



Independence

Auditor independence education materials: The importance of being independent

In-class laboratory market game

Developed in conjunction with the University of Illinois Center for Professional Responsibility in Business and Society.

Audit • Tax • Consulting • Financial Advisory •

Overview and learning objectives

This exercise is a low-tech variation of the computerized market game alluded to in the Video. You can experiment with whether it is best played before or after the Video.

It leverages and extends the game that Charles Holt and Roger Sherman describe in “Classroom Games: A Market for Lemons,” (with R. Sherman), *Journal of Economic Perspectives*, 13(1) Winter 1999, 205-214. For more information, including other economics-oriented questions, you can ask your students to see their article (perhaps your students can easily access the article through your institution’s library via the Web).

The market game consists of three phases. Phase one is a full information market that features common knowledge about price and quality and so the market quickly equilibrates, phase two features information asymmetry about true quality that lets sellers mislead buyers by posting “ask” prices that normally would be warranted only with high quality (but that really correspond to low quality), and phase three features a verifier that returns the market to an equilibrium resembling that which occurred in phase one. Students experientially come to learn about how independent verifiers benefit our economy. We summarize the market game procedures below and thereafter provide a step-by-step illustrative example of a realistic market game.

We encourage you to take the time to read through these procedures as, in the end, the market game is easily executed and builds considerable enthusiasm and teamwork in the classroom. You can administer the market game in one fifty minute session. If your class runs seventy-five minutes, you easily can complete this game and view some of the Video. It is especially useful at the start of a semester, and enables your students to have fun while experientially learning:

1. How price movements enable markets to work via the invisible hand when sellers of a product or service have little to no informational advantage about its quality before buyers acquire the product or service in a transaction.
2. How markets fail, i.e., crash, once information asymmetry creeps into the picture with respect to the reliability of seller’s assertions about product or service quality. Because buyers fear over paying for a product or service, their bids drop to a level warranted by lower-quality products or services. This causes problems for sellers who otherwise would have marketed and sold higher-quality (or medium quality) products or services. They become unable to credibly signal their quality and either drop their quality or exit the market. Buyers anticipate the walking of medium and higher-quality sellers and do not bid any higher than justified by lower-quality products or services. Depending on their ability to resale low-quality profits, the buyers might quit bidding altogether. This is a variation of Akerlof’s “lemons” market.
3. That a demand for assurance endogenously arises within such markets, without outside (e.g., government) intervention.
4. That an independent assurer can help restore market efficiency and the rational allocation of resources to the best uses by reducing the information asymmetry about seller’s product, and that a biased assurer who lacks independence can impact a market (e.g., slow trading or cause trading to cease and cause irrational allocation of resources).

Summary of Procedures

Break your class into eight teams (two to five students per team). Three of the teams will be sellers, four will be buyers, and the one team will serve two roles: initially as an observer team and later as a verifier team. (It is important that the seller teams and buyer teams do not know that the observer team later will become a verifier team – so you likely will want to let the sellers and buyers see how busy the observer team is early on by, e.g., asking them to assist you with writing asking prices and units sold information

on the board; requiring them to take notes during trading and to use them to explain market attributes to the class once the invisible hand has worked and the market has equilibrated to medium quality).

For the phases in which this extra team is filling the role as an astute market observer, you will reward it for making keen observations about what has transpired during the first several rounds of trading (e.g., chocolate, participation points, or gift cards). Later, after phase one and two, you will announce that this team is a verifier. It has to earn reasonable profits (you make the call as to what is reasonable and keep the team in the dark about this) to earn their incentive.

Meanwhile, you incent the seller and buyer teams by telling them that the highest profit seller team and highest profit buyer team each will receive a modest prize (e.g., chocolate, gift cards). The other buyer and seller teams are out of luck (except for participation points).

You hand out the attached instructions to the seller and buyer teams (they appear after the step-by-step illustrative game in this guide). The top part of the instructions is common to all involved and so you read them (these appear in the instructor's instructions page that follows).

