

Game Theory



Game Theory

- Developed along with expected utility model
- Applicable to many duopoly situations

The Basic Idea

- Consider a simple game “odds or evens”

The Basic Idea

- Consider a simple game “odds or evens”
- Has the two key elements:
 - Strategies
 - Payoff Matrix

Odds or Evens

		Player B	
		One Finger	Two Fingers
Player A	One Finger		
	Two Fingers		

Odds or Evens

		Player B	
		One Finger	Two Fingers
Player A	One Finger	A Wins	B Wins
	Two Fingers	B Wins	A Wins

Odds or Evens

		Player B	
		One Finger	Two Fingers
Player A	One Finger	$W_B = -1$ $W_B = 1$	$W_A = 1$ $W_A = -1$
	Two Fingers	$W_B = 1$ $W_B = -1$	$W_A = -1$ $W_A = 1$

The Prisoner's Dilemma

		Prisoner B	
		Confess	Don't Confess
Prisoner A	Confess		
	Don't Confess		

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Prisoner A	Confess	$s_B = 3$ $s_B = 5$	$s_A = 3$ $s_A = \frac{1}{2}$
	Don't Confess	$s_B = \frac{1}{2}$ $s_B = 1$	$s_A = 5$ $s_A = 1$

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How much to Produce

Total Production	Revenue
0	0
1	20
2	36
3	30
4	22

How much to Produce

		Firm B	
		1	2
Firm A	1	$\pi_B = 18$ $\pi_A = 18$	$\pi_B = 20$ $\pi_A = 10$
	2	$\pi_B = 10$ $\pi_A = 20$	$\pi_B = 11$ $\pi_A = 11$

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How much to Produce

Cooperative Strategy

		Firm B	
		1	2
Firm A	1	$\pi_B = 18$ $\pi_A = 18$	$\pi_B = 20$ $\pi_A = 10$
	2	$\pi_B = 10$ $\pi_A = 20$	$\pi_B = 11$ $\pi_A = 11$

How much to Produce

Dominant Strategy
Nash Equilibrium

		Firm B	
		1	2
Firm A	1	$\pi_B = 18$ $\pi_A = 16$	$\pi_B = 20$ $\pi_A = 10$
	2	$\pi_B = 10$ $\pi_A = 20$	$\pi_B = 11$ $\pi_A = 11$

End

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