



Instructor guide to informative and persuasive advertising

Laboratory implementation, theoretical foundations,
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



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<https://beer-lab.org/>

How to use this guide

This guide supports preparation, implementation, and discussion of the BEER Lab advertising family. It is intended for instructors in microeconomics, industrial organization, and behavioral economics with different levels of familiarity with laboratory experiments.

There are three reading routes. Operational chapters explain session creation and monitoring. The economic model and worked examples support interpretation. Basic modes and extensions let instructors select a specific comparison without repeating common instructions.

The activity is individual and uses simulated consumers. One guide covers the basic and extended editions; the Spanish version preserves the same decisions, parameters, and measures. Use the questions and answer guidance to conduct feedback without assuming specialist knowledge.

Author

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For the instructor

Check configuration before starting. Reserve optimal references for the discussion and do not project individual identifiers. ECU are experimental units; this activity does not promise real-money payments.

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Preparing and launching a session

1.1 Learning objectives and scope

This activity lets students experience a business decision that is often compressed too quickly into an equation: how much to charge and how much to spend so consumers know or value a product. Each student manages the only seller in a small market. Computer-controlled consumers follow explicit purchasing rules. Nobody has to wait for a partner, act as a buyer, or negotiate with another student. Decisions are individual, while the subsequent discussion draws on aggregate results from the whole class.

The central teaching objective is to separate two advertising channels. Under persuasion, advertising changes willingness to pay. Under information, advertising changes who knows the product exists. Both can increase sales, but their implications for demand, optimal price, uncertainty, and surplus differ. A firm can spend heavily and make few sales because its price is too high. It can also sell many units and earn little because advertising is costly. These distinctions provide the material for the classroom discussion rather than being incidental details of the interface.

By the end, students should be able to construct demand from individual valuations, distinguish the total and marginal costs of an advertisement, calculate profit and surplus, explain why a favorable draw does not make a strategy optimal, and discuss what welfare means after preferences change. In an introductory course, focus on choices and accounting. In industrial organization, develop the joint choice of price and advertising. In behavioral economics, discuss limited search, learning, and evaluation under uncertainty, without automatically treating every departure from the benchmark as a cognitive bias.

For the instructor

Choose one persuasive or informative decision for a short session. Use the two-decision comparison to introduce both channels. Select extended conditions to answer a specific question about costs, learning, order, an advertising limit, or production costs. The extended edition offers fourteen pedagogical configurations per language; running all of them in one class is neither necessary nor the intended use.

1.2 Family summary

Purpose	Choose price and advertising against ten simulated consumers; compare awareness and valuation changes, increasing costs, profit, uncertainty, and welfare.
Experimental unit	One person managing a firm in an independent market. Minimum one participant; any positive integer number of participants is valid.
Participants	Individual choices, without partners or group waiting. Any positive integer number of participants is permitted.
Suggested duration	15–25 minutes of activity and 15–25 minutes of discussion.
Basic edition	One persuasive decision, one informative decision, or a two-decision comparison with low advertising costs.
Extended edition	Five-decision learning, high advertising costs, alternative orders, cost changes, a five-ad limit, and costly production; each mechanism can be activated separately.
Decision	Integer price from 0 to 30 ECU and integer advertising from 0 to 10, or from 0 to 5 under the limit.
Payoff	Classroom ECU outcome per decision: initial 100 ECU plus profit, accumulated across decisions. No real-money conversion is promised.
Topics	informative advertising, persuasive advertising, monopoly, marginal costs, welfare, learning.
JEL	A22, C91, D42, D83, L12, M37.

1.3 Access from the laboratory website

Start at <https://beer-lab.org/>. The **CLASE** menu, or its English teaching counterpart, leads to the teaching catalog at <https://teaching.beer-lab.org/>; the English catalog is <https://teaching.beer-lab.org/en/>. Search for this activity or use its topics and JEL codes. Clear filters left over from another search if the activity is not visible. Catalog language and session language are separate choices: check the card, room, and configuration before distributing an access link.

The family address is <https://advertising.beer-lab.org/>. Students use https://advertising.beer-lab.org/room/advertising_en for the basic English edition and https://advertising.beer-lab.org/room/advertising_extended for the extended edition. Spanish rooms end in `publicidad_es` and `publicidad_extendida`. Instructor access is <https://advertising.beer-lab.org/demo>; rooms are administered at <https://advertising.beer-lab.org/rooms>. These are the stable routes to preserve when the laboratory deploys the family.

Demo offers three basic and fourteen extended configurations in each language: thirty-four in total, all belonging to advertising. Rooms contains exactly four rooms. If another family appears, such as trust or auctions, stop preparation and contact laboratory coordination: this domain should load only this activity. Reports and exports belong to the selected session, rather than to whichever session happens to be open in another browser tab. Check the session name and language before projecting results.

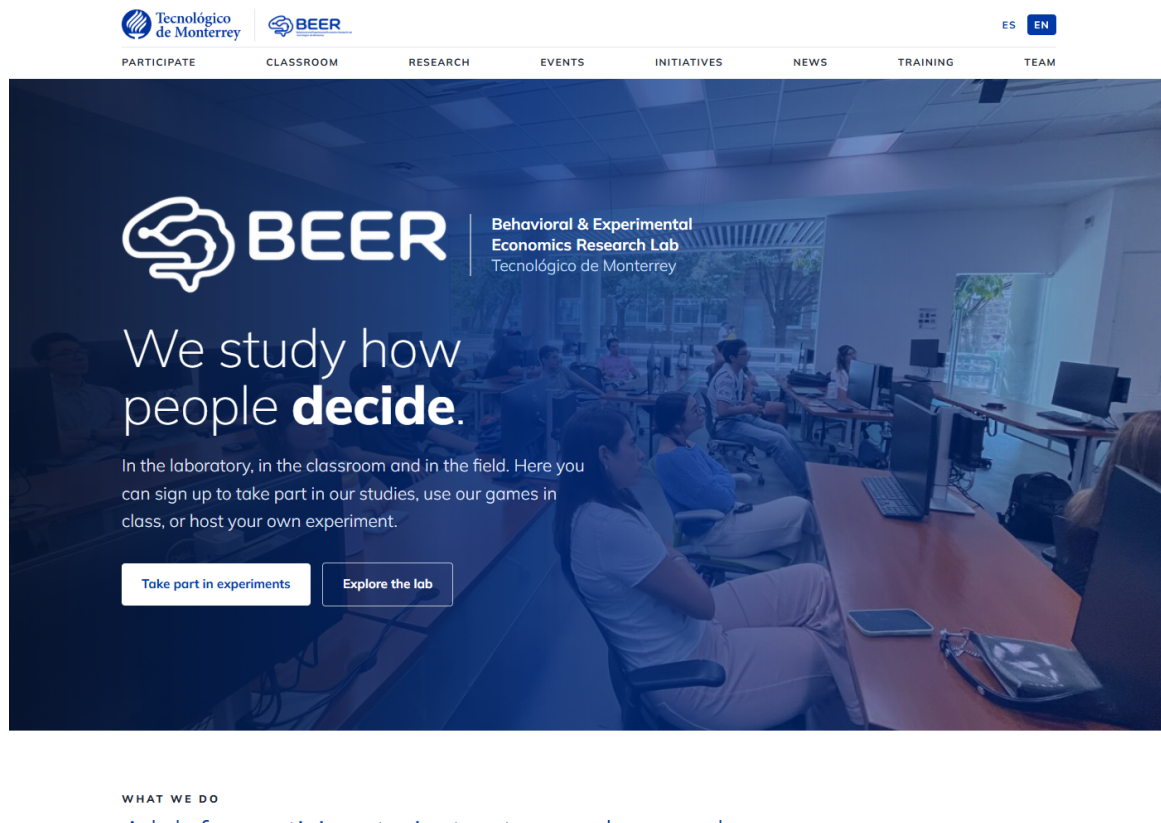


Figure 1.1: Institutional website consulted for this delivery. Use the teaching menu to reach the classroom catalog.

