Guess Two-Thirds of the Average

- Choose a number between 0 and 100.
- A prize of $5 will be split equally between all participants whose number is closest to $\frac{2}{3}$ of the average number chosen (the mean of all choices).
- What should you choose?
- Write down your answer.
- If we repeated this several times, where would it end (its equilibrium)?

Business Rivalry

You are the CEO of a firm which has a single rival in the market. How much (max) would you be prepared to pay to have the rival firm lose $1 from its bottom line?

Duelling Networks

Two television networks, let's call them ABC and XYZ, are battling for shares of total viewers. Viewer shares are important because the higher the viewer share, the greater the amount of money the network can make by selling advertising time on that program.

Each network can show either a *sitcom* or a *sport event*, and the networks make their programming decisions independently and simultaneously. ABC has an advantage in sitcoms: if both networks show sitcoms, then ABC gets a 55% viewer share and XYZ a 45% share. XYZ has an advantage in sport: if both networks show sport, then XYZ gets a 55% share and ABC a 45% share. If ABC shows sport while XYZ shows a sitcom, the shares are evenly split; if ABC shows a sitcom while XYZ shows sport, the shares are 52% : 48%, respectively.

a. Draw a 2×2 payoff matrix for this interaction, clearly labelling the players, their choices, and the payoffs.

b. Identify any equilibria, clearly showing why.

An Example of Your Own?

1. Think of an interaction (within your organisation, or between your organisation and another) where you had to choose before knowing what the other had chosen **and vice versa**, and where the outcome for each depended on what both chose. This can be modelled a *simultaneous-play game*.
2. What were the occasion, the possible choices, and the possible outcomes?
3. Rank the outcomes for you. For the other player.
4. Present this as a payoff matrix.
5. What happened?

Paper, Scissors, Rock

A children's game (in various forms) is found around the world—in Australia we call it "Paper, Rock, Scissors." Simultaneously, two kids will each hold up a hand, shaped as paper, or as rock, or as scissors. Paper wins over rock (smothers); rock wins over scissors (blunts); and scissors wins over paper (cuts).

a. How many possible combinations of play are there in the one-shot game? Choosing values for the rankings of the alternatives for each player, write down the full payoff matrix for this game.

b. What is meant by an "equilibrium" in such a game? Is there an equilibrium in players' actions? Explain.

c. What is a "dominant strategy"? Does either player have a dominant strategy in this game? Explain.

d. Would there be a first-mover advantage if the game were not simultaneous play? Explain.

e. What do you think the appeal of such a game is?

f. Can you think of any adult situations (including market interactions) similar to this game? Explain.

Paper, Scissors, Rock

Other player

You		Paper	Scissors	Rock
	Paper	0, 0	−1, 1	1, −1
You	Scissors	1, −1	0, 0	−1, 1
	Rock	−1, 1	1, −1	0, 0

TABLE 1. The payoff matrix (You, Other player)

A non-cooperative, zero-sum game,
with no equilibrium.

A Three-Way Battle

There are three television stations in an American city, each affliated with one of the three major networks, ABC, CBS, and NBC. All three stations have the option of running the evening network news program at either 6:30 pm (a “live feed”) or at 7:00 pm (a “taped delayed broadcast”). Among network news viewers, 60% prefer to watch the news at 6:30 pm, and 40% prefer to watch it at 7:00 pm because of competition at 6:30 pm with “The Simpsons” on an independent station. Moreover, head-to-head, ABC’s news program is the most popular, CBS’s is the next most popular, and NBC’s is the least popular. The share of evening news viewers captured by each station as a function of when the station shows its news in this simultaneous-play interaction is given in the Table. Each station’s objective is to maximise its share of the viewing audience, because that determines the station’s advertising revenue.

a. Find all the dominated strategies. Explain.

b. Eliminate the dominated strategies found in part (a) and find all the Nash equilibria in pure strategies of the simplified game. Explain.

ABC News @ 6:30 pm

		CBS News 6:30 pm	CBS News 7:00 pm
NBC News	6:30 pm	(42%, 34%, 24%)	(37%, 40%, 23%)
	7:00 pm	(34%, 26%, 40%)	(60%, 22%, 18%)

ABC News @ 7:00 pm

		CBS News 6:30 pm	CBS News 7:00 pm
NBC News	6:30 pm	(40%, 34%, 26%)	(34%, 26%, 40%)
	7:00 pm	(24%, 60%, 16%)	(42%, 34%, 24%)

Payoffs: (ABC, CBS, NBC)

The Firms' Hold-Up Problem

Two firms reach agreement on a joint venture, and then each invests in a sunk asset.

Each worries:

"They've got me over a barrel" — because of fear of:

- being forced to accept disadvantageous terms later, or
- its investment being devalued by the other's actions.

— the **hold-up problem**

Because of the absence of complete contracts (see later).

Example of the Hold-Up Problem

Assume the asset is entirely worthless outside the joint venture: *sunk*.

The cost of the investment is 2 for each firm,
and the gross return for the venture is 8, or a net return of 4.

Assume division of the gross return can occur through costly actions, which cannot be contracted.

Actions: “Grab” or “Don’t grab”.

Grabbing costs 3.

If neither Grabs, then equal shares = 2.

If both Grab, then equal shares = −1.

If A Grabs but B Doesn’t, then A gets 8 − 2 − 3 = 3 and B gets −2.
And vice versa.

The Hold-Up Problem

		B: Grab	*B*: Don’t
A	Grab	−1, −1	3, −2
A	Don’t	−2, 3	2, 2

TABLE 2. The payoff matrix (A, B)

A Prisoner’s Dilemma, *but* —

the firms don’t have to play!

The threat of opportunism completely destroys the incentive to invest:
If the firms can’t commit not to try to Grab, then no investment will take place:

Market example: 1920s General Motors and the independent Fisher Body company.

Your Previous Example of Strategic Interaction

Revisit the simultaneous interaction you described earlier.

1. What if you can now move first (so that your move is known by the other player when they decide how to move)? This can be modelled as a *sequential-play game*. How does this change the interaction?
2. What if the other player moves first?
3. Is there a first-mover advantage?
4. Is there a second-mover advantage?