



Instructor Guide: Power Shifts and Commitment

Laboratory implementation, theoretical foundations,
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



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

How to use this guide

This guide supports the preparation, implementation, and classroom discussion of the family on power shifts and commitment available through the Behavioral and Experimental Economics Research Lab (BEER Lab) at the Department of Economics of Tecnológico de Monterrey. It is intended for instructors with different levels of familiarity with experimental and behavioral economics.

The document offers three reading paths. The **quick guide** is enough to launch a session. The operational chapters explain each screen used by instructors and students. The conceptual chapters present the theories, predictions, and empirical findings needed to lead the post-game discussion.

Access instructions and common screens are explained once. Each variant then focuses only on what changes relative to the basic game: configuration, group size, decisions, predictions, relevant outcomes, and academic literature.

Author

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For the instructor

This guide follows the English-language interface. Spanish configurations use the same logic. Never project individual codes or connect outcomes to names, student identification numbers, or seats in the room.

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Preparation and classroom use

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.

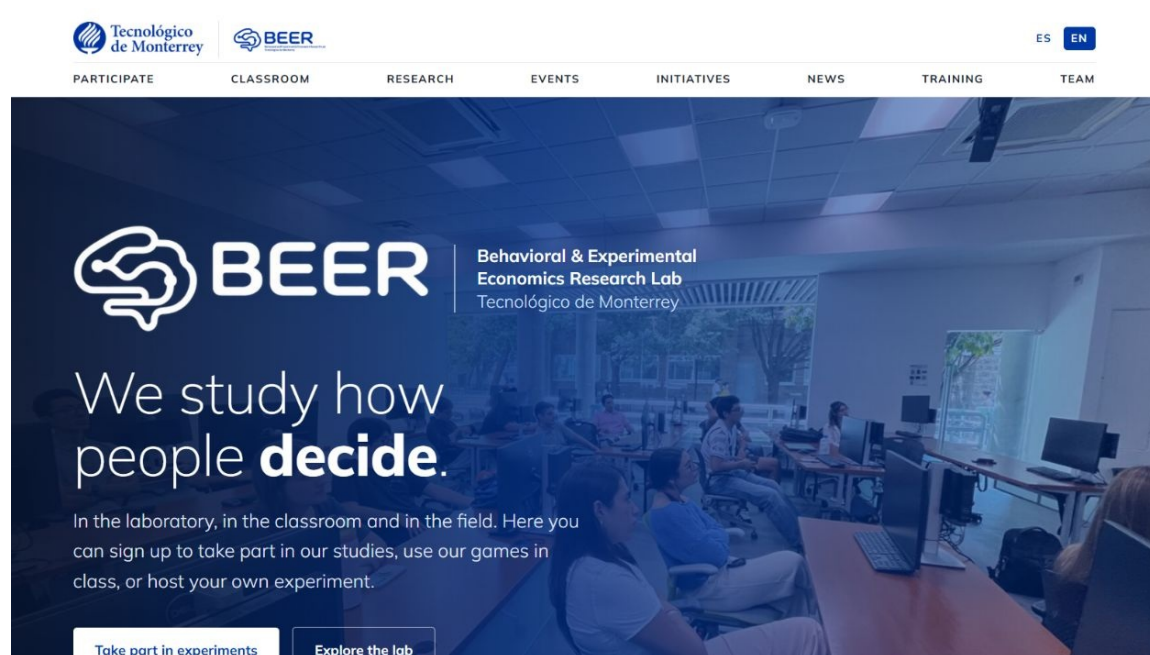


Figure 1.1: Current institutional website. Select CLASSROOM in the top navigation menu to open the teaching experiments. Captured on October 11, 2026.

