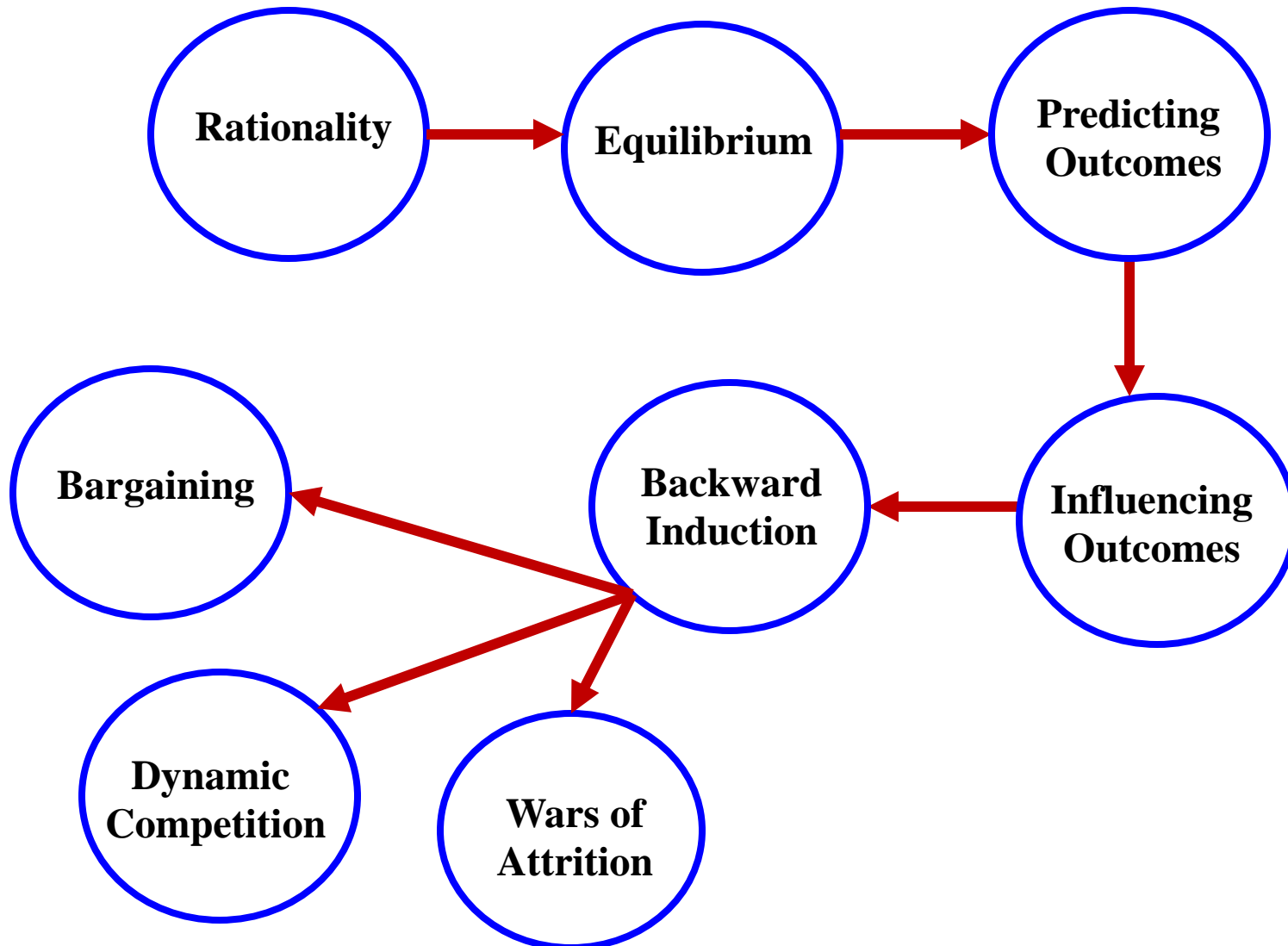


**Game Theory  
for  
Strategic Advantage**

**15.025**

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MIT Sloan**

# Foundations of Game Theory



# Today's Class: Game-Changers and Game Changers

- Changing the payoffs
- Changing the available moves
- Enabling retaliation
- Changing the order of moves
- Leaving some things to chance

***“Most game theorists aren’t very strategic: they solve the game as given, rather than change the game.”***

**Richard Thaler, “Nudge”**

<http://www.youtube.com/watch?v=2jxq1B7NkhE>

- (1) Categorization: what kind of game is this?
- (2) Play: what should I do?

