GEQ1000

Economics

(Social Science)

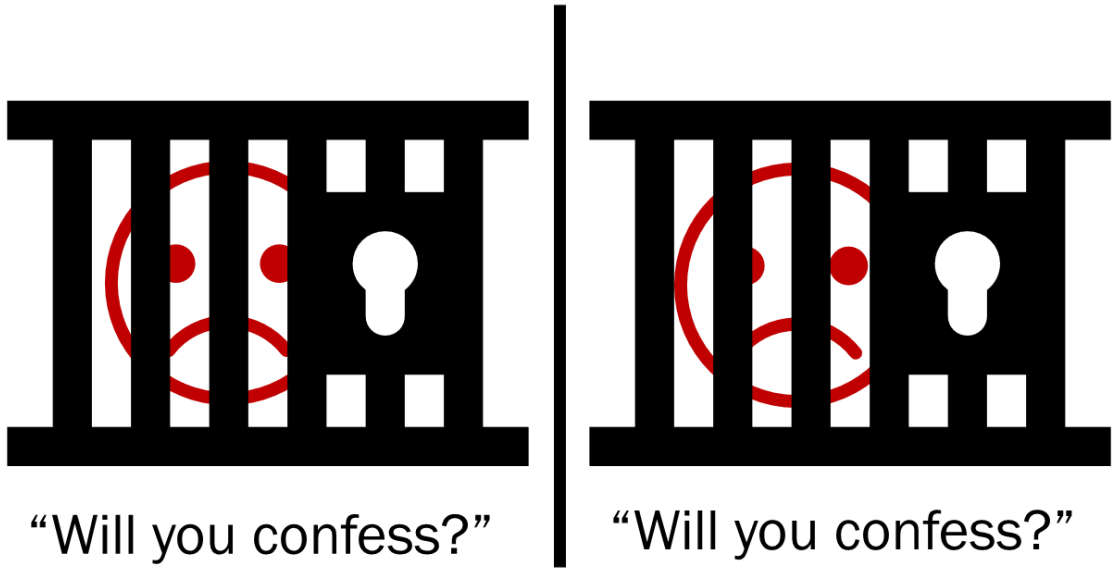
2.2
A Famous Model

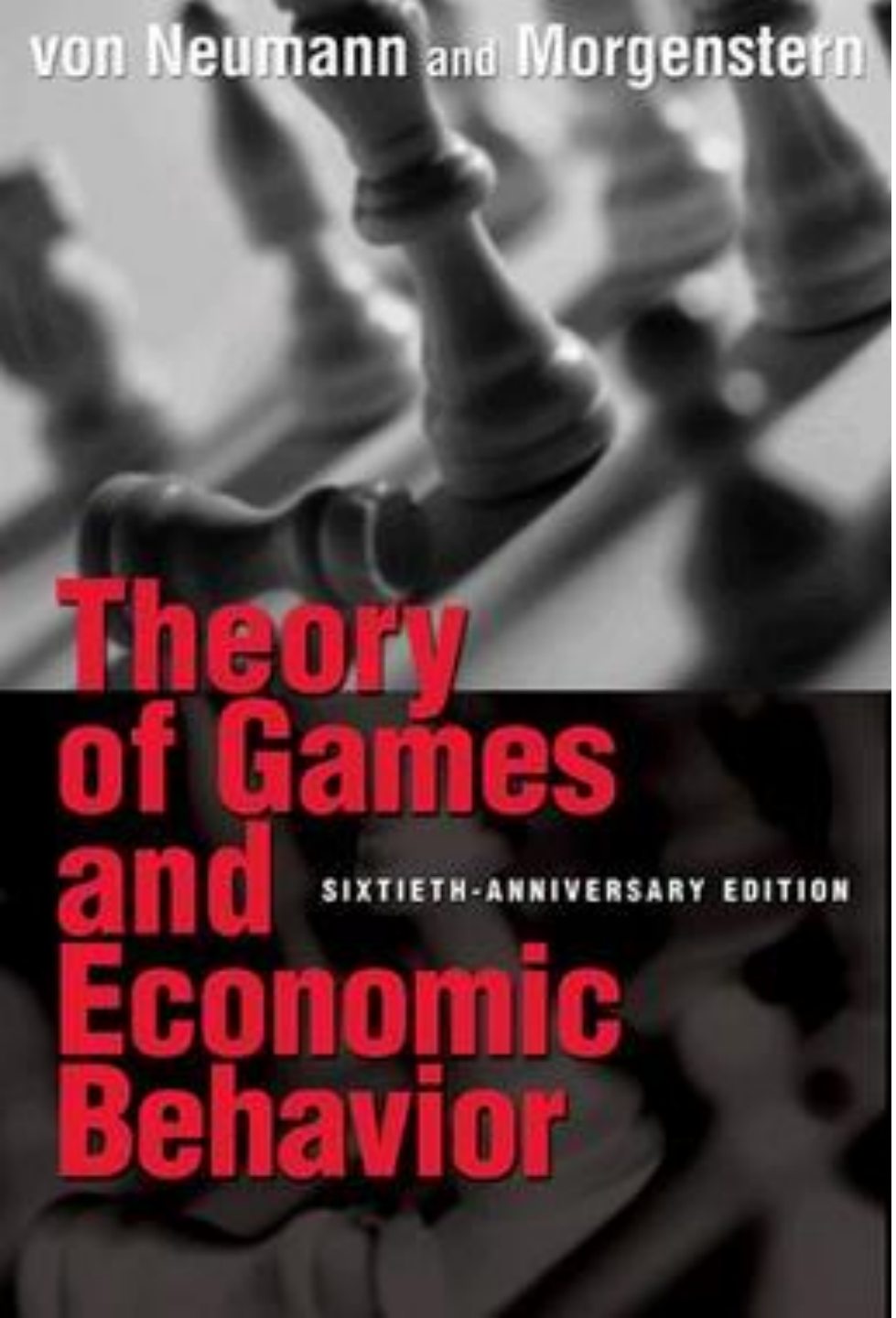
A Famous Model

Karolina Kurkova

A Famous Model

Prisoner's Dilemma





Game Theory

Not a grand explanation as "Theory" in Science

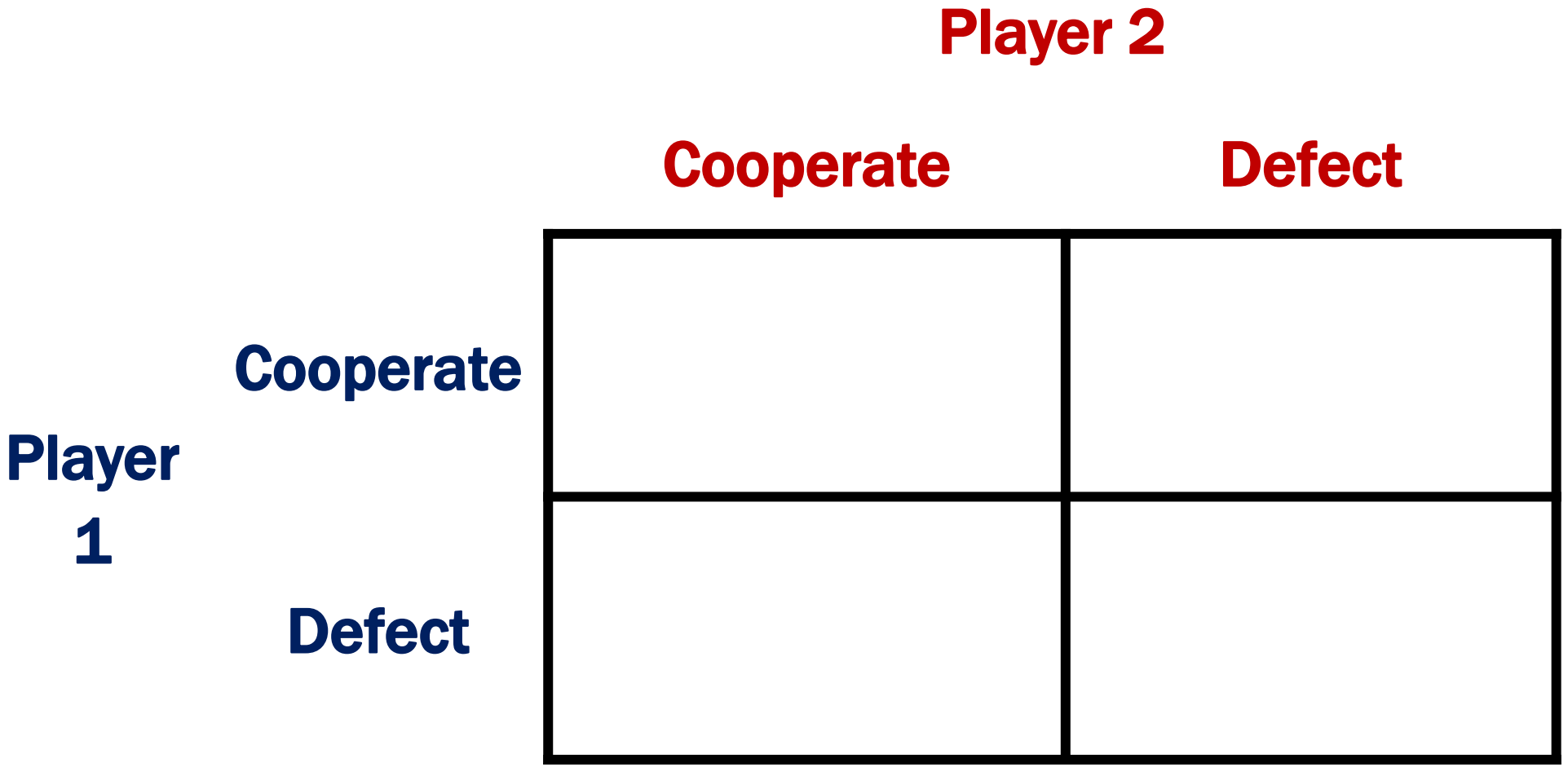
A toolkit for building models

The game

Player 2

Player 1

The game



The game

		Player 2: Cooperate	Player 2: Defect
Player 1	Cooperate	4 , 4	
	Defect		

The game

		Player 2	
		Cooperate	Defect
Player 1	Cooperate	4 , 4	
	Defect		2 , 2

The game

