Preparing for the Asymmetric Information and the Market for Lemons Experiment
Prepares students for the Asymmetric Information and the Market for Lemons experiment.

Professor Description: Prepares students for the Asymmetric Information and the Market for Lemons experiment. Provides trading tips and explains the four variations of the experiment: full information, hidden information, consumer protection laws, and product warranties. Assign as a graded problem set with a due date prior to the start of the experiment.

Scenario

Overview

Your professor has asked you to participate in an interactive market experiment in which you will learn how markets function when information about the quality of goods can differ. These instructions will help you get ready to trade.

This is a market for MP3 players. You will alternate between playing the role of a seller and the role of a buyer. If you're a seller, you will choose the quality of MP3 player you would like to sell and set the asking price for it. If you are a buyer, you will decide whether to buy an MP3 player from one of the sellers at the price he or she lists.

One of the things that makes this market different from the market for used textbooks (you may remember doing that exercise earlier in the semester) is that MP3 players are not identical. Depending on the battery life, MP3 players can be either of high or low quality. If you're a seller, manufacturing an MP3 player with long-lasting batteries will cost you more than manufacturing an MP3 player with short-lasting batteries. If you're a buyer, you'll be willing to pay a lot more for a high-quality MP3 player--but only if you can be sure of its quality.

Scenario

Seller Costs

The sellers in this game produce MP3 players on a "made-to-order" basis: that is, they advertise MP3 players, and then, when they receive an order, they purchase the parts from distributors and manufacture the player. You can sell at most one player per round.

Every seller in the game can choose to manufacture a high-quality MP3 player or a low-quality MP3 player. It costs more to produce a high-quality player, but buyers are willing to pay a lot more for high-quality players.
If you've been given the role of a seller, your gain is the difference between the price you receive for an MP3 player and your cost of producing that player. You may have a different gain for each quality of MP3 player, and you will have to calculate both to figure out which is the best deal. For example, suppose you have a seller cost of $20 for a high-quality MP3 player and a seller cost of $12 for a low-quality MP3 player. If you sell a high-quality player for $25, your gain is $5; if you sell a low-quality player for $15, your gain is $3.

### Example:

<table>
<thead>
<tr>
<th></th>
<th>High Quality</th>
<th>Low Quality</th>
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<tbody>
<tr>
<td>Sale Price</td>
<td>$25</td>
<td>$15</td>
</tr>
<tr>
<td>Seller Cost*</td>
<td>-$20</td>
<td>-$12</td>
</tr>
<tr>
<td>Your Gain</td>
<td>$5 ↗</td>
<td>$3 ↗</td>
</tr>
</tbody>
</table>

*If your sale price is less than your seller cost:

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<td>-$2 ↘</td>
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</table>

*Seller Cost = Cost of producing the MP3 player

**Scenario**

Suppose that you are a seller. Your seller cost is $40 for a low-quality MP3 player and $60 for a high-quality player.

**Question 1.1**

1.1. Suppose you sell someone a high-quality player for $80. What is your gain or loss?

- A. $80 gain
- B. $20 loss
- C. $20 gain
- D. $60 loss

**Question 1.2**

1.2. Suppose you sell someone a low-quality MP3 player for $50. What is your gain or loss?

- A. $50 gain
- B. $60 loss
- C. $10 gain
- D. $40 loss

**Question 1.3**
1.3. Suppose you have two buyers who are willing to purchase an MP3 player from you: one who is willing to pay $80 for a high-quality player, and another who is willing to pay $50 for a low-quality player. However, you can only sell one player. You would receive more gain from selling:

- A. A high-quality player for $80
- B. A low-quality player for $50

**Scenario**

**Buyer Values and Gains**

If you've been given the role of a buyer, your goal is to get the best deal you can for an MP3 player. You can buy at most one player per round.

Every buyer is given two buyer values that indicate the maximum amount the buyer would pay for an MP3 player of each quality. Since the high-quality MP3 player is better, it has a higher buyer value than the low-quality MP3 player.

