



Teacher guide for the price controls game

Running it in the lab, theoretical background,
experimental evidence and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



Version 2.1 | October 2026

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

How to use this guide

This guide helps you prepare, run and debrief the **price controls** game of the Behavioral and Experimental Economics Research Lab (BEER Lab), Department of Economics, Tecnológico de Monterrey. It is written for instructors of principles, intermediate microeconomics, industrial organization and economic policy, with or without prior experience in experimental economics. The game has two versions:

- **Basic version: the classic experiment.** The whole class trades in a continuous double auction, as in [Smith \(1962\)](#). After a few free periods a price ceiling or a price floor is imposed on the whole market, as in [Isaac and Plott \(1981\)](#), [Smith and Williams \(1981\)](#) and the classroom version in [Holt \(2019\)](#). Students see the shortage, the surplus and the efficiency loss.
- **Extended version: hoarding.** The classroom version of the experiment in [Castro Méndez and Martinelli \(2026\)](#), *Price Distortions and Hoarding: An Experiment* (BEER Lab Working Paper 2026-02): the good can be stored from one period to the next, and groups anticipate a supply shock, a price ceiling or its removal.

The **quick-start guide** gets a session running. Chapters 3 to 6 cover the basic version; Chapter 7, the extended one. Common rules are explained once; each treatment only describes what changes.

Author

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For the instructor

This guide matches the English interface. A separate Spanish version exists. Screenshots in this guide were taken on a local instance of the game with simulated decisions; the numbers shown illustrate the interface and are *not* results from a real class or from the working paper's experiment. Project only aggregate results: never link participant codes to names, student IDs, seats or individual decisions.

Screenshots of the game's card on teaching-admin.beer-lab.org and teaching.beer-lab.org will be added in the next version of this guide; the steps are the same as for the lab's other games.

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Quick-start guide

1.1 Fact sheet

Purpose	Show what happens when a price ceiling or floor is imposed on a competitive market: shortage or surplus, fewer trades, lost efficiency and, with a nonbinding ceiling, prices that stay below equilibrium.
Participants	The whole class in one market: half buyers, half sellers (with an odd number, one more buyer). Works from 8 students; with 22 or more the equilibrium is always 11 units at 150 ECU.
Market	Continuous double auction, 150 seconds per period. Buyer values 300, 285, 270, ...; seller costs 0, 15, 30, ... (one unit per person and period).
Sequence	8 periods: the first 3 without a limit; periods 4 to 8 with the treatment's price limit, announced on a screen of its own.
Treatments	Binding price ceiling (30 ECU below the equilibrium band); nonbinding ceiling (10 ECU above it); binding price floor (30 ECU above it).
Duration	25–30 minutes, not counting discussion.
Extended version	Hoarding with storage between periods (Chapter 7).
Instructor (you)	teaching-admin.beer-lab.org → the game's card → Open panel (section 2.1).
Students	Room link https://pricecontrols.beer-lab.org/room/price_controls_en , its QR code (section 2.5) or teaching.beer-lab.org .
Report	Equilibrium and price limit (with the shortage or surplus it implies), before/after comparison, price and number of trades by period, price distribution and a per-period table.

Note

There are two different pages. **teaching-admin.beer-lab.org** is yours: from there you open the game's panel and download this guide. **teaching.beer-lab.org** is your students': from there they can only *play*, not create sessions.

1.2 Minimal sequence

Before class

1. Request panel access at lab.economia@servicios.tec.mx, stating the game, course, number of students and date. You will receive the password for the **admin** user.
2. Open teaching-admin.beer-lab.org, find **Price Controls** and click **Open panel**.
3. Rehearse in **Demo** (section 2.3) and choose the treatment (Chapter 6).

In class

4. Count the students present.
5. Under **Rooms**, open the [EN] **Price Controls** room, choose the configuration, type the *exact* number of students under **Number of participants** and click **Create**.
6. Share the room link or project its QR code. Each student clicks **Start**.
7. Click **Monitor the session**. When done, open **Report**, click **Show results** and lead the discussion.

After class

8. In the room, click **Close this room**. The session's data stays under **Sessions**.

1.3 Checklist

- ☐ Panel password received and tested at pricecontrols.beer-lab.org/login.
- ☐ Rehearsal done in **Demo**.
- ☐ Treatment chosen: binding ceiling, nonbinding ceiling or binding floor.
- ☐ Session's number of participants equal to the number of students present.
- ☐ Room link or QR at hand; tested from a phone.
- ☐ Students told that ECU are experimental units and there is no money payment.

Platform access

2.1 Your access: teaching-admin and the game's panel

The instructor page is teaching-admin.beer-lab.org. It is not in the beer-lab.org menu: type the address directly or bookmark it. It lists all of the lab's classroom games; you can search by title, topic or JEL code.

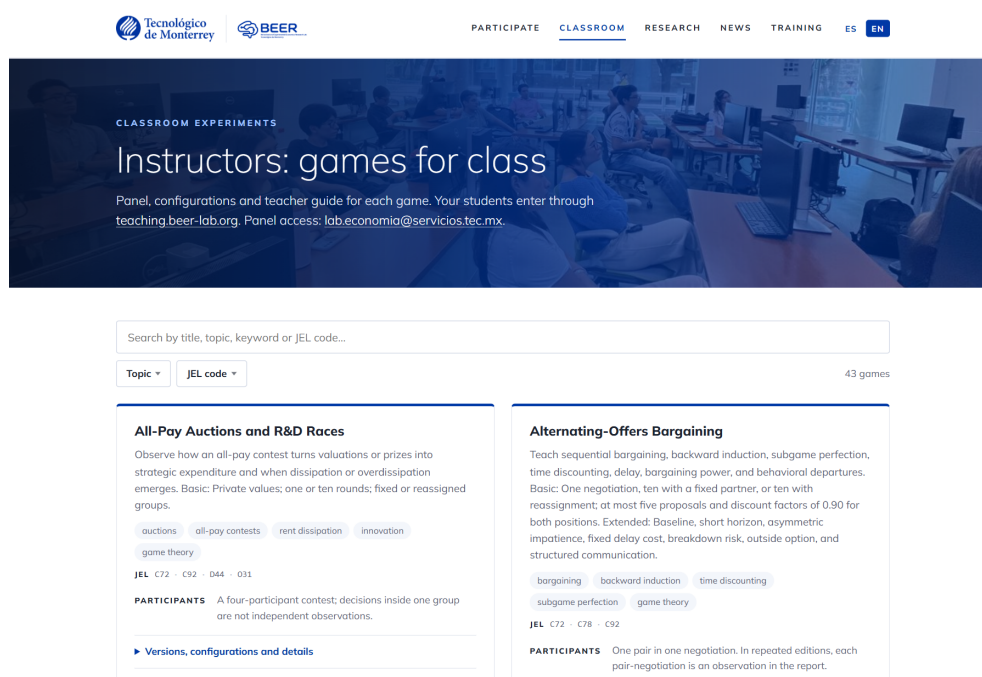


Figure 2.1: Instructor page: teaching-admin.beer-lab.org. Look for the **Price Controls** card.

Each game has a card with its description and two buttons: **Open panel** and **Teacher guide (PDF)**. The game's panel (<https://pricecontrols.beer-lab.org>) is protected: **Open panel** shows the **Admin Login** screen, where you type **admin** and the password the lab gave you.

2.2 The panel: minimal vocabulary

Demo	Practice sessions with dummy participants that you play in several tabs. Never with students.
Rooms	Fixed class addresses: basic and extended, in Spanish and in English.
Create / Number of participants	Create the session in the room and declare how many people will play.
Monitor	Period and page of each participant. Shows no decisions.
Advance slowest participants	Moves forward whoever fell behind; also closes a trading period before time runs out.
Report	The instructor report for projecting aggregate results.
Data	CSV data download.
Close this room	Frees the room when you are done.

oTree Demo Sessions Rooms Data Server Check

Demo

[ES] Controles de precios — precio máximo activo (8 periodos)
[ES] Controles de precios — precio máximo no activo (8 periodos)
[ES] Controles de precios — precio mínimo activo (8 periodos)
[EN] Price controls — binding price ceiling (8 periods)
[EN] Price controls — nonbinding price ceiling (8 periods)
[EN] Price controls — binding price floor (8 periods)
[ES] Acaparamiento — una ronda (4 tratamientos por grupo)
[ES] Acaparamiento — 5 rondas (4 tratamientos por grupo)
[ES] Acaparamiento — 10 rondas (4 tratamientos por grupo)
[ES] Acaparamiento — referencia (sin cambios), 10 rondas
[ES] Acaparamiento — choque de oferta, 10 rondas
[ES] Acaparamiento — choque + precio máximo en P2, 10 rondas
[ES] Acaparamiento — precio máximo en P1 y liberalización, 10 rondas
[EN] Hoarding — one round (4 treatments by group)
[EN] Hoarding — 5 rounds (4 treatments by group)
[EN] Hoarding — 10 rounds (4 treatments by group)
[EN] Hoarding — reference (no change), 10 rounds
[EN] Hoarding — supply shock, 10 rounds
[EN] Hoarding — shock + price ceiling in P2, 10 rounds
[EN] Hoarding — ceiling in P1 and liberalization, 10 rounds

Juegos de mercados / Market games — BEER Lab

Controles de precios /
Price controls

To add to this list,
create a new session
config.

Figure 2.2: Demo: the game's 20 configurations (six basic and fourteen extended, in Spanish and English).

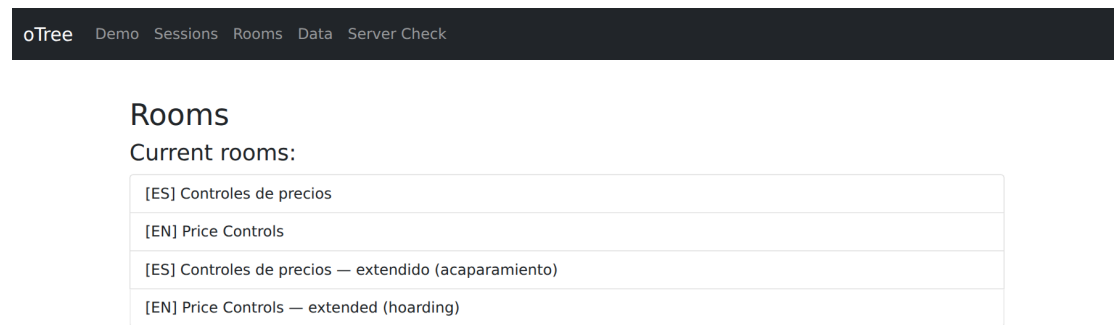


Figure 2.3: Rooms: the game's four rooms.