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

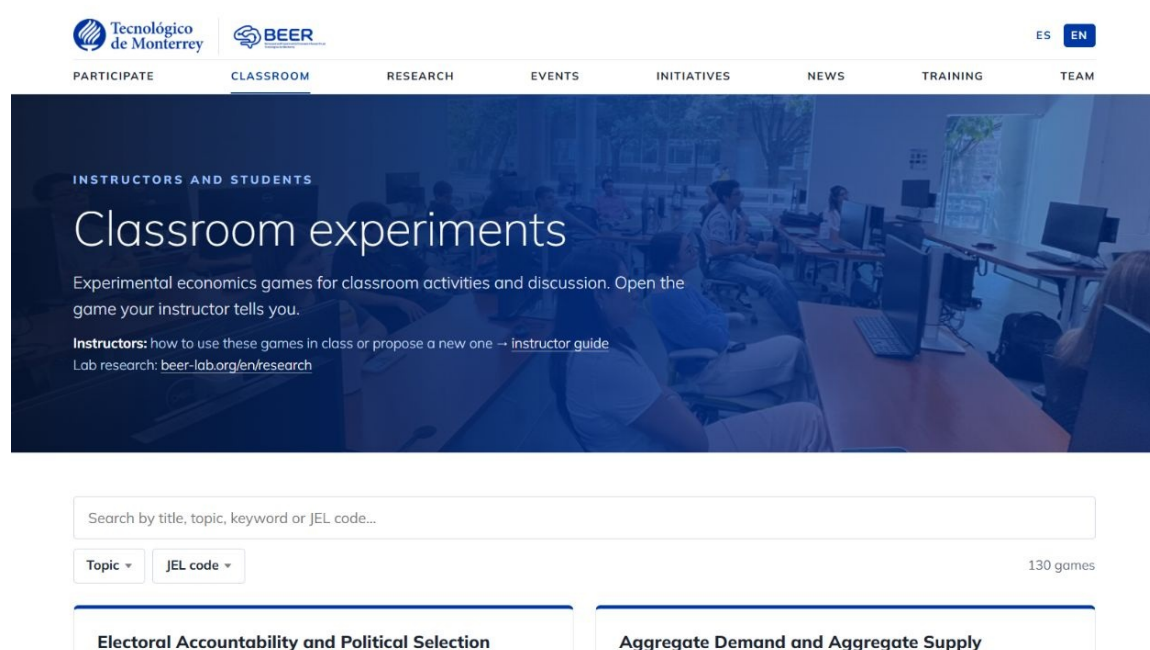


Figure 1.2: Current catalog: search by title, topic, or JEL code. Then locate this family's card and select language and edition. Captured on October 11, 2026.

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.

oTree
Demo
Sessions
Rooms
Data
Server Check
Logout

Demo

[ES] Un encuentro completo
[ES] 10 encuentros, pareja fija
[ES] 10 encuentros, parejas reasignadas
[EN] One complete encounter
[EN] 10 encounters, fixed pair
[EN] 10 encounters, reassigned pairs
[ES] Extendido — Cambio de poder sin obligación futura
[ES] Extendido — Poder estable
[ES] Extendido — Paquete ejecutado automáticamente
[ES] Extendido — Garantía de probabilidad cero: control
[ES] Extendido — Garantía del 5%
[ES] Extendido — Garantía del 50%
[ES] Extendido — Adelanto financiado: máximo 10
[ES] Extendido — Adelanto financiado: máximo 20
[ES] Extendido — Inversión observable y poder futuro
[ES] Extendido — Peso futuro de 0.5
[ES] Extendido — Continuación con probabilidad 0.5
[ES] Extendido — Desacuerdo con pago esperado cierto

Cambios de poder y compromiso / Power Shifts and Commitment — BEER Lab
 Seleccione una variante de este juego. Select a version of this game.

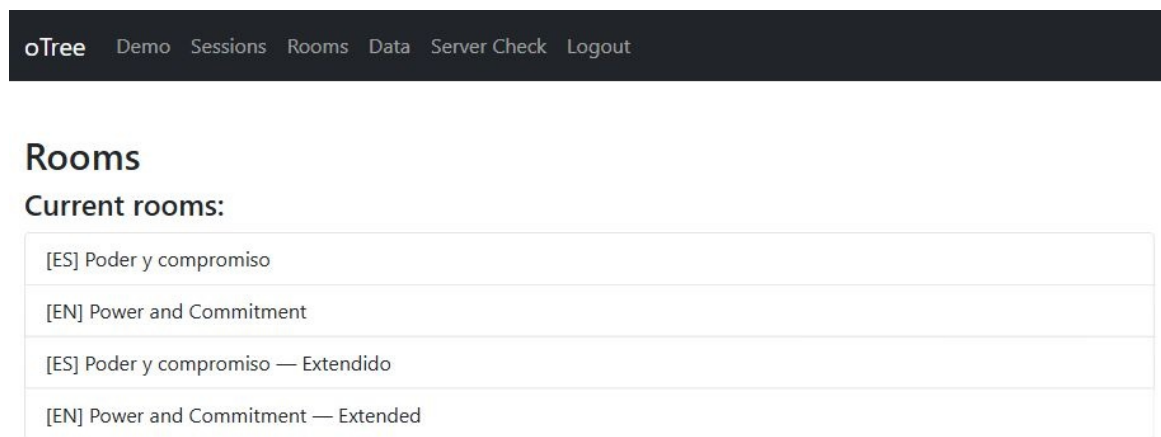
Figure 1.3: Demo contains only the configurations of this game family, in both languages and editions. Continuation 1/3.