Your gain from buying an MP3 player is your buyer value for that quality of player minus the price you pay. You may have a different gain for each quality of MP3 player, and you will have to calculate both to figure out which is the best deal. For example, suppose you have a buyer value of $30 for a high-quality MP3 player and a buyer value of $22 for a low-quality MP3 player. If you buy a high-quality player for $25, your gain is $5; if you buy a low-quality player for $15, your gain is $7.

<table>
<thead>
<tr>
<th>Example:</th>
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<tbody>
<tr>
<td>Buyer Value*</td>
<td>$30</td>
<td>$22</td>
</tr>
<tr>
<td>Purchase Price</td>
<td>-$25</td>
<td>-$15</td>
</tr>
<tr>
<td>Your Gain</td>
<td>$5</td>
<td>$7</td>
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If the purchase price exceeds your buyer value:

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<tr>
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<td>-$25</td>
</tr>
<tr>
<td>Your Gain</td>
<td>-$2</td>
<td>-$3</td>
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*Buyer Value = How much the MP3 player is worth to you

In the example above, you would pick the low-quality MP3 player because it gives the highest gain. In the market, things might turn out the other way around—with a higher gain for the high-quality MP3 player.

**Question 2**

2. Suppose you are a buyer. Your buyer value is $35 for a high-quality MP3 player and $28 for a low-quality player. A seller offers a low-quality player for $22. What is your potential gain or loss?

- A. $6 gain
- B. $6 loss
- C. $13 gain
- D. $22 gain
Question 3

3. Suppose you are a buyer who values a high-quality player at $35 and a low-quality player at $28. The following are four players that sellers are offering for sale. Which of them should you buy?

- A. A low-quality player for $25
- B. A high-quality player for $39
- C. A high-quality player for $34
- D. A high-quality player for $35

Scenario

How the Market Will Work

There will be a number of 90-second rounds of trading. You can buy or sell only one MP3 player during each round. If a round ends and you have not traded, your chance to make a gain in that round goes away. If you do not trade, you do not gain or lose anything. You cannot carry over an unsold unit to the next round.

Sellers post asking prices and buyers accept them. Sellers post their offers by selecting a quality, entering a price, and clicking the Ask button, as shown below.

These prices show up as lines on a graph. A line at a particular price continues on the graph as long as the seller continues to offer an MP3 player for sale at that price. At any time, a seller can withdraw the current offer and then submit a new one. Sellers can look at the graph to see the prices and qualities that other competing sellers have offered in the current round.
The purple lines show the asking prices for sellers of high-quality MP3 players, and the yellow lines show the asking prices for sellers of low-quality MP3 players. If you're a seller, your asking price will be represented by a green line. The graph also shows how much time is left in the round.

A buyer can get more information from a seller by mousing over that seller's line on the market graph. Mousing over a line that extends up to the current time brings up a box with price and quality information for this seller. (In some variations, it also tells you whether the seller is offering a warranty.) If the buyer decides to purchase the MP3 player, he or she must click on the line. A dialog box will then appear asking the buyer whether or not he or she wants to proceed with the purchase.

You can think of the lines on the graph as a record of the asking prices from all the sellers. A line extending up to the present time represents an MP3 player that is still available. Mousing over a line is like going to the seller's website or store to get more information. As a buyer, if you like what you see, you can buy it. But remember, there are other buyers, and the good may be sold by the time you make your decision. If you don't want to buy from a particular seller, you can mouse over another seller's price and try again.

**Question 4**

4. True or False: Suppose you are a seller. If you can't make a gain with the low-quality MP3 player, you can switch to producing a high-quality player.

- ☐ True
- ☐ False

**Question 5**

5. If you are a buyer, what is the maximum number of MP3 players you will be able to buy in one round of trading?

- ☐ A. 1
Question 6

6. True or False: If you are a seller and you are not able to sell an MP3 player in a particular round of trading, you can carry it over and have an extra one to sell in the next round.

- True
- False

Scenario

Transactions

The only way a transaction can happen is if a seller makes an offer and a buyer accepts it. Let's look at a market transaction from both the buyer's perspective and the seller's perspective.

