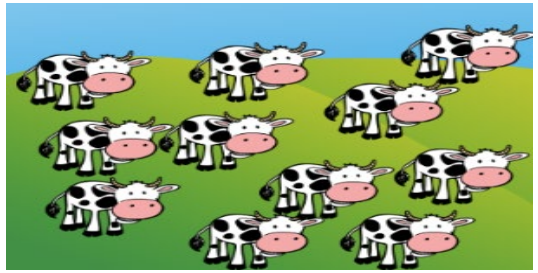
ECO2011 Basic Microeconomics

Mankiw Chapter 15 (Games)

2023

Motivation

- Do you remember what is common resources?
- What is tragedy of the commons?



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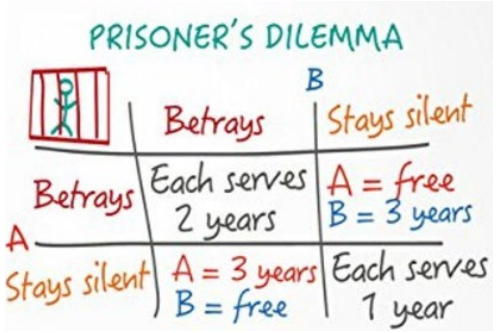
The Prisoners' Dilemma

- The prisoners' dilemma
  - Particular "game" between two captured prisoners
  - Illustrates why cooperation is difficult to maintain even when it is mutually beneficial
- Dominant strategy
  - Strategy that is best for a player in a game
  - Regardless of the strategies chosen by the other players
- Nash equilibrium
  - Economic actors interacting with one another, each choose their best strategy



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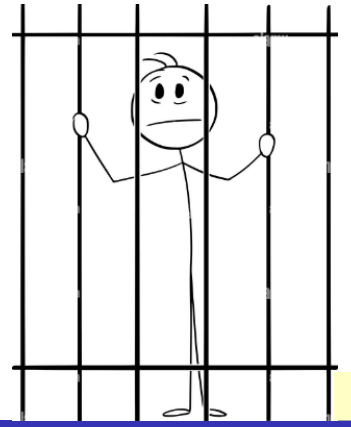
Example

- The police have caught Robert and James, two suspected bank robbers, but only have enough evidence to imprison each for 1 year.
- The police question each in separate rooms, offer each the following deal:
  - If you confess and implicate your partner, you go free.
  - If you do not confess but your partner implicates you, you get 20 years in prison.
  - If you both confess, each gets 8 years in prison.