		Player 2: Cooperate	Player 2: Defect
Player 1	Cooperate	4 , 4	0 , 6
	Defect		2 , 2

The game

		Player 2: Cooperate	Player 2: Defect
Player 1	Cooperate	4 , 4	0 , 6
	Defect	6 , 0	2 , 2

Strategic Interaction

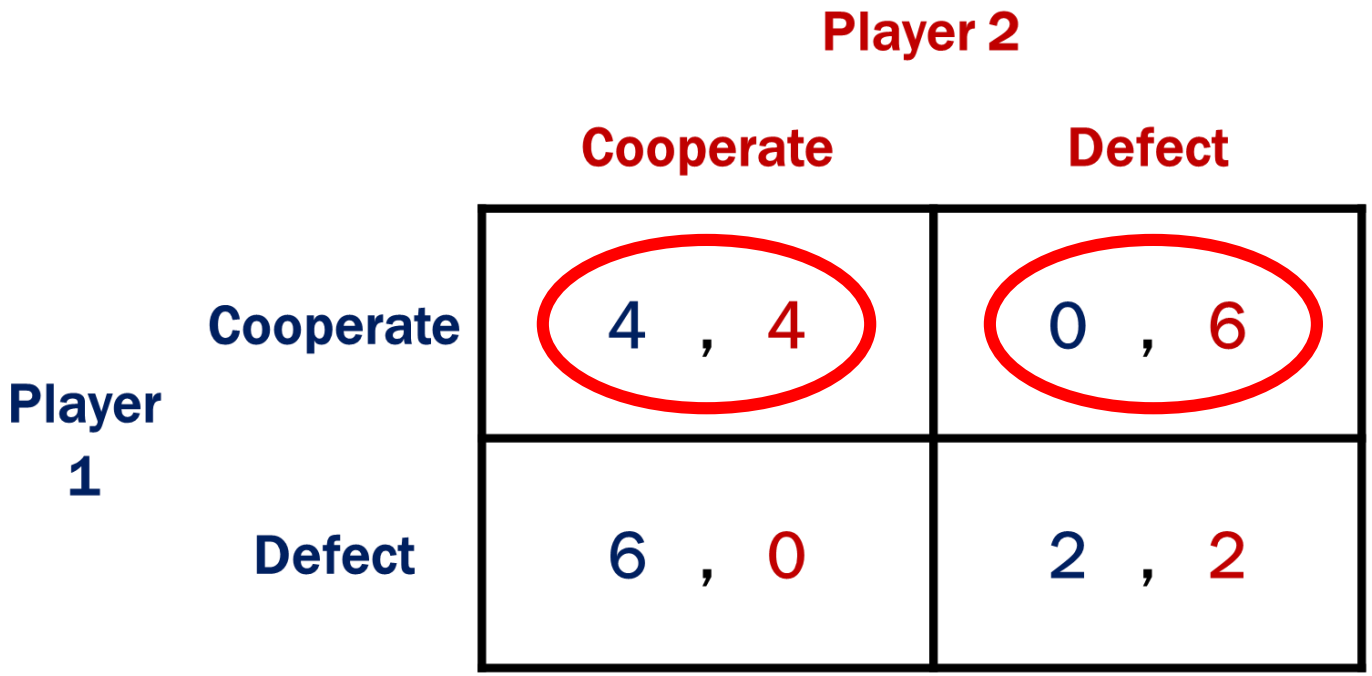
		Player 2: Cooperate	Player 2: Defect
Player 1	Cooperate	4 , 4	0 , 6
Player 1	Defect	6 , 0	2 , 2

Each player's pay-off depends on what he chooses, but also what the other player chooses

Comparing Outcomes

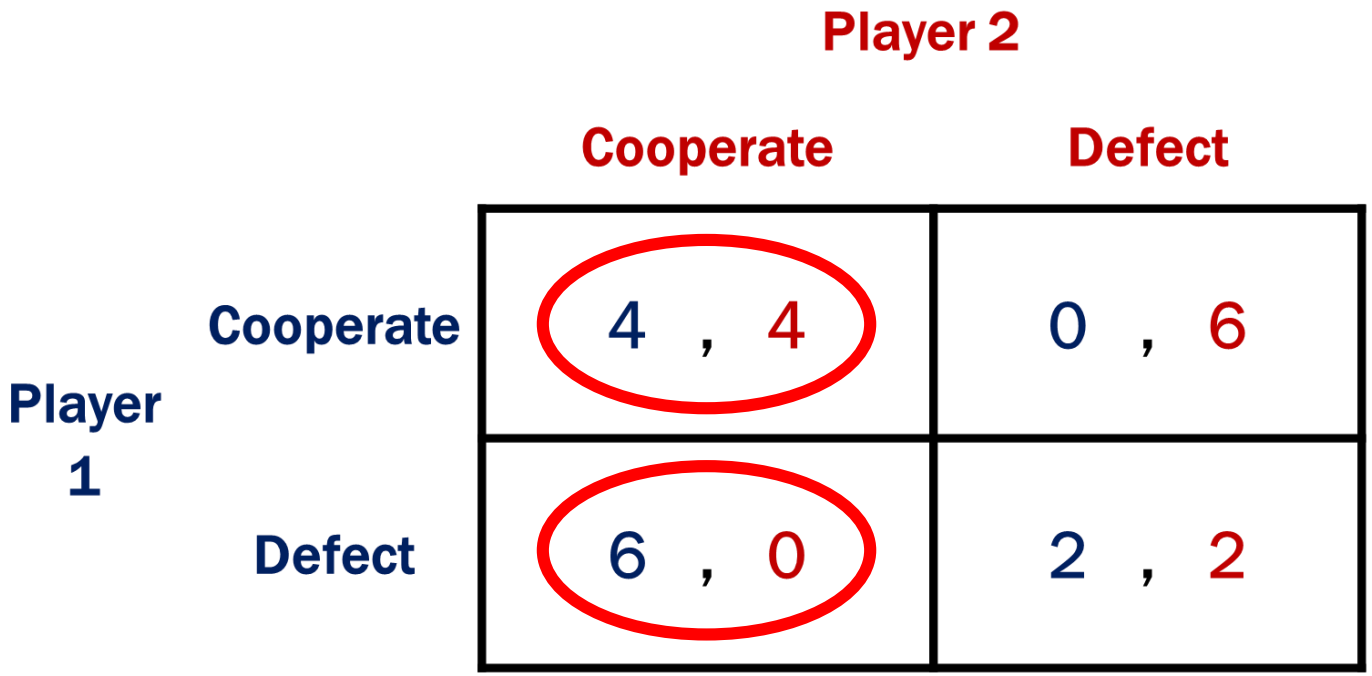
Player 1 \ Player 2	Cooperate	Defect
Cooperate	4 , 4	0 , 6
Defect	6 , 0	2 , 2

