



Instructor Guide to New Trade Theory and Market Integration

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 new-trade and market-integration family. It is intended for instructors in international trade, microeconomics and industrial organization with different levels of laboratory experience.

Operational chapters explain access and decisions. Foundations develop costs, accounts and analytical references through worked examples. Extensions support targeted comparisons without repeating common rules. Report interpretation connects classroom choices with economic questions and inference limits.

The activity is individual and needs no partners. One guide covers basic and extended editions; Spanish preserves the same parameters and options. Always distinguish an observed decision, an announced condition and a theoretical diagnostic. This simulated market generates neither prices nor entry from other students' choices.

Author

This guide was prepared by Stanislaw Maldonado, research professor in the Department of Economics at Tecnológico de Monterrey, Monterrey Campus. For questions or suggestions about its content, please contact the author at stanislao.maldonado@tec.mx.

For the instructor

Check configuration, language and sequence before creating a session. Separate physical quota from the hundred-ECU account. Explain the current fixed-cost rule and reserve optimizing references for discussion. ECU promise no real-money payment, and choices do not change classmates' quotas.

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Preparing access and choosing the activity

1.1 Purpose and scope of the family

This activity examines a problem different from exchange based on comparative advantage. Countries with the same technologies can still have reasons to integrate their markets. When production requires a fixed cost, spreading it over more units reduces average cost. When consumers value different varieties of a product, access to more suppliers can also matter. Yet a price reduction that benefits buyers may make operation unprofitable for a high-cost firm. Integration therefore raises questions about scale, variety and the distribution of opportunities within an industry.

Each student manages a simulated firm and chooses whether to produce its announced quota or suspend production in that decision. The program announces the price, total market quantity and supplier count. Students do not bid, negotiate or choose prices. One person's decisions do not change another person's market conditions. This is an individual decision and economic-accounting activity, rather than an experimental market generating endogenous prices or entry. The distinction permits use with any positive class size and prevents interpreting the classroom suspension rate as an industry equilibrium.

The design combines market conditions with different cost profiles. An instructor can begin with a simple decision, continue with five situations and then select a particular extension. Simulated firms are located in countries A and B. Both countries have the same sequence of four initial cost profiles; the country label creates no technological advantage. Profiles are assigned cyclically by session entry position and remain constant. The demonstration uses eight participants to show all eight positions, but eight is neither a required minimum nor a required multiple.

For the instructor

The initial objective is to explain why a larger quota lowers average cost and why a negative accounting outcome does not always justify suspending production. Then select a comparison involving prices and consolidation, shipping costs, support or sunk cost. Reserve optimizing benchmarks and theoretical diagrams for the private report. Students need clear operating rules without a screen recommending the benchmark action.

1.2 Activity summary

Purpose	Understand production scale, variety, market integration and operating decisions by firms with different costs.
Experimental unit	One individual decision at a simulated firm; other people do not change its market conditions.
Participants	Any positive integer number; the demonstration uses eight to cover all country and cost positions.
Suggested duration	15–25 minutes of activity and 20–30 of discussion; allow additional time for ten decisions or multiple extensions.
Basic edition	One decision; five conditions in fixed order; the same five conditions in individual random order.
Extended edition	Eighteen comparisons covering integration, consolidation, market size, costs, productivity, shipping, support, sunk costs, variety and learning.
Decision	Produce the announced quota or suspend this decision. Students choose neither price nor quantity and are never permanently excluded.
Outcome	A renewed initial account of 100 ECU plus the firm's net outcome, which can be negative. No real-money conversion.
Topics	Economies of scale, intra-industry trade, market integration, firm heterogeneity, trade costs, product variety.
JEL	A22, C91, D24, F12, F15, L11.

1.3 From the institutional website to the session

Begin at <https://beer-lab.org/en/>. The teaching section leads to the activity directory at <https://teaching.beer-lab.org/en/>. Find the *New Trade Theory and Market Integration* card and review language, edition and topics. The directory helps select a family; the specific configuration is chosen in the oTree instance. An institutional website link is not an individual student link and does not identify a person within a session.

The English basic participant route is https://newtrade.beer-lab.org/room/new_trade_en. The corresponding Spanish route is https://newtrade.beer-lab.org/room/comercio_es. Extended rooms are https://newtrade.beer-lab.org/room/new_trade_extended and https://newtrade.beer-lab.org/room/comercio_extendido. Announce one room if everyone undertakes the same activity. If assigning different conditions, identify the appropriate links before starting and retain an instructor allocation table.

The instructor enters <https://newtrade.beer-lab.org/demo> to explore configurations and <https://newtrade.beer-lab.org/rooms> to prepare a room session. Administrative authentication uses the credentials supplied by laboratory coordination. Do not project a password or administrative link. Students use the room or their current individual link; they need no administrator access to respond.

Demo contains only this family: 42 configurations, with 21 in Spanish and 21 in English. Rooms contains four rooms differentiated by language and edition. Each basic room offers three configurations and each extended room eighteen. A basic room's form should initially select a basic configuration in the appropriate language. If another game appears, do not create the class session from that instance; contact coordination to check family isolation.

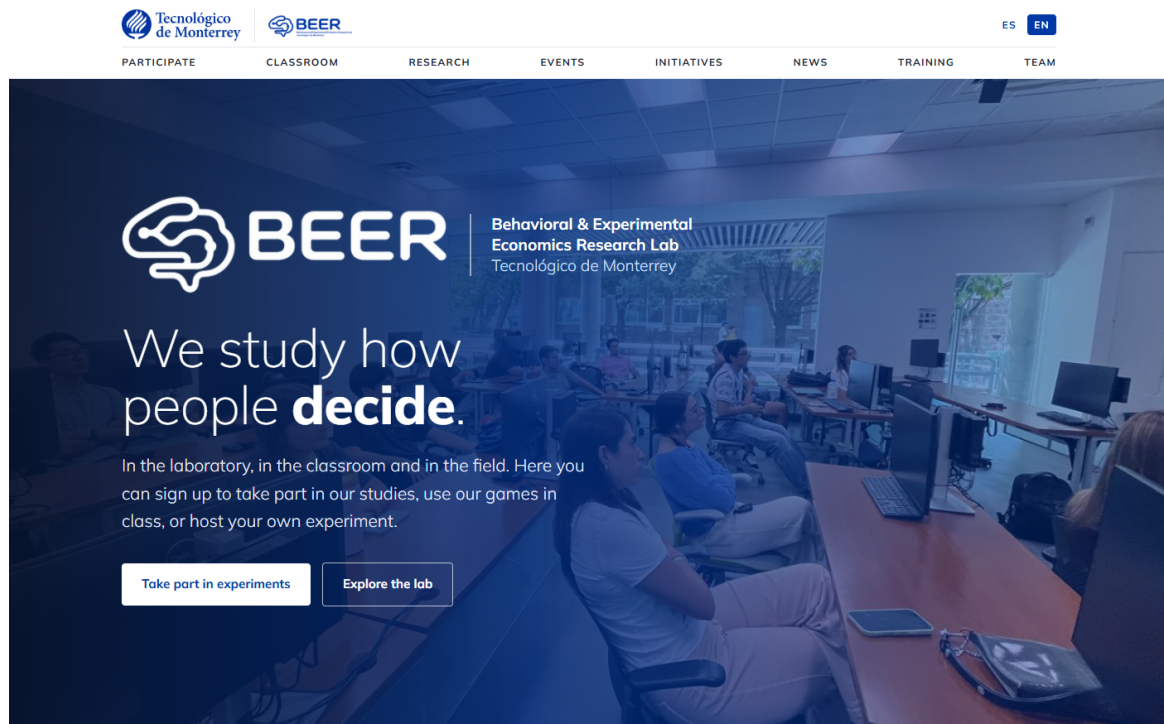


Figure 1.1: Find the teaching section on the institutional website.

