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# Instructor's Guide: Inequality, Taxation and Redistribution

Laboratory implementation, theoretical foundations,  
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab  
Department of Economics



Revised edition | October 2026

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

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# How to use this guide

This guide supports preparation, implementation, and classroom discussion of the BEER Lab family on inequality, taxation, and redistribution. It is written for instructors in microeconomics, public economics, political economy, behavioral economics, and experimental methods.

No prior oTree experience is assumed. The opening chapters provide an operational route; later chapters develop theory, evidence, treatments, and discussion plans. Common rules appear once.

Treatments are organized around what they change: information, the origin of income, efficiency costs, inequality, the tax base, or targeting. The activity does not search for a morally correct rate. It turns a collective choice into evidence with which students can compare predictions and mechanisms.

## Author

This guide was prepared by Stanislao 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](mailto:stanislao.maldonado@tec.mx).

### For the instructor

Decisions are private and the report displays aggregates. Do not project identifiers, label a vote selfish or morally superior, or interpret one classroom decision as a stable political preference.

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# Quick implementation guide

## 1.1 Access through the updated laboratory website

Start at <https://beer-lab.org/en/>. Select **CLASSROOM** in the top navigation menu; it opens <https://teaching.beer-lab.org/en/>. In the **Classroom experiments** catalog, use the search box to locate the activity by name. You can also filter by **Topic** or **JEL code**. Clear any filters left from an earlier search before looking for another game.

Each family's card distinguishes **Español** and **English** access links. The **Show extended version** checkbox selects that edition before following a link. Catalog language and session language are separate choices: verify both. Students use the room specified by the instructor; the instructor prepares and monitors the session through this family's own administrative pages.

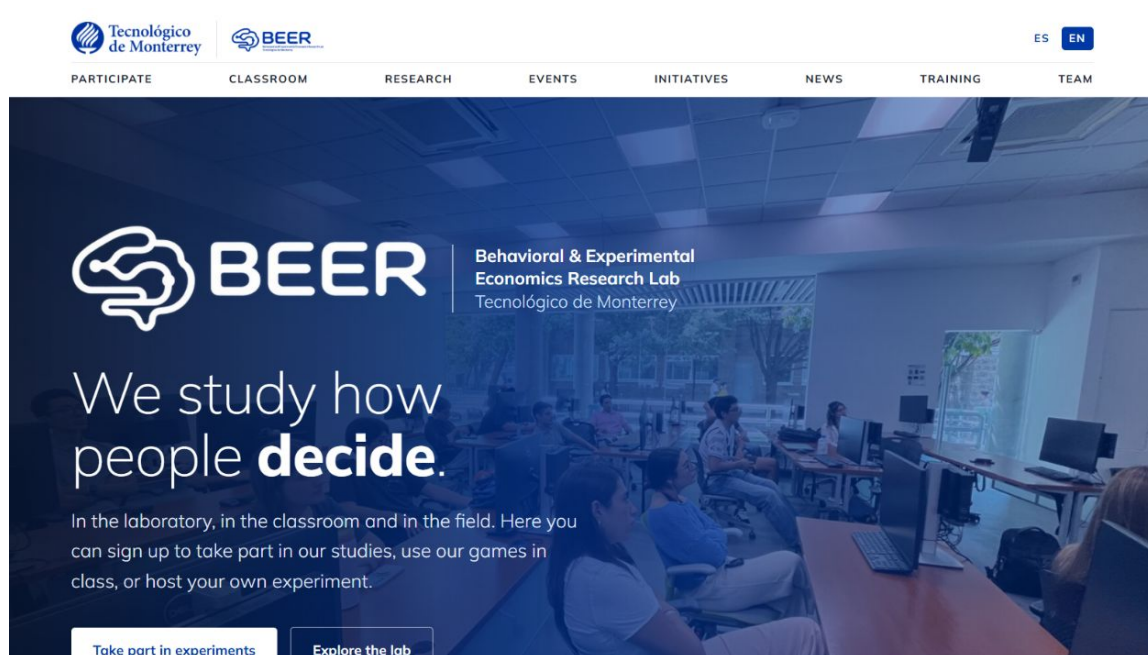


Figure 1.1: Current institutional website. Select CLASSROOM in the top navigation menu to open the teaching experiments. Captured on October 11, 2026.

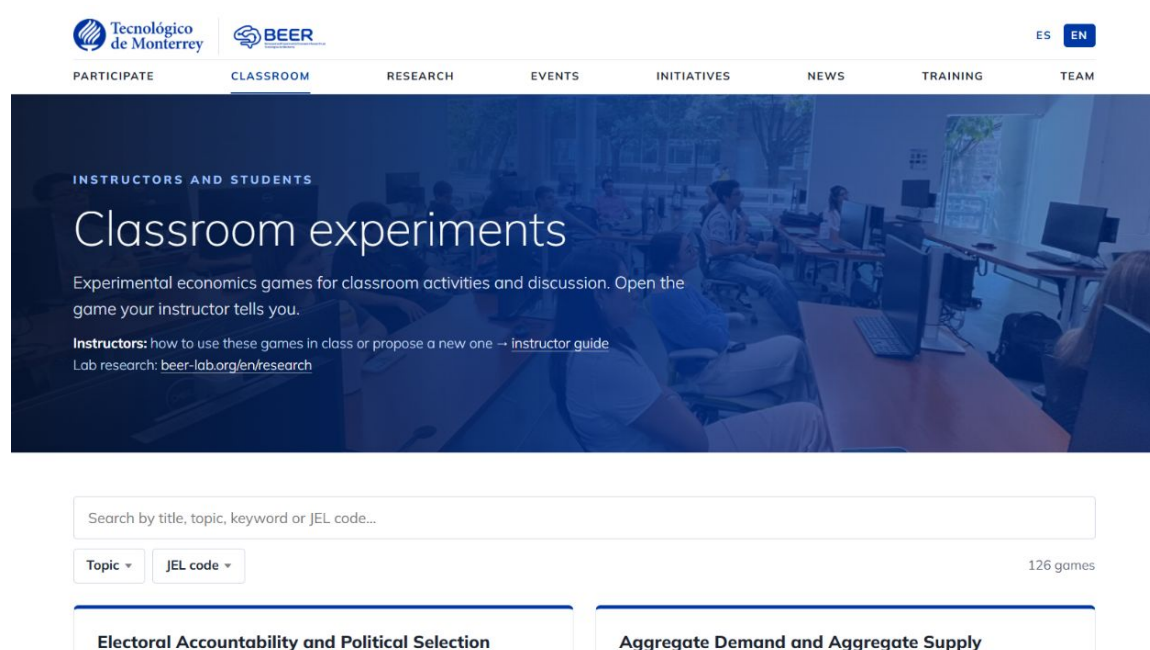


Figure 1.2: Current catalog: search by title, topic, or JEL code. Then locate this family's card and select language and edition. Captured on October 11, 2026.

## Checking resources, comprehension, and participant requirements

Before opening the room, check the selected configuration and the number of students present. The session-creation form states the group size and minimum required by that configuration. An individual activity accepts any positive participant count; an interactive activity must satisfy its stated requirement: complete groups when size is fixed, or a minimum participant count when size is flexible. Requirements may change across treatments, for example when adding a third party or changing an institution's size. If you edit a grouping parameter, check the requirement for the edited configuration, rather than relying only on the demo's suggested count.

In the instructions, ensure that students can identify what each role receives, what they can decide, and how the outcome is calculated. An initial account, a distributable budget, and final earnings need not be the same amount. Refer to the resources panel and the example for the selected treatment. Do not carry the basic edition's endowment into a treatment that changes accounts or introduces additional positions.

ECU stands for *Experimental Currency Units*: the activity's unit of account. An outcome of 100 ECU does not automatically equal 100 pesos or 100 dollars. Conversion depends on the session configuration. Before announcing a payment, confirm with the laboratory whether money is paid, the conversion rate, and which decisions count for payment. In hypothetical modules, describe amounts as outcomes in the stated situation.

When a comprehension check is included, an incorrect response receives an explanation beside that question, identifying the submitted answer and the correct answer. Other answers remain in the form. Ask the student to return to the example, locate the relevant rule, and redo the calculation before correcting the response. Avoid revealing answers to the entire class for an individual error, and do not interpret a comprehension mistake as an economic choice in the game.