Comparing Outcomes



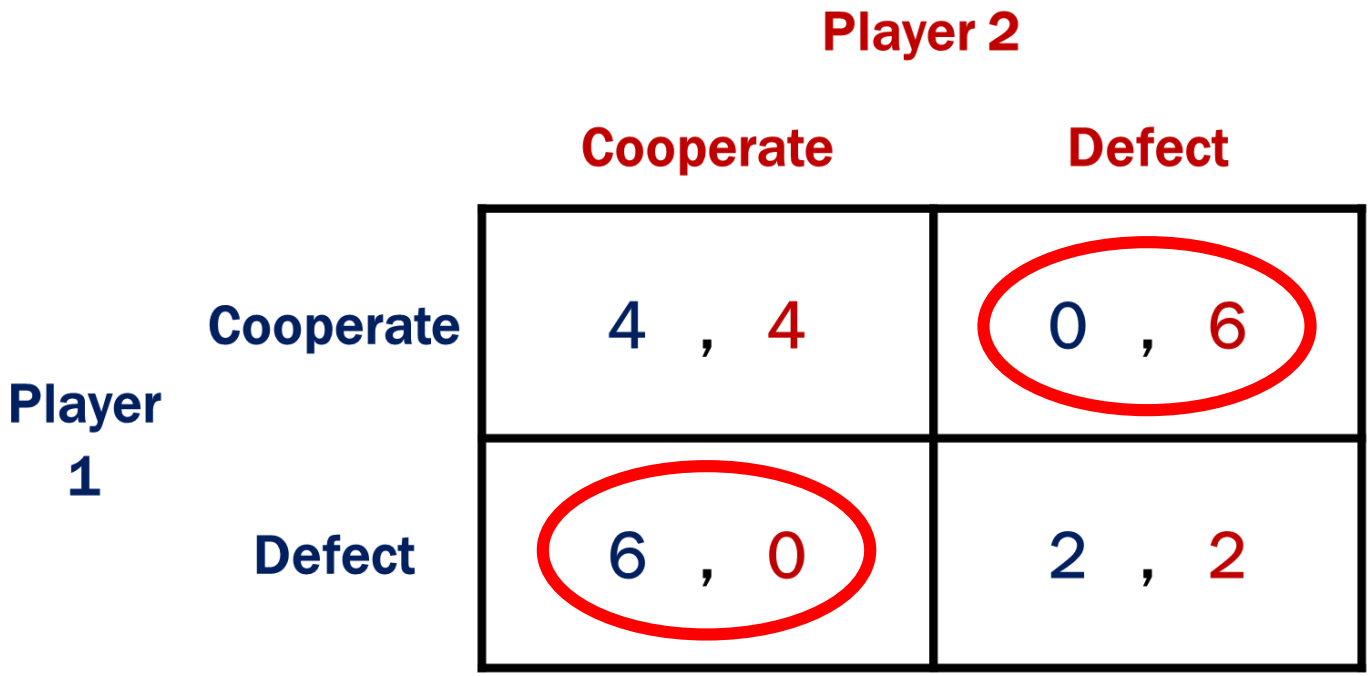
(4, 4) is not obviously better than (0, 6)

Comparing Outcomes



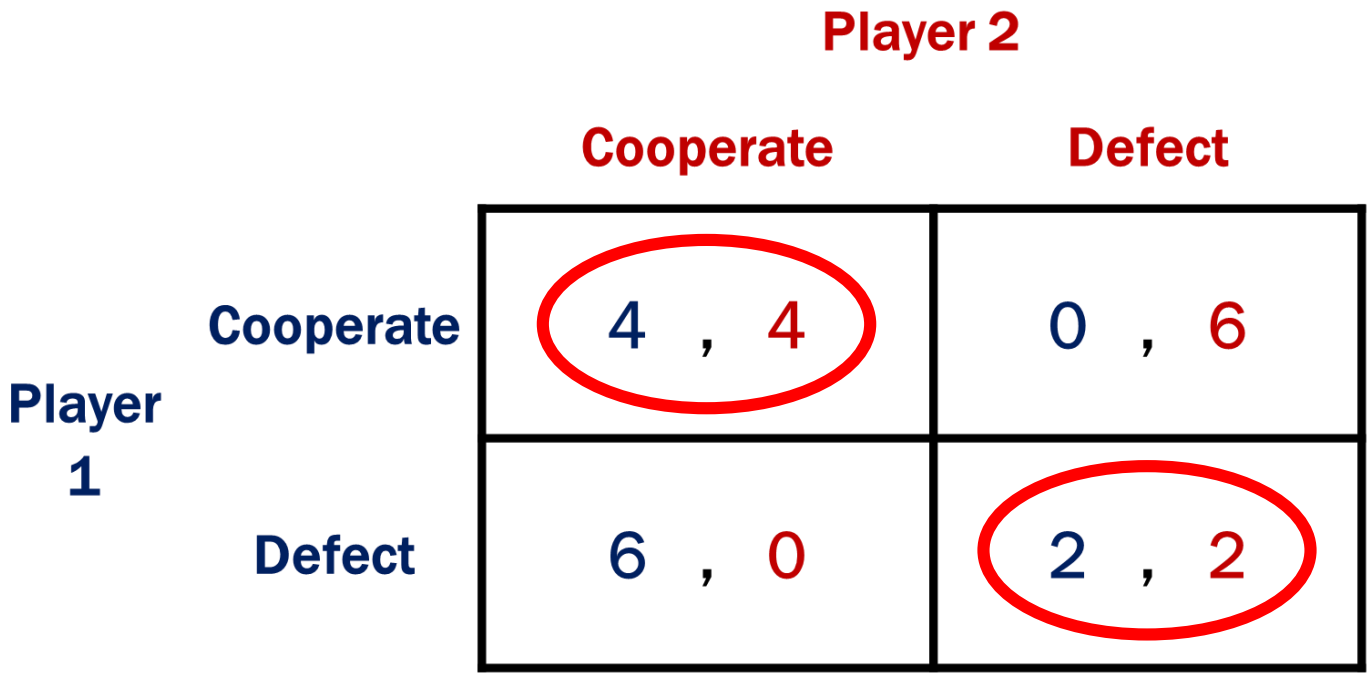
(4, 4) is not obviously better than (6, 0)

Comparing Outcomes



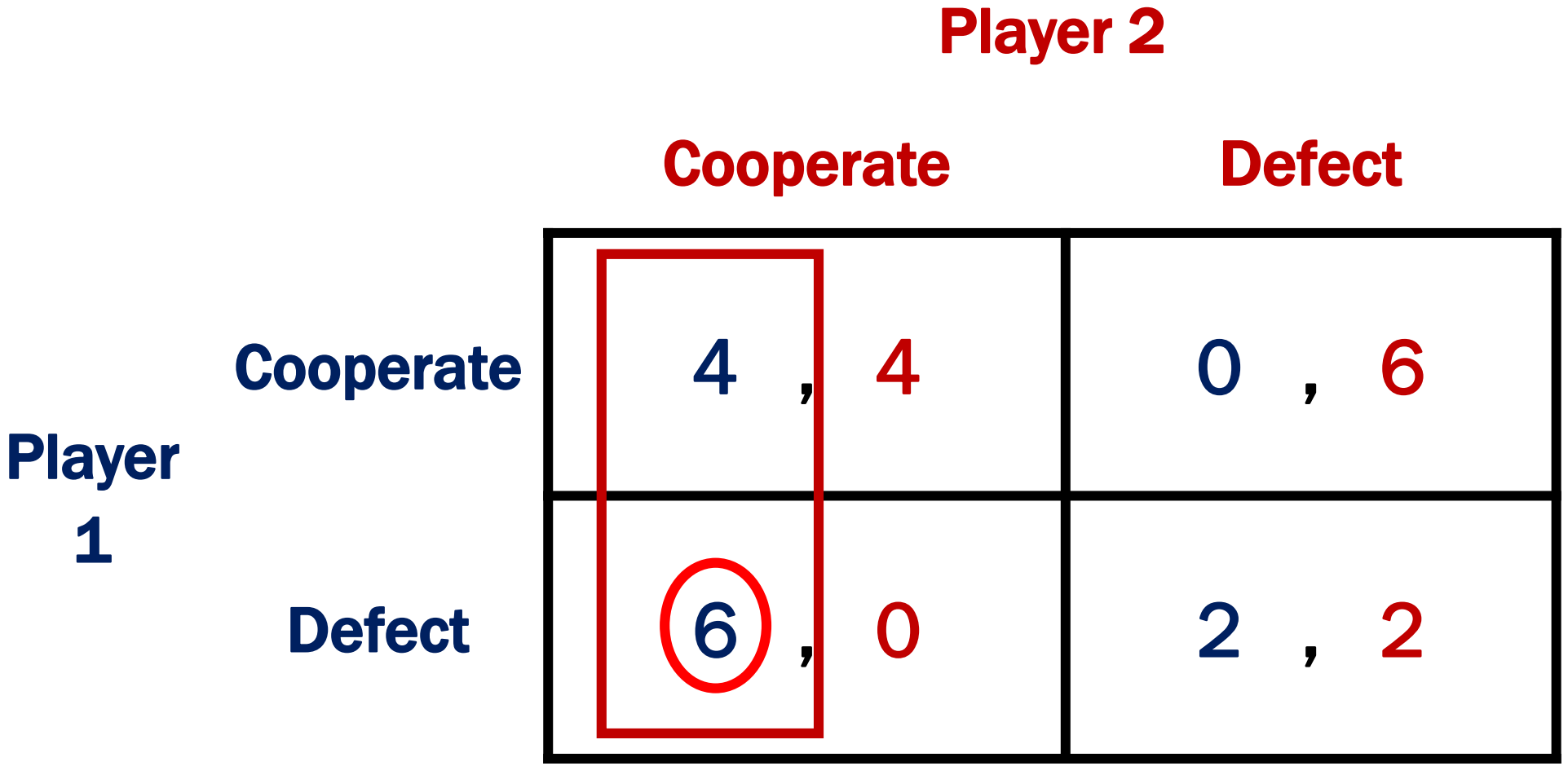
(0, 6) is not obviously better than, or worse than (6, 0)