[ES] Extendido — Sin anuncio de reparto futuro
[ES] Extendido — Costo temprano de 30, reserva 40
[ES] Extendido — Costo temprano de 20, reserva 40: control
[EN] Extended — Power shift without future enforcement
[EN] Extended — Stable power
[EN] Extended — Automatically enforced package
[EN] Extended — Zero-probability guarantee: control
[EN] Extended — 5% guarantee
[EN] Extended — 50% guarantee
[EN] Extended — Funded advance: maximum 10
[EN] Extended — Funded advance: maximum 20
[EN] Extended — Observable investment and future power
[EN] Extended — Future weight of 0.5
[EN] Extended — Continuation probability of 0.5
[EN] Extended — Certain expected disagreement payment
[EN] Extended — No future allocation announcement
[EN] Extended — Early cost of 30, reserve 40
[EN] Extended — Early cost of 20, reserve 40: control
Reforma y compensación — Un encuentro
Reforma y compensación — Diez encuentros, pareja fija
Reforma y compensación — Diez encuentros, reasignación

Figure 1.4: Demo contains only the configurations of this game family, in both languages and editions. Continuation 2/3.

Reforma y compensación — Extendida — Promesa revocable	
Reforma y compensación — Extendida — Compensación condicional garantizada	
Reforma y compensación — Extendida — Sin veto	
Reforma y compensación — Extendida — Anticipo irreversible	
Reforma y compensación — Extendida — Beneficio privado	
Reforma y compensación — Extendida — Tres afectados con veto	
Reforma y compensación — Extendida — Tres afectados y garantías	
Reforma y compensación — Extendida — Reputación pública	
Reforma y compensación — Extendida — Garantía parcial	
Reform and Compensation — One encounter	
Reform and Compensation — Ten encounters, fixed pair	
Reform and Compensation — Ten encounters, reassignment	
Reform and Compensation — Extended — Revocable promise	
Reform and Compensation — Extended — Guaranteed conditional compensation	
Reform and Compensation — Extended — Without veto	
Reform and Compensation — Extended — Irreversible advance	
Reform and Compensation — Extended — Private benefit	
Reform and Compensation — Extended — Three affected parties with veto	
Reform and Compensation — Extended — Three affected parties and guarantees	
Reform and Compensation — Extended — Public reputation	
Reform and Compensation — Extended — Partial guarantee	

Figure 1.5: Demo includes the new reform configurations in both languages. Continuation 3/3.



oTree Demo Sessions Rooms Data Server Check Logout

Rooms

Current rooms:

[ES] Poder y compromiso
[EN] Power and Commitment
[ES] Poder y compromiso — Extendido
[EN] Power and Commitment — Extended

Figure 1.6: Rooms contains the four rooms for this family: basic and extended editions in Spanish and English.

oTree Demo Sessions Rooms Data Server Check Logout

Room: [EN] Power and Commitment

Create a new session

Session Config

[EN] One complete encounter

Number of participants

Complete groups of 2 participants. Use a multiple of 2; minimum 2.

Create

[Configure session](#) ⚙️

App sequence

power_commitment_game (10 rounds) Power Shifts and Commitment / Cambios de poder y compromiso.

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:8131/room/power_commitment_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 facts

Purpose	Study bargaining under power shifts and irreversible reforms with compensation, veto, and commitment.
Experimental unit	Two-person bargaining encounter; reform module with two or four people.
Basic edition	One encounter, ten with fixed counterparts, or ten with reassignment; three modes in each of two modules.
Extended edition	Fifteen historical treatments and nine reform conditions: guarantees, advances, veto, private benefit, three recipients, and reputation.
Decision	B proposes and finances transfers; A accepts or rejects. In reform, affected parties approve or veto before the irreversible change.
Payoff	Historical module: reserve and allocations net of costs. Reform: endowment, gain or loss from change, and transfers funded by B.
Unit	Experimental Currency Units (ECU).
Suggested duration	35–45 minutes for one encounter; 60–80 minutes for ten encounters and feedback.
Participants	Pairs; groups of four for three affected parties; at least twenty people for reform reputation.
Proposed host	powercommitment.beer-lab.org .
Basic EN room	/room/power_commitment_en .
Extended EN room	/room/power_commitment_extended .
Instructor access	/demo .
Topics	intertemporal bargaining; commitment problems; power shifts; enforcement guarantees; reforms and compensation; veto rights.
JEL	A22; C73; C78; C92; D74; D86.

