EECS 440 System Design of a Search Engine
Winter 2021
Lecture 20: Negotiations

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Agenda

1. Course details.
2. Negotiations.

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Schedule

Mon Apr 19 3:00 pm   Slides due

Mon Apr 19 and Wed Apr 21 Presentations

Wed Apr 21 Classes end

Fri Apr 23 11:59 pm Final reports

Mon Apr 26 10:30 am Optional final exam

Mon Apr 26 thru Thu Apr 29 Team meetings

Presentations

Schedule posted at:

https://docs.google.com/spreadsheets/d/1qOhvgkPm-cZz34d4-74FXA8GmVPnJ1PjJzJzDm_Y0Jc/edit#gid=0

Someone had to go first.

Fill in links to your Zoom meetings and recordings.

Details on Canvas.

Submit your slides on Canvas by 3:00 pm Mon Apr 19.

If you aren't presenting, you are expected to attend a presentation of your choice. (Please try to spread out.)

You do not have to demo.

You have 20 minutes with 10 minutes breaks in between.

Final reports

Due 11:59 pm April 23.

Zip of your code, your report and your finished slide deck.

Details on Canvas.

Try to keep it to 10 pages + exhibits and diagrams.

Peer evals

We'll do surveys of your teammates and you will each get a report like this:

```
Hello, Kara Danvers (kara).

Below is an individual report of your EECS 440 peer evaluations.
Results range from 1 (Strongly Disagree) to 5 (Strongly Agree).
```

	Your Rating	Team Average	Class Average
Sets High Standards And Delivers High Quality.	2.6	4.2	4.2
Treats Others With Respect And Respects Their Boundaries.	4.6	4.4	4.6
Listens To And Encourages Others' Ideas.	4.2	4.3	4.5
Is Cooperative.	4.2	4.4	4.5
Is Reliable, Shows Up, Answers Emails, Delivers On Time.	1.6	4.1	4.2
Contributed Lots Of Helpful Ideas.	3.4	4.2	4.2
Responds Constructively To Suggestions Or Criticism.	4.4	4.3	4.4
Really Stepped Up To Do Their Share Of The Work.	2.8	4.3	4.2
Is An Excellent Teammate.	2.8	4.3	4.3

Team meetings

I will open up 90-minute meetings with each team for you to demo and debrief on your experience.

As before, the meetings will be non-evaluative except that you must demo to finish the course.

I've decided to do these after the final and I've had a chance to read your submissions.

Mon Apr 26 through Thu Apr 29.

Agenda

1. Course details.
2. Negotiations.

Examples

1. Buying a car from a dealer.

2. Buying or selling a car from through Craigslist.

3. Buying or selling a house.

4. Negotiating a starting salary or title.

5. Negotiating a quantity discount.

6. Negotiating a licensing agreement.

7. Negotiating with a potential investor.

8. A union negotiating with an employer.

9. Where to have dinner with friends.

10. With your spouse about whether it's a good time to have another child.

Bargaining is cultural

Americans expect to pay posted prices except on cars and houses or when buying outside the usual retail channel.

People growing up in other parts of the world often expect to bargain over everything.

Everything is negotiable.

Everything is negotiable
until you find out for sure it's not.

Going into a negotiation, it's helpful to know:

1. What you want.

2. The minimum you would accept.

3. What you think the other side would accept.

4. What happens if you don't get an agreement.

Example: Buying a new car, you might research typical prices paid or dealer invoice prices.

usnews.rankingsandreviews.com/cars-trucks/Honda_Accord/prices/

U.S.News BEST CARS

Car Rankings & Advice

| Home | New Cars | Used Cars | Car Rankings | Financing | News |

Find a Car: | All Makes ▾ | All Models ▾ | Year ▾ | **GO**

Home > Honda > 2015 Honda Accord > Prices

2015 Honda Accord   2014   Used   Repairs

#5 in **Affordable Midsize Cars**

Avg. Paid: $22,070 - $33,033
MSRP: $22,105 - $33,630
Invoice: $20,237 - $30,749

More Photos »   American Honda Motor Co., Inc.