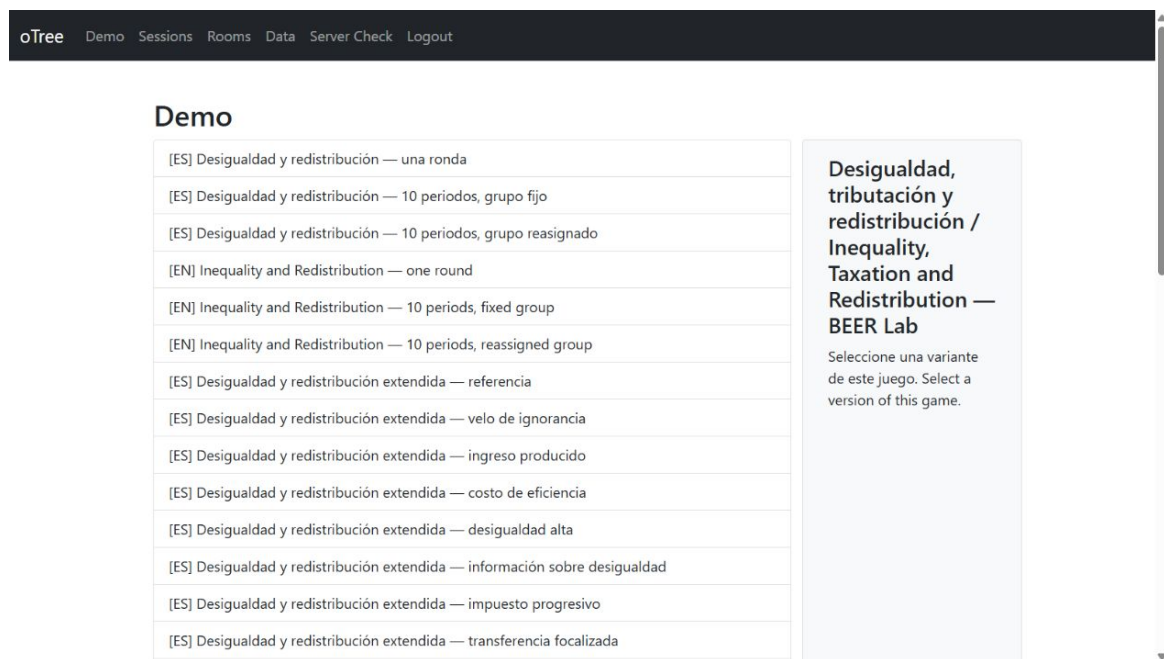


Figure 1.3: Demo contains only the configurations of this game family, in both languages and editions.

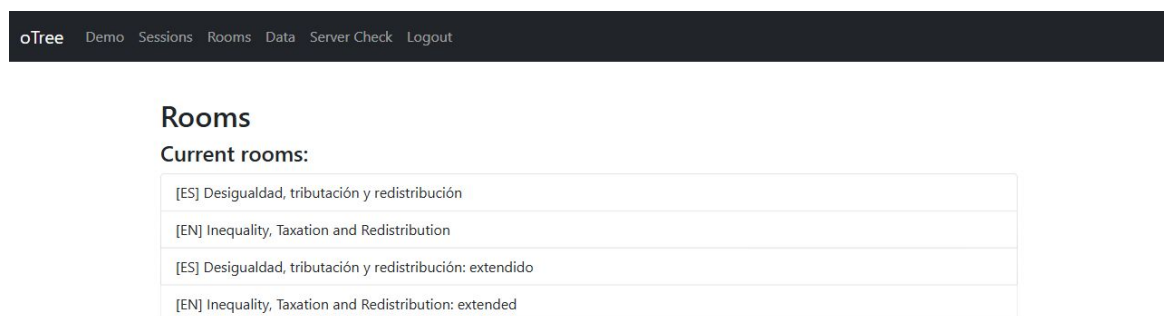


Figure 1.4: Rooms contains the four rooms for this family: basic and extended editions in Spanish and English.




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

## Comprehension check Benchmark

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**What is the median of votes 10, 20, 30, 40, and 50?**

31

Your answer: 31. The correct answer is 30. Review the rules: the rate is the median, transfers depend on group revenue, and outcomes combine income, tax, transfer, and effort when applicable.

**What determines your transfer?**

Group revenue and the transfer rule ▾

**What determines your outcome?**

My post-tax income and effort cost, when applicable ▾

Continue

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Figure 1.5: Current comprehension check: specific feedback explains the incorrect answer and preserves the other responses.




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## Instructions Benchmark

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**The collective decision**

Each group contains five people. Each person proposes a rate from 0% to 50%.

The implemented rate is the median: the third vote after ordering all five votes.

Tax is then collected and the treatment transfer rule is applied.

|                            |                                    |                              |                               |
|----------------------------|------------------------------------|------------------------------|-------------------------------|
| <b>1</b><br>Pre-tax income | <b>2</b><br>Your proposed tax rate | <b>3</b><br>Implemented rate | <b>4</b><br>Transfer received |
|----------------------------|------------------------------------|------------------------------|-------------------------------|

**Benchmark**

Incomes are known; the median of five votes selects a linear tax rate and revenue returns in equal shares.

**Example:** with votes 10, 20, 30, 40, and 50, the implemented rate is 30%.

Continue

Con tecnología de [oTree](#)

Figure 1.6: Current basic-edition instructions, with initial resources and experimental units.

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

## Room: [EN] Inequality, Taxation and Redistribution

### Create a new session

Session Config

[EN] Inequality and Redistribution — one round

Number of participants

Complete groups of 5 participants. Use a multiple of 5; minimum 5.

Create

[Configure session](#) ⚙️

### App sequence

|                                        |                                                                  |
|----------------------------------------|------------------------------------------------------------------|
| <b>redistribution_game (10 rounds)</b> | Voting over redistributive taxation under heterogeneous incomes. |
|----------------------------------------|------------------------------------------------------------------|

---

### 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://localhost:8130/room/redistribution\\_en](http://localhost:8130/room/redistribution_en)

Figure 1.7: Session-creation form for the basic English room. Check the selected configuration and participant requirement before creating the session.

## Downloading a session with several rounds

### For the instructor

Open **Data** within the relevant session and use that session's CSV or CSV-for-Excel download link. The general export has one row per participant and columns for the different rounds. Ten rounds do not necessarily mean ten rows per person. When the family provides its own long-format export, observations may instead be organized by participant and round or another unit defined by the design.

Save the original file together with the configuration name, session code, and active-round count. Check that columns for the last active round are present and that the data belong to the selected session. Empty cells can represent inactive rounds, a pending decision, or a field that does not apply to a role; do not automatically recode them as zeros. To compare learning, preserve round and group identifiers alongside participant identifiers. Share only anonymous aggregates in class, and record session incidents before constructing derived tables.

## 1.2 Family profile

|                           |                                                                                                                                                                |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>            | Study how income, risk, information, responsibility, and institutional design affect support for taxation and redistribution.                                  |
| <b>Experimental unit</b>  | A group of five; policy follows the median, one person's choice, or majority selection between two platforms.                                                  |
| <b>Participants</b>       | Multiples of five; ten or more are recommended.                                                                                                                |
| <b>Basic edition</b>      | Assigned incomes or percentage before production: one round, ten periods with fixed groups, and ten with reassignment.                                         |
| <b>Extended edition</b>   | Eight distributional treatments and six production comparisons: prior policy, unequal productivity, restricted choice, mobility, platforms, and sharing frame. |
| <b>Decision</b>           | Propose a rate from 0 to 50 percent, select A/B when applicable, and choose effort in production treatments.                                                   |
| <b>Outcome</b>            | Base account plus income after tax and transfer, minus effort cost when applicable.                                                                            |
| <b>Topics</b>             | inequality; redistribution; taxation; majority voting; distributive justice; labor supply.                                                                     |
| <b>JEL</b>                | A22; C92; D63; D72; H23; J22.                                                                                                                                  |
| <b>Suggested duration</b> | 25–35 minutes for one round; 45–65 minutes for ten periods and discussion.                                                                                     |
| <b>Basic room</b>         | <a href="https://redistribution.beer-lab.org/room/redistribution_en">https://redistribution.beer-lab.org/room/redistribution_en</a> .                          |
| <b>Extended room</b>      | <a href="https://redistribution.beer-lab.org/room/redistribution_extended">https://redistribution.beer-lab.org/room/redistribution_extended</a> .              |
| <b>Instructor access</b>  | <a href="https://redistribution.beer-lab.org/demo">https://redistribution.beer-lab.org/demo</a> .                                                              |
| <b>Guide</b>              | docs/guia_docente_redistribucion/english/teacher_guide_redistribution.tex.                                                                                     |