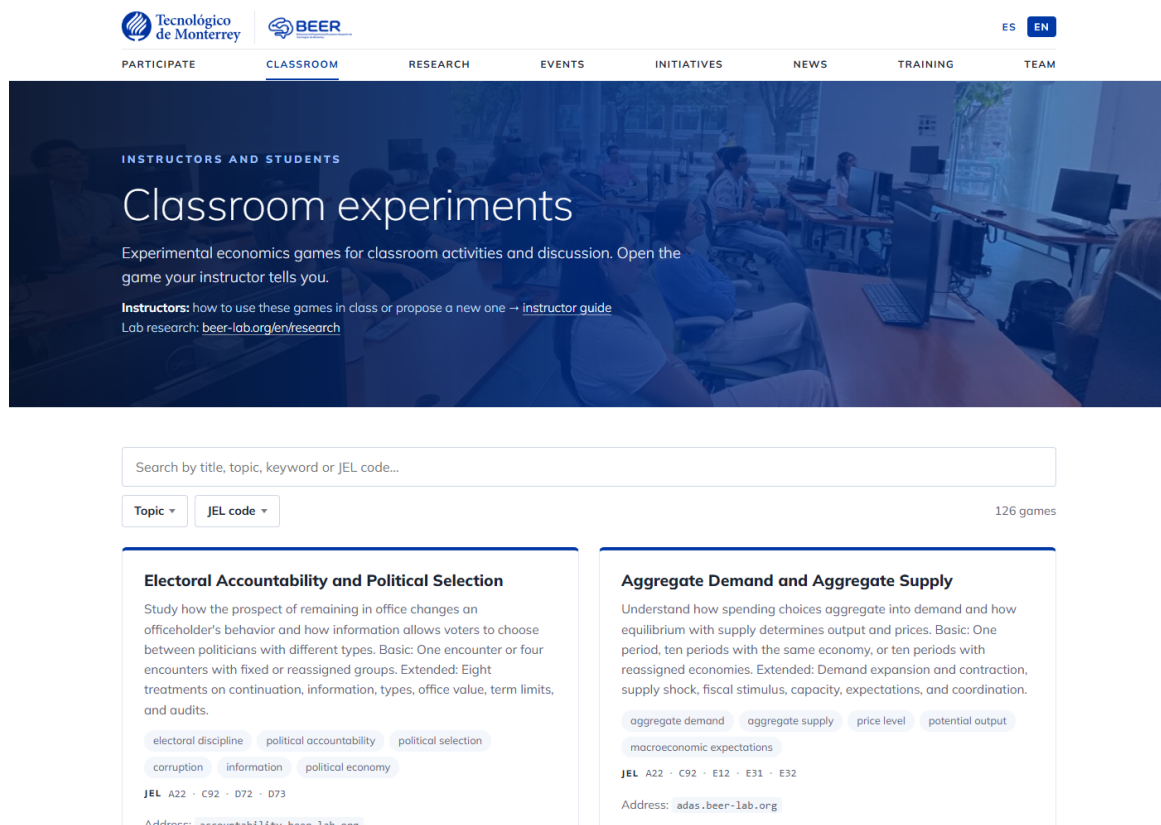


Figure 1.2: Find the activity and select language and edition.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

Demo

Publicidad informativa y persuasiva · Básica · ES · Persuasiva · una decisión
Publicidad informativa y persuasiva · Básica · ES · Informativa · una decisión
Publicidad informativa y persuasiva · Básica · ES · Comparación · persuasiva seguida de informativa
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · cinco decisiones
Publicidad informativa y persuasiva · Extendida · ES · Informativa · cinco decisiones
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · costos altos
Publicidad informativa y persuasiva · Extendida · ES · Informativa · costos altos
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · costos altos y aprendizaje
Publicidad informativa y persuasiva · Extendida · ES · Informativa · costos altos y aprendizaje
Publicidad informativa y persuasiva · Extendida · ES · Comparación · informativa seguida de persuasiva
Publicidad informativa y persuasiva · Extendida · ES · Comparación · orden aleatorio individual
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · cambio de costos
Publicidad informativa y persuasiva · Extendida · ES · Informativa · cambio de costos
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · máximo de cinco anuncios
Publicidad informativa y persuasiva · Extendida · ES · Informativa · máximo de cinco anuncios
Publicidad informativa y persuasiva · Extendida · ES · Persuasiva · producción con costo
Publicidad informativa y persuasiva · Extendida · ES · Informativa · producción con costo
Informative and Persuasive Advertising · Basic · EN · Persuasive · one decision
Informative and Persuasive Advertising · Basic · EN · Informativa · one decision
Informative and Persuasive Advertising · Basic · EN · Comparison · persuasive then informative
Informative and Persuasive Advertising · Extended · EN · Persuasive · five decisions
Informative and Persuasive Advertising · Extended · EN · Informativa · five decisions
Informative and Persuasive Advertising · Extended · EN · Persuasive · high costs
Informative and Persuasive Advertising · Extended · EN · Informativa · high costs
Informative and Persuasive Advertising · Extended · EN · Persuasive · high costs and learning
Informative and Persuasive Advertising · Extended · EN · Informativa · high costs and learning
Informative and Persuasive Advertising · Extended · EN · Comparison · informative then persuasive
Informative and Persuasive Advertising · Extended · EN · Comparison · individual random order
Informative and Persuasive Advertising · Extended · EN · Persuasive · cost change
Informative and Persuasive Advertising · Extended · EN · Informativa · cost change
Informative and Persuasive Advertising · Extended · EN · Persuasive · maximum of five ads
Informative and Persuasive Advertising · Extended · EN · Informativa · maximum of five ads
Informative and Persuasive Advertising · Extended · EN · Persuasive · costly production
Informative and Persuasive Advertising · Extended · EN · Informativa · costly production

Publicidad informativa y persuasiva / Informative and Persuasive Advertising — BEER Lab

Seleccione una variante de este juego. Select a version of this game.

Figure 1.3: Demo offers configurations from this family only.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

Rooms

Current rooms:

Publicidad informativa y persuasiva · ES · Básica / Basic
Informative and Persuasive Advertising · EN · Básica / Basic
Publicidad informativa y persuasiva · ES · Extendida / Extended
Informative and Persuasive Advertising · EN · Extendida / Extended

Figure 1.4: Four rooms separate language and edition.

1.4 Rooms, demonstrations, and individual links

A room is a common entrance. Its stable link or QR code can be reused between classes. A demonstration lets the instructor rehearse with fictitious participants; it does not replace preparing the intended classroom session. An individual link identifies one participation and preserves that person's progress. Two people must not use the same individual link, even when testing the same configuration. Opening that link on two devices can produce conflicting actions within a single participation.

The instructor creates a session, chooses the configuration, and confirms the participant count. This family accepts one, four, twenty-three, or any other positive integer: students do not have to form pairs. The visible participant requirement should say individual activity. Distribute the room or the participant links using the laboratory's normal procedure. The session-links screen also provides monitoring, data, and report access. Avoid projecting a list that would associate decisions with names, student numbers, or particular seats in the laboratory.

1.4.1 Creating the room session

Open Rooms, select the room, and check Session Config. A basic room contains three configurations in its language; an extended room contains fourteen. Choose the intended mechanism and duration before entering the participant count. Enter the actual number of students under Number of participants and select Create. Any positive integer is permitted because choices are individual.

Check links and Monitor before inviting students to enter. Opening the room displays a welcome with Start. That button begins entry; without an available session the participant waits for the instructor to prepare one. After assignment, the activity's own welcome and rules appear. Do not distribute the administrative creation page as a participant link.

Attention

A participant link from an earlier database may stop working. Create a new session and distribute its current links; do not reset the database to resolve a student's delay. An address beginning with localhost works only on the computer running the server. Use the laboratory's public address for a class accessing the activity from different computers.

1.5 Preparation before students arrive

Decide which comparison you need before choosing a configuration. A single persuasive decision is suitable for business accounting, an informative decision for uncertainty, and the comparison for contrasting channels. Record language and the full configuration name. Check the number of active decisions: learning conditions contain five markets, cost-change conditions contain four, and comparisons contain two. Do not infer the number from the five technical rounds displayed by the administrator. Students see active decisions only, and the report uses those decisions only.

Complete a rehearsal with fictitious data. Check the logo, the definition of ECU, explanatory comprehension feedback, and a final screen that stays open instead of advancing to an empty ending. Open an empty report, confirm that revelation is locked, and download a test file. Check your downloads folder so the rehearsal file is not mistaken for the classroom export. A short rehearsal prevents many interruptions and makes it easier to distinguish a navigation issue from a misunderstanding of the economic task.

Prepare a slide or worksheet containing discussion questions, but keep solutions hidden until

[oTree](#) [Demo](#) [Sessions](#) [Rooms](#) [Data](#) [Server Check](#) [Logout](#)

Room: Informative and Persuasive Advertising · EN · Básica / Basic

Create a new session

Session Config

Informative and Persuasive Advertising · Basic · EN · Persuasive · one decision

Number of participants

Individual decisions: any positive participant count is allowed.

Create

[Configure session](#) ⚙️

App sequence

advertising_game (5 rounds)

0 participants present

Start links

These URLs will stay constant for new sessions, even if the database is recreated.

Room-wide URL

Here is the room-wide URL anyone can use. Don't use this link when testing in multiple tabs on the same browser, because all tabs will be assigned to the same participant, using a cookie.

http://127.0.0.1:8180/room/advertising_en

Figure 1.5: Choose configuration and participant count, then select Create to prepare the room.