Comparing Outcomes

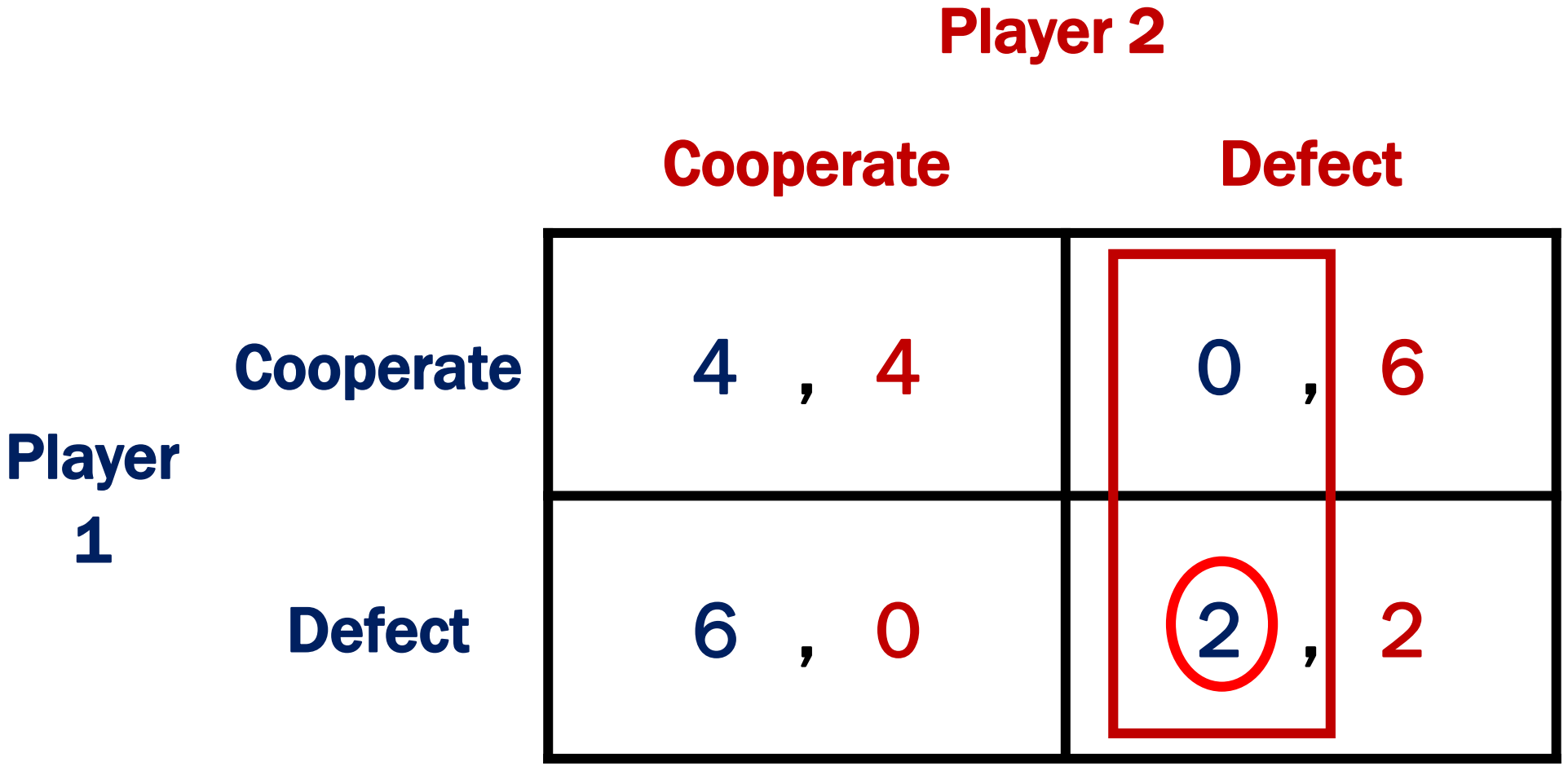


But (4, 4) is clearly better than (2, 2) for everyone!

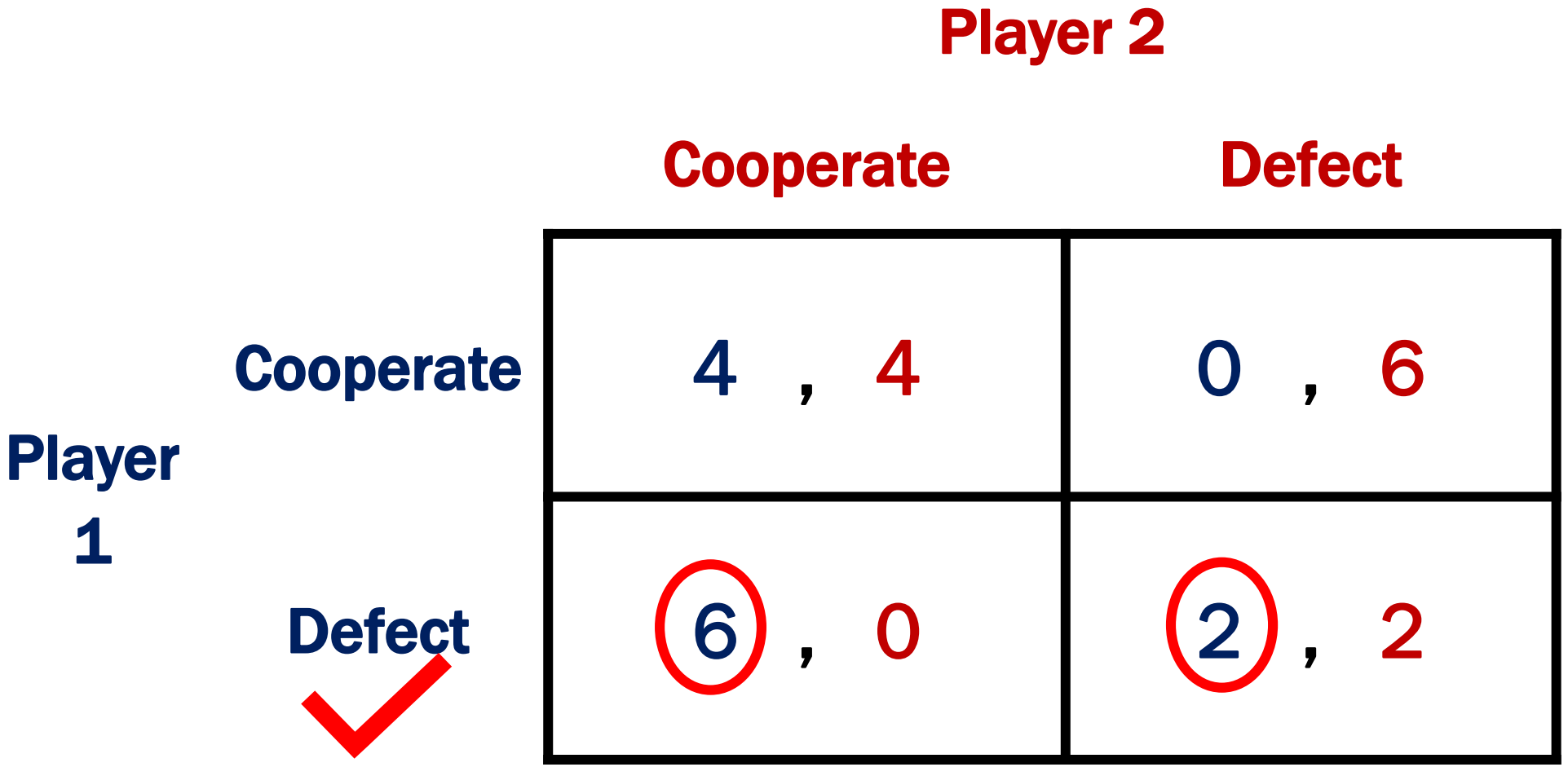
Suppose Player 2 Cooperates, Then Player 1 ...