## 1.3 Ten-step preparation

1. Open <https://beer-lab.org/> and the catalog at <https://teaching.beer-lab.org/>.
2. Select Inequality, Taxation and Redistribution.
3. Open the instructor domain, choose **Rooms**, language, and edition.
4. Choose one round, fixed groups, reassignment, or an extended treatment.
5. Confirm that attendance is a multiple of five.
6. Open **Monitor** and **Report**; keep aggregates hidden.
7. Share only the participant room.
8. Read the rules and solve an example different from the actual choice.
9. Wait for zero pending decisions, request predictions, and reveal.
10. Export data if it will be used later and close the session explicitly.

### Checkpoint

Demo must list exactly 40 configurations from this family and Rooms must list four rooms. The basic room offers six configurations and the extended room fourteen. If another game appears, do not begin and contact the laboratory coordinator.

## 1.4 What the activity does

Five people receive income positions. Each proposes a rate. Votes are ordered and the third becomes the implemented rate, so opinions are not averaged. The institution collects taxes, forms a pool, and applies a transfer rule. Each screen reports gross income, tax, transfer, post-tax income, and an ECU outcome. A 30 ECU base account keeps outcomes positive and separates the exercise from real money.

The median creates a transparent majority institution. When rates can be ordered on one dimension and preferences are single peaked, the median position is often decisive. The laboratory shows when this logic organizes behavior and when additional considerations appear. High votes by high-income participants, or low votes by low-income participants, are not errors by themselves: they may reflect fairness, risk, beliefs, confusion, or strategy.

## 1.5 Solved example

With incomes 20, 40, 60, 80, and 100 ECU and votes 10, 20, 30, 40, and 50 percent, the median is 30. Taxes are 6, 12, 18, 24, and 30 ECU, totaling 90. Every person receives 18. Post-tax incomes are 32, 46, 60, 74, and 88 ECU. The bottom positions gain, the middle stays unchanged, and the top positions contribute. Total income remains 300 ECU because the benchmark destroys no resources.

This calculation separates three objects. The rate is a collective decision; tax paid depends on the individual base; the transfer depends on group revenue. A student may support a rate that reduces monetary income because of equality, insurance, reciprocity, or legitimacy. A student may

oppose it because of efficiency costs or beliefs about responsibility. Extended treatments change one dimension at a time so these arguments can be compared.

## 1.6 Platform walkthrough

### 1.7 Reading the screens

The institutional welcome establishes silence, privacy, and continuity. Instructions explain group size, the median rule, and transfers. The comprehension check requires participants to identify the median and outcome components; it is not a graded test. The decision page concentrates relevant information and a slider. The result uses a ledger so tax and transfer are not confused. The final summary confirms registration and prevents a technical end-of-pages message.

The instructor report stays hidden while decisions are pending. It then displays mean and median votes, the implemented rate, pre- and post-policy Gini coefficients, transfers, outcomes, and efficiency costs. The histogram preserves heterogeneity; the income-position table links votes to material interest; the period table supports learning analysis. Reveal only after recording predictions.



### 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 study how a group chooses a taxation and redistribution policy.

#### General laboratory rules

- Remain silent throughout the activity.
- Do not talk or communicate with other participants.
- Make decisions individually and privately.
- Follow the instructions on each screen.
- Do not refresh, close, or leave this page.
- If you have a problem, raise your hand and wait for laboratory staff.

☐ I confirm that I understand and will follow these rules.

Start

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Figure 1.8: Laboratory welcome and rules.

## Instructions

Benchmark

### The collective decision

Each group contains five people. Each person proposes a rate from 0% to 50%.

The implemented rate is the median: the third vote after ordering all five votes.

Tax is then collected and the treatment transfer rule is applied.

**1**

Pre-tax income

**2**

Your proposed tax rate

**3**

Implemented rate

**4**

Transfer received

### Benchmark

Incomes are known; the median of five votes selects a linear tax rate and revenue returns in equal shares.

Example: with votes 10, 20, 30, 40, and 50, the implemented rate is 30%.

[Continue](#)

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Figure 1.9: Instructions and decision sequence.

## Comprehension check

Benchmark

What is the median of votes 10, 20, 30, 40, and 50?

What determines your transfer?

What determines your outcome?

[Continue](#)

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Figure 1.10: Comprehension check.

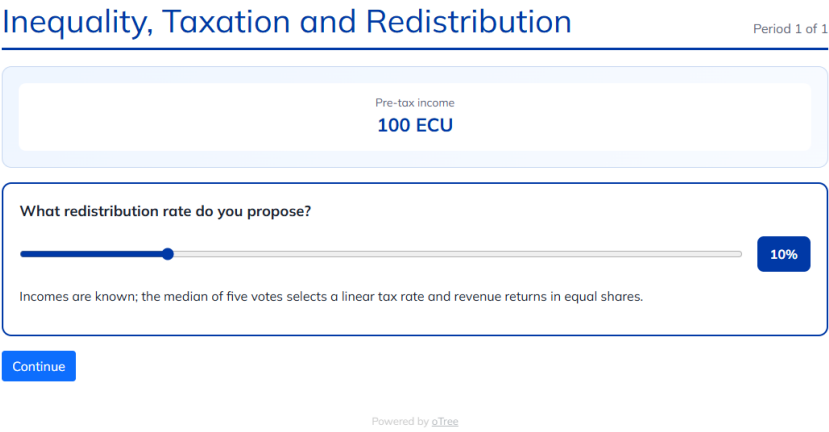


Figure 1.11: Voting screen.

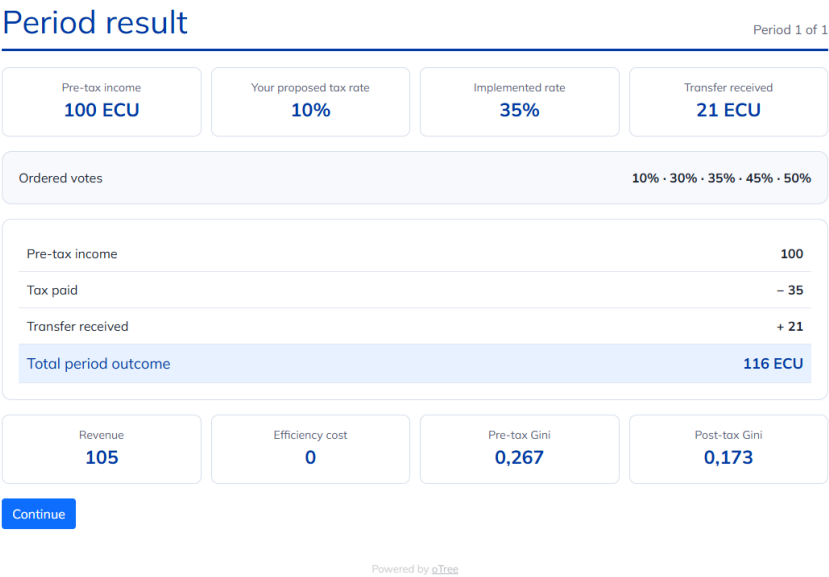


Figure 1.12: Individual and aggregate period result.

