Problem Set 1: Static Game Theory

December 19, 1996 © David K. Levine

1. Chicken

Stephen J. Seagull and Clod VandeCamp meet in a bar. Each must choose between fighting the other, or losing face. If both lose face, both get a utility of 6. If both fight, both get a utility of 0. However, if one fights and the other loses face, the fighter gets 7, and the one who loses face only 2. Write out the payoff matrix for this game. What strategies are weakly or strongly dominated in this game? Apply the theory of Nash equilibrium to predict what will happen.

2. First Price Auction

Stephen J. Seagull and Clod VandeCamp are the only bidders in an auction on a chinese jacket. The seller does not value the item, but Seagull would pay up to $20,000 for it, while VandeCamp will pay no more than $1,000. Both submit sealed bids, which can be for any of the following amounts: $0.00, $500, $1,000, $10,000, $20,000 or $25,000. In case of a tie, a coin is flipped to see who will get the jacket. Write payoff matrix for this game. What strategies are weakly or strongly dominated? Eliminate weakly dominated strategies, then apply iterated strong dominance. Apply iterated weak dominance. Apply the theory of Nash equilibrium.

3. Duopoly

Stephen J. Seagull and Clod VandeCamp are making movies. The amount that movie-goers are willing to pay to attend depends on the amount of violence in the two movies: $p_i = a + bx_i - e(x_i)^2 - fx_i x_{-i}$. (There is a fixed number of movie-goers who will attend both films.) Violence is produced at constant marginal cost c. Both stars simultaneously determine how much violence to produce. Determine the symmetric Nash equilibrium levels of violence and prices. Here f is a measure of how violence much more violence in one film lowers the demand for the other film. What happens to the equilibrium level of violence as f increases?