In phase one of this three-phase market game, sellers compete on the combination of price and quality. Unknown to students, the production schedule of sellers and resell schedules of buyers are such that the largest market surplus occurs with medium quality. Once the market does equilibrate to medium quality – which can take three to five rounds – you modify the rules of the game for phase two.

Phase two entails you telling sellers and buyers that quality no longer will be observable to buyers beforehand. Instead, buyers will learn of quality only after trading. This change throws a curveball at students. Chances are you will observe a variety of strategies by sellers and buyers:

- Some sellers price the product in line with their chosen quality (which usually, by now, will be medium). The extent to which these sellers earn profits with this strategy depends on how many other sellers implicitly assert – via asking prices – that they are producing at medium quality, but really are looking windfall profit by producing at low quality.
- Some sellers will “think ahead” and (usually) incorrectly conclude all sellers and buyers will also think ahead and produce more low quality products and price them accordingly. This approximates rational game theory, but infrequently happens because students have bounded rationality, etc.
- Some buyers will rely on social norms which entail honesty in business dealings. But, other buyers will fear the worst and reason that some, if not all, sellers might try to dupe them.

It is desirable for phase two of the game to last long enough to let at least one seller team dupe at least one buyer team, who then “over” pays for low quality. Oftentimes, this will not take long and the market will come to a crawl – buyers tend to be risk-averse and sometimes do not even buy a product after being duped! After buyers feel as though they have been deceived by a strategic seller, the game enters phase three that extends the game described by Holt and Sherman (1997).

It really is interesting to watch play unfold across the three phases! Students really have fun with this game. Sometimes, it dawns on the sellers that they have potential gift cards to use as an incentive to convince an auditor to collude and misreport. Sometimes auditors rebuff the suggestion that they are for sale, but not always, leading to the ultimate rip-off of one or more buyers.

If auditors remain independent during phase three, the orderly (and profitable!) market will be restored. Further, sellers who obtain exclusive access to the verifier can charge premium prices for their units because of buyer concern that unverified seller asking prices do not correspond to efficient market prices for various quality levels. If auditors are biased during phase three, the market will become worse and some students are surprised that their classmates can so brazenly rip them off.

Use your discretion to determine when the game is over. It is useful to discuss again the concepts that came to life during the competition. A student handout that covers the main ideas is available several pages hereafter (after handouts containing in-class directions for the instructor, seller teams, buyer teams, and the observer/verifier team).

Step-by-Step Illustrative Game

While you read the common portions of buyer and seller instructions (do not read aloud the seller's cost or buyer's resale value information), the observation team quietly sets up the initial table that will track the market on the chalkboard (or transparency overhead or PowerPoint). As illustrated below, this table has four columns: one for the period and one for each seller team. It starts with one row, and a new row is added period by period.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)			

For Period 1, sellers have three to five minutes to decide asking price and quality grades (subsequently enforce a stricter time limit, e.g., two to three minutes). After collecting offers from each seller team, the observation team records the asking prices and grades on the chalkboard and returns the sheets to the seller teams.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality	\$6.00 medium quality	\$12.00 high quality

As sellers cannot lie about grade during period one, buyers simply check sellers' asking prices against their resale values. Again, given the cost and resale values herein, medium quality turns out to provide the highest surplus for the economy; this fact is unknown to sellers and buyers.