## Activity completed

Benchmark

Your decisions were recorded. Please wait for the instructor.

| Cumulative outcome<br><b>116 ECU</b> |                | Mean vote<br><b>10%</b> |                  |                   |                      |
|--------------------------------------|----------------|-------------------------|------------------|-------------------|----------------------|
| Period                               | Pre-tax income | Your proposed tax rate  | Implemented rate | Transfer received | Total period outcome |
| 1                                    | 100            | 10%                     | 35%              | 21                | 116                  |

Powered by [oTree](#)

Figure 1.13: Final summary.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

[EN] Percentage before production — one round: session 'uu1s64h7' (demo)

New
Links
Monitor
Data
Payments
Report
Description

App Name
Round Number

redistribution\_game (10 rounds)
10
Go

### Instructor report: inequality, taxation, and redistribution

Anonymous aggregate results. Decisions remain hidden until the instructor reveals them. · Percentage before production

10  
Participants

10/10  
Completed decisions

0  
Pending

2  
Completed groups

Reveal aggregate results

Figure 1.14: Instructor report before disclosure.

structor report: inequality, taxation, and redistribution

onymous aggregate results. Decisions remain hidden until the instructor reveals them. · Percentage before production

0

Participants

10/10

Completed decisions

0

Pending

2

Completed groups

Hide results

distribution overview

0%

Mean vote (n=10)

30,0%

Median vote

30%

Mean implemented rate (n=2)

0,133 → 0,093

Gini before → after

3,0 ECU

Mean transfer

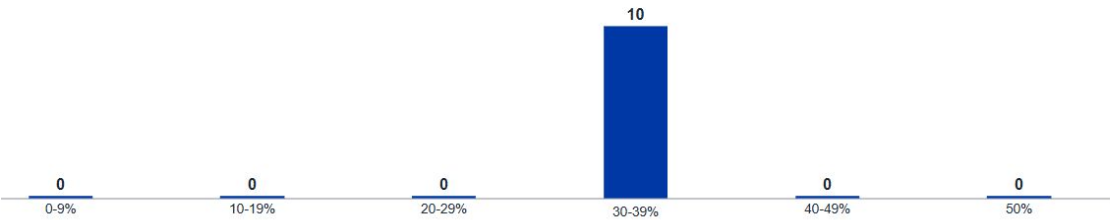
77,5 ECU

Mean outcome (n=10)

0,0 ECU

Total efficiency cost

distribution of proposed rates (n=10)



Gini before → after



Preferences by income position

Position is the assigned group position, rather than a recalculated wealth ranking. Mobility may change productivity.

| Position | n | Pre-tax income | Mean vote (n) | Transfer received |
|----------|---|----------------|---------------|-------------------|
| 1        | 2 | 40,0           | 30 (2)        | 18,0              |
| 2        | 2 | 50,0           | 30 (2)        | 18,0              |
| 3        | 2 | 60,0           | 30 (2)        | 18,0              |
| 4        | 2 | 70,0           | 30 (2)        | 18,0              |
| 5        | 2 | 80,0           | 30 (2)        | 18,0              |

Figure 1.15: Instructor report with aggregate results.

# Theory and distributional treatments

## 2.1 Median voter and demand for redistribution

Meltzer and Richard model redistribution as majority choice in which taxation affects transfers and labor supply (Meltzer and Richard, 1981). When median income is below mean income, the median voter may gain from redistribution, although high rates shrink the base. The argument links inequality to redistribution but relies on single-peaked preferences, one policy dimension, and common expectations. The game reproduces the median rule and makes efficiency costs visible.

In the costless benchmark, post-tax income is  $y_i(1 - t) + t\bar{y}$ . Its derivative with respect to the rate is  $\bar{y} - y_i$ . A position below the mean gains monetarily from a higher rate; a position above the mean loses; a person at the mean is indifferent. The 50 percent upper bound keeps calculations manageable. With leakage, the rebate becomes  $0.7t\bar{y}$  and the threshold shifts: a person can be below the mean and still fail to gain from a higher rate.

## 2.2 Distributive justice, self-interest, and responsibility

Konow shows that fairness judgments combine equality, need, efficiency, and accountability (Konow, 2000). Produced income makes this distinction visible: productivity is assigned and effort is chosen. A vote may respond to unequal opportunity, unequal choices, or both. Instructors should avoid automatic moral labels. Experimental evidence identifies average patterns rather than individual intentions.

Inequality-aversion models allow people to sacrifice resources to reduce gaps. Other accounts emphasize reciprocity, identity, and desert beliefs. The same decision can fit more than one mechanism. Treatments are therefore most useful as planned comparisons: veil versus known position, produced versus assigned income, universal versus targeted transfer, and costless versus costly redistribution.

## 2.3 Veil of ignorance and insurance

Before learning a position, redistributive policy combines impartial judgment with insurance. A risk-averse person may accept lower expected income to reduce dispersion; a risk-neutral person may support equality for normative reasons. The veil blocks direct conditioning on realized income but does not identify motivation by itself. Durante, Putterman, and van der Weele distinguish self-interest, risk, and social preferences through distributive choices (Durante et al., 2014). An instructor should present higher rates under a veil as compatible with several channels.

## 2.4 Information and preference formation

Inequality information can correct perceptions, direct attention, or change a reference point. Kuziemko and coauthors show that carefully designed information can affect knowledge and some attitudes, while policy responses are not uniform (Kuziemko et al., 2015). The laboratory information treatment holds payoffs and rules constant. If votes change, the result suggests that representation of the distribution matters; it does not establish which cognitive process caused the change.

## 2.5 Measurement: Gini, incidence, and welfare

The Gini coefficient summarizes relative dispersion from zero to one, but it does not identify winners, resource costs, or fairness. The report therefore combines it with incomes, transfers, and efficiency loss. A large Gini reduction can coexist with a large loss of total income. A small reduction can hide meaningful transfers to the bottom. Feedback should use several measures and state every denominator.

Net incidence equals transfer minus tax. Under a progressive tax, the statutory rate applies to income above the exemption and the average rate is smaller than the marginal rate. Under targeting, the same revenue generates larger benefits for fewer recipients. Redistribution is therefore not a single rate: the base, rebate, targeting, and efficiency technology jointly define the institution.

## 2.6 Basic and extended treatments

## 2.7 Benchmark

**Mechanism.** Known incomes are 20, 40, 60, 80, and 100 ECU. Each person proposes a linear rate from 0 to 50 percent; the median of five votes applies to all income and revenue returns in equal shares.

**Prediction and comparison.** With purely monetary preferences, the two low-income positions prefer a high rate, the two high-income positions prefer a low rate, and the median-income voter is pivotal. With costless equal rebates, the voter at 60 ECU is approximately indifferent at the margin. Dispersion shows why self-interest is not a complete account.

**Pedagogical use of the report.** Use this condition to introduce the median voter, net incidence, and equality. Order votes before revealing the median and calculate each position's net contribution.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

A rigorous discussion follows four steps. First describe the institutional change without using outcomes. Second derive each position's monetary payoff at rates of 0, 25, and 50 percent. Third record the class prediction and its uncertainty. Fourth compare the prediction with the histogram and tables, separating self-interest, risk, reciprocity, responsibility, and equality concerns. This

sequence prevents an after-the-fact explanation of every pattern and turns the treatment into a test of mechanisms.

## 2.8 Veil of ignorance

**Mechanism.** Voting takes place before participants learn their income positions. The possible distribution is public and positions are revealed after voting.

**Prediction and comparison.** The choice is no longer a direct reaction to realized income and can represent ex ante insurance, risk aversion, or an impartial criterion. A higher rate than in the benchmark is consistent with these mechanisms, although one comparison cannot separate them.

**Pedagogical use of the report.** Compare the full vote distribution with the benchmark. Ask first what risk is being insured and then which fairness judgment could generate the same choice.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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## 2.9 Produced income

**Mechanism.** Each participant chooses effort from 0 to 10. Income equals 20 plus productivity times effort, and effort cost equals one half of effort squared. The group then votes.

**Prediction and comparison.** Assigned productivity creates unequal opportunity; chosen effort introduces responsibility and a supply response. High rates can weaken effort incentives and shrink the base. Fairness preferences may distinguish luck from effort.

**Pedagogical use of the report.** Display effort, income, vote, and outcome together. Do not label observed income as merit without separating assigned productivity, chosen effort, and cost.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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and tables, separating self-interest, risk, reciprocity, responsibility, and equality concerns. This sequence prevents an after-the-fact explanation of every pattern and turns the treatment into a test of mechanisms.

