Chapter 10

Strategic Moves

Today's Topics:

1. Commitments, Threats, and Promises
   - Moving first
   - Unconditional → Commitments
   - Conditional → Threats and Promises
2. Credibility
3. Commitments
4. Threats and Promises
5. More Strategic Moves
6. Acquiring Credibility, or Countering the Other's

{golden balls. the weirdest split or steal ever! – A must to see}

Parent – children game

„No dessert unless you finish your vegetables”

„You will get a new laptop at the end of June if you maintain at least „5” average at school”

Chicken!

		Bomber	
		Veer	**Straight**
Alien	**Veer**	**Blah, Blah**	**Chicken!, Winner**
	Straight	**Winner, Chicken!**	**Death? Death?**

Chicken!

		Bomber	
		Veer	**Straight**
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Chicken!

Alien \ *Bomber*	Veer	Straight
Veer	Blah, Blah	Chicken!, Winner
Straight	Winner, Chicken!	Death? Death?

Chicken!

Alien \ *Bomber*	Veer	Straight
Veer	Blah, Blah	Chicken!, Winner
Straight	Winner, Chicken!	Death? Death?

Chicken!

Alien \ *Bomber*	Veer	Straight
Veer	Blah, Blah	Chicken!, Winner
Straight	Winner, Chicken!	Death? Death?

How to win?

Chicken!

How to win?
How to signal Straight credibly?

Chicken!

How to win?
How to signal Straight credibly?
How to Commit?

Chicken!

How to win?
How to signal Straight credibly?
How to Commit?
Or what?

Strategic moves

Strategic moves - devices to manipulate the rules of the game.

Manipulations:

- changing the order of moves from sequential to simultaneous or vice versa
- adding or removing the moves
- changing the payoffs

Strategic moves

Strategic move results in creation of new two-stage game.

The first stage specifies how you will act in the second stage

The second stage is the original game

Strategic Moves:

Three types of 1st-stage strategic moves:

1. commitments

2. threats

3. promises

Each aims to alter the outcome of the 2nd stage.

But all require *credibility*: the other player must *believe* that you will not renege, that you will follow through.

Mere declarations are not enough. Need extra (ancillary) moves in the 1st stage to make them credible.

Unconditional and Conditional Moves

- An *unconditional* move is a (response) rule in which you move first and your action is fixed, to gain *first-mover advantage.*
- *threats* and *promises* occur when you move second: they are conditional because the response dictated by the rule depends on what the other side does.
- A *strategic move is a preemptive action*, and the response rule must be in place *and communicated* before the other side moves. Intended to gain *second-mover* advantage, if credible.

1. Commitments, Threats, & Promises

1. A classification of strategic moves

Moving First?

What does it mean to *move first*?

The move must be ***observable*** and ***irreversible***:

- If not observable, then strategically simultaneous.
- If not irreversible, then could move, wait for the other player to move, and the undo one's move to gain a 2nd-mover advantage, if it exists.

1.A. Unconditional Strategic Moves

Al: “In the game to follow, I shall do X,” — an unconditional strategic move, a ***commitment***.

With this declaration, Al in effect moves 1st. If credible, Al’s statement alters Bob’s beliefs and hence Bob’s actions.

“We never negotiate with terrorists” might dissuade terrorists from taking hostages.

Street-garden game example

Commitment is a simple seizing of the first-mover advantege if it exists.

1.B. Conditional Strategic Moves

Al: “In the game to follow, if you do W, then I’ll do X, but if you do Y, then I’ll do Z.”

Al is stating his ***response rule*** *(reaction function)*;

Al moves 2nd in the game to follow, and has stated how he will respond.

Bob must make a 1st (observable, irreversible) move.

Al’s conditional strategic move:

deterrence: stop Bob from Y (Z hurts Bob)

compellence: compel Bob to W (X rewards Bob).

If Z hurts Bob, then a *threat* of Al’s.

If X rewards Bob, then a *promise* of Al’s.

2. Credibility of strategic move

Al gains a higher payoff when Bob acts as Al wants.

Important: Al's payoff might be altered by Al's action — if Al's own payoff is increased by the response action, then Bob says, "Al'll do it anyway": not a strategic move.

- *To be effective,* Al's threatened action must be **costly** to *both* players — *mutual harm*.

e.g. Child of a sadistic parent will figure: why eat his broccoli — still won't get any ice-cream.
So the threat: "No ice-cream if you don't eat your broccoli!" is hollow unless the parent has an incentive to serve ice-cream.

- need credibility.

Credible, communicated commitments.

Commitments must be *credible* and *communicated* and understandable to be of value .

- By their nature, strategic commitments (threats or promises) are intended to change others' beliefs and behaviour; others must wonder: are they hollow? and the player will fall back on the uncommitted best action: is it nothing but a bluff?
- *Dr Strangelove* describes a Russian commitment — The Doomsday Machine — to respond to any incursion into Soviet airspace with an attack of nuclear missiles on the U.S. Unfortunately, the Russian have not yet told the Americans about it ...

Non-credible threats are ignored.

Credible, communicated commitments.

Threat carries with it an implicit promise.

Threat: „no dessert if you don't finish your vegetables".

Implicit promise: „dessert if you do finish your vegetables".

The same story goes with promises.

Credible, communicated commitments.

Ultimatum game.

- Two players (A & B)
- Player A offers a split of a zloty
- If B agrees the game is over
- If B refuses now it's his turn to split, but now he has only 0.80 zloties.
- If A agrees the B's split the game is over
- If A refuses the game is over no one gets anything

How credible commitment can change payoff of player A?

Credible, communicated commitments.

How to make strategic moves credible?

1. Remove from your own set of future choices the other moves that may tempt you.
2. Reduce your own payoffs from those temptation moves so that the stipulated move becomes the actual best one.

3. Commitments

In Chicken game if James makes a (observable, irreversible) commitment to Straight, so it's credible, he wins by reducing Dean's possibilities to Swerve only.

How?

What if Dean has cut himself from communication?

Then James's action is not observable — not a commitment.