Here, the first two buying teams determine it is in their best interest to purchase a medium quality unit from Seller 2. Each of these two buyer teams earns a profit of \$2.80 (\$8.80 resale value - \$6.00 cost). (Note that the second unit costs Seller 2 a \$1.00 extra (i.e., \$5.60 vs. \$4.60), but \$6.00 still allows Seller 2 to earn a profit). The third buying team contracts with Seller 1 at \$11.50, earning a profit of \$2.10 (\$13.60 resale value - \$11.50 cost). Last, the fourth buying team contracts with Seller 3 for \$12.00, earning \$1.60 (\$13.60 resale value - \$12.00 cost). With these purchases, Seller 1 earns \$0.50, Seller 2 earns \$1.80, and Seller 3 earns \$1.00. The revised table below reflects how the board will look after Period 1:

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit

Going into Period 2, Sellers 1 and 3 realize a need to switch grades to earn more profit. Seller 1 shifts to medium grade and competes with Seller 2 by lowering the asking price to \$5.75. Anticipating new competition, Seller 2 happens to drop the price to \$5.50. Seller 3 tries out the market for low-grade units.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality	\$5.50 medium quality	\$1.90 low quality

Buyers again compare seller's asking prices to germane resale values. The first buyer team purchases from Seller 2 earning \$3.30 (\$8.80 resale value - \$5.50 cost). Seller 2 earns \$0.90 (\$5.50 selling price - \$4.60 cost) on the same transaction.

The second buyer team also wants to contract with Seller 2. Here, Seller 2 interestingly chooses to sell again at \$5.50, apparently as a means to keep buyers in the dark about their breakeven point. (Note that Seller 2 loses \$0.10 on this transaction). The third buying team contracts with Seller 1, earning \$3.05 for themselves. Seller 1 earns \$1.15 on the same transaction. The fourth team to buy also purchases from Seller 1, earning \$3.05 for themselves and \$0.15 for Seller 1. Because of this activity, Seller 3 comes to learn, through the invisible hand, that more profits would be feasible from selling medium grade units.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality 2 units	\$5.50 medium quality 2 units	\$1.90 low quality 0 units

In this illustrative game, all sellers converge to medium quality going during Period 3. (Note: It may take another round or two for your games.) Consequently, Period 3 is the last period of phase one in this game. Things are about to become much more complex and interesting!

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality 2 units	\$5.50 medium quality 2 units	\$1.90 low quality 0 units
Period 3 (Price and quality info.)	\$5.65 medium quality 1 unit	\$5.65 medium quality 2 units	\$5.60 medium quality 1 unit

Before commencing with phase two in Period 4, the observation team comes to the front of class to make some remarks. Common remarks include things, such as:

- Higher quality does not necessarily mean profit maximization
- Markets moving toward equilibrium by the invisible hand
- Sellers are competing with each other, trying to outguess what quality level and price at which their competitors will choose to produce

You tell everyone that, starting with Period 4, grade quality will be available to the market **only after trading has been completed**. In this illustrative game, Sellers 1 and 3 attempt to convince buyers they are offering high-grade units with relative high asking prices. Seller 2 attempts to signal medium-grade quality.

Buyer teams now have a hard choice. Some buyer teams might opt out, fearing sellers are deceptively offering low-grade quality. In our experience, however, trading does not come to a halt in one period. Instead, some buyer teams rely on social norms of honest dealings.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality	\$5.50 medium quality	\$1.90 low quality

	2 units	2 units	0 units
Period 3 (Price and quality info.)	\$5.65 medium quality 1 unit	\$5.65 medium quality 2 units	\$5.60 medium quality 1 unit
Period 4 (Only price info.)	\$11.25	\$6.00	\$11.50

As the next table shows, sellers in this illustrative game act as if they ascribe equal trust to each seller: The first two units are sold by Seller 2, the next by Seller 1, and the last by Seller 3. In this illustrative Period 4, three of the four buying teams are willing to gamble. Two buy from Seller 2 and one from Seller 1. Seller 3 loses out even though it honestly tried to sell high-quality grade at a reasonable price. So far, no strategic misrepresentation has crept into the market!