Stable basic-room route:

https://powercommitment.beer-lab.org/room/power_commitment_en.

1.3 Minimum sequence

1. Open beer-lab.org and select the teaching-games section.
2. Find Power Shifts and Commitment at teaching.beer-lab.org.
3. Open instructor access and confirm that Demo lists only the 60 configurations in this family.
4. Open Rooms and choose the basic or extended room in the class language.
5. Select one encounter, ten with a fixed pair, ten with reassigned pairs, or an extended treatment.
6. Create a session with an even participant count and keep Monitor and Report open.
7. Share only the corresponding room link.
8. Wait for a complete encounter before revealing aggregates.
9. Project denominators first, then outcomes, offers, promise-offer gaps, and payments.
10. Close with the theoretical comparison and export data if needed.

Before opening the room

Confirm language, edition, treatment, encounter count, matching, and an even participant count. Partners may change between encounters but never between the two periods within one encounter.

1.4 Access, rooms, and session creation

The public host and room addresses in this guide are proposed deployment routes. Their inclusion does not certify publication in the directory. The validated local instructor instance is <http://localhost:8092/demo>; it is accessible only from the computer running the server. Confirm deployment before sharing public links with a class.

The institutional path begins at <https://beer-lab.org/> and continues at <https://teaching.beer-lab.org/>. This family's card should point to powercommitment.beer-lab.org. Family isolation is pedagogical protection: users entering through this host should not be able to create or play trust, public-goods, dictator, or unrelated activities.

Demo is an authenticated instructor page. It lists six basic and twenty-four extended configurations per language, including both modules. Rooms lists four rooms, each filtering configurations by its exact prefix:

- poder_compromiso_es
- power_commitment_en
- poder_compromiso_extendido
- power_commitment_extended

Do not reuse old session links

Addresses containing /p/ identify a temporary session and participant. Share the stable /room route for a new class rather than an internal link copied from a previous session.

1.5 What participants see

Screenshots in this guide come from test sessions with simulated decisions. Their numbers demonstrate the system and are neither classroom-pilot results nor empirical evidence about countries. The stated duration needs classroom validation.

The cover identifies the laboratory, states the general purpose, and requires acceptance of silence, privacy, and interface rules. It does not disclose the hypothesis or suggest a correct decision. Start leads to treatment-specific instructions.



An allocation activity

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

Each encounter contains a current allocation and a possible later allocation. Read the rules before deciding.

Laboratory rules

- Remain silent and do not communicate outside the options in this activity.
- Make your decisions individually and privately.
- Follow the instructions on the screen.
- Do not refresh, close, or leave the page.
- If you have a problem, raise your hand or contact staff privately.

☐ I have read and accept the rules.

Start

Figure 1.8: Institutional cover and general laboratory rules.

Instructions display resources, reserve, probabilities, and costs. The reserve appears once per encounter. A callout distinguishes initial from late rejection. Treatment pages add only the relevant rule: enforcement, advance, investment, discounting, continuation, deterministic payment, or no

announcement.



BEER Lab - Basic - Encounter 1 of 1

Activity rules

Resources and unit of account

Joint resource in the displayed period: 100 ECU.

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

This session does not convert ECU into real money.

A and B take part in two-period encounters. B proposes and A responds. Your letter stays fixed throughout the session. Resource amounts, probabilities and costs are public.

Resource in each period: 100 ECU · Reserve per person, once per encounter: 30 ECU

A's current probability: 70% · A's future probability: 20%

Initial rejection cost per person: 20 ECU · Late rejection cost per person, before weighting: 10 ECU

Future weight: 1 · Probability of period 2: 100%

Period 1

B proposes A's share of the current resource. A accepts or rejects. Acceptance settles that allocation and activates the next-period rule.

B also announces a future share for A. The announcement alone is not binding: without automatic execution, B may choose a different offer later and A may reject it.