		DEAN	
		Swerve (Chicken)	Straight (Tough)
JAMES	Swerve (Chicken)	0/0	-1/1
	Straight (Tough)	1/-1	-2/-2

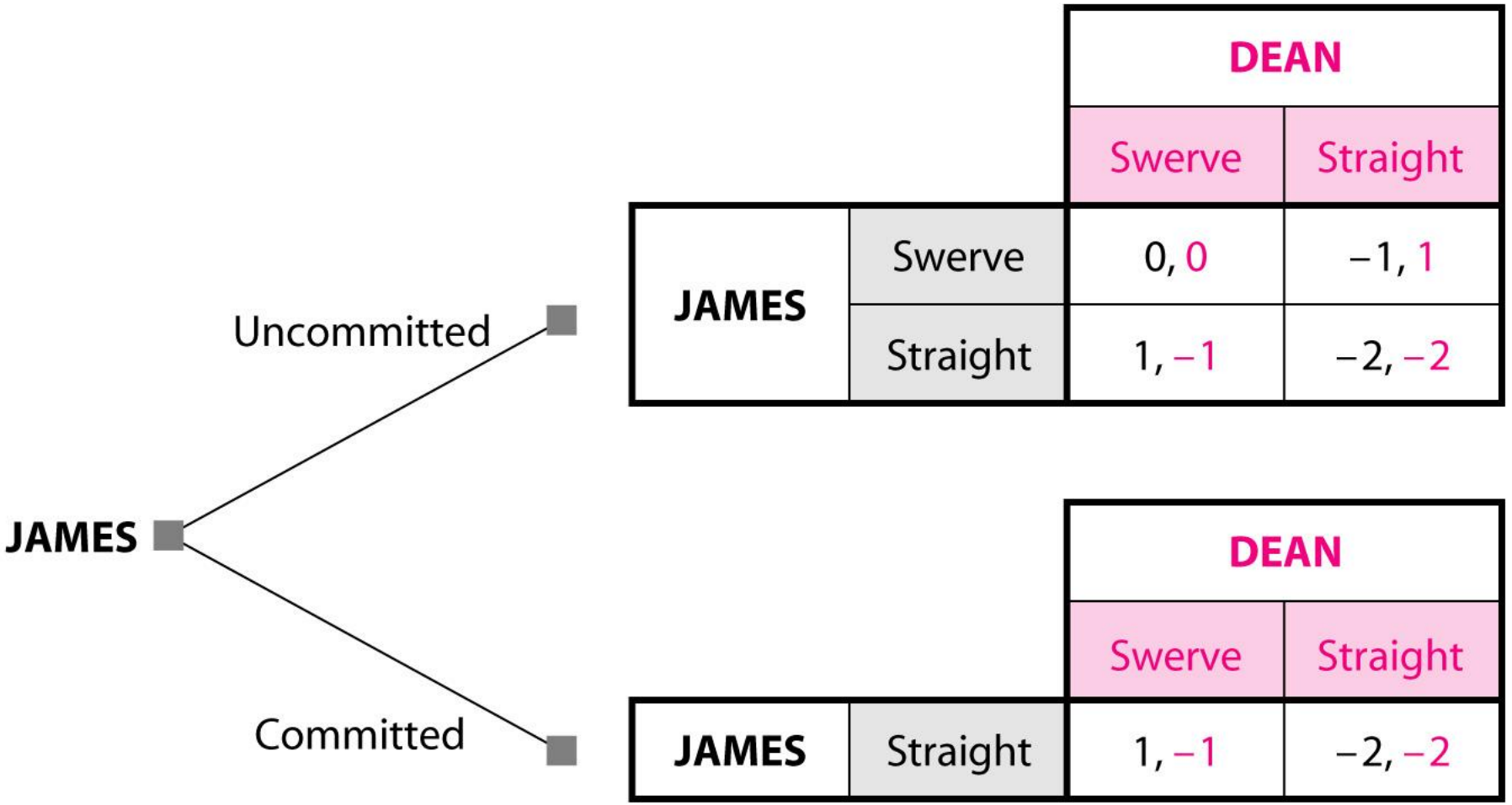
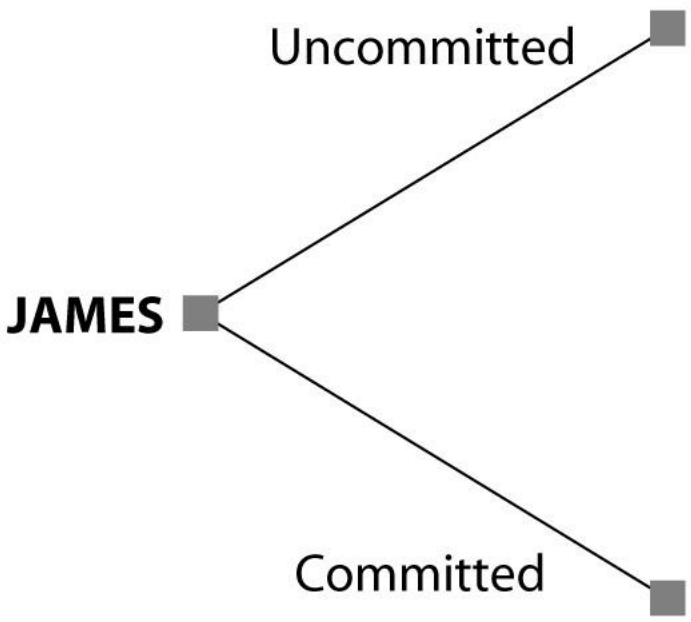


FIGURE 10.1 Chicken: Commitment by Restricting Freedom to Act

3. Commitments

If Chicken game is played every weekend, then reputation is important. Loosing reputation by swerving might be very costly.

This changes James' payoff:



		DEAN	
		Swerve	Straight
JAMES	Swerve	0, 0	−1, 1
	Straight	1, −1	−2, −2

		DEAN	
		Swerve	Straight
JAMES	Swerve	−3, 0	−4, 1
	Straight	1, −1	−2, −2

FIGURE 10.2 Chicken: Commitment by Changing Payoffs

3. Commitments

Another game – the bigger the number, the better

		STUDENT	
		Punctual	Late
TEACHER	Weak	4, 3	2, 4
	Tough	3, 2	1, 1

FIGURE 10.3 Payoff Table for Class Deadline Game

3. Commitments

What is NE of this game?

Weak is dominant strategy for teacher

NE: {Weak, Late}

The teacher should commit to Tough (i.e. dominated strategy), then students will respond with punctual

The strategic move must be:

- observable
- irreversible

(NO: „just this one", or „it won't happen again")

		STUDENT	
		Punctual	Late
TEACHER	Weak	4, 3	2, 4
	Tough	3, 2	1, 1

FIGURE 10.3 Payoff Table for Class Deadline Game

Why Commitment Is Important

Two firms, Able and Baker, compete in a duopoly.

Able, the dominant firm, is contemplating its capacity strategy, with two options:

- "Aggressive ," a large and rapid increase in capacity aimed at increasing its market share, perhaps at a cost to its profits, and
- "Soft," no change in the firm's capacity.

Baker, a smaller competitor, faces a similar choice.

(Remember: no binding contracts —
— *non-cooperative* game theory.)

(Contracts & side-payments & coalition formation are studied in *cooperative* game theory.)

