



# Instructor guide to monetary policy and central banking

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 monetary-policy and central-banking family in the Behavioral and Experimental Economics Research Lab (BEER Lab), Department of Economics, Tecnológico de Monterrey. It assumes no previous experience with oTree, experimental macroeconomics, or laboratory teaching.

The quick route launches a session; operational chapters explain each screen; conceptual chapters develop the model, predictions, evidence, and feedback questions. Common access, laboratory rules, participant flow, data, and reporting are explained once.

Treatment entries then describe only what changes: the policy mandate, shock, information, rule, or communication environment. English and Spanish configurations use one application and parallel content, so language does not change the economic design.

## Author

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### For the instructor

The guide follows the English interface. Spanish configurations reproduce the same mechanics. Project only aggregate results; never connect participant codes to names, student numbers, seats, or public comments.

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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 7, 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 7, 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.

|                                                 |                                                                                                                                                                     |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| etaria — una ronda                              | <b>Política monetaria y banco central / Monetary Policy and Central Banking — BEER Lab</b><br>Seleccione una variante de este juego. Select a version of this game. |
| etaria — 10 periodos, misma economía            |                                                                                                                                                                     |
| etaria — 10 periodos, economías reasignadas     |                                                                                                                                                                     |
| olicy — one round                               |                                                                                                                                                                     |
| olicy — 10 periods, same economy                |                                                                                                                                                                     |
| olicy — 10 periods, reassigned economies        |                                                                                                                                                                     |
| etaria extendida — mandato dual                 |                                                                                                                                                                     |
| etaria extendida — meta estricta de inflación   |                                                                                                                                                                     |
| etaria extendida — regla automática tipo Taylor |                                                                                                                                                                     |
| etaria extendida — shocks de demanda            |                                                                                                                                                                     |
| etaria extendida — shocks de oferta             |                                                                                                                                                                     |
| etaria extendida — límite inferior de la tasa   |                                                                                                                                                                     |
| etaria extendida — meta no revelada             |                                                                                                                                                                     |
| etaria extendida — orientación futura           |                                                                                                                                                                     |
| onetary Policy — dual mandate                   |                                                                                                                                                                     |
| onetary Policy — strict inflation target        |                                                                                                                                                                     |
| onetary Policy — automatic Taylor-type rule     |                                                                                                                                                                     |
| onetary Policy — demand shocks                  |                                                                                                                                                                     |
| onetary Policy — supply shocks                  |                                                                                                                                                                     |
| onetary Policy — effective lower bound          |                                                                                                                                                                     |
| onetary Policy — undisclosed target             |                                                                                                                                                                     |
| onetary Policy — forward guidance               |                                                                                                                                                                     |

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

## Rooms

### Current rooms:

|                                                    |
|----------------------------------------------------|
| [ES] Política monetaria y banco central            |
| [EN] Monetary Policy and Central Banking           |
| [ES] Política monetaria y banco central: extendida |
| [EN] Monetary Policy and Central Banking: extended |

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

## Room: [EN] Monetary Policy and Central Banking

### Create a new session

Session Config

[EN] Monetary Policy — one round

Number of participants

Complete groups of 4 participants. Use a multiple of 4; minimum 4.

Create

[Configure session](#) 

### App sequence

**monetary\_policy\_game (10 rounds)**

A central bank sets the policy rate after private-sector inflation forecasts.

Figure 1.5: 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 Basic facts

|                          |                                                                                                                          |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Purpose</b>           | Understand how expectations, shocks, and stabilization objectives shape a central bank's interest-rate decision.         |
| <b>Experimental unit</b> | One economy with one central bank and three private-sector members.                                                      |
| <b>Basic edition</b>     | One period, ten periods with the same economy, or ten periods with reassigned economies.                                 |
| <b>Extended edition</b>  | Dual or inflation mandate, Taylor-type rule, demand and supply shocks, lower bound, hidden target, and forward guidance. |

|                           |                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Decision</b>           | Each private participant forecasts inflation; the central bank observes their mean and sets the rate, except under the automatic rule. |
| <b>Payoff</b>             | Forecast-accuracy score for private participants and an inflation-and-output stabilization score for the central bank.                 |
| <b>Topics</b>             | monetary policy; inflation expectations; Taylor rule; central banking; macroeconomic stabilization.                                    |
| <b>JEL</b>                | A22; C92; E31; E52; E58.                                                                                                               |
| <b>Suggested duration</b> | 25–35 minutes for one period; 55–75 minutes for ten periods and feedback.                                                              |
| <b>Participants</b>       | Multiples of four. Eight participants form two independent economies.                                                                  |
| <b>Results</b>            | Inflation, expectations, and rate paths; error and rate distributions; stabilization loss; period detail.                              |

### 1.3 Decisions before class

First identify the concept to make observable. A one-period baseline introduces nominal and real rates, the output gap, and an inflation target. Ten periods with the same economy reveal learning, reputation, and expectation anchoring. Ten periods with reassigned economies preserve each participant's role while changing partners. That comparison helps separate persistence within a particular economy from patterns shared across the class.

Second choose the treatment. The dual mandate and inflation-only target compare loss functions. Demand and supply shocks distinguish states in which inflation and activity move together from states that create a trade-off. The Taylor-type rule replaces discretion with a systematic response. The lower bound shows why the nominal rate cannot always fall far enough. The hidden target and forward guidance make information and communication economic variables.

Finally define the unit of comparison. An economy produces one macroeconomic outcome per period even though four people belong to it. Forecasts are individual decisions, whereas inflation, output, and the rate are shared results. Ten observations from one economy contain learning and are not ten independent replications. State this distinction during feedback so a descriptive graph is not presented as a causal test.

#### For the instructor

For an inexperienced class, a robust sequence is: written prediction; one baseline period; brief real-rate explanation; ten dual-mandate periods; report reveal; reconstruction of two periods; and a supply-shock or automatic-rule extension. Do not announce the “correct” decision before students choose.

### 1.4 Minimum sequence

1. Confirm a multiple of four participants and choose language, edition, treatment, and matching.
2. Open [beer-lab.org](https://beer-lab.org), select teaching, and continue to [teaching.beer-lab.org](https://teaching.beer-lab.org).
3. Select **Monetary policy and central banking**. The subdomain should display only this family.

4. In **Rooms**, open the English basic or extended room, select one configuration, and create the session.
5. Keep **Monitor** and **Report** in separate tabs. Share only the stable participant room route.
6. Read the laboratory rules and let each participant complete comprehension questions privately.
7. Answer questions about rules and units. Do not suggest a rate, forecast, or strategy.
8. Wait for every economy to finish. Project the still-hidden report, elicit a prediction, and only then reveal.
9. Export data if sessions will be compared. Retain anonymous codes and record the exact configuration.

### Checkpoint

Before starting: correct server; four rooms; correct configuration and language; multiple of four; links ready; projector free of individual data; report hidden; treatment recorded; recovery plan for a disconnected computer.

# Access, rooms, and family isolation

## 2.1 From the institutional portal to the experiment

Navigation starts at [beer-lab.org](https://beer-lab.org). The teaching section leads to [teaching.beer-lab.org](https://teaching.beer-lab.org). The monetary-policy card should open the dedicated subdomain. Isolation is part of the product: /demo must list exactly this family's 22 configurations and /rooms its four rooms. Dictator, trust, markets, and other games must not be available on this host.

Basic rooms offer one period, ten periods with the same economy, and ten periods with reassignment. Extended rooms offer eight treatments. English and Spanish are complete interfaces of one application: equations, parameters, and data are shared, while titles, instructions, errors, buttons, waits, outcomes, and reports are translated.

### Attention

If the host lists unrelated games, do not create a session by searching through a large catalog. The instance was not started with `monetarypolicy`. Report the deployment problem. The participant route must never expose the administrative password.

## 2.2 Creating a session and distributing access

After a configuration is selected, oTree creates participant links and access to Monitor, Data, and Report. In class, the stable room route simplifies entry and allows the laboratory to reuse managed room codes. Individual links are useful for a demonstration or controlled recovery. Never project codes together with names or seat numbers.

Use Monitor to locate a delayed group. Waiting is normal: forecasters must finish before the central bank sees the mean, and everyone waits while the outcome is computed. A prolonged wait usually means someone remains on an earlier page, lost connection, or opened the wrong link. Report stays hidden until every active economy-period is complete.

