moves).

Consider a game of chicken. You and your opponent are playing a game where you both must decide whether to go straight or swerve. If you and your opponent swerve, you will each get a payoff of -1. If you both go straight, you will crash into each other, and each receive a payoff of -5. If one chooses to swerve and one chooses to go straight, the one who swerved will receive a payoff of 0 and the one who went straight will get a payoff of 5. With no strategic moves, there are two pure strategy Nash equilibria with one player going straight and one swerving. With closing analyzation, there is also a mixed strategy equilibrium where each player chooses each strategy a fraction of the time. Suppose that before the game begins, your opponent states that no matter what, they will go straight. You notice that when they say this, they seem very nervous and shaky. This leads you to believe that this commitment lacks credibility. So, you choose to go straight during the game. Now suppose you are playing a new opponent. When you saw this opponent arrive at the game they were driving very recklessly. This opponent walks up to you and makes the same commitment of going straight. They say this commitment very confidently with no hesitation. This behavior with the commitment leads you to believe that the commitment is credible. During this game, you choose to swerve. A successful strategic move depends on credibility, and with credibility, perception is everything.

### **Game Theory and the Law.**

The law in and of itself is interactive. There is interaction from civilians to legal actors to bills to courts. Interaction can be something as small as a driver deciding whether to speed or something as large as a bill making its way through the House of Representatives and Senate. Any court case can be analyzed as a game. All are examples of real interactive games that happen every day. The law is also broad and, in some ways, open to interpretation. It involves numerous elements and actors. Whether its lawyers, the court system, court rulings, judges, statutes, or rulings, they all fall under the general definition of the law. The law reacts to how people act, and people react to the law. It is all one big game filled with smaller games. Within the law there are prisoners' dilemmas, games of chicken, games of assurance, and even battles of two cultures. Whether it is the law itself, elements within the law, or perspectives of the law such as deterrence or rehabilitation, the law can be analyzed with game theory. Everything can be looked at as a game or an element within a larger game.

### ***Deterrence.***

Deterrence is one broad category within the law. Deterrence can be divided into two parts. The first part involves answering the question of what the law should be. This question, for the most part, is answered by the legislature. It is assumed that the laws and legislature are right in determining what the law should be. The second part of deterrence involves the actions used to deter people from doing things that go against the law. This is based on the idea that people choose whether to obey or violate the law after calculating the gains and consequences of their actions. There are two basic types of deterrence, general and specific. Specific deterrence is focused on preventing a specific offender from committing the same or similar crime in the future. General deterrence is used to prevent crime in the general population. General deterrence

is the ideology behind punishments such as the death penalty or corporal punishment, and it is also behind public punishment. With specific deterrence, some believe that with more harsh, severe punishments will work more effectively. With both instances, deterrence is the use of strategic moves, more specifically threats, to deter people or one person from doing something like breaking the law (DiIulio).

Deterrence theory of punishment is based on the ideas of several philosophers including Thomas Hobbes (1588 – 1678), Cesare Beccaria (1738 – 1794), and Jeremy Bentham (1748 – 1832). These classical philosophers created the foundation for modern deterrence theory in criminology. They theorized that effective deterrence relies on the severity, clarity, certainty, and celerity of the punishment. Punishments must be severe but not too severe. The target must believe that the punishment is certain. Punishments must also be carried out soon after the crime (DiIulio). Like game theory, these aspects of successful deterrence have the assumption that the players are rational.

Celerity is the swiftness of motion. Once the deterrence fails, the consequences must be carried out. It has been theorized that the punishment must be swift. When the punishment is carried out soon after the crime is committed, there is a larger effect. For example, consider a driver caught speeding. The police officer gives them a ticket ordering them to pay a certain fine. If the fine is not due for years, the punishment is not very effective. However, if the fine was a large amount and was due soon after the ticket was written, it is likely the driver will not be speeding again. The effectiveness of celerity is based on specific deterrence. When the punishment is carried out swiftly, the offender is less likely to continue committing that crime or other crimes (DiIulio).



The severity aspect of a punishment is connected to the level of aggressor motivation. The intentions behind the potential aggressor can determine whether deterrence will be successful or not before the crime is even committed. If there is little aggression or unwanted aggression, deterrence should be effective. However, when the aggressor is extremely motivated, deterrence becomes much harder to achieve. While some potential aggressors may act irrationally, others weigh the alternatives. If the potential aggressor thinks that aggression will give them the best outcome possible, deterrence will be difficult. Some philosophers have expanded on this arguing that the following through of deterrent threats must be contingent on the person's actions. If the threats become viewed as overall consistent hostility, the threats lose their capabilities (Mazarr).

