

About this document

Details of the study (e.g., number of rounds) will be set according to time requirements. All such details given here are estimates.

Study overview

We propose a study in which participants act as buyers or sellers. Sellers will choose the pricing structure for their product and are compensated based on profits (quantity sold x price). Buyers will choose to buy a good from one of the sellers. They are compensated based on the price paid. Markets in different conditions will vary in terms of price dimensionality (how many dimensions comprise total price), and in the number of sellers who are present.

Our proposed conditions are as follows:

1-Price Duopoly	Two sellers will choose a single, total price. This price can vary between 0 and 800 tokens.
16-Price Duopoly	Two sellers will choose values for each of 16 prices. Each price can vary between 0 and 800 tokens, but the total price is constrained between 0 and 800 tokens.
1-Price Quadropoly	Four sellers will choose a single, total price. This price can vary between 0 and 800 tokens.
16-Price Quadropoly	Four sellers will choose values for each of 16 prices. Each price can vary between 0 and 800 tokens, but the total price is constrained between 0 and 800 tokens.

Timeline

			Repeated 2 times, with different order of conditions possible across sessions			
Informed consent [In person, from contractor]	General instructions (applicable to all disclosure conditions)	Practice rounds (as buyer and seller)	Condition specific instructions	14 game rounds	Survey, including risk preferences, numeracy, and basic demographics	Payment [In person]

Study detail

- Disclosure conditions: We will run two markets per session—one duopoly and one quadropoly. Which price condition players see in their session will be varied across sessions. We will track the order of conditions across sessions, making sure that all combinations are played an equal number of times
- Market:

- Each market will be comprised of 2 buyers. There will be 2 sellers in the duopoly conditions, and 4 sellers in the quadropoly conditions. Participants will be randomly assigned to a market group each round.
- Additionally, the role of buyer and seller will be randomly selected each round.
- All participants will be anonymous.

General Instructions (Applicable to All Disclosure Conditions and Roles)

Introduction

Values may be modified to allow for problems that arise during pretesting.

Welcome to the experiment.

[next]

Privacy Notice

The information you provide to Gettysburg College will assist the Consumer Financial Protection Bureau gather data that studies the effects of different disclosure regimes on market outcomes.

Participation is voluntary. You may withdraw your participation at any time. No identifying information will be collected.

Paperwork reduction Act Notice

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The OMB control number for this collection is 3170-0048. It expires on XX/XX/XXXX. The time required to complete this information collection is estimated to average approximately 2 hours per response. Comments regarding this collection of information, including the estimated response time, suggestions for improving the usefulness of the information, or suggestions for reducing the burden to respond to this collection should be submitted to the Consumer Financial Protection Bureau (Attention: PRA Office), 1700 G Street NW, Washington, DC 20552, or by email to PRA_Comments@cfpb.gov

Experiment Basics

—section—

Thank you for participating in this experiment.

During the experiment, we require your complete attention. Please do not speak to other participants or engage in other distracting activities such as using your cell phone. Please do not use the computer except as instructed.

You will be paid in cash at the end of the experiment, and the amount you earn depends on your choices during the experiment. It is therefore important that you follow along carefully and fully understand the instructions.

—section—

The experiment will be conducted through the lab computers. All interactions between you and other participants will therefore take place through the computers. Please do not try to speak to other participants or to look at their screens.

If you have a question at any time, please raise your hand and someone will come to your computer to assist you.

—section—

As advertised, you will be given \$10.00 today regardless of your performance in the experiment.

In addition, in the experiment you will earn "tokens". For every 700 tokens you earn, you will be paid \$1.00 in cash. You will be paid in private at the end of the experiment.

To start the experiment, you have 800 tokens.

—section—

Throughout these instructions, we will ask you questions about what you read. These are simply meant to ensure that you understand the instructions, and your responses will not affect the rest of the experiment or the amount you will earn. Here comes a question now...

[next]

Experiment Basics

True or False: The more tokens you earn in the experiment, the more cash you will be paid at the end.

- True
- False

[next]

Game Basics

—section—

This is an experiment studying behavior in a simple game. In this game you will play the role of either a "buyer" or a "seller".

—section—

If you are a seller, you will earn tokens by producing objects and selling them to buyers.