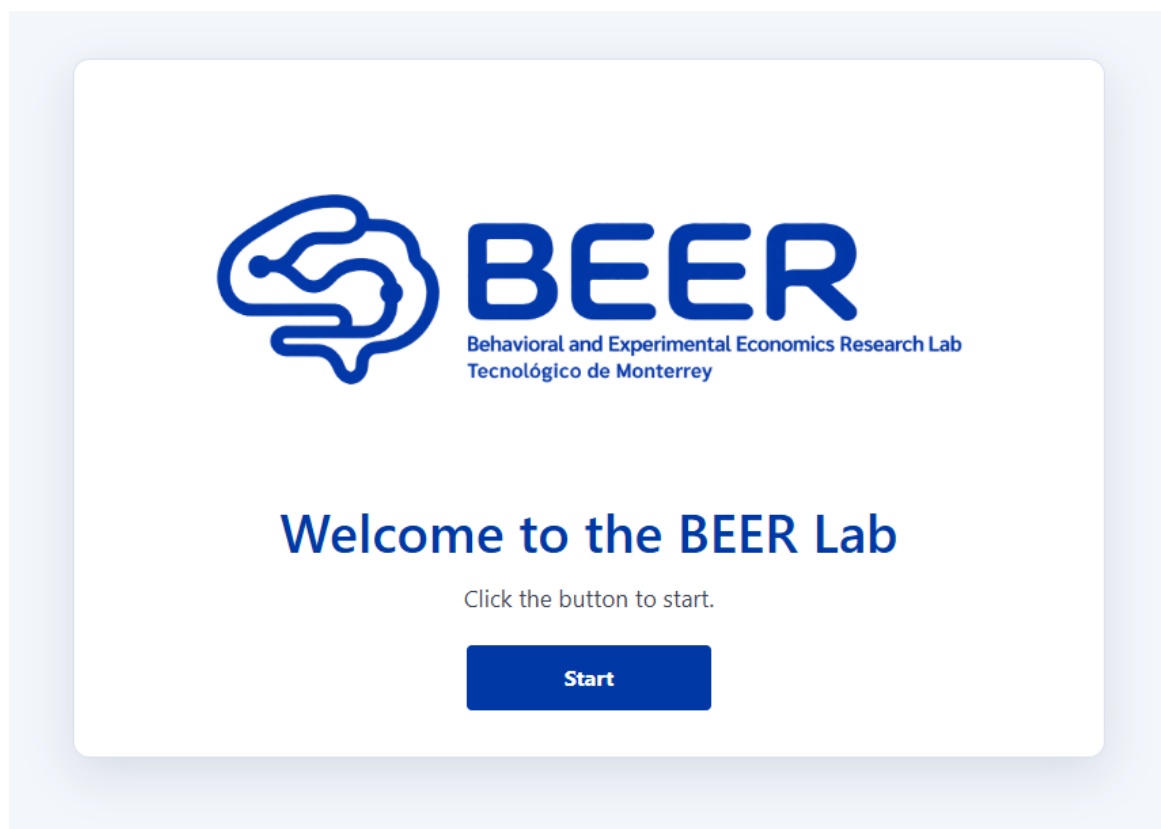


Figure 1.6: Select Start to enter the session prepared by the instructor.

The screenshot shows the oTree web interface. At the top is a navigation bar with links: oTree, Demo, Sessions, Rooms, Data, Server Check, and Logout. Below this is a header for the current session: 'Informative and Persuasive Advertising · Basic · EN · Comparison · persuasive then informative: session '10z2ff2z' (demo)'. A secondary navigation bar contains icons and labels for New, Links, Monitor, Data, Payments, Report, and Description. The main content area has a message about temporary links for testing and demonstration, followed by a choice of options to play the session. Under 'Combined views', there are buttons for 'Split-screen view' and 'Grid view', each with a 'Launch' link. Below this is a 'Session-wide testing link' section with a URL and instructions to open it in up to 4 browser tabs. Finally, there is a 'Single-use links' section with instructions to open each link in its own browser tab, followed by a table of four links labeled P1 through P4.

oTree Demo Sessions Rooms Data Server Check Logout

Informative and Persuasive Advertising · Basic · EN · Comparison · persuasive then informative: session '10z2ff2z' (demo)

New Links Monitor Data Payments Report Description

Below are temporary links for testing and demonstration. To launch a real study, either create persistent links by setting up a [room](#), or create a session through the [sessions page](#).

Choose one of the following options to play the session:

Combined views

Split-screen view Launch

Grid view Launch

Session-wide testing link

Open the below link in up to 4 browser tabs.

<http://127.0.0.1:8180/join/jenozogi>

Single-use links

Open each link in its own browser tab.

P1	http://127.0.0.1:8180/InitializeParticipant/3bmvwonk
P2	http://127.0.0.1:8180/InitializeParticipant/1qh80swh
P3	http://127.0.0.1:8180/InitializeParticipant/o3jnk3mf
P4	http://127.0.0.1:8180/InitializeParticipant/0w30sxly

Figure 1.7: Use Monitor for progress and Report for the private report.

choices are complete. For an introductory class, remind students verbally that revenue, profit, and initial endowment are different quantities. If probability is unfamiliar, explain that the system also calculates an average over possible recipients and that the class will work through its meaning afterward. Assistance during decisions should clarify navigation and rules rather than recommend a price or an advertising level.

Checkpoint

Before starting, verify configuration and language, individual participation, the visible 100-ECU endowment, the correct advertising range, private report access, a projector without identifiers, a new valid session, and a successful download. Record date, course, and treatment in instructor notes without adding demographic questions to the activity.

The participant experience

2.1 Welcome and general laboratory rules

The opening screen displays the institutional logo, a welcome, and the laboratory's purpose. It identifies the BEER Lab as part of the Department of Economics at Tecnológico de Monterrey. Students are asked to remain silent, decide individually, and respect the privacy of other screens. Accepting these rules is neither an economic decision nor a demographic question. It establishes common conditions for later discussion based on independently made choices.

Ask students to read before continuing and to contact staff privately if they need help. Publicly discussing a strategy during repetition can change the behavior of participants who have not yet decided. Silence therefore helps distinguish learning from one's own outcomes from learning through others' recommendations. A deliberate class discussion can take place after everyone completes the markets. The instructor can then use aggregate distributions without connecting a particular decision to an identifiable student.

2.2 Instructions, resources, and units

Every person manages a firm with an initial endowment of 100 ECU in each decision. ECU means Experimental Currency Units. The activity uses them to organize classroom outcomes. It does not specify an exchange rate or automatically convert the score into cash. A course intending to offer real financial incentives needs a separate payment protocol announced before participation; a conversion should not be improvised after results become visible. The default implementation is a classroom-score activity.

The endowment is not a sale, a product valuation, or a supply of free advertisements. It is the base of the participant's account. Profit of 24 ECU gives an outcome of 124; a loss of six gives an outcome of 94. The next market starts again from 100. History adds profits and ECU outcomes across active decisions, so five decisions incorporate five initial endowments. Compare mean profits rather than cumulative outcomes when sessions contain different numbers of markets. This accounting convention keeps one market's losses from changing another market's opportunities.

Instructions introduce both channels so students do not assume that every advertisement persuades consumers. Each decision screen then names the current mechanism and restates its rule. Students need not memorize treatment letters from the source article or a production-plan identifier. Visible names describe choices, costs, and the number of markets. Spanish and English use the same economic logic and a single shared application, including the private report and the exported variables.



Welcome to the BEER Lab

The Behavioral and Experimental Economics Research Lab in the Department of Economics at Tecnológico de Monterrey is a space designed for learning about economic decision-making through controlled activities.

In this activity, you will choose a firm's price and advertising facing simulated consumers.

Laboratory rules

- Remain silent and do not talk to other participants.
- Make decisions individually and do not look at other screens.
- Keep this page open; raise your hand if you need help.

☐ I understand the instructions and will follow the rules.

Start

Figure 2.1: Accept the rules and select Start.

Instructions

Resources and unit of account

Initial endowment per decision: 100 ECU. Every market starts with 100 ECU; it does not carry over the previous balance. ECU are Experimental Currency Units.

Decisions in this session: 1.

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

You manage a firm

You receive an initial endowment of 100 ECU in EACH decision. ECU means Experimental Currency Units. This is a classroom score; it does not imply a payment in real money. The computer represents ten consumers; each can buy at most one unit.

The endowment is renewed in each decision. Your ECU outcome is $100 + \text{profit}$. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Decisions in this session: 1

Persuasive advertising

Every consumer knows the product, even with no ads. Initial valuations are 10, 9, ..., 1 ECU. Each ad raises the valuation of ALL consumers by 1 ECU. Ads do not select recipients.

Informative advertising

Valuations are 20, 19, ..., 11 ECU and do not change with ads. Each ad reaches a different consumer, selected randomly without replacement AFTER you confirm price and advertising. Only reached consumers can buy. With zero ads, nobody buys.

Figure 2.2: Review the endowment, ECU, and mechanisms before deciding.

2.3 Comprehension and specific assistance

The comprehension screen asks three questions: the initial endowment per decision, the effect of informative advertising, and the sum of the first two advertising costs. Answers are 100 ECU, product awareness, and six ECU. The third question explicitly specifies low costs: 2.5 plus 3.5. Its answer therefore remains six even in a high-cost session, because it asks about a stated low-cost example rather than the current session's schedule. This checks whether students add costs without concealing a change of rule.

An incorrect answer receives the submitted response, the correct answer, and an explanation next to that question. Other responses are preserved. If a student is delayed here, ask them to read the message and reconstruct the rule. There is no need to announce the answer publicly or restart participation. When difficulties persist, distinguish reading problems from economic confusion. For example, ask whether the student is adding two different advertising costs or multiplying the second advertisement's cost by two.

2.4 Choosing and confirming

Four prominent cards display initial endowment, the advertising maximum, production cost, and advertising-cost regime. The text restates the purchase rule and accounting. Students enter an integer price from zero to thirty ECU and an integer number of advertisements. A table gives both the marginal cost of the final advertisement and total advertising cost. Advertising is paid even when price prevents all sales. Students can revise both entries before confirmation; afterward they cannot replace them with a choice made after seeing randomly selected recipients.