## 2.3 The 22 configurations

The stable basic English room is:

[https://monetarypolicy.beer-lab.org/room/monetary\\_policy\\_en](https://monetarypolicy.beer-lab.org/room/monetary_policy_en)

The family contains six basic configurations: three English/Spanish modes. It also contains sixteen extended configurations: eight treatments in each language. The four rooms are:

oTree Demo Sessions Rooms Data Server Check Logout

[EN] Monetary Policy — 10 periods, same economy: session 'wukbl7eo' (demo)

New Links Monitor Data Payments Report Description

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

Combined views

Split-screen view [Launch](#) Grid view [Launch](#)

Session-wide testing link  
Open the below link in up to 4 browser tabs.  
<http://127.0.0.1:8058/join/nudebehe>

Single-use links  
Open each link in its own browser tab.

|    |                                                                                                                         |
|----|-------------------------------------------------------------------------------------------------------------------------|
| P1 | <a href="http://127.0.0.1:8058/InitializeParticipant/m415dt1k">http://127.0.0.1:8058/InitializeParticipant/m415dt1k</a> |
| P2 | <a href="http://127.0.0.1:8058/InitializeParticipant/phc5jvdx">http://127.0.0.1:8058/InitializeParticipant/phc5jvdx</a> |
| P3 | <a href="http://127.0.0.1:8058/InitializeParticipant/0qt134qe">http://127.0.0.1:8058/InitializeParticipant/0qt134qe</a> |
| P4 | <a href="http://127.0.0.1:8058/InitializeParticipant/dshbwios">http://127.0.0.1:8058/InitializeParticipant/dshbwios</a> |

Figure 2.1: Links and administrative tools for a test session.

- `politica_monetaria_es` and `monetary_policy_en`;
- `politica_monetaria_extendida` and `monetary_policy_extended`.

Every configuration name starts with its room name, preventing a manual exception table.

Do not switch treatments inside a session. For a within-class comparison, create separate sessions and record order. When the same people play multiple versions, treatment and experience can be confounded. This may be acceptable for illustration; for a structured comparison, assign treatments across sections or counterbalance order.

## 2.4 Preflight check and recovery

Before a new class, open all four rooms and confirm the option count: three in each basic room and eight in each extended room. A basic room must initially select a basic configuration in the correct language. Create a minimum session, traverse welcome and instructions, and confirm that **Server Check** reports debug off, password protection, and a configured database on production.

Record the session code and configuration, but do not reuse links from a database that was replaced. If a session is interrupted, determine whether one person, one economy, or the whole instance is affected. An individual link can restore a closed tab; it cannot repair a different database or stopped process. For a general failure, preserve evidence and contact the laboratory administrator instead of creating sessions on another host.

Preflight also checks teaching content. Verify that the bank receives three aggregated forecasts, private agents cannot see a hidden target, the rule treatment requests no human rate, and the report remains concealed. This five-minute test prevents a configuration error from being mistaken for economic behavior during class.

# Participant journey and common rules

## 3.1 Welcome and laboratory conduct

The first page introduces the BEER Lab, its teaching purpose, and conduct rules. Each participant confirms silent individual work and agrees to use only information on the screen. The cover separates the



**BEER Lab**



### Monetary Policy and Central Banking

An experimental economy will connect inflation expectations, interest-rate choices, economic activity, and inflation.

#### Purpose of the laboratory

The Behavioral and Experimental Economics Research Lab in the Department of Economics at Tecnológico de Monterrey is designed for learning about economic decisions through controlled activities. Decisions will be analyzed anonymously and in aggregate.

#### General rules

- Remain quiet and do not talk with other participants.
- Make decisions independently and do not show your screen.
- Read every screen carefully; amounts are expressed in ECU.
- For technical help, raise your hand and wait for the instructor.

☐ I have read and accept the laboratory rules.

**Start**

Figure 3.1: Institutional welcome and acceptance of laboratory rules.

## 3.2 Roles and timing

Each economy contains one central bank and three private-sector members. Roles remain fixed over ten periods, including under economy reassignment. Private participants forecast inflation first. The platform computes the mean. The central bank observes the mean, shocks, neutral real rate, and target, then chooses a nominal rate from 0 to 12 percent. Under the rule treatment, the system replaces this choice. The platform then computes the real rate, output gap, inflation, errors, and payoffs.



Basic version - one interaction

### How the economy works

#### Resources and unit of account

**Monetary base of your account per round: 100 ECU. The outcome adds income or bonuses and deducts the costs or losses specified in the instructions.**

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

This session does not convert ECU into real money.

Each economy has one central bank and three private-sector members. The sequence repeats every period.

#### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

#### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.

#### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{supply shock} + 0.5 \times \text{output gap}$$

Figure 3.2: Current instructions for the basic edition: initial resources, decision rules, and experimental units. Continuation 1/2.

This timing avoids an ambiguous simultaneity. The bank responds to aggregate expectations and current conditions; forecasters do not know the rate when reporting. They must anticipate both the model and the authority. The activity creates a simple strategic interaction: policy responds to expectations, and realized inflation determines the accuracy of those expectations.

## 3.3 Comprehension check

#### ECU payoffs

Private-sector members earn up to 100 ECU based on forecasts. Each person answers three questions about transmission, incentives, and order. An incorrect answer does not remove the participant; the page asks for review and another attempt.

The instructor may clarify how to read an equation but should not translate comprehension into a recommended rate or forecast.

#### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 0%.

**Session treatment:** Dual mandate: stabilize inflation and activity.

## How the economy works

### Resources and unit of account

**Monetary base of your account per round: 100 ECU. The outcome adds income or bonuses and deducts the costs or losses specified in the instructions.**

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

This session does not convert ECU into real money.

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Dual mandate: stabilize inflation and activity.

**Continue**

Powered by [oTree](#)

Figure 3.3: Current instructions for the basic edition: initial resources, decision rules, and experimental units. Continuation 2/2.



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



**Comprehension questions**

1. Holding everything else constant, a higher policy rate tends to:

- ☐ Lower the output gap and inflation
- ☒ Raise both
- ☐ Change neither

Your answer: Raise both. The correct answer is Lower the output gap and inflation. Review the answers: the rate affects demand, forecasts are rewarded for accuracy, and policy is set after expectations are aggregated.

2. What determines a private-sector payoff?

- ☒ The accuracy of the inflation forecast
- ☐ Choosing the highest rate
- ☐ A draw unrelated to the decision

3. Who sets the rate after seeing the mean forecast?

- ☒ The central bank or automatic rule
- ☐ Each forecaster
- ☐ The instructor

**Continue**

Powered by [qTree](#)

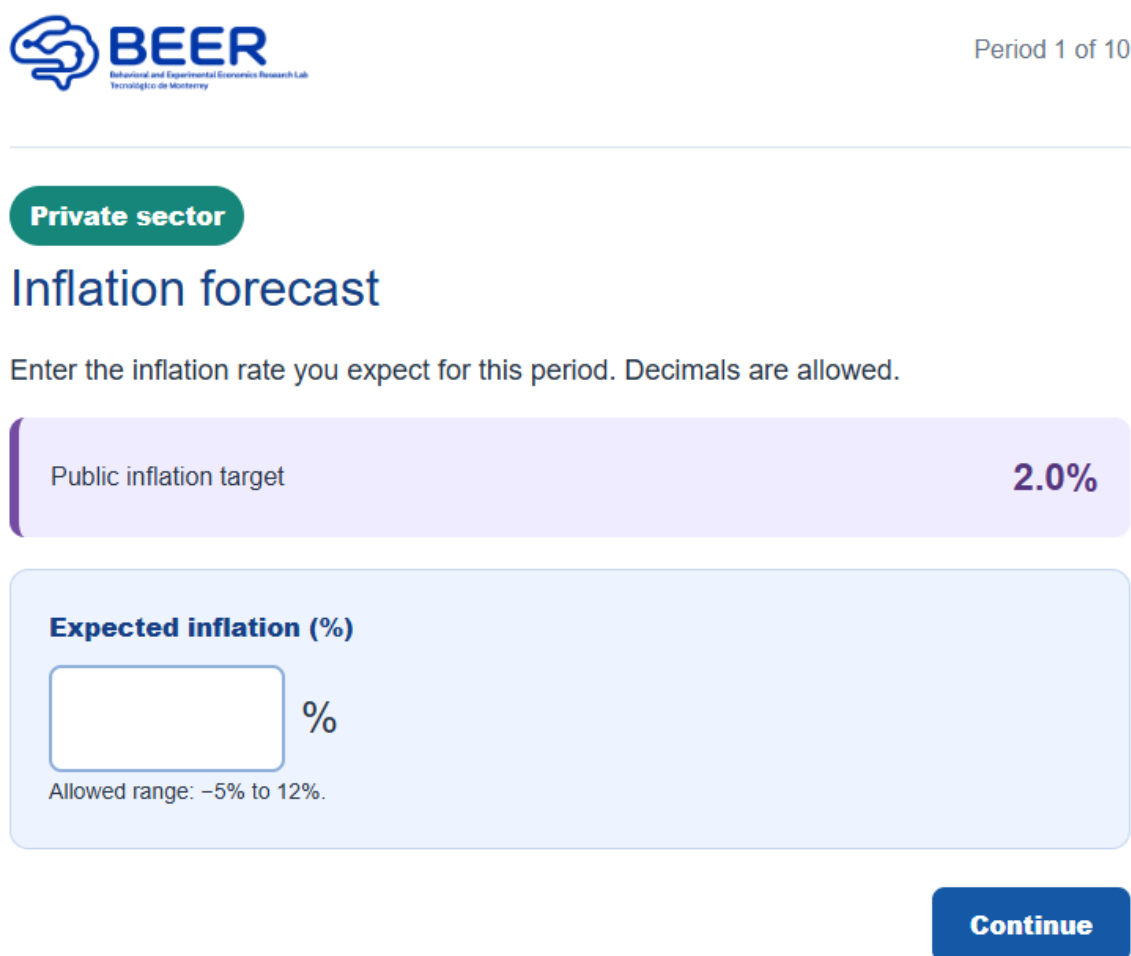
Figure 3.4: Current comprehension check with an incorrect answer, its specific explanation, and retained responses.