Able and Baker

The payoff matrix shows the NPV associated with each combination of strategies:

		Baker	
		Aggressive	**Soft**
Able	**Aggressive**	12½, 4½	16½, 5
	Soft	15, 6½	18, 6

Able and Baker

The POM shows the NPV associated with each combination of strategies:

		Baker	
		Aggressive	**Soft**
Able	**Aggressive**	**12½, 4½**	**16½, 5**
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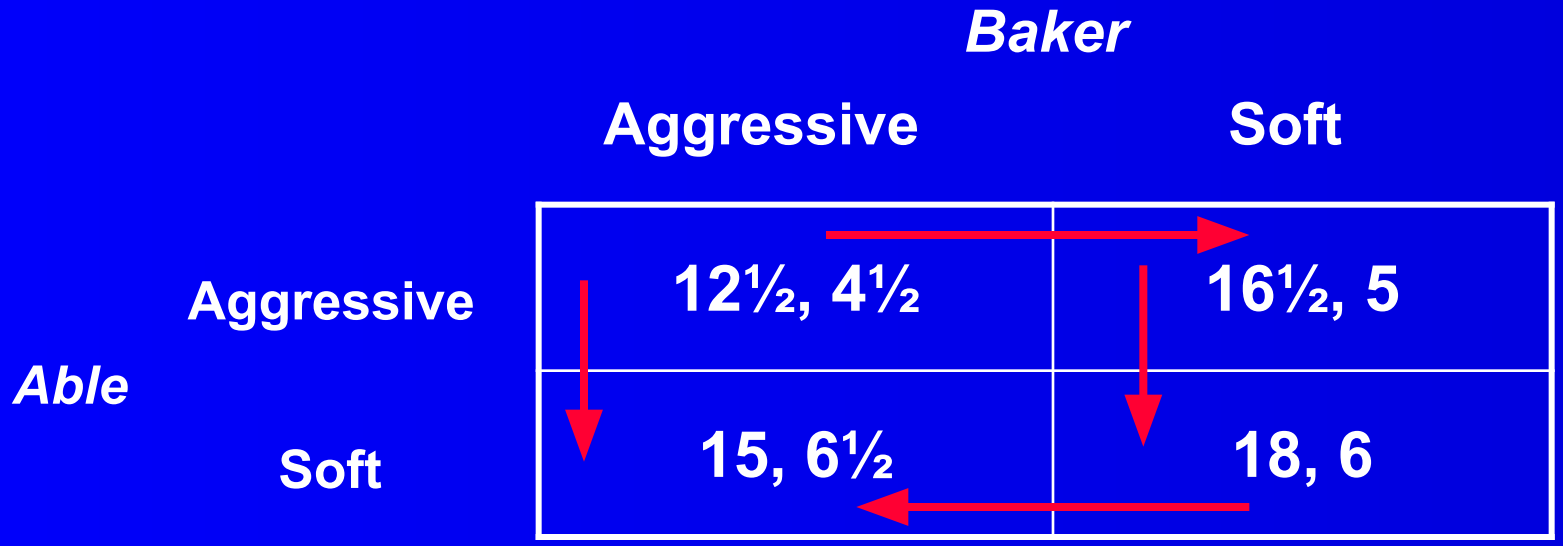

Able and Baker

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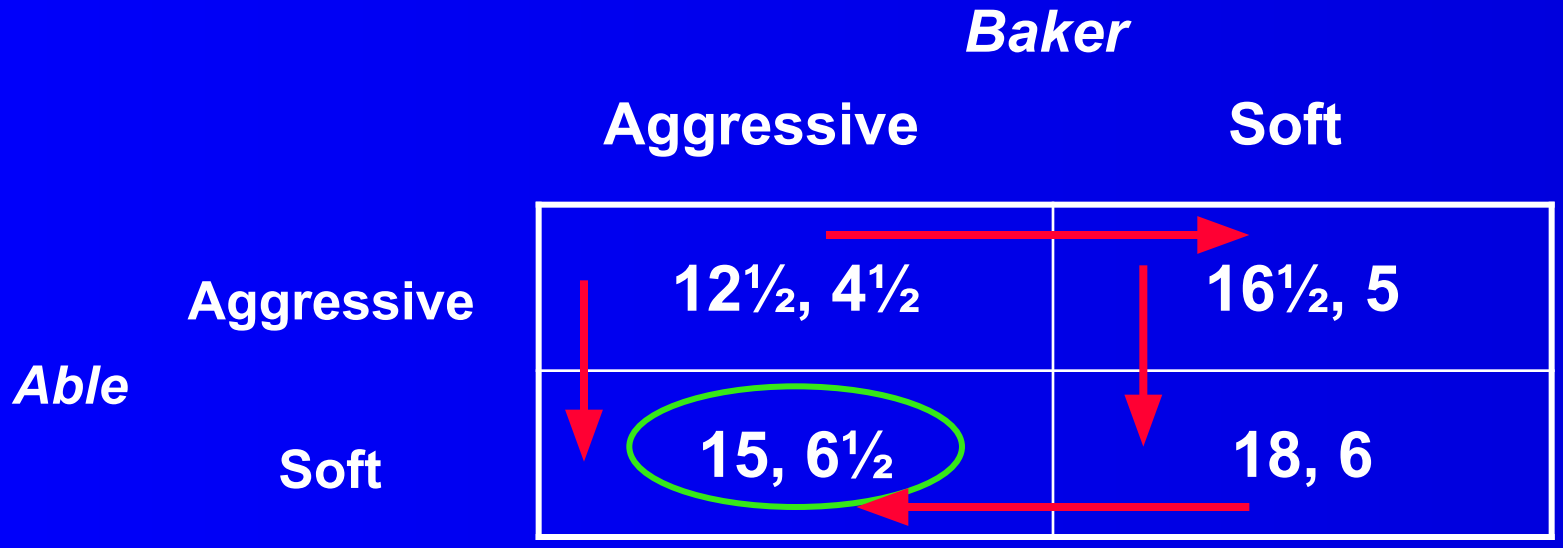

Simultaneous Payoffs (Able, Baker).

