

Lecture 6 Game Plan

- Strategic moves continued
 - ... how to be credible
- Dynamic Pricing Game
- Strategic substitutes and complements
 - commitments to be tough vs. soft
 - puppy dog ploy, lean & hungry look, etc.

Trucking Entry (from Chevalier reading)

- A new trucking company is considering entering two *natural monopoly* markets for hauling agricultural products
 1. Market 1 currently served by railroad with $MC = \$.20/\text{ton-mile}$ and track that cost \$20 million
 2. Market 2 currently served by trucking company with $MC = \$.20/\text{ton-mile}$ and trucks that cost \$20 million

Irreversibility

- Sunk cost of track is irreversible for the railroad
 - railroad has credibly committed to stay in this market, regardless of whether another firm comes in
- Cost of trucks is fixed cost, not sunk
 - truck company can not credibly commit to stay in the market after entry



Conventional Wisdom

- Don't burn bridges.
- Decrease downside risk.
- It is nice to have more options.
- *This ignores the strategic value of commitment!*

Strategic Commitment

- You are not credible if you propose to take actions that go against your own incentives ...
- How to be credible?

Credibility

- Remove strategies
 - from your own set of future choices the strategies that may tempt you in the future
 - Example: giving away your patent
- Reduce payoffs
 - from those strategies that may tempt you
 - Example: customers as hostages.



Removing Strategies I

■ Delegation

- In contract negotiation, can “squabble” over many details
- Instead, send an agent with power of attorney to “sign as is” or “walk away”
- Haggling over prices in a department store

Learn from government bureaucracy:

“The rules won’t allow me to do what you ask”

Removing Strategies II

- Burning Bridges
 - Power comes from *not* being able to retreat

Burning Bridges

*"A surrounded enemy must
be given a way out"*

- Sun Tzu in "Art of War", 400BC

Burning Bridges: Example 1

■ Semiconductor patent sharing

“Mosaid Technologies, a designer and licensor of semiconductor chips and technologies, just announced a patent sharing deal with Mitsubishi Electric”

- Share patent with another competing firm
- Commit to chip supply to production plants
- Commit to no opportunistic behavior

Burning Bridges: Example 2

- Polaroid instant photography
 - Refused to diversify out of its core business. With all its chips in instant photography, it was committed to fight against any intruder in the market.
 - On April 20, 1976, after twenty-eight years of a Polaroid monopoly on the instant photography market, Eastman Kodak entered the fray.

Burning Bridges: Example 2

- 12 October 1990: Court awards Polaroid a \$900 million judgment against Kodak. Kodak forced to withdraw from market

Contracts with Third Parties

- Reducing one's own payoffs in a credible, *irreversible* way can be difficult.
- Third-parties can be useful as "enforcers"

The Bocchicchio Family

- Mafia in Italy, peaceful in the U.S.
- Mob bosses need to be able to meet safely, but no one trusts anybody
- Enter the Bocchicchio family
 - certain revenge if any Bocchicchio harmed
 - act as “hostages” for both sides.
 - if Don Corleone is killed by Don Barzini, then the Corleone family will kill their Bocchicchio
 - But then the Bocchicchio will blame *Barzini* since he promised the Bocchicchio would be safe!!

Committing to Fight

- Make yielding market share intolerable
 - adopt high FC, low MC technology
 - sign irrevocable agreements for expensive raw materials
 - load up on debt, or covenant debt so management loses control of the firm if market share slips

Reducing Your Payoffs Using Third-Parties

- Contracting with customers to commit to competitors
 - Most Favored Customer clauses
- Contracting with lenders to commit to a take-over price
 - Interest-rate rise if loan amount increases

Island Bars

- Two firms: **Firm 1** and Firm 2
- Two prices: low (\$4) or high (\$5)
- 3000 captive consumers per firm
- 4000 floating go to firm with lowest price

| | | Firm 2 | |
|--------|------|----------------|----------------|
| | | Low | High |
| Firm 1 | Low | 20 , 20 | 28 , 15 |
| | High | 15 , 28 | 25 , 25 |

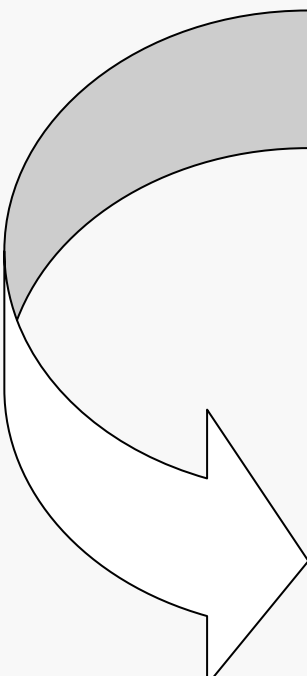
Contracting with Customers

- The game is a prisoner's dilemma
 - Both firms prefer: {High, High}
 - Only equilibrium: {Low , Low}
 - Cannot credibly promise to play High
 - Even if committed to High,
other firm would still respond with Low
- How to resolve this?
 - Third-party contracts with customers

Most Favored Customer

- Say in period 1, the firms colluded and each sold to 5000 customers
- In period 2, firms must refund to last period's customers \$1 each if price is *low*
- What is the impact on the game?