Under persuasion every consumer knows the product, even when advertising is zero. Three advertisements raise every valuation by three ECU. Under information, three advertisements reach three different consumers without changing anyone's valuation. Recipients are drawn after commitment. The participant knows valuations and the random-selection procedure but cannot target the most profitable consumers in advance. Price and advertising are committed together. The task consequently combines a demand decision with an investment decision rather than offering an advertising purchase after known sales.

2.5 Own results and closure

After confirming, students see units sold, awareness, revenue, costs, profit, ECU outcome, and surpluses. A ten-consumer table makes it possible to verify awareness, final valuation, and purchasing. It records the participant's own simulated market rather than classmates. Persuasive awareness is always ten, including with no advertising; informative awareness equals advertising. Awareness is therefore different from the number of buyers, and it should not be described simply as sales or successful advertisements.

Expected profit is an average calculated before the draw. It is not added to realized profit or paid a second time. In persuasion the two coincide because recipients are not randomized. In information they can differ. Own results support learning in repeated sessions, but the participant does not see the optimal choice before the discussion. Exact benchmarks appear in the instructor report and remain inside its controlled-revelation block. This preserves the opportunity to search rather than converting every later decision into copying a displayed solution.

The final screen says Activity completed, shows decision history, and asks participants to wait for the instructor. There is no next button leading to an empty ending. An early finisher can

Review the marked questions. Each shows your answer and an explanation; your other answers are retained.

Comprehension check

Resources and unit of account

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

This session does not convert ECU into real money.

How many initial ECU do you receive in EACH decision?

50

Your answer: 50. The correct answer is 100. Every market starts with 100 ECU; it does not carry over the previous balance. ECU are Experimental Currency Units.

What does informative advertising change?

- ☐ Which consumers know the product
- ☒ Every consumer's valuation
- ☐ Valuations and the number of units per consumer

Your answer: Every consumer's valuation. The correct answer is Which consumers know the product. Informative advertising changes product awareness, not valuation. Recipients are drawn after your decision.

With low costs, the first ad costs 2.5 and the second costs 3.5 ECU. What is the total cost of two ads?

7

Your answer: 7. The correct answer is 6. Add $2.5 + 3.5 = 6$ ECU. The table distinguishes marginal cost and total cost.

Continue

Figure 2.3: Each error retains the response and explains the correct rule.

DECISION 1 OF 2

Price and advertising

Persuasive advertising

Initial endowment per decision

100 ECU

Maximum number of ads

10

Production cost per unit

0 ECU

Advertising cost

Low

Every consumer knows the product, even with no ads. Initial valuations are 10, 9, ..., 1 ECU. Each ad raises the valuation of ALL consumers by 1 ECU. Ads do not select recipients.

A consumer buys when aware of the product and valuation is greater than or equal to price. Equality leads to a purchase. Choose one integer price from 0 to 30 ECU and an integer number of ads from 0 to the stated maximum.

The endowment is renewed in each decision. Your ECU outcome is 100 + profit. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Price per unit (ECU)

Number of ads

Total advertising cost is paid even when nobody buys. Successive ads cost more: add the costs of all selected ads rather than multiplying the final ad's cost by the number of ads.

Advertising costs (ECU)

Number of ads	Cost of the additional ad	Total advertising cost
0	—	0
1	2.5	2.5
2	3.5	6
3	4.5	10.5
4	5.5	16
5	6.5	22.5
6	7.5	30
7	8.5	38.5
8	9.5	48
9	10.5	58.5
10	11.5	70

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 2.4: Choose price and ads; advertising raises valuations.

DECISION 2 OF 2

Price and advertising

Informative advertising

Initial endowment per decision

100 ECU

Maximum number of ads

10

Production cost per unit

0 ECU

Advertising cost

Low

Valuations are 20, 19, ..., 11 ECU and do not change with ads. Each ad reaches a different consumer, selected randomly without replacement AFTER you confirm price and advertising. Only reached consumers can buy. With zero ads, nobody buys.

A consumer buys when aware of the product and valuation is greater than or equal to price. Equality leads to a purchase. Choose one integer price from 0 to 30 ECU and an integer number of ads from 0 to the stated maximum.

The endowment is renewed in each decision. Your ECU outcome is 100 + profit. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Price per unit (ECU)

Number of ads

Confirm decision

Total advertising cost is paid even when nobody buys. Successive ads cost more: add the costs of all selected ads rather than multiplying the final ad's cost by the number of ads.

Advertising costs (ECU)

Number of ads	Cost of the additional ad	Total advertising cost
0	—	0
1	2.5	2.5
2	3.5	6
3	4.5	10.5
4	5.5	16
5	6.5	22.5
6	7.5	30
7	8.5	38.5
8	9.5	48
9	10.5	58.5
10	11.5	70

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 2.5: Commit price and ads before recipients are drawn.

DECISION 2 OF 2

Your decision result

Informative advertising

Consumers aware of the product 7	Units sold 7	Sales revenue 77	Total advertising cost 38.5
Total production cost 0	Realized profit 38.5	Expected profit before the draw 38.5	ECU outcome 138.5
Consumer surplus 31	Total surplus using final valuations 69.5		

Expected profit averages over possible recipients; it is not additional revenue. Surplus uses final model valuations; it does not by itself measure people's actual welfare.

Simulated consumer	Final valuation (ECU)	Aware of the product	Buys
1	20	Yes	Yes
2	19	No	No
3	18	Yes	Yes
4	17	No	No
5	16	Yes	Yes
6	15	Yes	Yes
7	14	Yes	Yes
8	13	Yes	Yes
9	12	Yes	Yes
10	11	No	No

[Continue](#)

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 2.6: Reconstruct purchases, costs, and profit using the simulated consumers.

review decisions while classmates continue. If someone leaves, confirmed choices remain recorded and pending choices are not invented. An incomplete sample can be discussed using an export, provided the instructor describes the selection. A locked report should not be represented as a calculation failure or unlocked by entering fictitious classroom decisions.



Activity completed

You have completed every decision. Keep this screen open and wait for the instructor's directions.

Cumulative profit

81 ECU

Cumulative ECU outcome

281 ECU

History

Decision	Mechanism	Price per unit (ECU)	Number of ads	Realized profit	ECU outcome
1	Persuasive advertising	9	7	42.5	142.5
2	Informative advertising	11	7	38.5	138.5

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 2.7: Closure separates cumulative profit from cumulative ECU outcome.

Economic model and worked examples

3.1 From individual consumers to demand

A valuation is the largest amount a consumer would pay for one unit within the model. It is neither the market price nor the firm's revenue. A consumer valuing a unit at twelve ECU buys at price ten and receives surplus of two. At price thirteen that consumer does not buy. The activity specifies that an indifferent consumer buys: equality between valuation and price creates a sale with zero consumer surplus. State this convention explicitly, because changing it affects some results in a market with only ten buyers.

Demand counts consumers who know the product and value it at least as much as its price. It is not a continuous straight line: quantity is an integer between zero and ten. With two persuasive advertisements, valuations are twelve, eleven, ten, nine, eight, seven, six, five, four, and three. At price ten there are three buyers; at price nine there are four; at price thirteen there are none. Asking the class to reconstruct these points can be more useful than starting immediately with differentiation and a smooth demand function.

Let p denote price, a advertising, and c production cost per unit. With persuasion, consumer i , numbered from one to ten, has valuation $v_i(a) = 11 - i + a$. Quantity is

$$Q_P(p, a) = \sum_{i=1}^{10} \mathbf{1}\{v_i(a) \geq p\}.$$

The indicator is one when the condition holds and zero otherwise. Adding indicators counts buyers. Everyone knows the product, so no further awareness condition is necessary. Advertising can raise valuations among people who already intended to buy and bring in people whose previous valuation was below price. Neither effect changes the rule that each consumer purchases at most one unit.

Theoretical foundation

Persuasive advertising is implemented as an explicit shift in valuations. It need not mean deception or improved physical quality. Informative advertising means awareness of a product's existence, holding valuations constant. These channels are defined by the design: participants do not write actual messages whose persuasive effects are measured on other students.

3.2 Marginal cost, total cost, and profit

Under low advertising costs the first advertisement costs 2.5 ECU, the second 3.5, and the third 4.5. Total cost for three is 10.5 rather than 13.5. The third advertisement's marginal cost is the amount added when moving from two to three advertisements. Total cost includes earlier advertisements as well. For a advertisements the sum is $C_L(a) = 2a + a^2/2$. Under high costs each advertisement costs one extra ECU, giving $C_H(a) = 3a + a^2/2$. Holding the decision fixed, the total difference between regimes is exactly a ECU.

Profit is $\pi = (p - c)Q - C(a)$. Revenue is pQ , production costs cQ , and advertising costs $C(a)$ even when nobody buys. The initial 100 ECU is added afterward to construct the classroom outcome. Because the endowment is the same across alternatives within a market, maximizing $100 + \pi$ is equivalent to maximizing π . This equivalence does not make endowment and revenue interchangeable: one is fixed, whereas the other depends on sales. It also does not imply that a lower price or higher sales always improve the firm's outcome.