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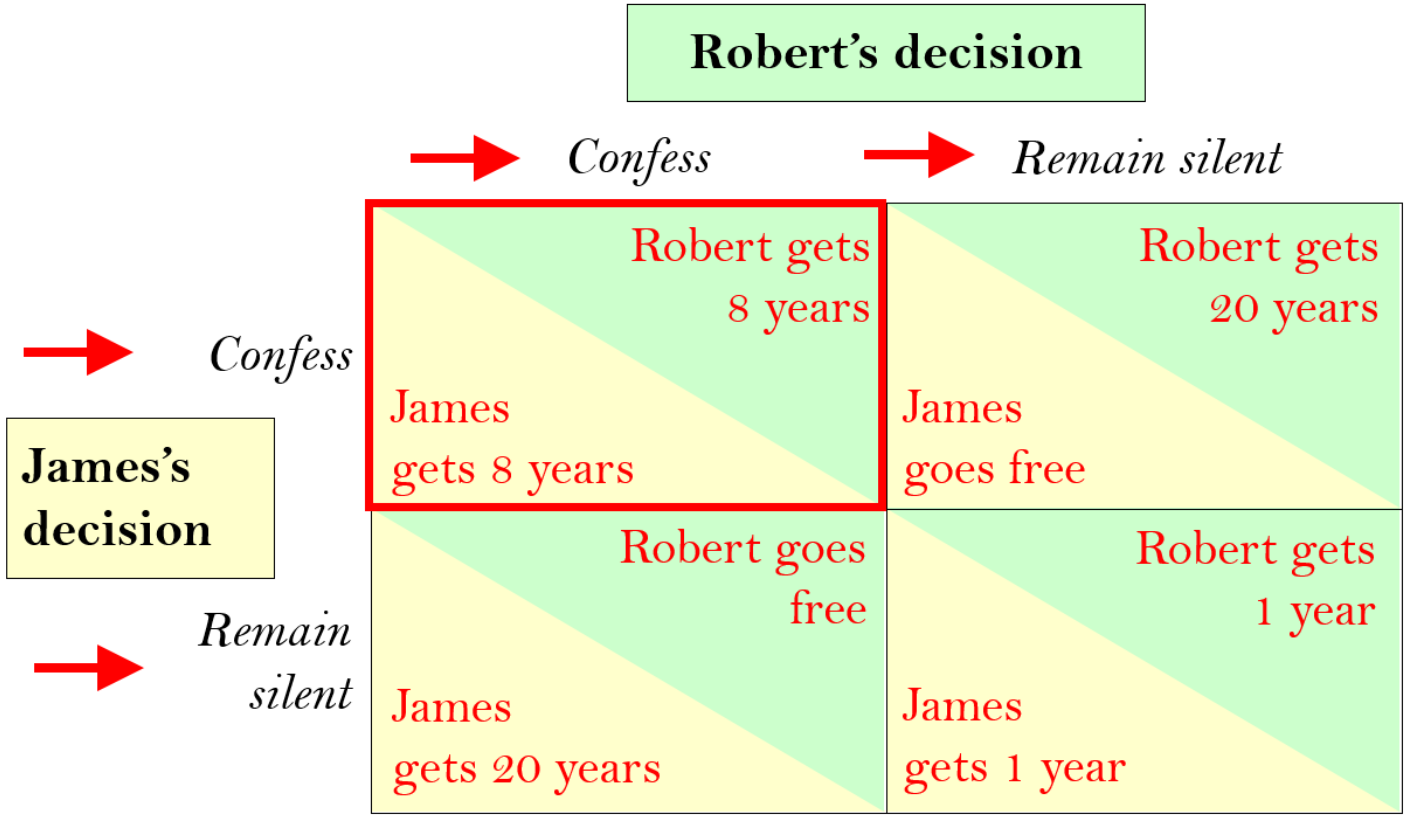
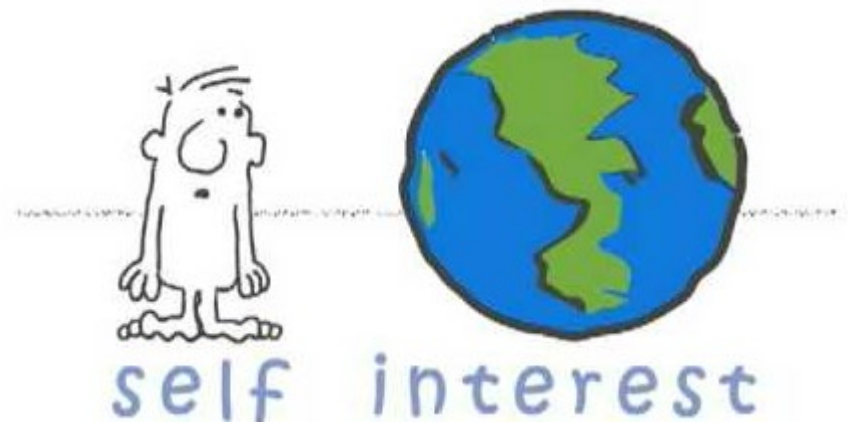
Example



- Confessing is the dominant strategy for both players.

Example

- Outcome: Robert and James both confess, each gets 8 years in prison.
  - Both would have been better off if both remained silent.
  - But even if Robert and James had agreed before being caught to remain silent, the logic of self-interest takes over and leads them to confess.