2.3 Rehearse before class

In **Demo**, click a configuration: a practice session is created, with 10 participants in the basic version. Open several **P1**, **P2**, ... links in separate tabs and trade among them; advance the rest from the Monitor.

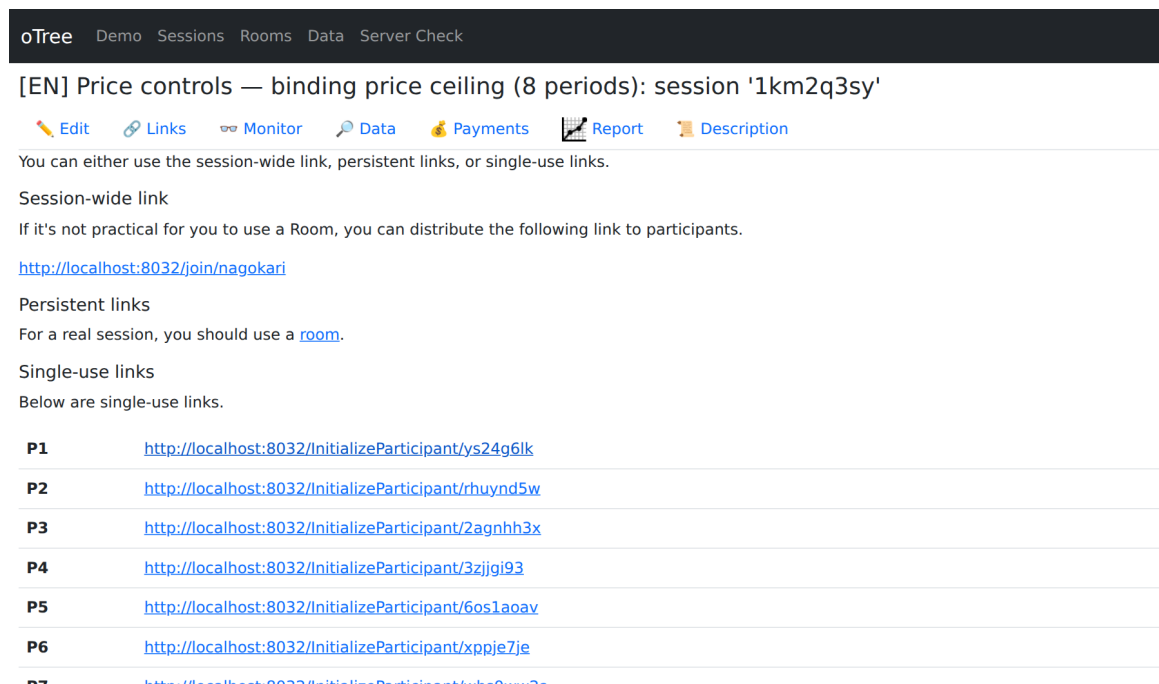


Figure 2.4: Session links (local copy: addresses read localhost; on the server they read pricecontrols.beer-lab.org).

2.4 Create the session in class

Under **Rooms**, open the room for your language, choose the configuration, type the number of students present under **Number of participants** and click **Create**.

oTree Demo Sessions Rooms Data Server Check

Room: [EN] Price Controls

Create a new session

English room. Only the configurations of this game, language and edition are shown below.

Session Config
 [EN] Price controls — binding price ceiling (8 periods) ▾

Number of participants

 Must be a multiple of 1

Create

[Configure session](#) ⚙️

App sequence

price_controls (10 rounds) Price controls: continuous double auction with induced values; free periods, then a binding ceiling, a nonbinding ceiling or a binding floor.

Figure 2.5: The basic English room's form.

Note

Declare the exact number. Roles (buyer or seller), values and costs are assigned when the session is created, and the price limit is computed from them. If you declare more participants than actually join, the market waits for someone who never arrives. If a student disconnects, ask them to reopen the room in the same browser; if they cannot, use **Advance slowest participants**.

oTree Demo Sessions Rooms Data Server Check

[EN] Price controls — binding price ceiling (8 periods): session '1km2q3sy'

[Edit](#)
[Links](#)
[Monitor](#)
[Data](#)
[Payments](#)
[Report](#)
[Description](#)

ID	Code	Label	Progress	App	Round	PageName	Waiting	WaitsFor	Since
P1	ys24g6lk		15/90	price_controls	2	Trade			1m
P2	rhuynd5w		15/90	price_controls	2	Trade			1m
P3	2agnhh3x		15/90	price_controls	2	Trade			1m
P4	3zjgi93		15/90	price_controls	2	Trade			1m
P5	6os1aov		15/90	price_controls	2	Trade			1m
P6	xppie7je		15/90	price_controls	2	Trade			1m
P7	wbs0ww2a		15/90	price_controls	2	Trade			1m
P8	wty38gi4		15/90	price_controls	2	Trade			1m
P9	vs56br0s		15/90	price_controls	2	Trade			1m
P10	ad9lsxvg		15/90	price_controls	2	Trade			1m

Figure 2.6: Monitor: period and page of each participant.

2.5 How your students join

Students need no account and nothing to install. They can join through the QR code (below and in Appendix A), the link https://pricecontrols.beer-lab.org/room/price_controls_en, or

the catalogue at teaching.beer-lab.org.



English, basic

pricecontrols.beer-lab.org/room/price_controls_en



English, extended

pricecontrols.beer-lab.org/room/price_controls_extended



Spanish, basic

pricecontrols.beer-lab.org/room/price_controls_es



Spanish, extended

pricecontrols.beer-lab.org/room/price_controls_extendido

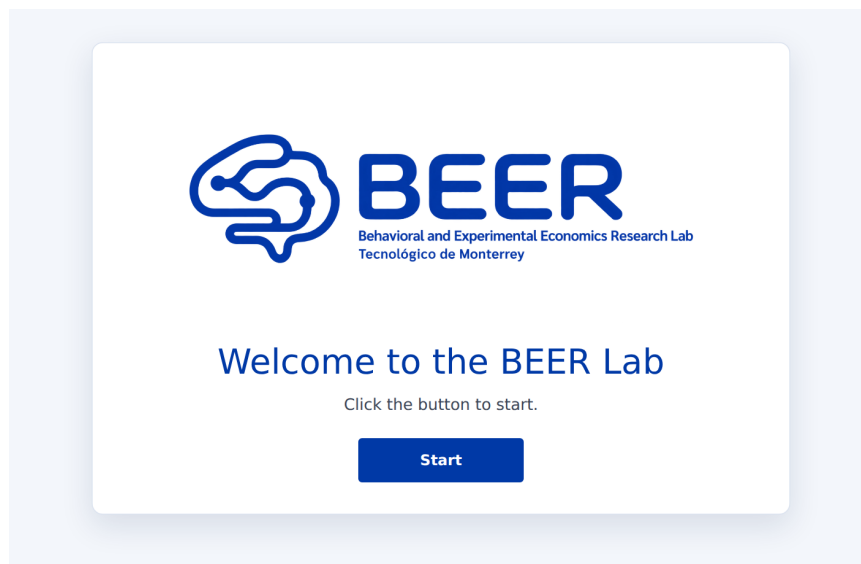


Figure 2.7: The room a student opens.




[PARTICIPATE](#)
[CLASSROOM](#)
[RESEARCH](#)
[NEWS](#)
[TRAINING](#)
[ES](#)
[EN](#)

INSTRUCTORS AND STUDENTS

Classroom experiments

Experimental economics games for classroom activities and discussion. Open the game your instructor tells you.

Instructors: how to use these games in class or propose a new one → [instructor guide](#)
 Lab research: beer-lab.org/en/research

Topic ▾

JEL code ▾

43 games

All-Pay Auctions and R&D Races

Observe how an all-pay contest turns valuations or prizes into strategic expenditure and when dissipation or overdispersion emerges. Basic: Private values; one or ten rounds; fixed or reassigned groups.

[auctions](#)
[all-pay contests](#)
[rent dissipation](#)
[innovation](#)

game theory

JEL C72 · C92 · D44 · 031

Address: allpay.beer-lab.org

[Español](#)
[English](#)

Alternating-Offers Bargaining

Teach sequential bargaining, backward induction, subgame perfection, time discounting, delay, bargaining power, and behavioral departures. Basic: One negotiation, ten with a fixed partner, or ten with reassignment; at most five proposals and discount factors of 0.90 for both positions. Extended: Baseline, short horizon, asymmetric impatience, fixed delay cost, breakdown risk, outside option, and structured communication.

[bargaining](#)
[backward induction](#)
[time discounting](#)

subgame perfection game theory

JEL C72 · C78 · C92

Figure 2.8: The teaching.beer-lab.org catalogue.

The basic game and its screens

3.1 Rules and incentives

The whole class forms a single market. When the session is created, half are assigned the buyer role and half the seller role; with an odd number there is one more buyer. Buyers are ordered at random and get values that step down by 15 from 300 ECU; sellers get costs that step up by 15 from 0 ECU. Role, value and cost stay the same in every period.

Each period lasts 150 seconds. Each person can buy or sell *one* unit per period. Buyers post bids and sellers post asks; everyone sees the best of each side. A new quote only enters if it improves the standing one (a higher bid, a lower ask), and anyone can accept the best quote on the other side: the trade closes immediately at that price. The software does not allow quoting or accepting at a loss.

$$\pi^{\text{buyer}} = v_i - p, \quad \pi^{\text{seller}} = p - c_j, \quad \text{and } 0 \text{ with no trade in the period.}$$

The first three periods have no limit. Before period 4 a screen announces the new rule, valid until the end: nobody may quote or trade above (price ceiling) or below (price floor) a given level. The level is computed from the equilibrium price band of *your* class:

Treatment	Limit	With 22 or more students
Binding price ceiling	lower end of the band -30	120 ECU (equilibrium: 150)
Nonbinding price ceiling	upper end of the band +10	160 ECU
Binding price floor	upper end of the band +30	180 ECU

For the instructor

The instructions only say that there *may* be a price limit in some periods and that it will be announced in advance. They never mention “equilibrium”, “price control” or “shortage”. Before period 4 starts, ask: what do you think will happen to the number of trades?

3.2 Welcome, instructions and comprehension





Welcome to the BEER Lab

The **Behavioral and Experimental Economics Research Lab** of the Department of Economics at Tecnológico de Monterrey is a space for learning about economic decisions through controlled activities.

Today you will take part in a market as a buyer or a seller. Your earnings depend on your decisions.

During the session

- Do not talk or communicate with other people, except through the means shown on screen.
- Make your decisions individually.
- Follow the on-screen instructions. Do not refresh or close this page.
- If you need help, raise your hand.

I have read and understood the lab rules.