Able and Baker

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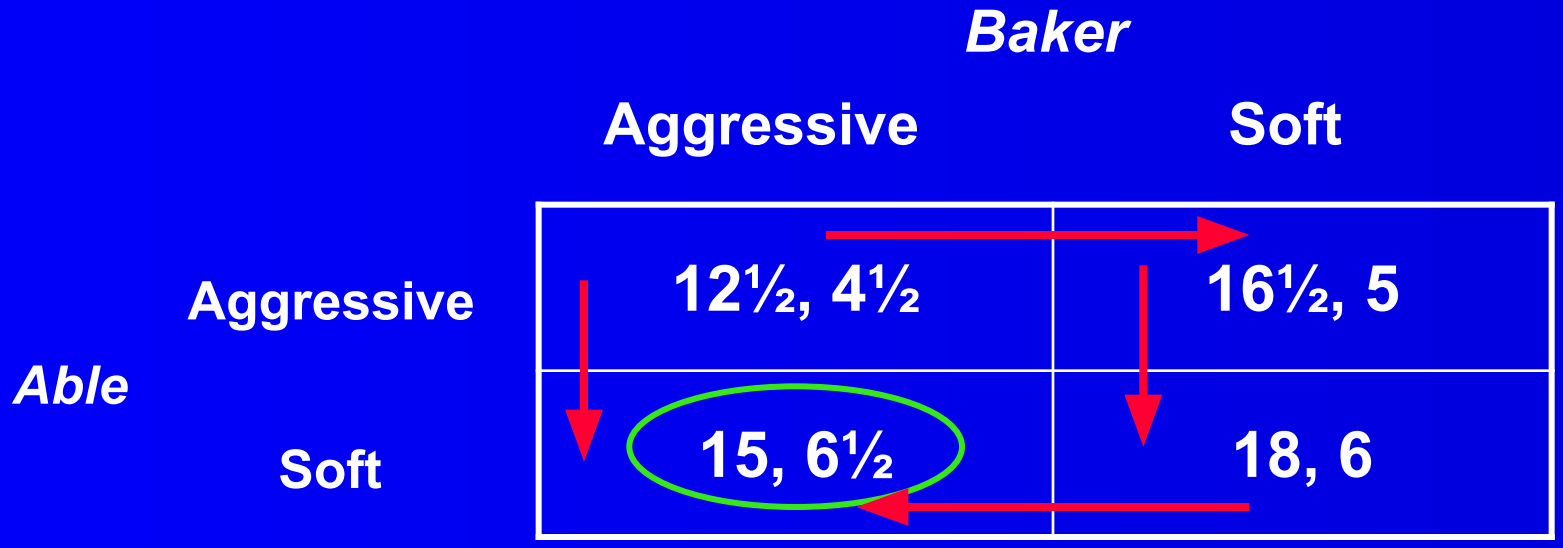
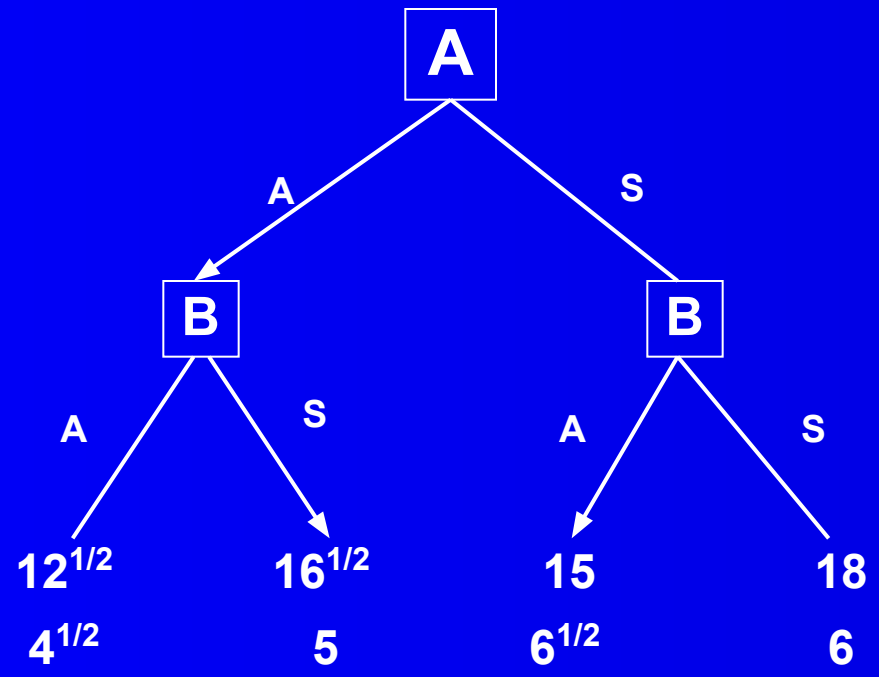


Simultaneous Payoffs (Able, Baker)

Using arrows, we easily see that Able has a dominant strategy of S.

What if Able moves first: a commitment.



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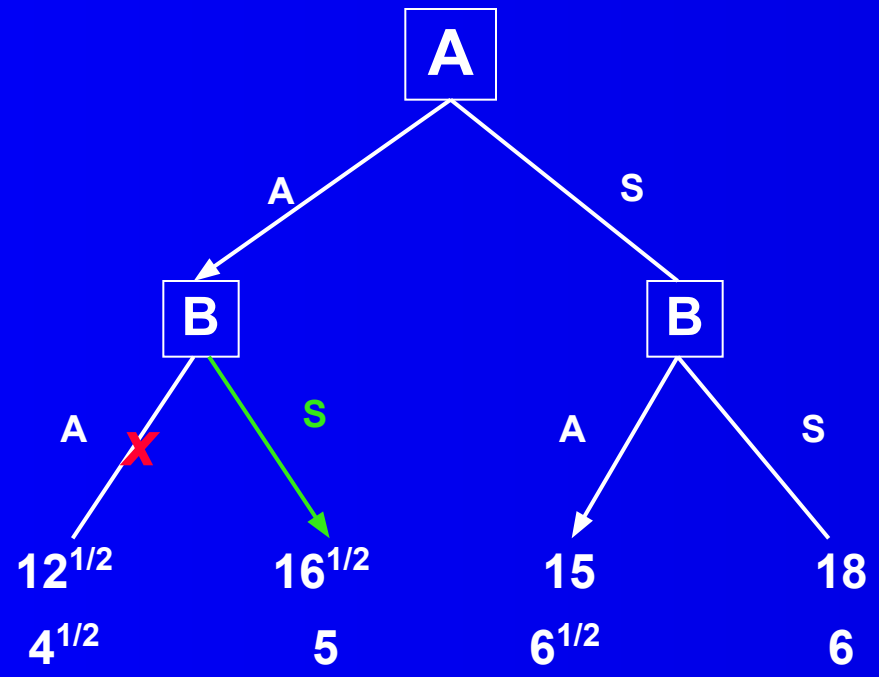

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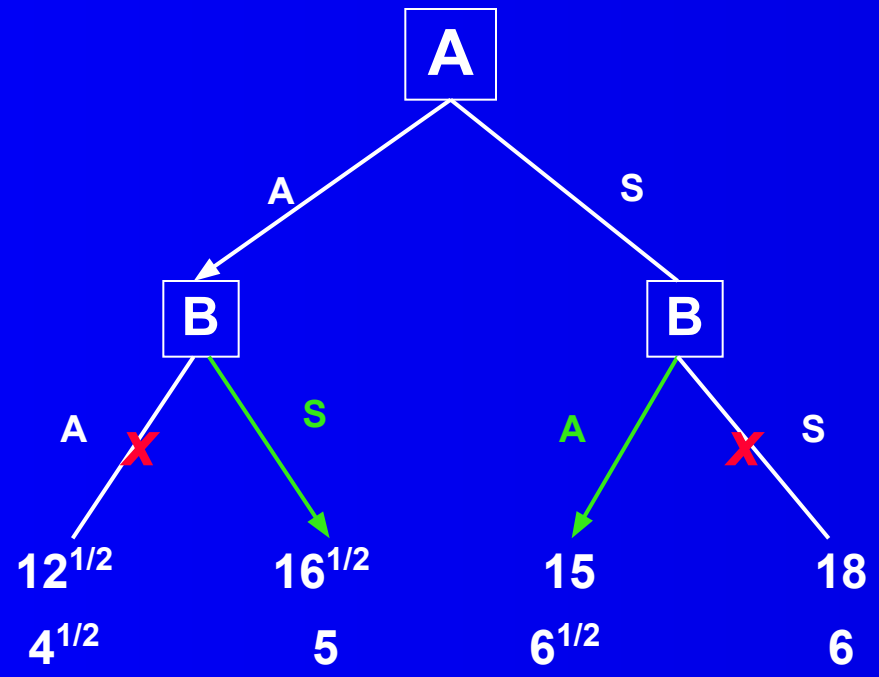