Escaping the Prisoners' Dilemma with MFCs



| | | Firm 2 | |
|--------|------|----------------|----------------|
| | | Low | High |
| Firm 1 | Low | 20 , 20 | 28 , 15 |
| | High | 15 , 28 | 25 , 25 |

| | | Firm 2 | |
|--------|------|----------------|----------------|
| | | Low | High |
| Firm 1 | Low | 15 , 15 | 23 , 15 |
| | High | 15 , 23 | 25 , 25 |

Incentives for MFCs

- Firms can escape Prisoners' Dilemma if they adopt MFC clauses
- BUT each firm appears to have a dominant strategy *not* to adopt
 - If other has MFC, you get 25 with MFC and 28 without. (In latter case, you price Low while other prices High)
 - If other does not have MFC, you get 15 with MFC and 20 without

Meta-Prisoners' Dilemma?

- We appear to have simply created a new Prisoners' Dilemma
- Is there any reason this Dilemma might be easier to resolve?

| | | Firm 2 | |
|--------|-----|----------------|----------------|
| | | MFC | Not |
| Firm 1 | MFC | 25 , 25 | 28 , 15 |
| | Not | 15 , 28 | 20 , 20 |

Contracting with Lenders

- Takeover offer: \$200 million
- You can “afford” \$20 million / year
- Finance takeover for 20 years at 7%
- Add penalty: if amount greater than \$200 million, +1.5 points on interest rate
- Annual Payments:
 - \$200 million: \$18.6 million / year
 - \$210 million: \$19.6 million / year
 - with penalty: \$21.9 million / year

Summary of Commitment Methods

- Reduce available strategies
- Reduce payoffs

The Flip Side

- You want to make it difficult for opponent to commit to actions that hurt you / help opponent commit to actions in your favor
- Increase opponent's strategy space
 - Exclude bargaining agents
- Lower opponent's payoffs
 - Poison pills
- Raise opponent's payoffs
 - Reputation bolstering



In-Class Game

Dynamic Pricing Game

Dynamic Pricing: Rules

- Two firms. 100 customers. Zero costs.
- Stage 1: Firms decide whether to invest in creating “loyal” customers
 - “loyal” customer will always buy from you no matter what the price
 - choice: 0 loyal or 30 loyal at cost \$250
- Stage 2: Firms alternate with (non-increasing) price announcements until they stop changing. Prices start at \$50 each.
 - choices: \$50, \$40, \$30, \$20, \$10

Dynamic Pricing: Payoffs

- $\text{Payoff} = \text{Revenue} - \text{Loyalty Cost}$
- If prices stay \$50 for both firms, each firm gets Revenue = \$2500
- Otherwise they won't split market equally:
 - "bigger firm" is one that has (1) lower price or (2) was first to announce final price (if equal)
 - bigger firm sells 100 or 70 at its own price, depending on loyalty of others' customers
 - smaller firm sells 0 or 30 at its own price

Play Dynamic Pricing Game!

You will play as a team. (Pair up with another team.)