☐ Yes ☐ No

Start

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Figure 3.1: Welcome page and lab rules.

Instructions

Period 1 of 8

In this activity you are a buyer. Each period you want to buy one unit of a product.

Each period you have your own **value** for your unit: the highest price it is worth paying. If you buy at a lower price you earn the difference; if you buy at a higher price you lose. No one else knows your value.

Your earnings = your value – the price you buy at. If you do not buy, your earnings are 0.

Example: if your value is 150 and you buy at a price of 120, your earnings are $150 - 120 = 30$ ECU.

How trading works

- Each period lasts 150 seconds. Buyers propose a price to buy at (a bid) and sellers propose a price to sell at (an ask); everyone sees the two best current offers.
- A new bid is only accepted on screen if it is higher than the current best bid. A new ask is only accepted if it is lower than the current best ask.
- At any time you can accept the best offer from the other side: as a buyer, you can accept the best ask; as a seller, you can accept the best bid. Accepting closes the trade immediately at that price.
- The system will not let you propose or accept a price that would lose you money. You can buy or sell at most one unit per period; if you do not trade, your earnings for that period are 0.
- In some periods there may be a price limit for the whole market. If there is one, it will be announced before that period and shown on the trading screen.

- There will be 8 periods. Your role and your value or cost stay the same in every period. Your earnings from all periods are added up.
- Amounts are in ECU (experimental currency units). There is no cash payment.

[Continue](#)

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Figure 3.2: A buyer's instructions. The last rule warns that there may be a price limit.

Instructions

Period 1 of 8

In this activity you are a seller. Each period you want to sell one unit of a product.

Each period you have your own **cost** for your unit: the lowest price it is worth accepting. If you sell at a higher price you earn the difference; if you sell at a lower price you lose. No one else knows your cost.

Your earnings = the price you sell at – your cost. If you do not sell, your earnings are 0.

Example: if your cost is 80 and you sell at a price of 120, your earnings are $120 - 80 = 40$ ECU.

How trading works

- Each period lasts 150 seconds. Buyers propose a price to buy at (a bid) and sellers propose a price to sell at (an ask); everyone sees the two best current offers.
- A new bid is only accepted on screen if it is higher than the current best bid. A new ask is only accepted if it is lower than the current best ask.
- At any time you can accept the best offer from the other side: as a buyer, you can accept the best ask; as a seller, you can accept the best bid. Accepting closes the trade immediately at that price.
- The system will not let you propose or accept a price that would lose you money. You can buy or sell at most one unit per period; if you do not trade, your earnings for that period are 0.
- In some periods there may be a price limit for the whole market. If there is one, it will be announced before that period and shown on the trading screen.

- There will be 8 periods. Your role and your value or cost stay the same in every period. Your earnings from all periods are added up.
- Amounts are in ECU (experimental currency units). There is no cash payment.

Continue

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Figure 3.3: A seller's instructions.

The example uses a buyer with value 150, a seller with cost 80 and a price of 120: the buyer earns 30 and the seller 40. The comprehension check asks for those two numbers; after an error it explains the rule and lets the student retry.

Before you start

Period 1 of 8

Answer both questions based on the instructions (they apply to any buyer or seller).

A buyer has a value of 150 and buys at a price of 120. What are their earnings?

- ☐ -30 ECU
 ☐ 30 ECU
 ☐ 120 ECU
 ☐ 150 ECU

A seller has a cost of 80 and sells at a price of 120. What are their earnings?

- ☐ -40 ECU
 ☐ 40 ECU
 ☐ 80 ECU
 ☐ 120 ECU

Check

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Figure 3.4: Comprehension check.

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Por favor corrija los errores.

Before you start

Period 1 of 8

Answer both questions based on the instructions (they apply to any buyer or seller).

A buyer has a value of 150 and buys at a price of 120. What are their earnings?

☐ -30 ECU ☐ 30 ECU ☐ 120 ECU ☐ 150 ECU

Check: a buyer's earnings = their value – the price they buy at.

A seller has a cost of 80 and sells at a price of 120. What are their earnings?

☐ -40 ECU ☐ 40 ECU ☐ 80 ECU ☐ 120 ECU

Check: a seller's earnings = the price they sell at – their cost.

Check

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Figure 3.5: Wrong answer: the message restates the rule without giving the answer.

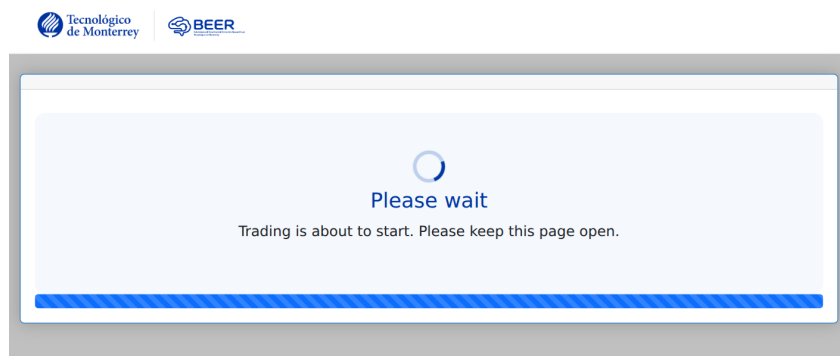


Figure 3.6: Waiting for the whole market to be ready.

What the participant sees

“Please wait” means other people are not ready yet. It is not an error. Participants should not close or reload the page.

3.3 Periods without a limit



Time left to complete this page: **2:21**

Trading

Period 2 of 8

You are a buyer.

Your value (the most it is worth paying)
180 ECU

Best bid
140

Best ask
165

Your bid

Offer to buy

Accept the best offer

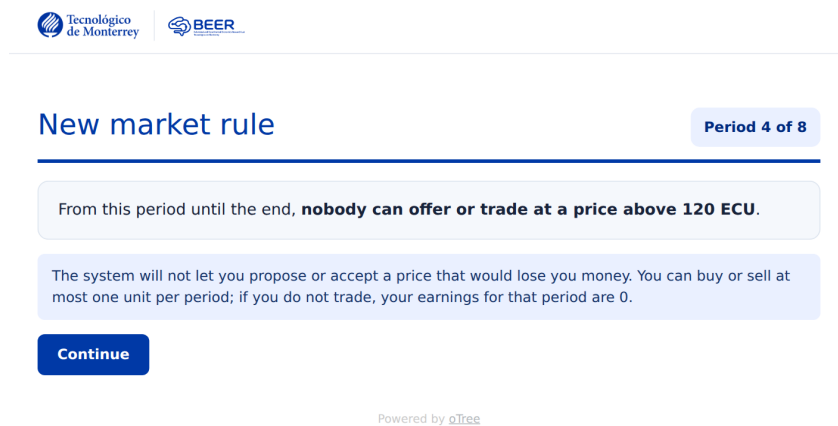
Trades closed this period

#	Price
1	180
2	175
3	170
4	165
5	160
6	158

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Figure 3.7: A buyer's trading screen in a free period: their value, the best bid and ask, and the period's trades.

3.4 The announcement and the periods with a limit



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New market rule

Period 4 of 8

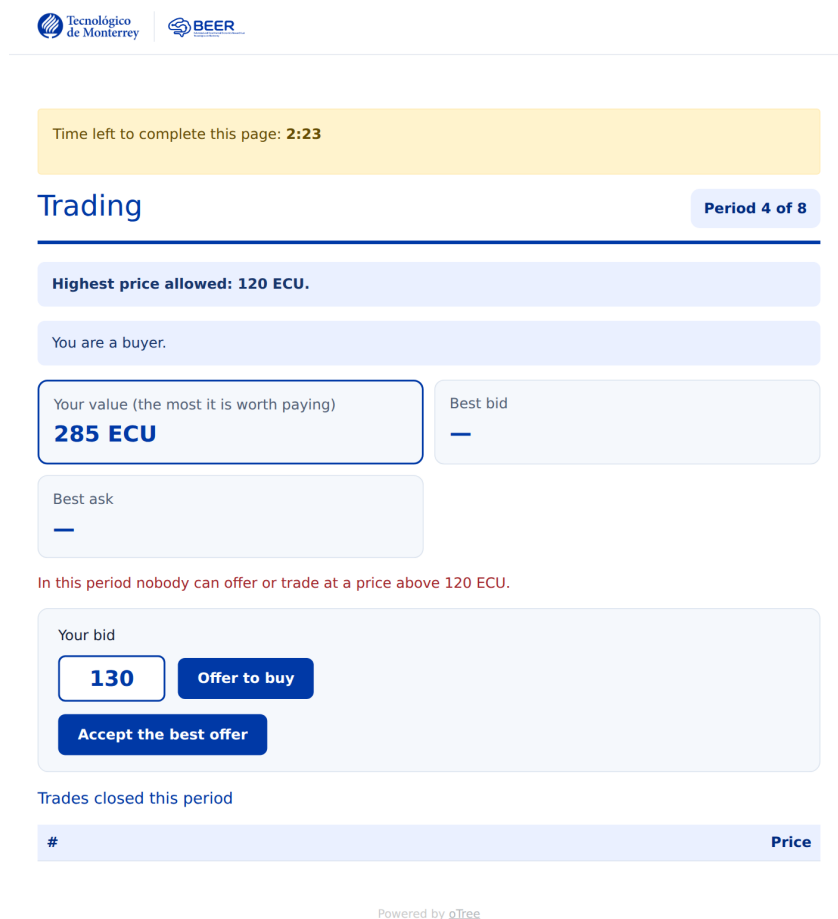
From this period until the end, **nobody can offer or trade at a price above 120 ECU.**

The system will not let you propose or accept a price that would lose you money. You can buy or sell at most one unit per period; if you do not trade, your earnings for that period are 0.

[Continue](#)

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Figure 3.8: Announcement before period 4 (binding ceiling, 22 participants).



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Time left to complete this page: 2:23

Trading

Period 4 of 8

Highest price allowed: 120 ECU.

You are a buyer.

Your value (the most it is worth paying)
285 ECU

Best bid
—

Best ask
—

In this period nobody can offer or trade at a price above 120 ECU.

Your bid

130 [Offer to buy](#)

[Accept the best offer](#)

Trades closed this period

#	Price	Quantity
---	-------	----------

Powered by oTree

Figure 3.9: A period with a price ceiling: the notice stays on screen and a bid above the limit is rejected.

