

**A Beautiful Mind, NYPD Blue, and Airline Fare Wars:
Game Theory, Oligopoly, and Sellers' Cartels**

When Russell Crowe won the Academy Award for his portrayal of John Nash in the movie "A Beautiful Mind," normal people thought it was for his ability to capture convincingly the behavior of a paranoid schizophrenic, or being able to say anything without stuttering in the presence of the beautiful Jennifer Connelly. Economists knew it was for his mastery of game theory.

With game theory economists attempt to explain all kinds of interdependent behavior. Often, rivals in a "game" engage in self-interested maximizing behavior that will not lead to a maximum of collective or joint well-being. In a scene early in the film, Nash and his graduate school colleagues are in a local bar near Princeton. Soon a group of beautiful coeds enters the bar. In the estimation of Nash and his colleagues, a blonde woman in the group is exceptionally beautiful. All but Nash are thinking about how to compete with the other guys to win this beauty. One of Nash's colleagues even refers to Adam Smith, the founder of modern economics, whose famous invisible hand principle says that individual competition leads to the common good. John Nash disagrees. He notes that if they all compete for the blonde they will block each other and no one will get her. And in the process of competing for the blonde they will lose the other girls as well, because no one wants to be second choice. Nash suggests that if no one goes for the blonde, they won't get in each other's way and will not insult the other girls. "It's the only way we win," he says. "It's the only way we get laid."

Of course, like any good genius, Nash is more enamoured with the abstract idea of a strategy to pursue the girls than in implementation of his plan. That can be left to mere mortals. The theory itself is more beautiful than any of the girls, even the blonde one. Nash gathers his papers and rushes back to the dorm to work on formalizing his breakthrough, his singularly new and creative idea.

Nash's (Crowe's) example in the bar is an illustration of one of the most common principles in game theory, the prisoners' dilemma, the idea that cooperation will lead to a better collective outcome than rivalry among participants in the game. For another example, this one even involving prisoners, or at least suspects, we need to turn to another popular medium, the television cop show.

I confess. I like cop shows, like Hill Street Blues and NYPD Blue. When Andy Sipowicz brings in a couple of perps, he shows an understanding of game theory, or at least he acts as if he understands it. With two perps, the idea is to get one to rat out the other in exchange for a lighter sentence. If both think this way, both rat and both are convicted. Often, the case is pretty weak. Andy needs a confession.

Even though in his heart of hearts he'd prefer to beat a confession out of one of the scumbags, he knows internal affairs would be on him if he does. Instead, Andy and his partner separate the perps and work on each independently. They tell each that if the other guy confesses first, he'll get the maximum sentence, but if he rats first, his sentence will be lower. Andy doesn't tell the perps that the best strategy for the two of them is to stonewall. Don't admit to anything. No confession, no case, go free. But if each perp distrusts the other, a distrust fostered by the separation and the ability to collude face-to-face, the incentives to rat look pretty good. If no honor exists among thieves, and they

don't "lawyer up," Andy's approach will work every time. It's a prisoners' dilemma, this time even with actual prisoners. Individual independent self-interested action leads to ruin for the group.

Sellers in markets are often like college boys in a bar and criminal suspects facing interrogation. Consider the airline industry, an oligopoly, a market with just a few sellers. A fare reduction by one airline company will have one effect if other airlines also reduce their fares and another effect if they don't. According to game theory, when deciding whether to lower fares, an oligopolist considers the actions of its rivals. But what will the rival do? It's unclear. If each thinks the other will not match a fare reduction, we get a fare war. If they think a reduction will be matched, no fare war ensues.

Game theory also suggests that a joint solution will be the best for the participants in the game, in this case a pricing game. To maximize their joint well-being, the former rivals should form a cartel and make joint decisions. The CEO of one airline company should call the others and say, "I won't lower prices if you don't," and "What would be the best price for all of us to charge?" Unfortunately for the airlines, this is illegal behavior in the U.S. You can go to jail for that. But the idea remains. Cartels emerge when oligopolists recognize the benefits of collusion and joint decision making.