Consider seven persuasive advertisements and price nine. Valuations range from seventeen to eight, so nine consumers buy. With low costs, advertising costs $14 + 24.5 = 38.5$. Revenue is eighty-one, production is free, and profit is 42.5. The ECU outcome is 142.5. Purchasing consumers receive surpluses of eight through zero, summing to thirty-six. Total surplus using final valuations is $42.5 + 36 = 78.5$. The consumer valuing the product at eight does not buy and contributes no consumption surplus.

Keep seven advertisements and price nine but switch to high advertising costs. Buyers and revenue do not change, because costs do not directly change demand. Advertising cost rises to 45.5 and profit falls to 35.5. This is an accounting effect on a fixed strategy. The firm may subsequently adjust choices, so comparing optimal profits requires allowing price and advertising to respond. Teaching the fixed-choice calculation first and the adjusted-choice calculation second separates a mechanical cost change from behavioral adaptation.

3.3 Information, random recipients, and expected profit

Informative valuations range from twenty to eleven ECU. One advertisement reaches one consumer; two reach two different consumers. Sampling is uniform without replacement, so a consumer cannot receive two advertisements within the same market. Each consumer's probability of receiving an advertisement is $a/10$. With two advertisements the individual probability is 0.2, not one half. Selecting two recipients does not mean that there are only two people eligible to be selected; the original pool contains ten.

Let $K(p)$ be the number of consumers whose valuations are at least p . Expected informative quantity is $E[Q_I] = aK(p)/10$. This multiplies the number of eligible consumers by each one's probability of being reached. It does not require independent recipient indicators: the expectation of a sum is the sum of expectations even when indicators are related. Expected profit is

$$E[\pi_I(p, a)] = (p - c) \frac{aK(p)}{10} - C(a).$$

This calculation uses information available before commitment. Realized profit uses the number of eligible consumers actually reached by the draw, which may be higher or lower than expected quantity.

At price sixteen with two advertisements, five consumers are eligible: those valuing the product from twenty down to sixteen. Expected quantity is one. With free production and low advertising costs, expected profit is $16 - 6 = 10$. If both advertisements reach eligible consumers, two units sell

and realized profit is twenty-six. If only one is eligible, profit is ten. If neither is eligible, the firm loses six. Among forty-five possible recipient pairs, ten contain two eligible consumers, twenty-five contain one, and ten contain none. Their weighted average profit is ten.

Feedback script

Ask: “Two firms both choose price sixteen and two advertisements. One earns twenty-six and the other loses six. Which made a better decision?” Their decisions were identical; the draw created the difference. Then ask what evidence would justify saying one strategy dominates another. Compare expected outcomes under the same rules and distinguish choices from their realized consequences.

3.4 Discrete solutions and maximization benchmarks

The application evaluates every permitted integer price and advertising level. It does not round a continuous solution and label the rounded result optimal. Small markets can have nearly equal outcomes and some conditions have exact ties. The report retains all maximizing pairs. This task requires individual optimization against simulated demand; it does not require a strategic equilibrium between competing firms. Calling every reference a Nash equilibrium would obscure the actual decision structure.

Market	Price	Ads	Maximum profit
Persuasive, low costs	9	7	42.5
Persuasive, high costs	8	5	36.5
Informative, low costs	11	9	40.5
Informative, high costs	11	8	32
Persuasive, five-ad limit	8	5	41.5
Informative, five-ad limit	11	5	32.5
Persuasive, production cost 2	9	5	26.5
Informative, production cost 2	11 or 12	7	24.5

With information and low costs, price eleven makes any reached consumer willing to buy. Quantity becomes certain even though recipient identity remains random. Nine advertisements cost 58.5, revenue is ninety-nine, and profit is 40.5. A tenth advertisement adds eleven in revenue but costs 11.5, reducing profit by half an ECU. Under high costs the ninth advertisement costs 11.5 and is also unattractive: eight produce revenue eighty-eight, cost fifty-six, and profit thirty-two. This shows a marginal condition without requiring calculus.

Persuasion changes both how many consumers buy and what they can pay. Six advertisements at price nine produce eight purchases, revenue seventy-two, cost thirty, and profit forty-two. Seven advertisements at that price produce nine purchases and profit 42.5. Eight produce ten purchases and profit forty-two. The lesson is not to memorize seven, but to identify the added revenue and added cost. Price can also change: checking advertising while holding an arbitrary price fixed does not establish a globally optimal joint strategy.

For advanced courses the continuous monopoly formulation is a useful approximation. If $Q = \alpha + \beta a - \gamma p$, maximize $(p - c)Q - C(a)$ using first-order conditions and boundary checks. However, this activity contains at most ten buyers and quantity changes in steps. A line predicting eleven or thirteen purchases contradicts the implemented market. Use the smooth model to interpret slopes and incentives, then return to counting consumers to verify numerical claims shown in the classroom.

3.5 Welfare with changing preferences

Consumer surplus adds valuation minus price among purchasing consumers. The report's total surplus adds consumer surplus and firm profit. Price then cancels as a transfer between buyer and seller, leaving consumption values minus the model's resource costs. The student's initial endowment is excluded, because adding it would inflate the measure without creating products, information, or consumption utility. Advertising and production costs are each subtracted once, not once in profit and again after profit and surplus are combined.

Under information, valuations remain fixed across advertising alternatives. Reaching a consumer may enable a trade previously prevented by lack of awareness, but advertising uses resources. Under persuasion, comparisons using final valuations presume that the new willingness to pay is a legitimate welfare reference. If advertising changes tastes, that presumption needs discussion. The report names its criterion and does not establish that every advertising-induced increase in valuation improves actual social welfare. An accounting measure and a normative judgment are different objects.

Consider price nine and seven persuasive advertisements. Total surplus using final values is 78.5. As a separate normative exercise, evaluate the same nine purchases using initial valuations of ten through two. Those values sum to fifty-four; subtracting advertising leaves 15.5. These are not two conflicting accounting answers: they use different valuation standards. The second is not the default report measure because it requires introducing and justifying another criterion. It is a conceptual comparison, not empirical proof that real consumers were manipulated.

Theoretical foundation

The literature distinguishes informative, persuasive, and other functions of advertising. Welfare evaluation when tastes change has a specific theoretical tradition, including Dixit and Norman (1978). This activity does not recover true human preferences from observed choices: it induces model valuations and makes the accounting standard explicit.

3.6 Evidence and interpretive limits

Freeborn and Hulbert (2011) introduce two classroom advertising activities for monopoly markets. This family adapts their mechanisms to a digital individual-choice interface. The available manuscript describes a small class and patterns of movement toward reference choices. It is a pedagogical antecedent, not a universal distribution our class must reproduce. The BEER Lab implementation adds a renewed endowment, integer prices, reports, translations, and extensions identified as teaching adaptations.

Ackerberg (2001) examines advertising and purchases of a new yogurt brand, distinguishing consumers with and without previous experience. The approach illustrates why a sales response does not automatically identify persuasion: who responds and what they already know matter. Ackerberg (2003) develops a learning and choice structure for experience goods. These studies motivate questions about mechanisms, rather than validating this simulation's numerical parameters or proving that student firm decisions reproduce real household purchasing behavior.

Bagwell (2007) situates these mechanisms within a broad review of advertising economics. The implemented cost and constraint extensions are teaching adaptations, not replications of empirical studies. Generalization requires distinguishing programmed rules from observed classroom choices.

Instructor report and interpretation

4.1 Monitoring without revealing solutions

Open Report from the correct session. The administrator may select the application's final technical round; the report reconstructs every active decision and does not limit itself to that round. The header shows participant count, completed decisions, and pending decisions. Four people in a two-decision comparison create eight expected records; four people making five decisions create twenty. These denominators distinguish incomplete participation from a small class in which everyone has finished.

Results are hidden when the report opens. Reveal results is disabled until every intended choice is confirmed. A decision becomes complete when price and advertising are recorded and settled: a participant can still be reading their own result screen. The instructor can hide results again to manage discussion. Reloading returns to the hidden state, requiring a deliberate choice about projection. This visibility control helps prevent distributing the optimization benchmark while some students are still making choices.

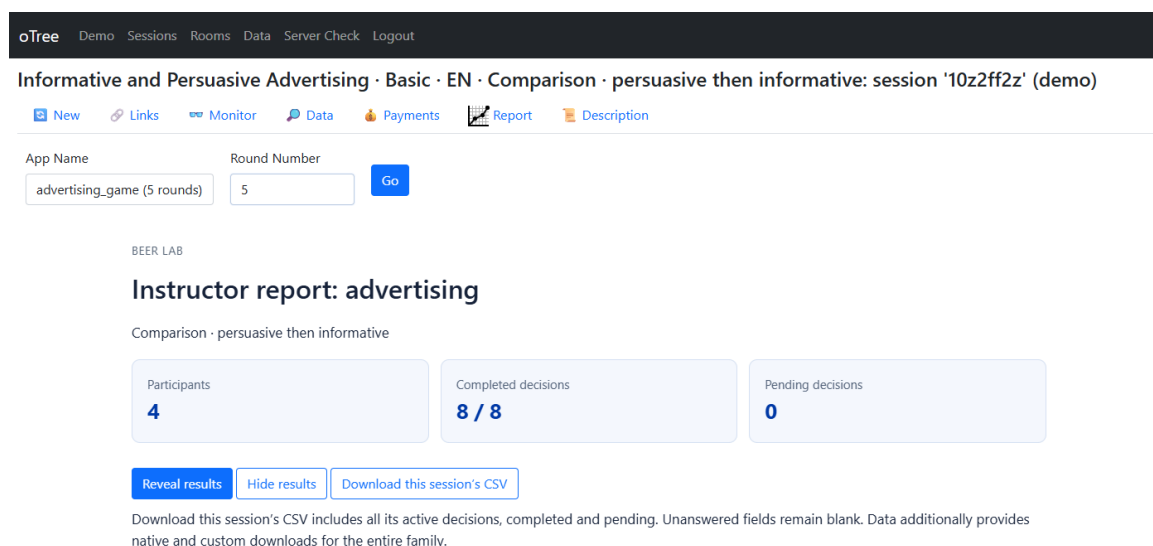


Figure 4.1: Monitor completed decisions before revealing results.