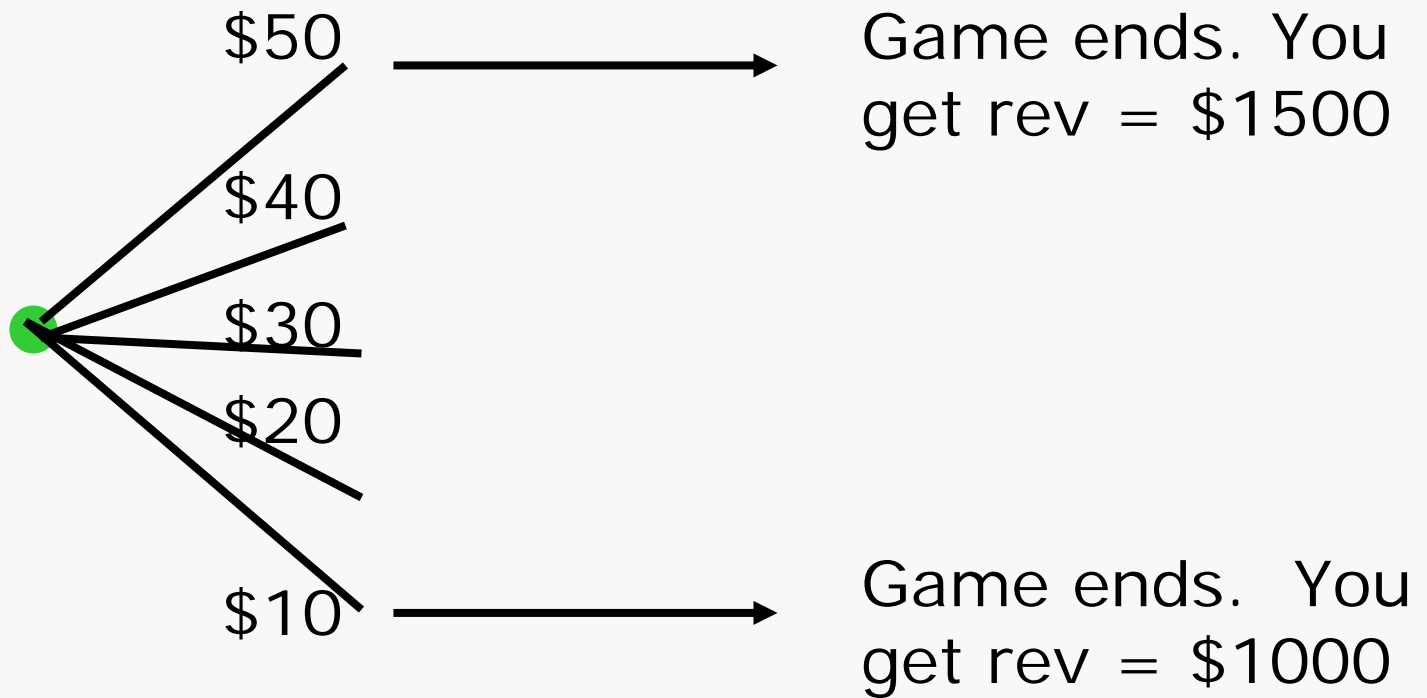
1. Play Loyalty Stage: simultaneously choose "Loyal" or "Not Loyal"
2. TA will tell you who goes first in Pricing Stage

Record game progress on handout and give this to TA at end of game

Upside of Loyalty

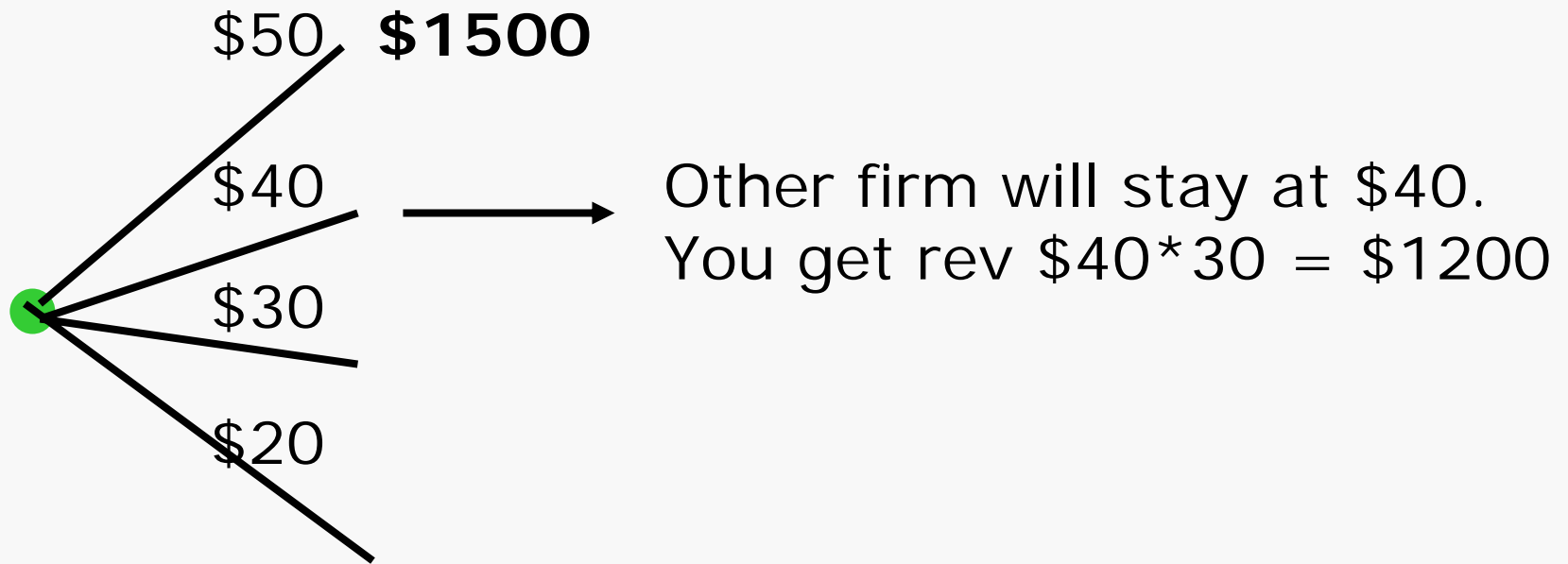
- If other firm undercuts you, your final payoff will be higher than if you had disloyal customers
- Suppose first that other has no loyal customers and undercuts with \$40
 - What would you do?