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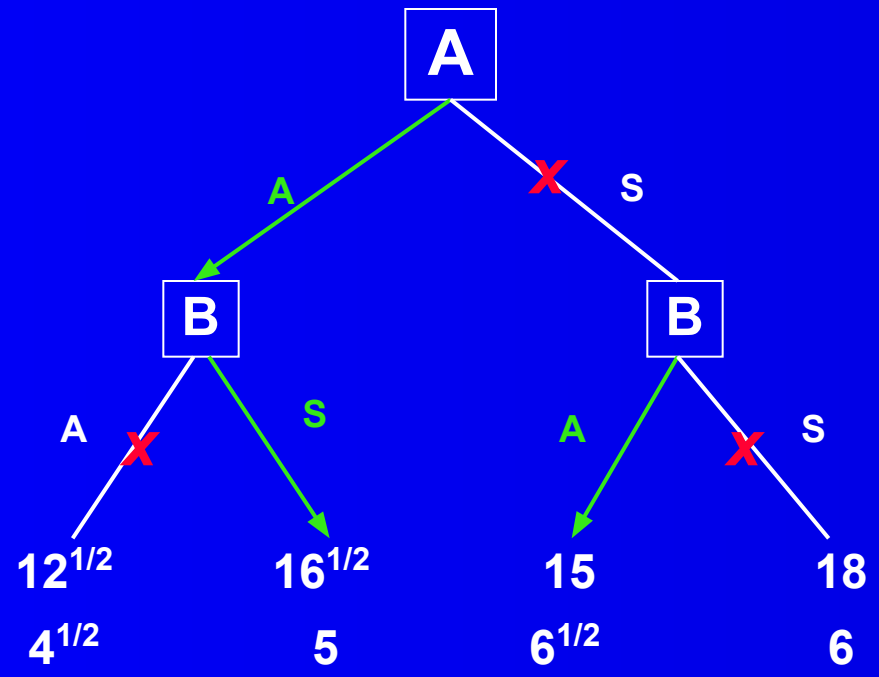

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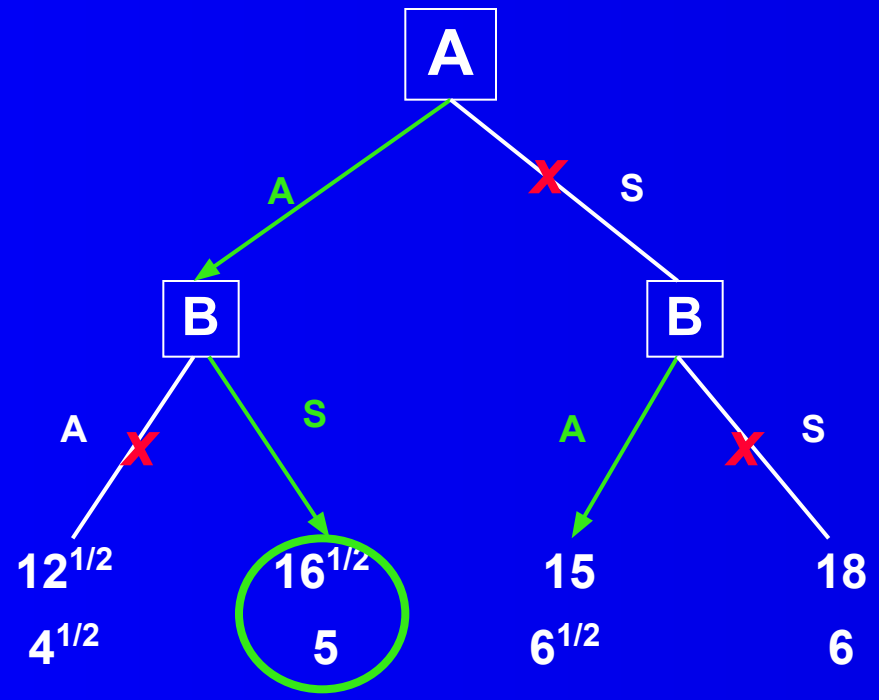

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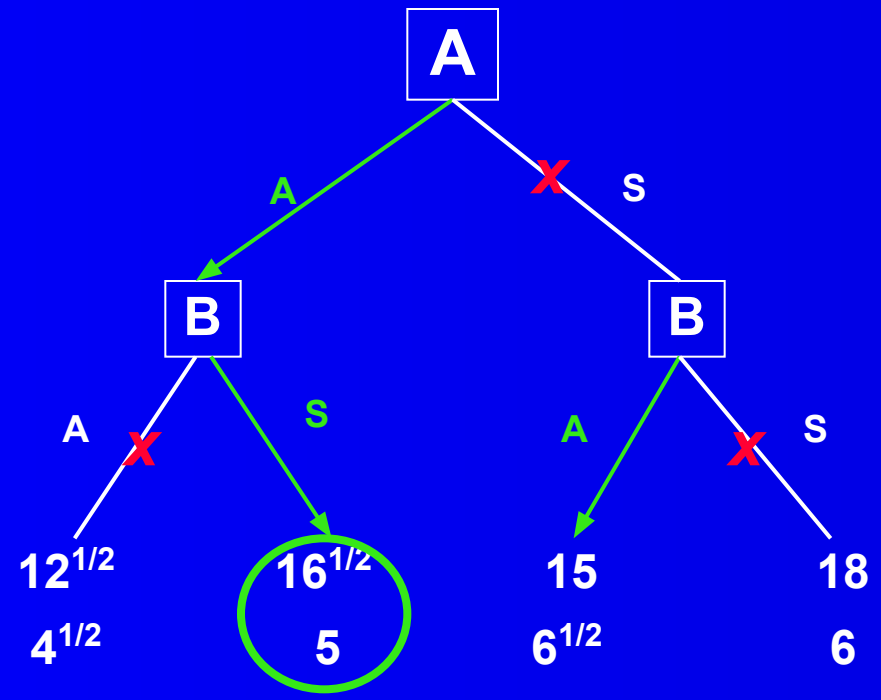

Sequential Payoffs (Able, Baker)

{Able: Aggressive, Baker: Soft} is a R.E. with payoffs of 16½, 5, but S is a dominant strategy for Able.
A's commitment increases its payoff.

The Value of Inflexibility

Inflexibility can have value: strategic commitments or moves that limit choices can actual improve one's position.

How?

By *altering one's rivals' expectations* of about how one will compete, and so altering their decisions, and so your outcomes.

By committing to what seems an inferior decision (Aggression), Able alters Baker's expectations and its action, to Able's advantage.

Altered perceptions.

4. Threats and Promises

Threats and promises are *responsive rules: y*our action is conditioned on what the other players do. But you will act according to the rule stated in the stage 1.

You are tied to a rule, which you would not want to follow if you were free to act.

4. Threats and Promises

US-Japan Trade talks. Each: Open or Closed markets.

Ranked: 4 = best, 1 = worst.