## 2.10 Efficiency cost

**Mechanism.** Only 70 percent of revenue returns to the group. The remaining 30 percent is displayed as an efficiency loss.

**Prediction and comparison.** Redistribution is no longer a pure transfer. Participants who value equality face a social cost, so preferred rates may fall. The change illustrates how the group trades equality against efficiency.

**Pedagogical use of the report.** Compare Gini reduction with ECU lost. A lower rate need not imply less concern about inequality; it may reflect a higher price of reducing it.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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## 2.11 High inequality

**Mechanism.** The distribution becomes 10, 25, 50, 90, and 125 ECU while the linear tax and equal rebate remain.

**Prediction and comparison.** The mean-median gap and potential transfers increase. A median-voter account predicts stronger redistribution when the mean moves away from the median, while mobility beliefs and fairness can moderate the response.

**Pedagogical use of the report.** Compare votes, initial Gini, and transfer magnitudes. Calculate every position's net income under a common rate before interpreting means.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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## 2.12 Inequality information

**Mechanism.** The screen explicitly reports the mean, median, range, and income position without changing payoffs or rules.

**Prediction and comparison.** The monetary model is unchanged because the feasible outcomes are identical. Limited attention, mistaken beliefs about the distribution, and reference-dependent perceptions can nevertheless change expressed preferences.

**Pedagogical use of the report.** Treat this as an information intervention. Ask which statistic mattered and distinguish comprehension from persuasion.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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## 2.13 Progressive tax

**Mechanism.** The approved rate applies only to income above a 40 ECU exemption; revenue is divided equally.

**Prediction and comparison.** The exemption changes the tax base, net contributors, and progressivity. Low-income positions may receive without paying, while high-income positions face a marginal rate on the excess. Rate and base are separate policy dimensions.

**Pedagogical use of the report.** Work through 100 ECU: only 60 ECU is taxable. Distinguish the marginal rate, average rate, and net transfer.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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## 2.14 Targeted transfer

**Mechanism.** Revenue is divided between the two lowest-income people rather than among all five.

**Prediction and comparison.** Targeting raises benefits per recipient and removes transfers to middle and high positions. It may increase support through distributive efficiency or reduce it through exclusion, stigma, and coalition effects.

**Pedagogical use of the report.** Compare winners, losers, and the median position. Discuss misclassification and administrative costs as extensions beyond the implemented design.

### Feedback script

Before revealing results, request a prediction for the median vote, identify net contributors and recipients, and ask for a falsifiable explanation. Then compare the full distribution, the change in the Gini coefficient, and any efficiency cost. A decision is an observation, but the independent unit may be the group; one hundred decisions from ten periods are not automatically one hundred independent observations.

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# Class plans, data, and assessment

## 3.1 Fifty-minute session

Allocate five minutes to rules and access, ten to instructions and comprehension, five to voting, five to predictions, fifteen to revelation and calculations, and ten to theory. One round is enough. Prepare board columns for mean vote, median vote, implemented rate, Gini, and cost. Do not display the report while students vote.

## 3.2 Ninety-minute session

Use two conditions with comparable groups or course sections. Benchmark versus veil and benchmark versus efficiency cost are effective pairs. Before the second result, collect anonymous predictions. Compare distributions rather than means alone. Ask what finding would contradict each hypothesis and what additional design would separate mechanisms.

## 3.3 Public economics

Emphasize the base, marginal and average rates, incidence, universal benefits, and targeting. Students should calculate a balanced budget and net transfers. In the progressive treatment, show why marginal and average rates differ. With efficiency costs, construct a frontier between total income and equality and explain that a social welfare function adds normative weights.

## 3.4 Political economy

Emphasize the median rule, coalitions, and the pivotal position. Compare mean and median income and derive a Meltzer–Richard prediction. Ask when preferences cease to be single peaked and why multidimensional policy complicates the theorem. Targeting supports a discussion of minimum winning coalitions and exclusion of the middle.

## 3.5 Behavioral economics

Emphasize responsibility, attention, reference points, and insurance. Salient information holds incentives fixed; the veil changes private information; produced income changes process and desert. Ask students to propose a comparison that distinguishes risk aversion from inequality aversion and explain why one choice is insufficient.

### 3.6 Leading the feedback discussion

Begin with facts: number of decisions, pending participants, histogram shape, and median rate. Continue with calculations: revenue, rebate, incidence, and Gini. Only then discuss mechanisms. This order prevents an attractive narrative from being presented as an identified result. Invite two rival explanations and ask which treatment would separate them.

A bimodal distribution matters even when the mean is moderate. It may reflect income coalitions, two fairness norms, or different uses of the scale. The median determines policy, but the histogram displays conflict. In repetition, a trend can reflect arithmetic learning, strategic adaptation, or changing norms. Reassigned groups reduce shared histories but do not make repeated decisions by the same individual independent.

#### Feedback script

Six-question script: What rate did the monetary model predict? Who gained and lost net? What changed in the treatment? Which additional mechanism explains the deviation? Which report statistic supports it? What new treatment would distinguish it from a rival explanation?

### 3.7 Exercises with solutions

### 3.8 Median calculation

**Question.** Votes are 0, 10, 35, 35, and 50. Which rate is implemented? **Solution.** The third ordered vote is 35. Repetition does not change the rule; the mean of 26 is irrelevant.

### 3.9 Balanced budget

**Question.** With benchmark incomes and a 25 percent rate, calculate revenue and rebate. **Solution.** Revenue is 75 ECU and each person receives 15. Post-tax incomes are 30, 45, 60, 75, and 90. Their sum remains 300.

### 3.10 Efficiency cost

**Question.** Repeat when only 70 percent returns. **Solution.** Of 75 ECU, 52.5 returns, or 10.5 each, and 22.5 is lost. Post-tax incomes sum to 277.5. Inequality may fall at the cost of total income.

### 3.11 Progressive tax

**Question.** With a 40 ECU exemption and a 30 percent rate, what does a person earning 100 pay? **Solution.** The base is 60 and tax is 18. The marginal rate is 30 percent and the average rate on total income is 18 percent before the transfer.

### 3.12 Identification

**Question.** The mean vote rises under the veil. Does this prove a preference for equality? **Solution.** No. It is consistent with equality, risk aversion, insurance, or a changed interpretation. Additional choices or treatment variation are required.

### 3.13 Independence

**Question.** Ten groups play ten periods. Are there five hundred independent observations?

**Solution.** There are five hundred individual decisions, but repetition and shared outcomes create dependence. The group, session, or person may be the clustering unit depending on the question.

### 3.14 Comparative design, data, and learning assessment

### 3.15 Building an informative comparison

A classroom comparison is more informative when the instructor decides in advance which mechanism should be isolated. The benchmark should retain the same group size, language, duration, rate range, and disclosure procedure. The second condition changes only the focal dimension. If one course section plays under a veil and another with known income, time of day, composition, or instructor explanations can also affect votes. Random assignment within a session would strengthen causal interpretation, while the current separate configurations prioritize ease of teaching. Results should therefore be described as classroom contrasts unless a research protocol supports stronger claims.

Order matters as well. Playing the benchmark first teaches the tax calculation and may affect a later decision. Playing the efficiency-cost treatment first makes leakage salient even after it disappears. For a demonstration, that learning is part of the experience. For causal attribution, balance order across sections, keep wording identical, and record hypotheses before observing outcomes. The report documents the configuration, participant count, and completed decisions; instructors should separately record interruptions and any additional explanation.

A mean difference does not exhaust the evidence. Two classes can have the same mean vote and very different distributions: one concentrated at 30 percent and another divided between 10 and 50. The former suggests coordination or consensus; the latter reveals distributive conflict. Compare the mean, median, histogram, and income-position profile. In ten periods, examine complete trajectories rather than selecting the round that best fits the expected narrative. Transparent analytical choices are themselves part of experimental training.

### 3.16 Conceptual data dictionary

Each exported row represents one participant in one period. Configuration fields identify language, edition, treatment, active periods, and matching rule. Position fields include group position, productivity, effort, gross income, and effort cost. Policy variables include the individual vote, implemented median rate, tax, revenue, distributable pool, transfer, and efficiency loss. Outcome fields record post-tax income, period outcome, and completion status.