# Chapter 1: Prisoners' Dilemmas

- The classic game (prisoners)
- Advertising games (e.g., cigarette companies)
- “Commons” games (fishing, water use, etc.)
- Pricing games in oligopolies
- “Rat races” in the workplace

# William the Conqueror

Soldiers

		Stay & Fight	Go Home
<u>Bill</u>	Stay & Fight	10 , 5	-10 , 10
	Go Home	-10 , -10	-5 , 15

# Burning the Boats

(your opponent's payoffs)

		<u>Soldiers</u>	
		Stay & Fight	Go Home
<u>Bill</u>	Stay & Fight	10, 5	-10, -200
	Go Home	-200, -10	-200, -200

- All payoffs are now lower
- Bill has fewer viable actions
- Direct effect vs. strategic effect

# Credible Commitments

- “Burning the Boats” – any experience?
- Binding yourself vs. opponent vs. both
- Is it easy to commit?
- Credibility and irreversibility
- What if there’s no smoke?



# Game without Price-Match

Competitor

Prices

Hi

Lo

You

Hi

( 6 , 6 )

( 0 , 7 )

Lo

( 7 , 0 )

( 3 , 3 )

	Hi	Lo
Hi	( 6 , 6 )	( 0 , 7 )
Lo	( 7 , 0 )	( 3 , 3 )

# Game with Price-Match (by You only)

Competitor

Prices

Hi

Lo

You

Hi

( 6 , 6 )

( 3 , 3 )

Lo

( 7 , 0 )

( 3 , 3 )

**A Related Principle: Mutually-Assured Destruction**

# Most-Favorite Nation (MFN) Clauses

(payoffs across games)

- In 1971, Congress passed the Federal Election Campaign Act, requiring campaign spots to be given the lowest rate for TV ads.
- In 1990, it required Medicaid to pay no more than 88% of the average price for drugs (at a time when HMOs were getting great deals).
- A 2010 antitrust lawsuit against Blue Cross Blue Shield took aim at contract provisions that required hospitals to offer the company the lowest non-government rate for hospital services.
- Now Michigan (and 20 other states) have laws barring insurers from using MFN clauses.

# Apple, Amazon and MFN

- In 2010, Amazon accounted for 80%-90% of all e-book sales.
- Amazon was discounting titles below cost to lure customers to the new format and promote its Kindle e-book reader.
- Apple's let publishers set the prices themselves, under an "agency model," but required the publishers to give iTunes store the best deal in the marketplace.
- Publishers could not keep low prices on Amazon without taking a hit.
- Publishers approached Amazon and demanded that it switch to the agency model, threatening to withhold e-books.
- Amazon relented, and e-book prices jumped to \$12.99 from \$9.99.
- July 2013: a federal judge ruled that “the MFN clause eliminated any risk that Apple would ever have to compete on price for e-books.”

# Chapter 2: Coordination Games

- Standard adoption
- Innovative technology adoption
- Investment
- Speculative attack

# Pharma research is difficult...

- *“Most scientists at Merck will work an entire career and not develop a single drug.”*  
-Ray Gilmartin (former Merck President & CEO)
- *“You desperately need all teams (management, litigation, sales, R&D) to pull their weight.”*  
-Joe Fuller (Founder, Monitor Consulting)

# Weakest Link: pairs

- Teamwork!
- Choose your investment level from 1 to 3
- *Unit* cost of investment = 1
- *Total* benefit of investment  
= 2\*lowest investment in the team

# Weakest Link: pairs

Effort  
levels

Colleague

1

2

3

1

( 1 , 1 )

( 1 , 0 )

( 1 , -1 )

2

( 0 , 1 )

( 2 , 2 )

( 2 , 1 )

3

( -1 , 1 )

( 1 , 2 )

( 3 , 3 )

You



# Weakest Link

- *“I don’t play the game, I’m a banker at best: I choose the people, I set the rules.”*  
Kevin Sharer (former Amgen CEO)
- **How would you change this game?**

# Recap: Game-Changers

- Introducing certainty
  - Credible commitments
  - Changing order of moves
- Changing the payoffs (e.g. investment)
- Introducing uncertainty
  - Leaving some things to chance

# Designing Games

## Frontiers of game theory

- Kids' cake
- Pasta and lobster
- High-frequency trading
- Design auction rules FCC
- New York School choice
- Kidney Exchanges

# → Look Forward, Think Back ←

- Two-stage games: what happens in the 2<sup>nd</sup> stage?
- Evaluate ALL possible scenarios, ROLL BACK
- Build a “Larger Game” for stage 1
- Key principle: *backward induction*

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