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality 2 units	\$5.50 medium quality 2 units	\$1.90 low quality 0 units
Period 3 (Price and quality info.)	\$5.65 medium quality 1 unit	\$5.65 medium quality 2 units	\$5.60 medium quality 1 unit
Period 4 (Only price info.)	\$11.25 <i>high quality*</i> 1 unit	\$6.00 <i>medium quality*</i> 2 units	\$11.50 <i>high quality*</i> 0 units

**Disclosed only after periodic trading.*

In Period 5, Seller 1 succeeds in its strategy of trying to mislead a buying team. Based on this large single period of profit of \$9.85 (\$11.25 sales price - \$1.40 cost), Seller 1 leaps ahead of competitor sellers in total profits. The classroom erupts into laughter, and the buyer team that lost money voices friendly indignation.

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality 2 units	\$5.50 medium quality 2 units	\$1.90 low quality 0 units
Period 3 (Price and quality info.)	\$5.65 medium quality 1 unit	\$5.65 medium quality 2 units	\$5.60 medium quality 1 unit
Period 4 (Only price info.)	\$11.25 high quality* 1 unit	\$6.00 medium quality* 2 units	\$11.50 high quality* 0 units
Period 5 (Only price info.)	\$11.25 <i>low quality**</i> 1 unit	\$5.60 <i>medium quality*</i> 1 unit	\$2.45 <i>low quality*</i> 2 units

**Disclosed only after periodic trading.*

#After periodic trading, it becomes obvious that Seller 1 has engaged in strategic misrepresentation.

In light of Seller 1's strategic misrepresentation, it is time to enter the phase three of the game: add the verifier. You announce to the class that the observation team will now become the verifier. There are all sorts of variations you could try, but you likely will want to leave much of the deal-making between the verifier team and other teams up to them. It does help to have a few ground rules. For example, one option is to let the class know that it is up to the verifier team to decide whether to market to sellers or buyers. For sellers, the verifier will post an audit report beforehand for them, but not for the other two sellers (see period 7 on the illustrative table). This Seller 3 has an assurance advantage and will sell two units, almost certainly, as buyers will have considerable uncertainty about the other sellers' quality. For buyers, the verifier could issue them an audit report about actual quality for each of the three sellers. So, for them, the game reverts back to the initial setup.

Once the ground rules are clear, the buyers and sellers each submit a private bid to you for the verifier's audit report. A simple rule is that highest bid wins. You can decide whether to publicly announce the bids that each team makes to purchase the assurance. You will find (usually) that the verifier would like the bids to remain sealed.

In this illustrative game, Seller 3 bids the highest for the verifier and is able to credibly charge a premium price for medium quality. Buyers who purchase audited units still earn a reasonable profit of \$2.05 (i.e., \$8.80 resale value - \$6.50), and Seller 3 also earns a reasonable profit, unless the price paid for the verifier's report exceeds \$3.30 (which is unlikely).

In this example, Seller 2 decides to engage in strategic misrepresentation during Period 6 realizing that class time is starting to run short, leaving them with insufficient time to build a reputation for honesty without the verifier's help. One buyer team opted to gamble (and lost) with Seller 2. After these six illustrative periods, the table would look like this:

	Seller 1	Seller 2	Seller 3
Period 1 (Price and quality info.)	\$11.50 high quality 1 unit	\$6.00 medium quality 2 units	\$12.00 high quality 1 unit
Period 2 (Price and quality info.)	\$5.75 medium quality 2 units	\$5.50 medium quality 2 units	\$1.90 low quality 0 units
Period 3 (Price and quality info.)	\$5.65 medium quality 1 unit	\$5.65 medium quality 2 units	\$5.60 medium quality 1 unit
Period 4 (Only price info.)	\$11.25 high quality* 1 unit	\$6.00 medium quality* 2 units	\$11.50 high quality* 0 units
Period 5 (Only price info.)	\$11.25 low quality* 1 unit	\$5.60 medium quality* 1 unit	\$2.45 low quality* 2 units
Period 6 (Only price info., unless verified)	\$5.50 medium quality* 0 unit	\$5.45 low quality* 1 unit	\$6.75 <u>medium verified</u> 2 units

*Disclosed only after periodic trading.