The report is a private instructor screen requiring administrative access. Do not share its address as a student room. If someone leaves before finishing, confirmed data can still be exported; the revelation lock does not erase them. State how many decisions are missing and explicitly describe the available sample. Do not enter fictitious classroom choices to unlock a report and create the appearance of complete participation. Rehearsal sessions and actual classes should remain separate

in both interpretation and data storage.

4.2 Distributions and means

The advertising distribution contains eleven bars, one for each integer from zero to ten. Under the five-ad limit, higher bars remain empty because those choices are inadmissible. The price histogram uses five-ECU intervals: zero enters the first and thirty enters the last. Bars count completed decisions. Their lengths are scaled relative to the most frequent bar; the numerical count next to each bar is the quantity to use when calculating proportions. The denominator displayed is the number of completed decisions, not the number of advertisements.

Means cannot replace these distributions. Prices eight and ten can have the same mean as a class in which everyone selects nine, yet they suggest different questions about concentration and heterogeneity. Profit means retain negative outcomes. Spending on advertisements without selling is part of the business decision and should not be removed to make performance look better. Missing decisions, however, are not losses or zero-profit decisions: they have no completed economic outcome and are excluded from means.

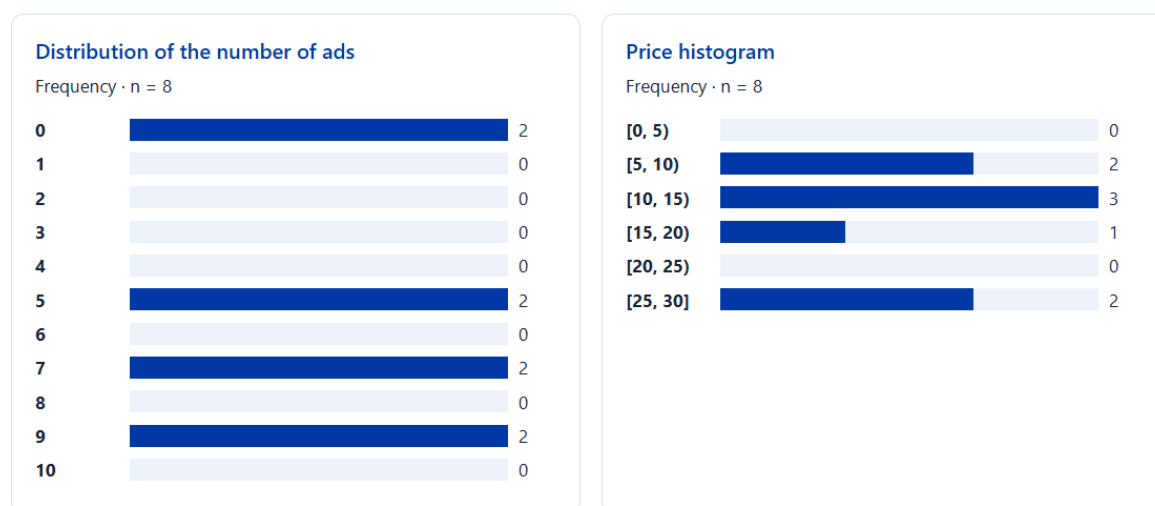


Figure 4.2: Read frequencies and concentration before interpreting means.

4.3 Comparing mechanisms and following learning

The comparison table groups decisions by mechanism, advertising-cost regime, advertising maximum, and production cost. Each row reports observation count and mean advertisements, price, realized profit, expected profit, and consumer surplus. A row with no observations retains a dash in its means. A dash is not zero: it prevents attributing zero sales or profit to a condition that nobody has yet completed. Before comparing rows, check whether constraints are equal and whether the decisions belong to the same people.

The decision-by-decision figure separates realized and expected profit with two colors. The table below provides exact values and denominators. A single decision gives a point rather than an estimated trend. In learning conditions, expected profit moving toward its maximum is compatible with improved search. Realized profit alone may increase through luck. In cost-change conditions the third decision introduces a different cost schedule. A decline there should not be called forgetting without first checking how the market changed.

Comparison by mechanism and cost

Mechanism	n	Number of ads	Price per unit (ECU)	Realized profit	Expected profit before the draw	Consumer surplus
Informative advertising · Low · Maximum number of ads: 10 · Production cost per unit: 0	4	5.25	17	26.12	24.12	20.25
Persuasive advertising · Low · Maximum number of ads: 10 · Production cost per unit: 0	4	5.25	14.25	25.38	25.38	29

Figure 4.3: Compare mechanisms, parameters, and realized and expected profits.

Profit by decision

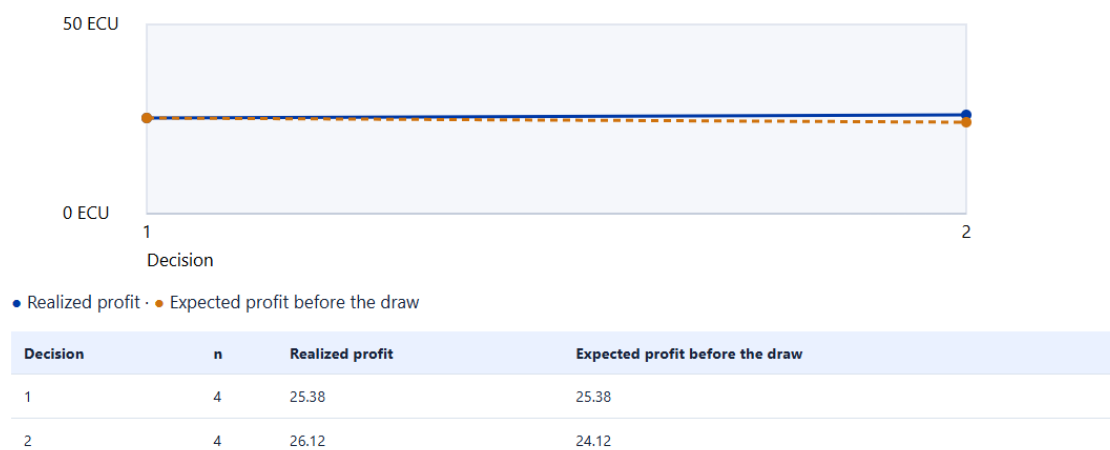


Figure 4.4: Distinguish strategy changes from variation in the draw.

Feedback script

Follow this sequence: what students chose, which rule linked choices to sales, which costs were deducted, which outcome component depended on the draw, and which comparison answers the teaching question. Introduce the optimum after reconstructing an observed case. End with a short written explanation separating an observation from its possible mechanism.

4.4 Benchmarks and diagnosing misunderstandings

The benchmark table lists all maximizing alternatives for scenarios present in the session. Conditions appear even before they have enough completed choices, but references remain inside the revelation block. For an observed strategy, define a gap as maximum expected profit minus that strategy's expected profit. It is nonnegative when parameters match. A realized profit can exceed maximum expected profit after a favorable draw. That does not invalidate the solution: a realization is being compared with an expectation.

Before invoking bounded rationality, reconstruct a decision with the consumer table. Did the student confuse total and marginal cost, omit production cost, assume information raises valuations, or try to maximize sales? Each misunderstanding implies different behavior. Comprehension attempts provide context, but they are not a validated ability measure and should not publicly label students. Discussion should improve explanations rather than rank people. Likewise, observing a good result after several decisions does not establish that the participant used the formal optimization method.

Basic modes and extended conditions

5.1 Selecting a basic mode

Basic persuasion uses low advertising costs, free production, and up to ten advertisements. It is suitable when students know revenue and cost but have not yet studied uncertainty. Basic information retains these costs and changes the demand channel. Its added challenge is choosing before recipients are known. The basic comparison runs persuasion followed by information, renewing both market and endowment. It does not create competition among student firms or move buyers from one participant's market to another.

The two individual modes let instructors allocate separate sessions without imposing a full battery. For comparisons between people, assign sessions before seeing choices and document the procedure. For comparisons within people, use the two-market mode and discuss order and practice. Initial valuations differ between channels; ten persuasive advertisements bring them to twenty through eleven, matching the informative valuations. This equivalence at maximum persuasive advertising does not mean that both markets begin with identical demand. It should be explained before interpreting a raw difference in profit as a pure channel effect.