Find the best local price: Zip Code   **GO**
How the Best Price Program works »

| Review | **Prices** | Specs | Performance | Interior | Safety | Reliability | Pictures |

Honda Accord Prices

Use the U.S. News Best Price Program to lock in a great price on the Honda Accord without the hassle. Shoppers have seen average savings of $3,221 off MSRP across vehicles. You can also research what others have paid for the Honda Accord to make sure you don't overpay. Learn more »

LX Manual Sedan

Find the best local price: Zip Code   **Get Best Price ▶**

Average Paid*:   See what others paid in your area »
MSRP: $22,105
Invoice: $20,237

See all specs and options »
Front Wheel Drive
Manual
Regular Unleaded I-4 2.4 L/144
24 City / 34 Hwy

U.S. News Auto Rankings

Rankings for Affordable Midsize Cars

#1 2015 Hyundai Sonata
#2 2014 Toyota Camry Hybrid
#3 2014 Ford Fusion Hybrid
#3 2014 Honda Accord Hybrid
#5 2015 Honda Accord

Compare with the Accord »

2014 U.S. News Best Car Awards

BEST CARS
U.S.News AWARDS

Best Cars for the Money
Great cars that are also great values

Best Cars for Families
Cars that the whole family will love

Monthly Payment Calculator

Calculate your monthly payment for the 2015 Honda Accord.

Avg. Paid: $22,070 - $33,033
MSRP: $22,105 - $33,630

Calculate Monthly Payment

I'm going borrow from these sources.
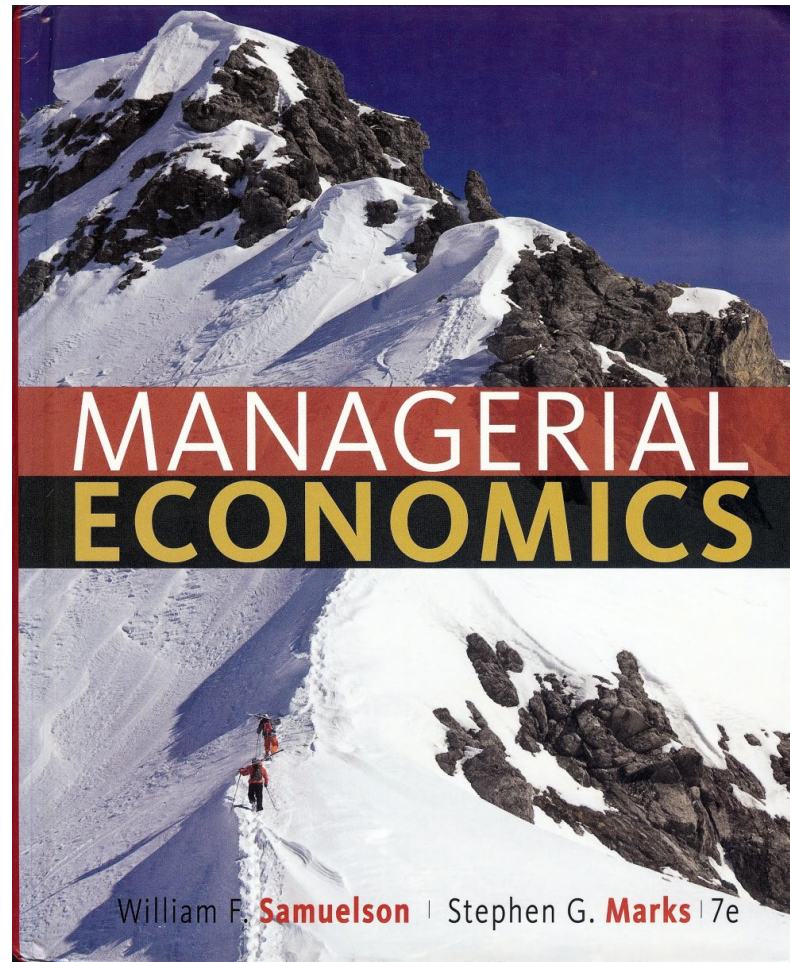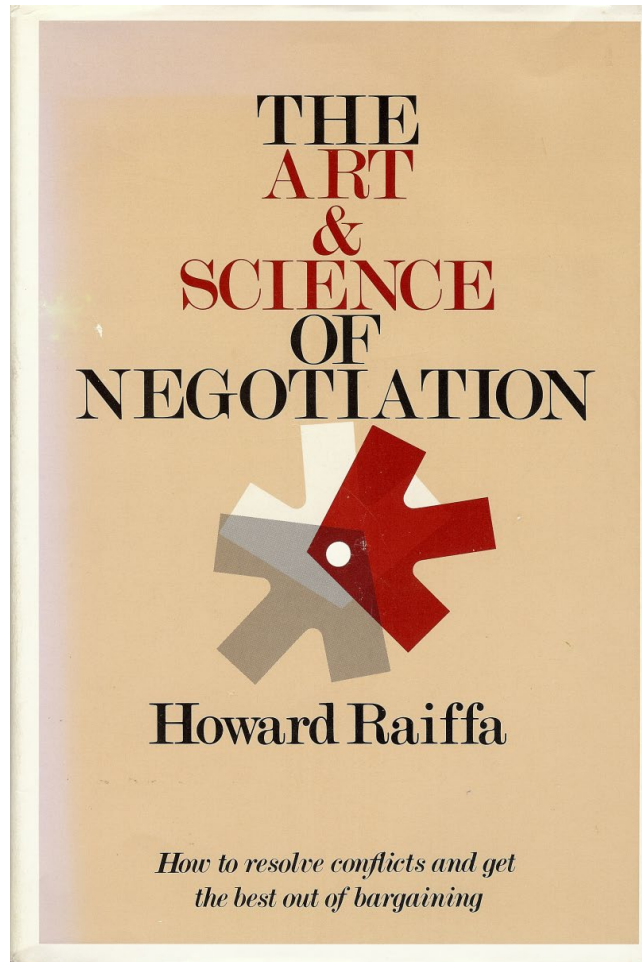
Lots of negotiations are simple.