An individual vote is an expressed preference inside this institution, not a tax preference observed outside the laboratory. The implemented rate belongs to the group and appears for all five members; treating those copies as independent policies exaggerates sample size. Pre- and post-policy Gini coefficients also belong to the group-period. Decision time supports quality control, but it should not automatically be interpreted as uncertainty,<sup>21</sup> cognitive effort, or comprehension.

For descriptive analysis, create a group-period table containing the median rate, Gini coefficients, and loss. Then summarize individual votes by income position. If sessions are combined, retain a

### 3.17 Cases for a structured debrief

**Case A: the median vote is zero.** Before discussing self-interest, verify comprehension, income positions, the transfer rule, and costs. Ask whether students expected taxation to reduce production even though the benchmark holds income fixed. A gap between the implemented model and a belief imported from the real world is a useful lesson about assumptions.

**Case B: everyone votes 50 percent.** Calculate net outcomes and ask whether the upper bound constrains preferences. The pattern may reflect equality, coordination, absence of cost, or a wish to simplify. Compare it with efficiency cost or produced income. If high votes persist when resources are lost, discuss how much cost the group accepts and which welfare criterion it applies.

**Case C: a high-income position supports more redistribution than a low-income position.** Do not correct it as a mistake. Social preferences, different comprehension, protest, future expectations, or random variation are possible. Inspect the histogram and repetition. Monetary theory is a counterfactual benchmark rather than a rule each participant must obey.

**Case D: the veil changes nothing.** A null contrast is informative. Preferences may be stable, perceived risk may be small, the sample may be limited, or benchmark votes may already be high. Ask for qualitative uncertainty intervals and propose greater dispersion or random payment to increase the insurance value.

### 3.18 Assessment before and after the activity

Before play, request three predictions from each student: the median rate, the sign of the income-vote association, and the treatment's directional effect. Afterwards, require a five-sentence explanation that cites two report statistics and recognizes one rival account. This structure evaluates theory, data reading, and identification without grading the private choice.

A short rubric can award one point for an explicit prediction, two for a correct calculation, two for interpreting the histogram, two for connecting theory, two for considering an alternative mechanism, and one for a design limitation. Quality does not depend on guessing the correct direction. A wrong prediction with a clear mechanism can produce more learning than a correct guess without reasoning.

For homework, students may write a one-page policy memo. They select a rule, identify contributors and recipients, describe a cost, and state what additional evidence they would need before recommending it outside the laboratory. Alternatively, they can design a ninth treatment with one modification, a prediction, a primary variable, a confounding risk, and a feedback plan. These assignments show why moving from experimental outcomes to public policy requires additional assumptions.

### 3.19 From a classroom pattern to a defensible claim

The instructor report is designed for immediate feedback, but each panel answers a different question. The histogram describes how individual proposals are distributed. The median identifies the policy selected by the voting institution. The income-position table asks whether material incidence organizes preferences. The Gini panel describes how the implemented rule changes relative dispersion. The period table describes dynamics. No single panel establishes why a person voted as observed, and a visually large difference is not automatically a statistically or economically important effect.

A useful claim states the population, comparison, outcome, and limitation. For example: "In this class, the median proposed rate was higher under the veil than in the known-income benchmark, a pattern consistent with ex ante insurance; because treatments were played in sequence, learning

may also contribute.” This sentence is stronger than saying that the veil caused fairness. It is also more informative than merely reporting two means, because it connects evidence to a mechanism while naming a rival explanation.

Ask students to distinguish three levels of conclusion. A descriptive conclusion reports what happened in the current session. A theoretical interpretation asks whether the pattern is consistent with a model. A causal conclusion requires a design that changes the focal mechanism while holding alternatives constant. A policy conclusion additionally requires external validity, administrative details, behavioral responses outside the lab, and normative weights. Moving carefully across these levels is one of the activity’s central learning objectives.

Graphical uncertainty can be discussed even without formal confidence intervals. Small groups make each vote influential, especially the third ordered vote. Recalculate the implemented rate after moving one proposal by ten percentage points. If the policy changes sharply, the collective result is fragile even when the mean seems stable. In repeated play, compare within-group movements and between-group dispersion. A stable aggregate can conceal offsetting individual changes, while a changing aggregate can be driven by one pivotal voter.

Finally, connect the report to reproducible work. Save the configuration name, session code, participant count, and exported file together. Record any exclusions before calculating summaries. Preserve the raw export and create derived tables in a separate file. If the activity is repeated next semester, use the same variable definitions and note changes in instructions or interface. These habits allow students to see that transparent empirical practice begins with a classroom exercise, not only with a formal research paper.

## 3.20 Solved workshop: three institutions with the same votes

This workshop develops the interpretation of the report without assuming prior training in public finance. Use the five benchmark incomes: 20, 40, 60, 80, and 100 ECU. Total income is 300 and mean income is 60. For the classroom calculation only, fix the votes at 0, 10, 30, 40, and 50 percent. The median is 30, the third value in the ordered list. The mean vote is 26, but the game’s rule implements 30. Holding the votes constant separates the accounting consequences of institutions from voters’ behavioral responses to them.

### 3.20.1 Benchmark with no resource loss

At a proportional tax rate of 30 percent, taxes are 6, 12, 18, 24, and 30 ECU. Revenue is 90, so each person receives a transfer of 18. After-tax incomes, including the transfer, are 32, 46, 60, 74, and 88. They still sum to 300. The two lower-income positions gain, the two higher-income positions lose, and the position whose income equals the mean remains at 60. This regularity helps explain each position’s material incentive when income is known and only own earnings matter.

The base account of 30 ECU is added afterward. Earnings are therefore 62, 76, 90, 104, and 118. Do not confuse these earnings with the post-tax income used to measure inequality. The base account raises total earnings to 450, but it does not generate tax revenue or change the redistribution budget. Ask students to reconcile both totals before interpreting a graph. Two columns can correctly report different numbers when they measure different economic objects.

### 3.20.2 Efficiency loss with a 70 percent return

Keep the same incomes and tax rate, but change the fraction returned from the fund to 70 percent. Revenue remains 90 ECU, while only 63 return to the five participants. Each transfer is 12.6 and

the resource loss is 27. Post-tax incomes are 26.6, 40.6, 54.6, 68.6, and 82.6. They sum to 273: the difference from initial income of 300 exactly equals the efficiency loss. Adding the base account gives earnings of 56.6, 70.6, 84.6, 98.6, and 112.6.

The pattern is useful for teaching. The position initially receiving 40 still gains a small amount, 0.6, while the position receiving 60 loses 5.4. A distributive institution can benefit some people while reducing total income. Asking whether inequality falls is therefore insufficient. Students must also ask how much income disappears, who bears that loss, and how the loss should be evaluated. In this implementation, the cost is an accounting reduction in the distributable fund. It does not itself estimate actual tax evasion, labor-supply responses, or administrative costs outside the laboratory.

### 3.20.3 Transfers targeted to the two lowest initial incomes

Return to full redistribution and retain the 30 percent rate. Revenue of 90 is now divided between the two participants with the lowest gross incomes: each receives 45. The other three receive zero. Post-tax incomes are 59, 73, 42, 56, and 70, and their total remains 300. Eligibility is determined by gross income before redistribution. The program does not recalculate who is poorest after paying the transfer. Make that distinction explicit when reading outcomes for each role.

Notice that the ranking of post-tax incomes changes. The person initially receiving 40 ends with 73, above the person initially receiving 100, who ends with 70. Targeting can reduce inequality while changing relative positions. This is not evidence of a calculation error. It opens discussion of discontinuities created by eligibility thresholds and of why different conceptions of fairness can evaluate the same allocation differently. Keep the positive question about incentives separate from the normative question about which institution is defensible.

#### One tax rate, three distributions

The implemented rate alone does not measure the extent of redistribution. Interpretation also requires the tax base, the share of revenue returned, and transfer eligibility. Two sessions with a median rate of 30 percent can produce different final incomes. Read the report together with the selected configuration rather than treating tax rates as observations independent of institutional rules.