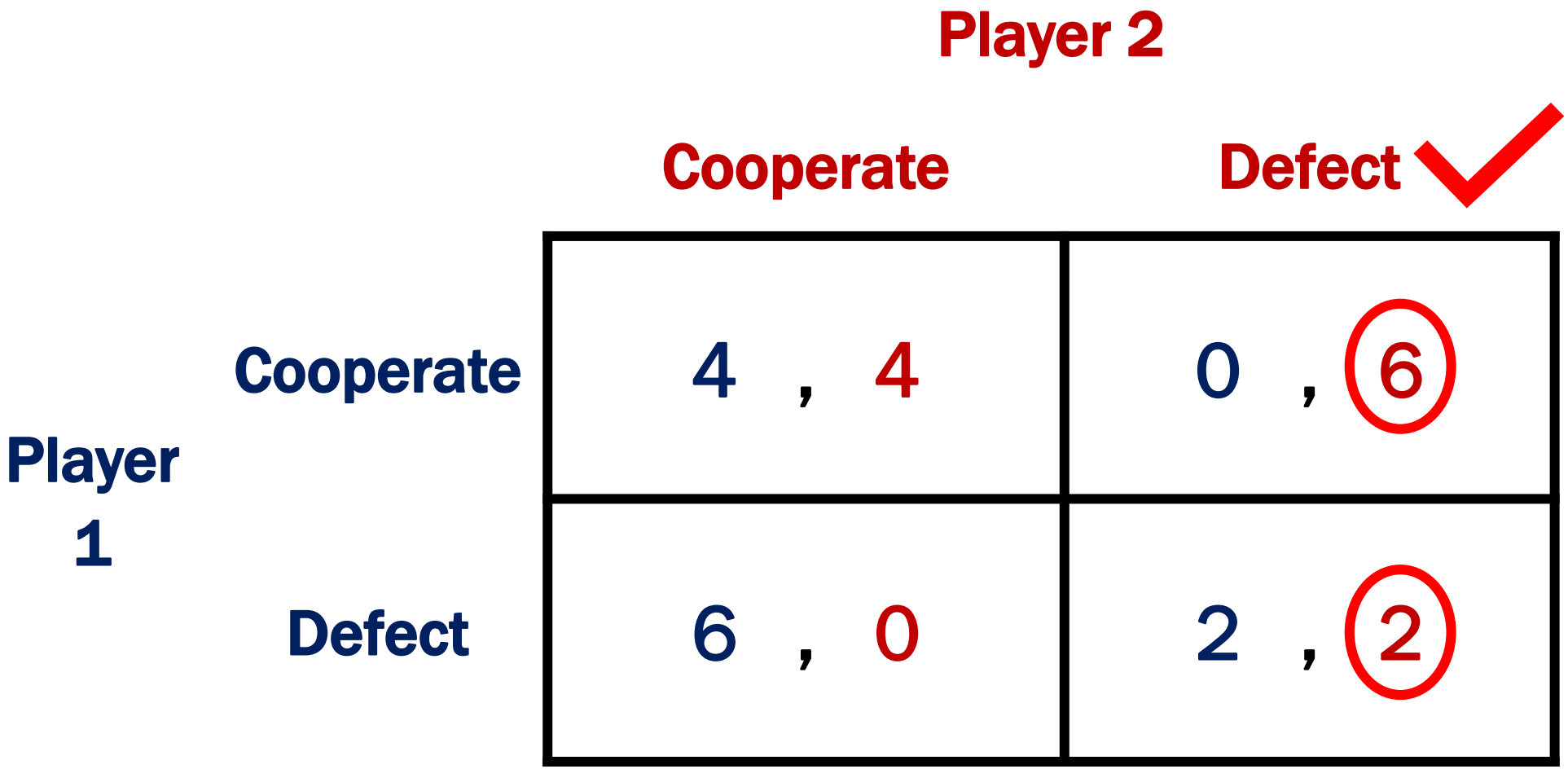
Suppose Player 2 Defects, Then Player 1 ...