One buyer, one seller, one issue: price.

These are purely distributive.

One party's gain is the other's loss.

Zero sum.

Example: Selling a warehouse

Two firms negotiating the sale of a warehouse, the equipment and inventory.

The main issue is price.

Present owner is closing down.

Valuable location to the buyer, who could make use of the equipment and inventory.
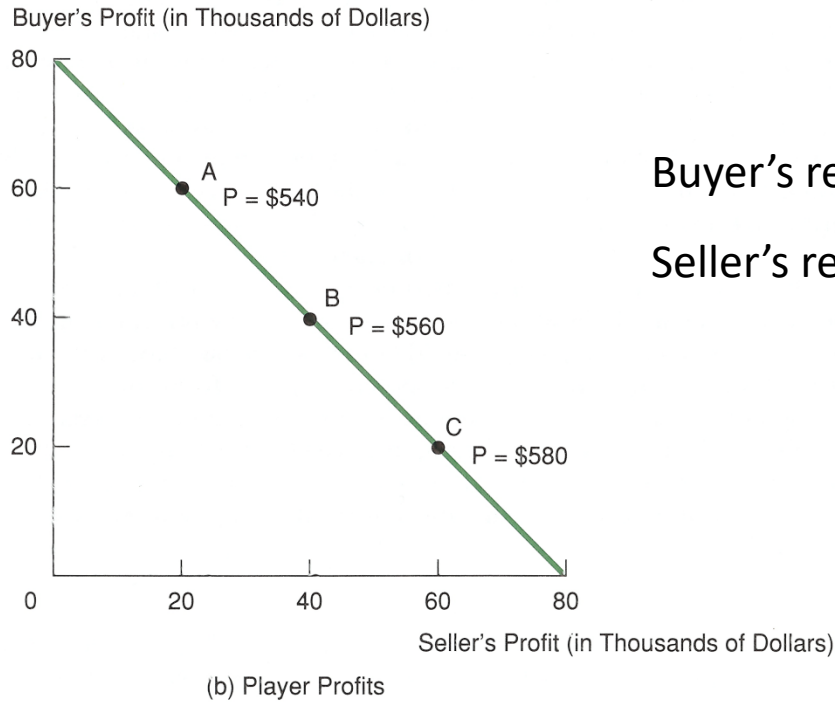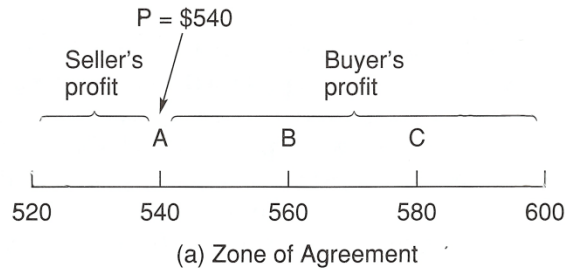
Buyer estimates the value at $600K.