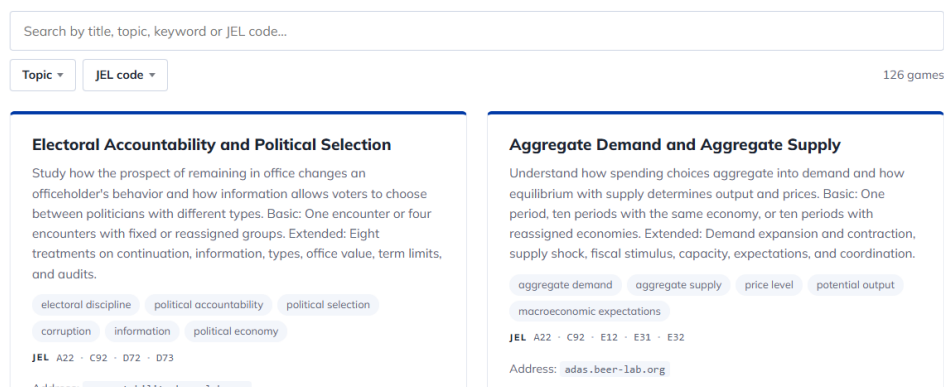
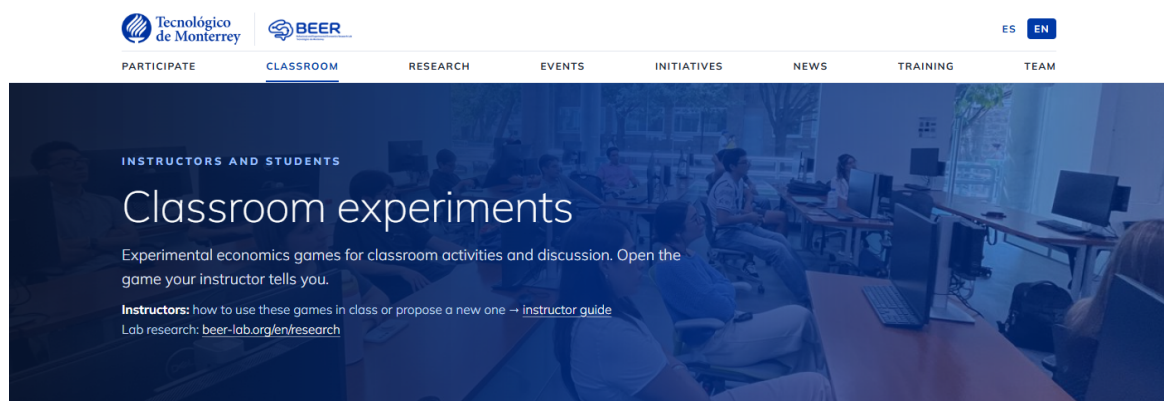


Figure 1.2: Select the family and language in the activity directory.

1.4 Preparing and rehearsing the class

Before the session, select the economic question. Use one decision to introduce calculation. Use the five fixed-order conditions to compare access, competition and scale. Random order distributes the same conditions and can support discussion of sequence effects, but it is not an industrial chronology. Retain the configuration name and language used in every case. The extended edition is a catalog of independent comparisons, rather than an obligation to run eighteen treatments in one class.

Enter the actual participant count. Do not round it to eight or create fictitious accounts to complete countries. Eight people cover the four A profiles and four B profiles; other counts can produce unequal representation, which must be reported when interpreting aggregates. One person can complete the whole sequence without waiting. To review every cost condition in a demonstration, open eight individual links in separate browser contexts.

Rehearse the screens and calculations you intend to discuss. The comprehension example has a four-unit quota; the first basic condition has three. The difference is deliberate: the example teaches the rule $q = Q/N$, rather than specifying a universal quota. Also check the sunk-cost treatment. Suspending there no longer preserves the entire initial account because an already-paid fixed cost cannot be recovered. The distinction must appear before the participant confirms an action.

Open the session's instructor report and keep it private. Its initial view shows completion and pending records without decision aggregates. The reveal button becomes available when all active decisions are complete. CSV download is available earlier and includes pending records. Keep a test session separate from the class session and use current individual links. Restarting the program to update code does not require deleting its database.

Checkpoint

Check family, language, edition, active decision count and participants. Rehearse both production and suspension, and confirm both fixed-cost rules. Check that the report counts active periods and that the basic room does not select an extension. Prepare the export and an explanation of ECU before distributing links.

New Trade Theory and Market Integration · Basic · EN · One operation decision
New Trade Theory and Market Integration · Basic · EN · Five conditions in fixed order
New Trade Theory and Market Integration · Basic · EN · Five conditions in individual random order
New Trade Theory and Market Integration · Extended · EN · Integration without consolidation
New Trade Theory and Market Integration · Extended · EN · Supplier consolidation
New Trade Theory and Market Integration · Extended · EN · Larger market
New Trade Theory and Market Integration · Extended · EN · Market contraction
New Trade Theory and Market Integration · Extended · EN · Higher avoidable fixed cost
New Trade Theory and Market Integration · Extended · EN · Lower avoidable fixed cost
New Trade Theory and Market Integration · Extended · EN · Own productivity improvement
New Trade Theory and Market Integration · Extended · EN · Common technology improvement

Figure 1.3: Review basic modes and the first extensions.

New Trade Theory and Market Integration · Extended · EN · Firms with homogeneous costs
New Trade Theory and Market Integration · Extended · EN · Low transport cost
New Trade Theory and Market Integration · Extended · EN · High transport cost
New Trade Theory and Market Integration · Extended · EN · Government charge on shipments
New Trade Theory and Market Integration · Extended · EN · Operating support
New Trade Theory and Market Integration · Extended · EN · Sunk fixed cost
New Trade Theory and Market Integration · Extended · EN · Low price with sunk cost
New Trade Theory and Market Integration · Extended · EN · Stronger preference for variety
New Trade Theory and Market Integration · Extended · EN · Greater substitutability across varieties
New Trade Theory and Market Integration · Extended · EN · Ten decisions with unchanged conditions

Figure 1.4: Continue the extension catalog within this family.

oTree	Demo	Sessions	Rooms	Data	Server Check	Logout
-------	------	----------	-------	------	--------------	--------

Rooms

Current rooms:

Nueva teoría del comercio e integración de mercados · Básica · ES
Nueva teoría del comercio e integración de mercados · Extendida · ES
New Trade Theory and Market Integration · Basic · EN
New Trade Theory and Market Integration · Extended · EN

Figure 1.5: Identify the four language-and-edition rooms.

oTree	Demo	Sessions	Rooms	Data	Server Check	Logout
-------	------	----------	-------	------	--------------	--------

Room: New Trade Theory and Market Integration · Basic · EN

Create a new session

Session Config

New Trade Theory and Market Integration · Basic · EN · One operation decision ▼

Number of participants

Individual decisions: any positive participant count is allowed.

Create

[Configure session](#) ⚙️

App sequence

new_trade_game (10 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://127.0.0.1:8183/room/new_trade_en

Figure 1.6: Choose configuration and participant count; a multiple of eight is not required.

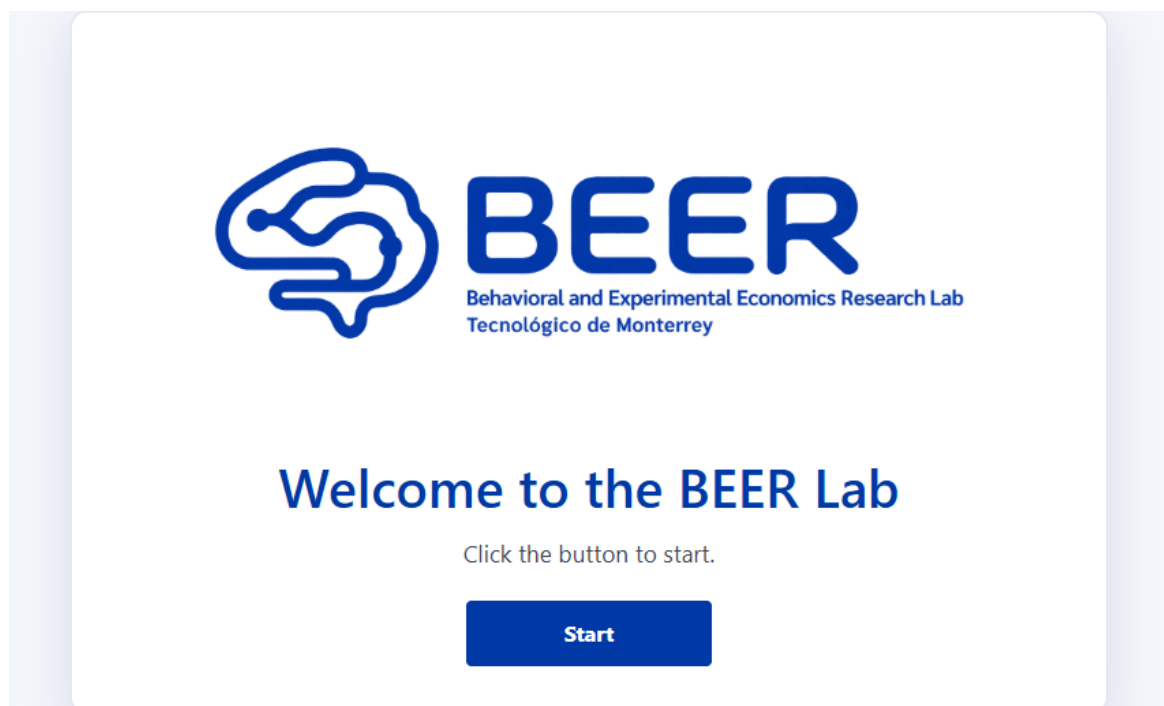


Figure 1.7: Distribute the room and start at the institutional welcome.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

New Trade Theory and Market Integration · Basic · EN · One operation decision: session 'bm4xwu5h' (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
Not available ⓘ

Grid view
[Launch](#)

Session-wide testing link

Open the below link in up to **8** browser tabs.

<http://127.0.0.1:8183/join/kedavafu>

Single-use links

Open each link in its own browser tab.