If you are a buyer, you will earn tokens by buying an object from a seller and then giving it to the experimenter in exchange for tokens.

—section—

You will play this game many times. Each time you play the game, we call this a "round".

[Text in brackets varies by condition].

Each round, you will be grouped with *[5 or 3]* other participants. There will be *[2 or 4]* sellers. There will be 2 buyers.

Who is in your group and what role you play are determined randomly by the computer at the start of each round.

—section—

Each round works like this: *[Text in brackets varies by condition.]*

1. The computer randomly groups participants into groups of [4, 6].
2. The computer randomly assigns 2 buyer roles and [2, 4] seller roles in each group.
3. Sellers set the prices of their objects.
4. Buyers see the prices of the sellers in their group.
5. Each buyer chooses a seller to buy from and pays the seller's price in tokens.
6. Each seller produces the number of objects that they sold (between 0 and 2), and gives one to each of their buyers.
7. Each buyer gives the object they bought to the experimenter in exchange for tokens.

[next]

Game Basics

—section—

True or False: A buyer's earnings in a round will be lower if they pay a higher price.

- True
 False

—section—

True or False: A seller's earnings in a round will be higher if they set a higher price.

- True
 False
 It depends

[next]

Price Instructions

In this game, the price of an object is made up of “sub-prices”. A sub-price is a part of the total price. Sellers will choose values for each sub-price, and buyers will pay sellers the sum of all the sub-prices.

Buyers will not see the total price — instead, buyers will only see the sub-prices before they make their choices.

In this game, each object has $[1/16]$ sub-prices.

To make clear how this works, we will explain both roles in detail

[next]

Seller Instructions

—section—

Sellers earn tokens by producing objects and selling them to buyers. When you are a seller, your only job is to set your sub-prices.

When a buyer chooses to buy an object from you, you will automatically produce it. Since there are 2 buyers in your group, you can sell between 0 and 2 objects each round.

—section—

When you are a seller, each object you sell will cost you 100 tokens to produce. Your total earnings at the end of a round will therefore equal the tokens you received from buyers, minus your total production costs.

This table summarizes what can happen each round:

# SOLD	RECEIVED FROM BUYERS	PRODUCTION COST	TOTAL EARNINGS
0	0	0	0
1	Sum of sub-prices ("Total price")	100	"Total price" - 100
2	2 x "Total price"	200	2 x "Total price" - 200

—section—

Now, we will go over how sellers set sub-prices. To the right is an example of a seller's interface. Feel free to enter prices there to see how it works.

Things to keep in mind when setting prices:

1. Sub-prices must be whole numbers (no decimals).
2. Sub-prices cannot be negative.
3. The total price (sum of sub-prices) cannot exceed 800 tokens.
4. You must enter values for all sub-prices.

—section—

You must set your sub-prices by typing values for each sub-price. The sum of the sub-prices will be shown in the "Total Price" box.

Before continuing, please try to set the sub-prices in the example interface to the right.

Total Price:

SUB-PRICE	VALUE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

[next]

Seller Instructions

If a seller sells one object, what is the seller's production cost?

- 100 tokens
- 200 tokens
- [1600 tokens – only appears in 16 price condition]

[next]

Buyer Instructions

—section—

A buyer earns tokens by buying an object from a seller and then giving it to the experimenter.

The experimenter gives 800 tokens for an object.

When you are a buyer, your only job is to choose from which seller you want to buy an object.

To the right is an example of a buyer's interface.

—section—

As you can see in the example interface, if you are a buyer, you will not see the sellers' total prices. Instead, you will see their sub-prices.

After you choose a seller, you will pay the seller the sum of the seller's sub-prices (the total price).

—section—

After you buy an object, you will automatically give the object to the experimenter and get 800 tokens.

Other than the price, it does not matter which seller you choose — the sellers' objects are the same in every way.

—section—

Therefore, accounting for everything, within a given round, you will gain 800 tokens and lose the total price you pay for the object.