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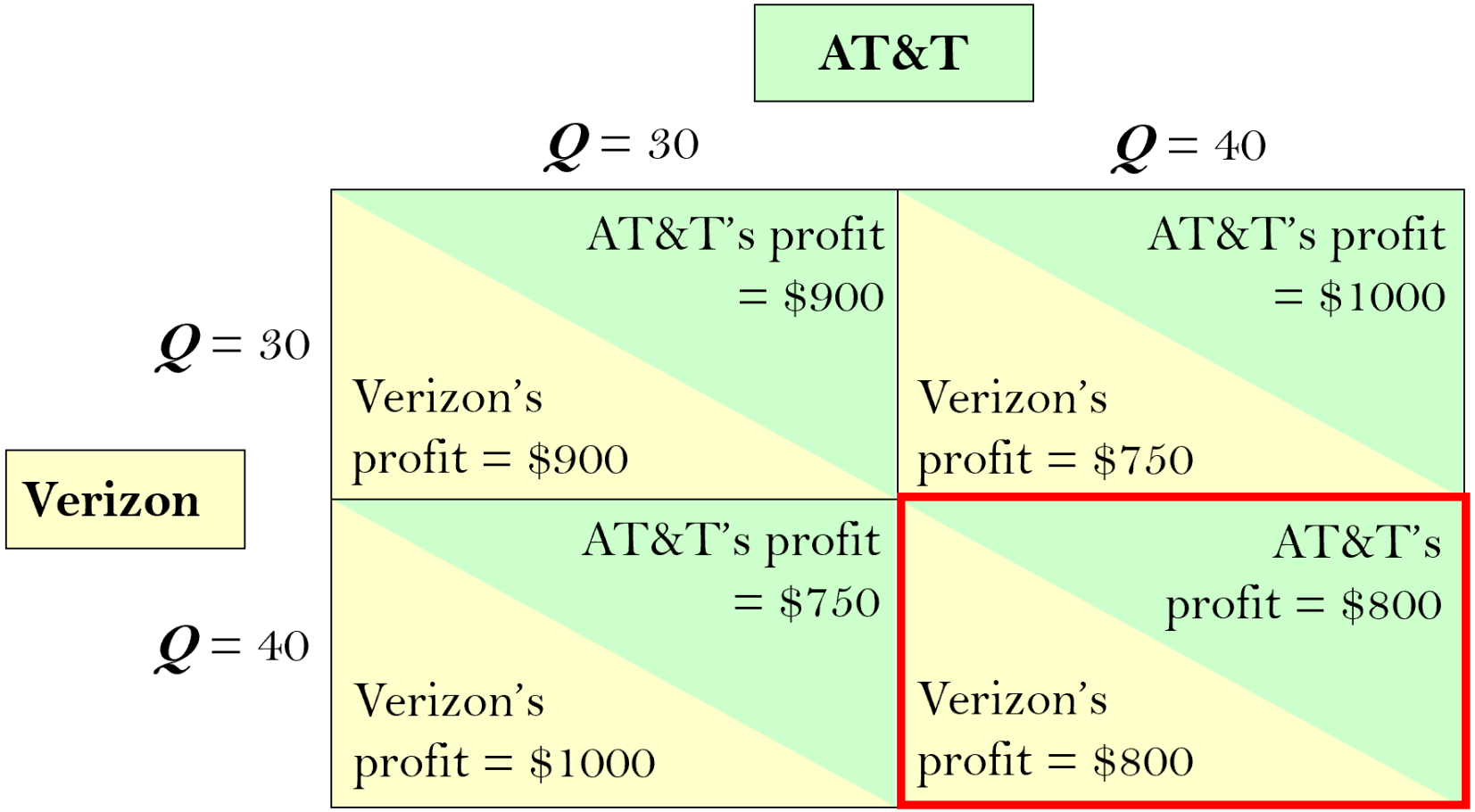
AT&T & Verizon in the Prisoners' Dilemma



Active Learning The fare wars game

- The players: Delta Airlines and United Airlines
- The choice: cut fares by 50% or leave fares alone
  - If both airlines cut fares, each airline's profit = $400 million
  - If neither airline cuts fares, each airline's profit = $600 million
  - If only one airline cuts its fares, its profit = $800 million; the other airline's profits = $200 million
- Draw the payoff matrix, find the Nash equilibrium

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Other Examples of the Prisoners' Dilemma

- Ad Wars
  - Two firms spend millions on TV ads to steal business from each other.
  - Each firm's ad cancels out the effects of the other, and both firms' profits fall by the cost of the ads.
- Organization of Petroleum Exporting Countries
  - Member countries try to act like a cartel, agree to limit oil production to boost prices and profits.
  - But agreements sometimes break down when individual countries renege.

Other Examples of the Prisoners' Dilemma

- Arms race between military superpowers
  - Each country would be better off if both disarm, but each has a dominant strategy of arming.