P1	http://127.0.0.1:8183/InitializeParticipant/5xnejok8
P2	http://127.0.0.1:8183/InitializeParticipant/ac4d3i53
P3	http://127.0.0.1:8183/InitializeParticipant/8lrkuugi
P4	http://127.0.0.1:8183/InitializeParticipant/w8rt2w5n
P5	http://127.0.0.1:8183/InitializeParticipant/jjz18a3l
P6	http://127.0.0.1:8183/InitializeParticipant/gh9nfil5
P7	http://127.0.0.1:8183/InitializeParticipant/al9tuj4a
P8	http://127.0.0.1:8183/InitializeParticipant/rpfpnrch

Figure 1.8: Use individual links and reserve the report for the instructor.

Guiding the participant sequence

2.1 Welcome, resources and decision rules

The room welcome displays the laboratory logo and Start button. The following page identifies the Behavioral and Experimental Economics Research Lab in the Department of Economics at Tecnológico de Monterrey and asks students to confirm laboratory rules. Request silence, individual work and private questions when something goes wrong. Decisions require no conversation between students, and no student acts as a real buyer for another. The classroom silence rule is not a necessary condition of a negotiated market: this market is announced by the program.

Instructions distinguish experimental money from physical product. Each decision starts with one hundred ECU, meaning *Experimental Currency Units*. Output is measured in product units, and price and unit costs in ECU per unit. A twenty-ECU fixed cost does not mean producing twenty units. Merely assigning an abstract quota does not reduce the initial account; production expenditures enter when the confirmed decision's outcome is calculated.

Students see a country and cost profile. Initial cost characterizes the assigned firm; each decision's table shows effective cost after relevant changes. Distinguish the two when technology improves or costs become homogeneous. Other suppliers are part of a simulated market. Their announced count need not equal the number of students choosing production, and the activity does not recalculate quotas when another person suspends.

There are two actions. Production sells the full quota at the announced price and pays applicable expenditures. Suspension produces zero. Fixed cost can be avoidable or already paid. Shipping and government charges per exported unit apply only to output actually produced. Operating support is received only when producing. The screen states the export share so students can calculate the corresponding expense without assuming that the entire quota is exported.

2.2 Comprehension and specific corrections

Three questions check the initial account, division of market quantity across suppliers and independence of market conditions. The example uses $Q = 24$ and $N = 6$, giving each supplier a four-unit quota. An incorrect answer preserves the other fields and displays the correct answer with its explanation next to the corresponding question. Direct the student to the rule behind the error, without completing the form or recommending that firms always operate.

A response of twenty-four confuses total market quantity with individual quantity. A response of six may simply copy supplier count. Reconstruct the division by distributing twenty-four units among six firms. If the initial account is confused with the quota, return to units of measurement. Comprehension attempts diagnose protocol clarity, not business ability or general knowledge.



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 to learn about economic decision-making through controlled activities.

In this activity you will manage production at a simulated firm.

Laboratory rules

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

☐ I have read the instructions and will follow the rules.

Start

Figure 2.1: Confirm general rules before reading production conditions.

BEER LAB

How this activity works

Resources and unit of account

Each decision starts with 100 ECU. This account is renewed; it is not spent on product units and does not depend on other students.

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

This session does not convert ECU into real money.

Initial account in each decision

100 ECU

Firm's country

A

Cost profile

1

Quota if you produce

3 units

You manage a firm in country A, with cost profile 1. Your initial variable cost is 2 ECU per unit. Firms in the other country are simulated; they are not classmates with whom you must negotiate.

The market announces total quantity Q and supplier count N . Your quota is $q = Q / N$. If you produce, you sell the full quota at the announced price. If you suspend, you produce zero. You do not choose the price or quantity; no other student changes these values.

Production cost = fixed cost + variable cost per unit $\times q$. If the fixed cost is avoidable, suspending avoids it. If it is already paid and cannot be recovered, it is deducted whether you produce or suspend. Each decision screen specifies which rule applies.

When part of the quota is sent abroad, per-unit shipping charges are deducted if you produce. Operating support is received only if you produce. Costs, quotas and rules are shown before you choose.

Rule example

If $Q = 24$ and $N = 6$, your quota is 4 units. With price 14, variable cost 4 and avoidable fixed cost 20, producing yields $14 \times 4 - 4 \times 4 - 20 = 20$ net ECU; your final account is 120 ECU. Suspending leaves 100 ECU. This example illustrates accounting; your decision conditions may differ.

Each decision is independent: suspending does not exclude you from later decisions. New conditions do not depend on earlier choices.

Continue

Figure 2.2: Explain quotas, units and the fixed-cost rules.

Check the rules

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.

Each decision starts with 100 ECU. This account is renewed; it is not spent on product units and does not depend on other students.

If $Q = 24$ and $N = 6$, your quota is 4 units. With price 14, variable cost 4 and avoidable fixed cost 20, producing yields $14 \times 4 - 4 \times 4 - 20 = 20$ net ECU; your final account is 120 ECU. Suspending leaves 100 ECU. This example illustrates accounting; your decision conditions may differ.

How many initial ECU do you receive in each decision?

Your answer: 10. The correct answer is 100. The initial account is 100 ECU and is renewed each decision. Product quantity is recorded in physical units.

In the example with $Q = 24$ and $N = 6$, how many units are in your quota?

Your answer: 6. The correct answer is 4. The quota is $Q / N = 24 / 6 = 4$ units; it is not an ECU amount.

What determines your firm's conditions?

- ☐ The conditions announced on screen
- ☒ My classmates' decisions

Your answer: My classmates' decisions. The correct answer is The conditions announced on screen. This activity is individual. The program announces price, quantity and supplier count; classmates do not change your quota.

Continue

Figure 2.3: Use the explanation beside each error and allow correction.

2.3 Decision, resulting account and closure

The choice page restates one hundred ECU, the quota and the fixed-cost rule. Its table gives market quantity, suppliers, price, fixed cost, effective variable cost, shipping cost, government charge and support. Ask students to review these values before confirming. The quota is computed automatically, but students should understand its source. There is no field to change quantity or price; inventing an intermediate quantity between production and suspension would change the implemented problem.

Results show the action, quantity produced, net outcome and final account. The spending table permits reconstruction of the accounting identity. Average cost is displayed for producing the potential quota, even when the student suspended. It is not actual expenditure at zero production. This diagnostic supports discussion while preserving the distinction between a potential magnitude and an observed action.

What participants will see

A useful introduction is: “You receive one hundred ECU in each decision. Your quota is announced market quantity divided by suppliers. Check which expenses are paid when producing and which have already been paid. Choose production of the full quota or suspension; your action does not change classmates’ conditions. A new decision offers both actions again.”

In multiple-decision configurations, students observe own results before proceeding to new conditions. Suspension does not remove them from the activity or exclude them from the next page. This rule avoids reproducing permanent exit that the design does not model. The end screen explicitly confirms completion and shows history and cumulative account without a next button leading to an empty page. Ask students to keep it open until discussion begins. A ten-decision cumulative account includes ten initial endowments and should not be directly compared with a single-decision account.

BEER LAB · DECISION 1 OF 1

Manage production

Initial account in each decision 100 ECU	Firm's country A	Cost profile 1	Quota if you produce 3 units
--	----------------------------	--------------------------	--

You receive 100 initial ECU in EACH decision. Your firm's net outcome, which can be negative, is added at the end. There is no real-money conversion. A product unit is a physical quantity, not one ECU.

You manage a firm in country A, with cost profile 1. Your initial variable cost is 2 ECU per unit. Firms in the other country are simulated; they are not classmates with whom you must negotiate.

The 20-ECU fixed cost is paid only if you produce; suspending preserves your initial 100 ECU.

Figure 2.4: Decision resources and initial account.

Announced market quantity Q	12 units
Announced supplier count N	4
Price per unit	16 ECU
Fixed cost for this decision	20 ECU
Variable cost per unit	2 ECU
Resource shipping cost per exported unit	0 ECU
Government charge per exported unit	0 ECU
Support if you produce	0 ECU
Share of quota shipped abroad	0 %
Fixed-cost rule	Avoidable: not paid if you suspend

The market announces total quantity Q and supplier count N . Your quota is $q = Q / N$. If you produce, you sell the full quota at the announced price. If you suspend, you produce zero. You do not choose the price or quantity; no other student changes these values.

Each decision is independent: suspending does not exclude you from later decisions. New conditions do not depend on earlier choices.

What would you like to do in this decision?

- ☐ Produce the announced quota
- ☐ Suspend this decision

Confirm decision

Figure 2.5: Continue with parameters and options, then confirm the action.

BEER LAB · DECISION 1 OF 1

Your decision result

Produce the announced quota

Quantity produced

3 units

Firm's net outcome

22 ECU

Final ECU account

122 ECU

Sales revenue	48 ECU
Production spending	26 ECU
Resource shipping expenditure	0 ECU
Government payment	0 ECU
Support received	0 ECU
Average production cost if operating	8.67 ECU per unit

The final account adds 100 ECU to the net outcome. Do not add sales revenue again. Market conditions and other participants' accounts remain independent.

Continue

Figure 2.6: Reconstruct revenue, spending and final account.



Activity completed

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

Cumulative ECU account

122

Decision history

Decision	What would you like to do in this decision?	Firm's net outcome	Final ECU account
1	Produce the announced quota	22	122

Figure 2.7: Keep the closing page open while the instructor prepares discussion.

