



ISyE 6230

Economic Decision Analysis II

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Spring 2007

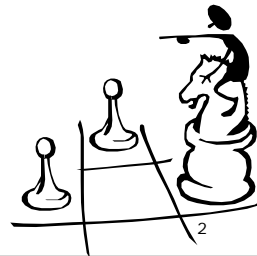
Thanks to Dr. Pinar Keskinocak for many slides.

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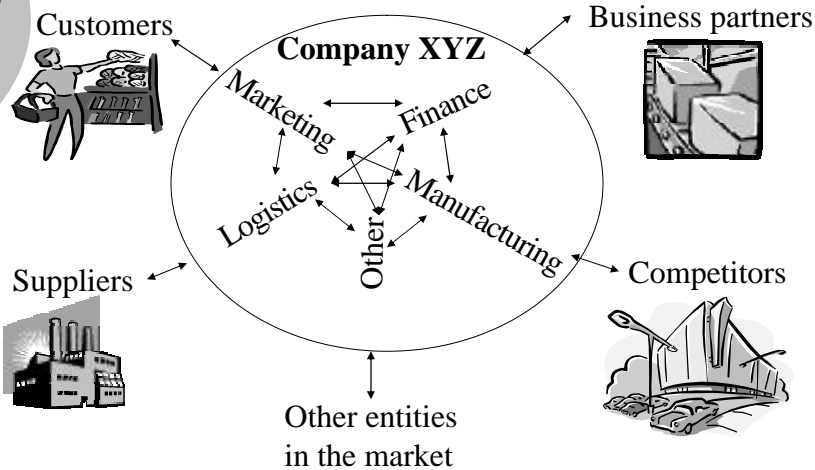


What is this course about?

- The interactions of multiple players (decision makers) and the resulting dynamics in a market environment
 - Suppliers, manufacturers, retailers, consumers, etc.



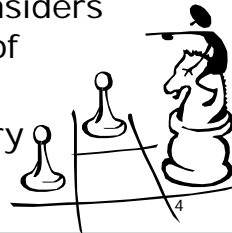
Interactions



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What is this course about?

- The interactions of multiple players (decision makers) and the resulting dynamics in a market environment
 - Suppliers, manufacturers, retailers, consumers, etc.
- **Strategic** behavior: Each player in the market acts on self-interest, e.g., tries to maximize its own profit
- In choosing an action, a player considers the potential responses/reactions of other players
- Main tool for analysis: Game Theory



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Burger King vs. McDonald's

- Burger King Corp. will put its flagship Whopper hamburger on sale for 99 cents beginning Friday ... The move is likely to intensify and prolong the burger price wars that have been roiling the U.S. fast-food industry in recent months. Burger King officials had said earlier that while they were reluctant to discount the Whopper, they had little choice given a \$1 menu at archrival McDonald's Corp. that included a Whopper-like hamburger, called the Big 'N Tasty.
– *Chicago Sun-Times, January 3, 2003*

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U.S. Auto manufacturing

- Through June 7, 2002, U.S. vehicle output was up 7.7% from a year ago (*Ward's Automotive Reports*)
 - GM's second-quarter production is up 12% from a year ago. The company says third-quarter output will increase 0.6%.
 - Ford's second-quarter production is up 4%, and the company expects the third quarter to be up 16%.
 - DaimlerChrysler's Chrysler Group but said production through May 2002 is up 3.2%.
- Analysts warn that automakers may end up spending more on rebate deals in late summer to clear out too many cars being built now. – *USA Today, June 14, 2002*

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Oil production

- OPEC decided to slash its crude oil production by 1.5 million barrels a day (6%).
The issue came to a head this autumn as the weakening world economy, together with the uncertainty caused by the Sept. 11 attacks on the United States, dragged down prices some 30 percent. ... The cut is expected to lift OPEC's benchmark price to \$22 a barrel - the group's minimum target price.
- Rival, independent producers such as Russia and Norway promised reciprocal cuts that were smaller than expected. OPEC, which has already reduced its official production by 3.5 million barrels a day this year, is weary of doing so only to see producers outside the group increase their market share as a result.

– CBS News, December 28, 2001

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“Fat Cat” Executive Pay

- In the first 9 months of 2003, pay to executives increased 60% over the same period in 2002.
- Recent severance packages have been quite large, even when the performance of the departing executive has been poor (“golden parachutes”)
- In 2001, the value of stock options granted to major executives rose by 43.6% even when value of company dropped almost 12% (Economist, Oct 2003)

- Incentives can be designed to overcome the moral hazard problem which arises due to imperfect information

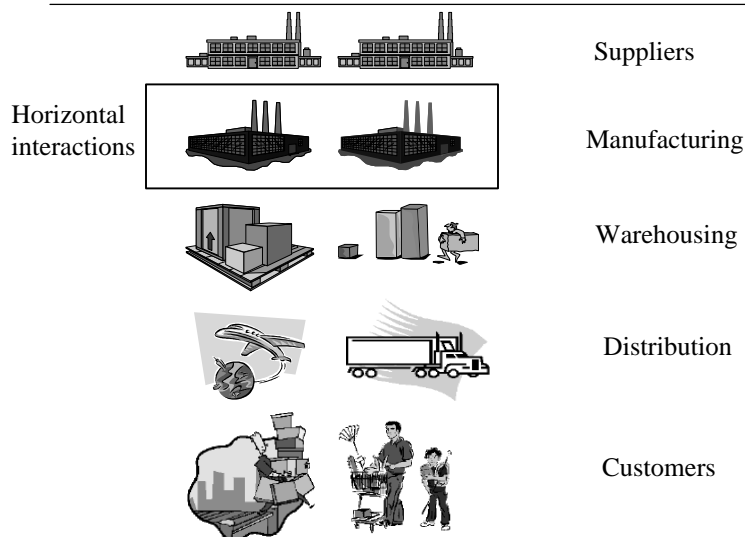
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Playing Chicken in California