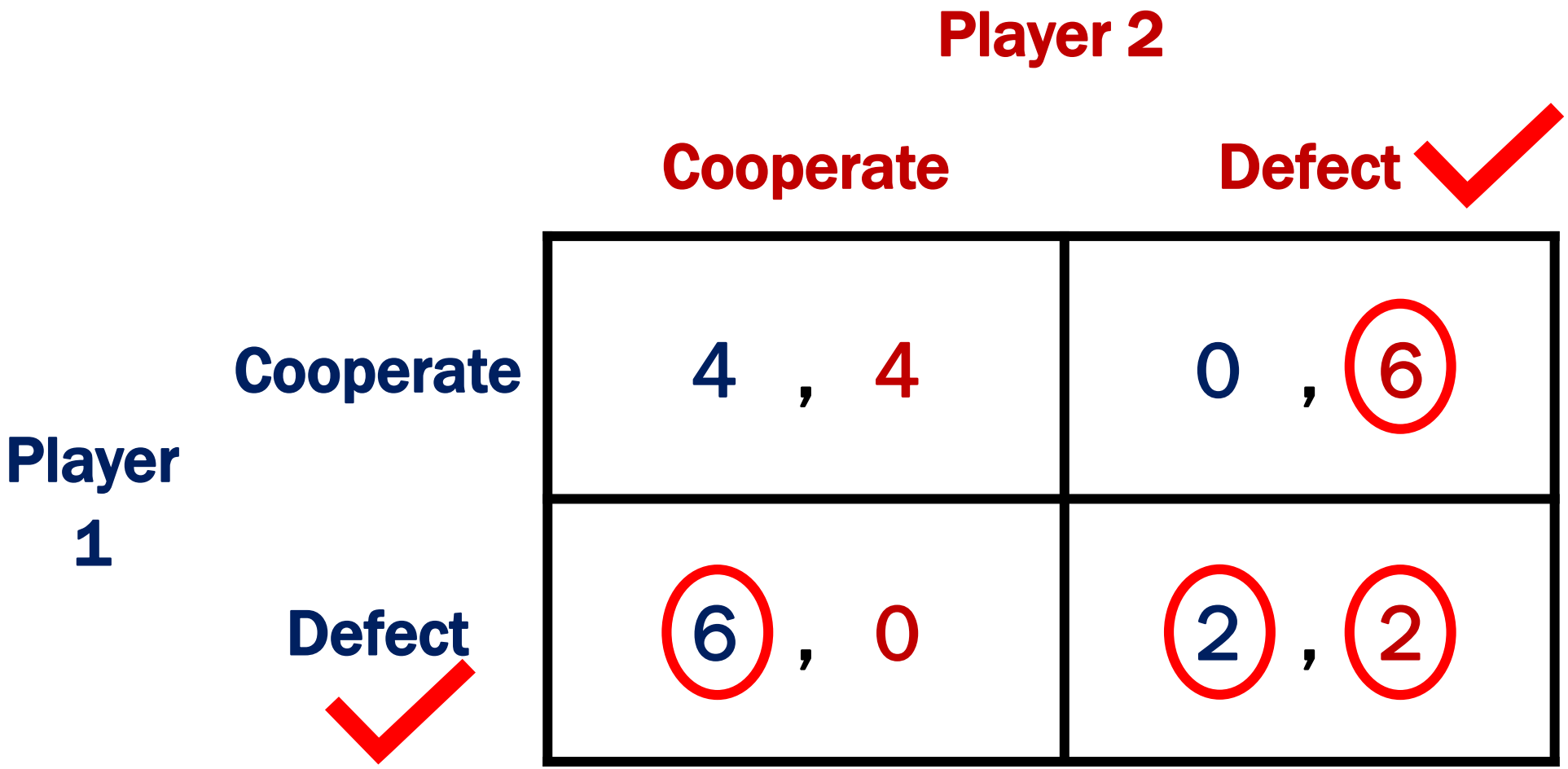
Player 1's best strategy



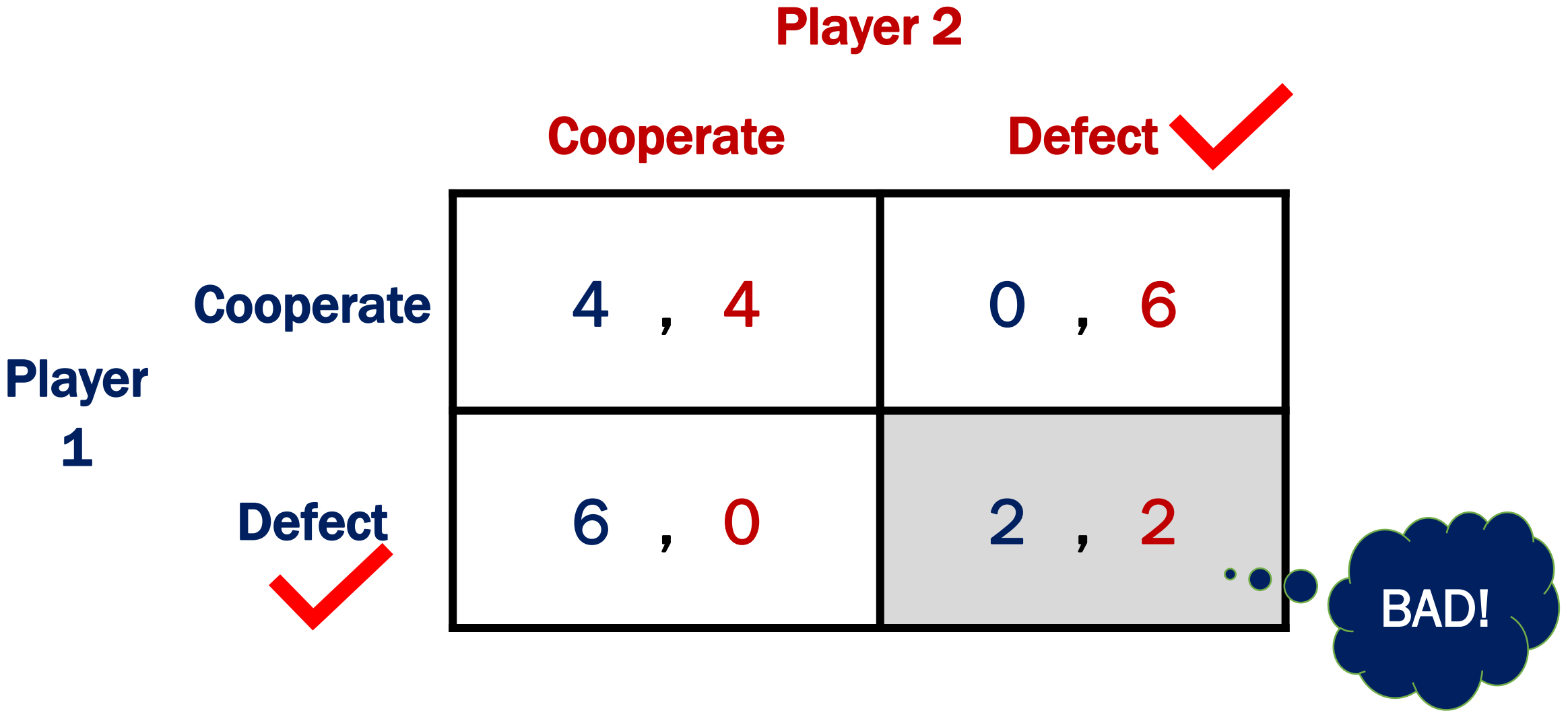
Player 2's best strategy



Both play their best strategies



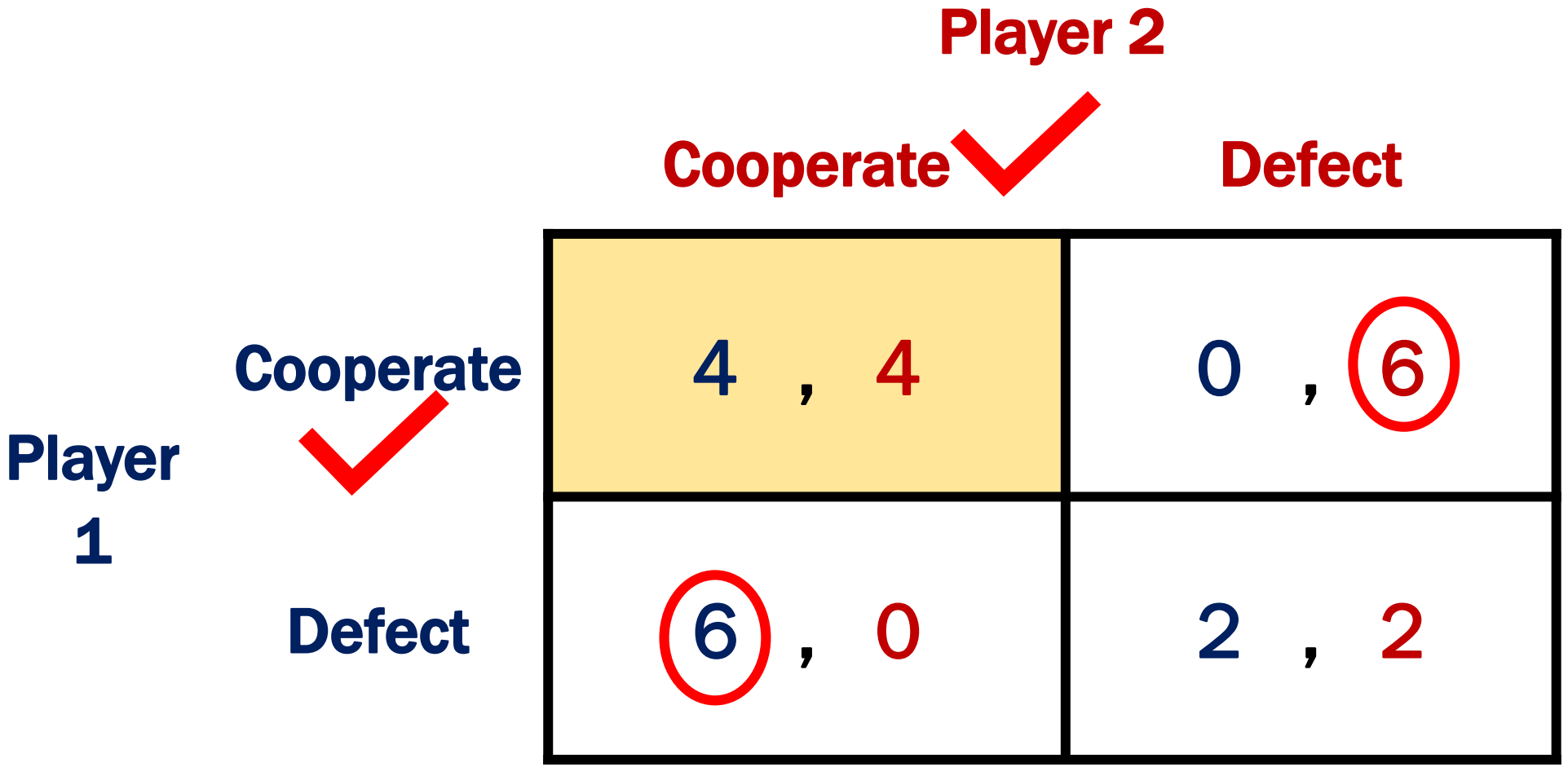
Both play their best strategies



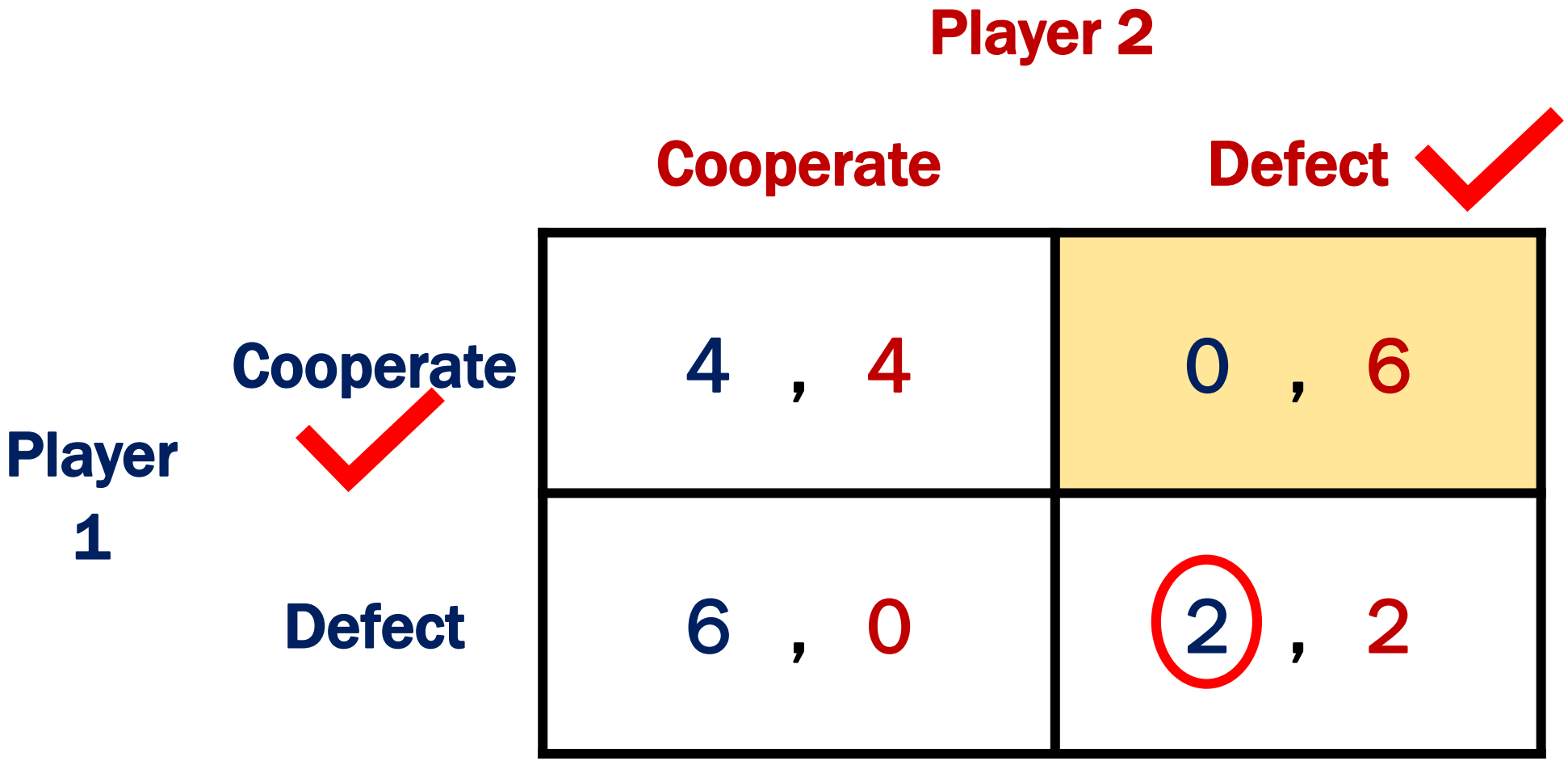
Nash Equilibrium

A situation where no player wants to change his strategy, given the other players' strategies