Before continuing, please choose a seller in the example interface to the right. *[2 or 4 sellers shown, depending on condition]*

SUB-PRICE	SELLER 1	SELLER 2	SELLER 3	SELLER 4
1	0	2	37	40
2	41	0	14	45
3	20	0	7	57
4	11	21	20	41
5	38	17	0	22
6	2	47	41	73
7	31	0	58	0
8	40	9	58	0
9	0	56	8	78
10	0	37	17	8
11	0	62	0	0
12	1	22	11	28
13	23	50	53	48
14	48	35	45	0
15	31	17	18	0
16	39	0	38	35

Choose: Seller 1 Seller 2 Seller 3 Seller 4

[next]

Buyer Instructions

If a buyer chooses a seller with a total price of 300 tokens, how many tokens does the buyer earn that round?

- 300 tokens
- 500 tokens
- 800 tokens

[next]

Round Summary Example

At the end of each round, you will see a screen that summarizes what happened in that round.

An example is shown below.

In this example, you were Seller 1, you set sub-prices that summed up to tokens, and Buyer 1 bought from you. Therefore, you made 225 tokens in this round.

This round you were Seller 1 and earned 225 tokens.

You sold 1 object for 325 tokens each.

Your total production cost was 100 tokens.

Your earnings are itemized in the table below.

Your Earnings

	VALUE	# SOLD	TOTALS
Benefit	325	x 1	325
Cost	-100	x 1	-100
Total	225	x 1	225 tokens

Buyers' Choices

	SELLER 1	SELLER 2	SELLER 3	SELLER 4
Buyer 1	X			
Buyer 2		X		

Sellers' Prices

SUB-PRICES	SELLER 1	SELLER 2	SELLER 3	SELLER 4
1	2	16	10	0
2	69	68	34	37
3	21	1	3	22
4	4	23	32	49
5	12	0	23	0
6	0	1	15	40
7	65	17	67	52
8	0	76	47	31
9	32	0	5	3
10	14	4	97	63
11	40	12	0	0
12	15	35	33	25
13	4	52	6	44
14	18	10	39	0
15	29	29	14	89
16	0	31	0	20
Total Price	325 tokens	375 tokens	425 tokens	475 tokens

[next]

Practice Rounds

Assign participants such that everyone plays one round as a buyer and one round as a seller. Practice rounds are played with computers making random decisions. Each participant is a seller in the first round, then a buyer in second round.

Practice Rounds

We will now go through 2 practice rounds to help you understand the game.

You will not be paid for your performance in these rounds.

You will play the [Seller/Buyer] role this round.

Game Rounds

Both buyers and sellers. Repeat for a certain number of rounds (to be determined based on timing).

Throughout, there will be text that indicates that you are waiting for the other players to finish making their choices. These text screens should disappear automatically.

Waiting for other players to begin the game...

Seller game screen

[#] represents an open text box that is pre-populated with nothing. Choose the appropriate number of prices based on condition (i.e., 1 or 16).

Time Remaining: 60

You are seller [1/2/3/4].

Please choose your sub-prices.

As a reminder:

- Sub-prices must be whole numbers (no decimals).
- Sub-prices cannot be negative.
- The total price (sum of sub-prices) cannot exceed 800 tokens.
- Your production cost is 100 tokens per object.
- You must enter values for all sub-prices.
- Choose a "Total price" and press "Distribute" to choose random sub-prices that sum to "Total price".
- You can press "Distribute" as many times as you like.
- You can edit individual sub-prices even if you already pressed the distribute button.

Press "Next" to submit your prices.

Total Price: []

SUB-PRICE	VALUE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

SUB-PRICE	VALUE
-----------	-------

- 11
- 12
- 13
- 14
- 15
- 16

[next]

Please wait for buyers to make their decisions...

Buyer game screen 1

Time Remaining: 60

You are buyer [1/2].

Please choose a seller to purchase an object from.

As a reminder:

- You will pay the sum of the sub-prices.
- You will exchange the object you buy for 800 tokens.

Press "Next" to submit your choice.