		Japan Open	*Japan* Closed
USA	Open	4, 3	3, 4
	Closed	2, 1	1, 2

4. Threats and Promises

US-Japan Trade talks. Each: Open or Closed markets.

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		Japan	
		Open	**Closed**
USA	**Open**	**4, 3**	**3, 4**
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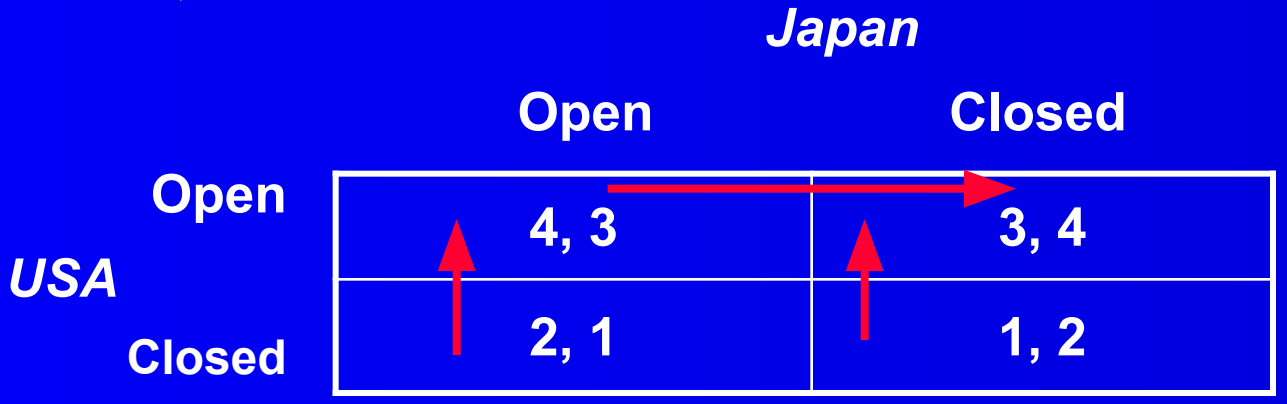

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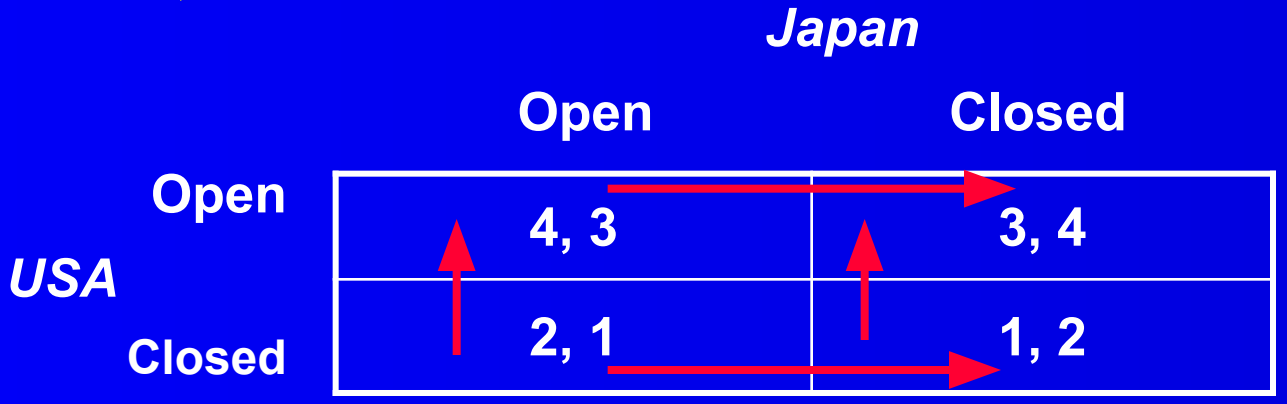

4. A. Example of a Threat

US-Japan Trade talks. Each: Open or Closed markets.

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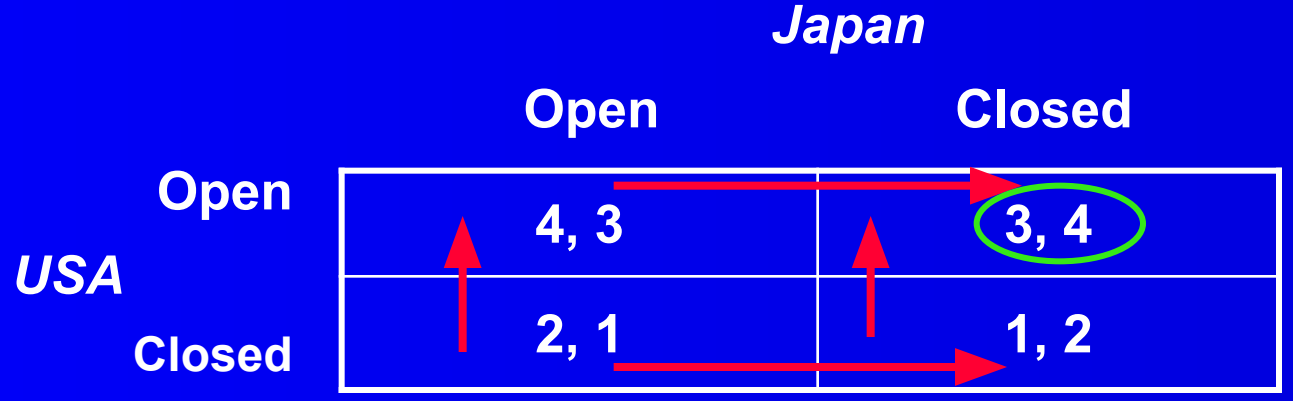


USA leans to Open markets, Japan to Closed.

Each has a dominant strategy → N.E. of Open, Closed

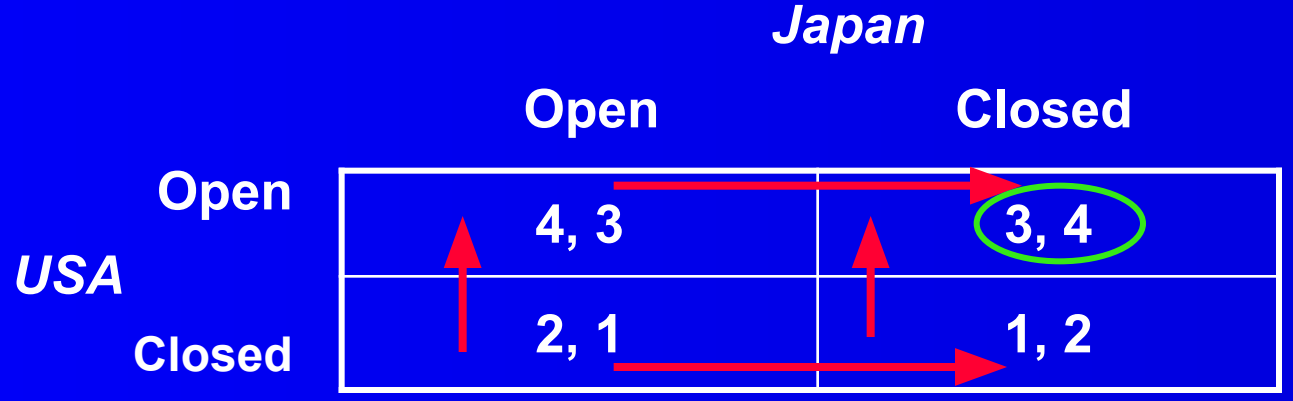
and for Japan this is the best combination.