Seller estimates the value at $520K.

These are their **reservation prices** or **walk-away prices**.

Source: Samuelson & Marks, *Managerial Economics, 7e*, p. 631.

P = $540

Seller's profit

Buyer's profit

A   B   C

520   540   560   580   600

(a) Zone of Agreement

Buyer's Profit (in Thousands of Dollars)

80

A
60   P = $540

B
40   P = $560

C
20   P = $580

0   20   40   60   80

Seller's Profit (in Thousands of Dollars)

(b) Player Profits

Buyer's reserve $600K.

Seller's reserve $520K.

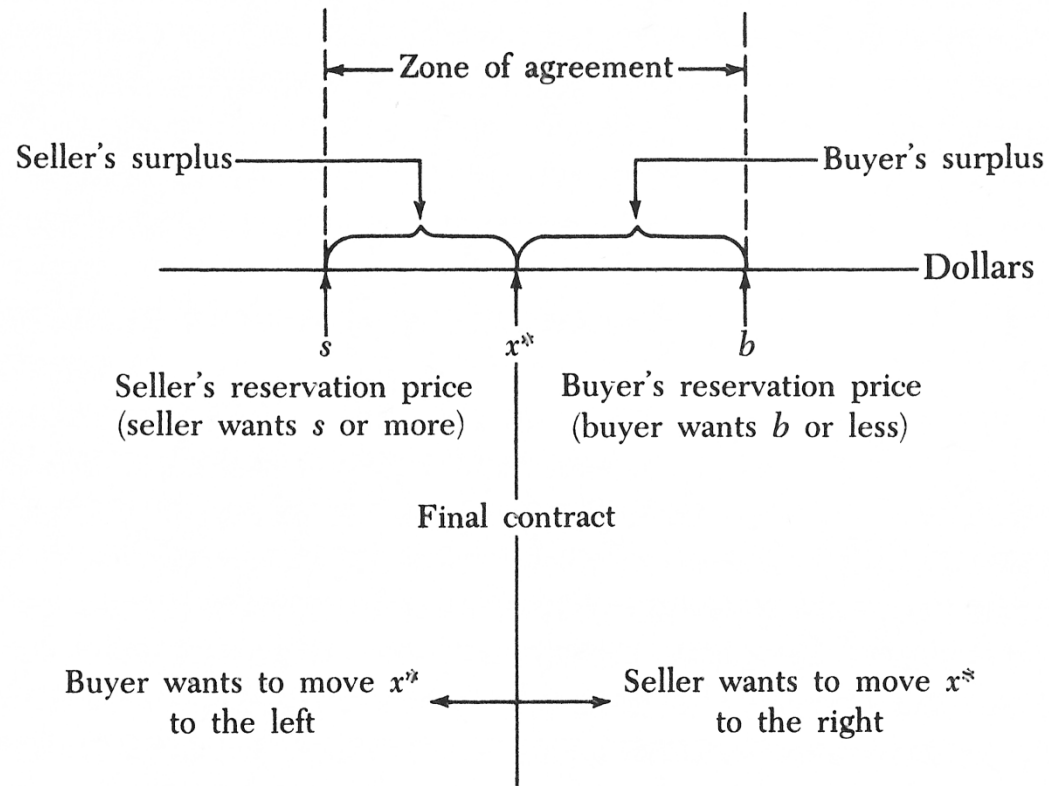Source: Samuelson & Marks, *Managerial Economics, 7e*, p. 633.