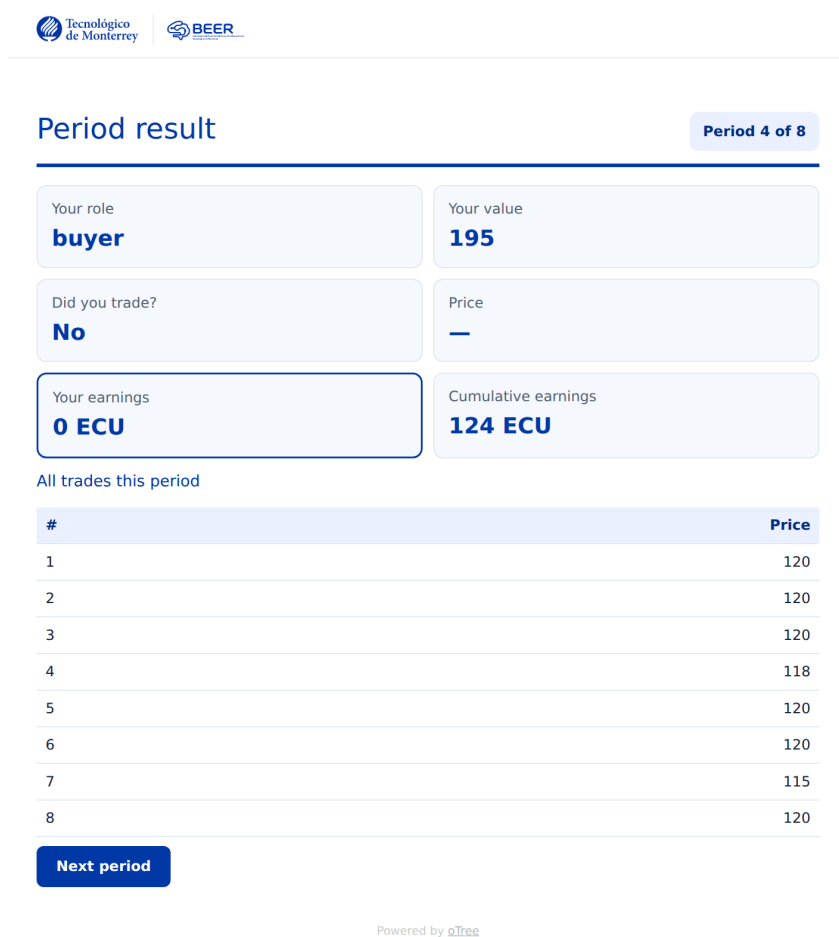


Figure 3.10: Period result for a buyer who could not trade under the ceiling.

End of the activity

Period 8 of 8

Your total earnings

1058 ECU

Period	Role	Value / cost	Traded	Price	Earnings
1	buyer	270	Yes	175	95
2	buyer	270	Yes	175	95
3	buyer	270	Yes	152	118
4	buyer	270	Yes	120	150
5	buyer	270	Yes	120	150
6	buyer	270	Yes	120	150
7	buyer	270	Yes	120	150
8	buyer	270	Yes	120	150

Thank you for participating. Please wait for your instructor.

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Figure 3.11: Closing screen: total earnings and history.

Instructor report and debrief

4.1 When to reveal

Report opens with the results hidden and shows participants, buyers, sellers and completed periods. Click **Show results** after the last period (or after period 3, to ask for predictions before the limit).

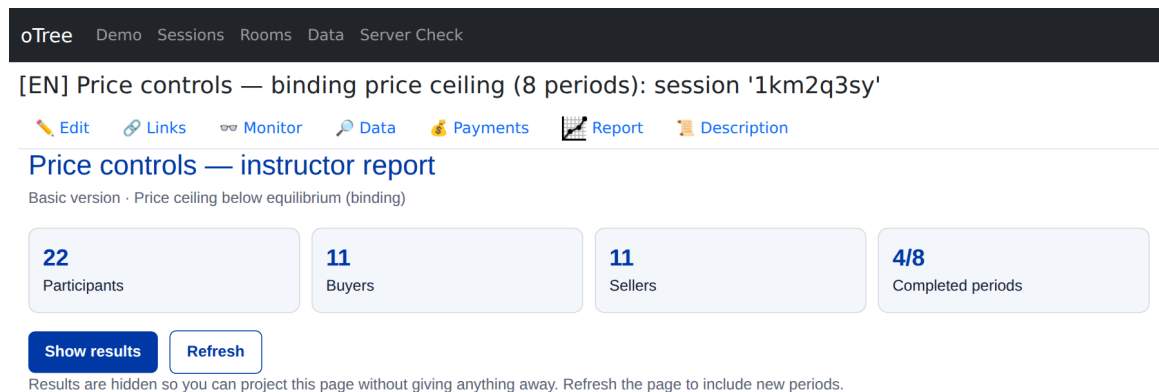


Figure 4.1: Report with results hidden.

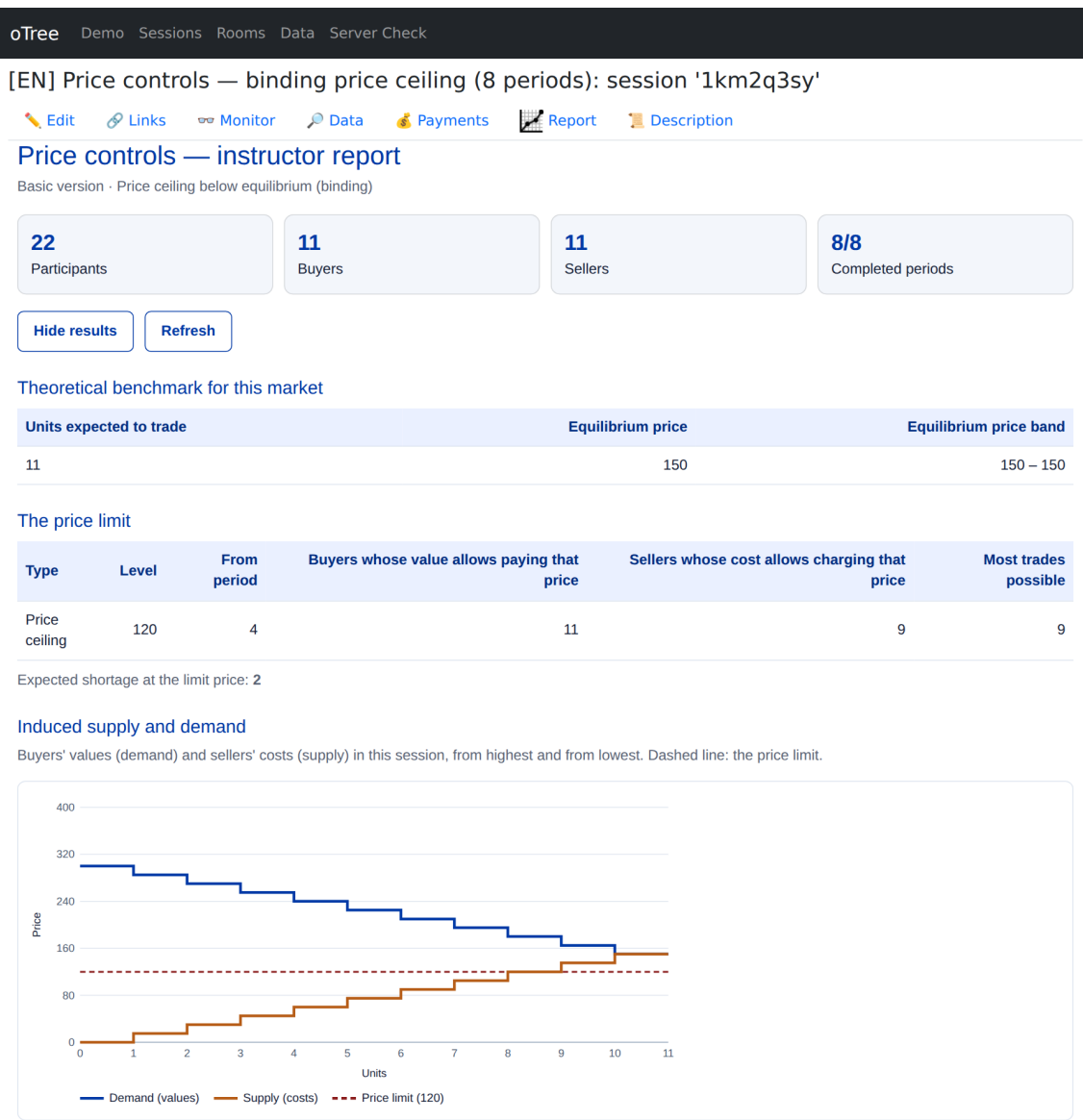
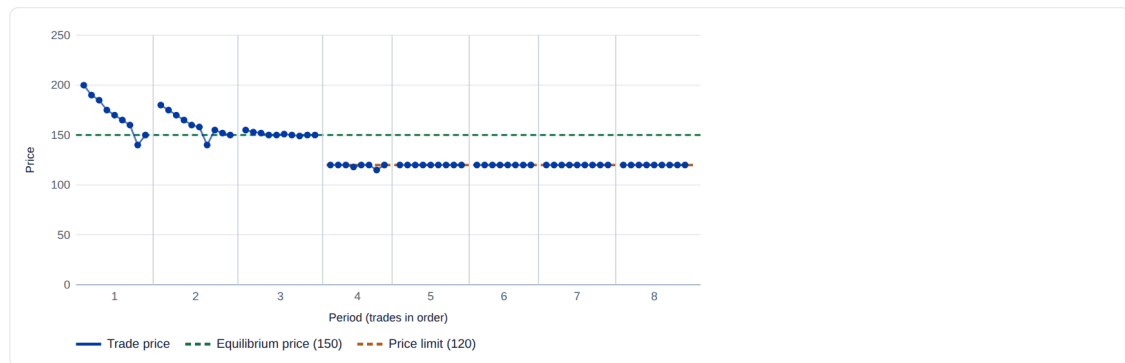


Figure 4.2: Report revealed: the equilibrium benchmark, the price limit with how many people would buy and sell at that price, and the session's induced supply and demand (simulated decisions).

Price of every trade, in order

Each dot is a trade, in the order it was closed; vertical lines separate periods. Dashed lines: equilibrium price and, once it applies, the price limit.



Realized surplus: buyers and sellers

Left, buyers: the steps are demand (values, highest first) and each blue bar is the gain of a buyer who bought (from the price up to the value). Right, sellers: the steps are supply (costs, lowest first) and each orange bar is the gain of a seller who sold (from the cost up to the price). Grey: each side's surplus in the competitive equilibrium; grey left visible is surplus not realized, and bars outside the grey are gains beyond equilibrium. Pick the period with the buttons.