Economic foundations and worked examples

3.1 Fixed cost changes the meaning of scale

A fixed cost is expenditure that does not increase with one additional unit within the scale being considered. In this activity, preparing operation costs F ECU and producing each unit costs another c ECU. Producing q units therefore has total production cost $C(q) = F + cq$. Calling expenditure fixed does not establish that it is irretrievably lost. We must first ask whether suspension can still avoid it or whether it has already been paid and cannot be recovered. That timing distinction determines which alternatives should be compared.

Average production cost is total cost divided by units: $AC(q) = F/q + c$. It is not the cost of an additional unit, but average expenditure attributed to each unit. Marginal cost in this model is constant at c . As q rises, F/q falls without any change in marginal cost. With $F = 20$ and $c = 4$, two units cost 28 ECU and have average cost 14; four units cost 36 ECU and have average cost 9. Total cost rises while its average falls. Saying only that “costs fall” conceals this distinction.

Doubling a quota from three to six units does not require doubling fixed cost. At $c = 4$, the respective total costs are 32 and 44; the latter is less than twice the former. This property represents internal economies of scale within the activity’s range. We model neither congestion, limited capacity nor an eventual rise in marginal cost. Average cost continues descending toward c . A discussion of optimal plant size would require additional constraints or costs absent from this numerical model.

A firm’s scale depends on its quota $q = Q/N$. A larger market does not guarantee a larger quota: doubling both quantity and suppliers leaves the ratio unchanged. The first integration step in the battery illustrates this case. Announced quantity rises from twelve to twenty-four and suppliers from four to eight, leaving each firm with three units. A price reduction can therefore lower profits before any private scale advantage appears. Ask students to calculate the ratio before interpreting the word integration.

Theoretical foundation

Scale in this adaptation means potential quantity per firm, rather than student count or initial monetary account. With positive fixed cost, $AC = F/q + c$ falls as q rises. The program announces Q and N instead of estimating them from production choices. The classroom operating rate describes decisions under those conditions, rather than an entry equilibrium.

3.2 Private account and benchmark action

Let x denote the share shipped abroad, t the resource cost per exported unit, τ the government charge per exported unit, and h fixed support received when operating. Effective private variable cost per unit is $v = c + x(t + \tau)$. Sales revenue if operating is pq . Net operating outcome is

$$\pi_O = (p - v)q - F + h.$$

Suspension gives $\pi_S = 0$ when fixed cost is avoidable and $\pi_S = -F$ when it is already paid. The final account is $100 + \pi_a$, where a is the chosen action. Do not add sales again or subtract fixed cost twice: both already enter π_O .

The decision benchmark compares those two values. If $\pi_O > \pi_S$, production maximizes this decision's account; if it is smaller, suspension does. Both actions are benchmark choices at equality, and the report preserves that indifference. The benchmark gap is $\max\{\pi_O, \pi_S\} - \pi_a$. It is nonnegative and measured in ECU per decision. It is neither a percentage deviation nor a psychological cost of making a mistake; it simply measures the monetary difference between the observed action and the best available account.

With avoidable fixed cost, no support and positive margin $p - v$, the break-even quota is $q^{BE} = F/(p - v)$. At $p = 14$, $c = 8$, no shipping or support and $F = 20$, this is $20/6 \simeq 3.33$. A three-unit quota generates a two-ECU loss, so suspension preserves 100 versus 98 from operating. A four-unit quota generates four net ECU and an account of 104, above 100. Students are not asked to choose an optimizing quantity; the threshold helps instructors explain why the benchmark action changes.

When margin is zero or negative and avoidable fixed cost positive, a larger quota does not cure the loss. Extra units cannot cover fixed cost if none contributes positively to it. Support can change the comparison when it offsets sufficient expenditure. Do not apply the break-even formula by dividing through a zero margin. The computed benchmark compares the two accounts directly and remains valid in these circumstances.

3.3 Sunk cost and short-run suspension

Consider again quota three, price fourteen, variable cost eight and fixed cost twenty, but suppose fixed expenditure has already been paid. Operation leaves 98 ECU and suspension leaves 80. Operation is the benchmark despite the negative net firm outcome. Fixed expenditure enters both alternatives and cancels in their comparison: operation contributes eighteen ECU that would be lost under suspension. The relevant criterion is not simply whether price exceeds full average cost.

The low-price sunk-cost treatment sets the second decision's price at four. A firm with variable cost two has positive margin and should operate under the monetary benchmark. With cost four, operation and suspension are indifferent; both accounts include the already-paid fixed cost. At costs six or eight, producing adds a variable loss, so suspension is the benchmark. These cases teach the short-run shutdown condition without confusing it with recovery of total expenditure or permanent industry exit.

Implemented suspension lasts for one decision. The model contains no plant sale, severance payments, debt or future recovery of expenditure. Sunk cost also does not accumulate across decisions: each scenario introduces a fresh account and its stated rule. When a student operates to avoid losing an investment, ask whether the action recovers that expense or only adds new revenue and spending. Compare the actual alternatives before attributing a behavioral preference to an action that may be monetarily correct.

3.4 Similar countries and five conditions

Initial unit costs are two, four, six and eight in each country. The first condition announces $Q = 12$, $N = 4$, $p = 16$ and $F = 20$. Quota is three and operating outcomes across those profiles are 22, 16, 10 and 4 ECU. Every profile covers full cost. An A or B label leaves the calculation unchanged. This symmetry shows that comparing markets need not begin with relative technological advantage between countries.

The second condition announces a combined twenty-four-unit market with eight suppliers and price fourteen. Quota remains three. Operating outcomes become 16, 10, 4 and minus two. The highest-cost profile has a suspension benchmark with avoidable fixed cost. The third condition holds quantity and price constant while announcing six suppliers. Quota rises to four and outcomes become 28, 20, 12 and 4. Lower average cost can restore profitability, but six suppliers is an announced condition, rather than a count of students who chose to continue.

The fourth condition announces $Q = 32$, $N = 8$, $p = 13$ and a common one-ECU reduction in variable cost. Quota remains four. Net outcomes equal those in the previous condition: the lower unit cost is offset by the lower price. The announced catalog nevertheless contains more varieties. The fifth condition announces $Q = 16$, $N = 8$, $p = 9$ and retains common cost improvement. Quota falls to two and every profile has an operating loss: respectively four, eight, twelve and sixteen ECU. Suspension is the benchmark for every profile when fixed cost is avoidable.

The battery bundles changes and does not identify the isolated causal effect of each parameter. To attribute a difference to cost or quantity, use an extension holding the other relevant conditions constant. Fixed order supports reconstruction of reasoning without making these numbers a real industry history. Firm names, historical dates and observed market magnitudes are not reproduced. These are original classroom calibrations expressed in ECU.

3.5 Two analytical diagnostics for discussion

The report includes a separate homogeneous model with curves $PP = c_R + 1/(bn)$ and $CC = c_R + nF/Q$. Here n is continuous firm count, $b = 0.125$ a sensitivity parameter and c_R a reference unit cost. PP falls with additional firms; CC rises as quantity per firm declines. Their intersection satisfies $n^* = \sqrt{Q/(bF)}$, $q^* = Q/n^*$ and $p^* = c_R + 1/(bn^*)$. This is a theoretical price-and-average-cost diagnostic under homogeneity, rather than an estimated solution of classroom behavior.

At $Q = 12$, $F = 20$ and $c_R = 4$, the continuous reference has approximately 2.19 firms, quota 5.48 and price 7.65. Moving to $Q = 24$ gives 3.10 firms, quota 7.75 and price 6.58. Relative to each initial market, scale and available varieties increase; relative to the combined firms in two separate markets, the joint count can be lower. Fractional values belong to the analytical calculation, rather than executable fractional firms, and do not alter announced N . The reference excludes shipping, government charges, support and heterogeneity.

The second diagnostic uses a CES index for an announced catalog of N equally priced varieties: $P = pN^{-1/(\sigma-1)}$, with $\sigma > 1$. The indicator $100/P$ represents composite consumption at hypothetical fixed income of one hundred. The first condition's $N = 4$, $p = 16$ and $\sigma = 4$ give $P \simeq 10.08$; the second's $N = 8$ and $p = 14$ give $P = 7$. Reference consumption rises from 9.92 to 14.29. These are neither ECU earned by students nor physical quantities being added.

The diagnostics answer different questions and are not a single estimated structural equilibrium. PP/CC illustrates entry and scale in a stylized homogeneous industry; CES illustrates price and variety with an announced catalog. Do not combine their numerical results automatically to establish a welfare theorem. During contraction, the fixed-income index can improve through lower price while firms incur losses. The model contains no fall in consumer income, so this improvement

does not demonstrate greater observed welfare.

3.6 Transfers and academic context

Government charges and support affect the private account but have fiscal counterparts. Net government income is $G = \tau xq - h$ when operating and zero under suspension. The report's resource-net outcome is $\pi_a + G$. Shipping remains a resource expense, while transfers between firm and government cancel. This restricted aggregate includes neither consumer utility, collection costs nor externalities. Do not call it total welfare or treat fiscal revenue as an automatic social gain.