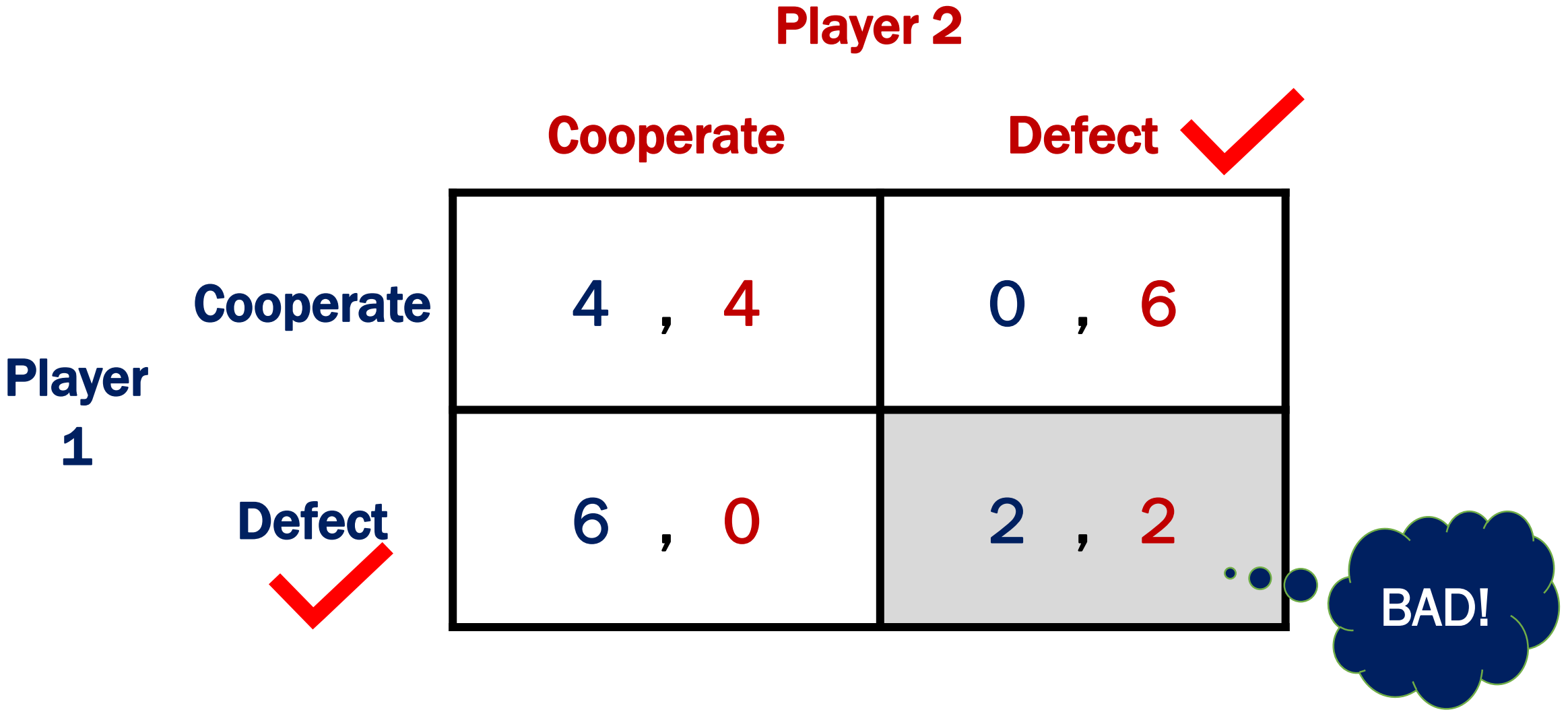
At (Cooperate, Cooperate) both players will change strategy