### 3.20.4 Turning the workshop into report interpretation

Divide the class into teams and assign one institution to each team. Request five columns: gross income, tax, transfer, post-tax income, and earnings including the base account. Each team must provide three checks. Taxes must sum to revenue; transfers must sum to the distributable fund; and post-tax incomes must sum to initial income minus lost resources. These identities locate the step responsible for an incorrect solution. They support explanatory feedback instead of merely identifying an incorrect number.

Next, build a single comparative table for all three institutions and discuss quantities before preferences. Ask which positions would have a material incentive to support each rule if they could choose their votes again. Do not treat the workshop's fixed votes as evidence for that prediction: they were imposed to compare accounting. In an actual session, votes are observed decisions and may respond to information, risk, fairness, or expectations about other participants. The solved exercise identifies a consequence of rules, rather than a psychological mechanism.

An assessment question can close the workshop: "Does a higher tax rate necessarily imply greater welfare?" A strong answer explains that the rate affects revenue and transfers, but welfare requires specifying what is valued. Aggregate income measures resources; inequality describes

their distribution; role-specific earnings describe incidence. None of these measures automatically supplies normative weights. A rule that destroys resources must be evaluated with that cost visible. A rule that targets transfers requires identifying beneficiaries and possible changes in relative position.

Ask students to distinguish a calculation from a prediction and a prediction from a causal claim. The accounting identities hold once the incomes, rate, and institution are specified. A prediction about votes additionally needs assumptions about information and preferences. A causal claim about why votes changed needs a comparison that isolates the relevant mechanism. For example, a lower median under resource loss is compatible with concern for efficiency, but it may also reflect changed private benefits. Using the report to distinguish these statements is more informative than labeling one treatment's choices more generous.

Finally, connect the workshop to data export. Preserve the gross income that determines the initial position and the post-tax income that defines the distributive outcome. Do not substitute one for the other or reorder roles before linking rounds. A graph by initial position and a graph by final income answer different questions. Documenting that analytical choice allows another instructor to reproduce the comparison and helps students understand why variable definitions are part of the economic argument.

# Taxation before production: incentives and institutions

## 4.1 The economic question and the appropriate comparison

The production extension addresses a question that assigned incomes cannot answer: how does production change when the redistribution percentage is known before work? Income becomes a choice-dependent outcome. Each person chooses effort and pays an increasing private cost. The political institution determines a rule affecting the private return to production. A distributional comparison must therefore examine the percentage, effort, production, and final outcomes together.

The existing produced-income treatment retains its sequence: effort first, voting afterwards. In percentage before production, policy is fixed before effort. Both use five people, productivities 4, 6, 8, 10, and 12, the same production intercept, the same cost function, and the same effort limit. Holding technology constant makes the timing comparison interpretable. Producing before voting does not eliminate expectations about future taxation: students may anticipate the tax while choosing effort. The contrast distinguishes an announced rule from a rule still awaiting a decision.

This classroom adaptation studies taxation with endogenous labor supply. Agranov and Palfrey experimentally examine wage inequality and political institutions. Their paper provides a reading on theory and evidence. The parameters, integer effort menu, and dual roles of platform setters are specified here for teaching. The activity does not reproduce their protocol literally, and the published findings are not guaranteed predictions for the current class.

### For the instructor

Choose one principal question. To study incentives, compare effort conditional on productivity and the percentage. To study institutions, compare the reference with choice by one person or two binding proposals. To study uncertainty about economic position, use random productivity. Changing all these dimensions together prevents a clear interpretation.

## 4.2 Common rules, sequence, and outcomes

Each period starts with 30 ECU per person. This balance is outside the contribution base. For productivity  $w_i$  and integer effort  $e_i \in \{0, \dots, 10\}$ , production income is  $y_i = 20 + w_i e_i$  and private cost is  $c_i = e_i^2/2$ . The cost is deducted from the outcome and does not enter the pool. Percentages range from 0 to 50 in integer units;  $t$  denotes the corresponding fraction. All people contribute  $ty_i$

and receive one fifth of collections:

$$\pi_i = 30 + (1 - t)(20 + w_i e_i) + \frac{t}{5} \sum_{j=1}^5 (20 + w_j e_j) - \frac{e_i^2}{2}.$$

The sequence fixes policy, produces under that known policy, and settles contributions, refunds, and costs. Waiting pages synchronize these stages; they do not create additional decisions. Pending responses are never replaced by zero.

Equal pool shares are preserved without rounding in the data. Payable outcomes are rounded to two ECU decimals. The exact resource identity therefore applies before final rounding: the sum of five payable outcomes can differ by up to 0.025 ECU from the unrounded total. This difference is not resource destruction caused by policy.

In the reference, all five proposals are ordered and the third applies. Own productivity and the group profile are known before proposals, except in the random-productivity treatment. After policy is fixed, each person sees the implemented percentage and their production productivity. The calculator shows income, cost, and balance before the common refund. Other people's production is still unknown, so the screen does not announce an invented refund.

The basic edition offers one period, ten periods with a fixed group, and ten with reassignment. Fixed groups preserve membership and positions. Reassignment forms new groups and assigns positions each period; productivity follows the current position. Random productivity changes productivity even within a fixed group. Membership reassignment and productivity mobility are different comparisons.

#### What participants will see

Instructions describe who proposes, how the percentage is selected, when productivity is revealed, and how the outcome is calculated. They do not recommend effort or announce a hypothesis about fairness or ideology. Comprehension checks cover the choice rule, effort cost, and decision order.

### 4.3 The monetary benchmark with five contributors

Holding other people's decisions and the percentage constant, additional effort increases own income and the producer's refund. The continuous derivative is  $w_i(1 - t + t/5) - e_i$ . The continuous benchmark is  $w_i(1 - 4t/5)$ , bounded by the allowed interval. The game permits integers only: evaluate every effort from 0 to 10 and retain all maxima. When two integers tie, both are monetary best responses. This benchmark maximizes the unrounded outcome; rounding the final payment can generate additional ties.

#### Theoretical foundation

One fifth of the producer's own collections comes back to that producer. Using  $w_i(1 - t)$  ignores this return and understates the private incentive. This benchmark is conditional on the observed percentage. It does not establish sincere voting or the absence of social preferences.

With productivity 10 and a 50 percent policy, the private marginal return is  $10(1 - 0.5 + 0.5/5) = 6$ , so optimal effort is 6. Ignoring own refunds incorrectly gives 5. With productivity 12 and zero percent, the continuous optimum would be 12, but the permitted maximum is 10. Flat effort at low percentages may therefore reflect the menu limit.

## Production decision

Period 1 of 1

### Percentage before production

Income =  $20 + \text{productivity} \times \text{effort}$ . Cost =  $0.5 \times \text{effort}^2$ .

Each person starts every period with 30 ECU in their account, in addition to income earned through production.

Percentage fixed before production: 30%

Choose an integer effort from 0 to 10.

Productivity  
**10**

Chosen effort  
**5**

Produced income  
**70.0 ECU**

Effort cost  
**12.5 ECU**

### Balance before the common refund: 66.5 ECU

The percentage is already fixed. The calculation shows your balance before the common refund, which depends on all five people's production.

Continue

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

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Figure 4.1: Effort is chosen after the percentage is fixed and own productivity is revealed. The calculated balance still excludes the common refund.

Productive efficiency uses a different criterion. Total outcomes equal  $150 + \sum_i (20 + w_i e_i) - \sum_i e_i^2 / 2$ . Taxes and refunds cancel inside the group. The percentage does not destroy resources directly, but it may affect production choices. A planner maximizing this sum chooses the integer nearest each productivity, bounded above by 10. This benchmark describes a surplus gap without automatically attributing deviations to errors or moral preferences.

## 4.4 A fully solved example

Proposals 10, 20, 30, 40, and 50 implement 30 percent. The private factor is  $1 - 4(0.3)/5 = 0.76$ . Best responses for productivities 4, 6, 8, 10, and 12 are 3, 5, 6, 8, and 9.

| Productivity | Effort | Income | Cost | Contribution | Outcome |
|--------------|--------|--------|------|--------------|---------|
| 4            | 3      | 32     | 4.5  | 9.6          | 70.58   |
| 6            | 5      | 50     | 12.5 | 15.0         | 75.18   |
| 8            | 6      | 68     | 18.0 | 20.4         | 82.28   |
| 10           | 8      | 100    | 32.0 | 30.0         | 90.68   |
| 12           | 9      | 128    | 40.5 | 38.4         | 101.78  |

Total production is 378, collections are 113.4, and each refund is 22.68. For the first position,  $30 + 32 - 9.6 + 22.68 - 4.5 = 70.58$ . Outcomes sum to 420.5, equal to  $150 + 378 - 107.5$ . This calculation separates production income, income after sharing, and the outcome after effort cost and the starting balance.