Loyal undercut by Disloyal



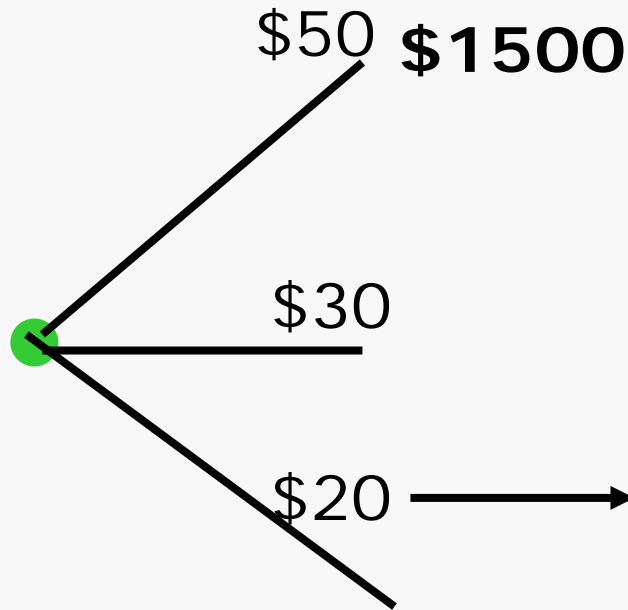
- Don't respond with \$10

Loyal undercut by Disloyal



- Don't respond with \$40
- *What about \$30 or \$20?*

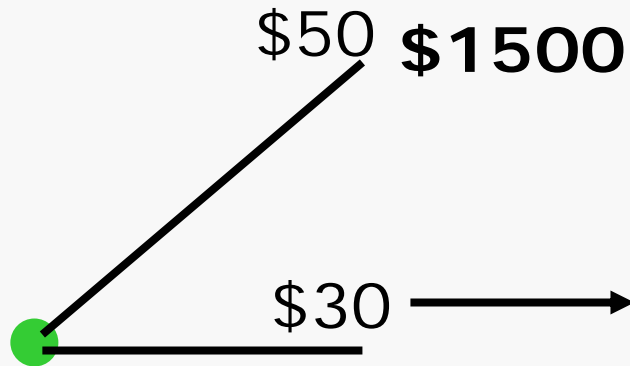
Loyal undercut by Disloyal



Since other firm has no loyal customers, it will re-undercut with \$10. You get $\$20 \times 30$