Figure 2. The geometry of distributive bargaining. (Note: If $b < s$, there is no zone of agreement.)

Source: Howard Raiffa, *The Art & Science of Negotiation*, p. 46.
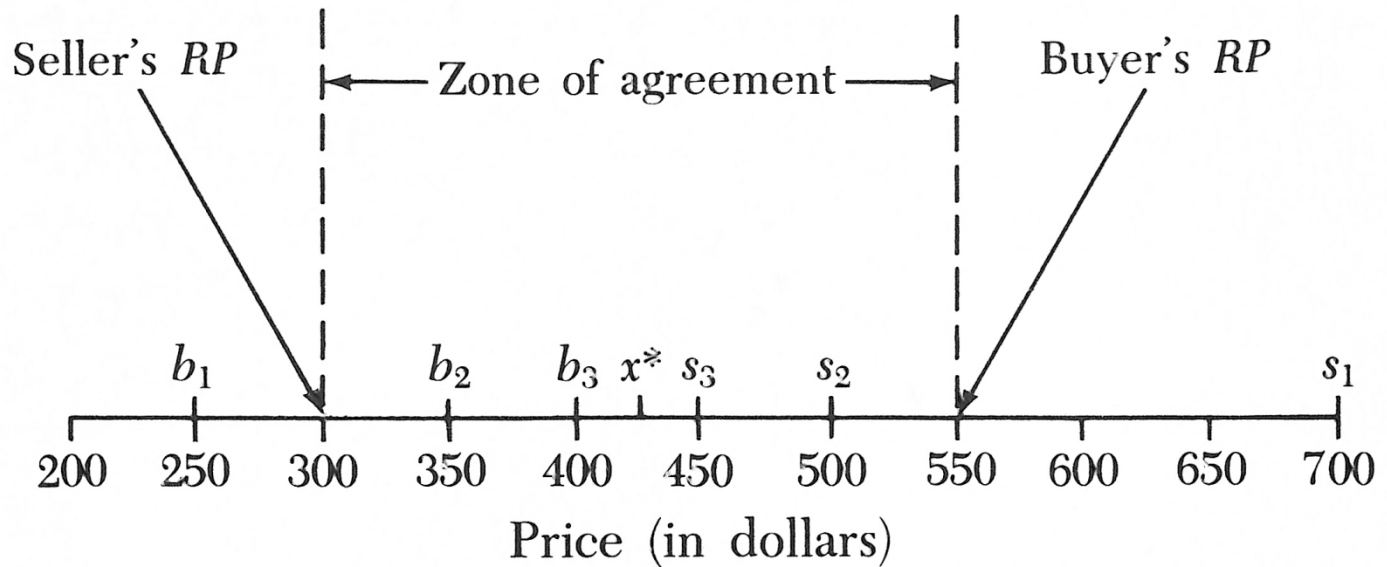
Figure 3. The negotiation dance (x^{*} = final-contract price).

Source: Howard Raiffa, *The Art & Science of Negotiation*, p. 48.

When there are multiple issues, there is often an opportunity to enlarge the pie with concessions that are worth more to one side than the other.

The **efficient frontier** – also called the Pareto Optimal Frontier – is the locus of achievable joint evaluations from which no joint gains are possible.

Source: Raiffa, *The Art & Science of Negotiation*, p. 139.

Hypothetical case

Associated Metropolitan Police Officers (AMPO) versus City.

The issues to be settled were the following:

1. starting salaries for police officers
2. maximum salaries for police officers
3. vacation for officers with less than five years' service
4. vacation for officers with more than five years' service
5. the status of fourteen officers under suspension
6. the percent of two-man patrol cars
7. creation of the rank of corporal
8. expansion of the number of sergeants
9. the fate of the police commissioner, Mr. Daniels
10. the status of the Police Civilian Review Board.

Source: Raiffa, *The Art & Science of Negotiation*, p. 133 – 140.