#After periodic trading, it becomes obvious that Seller 1 has engaged in strategic misrepresentation.

Instructor's instructions

To be read aloud to start the game

Selling team _____

This is a market with four teams of buyers and three teams of sellers. The selling teams will begin by choosing a price and quality "grade." I will collect these decisions and write them on the blackboard. Then I will give each team of buyers the chance to purchase from one team of sellers at the grade and price listed. The grade can be one of three levels: lower, middle, and higher. Better grades cost more for sellers to produce and are worth more to buyers. The table below shows your costs of producing different grades if you are a seller, and it shows your money values of different grades if you are a buyer.

[Tables appear here in student's handouts]

Each buyer team can purchase only one unit per period. Each seller team can sell up to two units per period, but the second unit costs \$1 more to produce. If you are a seller team, the top row of the table above shows the cost of the first unit you actually sell in a period (for the grade you choose), the second unit costs \$1 more than the first unit. Unsold units are not produced and hence incur no cost.

Buyers earn money by purchasing product at a price that is below their value, which depends on the quality grade. The value to the buyer depends only on the grade, not on whether it is a given seller's first or second unit in the period. A buyer's earnings are calculated as the difference between the value and the purchase price. If a buyer does not make a purchase, the buyer earns \$0.

Buyer earnings = value for grade purchased – seller's price

Sellers earn money by making one or more sales at a price that is above the cost of the unit (determined by the table above).

A seller's earnings are calculated as the sum of the earnings on the units actually sold (a seller who does not make a sale in a period will earn \$0):

Seller earnings = sales price – cost of grade produced

When all sellers have finished choosing their prices and grades for the period, I will collect these sheets and write the prices and grades on the blackboard under the seller numbers. Then I will deal cards to the buyers to determine the buyer number, and the first buyer team can decide to purchase a unit from one of the sellers or from no seller. Other buyer teams will then go in ascending order. Once a seller has sold a unit, the second unit costs \$1 more, so the seller will be asked whether or not the seller wants to sell a second unit at the advertised price and grade. If a second unit is sold, it must be at the same price and grade as the first unit. If a seller refuses to sell or sells both units in a period, I will draw a line through that seller's price.

Use the table below to calculate the hypothetical earnings. We will begin by having each seller choose a price and grade for Period 1.

Seller teams: Select your team's grade and price for period one and write them in the record table below. I will collect each seller team's sheet, write the information on the board, and return the sheets before the buyers begin their purchase decisions.

Buyer teams: If you decide to buy a product from one of the sellers, write the appropriate information in the record table. Now, while we wait patiently until the seller information is in... let's determine the order of buyer decision making for this period. Lowest card goes first...ascending order afterwards.

By the way, we may well play more than seven periods. If so, just add columns or use the backs of your sheets!

Now, let's get started!

Seller team instructions

Selling team _____

This is a market with four teams of buyers and three teams of sellers. The selling teams will begin by choosing a price and quality “grade.” I will collect these decisions and write them on the blackboard. Then I will give each team of buyers the chance to purchase from one team of sellers at the grade and price listed. The grade can be one of three levels: lower, middle, and higher. Better grades cost more for sellers to produce and are worth more to buyers. The table below shows your costs of producing different grades if you are a seller, and it shows your money values of different grades if you are a buyer.

	Lower grade	Middle grade	Higher grade
Seller cost of first unit	\$1.40	\$4.60	\$11.00
Seller cost of second unit	\$2.40	\$5.60	\$12.00

Each buyer team can purchase only one unit per period. Each seller team can sell up to two units per period, but the second unit costs \$1 more to produce. If you are a seller team, the top row of the table above shows the cost of the first unit you actually sell in a period (for the grade you choose), the second unit costs \$1 more than the first unit. Unsold units are not produced and hence incur no cost.