Initial rejection ends the encounter. One draw determines who receives all available resources from both periods; each person pays the early cost. No late cost is added.

Period 2

If no future allocation is executed automatically, B chooses a new offer and A responds. Rejecting it contests only the remaining period-2 resource. Period-1 allocations remain yours, and each person pays the late cost.

One pair for one complete two-period encounter.

Payments from all complete encounters are added. An isolated period is never selected for payment. A new reserve is added only when a new encounter begins.

Continue

Con tecnología de qTree

Figure 1.9: Current instructions for the basic edition: initial resources, decision rules, and experimental units. Continuation 1/3.

The comprehension page asks about a total-payment example and the single reserve. The 130 ECU answer adds reserve 30, current 50, and future 50. The reserve question prevents participants from adding another reserve in period 2.

B chooses A's current share and, except in the no-announcement condition, announces a future share. The announcement alone does not bind B. A sees the offer, announcement, and expected immediate-rejection payment before accepting or rejecting.

After acceptance, the transition screen reports whether period 2 exists and whether a guarantee enforced the announcement. Without enforcement, B chooses an effective offer. A may accept or contest only the remaining future resource while keeping the initial allocation.

Results show the complete path, offers, conflict winner when relevant, and distinct A and B payments. The final screen confirms recording and accumulated payment rather than ending with the generic No more pages message.



BEER Lab · Basic · Encounter 1 of 1

Activity rules

Resources and unit of account

Joint resource in the displayed period: 100 ECU.

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

This session does not convert ECU into real money.

A and B take part in two-period encounters. B proposes and A responds. Your letter stays fixed throughout the session. Resource amounts, probabilities and costs are public.

Resource in each period: 100 ECU · Reserve per person, once per encounter: 30 ECU

A's current probability: 70% · A's future probability: 20%

Initial rejection cost per person: 20 ECU · Late rejection cost per person, before weighting: 10 ECU

Future weight: 1 · Probability of period 2: 100%

Period 1

B proposes A's share of the current resource. A accepts or rejects. Acceptance settles that allocation and activates the next-period rule.

B also announces a future share for A. The announcement alone is not binding: without automatic execution, B may choose a different offer later and A may reject it.

Initial rejection ends the encounter. One draw determines who receives all available resources from both periods; each person pays the early cost. No late cost is added.

Period 2

If no future allocation is executed automatically, B chooses a new offer and A responds. Rejecting it contests only the remaining period-2 resource. Period-1 allocations remain yours, and each person pays the late cost.

One pair for one complete two-period encounter.

Payments from all complete encounters are added. An isolated period is never selected for payment. A new reserve is added only when a new encounter begins.

[Continue](#)

Con tecnología de [qTree](#)

Figure 1.10: Current instructions for the basic edition: initial resources, decision rules, and experimental units. Continuation 2/3.



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

BEER Lab - Basic - Encounter 1 of 1

Check the rules

Resources and unit of account

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

This session does not convert ECU into real money.

Resource in each period: 100 ECU · Reserve per person, once per encounter: 30 ECU
A's current probability: 70% · A's future probability: 20%
Initial rejection cost per person: 20 ECU · Late rejection cost per person, before weighting: 10 ECU
Future weight: 1 · Probability of period 2: 100%

If A receives 50 in each period, with no advance, investment or costs and with both periods available, what is A's total payment, including the reserve and stated future weight?

131.0

Your answer: 131. The correct answer is 130. Review the example: add one reserve, 50 current ECU and 50 multiplied by the future weight. No additional reserve is added in period 2.

Is another reserve added when moving to period 2 of the same encounter?

☐ Yes

☒ No

Continue

Con tecnología de [oTree](#)

Figure 1.11: Current comprehension check with an incorrect answer, its specific explanation, and retained responses.

BEER Lab · Basic · Encounter 1 of 1

Encounter

Your position: **A**

Resource in each period: 100 ECU · Reserve per person, once per encounter: 30 ECU

A's current probability: 70% · A's future probability: 20%

Initial rejection cost per person: 20 ECU · Late rejection cost per person, before weighting: 10 ECU

Future weight: 1 · Probability of period 2: 100%

One pair for one complete two-period encounter.

Resources restart between encounters. Keep your decisions private.

Continue

Figure 1.12: Actor A, whose power may decline.