Period 8 : With limit · Trades: 9 · Consumer surplus: 1065 (equilibrium: 825) · Producer surplus: 540 (equilibrium: 825) · Efficiency: 97,3%



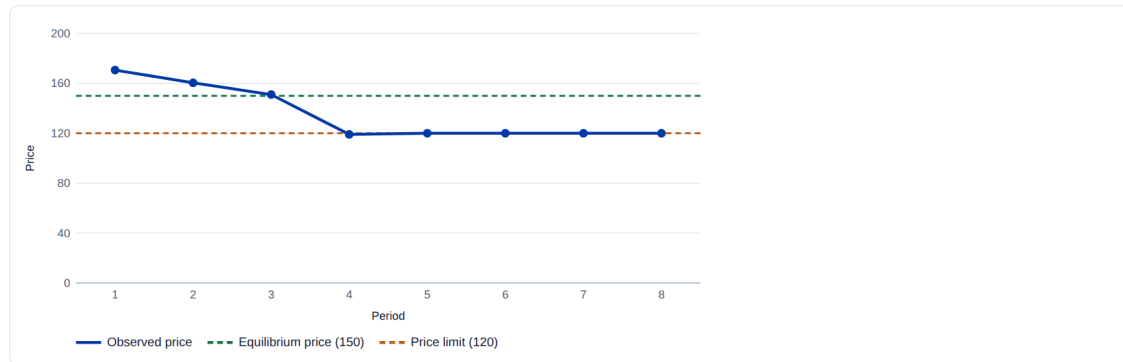
Figure 4.3: Price of every trade in order (vertical lines separate periods) and buyers' and sellers' realized surplus in one period, on the demand and supply schedules; the buttons switch periods (simulated decisions).

Before and after the limit

Phase	Periods	Trades	Average price	Efficiency	Consumer surplus	Producer surplus	Smith's α
No limit	3	9,7	160,7	97,6%	690	920	10,0
With limit	5	8,6	119,8	94,4%	1021,4	535,6	20,1
Competitive equilibrium (benchmark)		11	150	100%	825	825	

Average price by period

Average of all trade prices in the period. Dashed lines: equilibrium price and price limit (applies from the period shown).



Trades by period

Dashed lines: equilibrium quantity and the most trades possible under the limit.

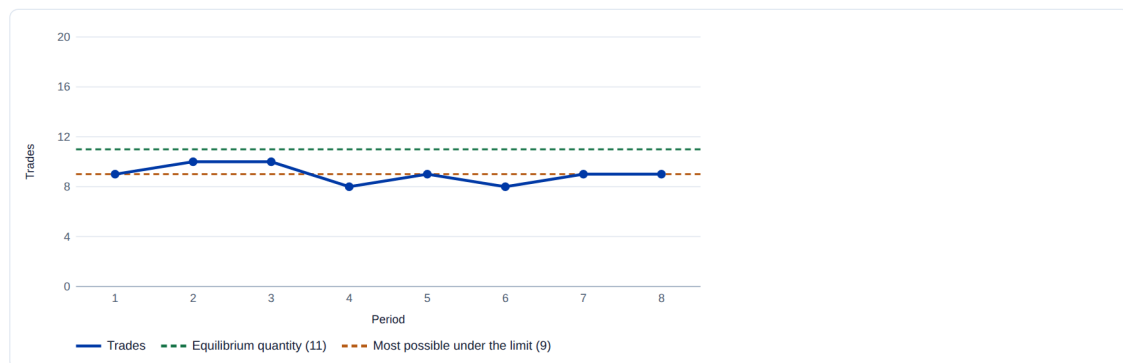
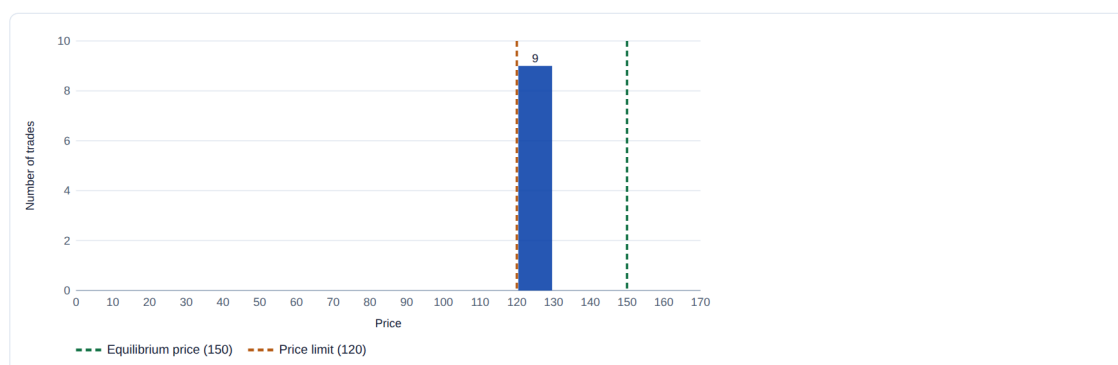


Figure 4.4: Before and after the limit (with the competitive equilibrium as benchmark), average price and trades by period (simulated decisions).

Distribution of trade prices

Trade prices in the last completed period.



Results by period

Period	Phase	Trades	Average price	Efficiency	Consumer surplus	Producer surplus	Smith's α	Trades outside the efficient set	Buyers who could pay the limit and did not buy
1	No limit	9	170,6	94,5%	565	995	18,3	0	
2	No limit	10	160,5	98,2%	690	930	10,4	0	
3	No limit	10	151	100,0%	815	835	1,3	0	
4	With limit	8	119,1	92,7%	997	533	20,6	1	3
5	With limit	9	120	95,5%	1035	540	20,0	1	2
6	With limit	8	120	90,9%	975	525	20,0	1	3
7	With limit	9	120	95,5%	1035	540	20,0	1	2
8	With limit	9	120	97,3%	1065	540	20,0	1	2

Consumer and producer surplus: total per period (average within each phase). Smith's α : root mean squared deviation of prices from the equilibrium price, as % of that price (0 = every price at equilibrium). Trades outside the efficient set: with a buyer or seller not among the K highest values or lowest costs (K = equilibrium quantity without a limit; with a limit, the most trades possible).

Individual data: Data → Custom export (price_controls).

Figure 4.5: Price distribution in the last period and per-period table (simulated decisions).

4.2 How to read the report

1. **Theoretical benchmark:** how many units should trade, and at what price, without a limit.
2. **The price limit:** type, level and starting period; how many buyers could pay that price and how many sellers would accept it. The difference is the expected shortage (ceiling) or surplus (floor); “most trades possible” is the most the market can trade while respecting the limit.
3. **Induced supply and demand:** the session's step curves, with the limit. Project it to explain the shortage or surplus: the horizontal distance between the curves at the limit.
4. **Before and after:** trades, price, efficiency, buyers' and sellers' total surplus per period and Smith's α in the free periods and in the periods with a limit, next to the competitive-equilibrium values. With a binding limit, trades and efficiency fall; a ceiling shifts surplus from sellers to the buyers *who manage to buy*, a floor the other way round.
5. **Charts by period:** with a binding limit the price sticks to the limit from period 4 and trades fall towards the most possible. With the nonbinding ceiling, check whether the price stays

below equilibrium.

6. **Price of every trade:** the contract sequence of [Smith \(1962\)](#); it shows convergence within each period and the jump to the limit.
7. **Realized surplus:** for the chosen period, on the left the demand with one bar per buyer who bought (from price up to value) and on the right the supply with one bar per seller who sold (from cost up to price). The grey area is the equilibrium surplus: grey left visible is lost surplus; a bar outside the grey is someone who would not have traded in equilibrium.
8. **Per-period table:** besides the above, Smith's α (root mean squared deviation of prices from equilibrium, as % of the equilibrium price), trades outside the efficient set (involving a buyer or seller not among the highest values or lowest costs) and, under a binding limit, how many buyers could pay the ceiling and did not buy (or how many sellers accepted the floor and did not sell).
9. **Efficiency:** surplus realized over maximum surplus. Under a ceiling it falls for two reasons: fewer trades, and units bought by low-value buyers while high-value buyers go without.

Debrief script

First ask those who could not trade after period 3: why? Then reveal the chart of trades. Close with the policy question: the ceiling lowered the price; whom did it help and whom did it hurt?

Theory and evidence

This chapter develops the theory of the basic version: the textbook model, its version with the game's induced values and costs, the difference between the textbook deadweight loss and the loss measured in the lab, and the lottery effect that appears when a shortage forces rationing. All numbers are for a class of 22 or more participants (11 buyers and 11 sellers at the margin); the instructor report computes those of your class.

5.1 Notation and competitive equilibrium

There are n_B buyers and n_S sellers. The buyer of rank k (from highest value down) values one unit at v_k ; the seller of rank k (from lowest cost up) produces it at c_k . In the game

$$v_k = 300 - 15(k - 1), \quad c_k = 15(k - 1), \quad k = 1, 2, \dots$$

Demand and supply are step functions: how many people would buy or sell at each price,

$$Q^d(p) = \#\{k : v_k \geq p\}, \quad Q^s(p) = \#\{k : c_k \leq p\}.$$

The equilibrium quantity q^* is the largest k with $v_k \geq c_k$, and any price in the band $[\max(c_{q^*}, v_{q^*+1}), \min(v_{q^*}, c_{q^*+1})]$ clears the market. With 22 or more participants, $q^* = 11$ and the band shrinks to a point, $p^* = 150$. Maximum total surplus and its split at the equilibrium price are

$$W^* = \sum_{k=1}^{q^*} (v_k - c_k) = 1650, \quad CS^* = \sum_{k=1}^{q^*} (v_k - p^*) = 825, \quad PS^* = \sum_{k=1}^{q^*} (p^* - c_k) = 825.$$

A trade between buyer i and seller j at price p creates $v_i - c_j$ of surplus whatever p is: the price only splits it. A period's **efficiency** is $E = W/W^*$, where W is the sum of $v_i - c_j$ over the trades made.

Theoretical background

The textbook approximation. Drawing straight lines through the steps gives inverse demand $P^d(q) = 315 - 15q$ and inverse supply $P^s(q) = 15q - 15$. They cross at $q^* = 11$, $p^* = 150$, like the steps. The difference shows up away from equilibrium: the line extrapolates buyers who do not exist (with 11 buyers, $Q^d(p)$ never exceeds 11) and triangles overstate the areas of the steps.

5.2 A binding price ceiling: shortage and deadweight loss

Under a ceiling $\bar{p} < p^*$ no trade can close above $\bar{p}$. At most $q^s(\bar{p}) = Q^s(\bar{p})$ units sell, and the **shortage** is

$$F(\bar{p}) = Q^d(\bar{p}) - Q^s(\bar{p}) > 0.$$

In the game, $\bar{p} = 120$: $Q^s(120) = 9$ (sellers with cost $0, \dots, 120$) and $Q^d(120) = 11$ (every buyer values the unit at 150 or more), so $F = 2$. The textbook line would give $Q^d(120) = 13$ and a shortage of 4: the difference is a good discussion point.