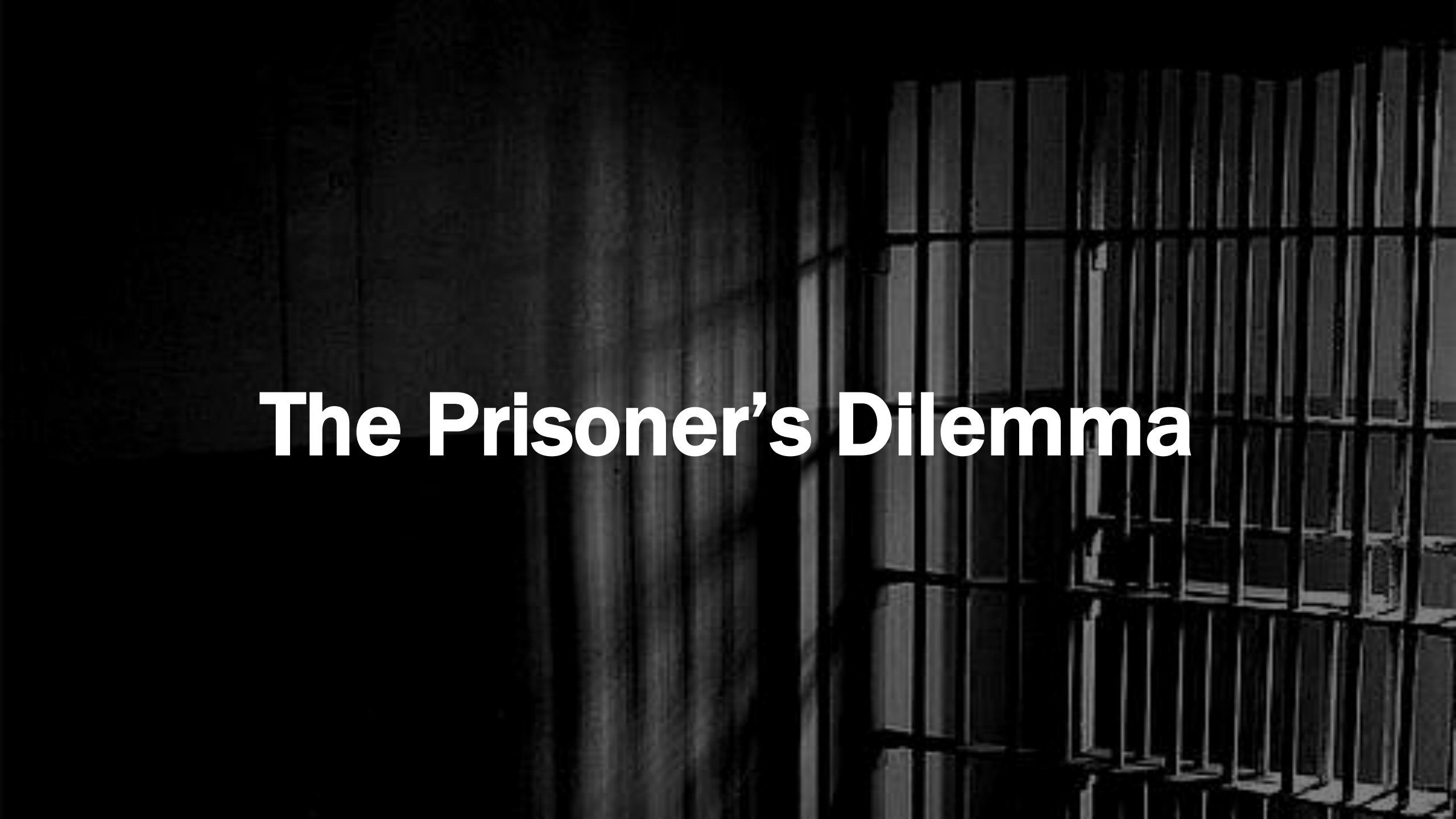


At (Cooperate, Defect) Player 1 will change strategy



(Defect, Defect) is a Nash Equilibrium

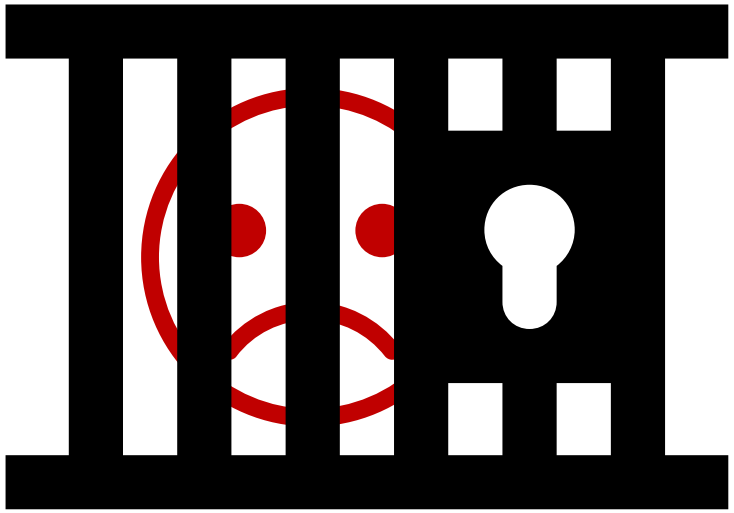




The Prisoner's Dilemma

The Prisoner's Dilemma

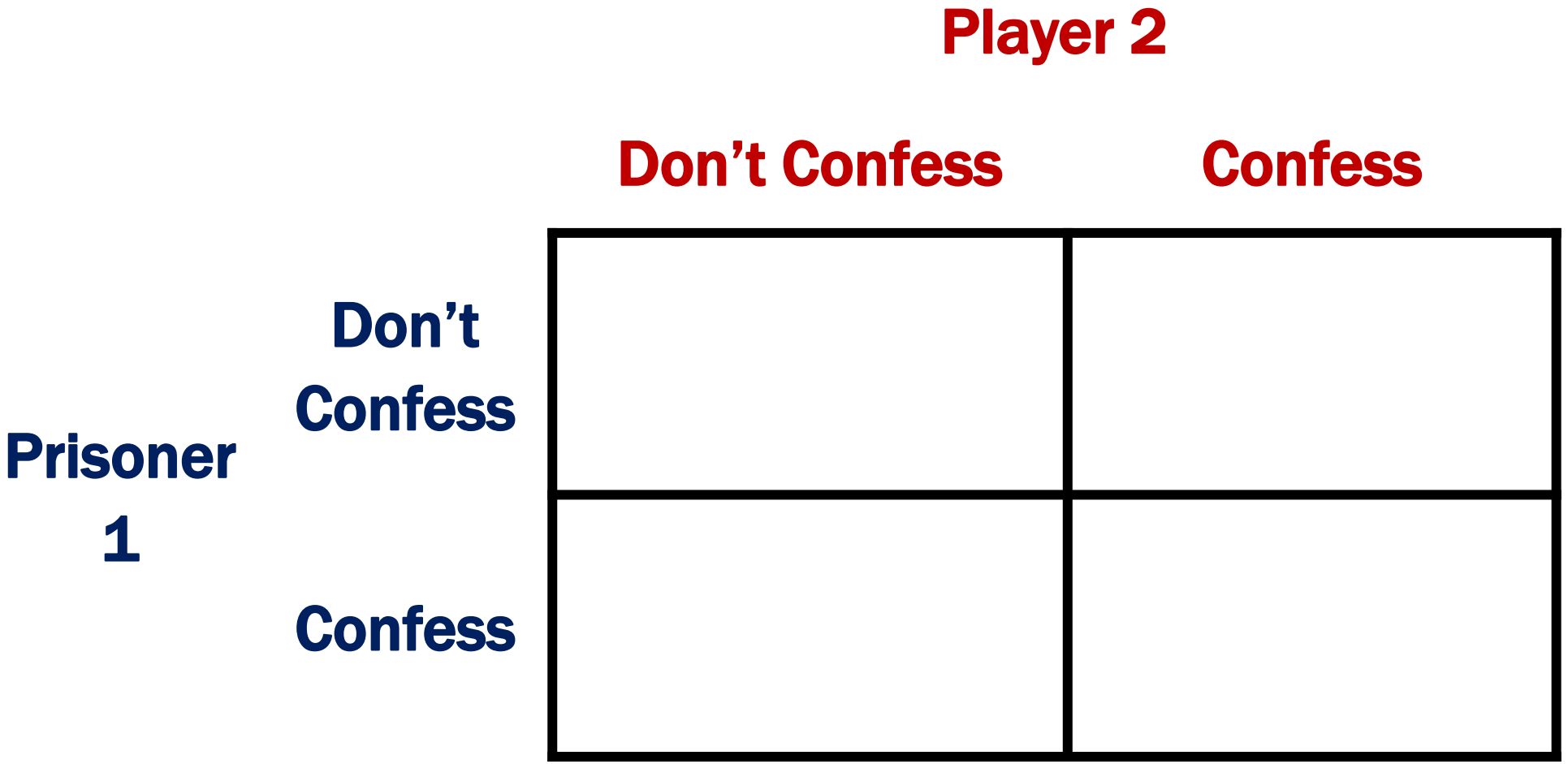
The Prisoner's Dilemma



"Will you confess?"

"Will you confess?"

Prisoner's Dilemma



Prisoner's Dilemma

		Player 2	
		Don't Confess	Confess
Prisoner 1	Don't Confess	-6 , -6	
	Confess		

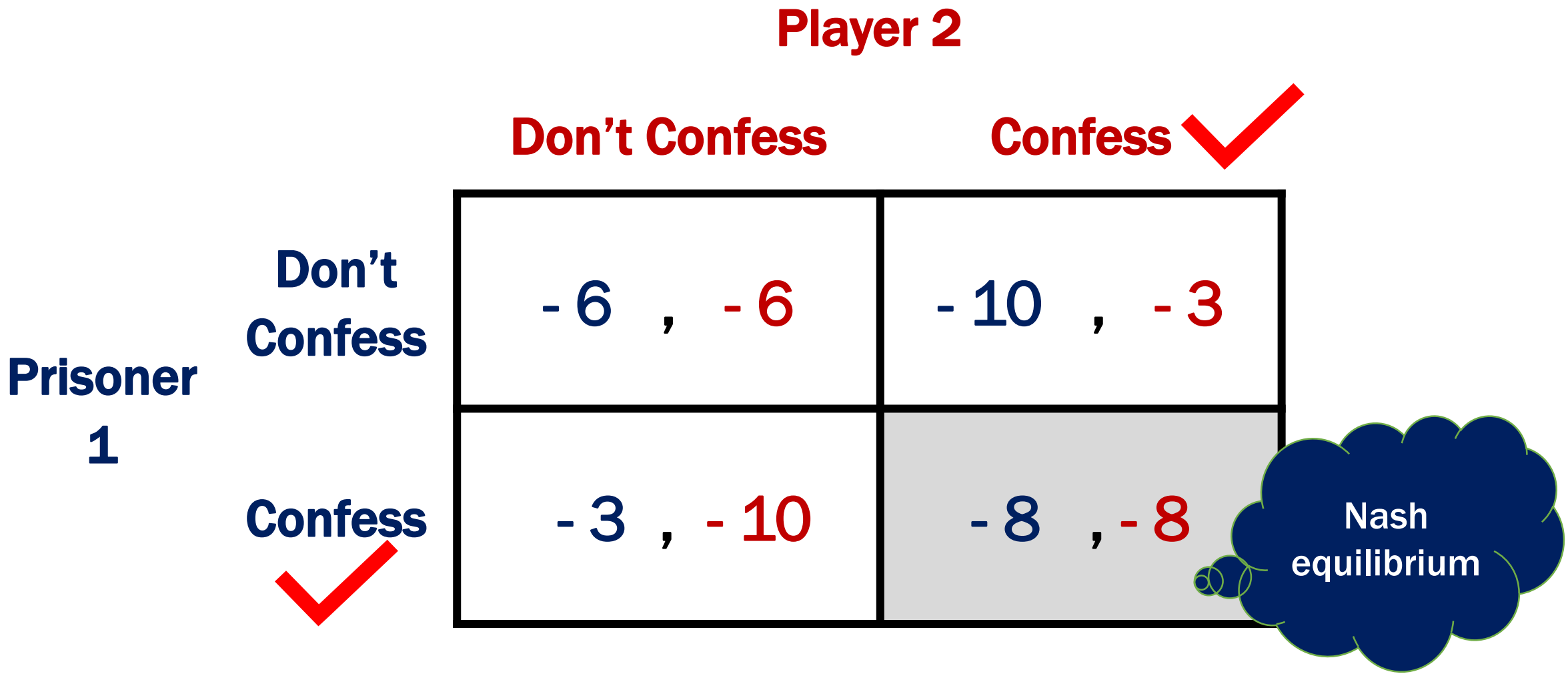
Prisoner's Dilemma

		Player 2: Don't Confess	Player 2: Confess
Prisoner 1	Don't Confess	-6 , -6	-10 , -3
	Confess	-3 , -10	

Prisoner's Dilemma

		Player 2: Don't Confess	Player 2: Confess
Prisoner 1	Don't Confess	-6 , -6	-10 , -3
	Confess	-3 , -10	-8 , -8

Prisoner's Dilemma



That's all the Game Theory you'll see here!

The objective is to illustrate how economists use models

Next up: Experimenting with the Model