TABLE 7. *Scoring schedule for AMPO and City.*

Issue	Setting	Payoff (in points) City	Payoff (in points) AMPO
Increase in salary: starting	$0–99	0	0
	100–199	0	100
	200–299	0	200
	300–399	0	300
	400–499	0	400
	500	0	550
	501–599	−4	550
	600	−4	700
	601–699	−8	700
	700	−8	850
	701–799	−16	850
	800	−16	1,000
	801–899	−32	1,000
	900	−32	1,150
	901–999	−64	1,150
	1,000	−64	1,300
	1,000+	NA	1,300+
Increase in salary: maximum	$0–499	0 to −12	NA
	500	−12	0
	501–600	−24	2–200[a]
	601–700	−48	202–400[a]
	701–750	−96	402–500[a]
	750+	NA	500+
Increase in vacation: less than 5 years' service	0 days	0	0
	2	−3	40
	3	−6	60
	4	−10	85
	5	−15	110
	5+	NA	110+
Increase in vacation: more than 5 years' service	0 days	0	0
	1	−2	0
	2	−6	60
	3	−14	85
	3+	NA	85+
Bonus if increase in vacation for all officers is held to zero			+10

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TABLE 7 *continued.*

Issue	Setting	Payoff (in points) City	Payoff (in points) AMPO
Reinstatement	No	0	NA
	Yes, without back pay	−50	−100
	Yes, with back pay	−70	0
Two-man patrols	Status quo	+15	−25
	Less than 20% increase	−5	25
	Greater than 20% increase, but less than strictly two-man patrols	−5	50
	Strictly two-man patrols	NA	100
Create rank of corporal	No	+5	0
	Yes, limit of 20	−15	50
	Yes, unlimited	−20	50
Increase number of sergeants	0	+5	0
	1	−2	10
	2	−4	20
	3	−6	30
	4	−8	40
	5	−10	50
	6	−13	60
	7	−16	70
	8	−19	80
	9	−22	90
	10	−25	100
	10+	NA	100+
Commissioner Daniels	Fire	+40	200
	Keep	0	0
Police Civilian Review Board	Disband	−100	250
	Add police, no vote change	−20	150
	Add police, change vote	+20	100
	No police, no vote change	0	25
	No police, change vote	+20	−25

Note: If the City and AMPO failed to reach agreement on a sufficient number of issues (which were specified in the confidential information sheets), the City representative received a *total* score of −250 and the AMPO representative received a *total* score of 600. These scores were City's and AMPO's reservation prices.

NA indicates that such a setting was not acceptable as part of the agreement. A City representative who agreed to a setting that was not acceptable to City received a *total* score of −250, and an AMPO representative who agreed to a setting that was not acceptable to AMPO received a *total* score of 600.