If the 9 units went to the 9 highest-value buyers (*efficient rationing*, the textbook's implicit assumption), surplus would be

$$W(\bar{p}) = \sum_{k=1}^{q^s(\bar{p})} (v_k - c_k) = 1620, \quad \text{DWL} = W^* - W(\bar{p}) = \sum_{k=q^s+1}^{q^*} (v_k - c_k) = 30 + 0 = 30,$$

only 1.8 % of W^* (98.2 % efficiency). The triangle of the linear approximation, $\frac{1}{2} (q^* - q^s) [P^d(q^s) - P^s(q^s)] = \frac{1}{2} \cdot 2 \cdot 60 = 60$, doubles the loss because unit 11 carries no surplus. The split changes much more than the total:

$$\text{CS}(\bar{p}) = \sum_{k=1}^9 (v_k - \bar{p}) = 1080 (> 825), \quad \text{PS}(\bar{p}) = \sum_{k=1}^9 (\bar{p} - c_k) = 540 (< 825).$$

Buyers who manage to buy gain a transfer of $9 \times (150 - 120) = 270$; sellers lose it, and together they lose the DWL of 30. Moreover, what buyers would pay for the ninth unit, $P^d(q^s) = v_9 = 180$, exceeds the ceiling by 60: each unit carries a **rent** of up to 60 that someone may try to capture (under the table, by queuing, or by being first).

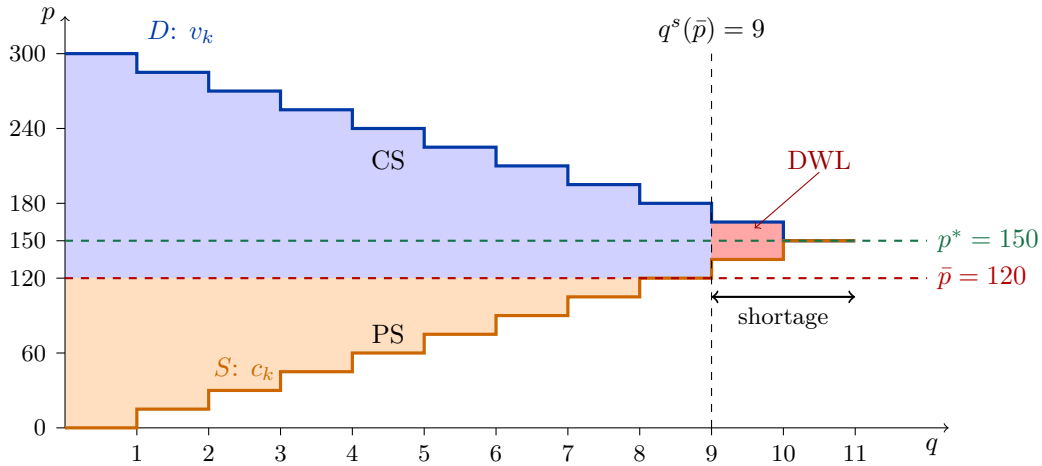


Figure 5.1: A ceiling of 120 with 22 participants and efficient rationing. Blue: consumer surplus (CS); orange: producer surplus (PS); red: deadweight loss (DWL) of units 10 and 11, which are no longer traded.

5.3 The lottery effect: who gets the scarce units

The triangle assumes that the shortage falls on the buyers who value the good least. Nothing in the market guarantees it: at price $\bar{p}$ every buyer with $v_k \geq \bar{p}$ wants to buy and only q^s succeed. If units are allocated *at random* among the $Q^d(\bar{p})$ buyers who want them (a lottery), the expected

value consumed is q^s times the average value of those buyers:

$$\mathbb{E}[W^{\text{lottery}}] = q^s(\bar{p}) \bar{v}_D - \sum_{k=1}^{q^s(\bar{p})} c_k, \quad \bar{v}_D = \frac{1}{Q^d(\bar{p})} \sum_{k=1}^{Q^d(\bar{p})} v_k.$$

The total loss splits into the textbook DWL and a **misallocation loss**:

$$W^* - \mathbb{E}[W^{\text{lottery}}] = \underbrace{\sum_{k=q^s+1}^{q^*} (v_k - c_k)}_{\text{DWL: units not traded}} + \underbrace{\sum_{k=1}^{q^s} v_k - q^s \bar{v}_D}_{\text{misallocation}}.$$

Ceiling $\bar{p} = 120$, 22 participants	Units	Surplus	Efficiency	Loss
Competitive equilibrium (no limit)	11	1650	100 %	0
Efficient rationing (textbook)	9	1620	98.2 %	30
Random rationing (lottery)	9	1485	90.0 %	165
of which misallocation				135

With the lottery the loss is more than five times the triangle. And it grows with the number of buyers who can afford the ceiling while valuing the good little: with 30 participants (15 buyers, 13 of them with $v_k \geq 120$) expected efficiency falls to 81.8 %, although the equilibrium and the DWL are unchanged. The average consumer who buys still gains ($\mathbb{E}[\text{CS}] = 9 \times 225 - 9 \times 120 = 945 > 825$ with 22 participants), but the textbook welfare calculation no longer describes what happens.

Theoretical background

Is there a lottery in the double auction? Nobody draws lots in the game: units go to those who first close a trade at the ceiling. If speed is unrelated to value, the outcome resembles a lottery; if high-value buyers accept first, it approaches efficient rationing. Observed efficiency under the ceiling should therefore lie *between* 90 % and 98.2 %. The report shows this directly: the “trades outside the efficient set” column counts the units taken by buyers (or sold by sellers) outside the best q^s , and “buyers who could pay the limit and did not buy” is the observed shortage. Outside the lab, the rent on each rationed unit is dissipated in queues, search or bribes (Barzel, 1974), and misallocation can be large (Glaeser and Luttmer, 2003); Bulow and Klemperer (2012) show that when allocation is random or contested at a cost, a price ceiling can leave even consumers worse off.

5.4 A binding price floor

The case is symmetric. With $\underline{p} > p^*$ only $q^d(\underline{p}) = Q^d(\underline{p})$ units sell and there is a **surplus** (unsold supply) $Q^s(\underline{p}) - Q^d(\underline{p})$. With $\underline{p} = 180$: $Q^d = 9$, $Q^s = 11$; with efficient allocation (the 9 lowest-cost sellers sell) $W = 1620$ and the DWL is again 30, with the split reversed: $\text{CS} = 540$, $\text{PS} = 1080$. If sales are allocated at random among the 11 willing sellers, the expected cost of what is produced is $9 \times \bar{c} = 9 \times 75 = 675$ instead of 540, and expected efficiency is again 90 %: expensive sellers produce while cheap ones are left unable to sell (the logic of a minimum wage or of support prices).

5.5 A nonbinding price ceiling

If $\bar{p} \geq p^*$ (160 in the game), the competitive equilibrium respects the limit: static theory predicts exactly the same price, quantity and efficiency as without it. Any effect is one of *dynamics* or

expectations: the ceiling can act as a focal point for sellers asking high or as an anchor for buyers, and change the path of prices within each period.

5.6 From the textbook to the lab: measuring losses

The report uses three measures worth relating to the theory:

1. **Efficiency** $E = W/W^*$ per period. Without a limit, the double auction usually exceeds 90 % from the first periods; under the ceiling, compare it with the two benchmarks, 98.2 % (efficient rationing) and 90 % (lottery).
2. **Loss decomposition**. With K the most trades possible (q^* without a limit, $q^s(\bar{p})$ under a ceiling, $q^d(\underline{p})$ under a floor) and $W_K = \sum_{k \leq K} (v_k - c_k)$,

$$W^* - W = \underbrace{(W^* - W_K)}_{\text{theoretical DWL}} + \underbrace{(W_K - W)}_{\text{allocation loss and trades not made}}.$$

The first term does not depend on what students do; the second does, and it is the one the textbook ignores. A trade by a buyer with $v_i < v_K$ or a seller with $c_j > c_K$ is an *extra-marginal* trade (Code and Sunder, 1993).

3. **Convergence**: the coefficient of Smith (1962),

$$\alpha = \frac{100}{p^*} \sqrt{\frac{1}{n} \sum_{t=1}^n (p_t - p^*)^2},$$

measures how far the prices p_t of the n trades are from the equilibrium price. Under a binding limit, α stops measuring convergence: if everything trades at $\bar{p} = 120$, $\alpha = 100 \cdot 30/150 = 20$ although the market is at its “rationing equilibrium”.

5.7 Experimental evidence

The continuous double auction converges quickly to the competitive equilibrium even with few traders (Smith, 1962). Isaac and Plott (1981) bring price controls to that market: with a binding ceiling prices stick to the limit and trades fall; with a limit that does not bind but is close to equilibrium, the market still changes: prices converge more slowly and tend to stay on the side of the limit. Smith and Williams (1981) find the same effect of nonbinding ceilings: prices stay below equilibrium, as if the ceiling were a focal point. Holt (2019) presents the classroom version with pit markets and double auctions.

5.8 Regularities worth discussing

- With a binding limit, the price sticks to the limit and the number of trades falls towards the most possible, $q^s(\bar{p})$ or $q^d(\underline{p})$.
- The loss observed under the ceiling is usually larger than the textbook DWL: some units are bought by people with low values while others with high values get nothing. Compare the report’s efficiency with 98.2 % and 90 %.
- A ceiling transfers surplus to the buyers who manage to buy; a floor, to the sellers who manage to sell. Those who do not trade lose.

- Under a nonbinding ceiling, the price may stay below equilibrium even though the limit constrains no one.

Note

A single class's results are descriptive: one market, whose periods are not independent observations. A difference between periods 1–3 and 4–8 mixes the effect of the limit with learning.

Basic configurations

The three basic configurations have 8 periods of 150 seconds: 3 without a limit and 5 with it.

Configuration	What it is for
<code>price_controls_en_ceiling_binding</code>	Ceiling below equilibrium: shortage, fewer trades, efficiency loss. The most direct option for an introductory course.
<code>price_controls_en_ceiling_nonbinding</code>	Ceiling above equilibrium: in theory nothing changes; in the lab the price often stays below. Ideal for discussing limits as reference points.
<code>price_controls_en_floor_binding</code>	Floor above equilibrium: surplus and efficiency loss (minimum wage, support prices).

The limit depends on the number of participants. With 22 or more it is always the one in the table of Chapter 3; with fewer students the equilibrium band is wider and the report shows the exact level.