Buyers earn money by purchasing product at a price that is below their value, which depends on the quality grade. The value to the buyer depends only on the grade, not on whether it is a given seller’s first or second unit in the period. A buyer’s earnings are calculated as the difference between the value and the purchase price. If a buyer does not make a purchase, the buyer earns \$0.

Buyer earnings = value for grade purchased – seller’s price

Sellers earn money by making one or more sales at a price that is above the cost of the unit (determined by the table above).

A seller’s earnings are calculated as the sum of the earnings on the units actually sold (a seller who does not make a sale in a period will earn \$0):

Seller earnings = sales price – cost of grade produced

When all sellers have finished choosing their prices and grades for the period, I will collect these sheets and write the prices and grades on the blackboard under the seller numbers. Then I will deal cards to the buyers to determine the buyer number, and the first buyer team can decide to purchase a unit from one of the sellers or from no seller. Other buyer teams will then go in ascending order. Once a seller has sold a unit, the second unit costs \$1 more, so the seller will be asked whether or not the seller wants to sell a second unit at the advertised price and grade. If a second unit is sold, it must be at the same price and grade as the first unit. If a seller refuses to sell or sells both units in a period, I will draw a line through that seller’s price.

Use the table below to calculate the hypothetical earnings. We will begin by having each seller choose a price and grade for Period 1.

	Pd. 1	Pd. 2	Pd. 3	Pd. 4	Pd. 5	Pd. 6	Pd. 7
1) Grade for current pd.							
2) Price for current pd.							
3) Sales price on 1 st unit							
4) Cost of 1 st unit							
5) Profit on 1 st unit (3)-(4)							
6) Sales price on 2 nd unit							
7) Cost of 2 nd unit							
8) Profit on 2 nd unit (6)-(7)							
9) Total profit in pd. (5) + (8)							
10) Cumulative profit (sum row 9 across columns)							

Buyer team instructions

Buyer team _____

This is a market with four teams of buyers and three teams of sellers. The selling teams will begin by choosing a price and quality “grade.” I will collect these decisions and write them on the blackboard. Then I will give each team of buyers the chance to purchase from one team of sellers at the grade and price listed. The grade can be one of three levels: lower, middle, and higher. Better grades cost more for sellers to produce and are worth more to buyers. The table below shows your costs of producing different grades if you are a seller, and it shows your money values of different grades if you are a buyer.

	Lower grade	Middle grade	Higher grade
Buyer value	\$4.00	\$8.80	\$13.60

Each buyer team can purchase only one unit per period. Each seller team can sell up to two units per period, but the second unit costs \$1 more to produce. If you are a seller team, the top row of the table above shows the cost of the first unit you actually sell in a period (for the grade you choose), the second unit costs \$1 more than the first unit. Unsold units are not produced and hence incur no cost.

Buyers earn money by purchasing product at a price that is below their value, which depends on the quality grade. The value to the buyer depends only on the grade, not on whether it is a given seller’s first or second unit in the period. A buyer’s earnings are calculated as the difference between the value and the purchase price. If a buyer does not make a purchase, the buyer earns \$0.

Buyer earnings = value for grade purchased – seller’s price

Sellers earn money by making one or more sales at a price that is above the cost of the unit (determined by the table above).

A seller’s earnings are calculated as the sum of the earnings on the units actually sold (a seller who does not make a sale in a period will earn \$0):

Seller earnings = sales price – cost of grade produced

When all sellers have finished choosing their prices and grades for the period, I will collect these sheets and write the prices and grades on the blackboard under the seller numbers. Then I will deal cards to the buyers to determine the buyer number, and the first buyer team can decide to purchase a unit from one of the sellers or from no seller. Other buyer teams will then go in ascending order. Once a seller has sold a unit, the second unit costs \$1 more, so the seller will be asked whether or not the seller wants to sell a second unit at the advertised price and grade. If a second unit is sold, it must be at the same price and grade as the first unit. If a seller refuses to sell or sells both units in a period, I will draw a line through that seller’s price.