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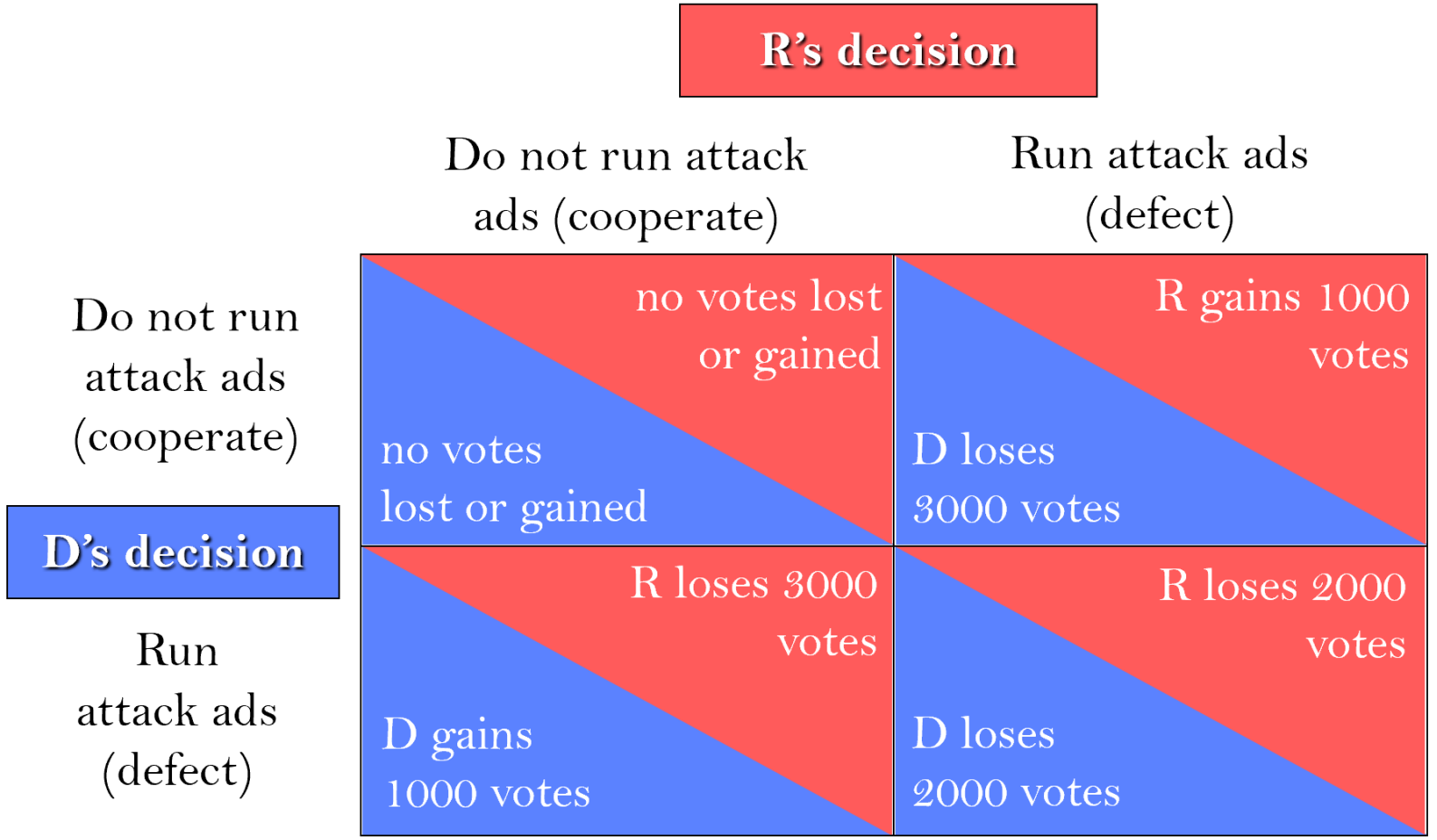
Another Example: Negative Campaign Ads

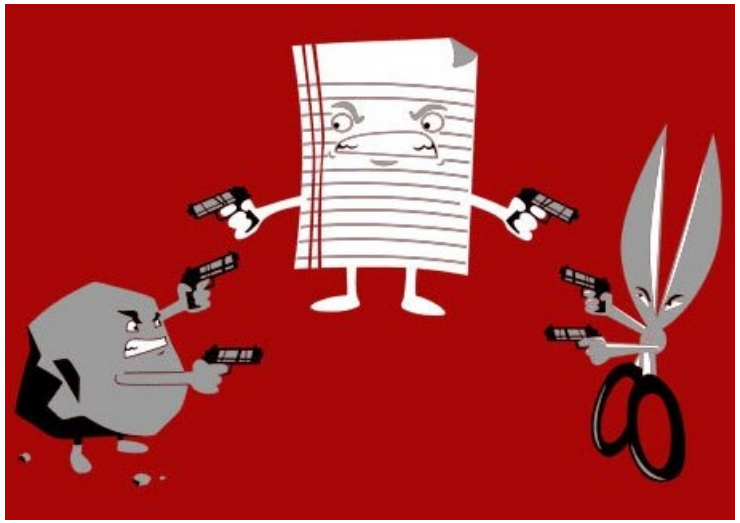
- Election with two candidates, "R" and "D."
  - If R runs a negative ad attacking D, 3000 fewer people will vote for D (1000 of these people vote for R, the rest abstain).
  - If D runs a negative ad attacking R, R loses 3000 votes, D gains 1000, 2000 abstain.
- R and D agree to refrain from running attack ads. Will each of them stick to the agreement?

Negative Campaign Ads



Can You Answer the Following Questions?

- What is Nash equilibrium?
- What is dominant strategy?
- Why cooperation is difficult to maintain even when it is mutually beneficial ?



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