a. For these settings, the AMPO representative received 2 points for every dollar over $500.
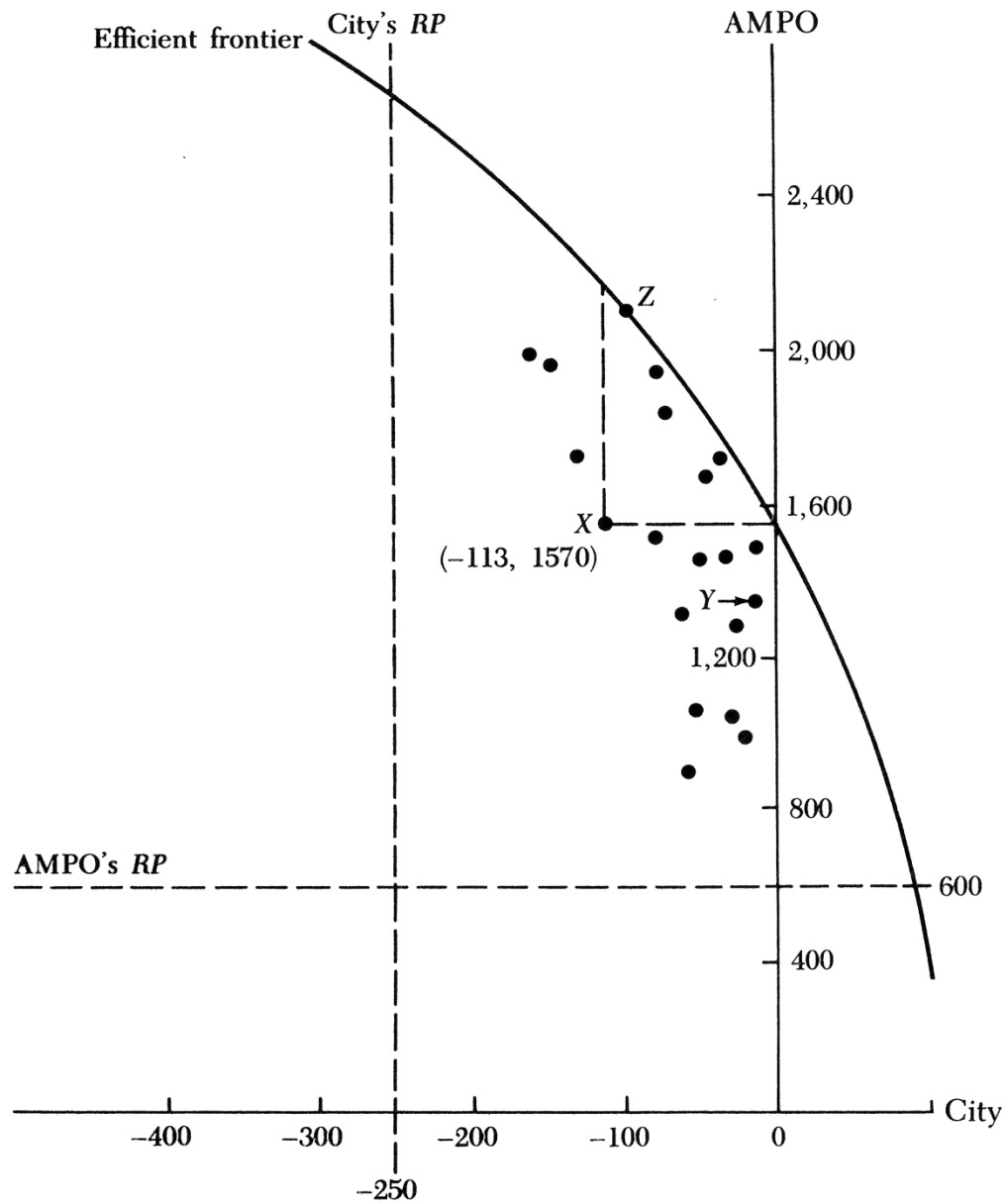
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Figure 23. Selected joint evaluations and the efficient frontier.
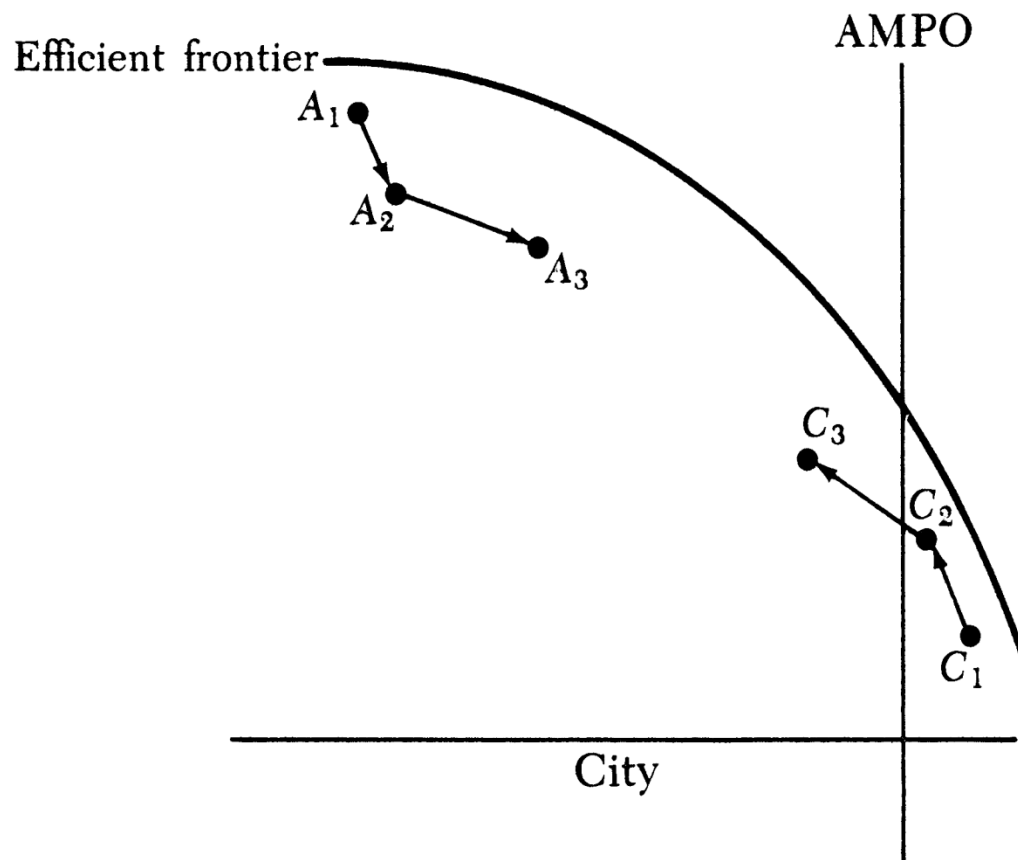
Figure 24. A dance of complete packages.