- Other firm will re-undercut for sure since it has no loyal customers

Loyal undercut by Disloyal

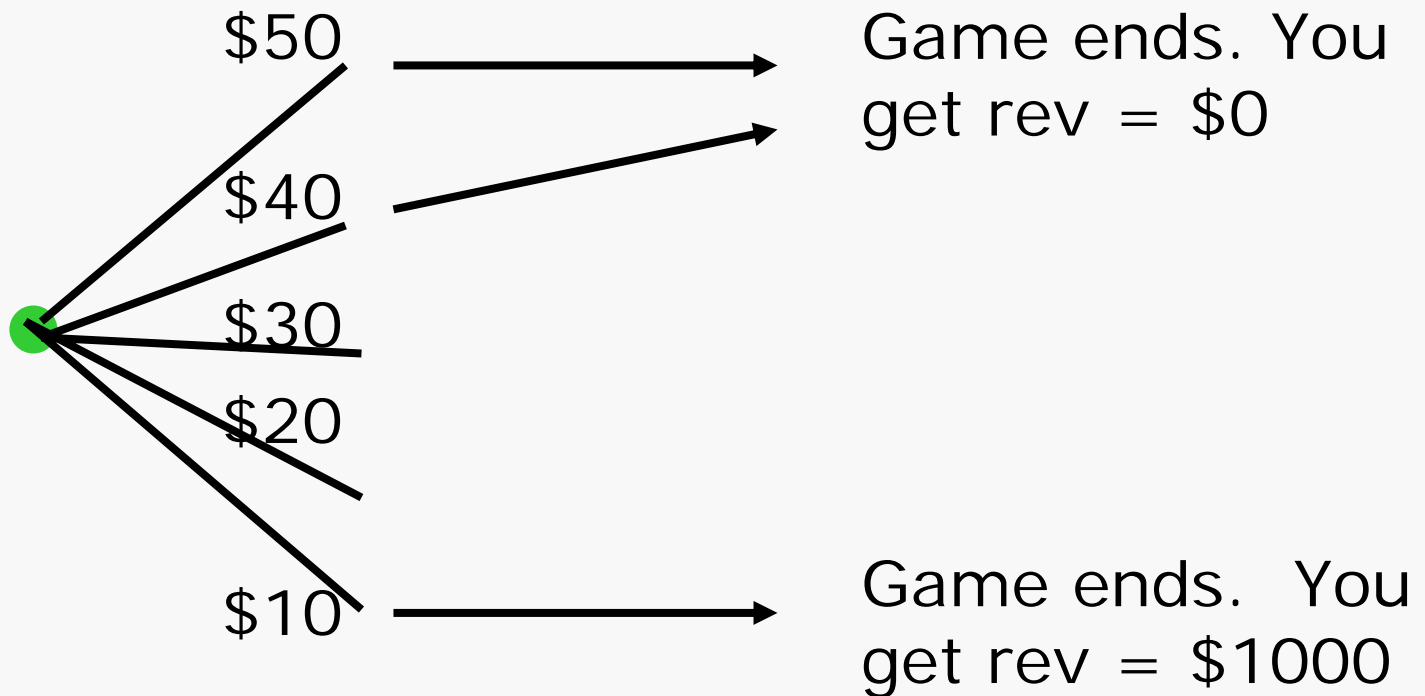


If other firm responds with \$20, you will re-undercut with \$10 since you prefer $100 * \$10$ over $30 * \$30$.

So, other firm will undercut with \$10 ending the game and you with $30 * 30$

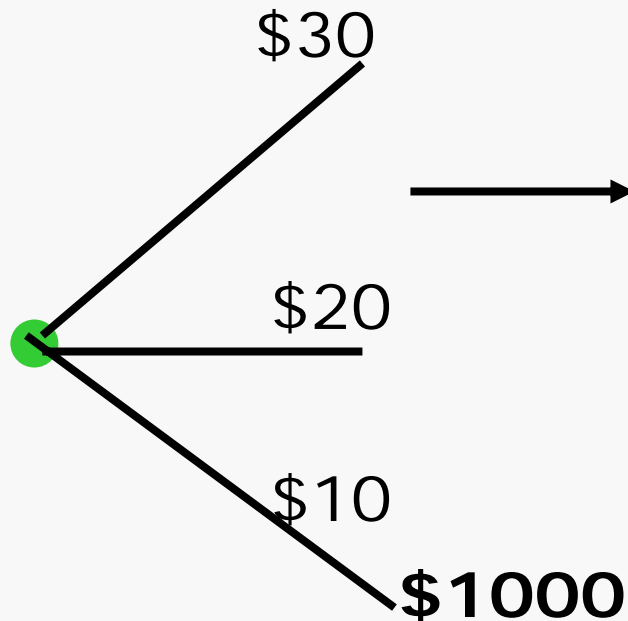
- Payoff if you have loyal customers and get undercut is $\$1500 - \$250 = \mathbf{\$1250}$

Disloyal undercut by Disloyal



- Don't respond with \$50 or \$40

Disloyal undercut by Disloyal



Since each firm has no loyal customers, each will re-undercut until price equals \$10. If you bid \$30 or \$20, other will go to \$10 and you will get zero revenue