Yamarik (2018) provides the pedagogical antecedent: an automobile-firm classroom activity using announced conditions, average costs and shutdown decisions. This family is an original numerical, individual adaptation with independent decisions. It does not replicate his cost curves, chronology or exit mechanism. The article supports the teaching question, rather than exact protocol equivalence or a claim of already-validated instructional effectiveness. (Yamarik, 2018)

Krugman (1979) supplies the framework of trade with internal scale economies and monopolistic competition between similar countries. Krugman (1980) develops scale, differentiation and trade patterns; the complete equilibrium is not implemented here. Dixit and Stiglitz (1977) motivate analysis of product diversity, while our index is a declared diagnostic, rather than preference measurement. Melitz (2003) links heterogeneity and reallocation across firms; our profiles and announced counts do not reproduce his dynamic selection model. (Krugman, 1979, 1980; Dixit and Stiglitz, 1977; Melitz, 2003)

Classroom empirical interpretation must remain limited. A choice consistent with maximizing the account does not identify how a real firm would respond to trade opening. Suspension proves neither endogenous productive selection nor an optimal policy barrier. Students face two actions, explicit information and announced conditions. Document comprehension, choices and changes in calculation; reserve claims about industries and welfare for independent evidence and more complete assumptions. A clear discussion can connect the activity with those larger questions while keeping the boundary between illustration and empirical inference visible.

Reading the private report and leading discussion

4.1 Completion, revelation and observation units

The initial report shows participants, completed decisions and pending decisions. A participant can contribute one, two, five or ten decisions depending on configuration. Eight students completing five conditions generate forty active decisions, rather than forty distinct firms. The same eight students generate eighty records in the ten-decision activity. The app counts active periods even if the administrator opens the report from the last technical oTree period.

Revelation becomes available only after every active decision is complete. Until then, the instructor can use the monitor to locate pending pages and download a CSV containing incomplete records. Do not complete a choice for a student just to release the report. An absent record is an operational issue to resolve while preserving the individual decision. If the class requires discussing partial data, download and explicitly document that selection; do not describe incomplete aggregates as a response from the entire class.

Reveal displays aggregates without individual codes, while Hide removes them from projection as another question is introduced. The report does not provide identifiable participant histories for classroom projection. Data files contain technical analysis keys and should remain with the instructor. Begin with a distribution or anonymous example and then show the tables explaining the pattern, rather than projecting every number simultaneously.

4.2 Distributions, profiles and accounts

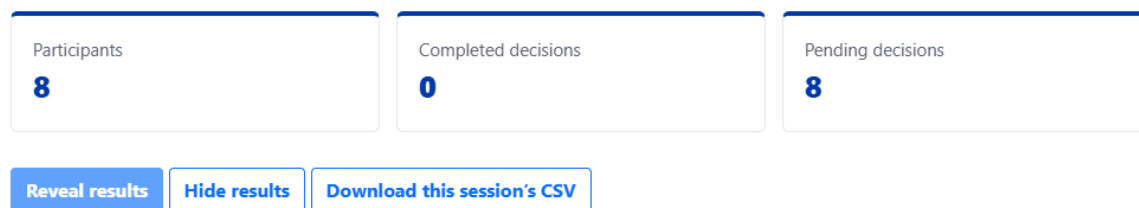
The decision histogram contrasts production and suspension. Its denominator is completed decisions, not announced suppliers. A 50% student suspension rate does not automatically turn $N = 8$ into four. The net-outcome histogram groups realized ECU into stated intervals. It excludes the initial one hundred ECU, so a negative bar represents a firm loss even when the final account remains positive. Under sunk cost, suspension can appear in a negative interval because previously paid expenditure remains.

The operating table separates period, effective conditions, country and profile. Mixing costs two and eight in one mean can conceal that both make benchmark choices under different incentives. Benchmark-choice percentage compares each action with both accounts available for that person and condition. It preserves ties: with price four, cost four and sunk fixed cost, both production and suspension are benchmark choices. Do not call either of those actions an error just because the student selected one of them.

BEER LAB

Instructor report: trade and integration

One operation decision



Complete every active decision before revealing aggregates. The CSV includes pending records.

The download contains one row per participant and active decision in this session. Unrecorded decisions and outcomes remain blank. Data also provides broader family-wide exports.

Figure 4.1: Use completion counts to resolve pending decisions before revealing.

Benchmark gap is calculated for each decision and then averaged. Zero gap means the best available private account was attained, rather than zero firm profit or a socially optimal market. The table keeps private outcome, resource-net outcome and net government income separate. Compare all three when discussing a charge or support; never substitute one criterion for another without identifying the change.

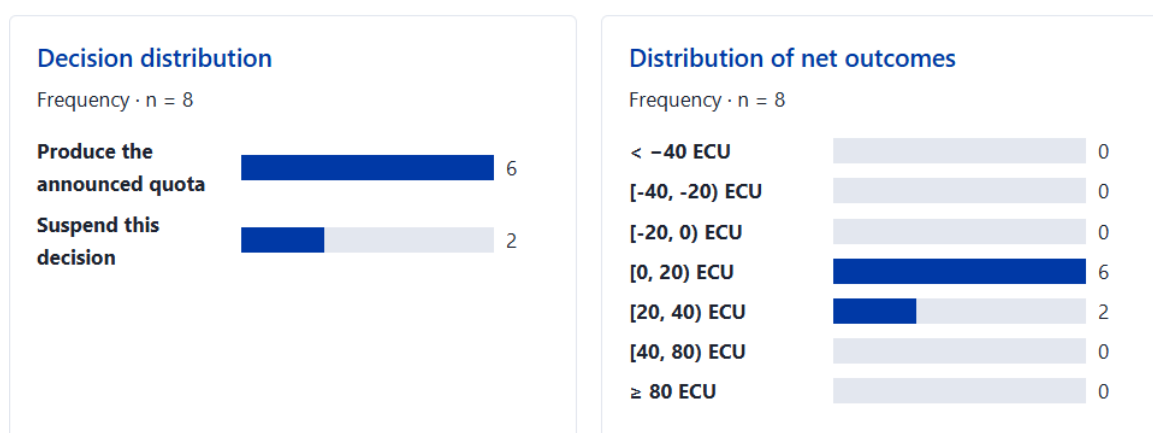


Figure 4.2: Distinguish the distribution of actions from the distribution of net outcomes.

4.3 Diagrams and the consumption diagnostic

The graph selector identifies period, country, profile, market quantity, suppliers and price. The first diagram places firm quantity on the horizontal axis and ECU per unit on the vertical axis. Private average cost net of support includes fixed cost spread across units, variable cost and shipping charges. A horizontal private-variable-cost line excludes the fixed component, while another marks announced price. A vertical line identifies the quota. None of these curves shows a quantity chosen by students: the observed action is production or suspension of a given quota.

With avoidable fixed cost, compare the full operating account against suspension. With sunk cost, fixed expenditure remains in both accounts, and operating below full average cost can be privately

Operation and outcomes by scenario and profile

Decision	n	Produces (%)	Benchmark choice (%)	Firm's net outcome	Best private net outcome	Gap from benchmark
1 · Firm's country A · Cost profile 1 · Q=12 · N=4 · p=16	1	100	100	22	22	0
1 · Firm's country A · Cost profile 2 · Q=12 · N=4 · p=16	1	100	100	16	16	0
1 · Firm's country A · Cost profile 3 · Q=12 · N=4 · p=16	1	0	0	0	10	10
1 · Firm's country A · Cost profile 4 · Q=12 · N=4 · p=16	1	100	100	4	4	0
1 · Firm's country B · Cost profile 1 · Q=12 · N=4 · p=16	1	100	100	22	22	0
1 · Firm's country B · Cost profile 2 · Q=12 · N=4 · p=16	1	0	0	0	16	16
1 · Firm's country B · Cost profile 3 · Q=12 · N=4 · p=16	1	100	100	10	10	0
1 · Firm's country B · Cost profile 4 · Q=12 · N=4 · p=16	1	100	100	4	4	0

Figure 4.3: Compare profiles under the same conditions and inspect denominators.

Private and public accounts

Decision	n	Firm's net outcome	Resource-net outcome	Net government income
1 · Firm's country A · Cost profile 1 · Q=12 · N=4 · p=16	1	22	22	0
1 · Firm's country A · Cost profile 2 · Q=12 · N=4 · p=16	1	16	16	0
1 · Firm's country A · Cost profile 3 · Q=12 · N=4 · p=16	1	0	0	0
1 · Firm's country A · Cost profile 4 · Q=12 · N=4 · p=16	1	4	4	0
1 · Firm's country B · Cost profile 1 · Q=12 · N=4 · p=16	1	22	22	0
1 · Firm's country B · Cost profile 2 · Q=12 · N=4 · p=16	1	0	0	0
1 · Firm's country B · Cost profile 3 · Q=12 · N=4 · p=16	1	10	10	0
1 · Firm's country B · Cost profile 4 · Q=12 · N=4 · p=16	1	4	4	0

Figure 4.4: Distinguish private outcome, resource-net outcome and government income.

preferable. Fixed support conditional on operation also makes a difference between inspecting price versus variable cost and comparing exact accounts. Use the numerical benchmark to prevent a diagram from becoming a mechanical decision rule outside its assumptions.