5.2 Persuasive and informative learning

Two extensions offer five decisions with low costs, one per mechanism. Every market restarts with the same parameters and 100-ECU endowment. Students can change price and advertising after seeing sales, costs, and profit. Persuasion links a choice deterministically to an outcome; some informative strategies retain uncertainty. These extensions draw on the classroom mechanism of Freeborn and Hulbert, but the number of markets and the digital interface are BEER Lab implementation choices rather than a claim to reproduce every detail of their protocol.

The maximizing reference remains constant: price nine and seven advertisements under persuasion, price eleven and nine under information. Observe whether choices or expected profit converge, while allowing that exploration may sacrifice immediate profit to learn. A nonmonotonic trajectory is not proof that a student cannot learn. Ask what information was gained by trying a high price and what could already have been calculated from the instructions. Use decision-level trends for discussion, but retain the person as the unit when summarizing changes in individual strategies.

5.3 High costs with and without learning

Two extensions apply high advertising costs for a single decision, and two more keep those costs for five decisions. Each additional advertisement becomes one ECU more expensive. Demand

and production cost remain unchanged. The references become five advertisements at price eight under persuasion and eight at price eleven under information. Compare identical strategies first to show the mechanical cost effect, then adjusted optimal strategies to show substitution. The two calculations answer different questions and should not be presented as interchangeable.

Repeated sessions make it possible to discuss whether familiarity helps students notice the relevant schedule. This is learning by firm managers, not learning by consumers: simulated buyers continue to obey programmed rules. Akerberg's work concerns consumer experience and therefore motivates a broader discussion rather than supplying evidence that this classroom repetition measures the same mechanism. Ask whether higher advertising costs necessarily mean a higher product price. The persuasive reference in this parameterization shows that optimal price can fall when optimal advertising decreases.

5.4 Reverse and individually randomized order

The reverse comparison presents information before persuasion. The random-order comparison draws an order for each participant at session creation and keeps it throughout that person's two decisions. The order draw does not form pairs, change the payoff rule, or select informative recipients before commitment. These extensions support a discussion of channels without requiring one always to be experienced second. The exported order variable permits reconstructing each participant's sequence.

Mathematical optimal choices do not change because order changes. Observed differences may be compatible with practice, transfer of an incorrect rule, or a previous decision serving as a reference point. The report groups mechanisms even when they occur at different decision positions. Small classes can have unequal numbers in the two random orders; randomization does not guarantee exact balance. Examine group sizes and within-person changes. These are original methodological teaching extensions, not order treatments attributed to the source article or automatic causal proof of a framing effect.

5.5 Within-person cost changes

Each mechanism has a four-decision extension: the first two use low costs and the final two high costs. Consumer count, purchase rules, and production cost are unchanged. The third decision explicitly displays the new condition in its card and cost table; it is not intended to deceive students. The goal is to observe whether choices adjust when one economically relevant part of the problem changes, and to connect that adjustment with comparative statics.

The persuasive optimum moves from seven to five advertisements and price nine to eight; the informative optimum moves from nine to eight advertisements while retaining price eleven. Keeping an old strategy creates a calculable opportunity loss. However, the regime change coincides with experience and fixed order. Subtracting early from late means is not an identified causal cost effect. Use the sequence as a guided comparison, or supplement it with independently assigned constant-cost sessions. Its foundation is model-based comparative statics with an explicitly disclosed teaching adaptation.

5.6 A maximum of five advertisements

Two extensions reduce admissible advertising to zero through five, one per mechanism. This is neither an endowment of five free advertisements nor a five-ECU monetary budget. The

DECISION 1 OF 1

Price and advertising

Persuasive advertising

Initial endowment per decision

100 ECU

Maximum number of ads

10

Production cost per unit

0 ECU

Advertising cost

High

Every consumer knows the product, even with no ads. Initial valuations are 10, 9, ..., 1 ECU. Each ad raises the valuation of ALL consumers by 1 ECU. Ads do not select recipients.

A consumer buys when aware of the product and valuation is greater than or equal to price. Equality leads to a purchase. Choose one integer price from 0 to 30 ECU and an integer number of ads from 0 to the stated maximum.

The endowment is renewed in each decision. Your ECU outcome is 100 + profit. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Price per unit (ECU)

Number of ads

Total advertising cost is paid even when nobody buys. Successive ads cost more: add the costs of all selected ads rather than multiplying the final ad's cost by the number of ads.

Advertising costs (ECU)

Number of ads	Cost of the additional ad	Total advertising cost
0	—	0
1	3.5	3.5
2	4.5	8
3	5.5	13.5
4	6.5	20
5	7.5	27.5
6	8.5	36
7	9.5	45.5
8	10.5	56
9	11.5	67.5
10	12.5	80

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 5.1: Check the high-cost schedule before deciding.

corresponding total advertising cost is still charged. The constrained persuasive reference is price eight, five advertisements, and profit 41.5. The informative reference is price eleven, five advertisements, and profit 32.5. Six advertisements are rejected with a specific explanation, although they are admissible in other configurations.

The relevant prediction is a boundary solution: without the cap the firm would want more advertising. Observe the frequency of five advertisements together with chosen prices. A restriction can lower profit and awareness but does not automatically improve welfare. To discuss regulation, compare costs and surpluses and state the persuasive valuation criterion. This is a quantitative teaching restriction on the model, not a simulation of a particular law or an empirical estimate of an advertising ban in an actual industry.

DECISION 1 OF 1

Price and advertising

Informative advertising

Initial endowment per decision

100 ECU

Maximum number of ads

5

Production cost per unit

0 ECU

Advertising cost

Low

Valuations are 20, 19, ..., 11 ECU and do not change with ads. Each ad reaches a different consumer, selected randomly without replacement AFTER you confirm price and advertising. Only reached consumers can buy. With zero ads, nobody buys.

A consumer buys when aware of the product and valuation is greater than or equal to price. Equality leads to a purchase. Choose one integer price from 0 to 30 ECU and an integer number of ads from 0 to the stated maximum.

The endowment is renewed in each decision. Your ECU outcome is 100 + profit. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Price per unit (ECU)

Number of ads

Confirm decision

Total advertising cost is paid even when nobody buys. Successive ads cost more: add the costs of all selected ads rather than multiplying the final ad's cost by the number of ads.

Advertising costs (ECU)

Number of ads	Cost of the additional ad	Total advertising cost
0	—	0
1	2.5	2.5
2	3.5	6
3	4.5	10.5
4	5.5	16
5	6.5	22.5

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 5.2: The five-ad limit constrains choices; advertising remains costly.

5.7 Costly production

Two extensions introduce production cost of two ECU per unit sold while retaining low advertising costs. Production is charged only for actual purchases. Under persuasion the reference is price nine with five advertisements and profit 26.5. Under information there are two optimal prices, eleven and twelve, both with seven advertisements and expected profit 24.5. The report shows both maximizing pairs; it does not treat one as wrong because an arbitrary single solution was selected for display.

The informative case is particularly useful. At price eleven everyone reached buys, so profit is certain. At price twelve nine consumers are eligible, expected quantity is 6.3, and sales depend on the draw. The strategies have equal expected profit but different risks. A student can prefer one for reasons beyond maximizing an expectation. Ask what additional evidence would identify risk aversion, and explain why one choice does not recover a utility function. This extension introduces marginal production cost into monopoly optimization rather than asserting a new empirical regularity.

DECISION 1 OF 1

Price and advertising

Persuasive advertising

Initial endowment per decision

100 ECU

Maximum number of ads

10

Production cost per unit

2 ECU

Advertising cost

Low

Every consumer knows the product, even with no ads. Initial valuations are 10, 9, ..., 1 ECU. Each ad raises the valuation of ALL consumers by 1 ECU. Ads do not select recipients.

A consumer buys when aware of the product and valuation is greater than or equal to price. Equality leads to a purchase. Choose one integer price from 0 to 30 ECU and an integer number of ads from 0 to the stated maximum.

The endowment is renewed in each decision. Your ECU outcome is 100 + profit. Profit equals sales revenue minus advertising and production costs. The cumulative outcome adds the decisions; the initial endowment is not sales revenue.

Price per unit (ECU)

Number of ads

Total advertising cost is paid even when nobody buys. Successive ads cost more: add the costs of all selected ads rather than multiplying the final ad's cost by the number of ads.

Advertising costs (ECU)

Number of ads	Cost of the additional ad	Total advertising cost
0	—	0
1	2.5	2.5
2	3.5	6
3	4.5	10.5
4	5.5	16
5	6.5	22.5
6	7.5	30
7	8.5	38.5
8	9.5	48
9	10.5	58.5
10	11.5	70

ECU stands for Experimental Currency Units. It is the unit of account for this activity.

Figure 5.3: Deduct two ECU in production cost per sale.

Running the class and consolidating learning

6.1 A fifty-minute lesson

Allow five minutes to introduce the question: why a firm advertises and what advertising changes for consumers. Use another five for access and laboratory rules. During ten minutes students read, complete comprehension, and make the two basic comparison decisions. Keep solutions off the projector while decisions remain open. Spend ten minutes reconstructing one persuasive and one informative choice using the report. Use fifteen minutes for cost comparisons, uncertainty, and welfare. Close with five minutes of individual writing and a conceptual explanation.