- Respond with \$10 and get \$1000
- Not as good as \$1500 if you had Loyal

Downside of Loyalty

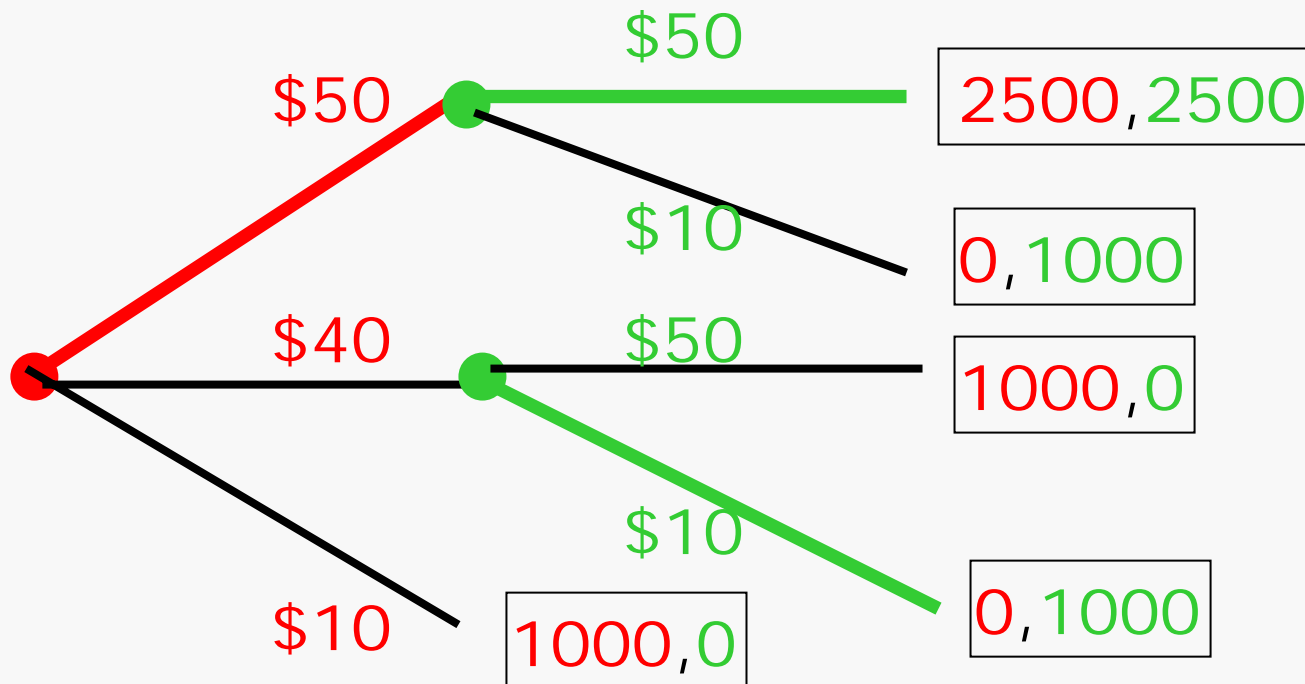
- Your unwillingness to re-undercut makes you an easy target
 - Disloyal opponent (whether first or second) will undercut you with \$40, leaving you with only \$1500
 - Loyal opponent (if first) will also undercut you with \$40
 - this is not obvious but can be shown

Upside of Disloyalty

- You are so “Lean & Hungry” that no Loyal opponent messes with you
- Against Loyal opponent, you get $70 * \$40 = \2800
- What about against Disloyal?

Disloyal vs. Disloyal

- Any undercutting must lead to ultimate price of \$10 → no better than \$1000
 - no price war in subgame-perfect equilibrium!



To Be Loyal or Not To Be ...

Loyal

Disloyal

Loyal

Chicken

- 1st gets \$2800
- 2nd gets \$1500
- Average **\$2150**

Loyal Servant

- DL gets \$2800
- L gets \$1500

Disloyal

Loyal Servant

- DL gets \$2800
- L gets \$1500

Assurance

- Both get **\$2500**



Commitments to be Tough

“At the critical moment, the leader of an army acts like one who has climbed up a height, and then kicks away the ladder behind him”

- Sun Tzu, “The Art of War”, 400 BC

Commitments to be Soft

“What is more fluid, more yielding than water? Yet back it comes again, wearing down the rigid strength that can not yield to withstand it. So it is that the strong are overcome by the weak, the haughty by the humble.”

- Lao Tzu, “Tao Te Ching”, 600 BC



Club Z

- Zeller's is a major Canadian mass-merchandiser
- 1/3 of Canadians belong to Club Z, Zeller's "loyalty rewards" program
- 4/5 of Zeller's shoppers are in Club Z
- Club Z appears to give Zeller's an advantage over competitors. At any given price, more people will buy from Zeller's

Potential New Entry

- In 1990, Q-Co is considering entering the Canadian market.
- Would Club Z give Zeller's an advantage in deterring entry?

Competing with Wal-Mart

- In 1990s, Wal-Mart is (definitely) entering the Canadian market.
- Does Club Z give Zeller's an advantage in price competition with Wal-Mart?

Tough or Soft?

- Three main factors determine whether to be tough or soft:
 1. Does your opponent view strategies as strategic substitutes or complements?
 2. Do you want your opponent to be more or less aggressive?
 3. Are you trying to induce exit/deter entry or to deal with an entrenched opponent?