This equilibrium holds also in sequential games, no matter who is the first to move.

4. A. Example of a Threat

US-Japan Trade talks. Each: Open or Closed markets.

Ranked: 4 = best, 1 = worst.



USA leans to Open markets, Japan to Closed.
Each has a dominant strategy → N.E. of Open, Closed
and for Japan this is the best combination.

USA can use a *strategic move* to get Open, Open.

HOW???

How?

Not by using the unconditional move (commitment of Open), since → N.E. of {O,C} already.

USA: “We’ll Close our market if you Close yours.”

Then in response only Japan has freedom of choice: USA echoes this.

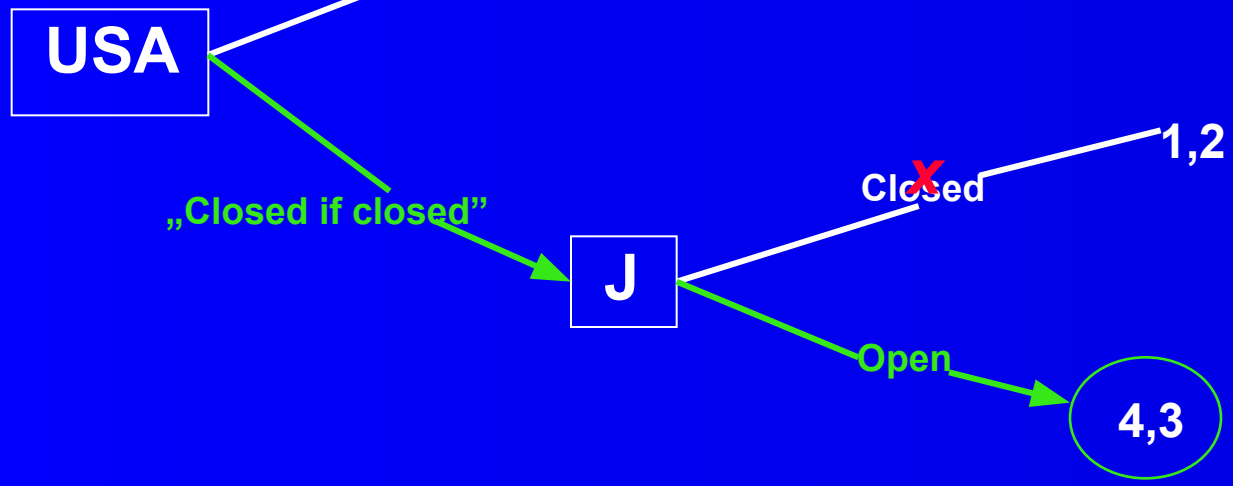
Japan chooses Open (since 3 at {O,O} is better than 2 at {C,C} for them), and USA gets at 4 {O,O} instead of 3 at {O,C}.

(Can use rollback on a two-stage tree, where USA gets to choose Threat or No threat first.)

USA v. Japan Trade game tree

Payoffs (USA, J),
ranked: 4 = best, 1 = worst

		Japan	
		Open	**Closed**
USA	**Open**	**4, 3**	**3, 4**
	Closed	**2, 1**	**1, 2**



R.E.: USA Threatens, then Japan Opens

Rollback in the USA-Japan game:

1. USA credible threat → J doesn't follow its dominant strategy (of C).
2. Credibility of US threat? A bluff? Must inflict mutual harm: C,C → 1,2. If that is not the case, it's not a threat but *warning*.
3. Threat incomplete: "and US Open if J Open." – implicit promise.
4. Credible threat → change in J's actions;
   deterring or compelling depends on where J is (its status quo ante).
5. How to make it credible?
   L-A-W (automatic), or delegate to protectionists in the Admin.
6. Note: If a threat works, it doesn't need to be carried out. (Unlike a promise). But the threat must not be *too big*, because it would not be credible.
7. J might use *salami tactics*: Open its markets slowly.

4.B Example of a Promise

Player 1: I will charge 5 if you do the same.

Player 1 makes promise in the first stage.

In the second stage he must arrange to move second.

Player 2 will move first in the second stage

Is Player's 1 promise credible?

		Player 2	
		3	5
Player 1	3	30/30	50/20
	5	20/50	40/40

4.B Example of a Promise

How to make Player's 1 promise credible?

- Delegate the decision and specify, that the price should equal Player's 2 price.
- Reputation

What is the cost of keeping a promise?

		Player 2	
		3	5
Player 1	3	30/30	50/20
	5	20/50	40/40

4.C Example Combining Threat and Promise

Action to compel North Korea to give up its nuclear weapons program

What is NE?

NE – {action, inaction}

		China	
		Action	Inaction
US	Action	3/3	2/4
	Inaction	4/1	1/2

4.C Example Combining Threat and Promise

An unconditional move will not work.

A threat alone will not work (implied promise is not credible)

A promise alone will not work (implied threat is not credible)

One has to make implied threat/promise credible

US: „We will act if, and only if, you do”

		China	
		Action	Inaction
US	Action	3/3	2/4
	Inaction	4/1	1/2

Warnings and Assurances

- Warnings and assurance are non-strategic: there is *no temptation to renege,* since they are N.E. actions.
- If the rule says merely that you will do what is best at the time, then there is no change in others' expectations, and hence no influence.
- When it's in your interest to carry out a "promise": an *assurance* — mere information.
  - A warning ≠ a threat, and
  - An assurance ≠ a promise.

5. More Strategic Moves

- More complicated options than above. Instead of establishing a response rule directly, you could allow someone else to take advantage of one of these options:
  - Allow someone else to make an unconditional move before you respond, *or*
  - Wait for a threat before taking any action, *or*
  - Wait for a promise before taking any action

Leave your opponent an escape.

- But sometimes your goal is: to prevent your opponent from making an unconditional commitment:

  - "When you surround an enemy, leave an outlet free." Deny the enemy the credible commitment of fighting to the death.

- It's never advantageous to allow others to threaten you:

  - you could always do what they wanted you to do without the threat;

  - the fact that they can make you worse off if you do not cooperate is bad, because it only limits your available options.

- *But* if the other side can make *promises*, then you can be better off.

Deterance vs. Compelance

In principles, either a threat or a promise can achieve either deterrence or compellence.

In practice deterrence is better achieved by a threat and compellence by a promise. This is due to timing and initiative.

- Deterrent threat can be passive and without any time limit. „If I ever catch you smoking, I will impose a 7 p.m. curfew on you for a whole year". Achieving this by promise would be more complicated.
- Compellence must have a deadline. „Each term you get the average above „5" I will give you €500".
- Reward and punishment depends on status quo.

Getting the threat right ...