What makes a negotiation more complex?

Possible complexities

1. Are there more than 2 parties?
2. Are the parties monolithic?
3. Is the game repetitive?
4. Are there linkage effects?
5. Is there more than one issue?
6. Is an agreement required?
7. Is ratification required?
8. Are threats possible?
9. Are there time constraints or time-related costs?
10. Are the contracts binding?
11. Are the negotiations private or public?
12. What are the group norms?
13. Is third party intervention possible?

Source: Howard Raiffa, *The Art & Science of Negotiation*, pp. 11-19.

"The most important thing in acting is honesty. Once you've learned to fake that, you've got it made."

      -- Samuel Goldwyn

A negotiation exercise

Selling a Maine house

Game designed by Bill Samuelson at Boston University.

Some of you will be buyers, others sellers.

Not all of you will have the same information.

You will have 10 minutes to read and prepare for the negotiation and 15 minutes to do it and report.

I'll put you into breakouts where you can decide who's the buyer and who's the seller.

Instructions here. Report your results in the spreadsheet.

https://drive.google.com/drive/u/1/folders/1mWIMRO8uqgn-YBEhkqqotFhbGhHq7hU0

SPOILER ALERT!!
STOP HERE UNTIL AFTER
YOU'VE FINISHED THE
EXERCISE

How many think they did really well?

Did anyone get skunked (zero profit)?

Strategies that worked or did not work?

How many chose the 17 acre option?

How many chose the 14 acre option?

What worked well
or not so well?

Observations

Make the pie bigger. Try to create a larger zone of agreement to share.

Negotiations tend to end in the middle between the opening offers.

Biggest mistake is being too generous in the first offer. Need to ask for a lot but not so much that the expected midpoint is outside any zone of agreement. Helps to compare offers by calculating profit.

Helps to ask questions like, "Suppose we changed the deal this way? What would that do?"

It also helps to be obstinate but being unreasonable doesn't help.

Lots of negotiations end "on the courthouse steps."

Two versions

All buyers had same information:

    Reserve price of $150K for house + 17 acres

    or $127K for house + 14 acres

Odd sellers:

    Reserve price of $120K for house + 17 acres

    or $107K for house + 14 acres

Even sellers:

    Reserve price of $120K for house + 17 acres

    or $85K for house + 14 acres

Odd pairs

House + 17 acres:

Buyer's reserve	$150K
Seller's reserve	$120K
"Profit" to be split	$ 30K

Most odd pairs should pick the house + 17 acres option because there's more profit to split.

House + 14 acres:

Buyer's reserve	$127K
Seller's reserve	$107K
"Profit" to be split	$ 20K

Even pairs

House + 17 acres:

Buyer's reserve	$150K
Seller's reserve	$120K
"Profit" to be split	$ 30K

House + 14 acres:

Buyer's reserve	$127K
Seller's reserve	$ 85K
"Profit" to be split	$ 42K

Most even pairs should pick the house + 14 acres option.