If access or comprehension takes longer, retain discussion of one mechanism and move an extension to another class. Connecting decisions with rules matters more than executing many configurations. For a seventy-five-minute class, use five decisions of one mechanism, a separate cost-extension session, and a longer feedback discussion. When several sessions are used, keep their files separate and record parameters. Reports do not automatically combine students across sessions, and a comparison should not be assembled without checking that its conditions are comparable.

What participants will see

Suggested oral introduction: “Each person manages a firm facing simulated consumers. You receive 100 initial ECU in each market. Read what advertising changes and which costs you pay. Choose price and advertising individually. Raise your hand if something does not work. After everyone finishes we will discuss outcomes without identifying anyone.”

6.2 Exercises with answer guidance

6.2.1 Selling much and earning little

Consider persuasion with two advertisements, price zero, and free production. Everyone knows the product and has a positive valuation, so ten units sell. Revenue is zero, advertising costs six, and profit is minus six. The ECU outcome is ninety-four. Ask whether selling the whole available quantity means the firm succeeded. A suitable answer distinguishes sales from profit and explains that lowering price also sacrifices revenue from people who would have accepted a positive price. Advertising cost remains payable even when revenue is absent.

Compare price ten with advertising still fixed at two. Three units sell, revenue is thirty, and profit is twenty-four. Consumer surplus is three, because purchasing consumers value the product at

twelve, eleven, and ten. Total surplus is twenty-seven. The first strategy is worse for the firm's objective, but need not be worse under every normative criterion using final valuations. Ask students to state the objective before describing one choice as better. The distinction prevents a single performance metric from answering every possible economic question.

6.2.2 An indifferent consumer

With information, ten advertisements, and price twenty, only the consumer valuing the product at twenty buys. Revenue is twenty, low advertising cost is seventy, and profit is minus fifty. Buyer surplus is zero. At price twenty-one nobody buys and the firm loses seventy. The equality convention explains the difference. A student calculating zero purchases at price twenty should revisit that rule rather than arbitrarily round a smooth demand curve. Ask why a high price need not produce a high profit.

6.2.3 The opportunity cost of keeping a strategy

Under persuasion, price nine with seven advertisements yields 42.5 under low costs and 35.5 under high costs. The low-cost maximum is 42.5; the high-cost maximum is 36.5 at price eight with five advertisements. Retaining the previous strategy sacrifices one ECU relative to the new optimum. The seven-ECU reduction in that strategy's result is not the same quantity as its opportunity loss. An adequate answer separates the accounting impact of higher costs from the improvement available by adjusting choices afterward.

6.2.4 Averaging over possible draws

Return to informative price sixteen and two advertisements. Give students three profits: twenty-six, ten, and minus six, with frequencies ten, twenty-five, and ten among forty-five possible recipient pairs. The weighted average is $(260 + 250 - 60)/45 = 10$. Taking an unweighted average of the three outcomes is incorrect unless they have equal probabilities. Ask why recipient pairs are equally likely but buyer counts are not. The answer connects sampling without replacement to economic uncertainty without requiring memorization of a distribution's name.

6.2.5 Two optima with different risks

With production cost two, seven informative advertisements cost 38.5. Price eleven sells seven units and gives profit 24.5. Price twelve sells seven when the consumer valuing the product at eleven is not reached and six when that consumer is reached. Profits are 31.5 and 21.5, with probabilities 0.3 and 0.7. Expected profit is 24.5. Both strategies maximize the expectation, but the second varies. A strong answer does not confuse variability with a mathematical error or infer risk aversion solely because someone chose the first strategy.

6.2.6 Identifying a mechanism outside the laboratory

Ask students to describe an advertisement for a new product and another for an established brand. Do not ask them to classify one as information and the other as persuasion from appearance alone. A campaign can combine channels. A good response proposes evidence: differences between experienced and inexperienced buyers, changes in awareness, and responses after trying the product. Relate this approach to the cited learning literature while explaining that the activity artificially separates channels that can coexist in actual market data.

6.3 A short assessment and rubric

Request a one-page report with an observed decision, its accounting, a benchmark comparison, and one interpretive limitation. Four equally weighted criteria can assess correct reconstruction, separation of mechanisms, distinction between expected and realized outcomes, and quality of the conclusion. Economic score should not automatically become an academic grade: informative outcomes may depend on a random draw and deliberate exploration may support learning. Assess understanding and explanation rather than simply awarding the highest grade to the luckiest realized profit.

For advanced students, add enumeration of feasible alternatives or a program calculating discrete optima. The submission must document ranges, equality purchases, costs, and the maximization criterion. For beginners, ask them to compare three specified strategies and explain what additional work would establish that the best of those three is globally optimal. These assignments verify understanding without treating exhaustive computation as a substitute for economic intuition. Require students to interpret why a neighboring choice helps or hurts the firm, not merely print a maximizing pair.

Data, difficulties, and continued use

7.1 Exporting and preserving choices

From Report, select Download this session's CSV to obtain the exact session currently displayed, even with unfinished decisions. Data additionally provides native and custom family-wide exports; these can combine multiple sessions and need filtering by session code when you want one class only. The custom CSV has one row for each participant and active decision, including unfinished decisions. Four participants making five choices imply twenty rows plus the header. Inactive technical rounds are excluded. Pending fields are blank and must not be converted to price zero, advertising zero, or profit zero when opening the file in a spreadsheet. These zeros would be valid economic choices and would incorrectly alter the means.

The file identifies session, participant code, decision, language, edition, treatment, and individual order. It retains price, advertisements, recipients, valuations, purchases, costs, expected and realized profits, surpluses, and ECU outcome. Lists are stored as JSON arrays. Respect CSV quoting and JSON structure rather than splitting an entire row at every comma in a list. Codes permit linking a person's decisions without using a name. The completed indicator is the primary rule for selecting valid economic observations; pending outcome fields should not be used as if they had been settled.

For learning analysis, calculate changes within each person or summarize that person's trajectory first. Treating twenty decisions from four people as twenty independent people understates dependence. For session comparisons, add instructor metadata on assignment and timing while retaining the original export. Do not combine demonstrations with classroom sessions simply because treatment names match. Preserve a read-only original and a working copy, and document exclusions so another instructor can reproduce the projected table without access to private student information.

7.2 Common problems and operational responses

If the room asks students to wait, check that an instructor has prepared a session for that room. Entry waiting is not a missing-partner requirement. If a participant reaches an obsolete link, distribute the current link from a valid session. If advertising is rejected, check the displayed cap: five in restricted conditions and ten elsewhere. If a decimal price is rejected, remember that prices are integers in this implementation. Half-ECU amounts in the examples describe advertising costs rather than admissible price inputs.

When completed decisions are below the expected count, use Monitor to find the stage without projecting identifiers. A dash in a mean means no observations, not zero profit. If realized profit exceeds maximum expected profit, first check for a favorable draw. If cumulative profits differ

between one- and five-decision sessions, compare means and equivalent markets. If a student adds expected and realized profit, explain that one evaluates the strategy before randomness and the other records its actual outcome. They are two evaluations of the same decision, not two revenue sources.

Checkpoint

At the end, confirm closure, download every active decision, record participation and completion, retain configuration and language, and note incidents. Close with the distinction between awareness, valuation, and cost. Prepare another session around a new question rather than changing several parameters without an explicit teaching purpose.

7.3 Maintaining a reusable teaching offer

Colleagues can use one guide per language for the whole family. The introduction, accounting, and routes are common; each extension explains its specific change. Keep visible names descriptive. Technical identifiers help reproduce configurations and analyze data, but they should not replace understandable explanations for participants. When a rule or screenshot changes, review the interface, report, benchmark table, and guide together. A discrepancy between these products can teach a different model from the one actually running on the server.

The family shares code across Spanish and English and retains four rooms. The laboratory deploys its own family instance and database, while GitHub stores source and documentation. Creating or uploading files does not prove that a public domain is current. Before class, check routes, rehearse, and confirm that the visible offer remains isolated. These practices support a growing catalog without mixing sessions, losing data, or weakening the institutional presentation. The intended result is an activity another instructor can prepare and interpret independently.

7.4 Additional questions for a careful discussion

Ask whether an informative advertisement is successful whenever it reaches someone. Not necessarily: a reached consumer may still reject the price. Ask whether reaching a low-valuation consumer is a programming failure. It is part of uniform sampling, and avoiding such recipients would change the task into targeted advertising. Ask whether all uncertainty vanishes when ten informative advertisements are purchased. Recipient and quantity uncertainty vanish for a fixed price in this model, but that statement does not mean real advertising demand is always known.

Ask students to distinguish an advertising constraint from a wealth constraint. The five-ad condition limits quantity directly; the renewed 100-ECU base does not make some permitted choices unaffordable within these parameters. Even the most loss-making allowed production conditions retain nonnegative ECU outcomes. A richer model could introduce credit, changing wealth, uncertain valuations, or competing sellers. Those are different mechanisms requiring explicit rules and suitable comparisons. They should not be assumed to exist in the current activity just because real firms face them.

Finally, ask what would support a claim of causal learning. An upward class average can reflect different completion rates or a few unusually favorable draws. A persuasive account checks fixed participation, expected-profit trajectories, choice changes, and the timing of feedback. An informative account additionally separates recipient randomness. These checks do not turn a short class into a research study, but they teach the habit of identifying the evidence actually needed for an economic conclusion.

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