Students	Equilibrium band	Binding ceiling	Nonbinding ceiling	Binding floor
10	60–240	30	250	270
14	90–210	60	220	240
18	120–180	90	190	210
20	135–165	105	175	195
22 or more	150	120	160	180

For the instructor

If you have time for two sessions, play the binding ceiling first and then the nonbinding one with the same class: the contrast is that of [Smith and Williams \(1981\)](#).

Extended version: hoarding

The extended version is the classroom version of the experiment in [Castro Méndez and Martinelli \(2026\)](#). It uses the [EN] **Price Controls — extended (hoarding)** room. There is no double auction: fixed groups of 8 buyers face 9 automated sellers in a single-call market, with two periods per round, and what is bought in the first period can be stored for the second.

7.1 Rules and incentives

Each automated seller sells one unit per period at any price at or above its cost (5, 20, 20, 30, 50, 55, 60, 80 and 100 ECU). At the start of each round, each person receives a budget of 200 ECU and a value $v_i \in \{50, 50, 70, 90, 110, 140, 140, 200\}$, assigned at random; they consume at most one unit per period.

In period 1 each person orders 0, 1 or 2 units and a maximum price per unit; the second unit is stored for period 2 and costs 10 ECU of storage. In period 2, whoever does not already have two units can order one. Each period the market clears once: ordered units are ranked from the highest bid down and costs from the lowest up; the k units whose bid covers the cost are sold, all at the same price, the k -th bid (the lowest accepted). If more units were ordered at or above that price than k , the k units are allocated at random: that is **rationing**, and the difference is the **shortage**.

$$\pi_i = \underbrace{200 - p_1 q_1 - 10 \cdot \mathbb{I}[q_1 = 2] - p_2 q_2}_{\text{unspent budget}} + v_i (q_1 + q_2), \quad q_1 + q_2 \leq 2.$$

Treatment	Period 1	Period 2
Reference	base costs, no cap	base costs, no cap
Shock	base costs, no cap	costs $\times 4$, no cap
Shock + ceiling	base costs, no cap	costs $\times 4$, cap of 50
Early ceiling	base costs, cap of 50	costs $\times 4$, no cap (liberalization)

Each group knows its own rules from the start: the instructions show both periods' costs and the ceiling, if any. That is the point of the design: people *anticipate* what is coming. Groups and their treatment stay the same in every round.

7.2 Configurations

Configuration	What it is for
price_controls_extended_1_round	The four treatments, one per group, in one round: a short demonstration.
price_controls_extended_5_rounds	Same, five rounds: shows whether advance purchases grow.
price_controls_extended_10_rounds	Same, ten rounds: the length of the original experiment.
price_controls_extended_baseline	One treatment for every group, 10 rounds: baseline.
price_controls_extended_shock	Hoarding without rationing: storing is arbitrage.
price_controls_extended_shock_cap	Anticipated ceiling: expected rationing.
price_controls_extended_early_cap	Ceiling today, liberalization tomorrow.

In the 1-, 5- and 10-round configurations the treatments are spread across groups, which play **at the same time**, each in its own market and seeing only its own rules: group 1 is reference, 2 shock, 3 shock with ceiling, 4 early ceiling; a fifth group is reference again, and so on. With 8 to 15 students there is one group (reference); with 16 to 23, two; with 24 to 31, three; with 32 or more, all four. Leftover students join the first groups. Duration: 15 minutes for one round, 25–30 for five, 40–45 for ten.

7.3 Screens

The instructions only describe the rules: they never mention “hoarding”, “price control” or “scarcity”. They change with the group’s treatment.

Instructions

Round 1 of 5

You are part of a group of buyers. Each round has two buying periods. On the other side of the market there are 9 automated sellers, each with one unit of the product per period.

At the start of each round you receive a budget of **200 ECU**. Whatever you do not spend in the round is added to your earnings. The budget does not carry over from one round to the next, but it does carry over from period 1 to period 2.

Each round you have your own **value** for the product: what you earn for each unit you consume. You can consume at most one unit in each period, so you can earn your value at most twice per round.

In period 1 you can buy **one or two units**: one is consumed in period 1 and the other is stored for period 2, at a storage cost of 10 ECU. In period 2 you can buy one unit, unless you already have both.

Round earnings = unspent budget + your value × units obtained.

Example: with a value of 120, if in period 1 you buy two units at 60 ECU each, you have $200 - 120 - 10 = 70$ ECU left. If you buy nothing else, your round earnings are $70 + 2 \times 120 = 310$ ECU.

How the market works

- In each period, everyone in the group chooses at the same time how many units they want to buy and the highest price they would pay for each one. Nobody sees anyone else's offer.
- The automated sellers sell at any price equal to or above their cost. The system ranks offers from highest to lowest and costs from lowest to highest, and works out how many units are sold and a single price for all of them: the lowest accepted offer.
- Every purchase is paid at that price, not at the price you offered. If there are more offers at or above that price than units sold, the units are allocated at random among those offers.

Sellers' costs

	1	2	3	4	5	6	7	8	9
Period 1	5	20	20	30	50	55	60	80	100
Period 2	20	80	80	120	200	220	240	320	400

- In period 2 the sellers' costs are 4 times those of period 1.
- In period 2 nobody can offer more than **50 ECU** per unit.

- There will be 5 rounds. At the start of each one you receive a new value and a new budget. Your earnings from all rounds are added up.
- Your group and your market's rules are the same in every round.
- Amounts are in ECU (experimental currency units). There is no cash payment.

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Figure 7.1: Instructions of a group with a shock and a ceiling in period 2.

Instructions

Round 1 of 5

You are part of a group of buyers. Each round has two buying periods. On the other side of the market there are 9 automated sellers, each with one unit of the product per period.

At the start of each round you receive a budget of **200 ECU**. Whatever you do not spend in the round is added to your earnings. The budget does not carry over from one round to the next, but it does carry over from period 1 to period 2.

Each round you have your own **value** for the product: what you earn for each unit you consume. You can consume at most one unit in each period, so you can earn your value at most twice per round.

In period 1 you can buy **one or two units**: one is consumed in period 1 and the other is stored for period 2, at a storage cost of 10 ECU. In period 2 you can buy one unit, unless you already have both.

Round earnings = unspent budget + your value × units obtained.

Example: with a value of 120, if in period 1 you buy two units at 60 ECU each, you have $200 - 120 - 10 = 70$ ECU left. If you buy nothing else, your round earnings are $70 + 2 \times 120 = 310$ ECU.

How the market works

- In each period, everyone in the group chooses at the same time how many units they want to buy and the highest price they would pay for each one. Nobody sees anyone else's offer.
- The automated sellers sell at any price equal to or above their cost. The system ranks offers from highest to lowest and costs from lowest to highest, and works out how many units are sold and a single price for all of them: the lowest accepted offer.
- Every purchase is paid at that price, not at the price you offered. If there are more offers at or above that price than units sold, the units are allocated at random among those offers.

Sellers' costs

	1	2	3	4	5	6	7	8	9
Period 1	5	20	20	30	50	55	60	80	100
Period 2	20	80	80	120	200	220	240	320	400

- In period 2 the sellers' costs are 4 times those of period 1.
- In period 1 nobody can offer more than **50 ECU** per unit.

- There will be 5 rounds. At the start of each one you receive a new value and a new budget. Your earnings from all rounds are added up.
- Your group and your market's rules are the same in every round.
- Amounts are in ECU (experimental currency units). There is no cash payment.

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Figure 7.2: Instructions of a group with a ceiling in period 1 and liberalization in period 2 (last part).

The example uses a value of 120 ECU (not on the actual ladder) and buying two units at 60 ECU in period 1: $200 - 120 - 10 = 70$ ECU remain, and the round's earnings are $70 + 2 \times 120 = 310$ ECU. The comprehension check asks for those two numbers.



Period 1: your offer

Round 1 of 5

Your value this round

50 ECU

Available budget

200 ECU

How many units do you want to buy?

☐ 0

☒ 1

☐ 2

0, 1 or 2. If you get two, one is stored for period 2 and you pay 10 ECU for storage.

Highest price you would pay per unit (ECU)

40

If you choose 0 units, leave this field empty.

Sellers' costs in this period

5 20 20 30 50 55 60 80 100

Send offer

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Figure 7.3: Period 1 order: value, budget, units, maximum price and the sellers’ costs.



Period 1: your offer

Round 1 of 5

Your value this round

50 ECU

Available budget

200 ECU

In this period nobody can offer more than 50 ECU per unit.

How many units do you want to buy?

☐ 0

☒ 1

☐ 2

0, 1 or 2. If you get two, one is stored for period 2 and you pay 10 ECU for storage.

Highest price you would pay per unit (ECU)

50

If you choose 0 units, leave this field empty.

Sellers' costs in this period

5 20 20 30 50 55 60 80 100

Send offer

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Figure 7.4: Period 1 order in a group with a ceiling in that period.

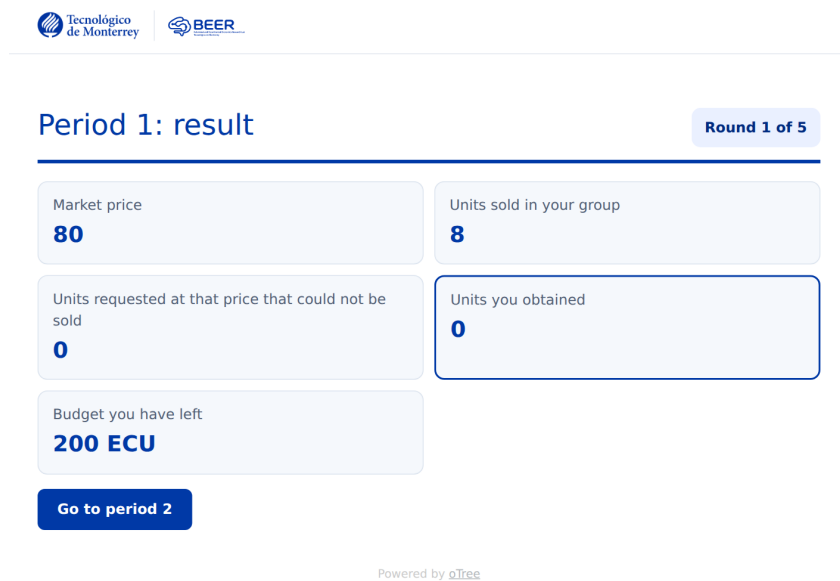


Figure 7.5: Period 1 result: price, units sold in the group, units that could not be sold at that price, and what the person got.