### Checkpoint

Contributions sum to 113.4 and refunds also sum to 113.4. Total outcomes must equal production plus starting balances minus costs. If the identity fails, check refunds, the contribution base, and effort deductions before interpreting preferences.

## 4.5 The six comparisons

### 4.5.1 The reference and different productivities

Percentage before production observes effort under a known rule. Comparison with produced income requires the same duration, group design, and technology. Examine whether the percentage changed and whether effort changed conditional on that percentage. An overall effort mean is insufficient when policies or productivities differ.

Different productivities uses 2, 4, 6, 8, and 20. The mean remains 8, but the median falls and dispersion increases. Income and cost functions remain the same. This allows discussion of central-voter productivity relative to mean productivity, although actual production depends on effort and limits. Equal mean productivity does not automatically imply equal mean income.

### 4.5.2 Choice by one person

Only position 5 proposes the percentage. The other four wait without casting fictitious percentage proposals. Everyone produces, contributes, and receives an equal refund. The report records

one proposal per group-period and five production decisions. The comparison connects economic incidence and representation: contributing does not imply equal power to choose the rule.

Do not interpret this treatment as a measure of attitudes towards democracy. It changes who chooses within a specific menu. The authorized person may pursue own income, anticipate effort responses, or have social objectives. A low percentage supports several possible explanations and does not by itself identify ideology.

### 4.5.3 Random productivity

Reference position appears before percentage choice but does not determine production productivity. Once policy is fixed, a random permutation of 4, 6, 8, 10, and 12 is assigned. Every value is equally likely for each person, with no duplicates within the group; draws are independent across periods. Own productivity is revealed before effort.

This uncertainty differs from hiding an already assigned income. Proposals may respond to risk and expected consequences of taxation for production. Reference position can support a discussion of anchoring, but the activity does not directly identify that mechanism. Keep the public distribution and revelation timing constant across groups.

### 4.5.4 Two binding proposals

Positions 1 and 5 simultaneously announce A and B without observing the rival announcement. All five people then vote, including both setters. The proposal receiving at least three ballots wins and its percentage is binding. Setters also produce and receive no additional office reward.

The adaptation combines a producer's economic interest with an incentive to attract support. It does not represent external politicians motivated solely by office. When percentages coincide, economic outcomes coincide even if another label wins. Compare announcements, ballots, the winning percentage, and effort. Ballots are not additional numerical percentage proposals.



## Choose one of the two proposals

All five people vote. The proposal with at least three votes determines this period's percentage.

Each person starts every period with 30 ECU in their account, in addition to income earned through production.

Productivity: **10**

Choose one of the two proposals

Continue

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

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Figure 4.2: A ballot selects A or B between two binding percentages.

### 4.5.5 Percentage allocated to sharing

This treatment preserves numbers, timing, productivity, cost, the median rule, and refunds. It changes contribution and sharing labels. Keep explanations identical and avoid adding a solidarity or tax-burden narrative in only one condition. Check comprehension before attributing differences to deep preferences. At the end, ask students to translate both descriptions into the same formula.

## 4.6 Report, data, and feedback

The report remains hidden until active-period decisions are complete and the instructor reveals results. It counts participants, decisions, pending observations, and groups. Policies have a group-period unit; effort has a person-period unit; numerical proposals have an eligible-person-period unit. Platform elections show A/B counts without an invented numerical mean.

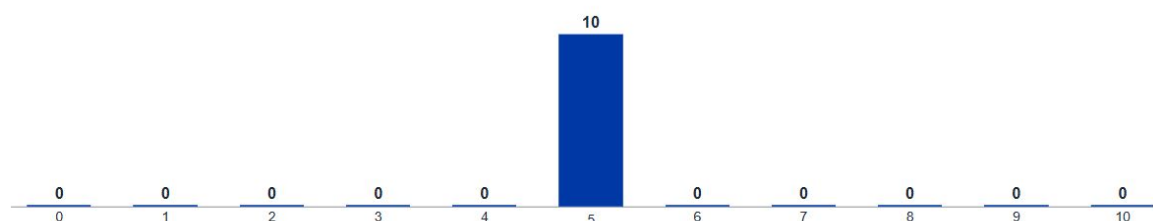
Production reporting includes effort histograms, mean group production and collections, and the mean sum of outcomes. The percentage table describes groups that chose each policy; it does not identify the causal effect of raising taxes. That requires exogenous policy assignment or another design supporting identification. The monetary benchmark preserves ties and limits. Matching it does not establish exclusively monetary motivation; deviating does not separately identify misunderstanding or social preferences.

Gini compares production income with income after sharing, before effort cost and the starting balance. It does not measure inequality of utility or final outcomes. Exports retain period, group, position, reference and actual productivity, announcements, ballots, locked policy, and payment components. Pending or inapplicable fields are empty. Zero is a valid decision. Position is not a permanent economic ranking under mobility.

#### Production and incentives

|                                |                                            |                                           |                                            |
|--------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------------------|
| <b>5</b><br>Mean effort (n=10) | <b>300,0</b><br>Total production per group | <b>90,0</b><br>Mean collections per group | <b>387,5</b><br>Mean sum of group outcomes |
|--------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------------------|

#### Effort distribution (n=10)



#### Production by implemented percentage

| Implemented rate | Completed groups | Production decisions | Mean effort | Total production per group | Mean collections per group | Mean sum of group outcomes |
|------------------|------------------|----------------------|-------------|----------------------------|----------------------------|----------------------------|
| 30%              | 2                | 10                   | 5           | 300,0                      | 90,0                       | 387,5                      |

Figure 4.3: Revealed report: production and effort have their own denominators and a conditional monetary benchmark.

**Attention**

Lower Gini and greater surplus answer different questions. A tax can compress incomes and reduce production. Five copies of a common percentage are not five independent policies; repetition does not create statistical independence.

Allow about fifteen minutes for instructions, ten to twenty for decisions, and twenty for discussion. In a fifty-minute class, use one period and a calculated comparison. Request predictions before play. During decisions, do not reveal best responses or comment on individuals. Close with distributions, aggregates, and finally theory.

**Feedback script**

“Start with the implemented policy. What was the private return to effort? Compare choices with that benchmark, then production and refunds. Finally examine what changed when we altered who decides or when productivity becomes known. We need quantities, rules, and competing explanations; decisions do not grade anyone’s ideology.”

A closing exercise derives  $1 - 4t/5$  while holding others’ effort constant. Another compares productivities 10 and 12: both choose 10 at zero percent; they choose 6 and 7 at fifty percent. A third fixes  $A=20$ ,  $B=40$ , and ballots A, B, B, A, B: B wins, 40 applies, and best-response effort for productivity 8 is 5. A fourth asks about ten periods with two groups: twenty policies and one hundred efforts, without automatic independence. Assess an explanation citing one statistic, its denominator, a prediction, and a limitation; do not grade the private percentage.

## 4.7 Quality, ethics, and troubleshooting

Run a five-browser rehearsal before class. Confirm language, treatment, active periods, and that the reference median uses five proposals, restricted choice uses one, and platform elections count five ballots. Verify that the report stays hidden while decisions are pending, no debug text appears, and the final screen is explicit. Prepare a non-incentivized teaching alternative when the course does not use money.

If a participant disconnects, preserve the participant code and reopen the link; do not create a substitute in the same group without understanding the consequence. If the report shows pending decisions, inspect Monitor before disclosure. If the wrong configuration was selected, document the mistake and create a new session. Never use resetdb on production.

Explain that ECU are units inside the activity and that choices do not diagnose ideology, altruism, or character. Aggregate results may be discussed; individual records remain private. Research use requires consent and institutional procedures beyond an ordinary class demonstration.

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