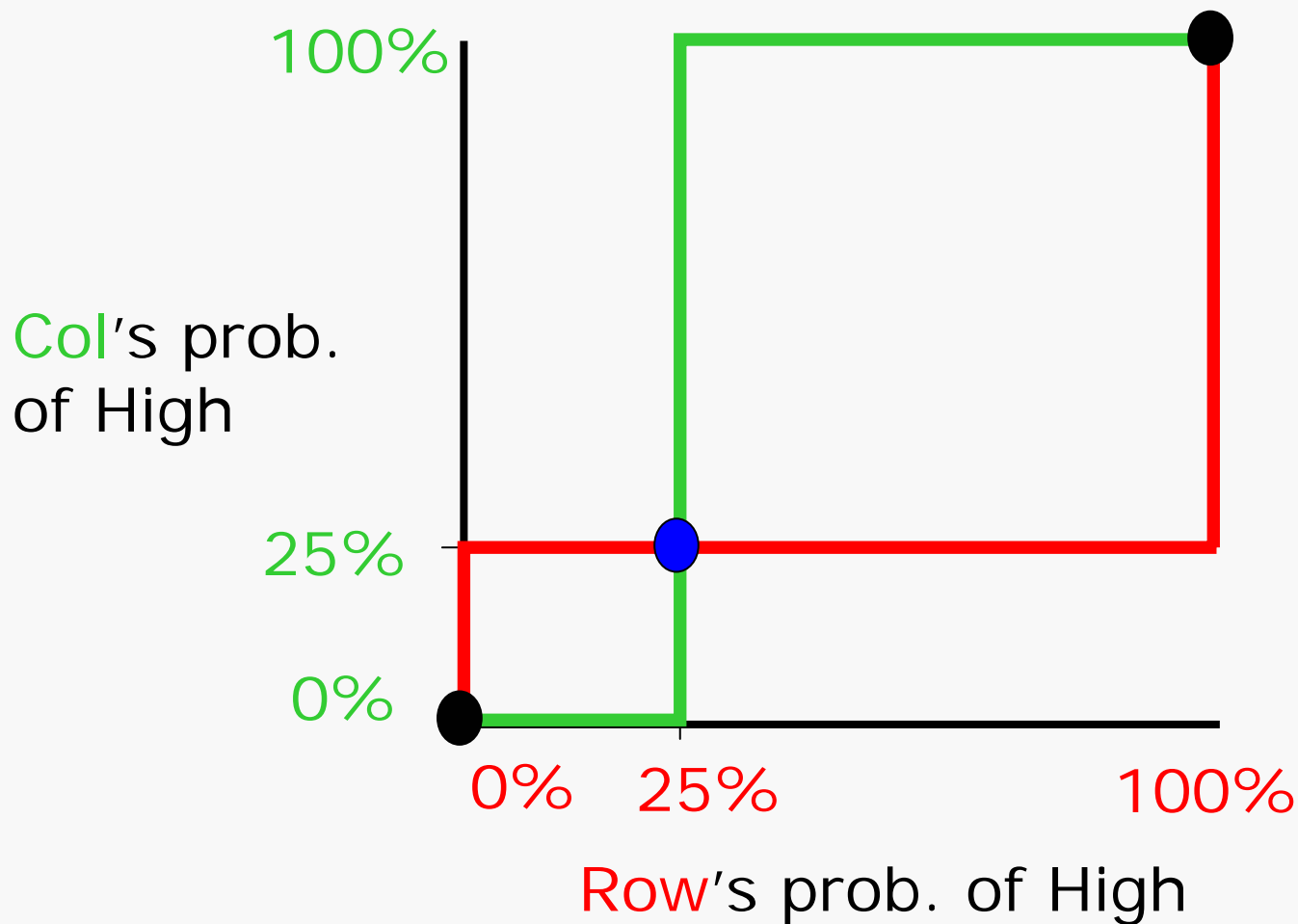
Strategic Substitutes vs Strategic Complements

- Player A views the strategies as **strategic substitutes** if its reaction curve is downward-sloping
 - i.e. A prefers to be less aggressive if other player is more aggressive
- Player A views the strategies as **strategic complements** if its reaction curve is upward-sloping
 - i.e. A prefers to be more aggressive if other player is more aggressive