For deterrence to be successful, the deterring state must be clear. The deterring state must make it known what it is trying to deter from and the consequences it will execute if the threat is ignored. The target must also understand the threat and consequences. This communication can be very tricky to maneuver. The deterring state must make their intentions clear, but they cannot make it seem too hostile. If the target interprets the threat as aggression, it may provoke them instead of deterring them. If the deterring state makes unqualified threats, situations can escalate and conflicts that could have been avoided are likely to arise. With all of this in mind, states attempt to balance a level of deterrence without provocation (Mazarr).

Like with strategic moves, possibly the most important aspect to successful deterrence is credibility. For deterrence to be successful, potential aggressors must believe that the deterring state can and will carry out its threats. If the potential aggressor does not believe the deterring state will follow through, deterrence is almost guaranteed to fail. This certainty has very little to do with the actual capabilities of the deterring state. Instead, certainty depends on the perception

of the target. Deterrence will ultimately fail if the target decides that the deterring state will not follow through with the consequences of the threat. This aspect of deterrence depends on capability and will. The capability includes the actual capability of the deterring state but more importantly, the target's perception of it. Will can be easily misinterpreted. Potential aggressors often believe that the deterring state does not have the will to follow through with their threats. For deterring states, will is often tied to national interests. If the deterring state has a vital interest at stake, potential aggressors tend to believe that they will follow through with their threats. Capability is often the ultimate determining factor of whether deterrence is successful (Mazarr).

#### *Deterrence Today.*

There are countless examples of deterrence in the world today. There are obvious examples of sentences and punishments for breaking the law, or a driver not speeding after they see a police officer sitting on the side of the road. However, on a larger scale there are acts of deterrence seen in the international world today. At the beginning of 2022, Russia invaded its neighboring country of Ukraine. For months, countries played a large-scale game with Russia; a game of chicken played between Russia and the rest of the world. Credibility and strategic moves could be clearly seen and analyzed during this crisis. Russian President Vladimir Putin's actions established credibility that he was irrational and would follow through with threats even if it resulted in a worse situation for his country. Meanwhile the United States and its allies failed to establish the same credibility. Putin's actions are an example of how behavior can help establish credibility.

Credibility can be the determining factor in whether a state can utilize deterrence successfully. If the target does not believe the deterring state will follow through with its threats or believes the threats are inconsequential, deterrence is bound to fail. If the deterring state does

not carry out actions that coincide with the threats, the target is inevitably going to doubt the threats. Behavior and actions of deterring states play a large role in establishing credibility. Russian President Putin's behavior has been establishing credibility for years. Sporadic, selfish, extreme behavior shows targets that threats will be followed through. Along with the behavior, actions such as invading Ukraine further establish credibility. Going as far as threatening nuclear force, fear of retaliation does not appear to be a large issue to Russia.

Unlike Russia, the United States and the west have failed to establish the same credibility. With threats of punishments to be executed after the invasion of Ukraine but no actions to attempt to stop Russia before invading, the threat did not seem credible. No sanctions were enacted to pressure Russia to stop the invasion before it began. When President Biden states that U.S. military force was not going to happen, this further diminished U.S. credibility. Even with the economic sanctions on Russia that are working, Russia is effectively instilling fear of nuclear war. In the game of successful deterrence, Russia is beating the west (Bolton).

With simple games there is a deterring state and a target state. However, in the real world, it is not always the case. Over the course of 2022, and even previous years, countries have been playing a mostly sequential game where there are multiple players using strategic moves like threats. With the Ukraine crisis, Russia and the West are both utilizing threats, although the threats are not all seen as equivalent.

With deterrence, there are different levels of severity, consequences, and crimes. Deterrence can be used within a household by parents utilizing threats of grounding their children. Deterrence can also be used with threats of jailtime. One of the most, if not the most, extreme uses of deterrence is the threat of nuclear warfare. This deterrent has not been used by the United States in 60 years. The last time the U.S. used nuclear deterrence was during the Cuban Missile

Crisis in 1962 by President John. F. Kennedy. When this dangerous deterrent was used, it was understood that the consequences would cause a war. Washington and Kennedy knew the use of nuclear weapons would almost guarantee retaliation that would grow into a war (Auslin).

Nuclear deterrence is one of, if not the most, dangerous, possibly catastrophic methods of deterrence. Nuclear weapons are inherently tied to war and destruction. Using them as a deterrent is extremely risky and costly to the deterring state. When one state uses them, retaliation is almost completely guaranteed. For the deterring state, nuclear deterrence can seem like a zero – sum game. There will be one loser and one winner. However, with the near guarantee of retaliation, with nuclear deterrence it can quickly become a negative – sum game. It is a lose – lose situation.