### What participants will see

A participant should explain three ideas: a higher nominal rate raises the real rate when expectations are unchanged; a private payoff rises as the forecast approaches realized inflation; and the bank moves after forecasts. Pause before starting if any of these statements remains unclear.

## 3.4 Decisions and outcomes

The private screen displays the public target or a question mark when it is hidden. Forecasts range from  $-5$  to  $12$  percent in tenths. The bank dashboard displays mean expectations, shocks, the neutral rate, the target, and a Taylor-type reference. The reference is a pedagogical comparison,



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Period 1 of 10

**Private sector**

### Inflation forecast

Enter the inflation rate you expect for this period. Decimals are allowed.

Public inflation target **2.0%**

**Expected inflation (%)**

%

Allowed range:  $-5\%$  to  $12\%$ .

**Continue**

Figure 3.5: The two decisions within a period. Individual inflation forecast.

The outcome screen places inflation and the target on one scale. It reports inflation, output gap, rate, mean expectation, target deviation, stabilization loss, and payoff. A private participant also sees the individual forecast error. With a hidden target, private screens omit the target line, target deviation, bank loss, and reference that could reveal it.

An explicit completion page reports accumulated ECU and role-relevant performance. There is no button leading to “No more pages left.” Participants can remain there while the instructor discusses the aggregate report.


Period 1 of 10

---

Central bank

## Central-bank decision

Observe expectations and shocks. Set the nominal policy rate between 0% and 12%.

|                              |                               |                               |                                  |                                 |                                      |
|------------------------------|-------------------------------|-------------------------------|----------------------------------|---------------------------------|--------------------------------------|
| Mean forecast<br><b>2.0%</b> | Demand shock<br><b>0.0 pp</b> | Supply shock<br><b>0.0 pp</b> | Neutral real rate<br><b>2.0%</b> | Inflation target<br><b>2.0%</b> | Taylor-type reference<br><b>4.0%</b> |
|------------------------------|-------------------------------|-------------------------------|----------------------------------|---------------------------------|--------------------------------------|

**Policy rate (%)**

%

Continue

Figure 3.6: Central-bank rate decision.


Period 1 of 10

---

Central bank

## Period outcome

|                                    |                            |                            |                                        |                                   |                                   |
|------------------------------------|----------------------------|----------------------------|----------------------------------------|-----------------------------------|-----------------------------------|
| Observed inflation<br><b>2.04%</b> | Output gap<br><b>0.08%</b> | Policy rate<br><b>3.9%</b> | Mean expected inflation<br><b>2.0%</b> | Gap from target<br><b>0.04 pp</b> | Stabilization loss<br><b>0.03</b> |
|------------------------------------|----------------------------|----------------------------|----------------------------------------|-----------------------------------|-----------------------------------|

Period payoff  
**99.97 ECU**

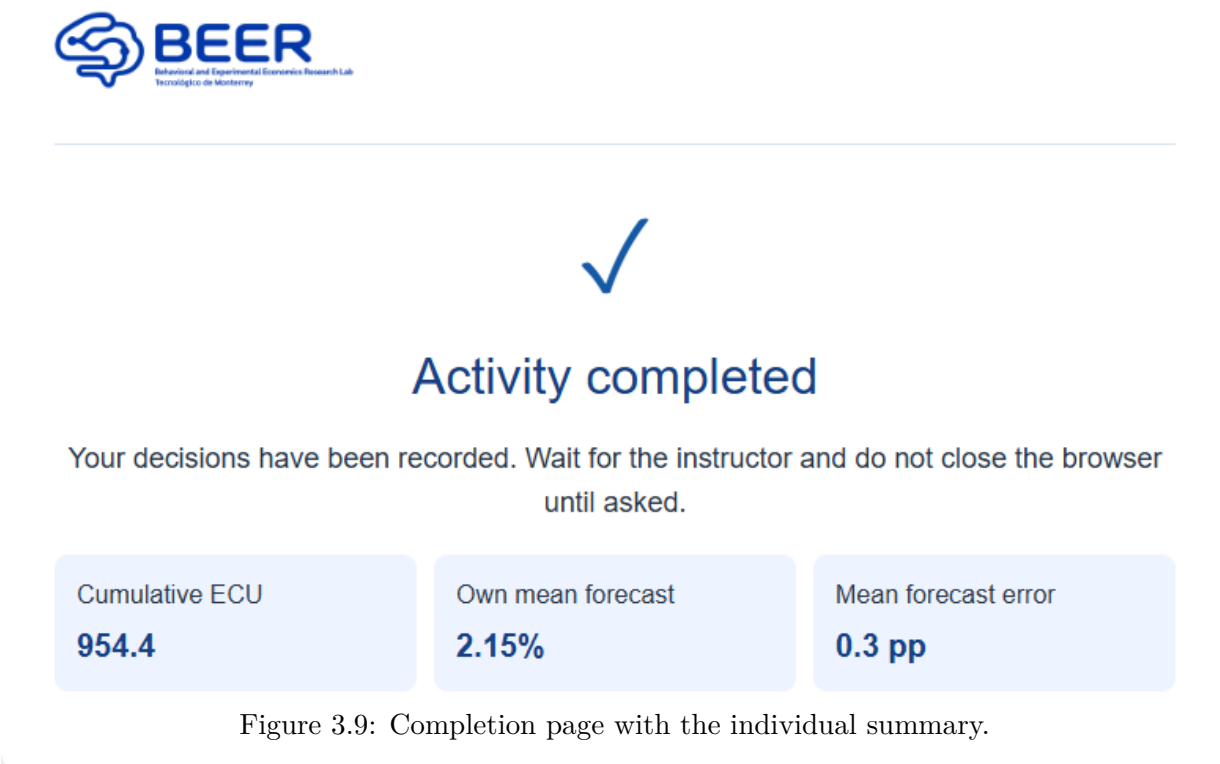
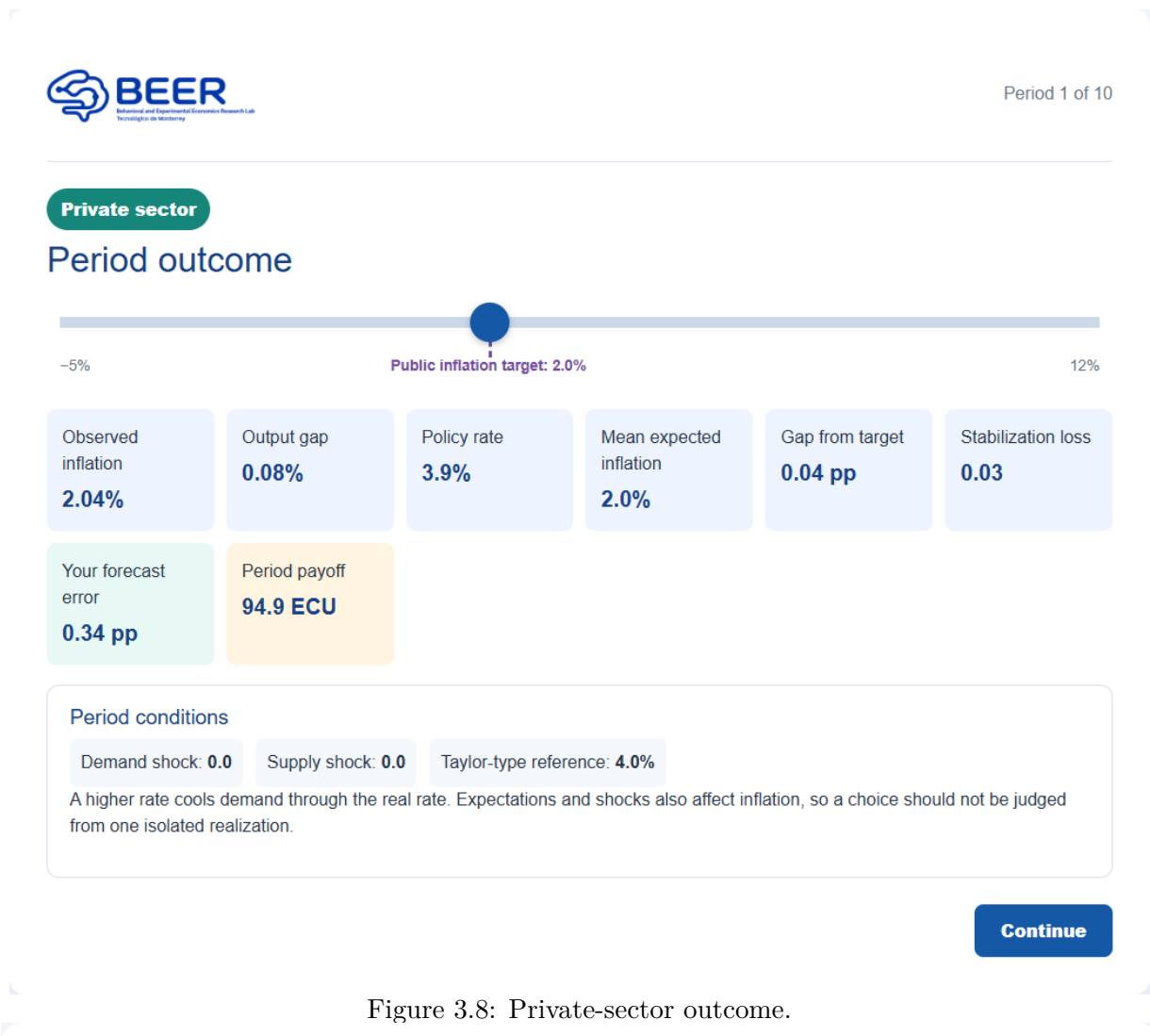
**Period conditions**