Use the table below to calculate the hypothetical earnings. We will begin by having each seller choose a price and grade for Period 1.

	Pd. 1	Pd. 2	Pd. 3	Pd. 4	Pd. 5	Pd. 6	Pd. 7
1) ID of seller of product							
2) Grade of product							
3) Value to you (see table)							
4) Purchase price							
5) Profit (3)-(4)							
6) Cumulative profit (sum row 5 across columns)							

Observer/verifier instructions

For now, you are an observer of the market action. Watch the dynamics carefully, because either in the second half of today's class or during the next class, your team will play the role of an independent verifier (but do not disclose this yet to the buyer and seller teams). That is, for some cost, you will have a chance to learn something about the quality of the product being offered and you will try to earn a profit by leveraging what you learn.

- Think about how much to ask for your services
- Think about whether you plan to approach selling teams or buying teams.
- Think about conditions under which it would be in your best short-run economic and long-run economic interest to remain independent in fact/appearance versus collude with teams who buy your services
- Think about the ethical thing to do and whether that aligns with your short- and long-run economic interests
- It will be up to buyers and sellers whether to provide you with information about value and cost, respectively

Student handout

Takeaways from market game

1. When both sellers and buyers know quality and price in advance, market forces (the so-called *invisible hand*) moves toward socially optimal levels of production for different quality levels.
2. Even when both sellers and buyers know quality and price in advance, society might be better off if a grade other than highest quality is traded. In the game, the highest total surplus existed when medium quality grade was produced. Recall just after a mere five periods, medium was the quality grade most frequently traded – market forces were working rather fast.
3. What happened when buyers did not know quality in advance? Did sellers' asking prices reliably sort the quality of products, especially when sellers have more information about quality than buyers?
4. When quality is not readily observable to buyers ahead of time, they will become more reluctant to engage in trade; fewer trades occur. (A fancy term for this precontractual roadblock is *adverse selection*).
5. The lower number of trades that do occur typically will include some buyers getting "ripped off" because of their trust of the sellers to not sell lower-quality products at prices typically associated with higher-quality products. Prices are not as different across quality levels.
6. When quality itself is not known in advance, sellers' reputations become key. In our market today, we didn't give sellers sufficient time to build a reputation for honest dealings.
7. Did any seller try to establish a reputation for credible signaling about quality (by having fair prices)? Did the seller get rewarded for such a noble goal? Why or why not?
8. When reputations cannot be established, sellers who want to provide honest combinations of price for quality produced will pull out of the market, fearing that buyers will have big doubts about quality. The only sellers who hang around are those who want to rip off buyers. But, buyers realize this threat and so do not trade. This is a *lemons market* (a term coined by 2001 Nobel Laureate in Economics, George Akerlof). Klein's article, of course, characterizes Akerlof's model as being quite nondescriptive of the real world. Provide a succinct summary of why Klein argues few lemons markets really manifest in real markets.
9. In our market's last few periods, audit services were voluntary, debunking the idea that auditing is supplied only when regulators mandate it. Buyers prefer contracting with sellers who have had their quality grades verified. Did purchasing audit service help the party who made the purchase? Did the entire market benefit from the provision of audit services or not? Explain.
10. You can draw parallels between this market game and the real world of financial statement reporting and auditing. For instance, equity and credit markets may benefit most when financial reporting quality falls below the conceptually highest level of quality. That is, the incremental costs of producing perfect reporting could exceed the benefits, cf., 2 above). As another example, if users of an issuers' financial statements have no or a limited ability of credibly learning an organization's financial reporting quality, they tend to assume the worst and to avoid contracting with the issuer (cf., 4 and 9 above). When organizations retain auditors to verify their assertions, users of financial statements become more willing to contract with them and on favorable terms (cf. 9 above).

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