The second diagram presents PP and CC in the separate homogeneous model. Its vertical line marks their continuous intersection. It is not estimated student entry and need not match announced N . Ask why PP slopes downward, why CC slopes upward and how greater Q shifts CC. The reference intentionally removes heterogeneity and trade expenses. It builds an equilibrium intuition that can then be distinguished from the announced-condition protocol.

The consumption table shows N , elasticity, price index and composite consumption at fixed income. Its observation unit is an announced condition, rather than a participant preference report. Elasticity is not estimated from production decisions. Changing elasticity can alter this table while leaving every private action benchmark unchanged. That is an intended design prediction: an assumption in the demand diagnostic changed, rather than the firm's monetary incentive.

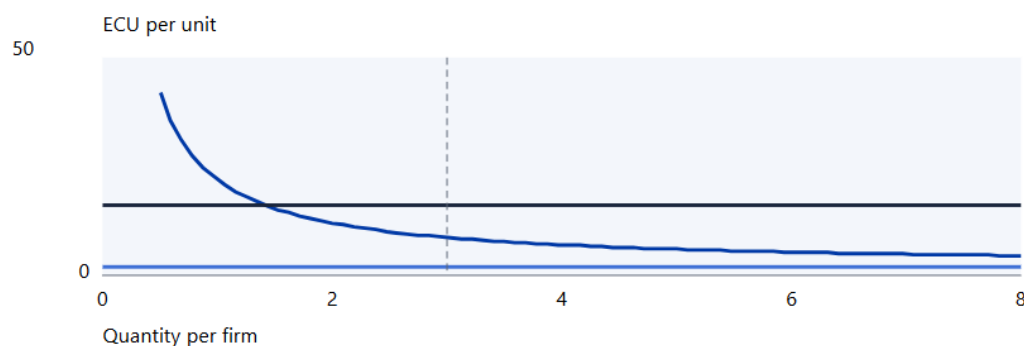
Variety and consumption diagnostic

CES index = $p \times N^{-(1/(\sigma-1))}$; reference consumption = $100 / \text{index}$. It uses the complete announced catalog and hypothetical fixed income. It does not measure observed welfare or change with one firm's decision.

Decision	N	σ	Scenario price index	Consumption index at fixed income 100
1 · Q=12 · N=4 · p=16	4	4	10.08	9.92

Figure 4.5: Interpret price and variety as a fixed-income diagnostic.

Private costs and announced price



• Private average cost net of support • Private variable cost per unit • Price per unit • Announced quota: 3

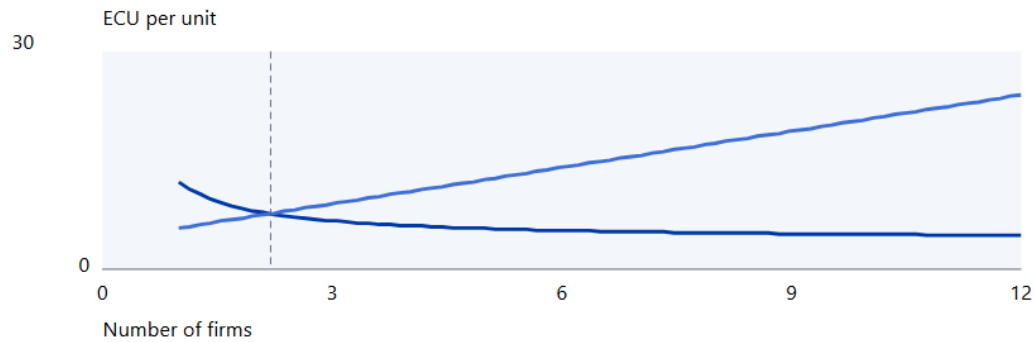
With avoidable fixed cost, compare revenue with full cost net of support. With sunk cost, compare both possible accounts: fixed cost appears in both. The curve does not determine a quantity chosen by the student.

Figure 4.6: Connect quota with average cost, variable cost and price.

4.4 Evolution and inference limits

The evolution plot compares realized net outcome and the best private outcome by decision. In the battery, temporal differences can reflect changed parameters rather than learning. With ten unchanged conditions, a smaller gap is consistent with learning the calculation but does not identify

Homogeneous reference: price and average cost



Price PP · Average cost CC · Continuous reference firm count: 2.19

Separate diagnostic model: $PP = c + 1/(b \cdot n)$; $CC = c + n \cdot F/Q$. It assumes homogeneous firms, without trade costs or support. The vertical line marks $PP = CC$; it does not estimate observed entry or replace announced parameters.

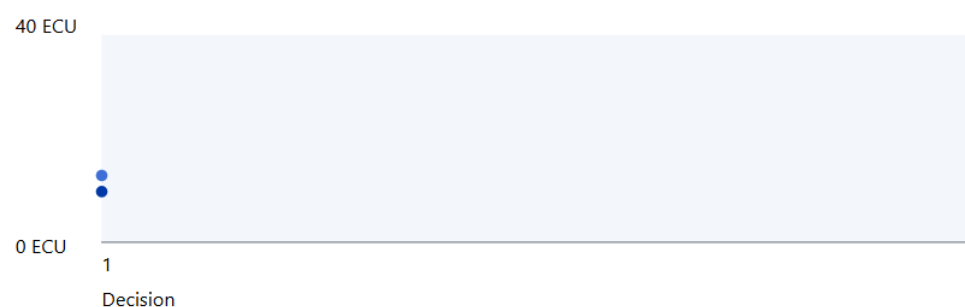
Figure 4.7: Explain PP and CC as a separate homogeneous reference.

its cause without another comparison. Under random order, period does not represent a shared condition across people; inspect parameter tables and recorded order before comparing averages.

Feedback script

Start with “Which quantity belongs to a firm and which to the market?” Continue with “Did the ratio change, or only supplier count?” Then compare accounts: “Which expenses can suspension avoid, and which remain?” Finish with “Does this graph describe an observed action, an announced condition or a theoretical reference?” Every answer should identify a unit and population.

Outcomes and benchmark by decision



• Firm's net outcome • Best private net outcome

Decision	n	Firm's net outcome	Best private net outcome
1	8	9.75	13

Figure 4.8: Compare gaps by decision without confusing sequence with treatment.

Selecting modes and pedagogical extensions

5.1 A common comparison strategy

The three basic modes share rules and accounts. One decision uses the first condition: price sixteen, quantity twelve, four suppliers and fixed cost twenty. The fixed battery adds four conditions; the randomized battery preserves that exact set, giving each person a reproducible permutation. A later decision never depends on prior suspension. The extended edition contains independent comparisons, usually two decisions, and one ten-decision option with unchanged conditions. Its first condition usually uses combined-market quantity twenty-four, eight suppliers and price fourteen.

Select an extension through a specific question rather than its position in the catalog. In a two-decision comparison, each person retains country and initial cost profile. Effective-cost tables establish what changed. Compare the same profile before and after, retaining both actions, quotas and accounts. Aggregate differences between sessions with different profile composition cannot automatically be attributed to treatment. Nor should a two-decision cumulative account be compared with a ten-decision account without normalization.

For introductory trade, combine integration without consolidation with consolidation, asking students to keep market quantity and firm quota distinct. For intermediate microeconomics, combine avoidable and sunk fixed costs, then use the low-price condition to identify the shutdown margin. For industrial organization, compare heterogeneous and homogeneous profiles and the announced industry against PP/CC. For public economics, contrast resource shipping expense, a government charge and operating support, tracing every counterpart in the account. None of these combinations requires activating all extensions or changing common rules.

5.2 Integration, consolidation and size

5.2.1 Integration without consolidation

Quantity rises from twelve to twenty-four, suppliers from four to eight and price falls from sixteen to fourteen. Quota stays at three. Cost-eight firms move from a four-ECU gain to a two-ECU loss if operating. The comparison separates access to varieties and lower price from a private scale benefit that has not yet appeared. Ask what must change for the ratio to increase. Avoid describing integration as an automatic increase in every firm's profit.

5.2.2 Supplier consolidation

Starting from the combined market, announced suppliers fall from eight to six while quantity twenty-four and price fourteen remain constant. Quota rises from three to four and the high-cost profile regains a positive four-ECU outcome. This condition teaches lower average cost through spreading the same fixed expense across more units. Consolidation is exogenous; the activity identifies neither which real manufacturers exited nor a causal link between student suspension choices and the new count.

5.2.3 Expansion and contraction of the market

Quantity rises from twenty-four to forty-eight without changing eight suppliers or price fourteen. Quota doubles from three to six. At cost eight and fixed expense twenty, operation improves from minus two to sixteen ECU. Unlike the initial integration condition, the change isolates announced quantity at fixed supplier count. Discuss when that restriction would be implausible in a real market with entry. PP/CC provides a contrasting theoretical reference in which a larger market induces an endogenous firm-count response.

The second condition reduces quantity to sixteen and price to ten, retaining eight suppliers. Quota falls to two. The highest-cost profile loses sixteen ECU if operating, and all profiles make an operating loss, with a small loss for the most efficient type. Since price and quantity change jointly, this is a contraction scenario rather than separate identification of elasticity. As a written exercise, calculate the contribution of each component while initially holding the other constant.