Demand shock: **0.0**
Supply shock: **0.0**
Taylor-type reference: **4.0%**

A higher rate cools demand through the real rate. Expectations and shocks also affect inflation, so a choice should not be judged from one isolated realization.

Continue

Figure 3.7: Role-specific outcome screens. Central-bank outcome.



# Economic model and payoffs

## 4.1 Three reduced-form relationships

The game uses a deliberately reduced model. It does not replicate every institution in an actual economy; it preserves the channels needed to experiment with expectations and policy. The ex ante real rate is

$$r_t = i_t - \pi_t^e,$$

where  $i_t$  is the nominal rate and  $\pi_t^e$  mean expected inflation. The output gap is

$$x_t = d_t - 0.8(r_t - r_t^n),$$

where  $d_t$  is a demand shock and  $r_t^n$  the neutral real rate. Inflation is

$$\pi_t = \pi_t^e + 0.5x_t + s_t,$$

with  $s_t$  a supply shock. These equations summarize an IS curve and an expectations-augmented Phillips curve.

### Theoretical foundation

The key mechanism is the real rate. If the bank raises the nominal rate while expectations stay fixed, the real rate rises, demand cools, the output gap falls, and inflation pressure declines. If expectations rise at the same time, a higher nominal number may not mean tighter policy. The report therefore presents the rate and expectations together.

Inflation inherits the average forecast because price and wage setters act on a view of the future. The 0.5 coefficient translates activity into inflation pressure. A supply shock enters directly and may raise inflation even with a negative gap. The coefficients are teaching parameters, not estimates for Mexico or any other economy.

## 4.2 The central bank's objective

Under the dual mandate, loss is

$$L_t = 8(\pi_t - \pi^*)^2 + 2x_t^2.$$

The bank earns  $\max\{0, 100 - L_t\}$  ECU. Inflation-only targeting sets the output weight to zero. The quadratic form makes large deviations in either direction costly and supports a discussion of below-target inflation as a miss. The weights express priorities; they are not an official objective function of an actual central bank.

Each forecaster earns

$$\max\{0, 100 - 15|\pi_{jt}^e - \pi_t|\} \text{ ECU.}$$

Absolute error is easy to explain: a one-point miss costs 15 ECU. Individual forecasts determine private payoffs, while the three-person mean enters the economy. A person may be accurate when the mean is inaccurate, and the reverse.

### 4.3 Taylor-type reference

The dashboard calculates

$$i_t^T = \pi^* + r_t^n + 1.5(\pi_t^e - \pi^*) + 0.5d_t + 0.5s_t,$$

bounded between 0 and 12 percent. The expression adapts the systematic-response logic of [Taylor \(1993\)](#). It uses expected inflation and observed shocks because the decision precedes the outcome. The value compares conduct with a rule; it does not define one uniquely correct rate.

#### Attention

Do not evaluate a student by exact agreement with the reference. Several rates can produce similar losses, and a sensible rate can have an adverse outcome after a shock. The learning goal is to justify the choice through the mechanism, not to guess a displayed number.

### 4.4 Fully worked example

Let the target be 2%, the neutral rate 2%, mean expectations 3%, the demand shock 1, and the supply shock 0.5. The bank sets  $i_t = 5\%$ . The real rate is  $5 - 3 = 2\%$ . It equals neutral, so policy does not offset demand. The gap is  $1 - 0.8(2 - 2) = 1$ . Inflation is  $3 + 0.5(1) + 0.5 = 4\%$ .

Inflation misses by two points and output by one. Dual-mandate loss is  $8(2^2) + 2(1^2) = 34$ , so the bank receives 66 ECU. A 3% forecaster misses by one point and receives 85 ECU. The reference is  $2 + 2 + 1.5(3 - 2) + 0.5(1) + 0.5(0.5) = 6.25\%$ .

Had the bank chosen 6.25%, the real rate would be 3.25%, the gap  $1 - 0.8(1.25) = 0$ , and inflation  $3 + 0 + 0.5 = 3.5\%$ . Loss would be  $8(1.5^2) = 18$ , below 34. The example shows why policy responds to the source of a disturbance, not only current inflation. It also shows why a reference does not remove uncertainty or become a universal truth.

#### Checkpoint

Ask the class to calculate the example in four lines: real rate, gap, inflation, and loss. When answers differ, locate the step rather than merely correcting the number. Then ask what changes under a pure supply shock or an unknown target.

# Preparing and running the session

## 5.1 Before students arrive

Open the instructor route, verify the family name, and create a four-person test session. Confirm one central bank, three forecasters, working participant links, and a hidden report. Check browser zoom, connectivity, and system time. Record the configuration and session code.

Prepare the room route and, if useful, a QR code. Do not include the instructor password. Have a late-arrival plan. Before decisions begin, recreating a session with the correct count is often clearest. After play begins, do not give a newcomer someone else's link because that changes a role or economy.

## 5.2 Opening the activity

Explain that this is an artificial economy and that payoffs are in ECU. The purpose is to learn economic relationships through choices, not to measure intelligence or grade performance. Read the silence rules. Avoid phrases such as “the bank should raise” or “the target is obvious,” which turn the exercise into guessing the instructor's judgment.

Elicit an anonymous prediction: will expectations converge to target, will the rate be more volatile than inflation, and will supply shocks be harder than demand shocks? Save the predictions. Compare them with the report so feedback answers a question the class already owns.