- 2001 article reports government officials were intending to punish energy regulators (file price-gouging suits, impose price-caps on electricity rates, add a windfall-profits tax or seize plants)
- Power company claimed it wouldn't build a new power plant until the "investment climate improved"
- Politicians have little option but to work with them, power firms have little long-term interest in exiting a large market (Business Week, June 18, 2001)

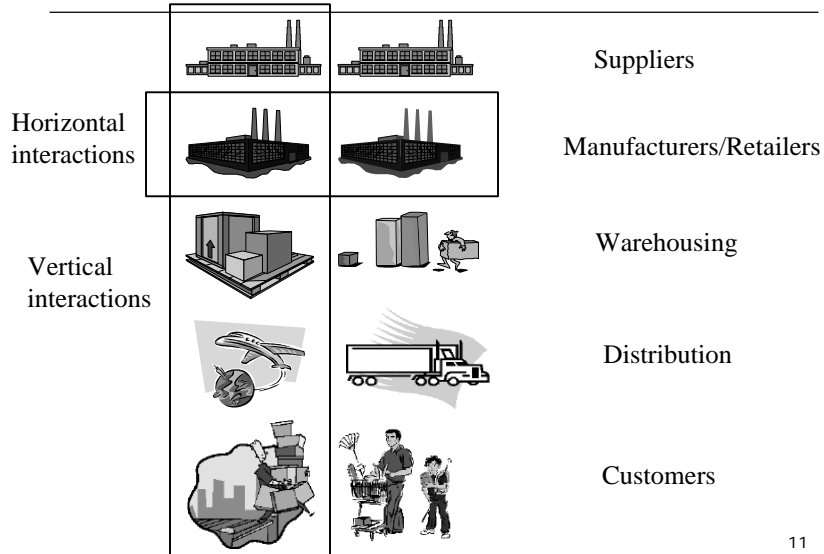
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Players in a supply chain



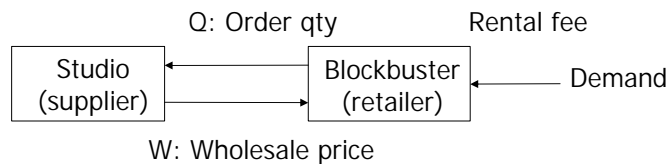
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Players in a supply chain



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Blockbuster and movie studios



- Before 1998: $W = \$65$.
 - Peak demand usually lasts <10 weeks; breakeven ~22 rentals
 - Low inventory, stock-outs: 20% of customers were unable to rent the movie they wanted
- After 1998: $W = \$8$, Blockbuster gives 30-45% of the revenues back to the studio
 - Stockouts dropped, Blockbuster increased its overall market share from 25% to 31% and its cash flow by 61%
- Win-win situation for all parties involved





ISYE 6230 - Course objectives

- Understand the impact of market structure on the strategic interaction of the players and the resulting outcome
 - Parameters: number and type of firms, or products, contracts, consumer preferences, etc.
 - Players: Firms, consumers, government, etc.
 - Outcome: Profits of the firms, surplus of the consumers, total quantity produced and sold in the market, etc.


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Game

- Choose a card (red or black) but don't show it until I say go (no cheating!)
- Values:
 - Playing a red card increases your own earnings by \$2
 - Playing a black card increases your partner's earnings by \$3
- Calculate earnings
 - If you both play red, you each earn \$2
 - If you both play black, you each earn \$3
 - If you play black and partner plays red, then you earn \$0 and they earn \$5
 - (If you play red and your partner plays black, then you earn \$5 and they earn \$0)

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Game (cont)

- You will have different partners in the first 3 rounds and the same partner for the last 3
- When told, one row may discuss strategy with their partner
- Alternate earnings:
 - Red, Red \rightarrow 2,2
 - Black, Black \rightarrow 8,8
 - Black, Red \rightarrow 0,10
 - Red, Black \rightarrow 10,0

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Game Lessons

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Questions

- How did results change as game changed?
- What was the effect of repetition?
Information sharing?
- What happens in the final period?
- How can we represent this game mathematically?
- In which cases is there an incentive to deviate?

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Classroom game, LC

		Player 2	
		Black	Red
Player 1	Black	3, 3	0, 5
	Red	5, 0	2, 2

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Classroom game, HC

		Player 2	
		Black	Red
Player 1	Black	8, 8	0, 10
	Red	10, 0	2, 2

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Examples of Game

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Notes

- Static versus dynamic games
- Dominated strategies
- Trigger strategies
 - One switch, or tit-for-tat

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Applications

- Price-cutting; offering low-quality goods
 - More demand if players collude on high price
 - More demand if players agree to all provide high quality
- Provision of public goods

- What characterizes all of these situations?

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