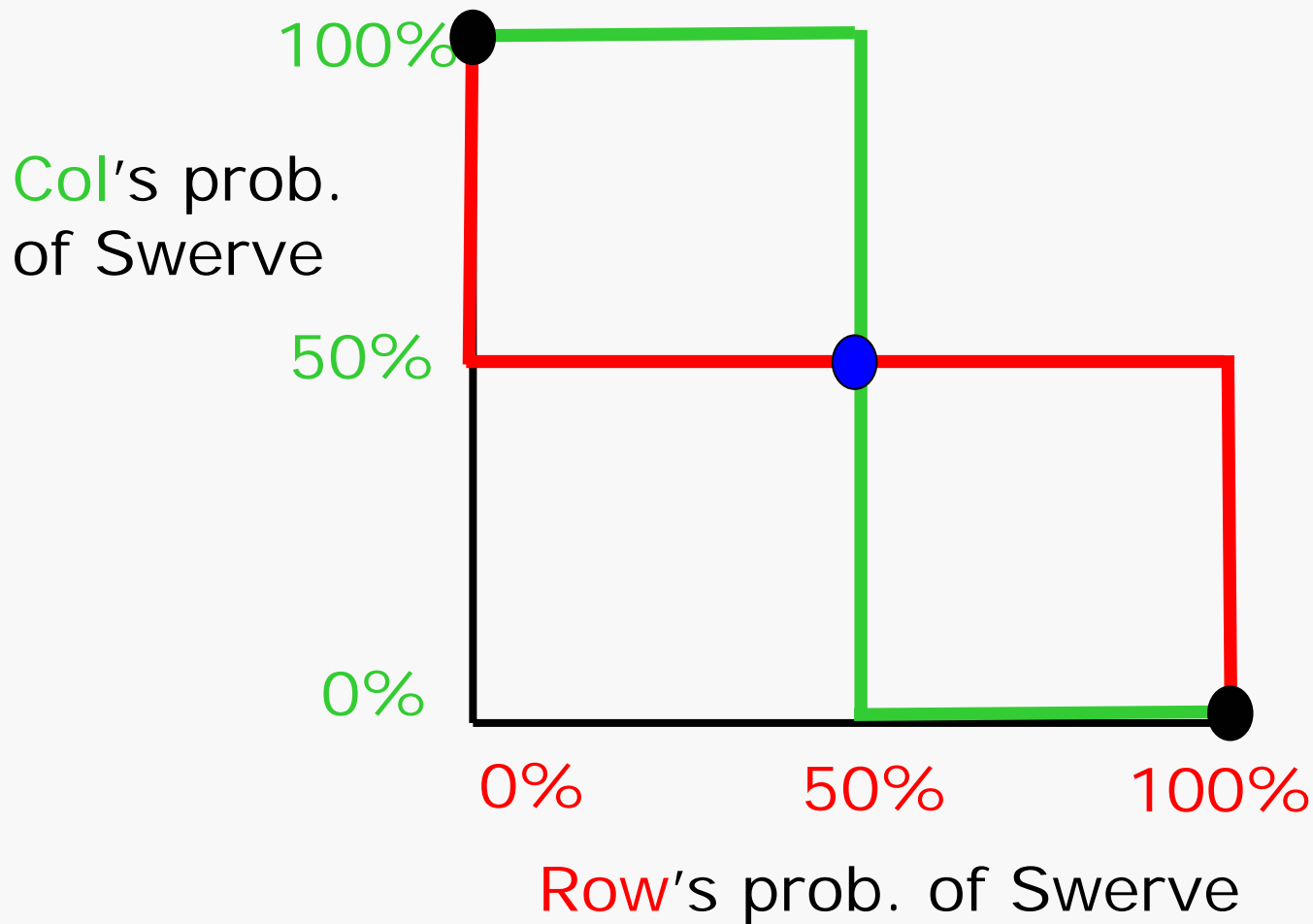
Strategic Substitutes vs Strategic Complements?

- Which is in strategic substitutes and which in strategic complements?
 - competing on price
 - competing on capacity/quantity
 - competing on advertising
 - competing on research

Assurance Game: Strategic Complements



Chicken Game: Strategic Substitutes



Competition vs Reliance

- Do you want the other player to be more or less aggressive?
 - Interpretation of “more aggressive” depends on the situation and need not have anything to do with actual aggression
- **“Competition”**: any game in which players want others to be less aggressive
- **“Reliance”**: any game in which players want others to be more aggressive

Competition with Investment

- Firms often have the opportunity to take an action prior to a game that makes it tend to be more or less aggressive than otherwise
 - Such actions are called “**investment**” though they may actually not be related to any actual investment

A Lot or a Little Investment?

- You want to commit to do more of whatever will lead the other player to be less aggressive
- So, decision to invest a lot or a little depends only on two factors:
 1. Does your investment lead you to be more or less aggressive?
 2. Does your opponent view strategies as strategic substitutes or complements?

Taxonomy of Optimal Competitive Strategies

More Makes
You Tougher

More Makes
You Softer

Strategic
Complements

Puppy Dog

less investment makes
you softer, makes other
less aggressive

Fat Cat

more investment makes
you softer, makes other
less aggressive

Strategic
Substitutes

Top Dog

more investment makes
you tougher, makes other
less aggressive

Lean & Hungry

less investment makes
you tougher, makes other
less aggressive

Puppy Dog: Serve a Niche

- Suppose firm is developing a product to compete with that of dominant firm
- “Investment” = potential clientele
 - Niche product won’t attract customers from dominant firm, decreasing your incentive to compete on price
 - This makes dominant firm less aggressive since prices are strategic complements

Top Dog: Export Subsidies

- Suppose domestic firm competes in quantities in a foreign market
- “Investment” = export subsidy
 - With export subsidy, domestic firm will export more into foreign market
 - This leads foreign firm to produce less

Summary

- The ideas of strategic substitutes and complements organize many strategic intuitions in a systematic framework
 - How best to play against an entrenched opponent (including “Judo Economics”)
- Next time:
 - How best to induce exit / deter entry
 - Application to an entry game (Ryanair)

Case for Next Time

- Prepare “Ryanair” Case for discussion in next class.
 - See handout