## 5.3 During play

Use Monitor to distinguish normal waiting from abandonment. If one forecaster delays, the whole group waits before the rate decision. If the bank delays, the economy waits for an outcome. Do not announce values from other groups. When asked “what rate should I choose?”, answer with the calculation sequence: expectations, real rate, gap, inflation, and objective.

Allow learning in a ten-period run. Explaining theory after every period coordinates strategies artificially. A short midpoint pause may clarify units or fix a technical issue, but should not reveal class averages.

## 5.4 After the last period

Keep the report hidden and ask each role what pattern it expects. Reveal only afterward. Describe levels, dispersion, trends, and episodes before interpreting. This order reduces the temptation to rationalize any pattern as confirmation.

A 60-minute class can allocate 10 minutes to instructions, 20 to decisions, 20 to the report, and 10 to synthesis. A 90-minute class can add a treatment, reconstruct a period, and discuss evidence. When time is short, reduce treatments; retain comprehension and closure.

# Reading the instructor report

## 6.1 Controlled reveal and denominators

The report displays participants, economies per period, completed outcomes, and pending outcomes. Reveal remains unavailable while an active outcome is incomplete. Once complete, the instructor chooses when to display aggregates and may hide them again. This protects ongoing choices and permits a prediction before feedback.

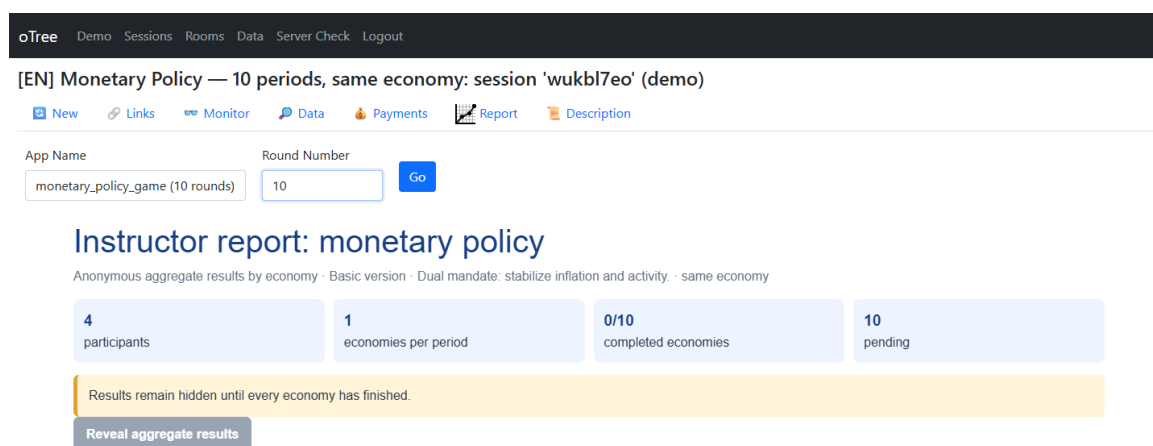


Figure 6.1: Instructor report before aggregate results are revealed.

## 6.2 Summary measures

The dashboard reports inflation, output gap, rate, expectations, forecast error, target deviation, distance from the reference, and loss. Inflation, output, and rate are averaged over economy-periods. Forecast error is averaged over individual forecasts. These quantities do not share the same denominator.

Absolute target deviation measures stability without canceling positive and negative misses. Loss incorporates the mandate weights. Distance from the reference describes behavior, not causal quality. A small distance may accompany high loss under extreme expectations or shocks; a large distance may coincide with low loss by chance.

## 6.3 Paths and distributions

The first chart overlays realized and expected inflation. Vertical separation approximates aggregate forecast error and can reveal learning, overshooting, or cycles. The second compares the chosen rate with the reference. Select periods and ask which information justified a divergence.

The error histogram groups individual forecasts. A low mean can hide a minority of large mistakes, so the distribution complements the average. The rate histogram displays concentration, polarization, and boundary choices. With multiple economies, compare shapes before referring to a single “class rate.”

The final table reports economy counts and period means. Choose a stable and a high-loss period. Reconstruct expectations, shocks, real rate, output, and inflation. This comparison turns the report into an explanation rather than a gallery of charts.

### Feedback script

Begin with four questions: which variable converged first, when did dispersion rise, did the rate respond in the predicted direction, and did the largest loss come from inflation, output, or both? Connect answers to the real rate, shock type, mandate, and expectation formation. End by asking what further evidence would be needed for a causal claim.

## 6.4 Common interpretation errors

Do not treat the mean forecast as every individual’s belief. Do not call a mean near target an equilibrium when dispersion is large. Do not interpret a positive rate-inflation correlation as proof that rate increases cause inflation: the bank raises rates precisely when it anticipates pressure. This policy reaction is an accessible example of endogeneity.

Do not compare losses across dual and inflation-only mandates without noting that the definition changes. Present inflation and output separately. Do not generalize from one economy to “students.” Unit, treatment, and order matter.



Figure 6.2: Aggregate report with paths, histograms, and period detail.

---

# Foundations for feedback

## 7.1 Expectations and monetary transmission

A nominal rate affects decisions through the expected real rate. If expected inflation rises by more than the nominal rate, policy may become expansionary even though the announced number is higher. The game makes this principle visible by placing the rate and expectations in one dashboard.

Expectations also enter inflation directly. A credible target can coordinate forecasts and reduce the rate adjustment required. An unknown target must be inferred from policy behavior. Forward guidance attempts to move expectations before the outcome. Communication and credibility are therefore part of the mechanism, not merely public relations.

## 7.2 Mandates, rules, and discretion

A dual-mandate authority weighs two gaps. A demand shock usually moves inflation and output together, so tightening can improve both objectives. An adverse supply shock raises inflation while lowering activity; reducing one deviation worsens the other in the short run. Loss weights determine the response.

A rule offers predictability and discipline. [Taylor \(1993\)](#) formulated a response guide, not a mechanical order for every state. Discretion uses information omitted from a formula but may make policy less predictable. The experiment compares these arrangements in a transparent model.

## 7.3 The Taylor principle

If the nominal rate responds less than one-for-one to higher expected inflation, the real rate falls, demand expands, and the original inflation expectation may validate itself. A more-than-proportional response raises the real rate and counters that mechanism. This is the Taylor principle. It does not imply that any very high coefficient is desirable: extreme reactions can destabilize output, especially with noisy information or supply shocks.

## 7.4 The lower bound and the neutral rate

When the neutral real rate falls below zero, the nominal rate needed to close the gap may be negative. The platform imposes a zero floor. With low expected inflation, the real rate can remain too high and deepen recession. The treatment introduces unconventional policy, future-rate

promises, and the distinction between a modeled floor and the broader set of actual central-bank tools.

## 7.5 Learning and rationality

Rational expectations are commonly represented as forecasts consistent with the model and available information. In the laboratory, people learn from limited data, use adaptive rules, and react to recent errors. [Pfajfar and Žakelj \(2014\)](#) show that policy design changes both stability and forecasting heuristics. A departure from a solution is not automatically “irrationality”; it may reflect learning, uncertainty about policy, or incomplete coordination.

### Theoretical foundation

The activity is a pedagogical representation of a New Keynesian model, not an estimate or calibrated forecast. Its strength is isolation of expectations, the real rate, shocks, mandate, and rule. It omits financial markets, unemployment, balance sheets, exchange rates, fiscal policy, and productive heterogeneity. Making the boundary explicit helps students see which questions require another model.

---

# Extended treatments

Treatments retain the roles, timing, and core equations. Each entry identifies the change, prediction, report reading, and facilitation. Avoid repeating the full instructions between treatments; emphasize the experimental change.

## 8.1 Dual mandate

**Configuration:** `monetary_policy_extended_dual_mandate`.

### Mechanism

The bank minimizes both inflation and output deviations. This is the extended benchmark for comparing rules and shocks.

### Prediction

Under demand shocks, a suitable rate stabilizes inflation and activity together. Supply disturbances create a trade-off.

### How to read the report

Compare absolute target deviation, the output gap, and loss. Find periods in which near-target inflation coexisted with a large gap.

#### Implementation

Use it as the starting treatment. Ask banks to explain how they weighed inflation and activity without treating the Taylor reference as mandatory.

## 8.2 Inflation-only target

**Configuration:** `monetary_policy_extended_inflation_target`.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Dual mandate: stabilize inflation and activity.

**Continue**

Figure 8.1: Treatment instructions for dual mandate.

## Mechanism

The loss function removes output. Transmission is unchanged, but the bank payoff depends only on moving inflation toward target.