SUB-PRICE	SELLER 1	SELLER 2	SELLER 3	SELLER 4
1	10	27	0	6
2	8	37	82	2
3	10	37	52	8
4	11	94	1	7
5	1	22	0	4
6	4	9	105	3
7	6	14	0	8
8	3	11	133	6
9	5	27	94	6
10	6	19	98	7
11	11	25	7	18
12	24	31	6	10
13	7	9	0	12
14	3	37	85	19

SUB-PRICE	SELLER 1	SELLER 2	SELLER 3	SELLER 4
15	3	26	37	5
16	7	8	65	6
Choose:	<input type="radio"/> Seller 1	<input type="radio"/> Seller 2	<input type="radio"/> Seller 3	<input type="radio"/> Seller 4

[next]

Round summary screen

ROLE should say "Seller 1", "Seller 2", "Seller 3", "Seller 4", "Buyer 1" or "Buyer 2"
 Prices are examples; actual prices should be listed instead.

Round Results

Time Remaining:

This round you were [ROLE] and earned 30 tokens.

You sold 1 object for 130 tokens each.

Your total production cost was 100 tokens.

Your earnings are itemized in the table below.

Your Earnings

	VALUE	# SOLD	TOTALS
Benefit	130	x 1	130
Cost	-100	x 1	-100
Total	30	x 1	30 tokens

Buyers' Choices

	SELLER 1	SELLER 2	SELLER 3	SELLER 4
Buyer 1	X			
Buyer 2		X		

Sellers' Prices

SUB-PRICES	SELLER 1	SELLER 2	SELLER 3	SELLER 4
1	5	132	40	105
2	5	51	20	0

SUB-PRICES	SELLER 1	SELLER 2	SELLER 3	SELLER 4
3	5	0	66	32
4	5	0	45	29
5	5	180	0	0
6	5	36	0	5
7	5	0	0	61
8	5	63	0	25
9	5	92	48	73
10	5	53	17	3
11	5	84	14	187
12	5	1	117	56
13	55	0	77	6
14	5	0	41	0
15	5	34	8	134
16	5	23	39	17
Total Price	130 tokens	749 tokens	532 tokens	733 tokens

Next

[next]

At the end of 8 rounds, re-randomize players into groups. Return to the seller and buyer instructions for the next disclosure condition.

3 questions developed by: Schwartz, L. M., Woloshin, S., Black, W. C., & Welch, H. G. (1997). The role of numeracy in understanding the benefit of screening mammography. *Annals of Internal Medicine*, 127(11), 966-972.

[next]

Thank you for your responses. Now, we have a few questions to help us better understand your choices during the game. First, we have questions about your choices when you were a seller.

SStrategyQ1. When you were playing as a *seller*, how did you decide what prices to set?

[open-ended text box]

SStrategyQ2. If you were telling someone else how to play this game, what would you tell them to do when playing as a *seller*?

[open-ended text box]

[next]

SStrategyQ3. When you were playing as a *seller*, how often did you think about the prices you had seen in previous rounds?

- Every round
- Almost every round
- Most rounds
- A few rounds
- None of the rounds

[next]

SSingleQ1. Please think about the rounds where you had to set only 1 price. Which one of these descriptions best matches your behavior toward buyers?

- I picked a price that I thought would make it harder for buyers to make a decision
- I picked a price that I thought would make it easier for buyers to make a decision
- I didn't think about buyers when I was setting prices

[next]

SSingleQ2. Please think about the rounds where you had to set only 1 price. Which one of these descriptions best matches your behavior toward other sellers?

- I picked a price that I thought would be higher than other sellers
- I picked a price that I thought would be the same as other sellers
- I picked a price that I thought would be lower than other sellers
- I didn't think about other sellers when I was setting a price

[next]

SMultiQ1. Please think about the rounds where you had to set 16 sub-prices. Which one of these descriptions best matches your behavior toward buyers?

- I picked prices that I thought would make it harder for buyers to make a decision
- I picked prices that I thought would make it easier for buyers to make a decision
- I didn't think about buyers when I was setting prices

[next]

SMultiQ2. Please think about the rounds where you had to set 16 sub-prices. Which one of these descriptions best matches your behavior toward other sellers?

- I picked a total price that I thought would be higher than other sellers
- I picked a total price that I thought would be the same as other sellers
- I picked a total price that I thought would be lower than other sellers
- I didn't think about other sellers when I was setting prices

[next]

SMultiQ3. Please think about the rounds where you had to set 16 sub-prices. Indicate how much you agree with the following statements.