The diagram above shows the buyer's perspective. After about 64 seconds of trading, this buyer accepted a $90 asking price for a high-quality MP3 player. To calculate this buyer's gain, look for her high-quality buyer value in the upper right corner of the screen: $100. The Transaction Details section on the right shows that her gain in this round was $100 - $90 = $10.
The diagram above shows the seller's perspective for the same transaction. The three green lines represent this seller's asks. At 17 seconds into the round, the seller started out offering a low-quality player at $62, but nobody bought it. At 31 seconds into the round, she withdrew her offer. At 38 seconds, she submitted a new offer, this time for a high-quality player at $95. Again, nobody bought it. At this point, she noticed that the last sale was a high-quality player at $91, so she withdrew her bid and offered a high-quality player at $90. Then, at 64 seconds into the round, someone finally bought her player. Since it cost her $85 to produce the high-quality player, she made a gain of $5.

Question 7

7. Suppose that you are a seller. Your seller cost is $28 for high-quality players and $21 for low-quality players. You've submitted an offer of $36, but no buyer has accepted your offer. The lowest current ask for high-quality players is $33, the lowest current ask for low-quality players is $22, and the round is about to end. There is only enough time for you to withdraw your current offer and submit one last ask. Of the following options, which is most likely your best choice?

- A. Leave your offer where it is and let the time run out.
- B. Withdraw your current offer and make an offer of $30 for a high-quality player.
- C. Withdraw your current offer and make an offer of $28 for a high-quality player.
- D. Withdraw your current offer and make an offer of $21 for a low-quality player.

Scenario

Variations

There are four variations of this experiment. The next few screens explain the differences between these variations. Your professor may elect to do some or all of them. Across the different variations, you alternate roles: you'll be a buyer in some variations and a seller in others. The buyer values and seller costs will stay the same. The key difference between the variations lies in the information that buyers have about the quality of the goods they are buying and the recourse available to unhappy buyers who are tricked into buying a low-quality player by a seller who pretends that it is a high-quality player.

Within each variation, all aspects of the market remain the same. This means that you can use what you've learned in a previous round to guide your strategy in the next one.
The variations are:

- Full Information
- Hidden Information
- Consumer Protection Laws
- Product Warranties

Scenario

Full Information Variation

In the Full Information variation, buyers know the quality of the goods that sellers are selling and can select the quality they want. There is no way for a seller to claim to be selling a high-quality MP3 player when she actually intends to give the buyer a low-quality player—buyers know exactly what they are getting. This variation is not very realistic, because in actual transactions, buyers cannot discern the quality of every single part of every good they buy. For example, the owner of an MP3 player may not know how long the battery will last until he has used it for many months. Having said all that, the Full Information setup serves as a useful benchmark for the variations that follow.

Question 8

8. Suppose that you are a buyer in the Full Information variation, in which buyers know the quality of each seller's MP3 player. You have buyer values of $40 for a high-quality player and $32 for a low-quality player. All the sellers of high-quality goods are offering prices of more than $42 except for one, who is offering $38. The round is about to end. What should you conclude?

- A. The seller offering $38 is really selling a low-quality good, even though it looks like a high-quality good. You should pass on the deal so you don't lose money.
- B. The seller offering $38 must have made an error, so even if you accept the offer, it will not be valid.
- C. There is a problem with the experiment. The computer must have given some seller a seller value that was too low, so if you accept, you will be stuck without a valid trade.
- D. The $38 offer is a good deal. You should buy that MP3 player before the round ends.

Scenario

Hidden Information Variation

In this variation, the buyers don't know what quality is offered by each seller. All offers are represented by gray lines. Unlike the Full Information variation, there is no quality level indicated on the screen. Once the round ends, a box pops up to tell the buyer the quality of the MP3 player he or she bought.