## Prediction

The authority accepts output movement when required for price stability. The contrast is sharpest under a supply shock.

## How to read the report

Do not compare loss levels directly with the dual mandate because the metric changed. Compare inflation and output separately, with the rate distribution.

### Implementation

Run it after the dual mandate or across sections. Before reveal, ask whether the simpler target stabilized expectations and at what real cost.

## 8.3 Automatic Taylor-type rule

**Configuration:** `monetary_policy_extended_taylor_rule`.

## Mechanism

The system computes the rate from target, neutral rate, expectations, and shocks. The assigned bank observes but does not choose the instrument.

## Prediction

A systematic response removes discretionary heterogeneity and may stabilize expectations when understood, although no misspecified rule dominates in every state.

## How to read the report

Distance from the reference is zero by construction. Focus on inflation, output, errors, and comparison with human central banks.

### Implementation

Do not describe this as the absence of a central bank: policy is represented by a rule. Compare predictability, flexibility, and performance.

## 8.4 Demand shock

**Configuration:** `monetary_policy_extended_demand_shock`.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Strict inflation target: the loss does not penalize the output gap.

**Continue**

Figure 8.2: Treatment instructions for inflation-only target.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Automatic Taylor-type rule instead of discretion.

**Continue**

Figure 8.3: Treatment instructions for automatic taylor-type rule.

## Mechanism

A predetermined path shifts demand through expansion, reversal, and recovery. The shock enters the gap and the reference.

## Prediction

Inflation and output tend to move in the same direction. Raising the rate in expansion or reducing it in contraction supports both objectives.

## How to read the report

Align the rate path with the shock and inspect expectation lags. A correct response can create positive rate-inflation correlation through endogeneity.

### Implementation

Do not announce the whole path. During feedback, mark the largest shock and reconstruct the bank's decision in that period.

## 8.5 Supply shock

**Configuration:** `monetary_policy_extended_supply_shock`.

## Mechanism

The disturbance enters inflation directly. Policy offsets it only by creating an output gap.

## Prediction

After an inflationary shock, price stabilization requires weaker activity. A dual mandate usually tolerates part of the inflation increase.

## How to read the report

Display inflation and output jointly. A single variable can make a coherent choice look mistaken. Compare losses and rates around the peak.

### Implementation

Use this treatment to teach the stabilization frontier. Ask for proposals under both mandates and discuss who bears the cost of each response.

## 8.6 Interest-rate lower bound

**Configuration:** `monetary_policy_extended_lower_bound`.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Large demand shocks that shift economic activity.

**Continue**

Figure 8.4: Treatment instructions for demand shock.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Cost-push shocks that create an inflation–activity trade-off.

**Continue**

Figure 8.5: Treatment instructions for supply shock.

## Mechanism

A lower neutral real rate requires strong easing, but the nominal rate cannot fall below zero. The bank screen flags the constraint.

## Prediction

When the desired reference is negative, the floor leaves the real rate too high. Output and inflation may remain below objectives.

## How to read the report

Count floor periods and compare the unconstrained reference with the feasible instrument. Ask whether expectations amplify or dampen recession.

### Implementation

Use the treatment to introduce forward guidance and unconventional policy. Clarify that it models the floor, not every actual instrument.

## 8.7 Hidden target

**Configuration:** `monetary_policy_extended_hidden_target`.

## Mechanism

The bank knows a four-percent target; private participants see a question mark. Private outcomes also omit references that would reveal it.

## Prediction

Forecasters infer the reaction function. Initial dispersion may be larger and then fall when policy behavior sends a consistent signal.

## How to read the report

Examine convergence speed, errors, and cross-economy differences. Do not reveal the target before completion.

### Implementation

At the end, ask each participant to state the inferred target before disclosure. Compare inference with rate behavior to discuss transparency.

## 8.8 Forward guidance

**Configuration:** `monetary_policy_extended_forward_guidance`.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Private sector

You forecast inflation; your payoff depends on accuracy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** Recession with a low neutral real rate and a 0% nominal lower bound.

**Continue**

Figure 8.6: Treatment instructions for interest-rate lower bound.



Extended version · same economy

## How the economy works

Each economy has one central bank and three private-sector members. The sequence repeats every period.

### Your role:

Central bank

You set the policy rate to stabilize the economy.

### Period sequence

1. The private sector forecasts inflation.
2. The central bank observes the mean forecast and available shocks.
3. The central bank sets the policy rate; in the automatic treatment, a rule sets it.
4. The system calculates the output gap, inflation, and payoffs.

### Transparent model

$$\text{Real rate} = \text{policy rate} - \text{expected inflation}$$

$$\text{Output gap} = \text{demand shock} - 0.8 \times (\text{real rate} - \text{neutral real rate})$$

$$\text{Inflation} = \text{expected inflation} + 0.5 \times \text{output gap} + \text{supply shock}$$

### ECU payoffs

Private-sector members earn up to 100 ECU based on forecast accuracy. Each percentage-point error reduces the payoff by 15 ECU.

The central bank earns up to 100 ECU. Its loss rises when inflation misses the target and, except under strict inflation targeting, when the output gap differs from zero.

### Worked example

If expected inflation is 2%, the policy rate is 4%, shocks are zero, and the neutral real rate is 2%, the real rate is 2%, the output gap is 0%, and inflation is 2%.

**Session treatment:** The target is known to the central bank but not the private sector.

**Continue**

Figure 8.7: Treatment instructions for hidden target.

## Mechanism

The bank first announces easing, no change, or tightening. Private agents see the message before forecasting; the bank then sets the rate.

## Prediction

A credible message can move expectations and the real rate before action. Repeated gaps between words and actions can reduce influence.

## How to read the report

Compare announcement, rate, expectations, and outcomes by period. Association alone is not credibility; look for repeated delivery and response.

### Implementation

Project the private screen as well as the bank screen. Do not allow oral explanations; all policy communication must use the interface.



Period 1 of 10

### Central bank

## Forward guidance

Before the private sector forms expectations, announce the stance you intend to follow. The announcement does not mechanically bind your later choice.

- ☐ ↓ Likely expansionary stance
- ☐ → Likely neutral stance
- ☐ ↑ Likely contractionary stance

**Continue**

Figure 8.8: Treatment instructions for forward guidance.

Period 1 of 10

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**Central bank**

## Forward guidance

Before the private sector forms expectations, announce the stance you intend to follow.  
The announcement does not mechanically bind your later choice.

☐ ↓ Likely expansionary stance

☐ → Likely neutral stance

☐ ↑ Likely contractionary stance

**Continue**

Figure 8.9: Forward guidance changes the information available before forecasts. The bank sends a policy signal.



Period 1 of 10

**Private sector**

## Inflation forecast

Enter the inflation rate you expect for this period. Decimals are allowed.

Public inflation target

**2.0%**

Central-bank announcement

**Likely neutral stance****Expected inflation (%)****%**

Allowed range: -5% to 12%.

**Continue**

Figure 8.10: Private agents observe the signal.

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# Experimental evidence and literature

## 9.1 Classroom monetary-policy experiments

Duffy and Jenkins (2019) propose a classroom implementation of a simple New Keynesian model in which students act as a central bank or private sector. The authority chooses rates under a dual mandate or inflation target and private agents forecast inflation. They show feasibility for intermediate macroeconomics and money-and-banking courses and propose replacing the bank with a rule. The BEER Lab family adopts that logic and adds bilingual isolation, matching, shocks, a lower bound, transparency, forward guidance, and an aggregate report.

The similarity does not make every parameter an exact replication. This implementation uses three forecasters per economy, visible equations, and ECU payoffs for a class session. These adaptations change cognitive demands and the experimental unit and should be documented. Pedagogical validity comes from exposing mechanisms and connecting outcomes with predictions, not from claiming that one class reproduces a paper point by point.

## 9.2 Expectations and policy-rule design

Pfajfar and Žakelj (2014) study expectation formation in a laboratory New Keynesian environment. They find that stronger rules can reduce variability and that participants adjust heuristics to the policy regime. The evidence motivates plotting paths and error distributions in addition to mean inflation. It also counsels caution: a coefficient cannot be assessed separately from public learning.

Salle (2021) compares inflation, average-inflation, and price-level targets. The results show that comprehension of history dependence is part of performance and that additional communication may anchor expectations only modestly and over time. Although the current family does not implement level targets, the evidence explains why an announcement need not coordinate immediately.