[Display scale showing: Completely Disagree – Mostly disagree – Somewhat disagree – Somewhat agree – Mostly agree – Completely agree]

- a. I set specific patterns of sub-prices
- b. I only cared about the first few sub-prices
- c. I only cared about very high sub-prices
- d. I only cared about very low sub-prices
- e. I set sub-prices that I thought looked random
- f. I set sub-prices that would be difficult for buyers to add together
- g. I set sub-prices based on prices that I saw in previous rounds
- h. Sub-prices didn't matter; only the total price was important

[next]

SCompQ1. In some rounds, there were 3 other sellers, and in some rounds, there was only 1 other seller. How did your behavior change across these two situations, as a seller?

[open-ended text box]

[next]

Next, we have a few questions about your choices when you were a buyer.

BStrategyQ1. When you were playing as a *buyer*, how did you decide what object to choose?

[open-ended text box]

BStrategyQ2. If you were telling someone else how to play this game, what would you tell them to do when playing as a *buyer*?

[open-ended text box]

[next]

BStrategyQ3. When you were playing as a *buyer*, how often did you think about the prices you had seen in previous rounds?

- Every round
- Almost every round
- Most rounds
- A few rounds
- None of the rounds

[next]

BMultiQ1. Please think about the rounds where there were 2 sellers and each seller had 16 sub-prices. Which one of these descriptions best matches your behavior?

- I looked at every one of the sub-prices
- I looked at more than half of the sub-prices
- I looked at less than half of the sub-prices
- I looked at almost none of the sub-prices

BMultiQ2. Please think about the rounds where there were 4 sellers and each seller had 16 sub-prices. Which one of these descriptions best matches your behavior?

- I looked at every one of the sub-prices
- I looked at more than half of the sub-prices
- I looked at less than half of the sub-prices
- I looked at almost none of the sub-prices

[next]

BMultiQ3. Please think about the rounds where sellers had 16 sub-prices. Indicate how much you agree with the following statements.

[Display scale showing: Completely Disagree – Mostly disagree – Somewhat disagree – Somewhat agree – Mostly agree – Completely agree]

- a. I read prices from the top to the bottom of the screen
- b. I looked for sub-prices that were especially large
- c. I looked for sub-prices that were especially small
- d. I looked at all of the sub-prices for a single seller before moving to the next seller
- e. I looked at the sub-prices across sellers rather than concentrating on a single seller at a time
- f. I changed how I looked at sub-prices from round to round
- g. I didn't look carefully at the sub-prices
- h. I chose randomly

[next]

BCompQ1. In some rounds, there were 4 sellers, and in some rounds, there were 2 sellers. How did your behavior change across these two situations, as a buyer?

[open-ended text box]

[next]

Experience level

ExperienceQ. Approximately how many in-person, laboratory experiments have you completed before today? If you're not sure, please make your best guess.

- 0
- 1 to 3
- 4 to 6
- 7 to 9
- 10 or more

CoursesQ. Please indicate if you have taken college-level coursework in any of the following fields. (Mark all)

- Yes No Microeconomics or game theory
 Yes No Marketing or business
 Yes No Law
 Yes No Cognitive psychology

[next]

GenderQ. What is your gender?

- Male
 Female

EnglishQ. Is English your primary language?

- Yes
 No
 Prefer not to answer

AgeQ. How old are you? _____ years

[next]

Only administer during pilot sessions.

FutureStudiesQ. Researchers conducting this study may be interested in contacting you regarding additional research studies in the next year. These future studies will provide compensation of approximately \$35/hour. Please indicate whether you would like us to contact you for these studies. Doing so will not affect any aspect of your participation today, including payment or privacy.

- Yes, I would like to be contacted for future studies
 No, I would not like to be contacted for future studies

[next]

MiscQ. You're almost finished! Do you have any comments or questions about this research? If so, please let us know in the text-box below. Please do not add any personally identifying information about you, such as your name or student ID number. (optional)

[open-ended text box]

[next]

Thank you for your participation today. Please wait patiently for the experimenter to call your subject number. When your number is called, gather all of your belongings, and walk to where you will be paid.

Your subject number is [subject number].

Please remember that this research is only valuable if all participants have the same experience. Therefore, please do not discuss this experiment with others outside of the lab.