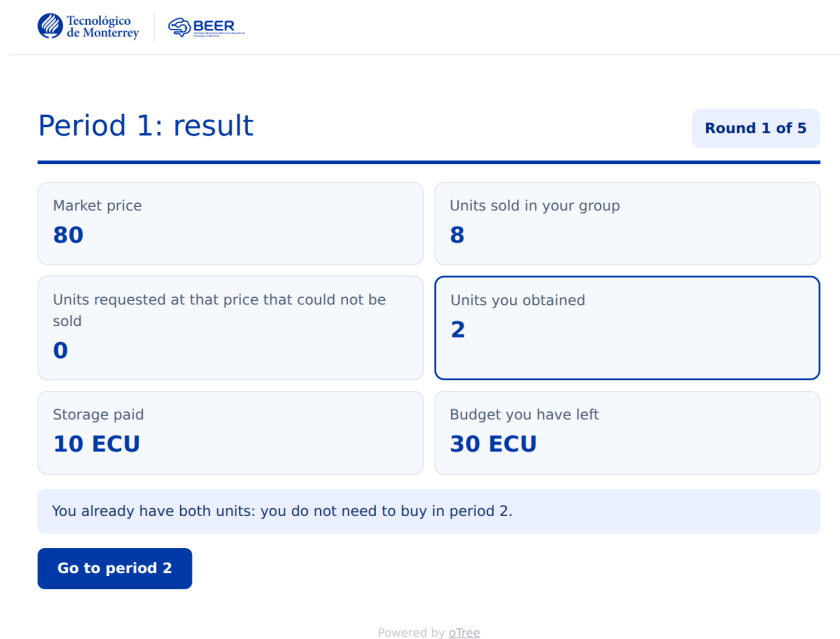


Figure 7.6: Whoever got two units pays for storage and does not buy in period 2.



Period 2: your offer

Round 1 of 5

Your value this round

50 ECU

Available budget

200 ECU

Units you already have for period 2

0

In this period nobody can offer more than 50 ECU per unit.

Do you want to buy one unit?

☐ 0

☒ 1

0 or 1.

Highest price you would pay per unit (ECU)

50

If you choose 0 units, leave this field empty.

Sellers' costs in this period

20 80 80 200 220 240 320 400

Send offer

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Figure 7.7: Period 2 order under a ceiling: the sellers' costs are four times higher.



Round result

Round 1 of 5

Period	Market price	Units sold in your group	Units requested at that price that could not be sold	Units you obtained
1	80	8	0	0
2	50	1	4	0

Value of what you consumed

0 ECU

Budget you have left

200 ECU

Your round earnings

200 ECU

Cumulative earnings

200 ECU

Next round

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Figure 7.8: Round result: both periods, value consumed and earnings.

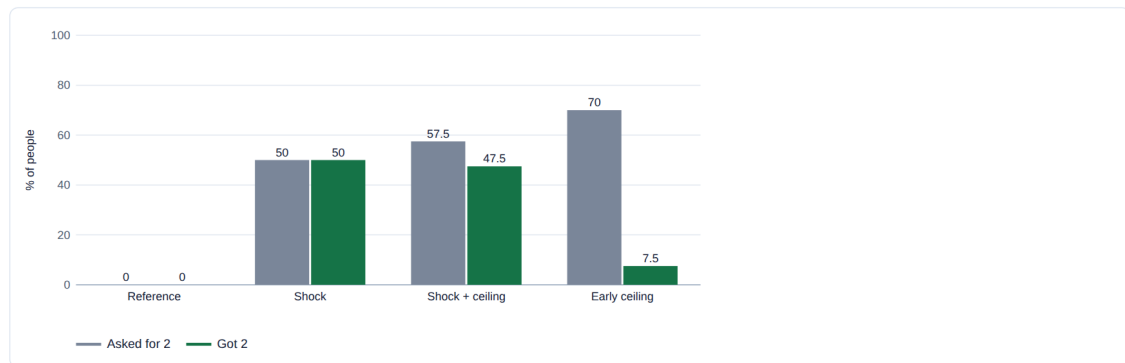
7.4 Report



Figure 7.9: Extended version report: rules of each treatment, summary and average price by period and treatment (simulated decisions).

Advance purchases: asked for and got two units in period 1 (%)

The gap between the two bars is rationing.



Average shortage by period and treatment (units)

Units requested at or above the market price that could not be sold, per group and round.

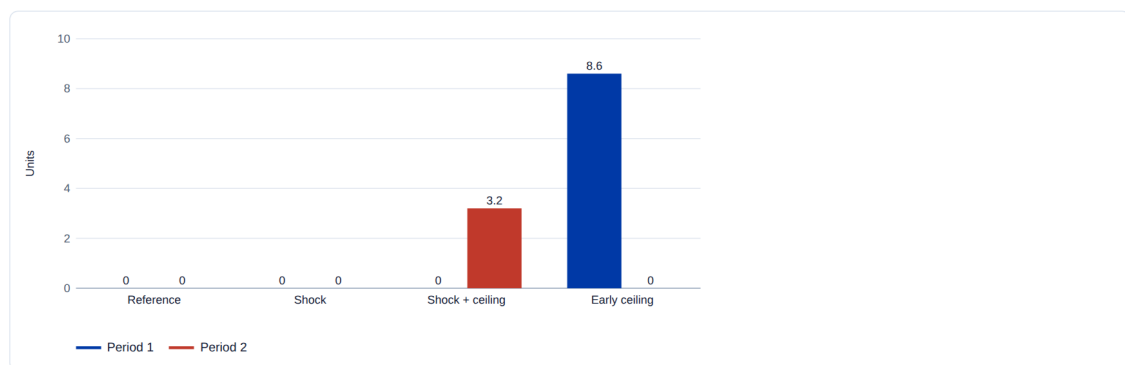


Figure 7.10: Advance purchases (ordered and got two units in period 1) and shortages by period, by treatment (simulated decisions).



Figure 7.11: With several rounds: advance purchases and period-2 price by round, and a per-group, per-round table (simulated decisions).

1. Start with the treatments table: which groups had which rules, and how many units would sell if nobody stored.
2. **Prices:** compare the period-1 and period-2 prices. If period 2 will be worse, demand moves forward and the period-1 price rises; under a ceiling, the price in the capped period does not exceed 50.
3. **Advance purchases:** compare the share that *ordered* two units in period 1 with the share that *got* them. Under a ceiling, the gap is rationing.
4. **Shortages:** units ordered at or above the market price that could not be sold.

7.5 Theory and evidence

Theoretical background

With storage, buying a second unit in period 1 pays if its total cost, $p_1 + 10$, is below what one expects to pay in period 2 *for a unit one actually gets*. With a supply shock and no cap, the expected period-2 price rises and storing is intertemporal arbitrage: hoarding without rationing. With a ceiling in period 2, the price cannot rise, but supply at that price is minimal: the chance of getting a unit falls and so does the expected value of waiting, so demand moves to period 1 and pushes its price up. With a ceiling in period 1 and liberalization afterwards, today's cheap unit is rationed and tomorrow's will be expensive: again it pays to order two. In the two-period model of [Castro Méndez and Martinelli \(2026\)](#), expected rationing is what drives hoarding.

Treatment	Reference units P1 / P2	Reference price P1 / P2
Reference	6 / 6	70 / 70
Shock	6 / 3	70 / 140
Shock + ceiling	6 / 1	70 / ≤ 50
Early ceiling	5 / 3	≤ 50 / 140

Static reference: each person orders one unit per period at their value and nobody stores; the price is the lowest accepted bid.

[Castro Méndez and Martinelli \(2026\)](#) take this design to the lab: a free market with no reason to store, a supply shock in which hoarding without rationing is expected, an anticipated ceiling, and a ceiling followed by liberalization. According to the paper's abstract, the model anticipates the patterns of prices and shortages well, and participants tend to hoard more than predicted, with efficiency losses.

Debrief script

First ask each group what it did in period 1 and why. Then reveal the comparison: which groups bought more units in advance? Where were there shortages? Close with the working paper's question: did the ceiling protect buyers, or did it lead them to buy earlier and at a higher price?

Lesson plan and reading the results

8.1 Suggested 50-minute session (basic version)

0–5 min	Create the session (binding ceiling). Students join via QR or link.
5–12 min	Instructions and comprehension check.
12–22 min	Periods 1 to 3, no limit. After period 3 you may reveal the report and ask for predictions.
22–37 min	Announcement and periods 4 to 8.
37–50 min	Reveal: before and after, trades and efficiency; close with the policy discussion.

For the extended version, use the 5-round configuration: 5 minutes to join, 7 for instructions, 23 for the rounds and 15 for discussion.

8.2 Questions to guide the discussion

- Under the ceiling, who managed to buy? Were they the people with the highest values?
- If the ceiling lowered the price, why did the market's total earnings fall?
- What would happen with a ceiling nobody enforces (a black market)?
- Under the floor, who wins and who loses? How is it like a minimum wage?
- If the ceiling did not bind, why did the price change?
- (Extended) Why would anyone pay for storage for a unit they could buy tomorrow? Does announcing a price control in advance make it more or less effective?

8.3 Common misreadings

Misreading	Clarification
“With a ceiling the good is cheaper.”	The recorded price is lower, but fewer people manage to buy: the cost shows up as a shortage (and, in the extended version, as advance purchases).
“A nonbinding ceiling does not matter.”	In theory no; in the lab it can act as a reference point and keep the price below equilibrium.
“A price floor helps sellers.”	It helps those who sell; those left unable to sell lose.
“Hoarding is always irrational.”	With an expected shock and no rationing, storing is arbitrage and smooths consumption.

Operations, privacy and troubleshooting

9.1 Privacy and conduct

Participant codes are anonymous: do not ask for or show names alongside individual decisions. Project aggregate results only.

9.2 Common issues

Situation	What to do
A student sees “The session is full”.	Close the room and create another session with the correct number.
The market keeps waiting.	Someone did not move on; ask them to reopen the room or use Advance slowest participants .
Nobody is trading and many seconds remain.	Use Advance slowest participants in the Monitor to close the period.
(Extended) Treatments missing from the report.	Fewer than 32 students: groups are filled in order.

9.3 Data for later analysis

Data → **Custom export** downloads, in the basic version, one row per person and period (treatment, whether a limit applied and its level, role, value or cost, whether they traded, price, trade number, earnings, and the number of quotes accepted, rejected by the limit or invalid) and, below, every bid and ask submitted, in order, with its status. In the extended version (**price_hoarding**), one row per person and round: group, treatment, value, units ordered and obtained, bids and prices for both periods, storage, remaining budget and earnings. No personal identifiers are included.

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QR codes for each room

English, basic



pricecontrols.beer-lab.org/room/price_controls_en

English, extended



pricecontrols.beer-lab.org/room/price_controls_extended

Spanish, basic



pricecontrols.beer-lab.org/room/price_controls_es

Spanish, extended



pricecontrols.beer-lab.org/room/price_controls_extendido