Kostyshyna et al. (2022) compare five frameworks, including lower-bound episodes. They report better performance for rate-framed approaches than several level strategies and show that longer horizons can make coordination difficult. A sophisticated rule must therefore be evaluated together with its comprehensibility.

## 9.3 Using evidence without overgeneralizing

A class produces evidence under particular parameters, incentives, composition, and order. It does not establish how an actual central bank behaves. It can contrast mechanisms: higher expectations lower the real rate, a supply shock creates a trade-off, a floor constrains, and communication may

or may not coordinate.

Compare pattern direction before magnitude. Ask whether dispersion falls, banks respond to shock origin, and a rule changes volatility. Then compare with the literature. When the class differs, investigate learning, comprehension, sample size, and sequence instead of declaring that theory simply failed.

## 9.4 Validity, comparison, and the scope of evidence

The cleanest comparison changes one dimension while holding session length, economy composition, shock sequence, and report presentation constant. Dual mandate versus inflation-only targeting can reveal how objective weights matter; automatic rule versus human choice can illuminate discretion and heterogeneity. When several dimensions change together, the contrast remains useful for discussion, but it no longer identifies which alteration generated the difference.

Random assignment helps balance groups, yet a small class can retain chance differences. Before interpreting means, inspect the number of completed economies, dispersion, and extreme observations. One economy is a strategic unit shared by four people; four participant rows are not four independent macroeconomic observations. Individual variation is relevant for forecasts, but errors within one economy share shocks, the interest rate, and the realized outcome. This dependence should guide both graphs and any subsequent analysis.

External validity also requires a precise question. The laboratory does not reproduce the scale, information, or institutions of an actual central bank. It does make mechanisms transparent: how an expectation changes the real rate, how a supply disturbance creates a trade-off, and how communication may coordinate beliefs. The instructor can make claims about these mechanisms and compare their direction with published evidence, while avoiding extrapolation of magnitudes or treating one cohort's performance as a conclusion about real authorities.

Finally, distinguish descriptive evidence, comparative evidence, and causal explanation. A path describes what happened. A treatment difference is comparative. A causal interpretation requires the treatment to be the relevant difference and no equally plausible procedural explanation. Asking students to classify each classroom claim with these three labels improves methodological discussion and prevents an attractive figure from being presented as stronger evidence than the design supports.

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# Class designs and discussion questions

## 10.1 A 50-minute introduction

Use one basic period. Elicit a rate and inflation prediction. Reconstruct one outcome with the three equations. Reveal the report and explain nominal versus real rates, the target, the gap, and shocks. Close with a policy question: why can a high rate coexist with high inflation without the rate causing it?

## 10.2 A 75-minute learning session

Use ten periods with the same economy. Do not interrupt the first five. After completion, inspect expectation convergence, reference tracking, and loss. Split discussion by role: banks explain a difficult choice; forecasters explain updating. Compare strategies without identifying people.

## 10.3 A 90-minute comparison

Assign a dual mandate to half the class and inflation-only targeting to another, or use demand and supply shocks across sections. Hold parameters and duration fixed. Before reveal, elicit predictions about inflation, output, and loss. Explain why loss comparisons require a common definition and use primitive outcomes.

## 10.4 Discussion questions

1. How does a high nominal rate differ from tight monetary policy?
2. How can an expectation become part of the outcome it forecasts?
3. Why is a demand shock easier for a dual mandate than a supply shock?
4. What information does the Taylor-type reference use and omit?
5. Does a rule reduce volatility because it is better or because it removes human heterogeneity?
6. What observation could distinguish adaptive learning from fixed expectations?
7. How can private agents infer an undisclosed target from policy decisions?
8. What makes forward guidance credible in a repeated environment?

9. Why can rates and inflation correlate positively even when tightening reduces demand?
10. Which additional policy would you introduce at the lower bound, and which equation would change?

## 10.5 Follow-up assignments

A short memo can select two periods, reconstruct equations, interpret a deviation from the reference, and state one limitation. Another assignment gives each group a treatment and asks for a communication recommendation supported by one report figure. A quantitative exercise changes the Phillips coefficient or output weight and predicts how best responses and loss change.

Advanced courses can estimate a descriptive rule  $i_t = a + b\pi_t^e + cd_t + es_t$  from exported data. Students must explain that coefficients describe behavior under this design and repeated observations require clustering by economy. The assignment connects experiments, econometrics, and policy endogeneity.

### Feedback script

An effective synthesis has three layers: observed fact, model mechanism, and scope. For example, “expectations converged after period four; a known target and consistent responses may have coordinated them; with two economies we cannot know whether the pattern generalizes.” This structure avoids anecdote and false precision.

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# Feedback cases and assessment

## 11.1 Case 1: convergence with anchored expectations

Suppose mean expectations start at 3.5%, gradually fall, and end near target while the rate approaches its neutral level from above. First describe the figure without using the word credibility. The class should identify a smaller gap between expected and realized inflation and less error dispersion. Then ask what bank behavior could support it. A sequence of target-consistent responses sends a signal, but does not prove that everyone believes the bank.

Reconstruct an early and a late period. Hold shocks approximately constant and show how lower expectations alter the real rate even if the nominal rate changes little. This prevents attributing every improvement to the instrument. A prudent conclusion is that learning, a public target, and systematic behavior are mechanisms consistent with observed convergence.

## 11.2 Case 2: demand shock and endogeneity

Imagine an expansion that raises the gap, followed by a higher rate and temporarily high inflation. Ask whether positive rate-inflation correlation means the increase caused inflation. Timing and information reveal a response: the bank raised the rate because expectations and the shock signaled pressure. Evaluating the effect requires the inflation that would have occurred under another rate.

Use the reference as a teaching counterfactual with caution. Calculate the outcome under the chosen rate and an alternative while holding expectations and shocks fixed. This is not an empirical estimate, but it teaches the distinction between reaction and causation. Connect the point to simultaneity bias in policy regressions.

## 11.3 Case 3: a supply-shock trade-off

Consider high inflation, negative output, and an intermediate rate. Divide the class: one side defends greater tightening and another easing. Each group must show which loss component improves and which worsens. The answer depends on the mandate and cannot be judged from inflation alone.

Then compare with inflation-only targeting. The same rate may be too low for that objective and reasonable under a dual mandate. “Success” requires an explicit objective function. This also separates a positive prediction about behavior from a normative judgment about social and distributional weights.

## 11.4 Case 4: recession at the lower bound

Suppose the reference falls below zero, the platform sets the rate at zero, expected inflation declines, and the gap remains negative. Calculate the real rate. A zero nominal rate can be restrictive when expected inflation is negative. The lower bound therefore does not imply extremely loose policy in real terms.

Request three proposals: raise expectations through guidance, support demand with another policy, or modify the target framework. Each proposal must identify an equation and channel. The activity cannot decide which real-world tool is best; it organizes mechanisms and shows the loss of conventional instrument space.

## 11.5 Case 5: communication without credibility

Suppose the bank announces tightening, private forecasts barely respond, and the final rate does not rise. A single message may fail because it is misunderstood, not credible, or dominated by new information. The report alone does not identify the explanation; one needs a history of statements and actions.

Construct a descriptive delivery indicator: announced direction versus rate change. Then ask whether expectation responses grow after repeated delivery. Even if they do, describe association and learning rather than causation from one economy. This caution distinguishes a signal, reputation, and an effect.

## 11.6 Rubric for a post-session reflection

A short answer can receive equal weight on four dimensions. **Description:** correctly identifies a pattern and denominator. **Mechanism:** uses the real rate, output gap, Phillips relation, shocks, or expectations consistently. **Evidence:** cites one report indicator, period, or distribution. **Scope:** states a limitation and avoids unsupported causality. The rubric rewards reasoning even when a student's choice did not maximize ECU.

For quantitative work, add reproducibility: inputs and steps must be visible. For policy work, add comparison: at least two options and an explicit criterion. Do not grade exact proximity to the reference because that would turn a teaching aid into an official answer.

## 11.7 Adaptations across courses

In introductory macroeconomics, emphasize nominal versus real rates, aggregate demand, and the target. In intermediate macroeconomics, derive the equations and rule. In behavioral economics, examine forecasting heuristics, overreaction, anchoring, and learning. In econometrics, use policy reaction to discuss endogeneity and clustered data. In central banking, compare mandates, transparency, communication, and the lower bound.

The interface need not change across courses. Elicited predictions, projected columns, and follow-up assignments change. Modularity lets instructors reuse the family without teaching every theory to every group. State which questions are outside the session to prevent overload.