Until the box pops up, buyers can't tell what their gain is, because it depends on the quality of the MP3 player. Sellers don't have to wait until the end of the round to calculate their gain, however, because they will know the quality of the player that they choose to sell. In this variation, buyers are uncertain about what they are getting.
Scenario

Consumer Protection Laws Variation

In the Consumer Protection variation, sellers are able to advertise the quality of the players they are selling. Note that the true quality a seller selects does not need to be the same as the advertised quality! For example, in the case illustrated below, the seller has chosen to claim that a low-quality player is actually a high-quality player, and ask a price of $95 for it:

In this variation, as in the Hidden Information variation, buyers cannot tell an MP3 player's quality by looking at it. In the Market window, buyers see the advertised quality of each seller's MP3 player on the graph, but NOT necessarily the true quality:
Once the round ends, buyers find out the true quality of the players they have bought. Consumer protection laws allow the buyer to return a low-quality MP3 player that was falsely advertised as a high-quality MP3 player. If this occurs, the buyer is presented with a dialog box at the end of the round asking whether he or she wants to keep the player or return it. If the MP3 player is returned, the buyer earns nothing and loses nothing. A seller whose MP3 player is returned loses a small amount of money that reflects the cost of handling the return.

Scenario

Warranty Variation

This variation starts out like the previous one, in which sellers can falsely (or accurately) advertise the quality of their MP3 players. Again, buyers find out if the advertised quality is correct once the round ends. The difference in this variation is that there are no consumer protection laws that allow buyers to return MP3 players that were falsely advertised. Instead, MP3 players may come with a product warranty.

Product warranties mean that the buyer can ask the seller to fix an MP3 player that does not offer the advertised quality. Sellers who offer a warranty and sell a low-quality player that is advertised as high quality will incur a cost to upgrade the player. Products without warranties can't be returned, and sellers need not fix them or upgrade them to the advertised quality.

In addition to choosing the true quality and the advertised quality, sellers get a choice about whether to offer a warranty:
Buyers can tell which MP3 players have warranties by using the Warranty filter (located above the graph in the Market screen) or by mousing over a line in the graph.

If a seller offers a warranty and sells a low-quality player that was falsely advertised as high quality, the buyer may invoke the warranty. When a warranty is invoked, the seller must fix or replace the low-quality MP3 player he or she sold. Sellers have to pay a $35 fee to upgrade the product plus a $5 fee for handling the upgrade, so it is generally not a profitable strategy to advertise a low-quality player as a high-quality player and plan to repair it later.

**Scenario**

**Using the Warranty Filter**

If you’re a buyer during the Warranty variation, you’ll want to know which products are being offered with a warranty. To do this, use the radio buttons at the top of the Market screen. You can toggle the view to show only products that are being sold with a warranty, only those being sold without a warranty, or all products regardless of whether they have a warranty. This will help you make an informed decision about which product to purchase.

**Scenario**

Suppose you are a seller with a seller cost of $65 for low-quality MP3 players and $95 for high-quality MP3 players. You decide to produce a low-quality player, advertise it as high quality, and offer a warranty. Suppose that someone buys your player for $110 and then invokes the warranty after finding out that you falsely advertised.
(Hint: You may want to go back two screens to review the exact details of what happens when a product is returned.)

**Question 9.1**

9.1. How much profit will you make on this transaction?

- **A.** -$5
- **B.** $0
- **C.** $5
- **D.** $10
- **E.** $15

**Question 9.2**

9.2. Suppose that you can sell a low-quality player for $75. Is it more profitable for you to falsely advertise, sell it for $110, and pay the upgrade and handling fees, or to advertise truthfully and sell the player for $75?

- **A.** Falsely advertise and sell the player for $110.
- **B.** Truthfully advertise and sell the player for $75.

**Scenario**

**Suggestions for Trading**

- Sellers: Don't sell below your cost. Try to figure out whether it's more profitable to sell high-quality or low-quality goods.
- Buyers: Don't buy above your buyer value. Keep track of quality—it determines how much gain you make on a purchase. Be careful in the variations in which you do not have full information about quality.

Watch the clock. Sellers, if the round is almost up, you should drop your price if you can do so and still make a gain. Buyers, if the round is almost up and there is an offer you can accept and still make a gain, you should go for it.