5.3 Costs, productivity and heterogeneity

5.3.1 Higher and lower avoidable fixed costs

Fixed expenditure rises from twenty to forty in the second decision, at quota three and price fourteen. Every profile's operating outcome falls by twenty ECU, while suspension preserves one hundred. Even the lowest-cost firm moves from sixteen-ECU profit to a four-ECU loss. Do not interpret suspension as risk rejection: both accounts are known. Connect the comparison with an initial-expenditure barrier and retain the crucial qualification that the fixed expense is still avoidable.

Fixed expense falls from twenty to ten with other combined-market conditions unchanged. The highest-cost profile moves from minus two to eight net ECU, changing its benchmark to operation. Quota does not grow, but average cost falls through lower fixed expenditure. Compare this explanation with increasing quantity: both lower F/q by changing different components. The guide identifies no real cost-reduction technology and promises no universal effect of lower initial expenditure in other industries.

5.3.2 Own and common productivity improvements

Effective variable cost falls by one ECU per unit, while initial profile cost remains recorded. At quota three, operation improves by three ECU for every profile. The report's homogeneous diagnostic retains its common unit cost because this condition represents an own-firm improvement rather than improvement in the reference industry. Ask why evaluating a productive investment would require the expense of obtaining it: improvement here is given, and no investment decision is implemented or evaluated for profitability.

The firm's variable cost also falls by one ECU, but this time the homogeneous diagnostic's common cost falls too. A firm's private account can therefore coincide with the own-improvement condition, while the industry reference changes. Explain what that assumption permits and what it does not. This illustrates diffused improvement rather than estimating an externality or recording contacts between firms. The distinction belongs to the announced mechanism, not actual communication between participants.

5.3.3 Homogeneous costs

The second decision sets effective unit cost at four for everybody while retaining country and initial profile labels. At quota three and price fourteen, operation gives ten net ECU to every type. Initially cheap profiles lose an advantage and costly profiles improve; benchmark dispersion disappears. Inspect effective cost instead of assuming the profile label always gives the current parameter. This comparison distinguishes aggregate differences caused by assigned technology from those caused by choices.

5.4 Shipping and public accounts

5.4.1 Low and high transport costs

Two configurations introduce resource expenses of one or four ECU per exported unit, respectively. Half the quota is exported, so a three-unit quota ships 1.5 units. Resulting expenditures are 1.5 and six ECU. Do not multiply shipping expense by the entire quota. A cost-six firm moves from four net ECU to 2.5 with low transport cost and minus two with high transport cost; the latter changes its benchmark to suspension. Transport remains a resource expense without a fiscal counterpart.

5.4.2 Government shipment charge

The charge is two ECU per exported unit at given gross selling price. Producing a three-unit quota with half exported requires remitting three ECU. The private account falls by three and government receives three. The design holds announced price constant; it estimates neither pass-through to buyers nor import-demand elasticity. The consumption diagnostic does not automatically change. Teach accounting incidence at fixed gross prices and identify the missing mechanisms needed for a complete trade-policy evaluation.

5.4.3 Operating support

Fixed support of four ECU is paid only when producing. The highest-cost firm moves from a two-ECU loss to a two-ECU gain, changing its private benchmark. Net government income is minus four and resource-net outcome excludes this transfer. An individually optimal response to support does not demonstrate a social efficiency gain. The rule contains no learning, employment or other external benefit that could justify support. Ask students to formulate such a mechanism as an additional hypothesis without attributing it to game data.

5.5 Sunk cost and short-run decisions

The second decision preserves combined-market conditions but makes the twenty-ECU fixed cost unavoidable under suspension. A high-cost firm compares operating with loss two against suspension with loss twenty. Operation is the benchmark, giving final account 98 rather than 80. This teaches total versus additional losses. Do not label an account-maximizing choice a sunk-cost bias. Studying that bias would require comparing actions across irrecoverable expenditures that leave incremental alternatives unchanged.

The 20-ECU fixed cost has already been paid and cannot be recovered. Suspending leaves $100 - 20$ ECU before any production.

Announced market quantity Q	24 units
Announced supplier count N	8
Price per unit	14 ECU
Fixed cost for this decision	20 ECU
Variable cost per unit	8 ECU
Resource shipping cost per exported unit	0 ECU
Government charge per exported unit	0 ECU
Support if you produce	0 ECU
Share of quota shipped abroad	50 %
Fixed-cost rule	Already paid: deducted even if you suspend

The market announces total quantity Q and supplier count N . Your quota is $q = Q / N$. If you produce, you sell the full quota at the announced price. If you suspend, you produce zero. You do not choose the price or quantity; no other student changes these values.

Each decision is independent: suspending does not exclude you from later decisions. New conditions do not depend on earlier choices.

What would you like to do in this decision?

- ☐ Produce the announced quota
- ☐ Suspend this decision

Confirm decision

Figure 5.1: Check the already-paid expenditure notice before choosing.

Fixed expenditure is paid in both decisions, and price falls from fourteen to four in the second. Costs two, four, six and eight respectively imply preferred operation, indifference, and preferred suspension for both high-cost types. The report preserves the tie. Ask students to explain price

BEER LAB · DECISION 2 OF 2

Your decision result

Produce the announced quota

Quantity produced

3 units

Firm's net outcome

-2 ECU

Final ECU account

98 ECU

Sales revenue	42 ECU
Production spending	44 ECU
Resource shipping expenditure	0 ECU
Government payment	0 ECU
Support received	0 ECU
Average production cost if operating	14.67 ECU per unit

The final account adds 100 ECU to the net outcome. Do not add sales revenue again. Market conditions and other participants' accounts remain independent.

Continue

Figure 5.2: A net loss can be consistent with the best short-run action.

relative to private variable cost while keeping the initial account explicit. Suspension removes neither sunk expense nor the participant from later decisions.

5.6 Variety and learning

5.6.1 Variety preference and substitutability

The CES diagnostic's elasticity falls from four to two. At eight varieties and price fourteen, the index falls from seven to 1.75. Production conditions and private benchmarks do not change. This compares demand assumptions for discussion rather than eliciting individual preferences. Explain why the same catalog receives a different valuation under another parameter and why no monetary change should be expected in a firm decision whose incentives were not modified.

Elasticity rises from four to eight. The announced index becomes closer to the price of one variety and the catalog's additional contribution to composite consumption becomes smaller. Firm costs, price and quota again remain unchanged. Compare this with changing supplier count: varieties and substitutability assumptions are different objects. The activity cannot establish that one group of students prefers less variety, because students were never asked to make a consumption choice.

5.6.2 Ten unchanged decisions

The final configuration repeats the first basic condition ten times, renewing the account and retaining each profile. It can reveal consistency, calculation practice and changing benchmark gaps. There is no reputation or learning about human rivals. Repetition also does not reduce costs through accumulation; a production learning curve is not implemented. To attribute a pattern to feedback, add an appropriate instructor comparison and describe the design. Ten observations alone do not identify that mechanism, and repeated records from one person are not ten independent firms.

Organizing the class and assessing understanding

6.1 A fifty-minute introductory session

Spend five minutes on a firm that must prepare a machine before producing. Write fixed cost twenty and unit cost four without introducing integration yet. Ask for total and average cost at two and four units. Different answers introduce the distinction between total, average and additional spending. Then explain one hundred ECU as a separate classroom account rather than a physical input or a purchase of twenty machines.

Allow ten minutes for access, instructions, comprehension and one decision. Resolve login and unit questions without inspecting or commenting on actions. Nobody needs to wait for a classmate. Early finishers retain the closing page while the instructor checks progress. Treat comprehension errors as information about protocol explanation rather than a public ranking of students. If a student needs help, explain the rule privately and ask that person to complete the response independently.

Use ten minutes to reveal choices and compare two anonymous profiles. Reconstruct their accounts at the same quota and explain why their outcomes differ. Introduce the five-condition battery over the next ten minutes. Draw two separate markets and one combined market, writing quantity and suppliers in each. Ask whether doubling market size doubles firm quota and wait for an explicit calculation before showing the diagram. This order makes the graph an explanation of an accounting problem students have already encountered.

Dedicate ten minutes to scale, price and variety. Begin with consolidation, which raises quota at given price. Then show the consumption diagnostic to distinguish a buyer reference from the firm's private account. Finish with five minutes of individual writing: one statement about an observed action, another about an announced condition and a third about a theoretical reference. Every statement should identify a unit and a relevant comparison. Retain the responses as a basis for the next class discussion.

6.2 A seventy-five-minute advanced session

Use twenty minutes for rules and the battery, fifteen for avoidable versus sunk costs, fifteen for shipping and support accounts, and twenty-five for diagrams and a written exercise. Both elasticity conditions need not be included if the course has not introduced composite consumption. For an advanced class, derive PP/CC and ask what assumptions would be needed for students to generate prices and firm counts through entry rather than receive announced values.