### Checkpoint

A complete discussion should contain: one numerical reconstruction; a comparison across periods or treatments; a distribution as well as a mean; a denominator explanation; a distinction between description and causation; and one limitation of the model.

## 11.8 A worksheet for leading feedback

Before revealing, place four headings on the board: expectations, instrument, economy, and performance. Under expectations, record the class prediction for level and dispersion. Under instrument, record whether they expect a strong, gradual, or absent response. Under economy, identify the shock and predicted directions of inflation and output. Under performance, define the criterion before seeing data. This preparation limits explanations tailored after the fact.

After reveal, fill each column with one verifiable observation. Avoid “good” and “bad” until an objective is stated. If inflation is stable and output volatile, ask whether judgment changes between dual and inflation-only mandates. If the rate is volatile and loss low, ask whether instrument stability is an objective or an omitted desirable property.

Next select an economy or, for an aggregate report, one period. Copy values in the model’s causal order. Mean expectations enter the real rate; the real rate and demand shock create the gap; gap, expectations, and supply produce inflation; inflation and output generate loss. Reading the table in this order prevents treating loss as a disconnected statistic.

Finish with a counterfactual. Change one input: one point less expected inflation, another rate, or no shock. Hold the rest fixed and recalculate. Then ask which supposedly fixed inputs would respond endogenously in an actual economy. The gap between a partial calculation and general-equilibrium adjustment reveals both the value and boundary of the exercise.

## 11.9 Diagnosing misconceptions

If a student says “high rates always reduce inflation,” request an expectation, horizon, and shock. The demand channel retains its direction, yet the observed outcome can include a larger disturbance or rising expectation. If someone says “the bank caused the recession,” compare the gap with a no-response counterfactual and separate the initial shock from the stabilization cost.

If an accurate forecast is interpreted as socially good behavior, recall that the private payoff rewards accuracy rather than stability. An agent can forecast high inflation, earn ECU, and belong to an economy with high loss. The separation is deliberate: private prediction and macroeconomic welfare are different objects.

If every departure from the rule is called irrational, ask what information the formula omits and whether its coefficients are known truths. A rule is a conditional benchmark. If every communication is assumed effective, compare statements and actions over periods. Credibility requires consistency, capacity, and comprehension, not one message.

If the target is confused with a forecast, use the hidden-target treatment. A target is an institutional objective; a forecast is a belief about an outcome. They may coincide with credible policy and small shocks, but remain different concepts. The interface and report use separate labels and colors to preserve that distinction.

# Data, ethics, and troubleshooting

## 12.1 Export and variables

The custom export contains session, anonymous participant, period, language, edition, treatment, matching, economy, role, forecast, announcement, rate, mean expectation, shocks, neutral rate, target, reference, output, inflation, errors, loss, and ECU. One row is a person-period; macro variables repeat across four rows in an economy. Keep one row per economy-period for macro outcomes and the three private rows for forecast errors.

Document exclusions and incomplete sessions. Do not pool languages or treatments without labels. Payoffs truncated at zero create a boundary mass; a linear ECU regression may not address the economic question. With few economies, prefer graphs and worked cases over formal inference.

## 12.2 Privacy and conduct

The activity requires neither names nor demographics. Codes recover a trajectory without identifying a person. Project aggregates rather than individual links. If participation belongs to a course, explain assessment. Grading reflection or comprehension is preferable to grading earnings because outcomes depend on partners and shocks.

### Attention

Never run `resetdb` against production during class. Local testing uses the isolated instance on port 8058. Deployment requires a backup, no active sessions, and a rollback plan.

## 12.3 Common problems

If someone remains waiting, inspect Monitor and the entire economy. “This user does not exist” usually means an old link refers to a reset database; create a new session. If a room displays other families, isolation is wrong. If an extended configuration is preselected in a basic room, inspect the room prefix. If the report cannot reveal, ensure pending equals zero.

No human rate field appears under the automatic rule by design. A hidden target appears as a question mark for private agents but as a number for the bank. An outcome beyond the visible scale is clipped visually, not computationally. Stop a test session and report any mixed-language label.

## 12.4 Classroom contingency plan

If one computer fails after play begins, retain the individual link and first try another browser or device. State belongs to the server, so the participant can continue from the same link. Never give out another person's link because it transfers role, choices, and payoff. If an economy cannot finish, record its code and state its exclusion from aggregate feedback.

If the whole room loses network access, leave tabs open and wait for recovery before creating another session. A second session fragments paths and may duplicate participants. If recovery is impossible, use the guide's screenshots to discuss the mechanism and reschedule the experience; do not invent numbers and present them as class outcomes.

If projection fails, participants can finish and the report can be reviewed later, but individual decisions should not be read aloud. When time expires, finish the current period and retain the report rather than accelerating with suggested rates or forecasts. Record every protocol deviation for interpretation.

After an incident, export data before changing the instance. Record time, configuration, expected participants, completed economies, and the action taken. This record separates technical failure from attrition and prevents a later comparison from attributing interruption effects to a treatment.

# Glossary and references

## 13.1 Operational glossary

**Output gap:** activity relative to potential; positive means expansionary pressure. **Inflation expectation:** a forecast of period inflation. **Target:** the value the bank seeks to stabilize. **Loss:** quadratic penalty on objective misses. **Nominal rate:** the chosen instrument. **Real rate:** nominal rate minus expected inflation. **Neutral rate:** real rate consistent with a zero gap absent a demand shock. **Demand shock:** disturbance moving activity and then inflation. **Supply shock:** direct inflation disturbance creating a trade-off. **Forward guidance:** a message about future stance intended to affect expectations. **Rule:** systematic function mapping information into the instrument.

## 13.2 Recommended reading path

For a first session, read [Duffy and Jenkins \(2019\)](#) with the operational chapters of this guide. To explain the benchmark rule, use [Taylor \(1993\)](#) and stress that a rule organizes responses without replacing judgment in every state. [Woodford \(2003\)](#) provides the broader framework for expectations and transmission.

For a class on learning, combine [Pfajfar and Žakelj \(2014\)](#) and [Pfajfar and Žakelj \(2015\)](#). They support a discussion of why stability depends on how the public forms expectations and on the variable entering a rule. For transparency and alternative targets, use [Salle \(2021\)](#); for the lower bound and regime comparisons, use [Kostyshyna et al. \(2022\)](#).

Students need not read the entire list. An instructor can assign one article, one figure, and one question. Literature helps interpret evidence and delimit claims; it does not replace the calculation and discussion generated by the class.

## 13.3 References

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# Bibliography

- Duffy, J., and Jenkins, B. C. (2019). A classroom experiment in monetary policy. *The Journal of Economic Education*, 50(2), 89–107. <https://doi.org/10.1080/00220485.2019.1583148>.
- Clarida, R., Galí, J., and Gertler, M. (1999). The science of monetary policy: A New Keynesian perspective. *Journal of Economic Literature*, 37(4), 1661–1707.
- Evans, G. W., and Honkapohja, S. (2001). *Learning and Expectations in Macroeconomics*. Princeton University Press.
- Hommes, C. H. (2011). The heterogeneous expectations hypothesis: Some evidence from the lab. *Journal of Economic Dynamics and Control*, 35(1), 1–24.
- Kostyshyna, O., Petersen, L., and Yang, J. (2022). A horse race of monetary policy regimes: An experimental investigation. Bank of Canada Staff Working Paper 2022-33. <https://doi.org/10.34989/swp-2022-33>.
- Pfajfar, D., and Žakelj, B. (2014). Experimental evidence on inflation expectation formation. *Journal of Economic Dynamics and Control*, 44, 147–168.
- Pfajfar, D., and Žakelj, B. (2015). Inflation expectations and monetary policy design: Evidence from the laboratory. Federal Reserve Board, FEDS 2015-045. <https://doi.org/10.17016/FEDS.2015.045>.
- Salle, I. (2021). What to target? Insights from a lab experiment. Bank of Canada Staff Working Paper 2021-53. <https://doi.org/10.34989/swp-2021-53>.
- Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39, 195–214. [https://doi.org/10.1016/0167-2231\(93\)90009-L](https://doi.org/10.1016/0167-2231(93)90009-L).
- Svensson, L. E. O. (1997). Inflation forecast targeting: Implementing and monitoring inflation targets. *European Economic Review*, 41(6), 1111–1146.
- Woodford, M. (2003). *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton University Press.