— *Monty Python's Piranha Brothers*

The Operation: *x*

1. Select a victim.
2. Threaten to beat him up if he paid the "protection" money.

The Other Operation: *x*

1. Select a victim.
2. Threaten not to beat him up if he didn't pay the "protection" money.

The Other Other Operation: *v*

1. Select a victim.
2. Threaten to beat him up if he didn't pay the "protection" money.

6. Acquiring Credibility

- “Continental Airlines said yesterday that it would raise airfares on about two-thirds of its routes ... to take effect September 5.” *New York Times,* August 29, 1992.

  “Continental Airlines has dropped its plan to raise domestic airfares by 5%.” *USA-Today,* 1992.

- “Microsoft officials won’t confirm or deny that its commitment to ACE with OS/2 3.0 was a bluff, but the [previous] announcement bought them about six months.” *UnixWorld,* February 1992.

- “On Januar y 5, Boeing, the world’s top aircraft maker, announced it was building a plane with 600 to 800 seats, the biggest and most expensive airliner ever. Some in the industry suggest Boeing’s move is a bluff to preempt Airbus from forging ahead with a similar plane.” *Business Week,* 1993.

  See the linked HBR case:
  www.people.hbs.edu/besty/Esty_Airbus_Boeing.pdf

6. Acquiring Credibility

A Reducing your freedom of action

B Changing your payoffs

Ten-Fold Path to Credibility

1. Automatic fulfillment (the *doomsday device*)
2. Delegation
3. Burning bridges
4. Cutting off communication
5. Reputation
6. Moving in steps
7. Teamwork
8. Rational irrationality (method in one's madness)
9. Contracts
10. Brinkmanship

Two Underlying Principles

A. *Limiting oneself's ability* to back out of a commitment or curtailing oneself's freedom - three possibilities: deny oneself any opportunity to back down,

— by cutting oneself off from the situation, or

— by destroying any avenues of retreat, or even

— by removing oneself from the decision-making position and leaving the outcome to chance

See methods 1, 2, 3, and 4.

Changing the effective payoffs

B. *Making it costly for oneself to renege*, by changing the payoffs of the game.

— to make it in oneself's interest to follow through on oneself's commitment:

— turn a threat → a warning,

— turn a promise → an assurance.

See methods 5, 6, 7, 8, 9, and 10.

6.1 Automatic fulfillment

Dr Strangelove's Doomsday device:

— its automatic trigger was essential;

— it made a good deterrent because it made aggressive action tantamount to suicide.

— But a cost: what if the aggression is based on a mistake?

— Cannot turn off the doomsday device's automatic retaliation.

Want a threat no stronger than necessary to deter the rival.

Reducing your freedom of action

6.2 Delegation

Buying a new car — “I’m on your side and I want the sale, let me ask the boss about the trade-in price”.

One’s bargaining situation can be improved if one has an agent to negotiate on one’s behalf.

A union leader may be less flexible because of his reputation. Or an agent may not have authority to compromise.

But using an agent can raise problems of divergence of interests — the Principal-Agent problem — which raises the issue of the appropriate *contract* between the principal and her agent.

Commerce Department in the USA example

Reducing your freedom of action

6.3 Burning Your Bridges (or Sinking Your Ships)

Cortes' burnt ships had two effects:

— his soldiers had no alternative but to fight,

— the opposition could see that there was no easy out for the would-be conquistadores, while they could retreat inland, which they did. Importance of all participants seeing the bridges being burnt.

Figuratively burning one's bridges with a particular group may increase one's credibility with other groups.

Another examples:

- William the Conqueror in England

- Common currency in Europe vs. fixed exchange rates regime.

- *Kamikaze* pilots

- Polaroid's undiversified business: instant photography. Successfully defended itself in court against Kodak's instant film and camera, but digital technology then sidelined Polaroid.

- Pulling down the Berlin Wall as a burnt bridge for Eastern Germany's "reformist" government.

Reducing your freedom of action

6.4 Cutting Off Communication:

Can make a decision truly irreversible.

— Extreme form: last will and testament.

— Posting a letter/receiving a letter.

— Pressing the “Send” button.

— Turning off one’s mobile.

— Closing one’s hotmail account.

— Other examples?

Changing your payoffs

6.5 Reputation:

In a repeated interaction, reputation may be valuable. (“Never negotiate with terrorists /Sendero Luminoso/the IRA/etc.”)

Why? Costly? alternatives?

Sometimes *destroying* your reputation has commitment value, by committing you *not* to take actions in the future against your best interests.

— Despite a commitment never to negotiate with hijackers, what if the government reaches a negotiated settlement and then breaks this by attacking the hijackers?

— with this action the government denies itself the ability to negotiate with hijackers in the future: how could hijackers ever be able to believe the government’s future promises?

In a once-in-a-lifetime situation, reputation may not matter (tourists, beware!)

6.6 Moving in Steps — “salami slices”

Break the threat or promise into many, small pieces, and then each is dealt with separately, one after the other.

Establishment of trust? Convert a once-off into a repeated game, in which reputation is important. Paying the builder.

End-game strategies? (such as Always Defect)

6.7 Teamwork

Peer pressure in AA. Pride and self-respect are lost when commitments are broken — enough to drive one to drink?

As well as social pressure, the army uses coercive desertion penalties as well as inculcation of love of country and loyalty to one's mates to induce commitment.

Honour code at Stanford makes not only cheating an offence but also failing to report others who you know to have cheated; exams are not monitored.

6.8 Irrationality

Destroying the credibility of a promise makes credible the threat never to negotiate. (Tax/immigration amnesties and perverse incentives, and side effects.)

The player cultivates a reputation to create credibility for her future commitments, threats, and promises.

Pride in our word, our promises, is an end in itself, but also improves the credibility of our commitments.

But *irrationality* may make credible the player's threats—Osama bin Laden, the North Koreans.

So, it may be rational to be "irrational"!

Changing your payoffs

6.9 Contracts:

Easy in the case of promise

Difficult in the case of threats

Agreeing to punishment if you fail to follow through will make your commitments credible.

— Pay the programmer a lump sum because it's the end of the financial year, even though the promised program is three months late?

— No. The contract is the commitment device .

Changing your payoffs

6.9 Contracts:

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— No. The contract is the commitment device.

But beware, contracts can be *renegotiated*,

- *the party who enforces the action or collects the penalty must have some independent incentive.*

Possible to write contracts with neutral parties as enforcers, who must care whether the commitment is kept.

- Contracts alone cannot overcome the credibility problem.

6.10 Schelling's *brinkmanship*:

- establish a *risk*, but not a certainty, that retaliation will occur.
- A risk cannot be ignored, even if it seems very unlikely. (U.S. versus the USSR in Europe, Cuban missile crisis.)

7. Countering your opponent's strategic moves

How to fight/stop possible strategic move of your opponent:

- Irrationality
- Cutting off communication
- Leaving escape routes open (dousing fires, reconstruct the bridges)
- Undermining your opponent's motive to uphold his reputation („I will not tell anyone, that you fail to carry out your threat")
- Salami Tactics