Connect operation under loss with expenditure that suspension can no longer avoid. Compare support changing a private benchmark with its fiscal counterpart. Finally, ask students to design one protocol modification: firm-selected price, chosen quantity, real buyers or persistent exit. Each proposal must specify new data and waiting requirements. These modifications are not implemented here; discussing them clarifies the scope of the present model and the difference between a numerical activity and an interactive market experiment.

6.3 Exercises with answer guidance

6.3.1 Market quantity and firm quota

In a twenty-four-unit market with eight suppliers, a student says the firm must produce twenty-four. Its quota is three because $24/8 = 3$. Another claims that forty-eight units with sixteen suppliers doubles firm output; this is also false, since $48/16 = 3$. Ask why two different markets can give the same quota and what additional information would justify attributing increased firm scale to integration. The correction should explain the ratio rather than simply memorize three. A diagram with equally allocated units can help a student distinguish the two quantities.

6.3.2 Total and average costs

With $F = 20$ and $c = 4$, three units cost 32 ECU and six cost 44. Their average costs are approximately 10.67 and 7.33. Marginal cost remains four. A correct explanation identifies that fixed expenditure was not doubled while total spending rose. Ask what happens if fixed cost also doubles: at forty and six units, average cost returns to 10.67. Scale is not a universal claim about every joint parameter change. Explain which expense is being spread before describing an outcome as a cost reduction.

6.3.3 Integration without larger quota

For cost eight and fixed expense twenty, the first condition gives $(16 - 8)3 - 20 = 4$ and the second $(14 - 8)3 - 20 = -2$. Outcome falls by six ECU because the two-ECU price decrease applies to three units. Quota is unchanged. Attributing the loss to lower productivity contradicts given cost. The variety diagnostic can improve while this firm loses because the two refer to different objects. Ask students to state those objects rather than force every measure to move in the same direction.

6.3.4 Consolidation and break-even quota

At price fourteen and cost eight, strictly positive profit requires more than $20/6$ units. A quota of three is below that threshold and four is above. Calculate average costs and locate both quotas in the diagram. The conclusion concerns this profile under these conditions. It does not prove that a real merger is socially desirable: market power, quality and strategic behavior do not change here, and supplier count is announced. An answer should name those omitted channels before making a merger-policy claim.

6.3.5 Total loss and the better alternative

Fixed cost twenty is already paid, quota three, price fourteen and variable cost eight. Operation gives net outcome minus two and account 98; suspension gives minus twenty and account 80. The

incremental benefit of operation is eighteen. A correct explanation separates that comparison from total firm profitability. At price four and cost eight, operation adds a twelve-ECU variable loss, giving account 68, so suspension is preferable. Irrecoverable expenditure alone justifies neither action; compare the revenue and costs that actually differ.

6.3.6 Half exported and different charges

A three-unit quota exports 1.5 units. Four-ECU shipping cost requires six ECU; a two-ECU government charge requires three. For cost six, price fourteen and fixed expense twenty, initial net outcome is four. Transport alone reduces it to minus two; the charge alone reduces it to one. The former consumes resources while the latter has a three-ECU fiscal counterpart. Verify the identity linking private outcome, government income and resource-net outcome. Do not charge a quota that was never produced or multiply an export-only expense by the entire quota.

6.3.7 Support and private action

The cost-eight profile loses two ECU in the combined market. Four-ECU support conditional on operation creates a two-ECU private gain and account 102. Government records minus four, leaving resource-net outcome at minus two. The private benchmark changes to production without evidence that the transfer creates resources. Ask students to propose an externality that could justify support and identify the additional observation required. The game does not measure that externality, and a hypothetical justification should remain visibly distinct from a recorded result.

6.3.8 Reference consumption during contraction

At eight varieties, elasticity four and price fourteen, the index is seven and fixed-income consumption is 14.29. At price nine, the index is 4.5 and reference consumption is 22.22. Ask why this does not establish that recession improves welfare. Diagnostic income stays fixed and omits lost employment or dividends. If hypothetical income fell to fifty, new consumption would instead be 11.11. This shows how an omitted assumption can reverse a comparison and why a numerical diagnostic requires a stated income population.

6.3.9 Continuous reference firms

Use $Q = 24$, $F = 20$ and $b = 0.125$. PP/CC intersects at $n^* = \sqrt{9.6} \simeq 3.10$, quota about 7.75 and price 6.58 at $c_R = 4$. The announced activity can instead have eight suppliers and price fourteen. Ask which numbers solve a model and which announce a scenario. Rounding the former to three changes neither the executed catalog nor evidence about real firm entry. Observing that entry would require another protocol in which choices determine actual supplier counts and market outcomes.

6.4 Assessment criteria and continuity

Assess units and quota, accounting, comparison of alternatives and inference. Award full credit for explanations consistent with parameters and units, partial credit for a missing counterpart, and none for contradictions of the rules. Do not grade only reaching the benchmark: choices may reflect imitation or chance. Request explanations, allow revision and retain initial answers. Archive configuration, date, profile composition and original export. Use specific comprehension difficulties to choose the next extension without automatically interpreting them as preference evidence.

Data, troubleshooting and responsible use

7.1 Downloading the correct session

The report's *Download this session's CSV* button exports one row per participant and active decision in the selected session. Eight people over five conditions give forty rows; eight over ten decisions give eighty. Participants who have not finished are included. Pending decisions retain identifiers and known parameters, but unrecorded actions and outcomes remain blank. Confirmed suspension instead has a recorded action and zero production. Never turn blanks into zeros or describe every exported record as a completed response.

The report download differs from Data. Native exports can include multiple sessions of this family, wide files and inactive technical periods. Wide format has one participant row with round-specific columns; app format has one participant row per technical round. The custom exporter filters active decisions. Inspect format and keys before counting observations. Family isolation prevents mixing other games, but does not turn a broad export into a file containing only one class. Preserve the original download before selecting sessions or reshaping columns.

Session, participant and period keys identify duplicates and reconstruct sequences. The file also records language, edition, treatment, profile, country, initial cost, effective parameters, comprehension attempts and condition order. Under randomized order, use stored order or each row's parameters to identify the condition. Initial profile does not replace effective cost; after homogenization or improvement, the latter determines the benchmark. These fields make it possible to distinguish a changed calculation from a changed parameter without relying on memory of the projected screen.

7.2 Derived fields and units

Potential quota q is measured in product units, and realized production may be zero. Average cost and price are ECU per unit. Sales, expenditures, net outcome, support and government income are ECU per decision. Final account includes the renewed endowment and net outcome. A sum of accounts includes as many endowments as decisions; compare configurations using per-decision net outcome or another justified normalized measure. Do not subtract the endowment from every component of the spending table.

The file distinguishes operating outcome, suspension outcome, best outcome and optimal actions. Two actions may be optimal because of indifference. Benchmark compatibility is not preference measurement, and the gap is nonnegative. Consumption indicators describe the complete announced

scenario; neither add them to student profits nor treat them as buyer choices. Resource-net outcome cancels public transfers but excludes consumer utility. A claimed social benefit requires a wider account than this implemented firm-and-government identity.

Attention

A pending row has no realized net outcome. Zero production after valid suspension is a real observation. Potential average cost is not spending at zero output. Announced N cannot be reconstructed by counting students who operated. Fixed-income consumption is not observed welfare.

For learning analysis, successive decisions by one person are dependent. Eighty rows from eight participants are not eighty independent firms. When comparing treatments, state how participants were assigned and whether profile composition changed. A class can provide an excellent descriptive exercise without claiming a publishable causal estimate. Keep original files and document transformations, especially completed-decision filters, profile aggregation and condition selection. A transparent count of complete and pending records is more useful than silently dropping difficult cases.

7.3 Common issues and recovery

A room with no session may simply require instructor creation. Select the configuration and create a room session before distributing access. A participant-not-found message can indicate a link belonging to an older session or recreated database. Distribute current links; do not delete the database to fix entry. Updating code requires restarting the affected instance while preserving data. Public deployment belongs to laboratory coordination and is distinct from a same-computer test.

If revelation is unavailable, inspect pending decisions in the monitor. People advance independently; the report lock is not a market wait. A suspension account of eighty instead of one hundred can be correct under the sunk-cost rule. If both actions count as benchmarks, look for equal accounts. If every profile appears to have identical cost, the homogeneous condition may be active. Check effective parameters rather than relying solely on the configuration label. The same checks also help distinguish an instructional misunderstanding from a genuine implementation issue.

If a distribution looks unexpected, separate periods and profiles. A histogram combining a battery deliberately mixes different conditions. Country averages with unequal student counts can reflect composition despite symmetric technologies. Changing language changes neither accounts nor parameters. Displayed local decimal commas do not change SVG geometry or saved numerical precision; retain exported decimals to reproduce accounts. Avoid interpreting the small difference caused by display rounding as a different payoff rule.

7.4 Preserving a reusable teaching package

The repository groups one common app, bilingual texts, configurations and four rooms. Instructor copies contain PDF, LaTeX and figures. Prepare a separate class session and retain configuration, language, version and export apart from rehearsals; never reuse exhausted individual links. Public guide routes specify the deployment product, so confirm availability before distributing them. The local preview has an independent instance and database; `localhost` works only on the same computer. Public access requires deployment and a domain connection. Once available, test both languages and confirm that Demo and Rooms contain only this family.

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