The factors that make up successful deterrence become that much more serious when nuclear weapons are involved. Determining whether the threat of nuclear weapons is credible can be the difference between war and negotiation. The severity aspect is clear. Nuclear weapons are one of the most severe threats possible. Most see nuclear warfare as a last attempt as a nation, if one is threatening nuclear warfare situations are dire. If a targeted state believes the threat is credible, then they must also believe that there will be celerity. With how catastrophic nuclear warfare can be, it must be believed that the threat will be carried out at any moment. Certainty is the biggest factor in this situation. Within deterrence, certainty can be the most difficult aspect to decide, but with nuclear deterrence it becomes that much more difficult. Would a state threaten something as catastrophic as nuclear warfare without backing it up? It is extremely risky to doubt the certainty of a threat of that level. If the target believes the threat, they must also decide whether they are willing to do what the deterring state wants. If they are not, then the response

can quickly turn into war. Certainty depends on perception, but with something possibly catastrophic many will decide to believe and be prepared as opposed to calling a bluff.

For an entire generation, the Ukraine crisis is the first-time nuclear deterrence is seen and utilized by states. The U.S. government and the state of New York released public service announcements and guidance on what to do if there was a nuclear attack on the United States. With updated additions of social distancing and masks, this was the first time such an announcement was released in sixty years. While many would believe that Putin's threats are not credible, his actions help establish some credibility. It would be extremely costly for Russia to follow through with such a threat. With how catastrophic nuclear deterrence can be and the credibility Putin has established with his behavior, U.S. officials are taking the threat seriously (Auslin).

With something like the threat of nuclear weapons, some response must be made. The U.S. used open-ended, ambiguous approach to deterrence to instill fear, "catastrophic consequences." The unknown is intended to make it harder for targets to calculate their risks. However, the U.S. has a long-standing aversion to nuclear weapons. If Putin knows that a nuclear response is not likely, the U.S. is automatically at a disadvantage (Auslin). The benefit of using nuclear weapons would be greater than the risk of a response not as catastrophic. With this, U.S. credibility begins to play a large role. It turns into a large sequential game. Suppose Russia does use nuclear weapons or something similar. The U.S. would have to respond somehow. If the U.S. responded with a conventional attack to avoid using nuclear weapons, the game would continue. Putin would respond to any attack from the U.S., nuclear or conventional, to maintain his credibility. If Russia responded with a second nuclear attack, the U.S. would be pressured to respond with something equivalent. If the U.S. did not respond with something seen as an

equivalent, Russia would no longer see any U.S. deterrence as credible. Credibility, especially the credibility of superpower countries, could result in a nuclear war across the world depending on whether countries have it or lose it.

**Conclusion.**

With game theory, one can analyze the actions in any interactive situation. Many people do not know what game theory is but use the ideas of game theory throughout their entire lives. The actions of criminals and countries can be analyzed with game theory. When looking at the law, game theory can be seen with countless applications. Deterrence is a large perspective of the law built on game theory. With game theory and deterrence, situations like the invasion of Ukraine and Russian President Putin's actions can be analyzed. The response of the U.S. and its allies can be analyzed alongside it. With game theory, what can happen with these large-scale situations can be predicted. Game theory and deterrence within the law can analyze, predict, and overall understand what happens within the world today.

## References

- Auslin, M. (2022, October 21). *The dangers of 'catastrophic consequences'*. Foreign Policy. Retrieved December 6, 2022, from <https://foreignpolicy.com/2022/10/21/nuclear-war-putin-biden-russia-ukraine-weapons-atomic-bomb-doctrine-deterrence-cuban-missile-crisis/>
- Bolton, J. (2022, March 9). *How Russia is beating the west at Deterrence*. Time. Retrieved December 6, 2022, from <https://time.com/6155990/russia-ukraine-invasion-deterrence/>
- DiIulio, J. J. (2019, November 11). *Deterrence Theory*. Law Times Journal. Retrieved December 6, 2022, from <https://lawtimesjournal.in/deterrence-theory-as-a-theory-of-punishment/>
- Dixit, Avinash K., et al. "How to Think about Strategic Games: Some Terminology and Background Assumptions." *Games of Strategy*. W.W. Norton & Company, 2021.
- Dixit, Avinash K., et al. "Strategic Moves." *Games of Strategy*. W.W. Norton & Company, 2021.
- Mazarr, M. J. (n.d.). *Understanding Deterrence*. Rand Corporation. Retrieved December 6, 2022, from [https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE295/RAND\\_PE295.pdf](https://www.rand.org/content/dam/rand/pubs/perspectives/PE200/PE295/RAND_PE295.pdf)