BEER Lab · Basic · Encounter 1 of 1

Encounter

Your position: **B**

Resource in each period: 100 ECU · Reserve per person, once per encounter: 30 ECU

A's current probability: 70% · A's future probability: 20%

Initial rejection cost per person: 20 ECU · Late rejection cost per person, before weighting: 10 ECU

Future weight: 1 · Probability of period 2: 100%

One pair for one complete two-period encounter.

Resources restart between encounters. Keep your decisions private.

Continue

Figure 1.13: Actor B, who makes proposals.

BEER Lab · Basic · Encounter 1 of 1

Prepare the initial allocation

A's future probability: 20%

A's current share

A's announced future share

B also announces a future share for A. The announcement alone is not binding: without automatic execution, B may choose a different offer later and A may reject it.

Continue

Figure 1.14: B's initial decision.

BEER Lab · Basic · Encounter 1 of 1

Respond to the initial allocation

A's future probability: 20%

A's current share: 61 ECU

A's announced future share: 60 ECU

A's initial allocation, including the advance: 61 ECU · B's initial allocation, before investment: 39 ECU

A's expected payment after initial rejection: 150 ECU

An expected value averages possible outcomes; an individual draw may pay more or less.

Initial rejection ends the encounter. One draw determines who receives all available resources from both periods; each person pays the early cost. No late cost is added.

Accept

Reject

Figure 1.15: A's initial response.

BEER Lab · Basic · Encounter 1 of 1

Next-period status

Period 2 exists.

A's future probability: 20%

Remaining future resource: 100 ECU

The announcement was not executed automatically. B will choose a new offer and A will respond.

Continue

Figure 1.16: Status of period 2.

BEER Lab · Basic · Encounter 1 of 1

Prepare the later allocation

A's future probability: 20%

Remaining future resource: 100 ECU

A's announced future share: 60 ECU

A's later share

If no future allocation is executed automatically, B chooses a new offer and A responds. Rejecting it contests only the remaining period-2 resource. Period-1 allocations remain yours, and each person pays the late cost.

Continue

Figure 1.17: B's new offer.

BEER Lab · Basic · Encounter 1 of 1

Respond to the later allocation

A's future probability: 20%

A's later share: 10 ECU

A's announced future share: 60 ECU

Remaining future resource: 100 ECU

Rejection affects only the remaining future resource. First-period allocations remain yours.

Accept

Reject

Figure 1.18: A's late decision.

BEER Lab · Basic · Encounter 1 of 1

Encounter outcome

Both allocations accepted

A's current share: 61 ECU

A's announced future share: 60 ECU

A's later share: 10 ECU

Advance for A: 0 ECU · Cost of B's option: 0 ECU

A's payment

101 ECU

B's payment

159 ECU

Your payment in this encounter: 101 ECU · Your accumulated total: 101 ECU

These payments already include one reserve and every applicable cost.

Continue

Figure 1.19: A peaceful outcome.

BEER Lab · Basic · Encounter 1 of 1

Encounter outcome

Later rejection

A's current share: 61 ECU

A's announced future share: 60 ECU

A's later share: 10 ECU

Advance for A: 0 ECU · Cost of B's option: 0 ECU

Person receiving the contested resource: B

A's payment

81 ECU

B's payment

159 ECU

Your payment in this encounter: 81 ECU · Your accumulated total: 81 ECU

These payments already include one reserve and every applicable cost.

Continue

Figure 1.20: Late conflict preserves the first allocation.

BEER Lab · Basic · Encounter 1 of 1

Activity complete

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

Your total ECU payment: **101 ECU**

Payments from all complete encounters are added. An isolated period is never selected for payment. A new reserve is added only when a new encounter begins.

Figure 1.21: Explicit activity closure.

Theory, predictions, and treatments

The rationalist starting point asks why costly war occurs. If conflict destroys resources and actors know the relevant payoffs, a range of peaceful allocations should make both sides better off. Observed war therefore requires an account of why that range cannot be reached or sustained. Private information, incentives to misrepresent, and commitment problems are distinct mechanisms requiring distinct designs.

This game isolates commitment. Probabilities, costs, reserves, and resources are public. B's future announcement is observable but does not bind in the benchmark. A power shift matters because it changes A's outside option between today and tomorrow. A may prefer costly conflict now to peace that B will revise once A becomes weak.

A credible commitment is not persuasive language. It is a rule changing future actions or payoffs. Automatic enforcement removes revision. A probabilistic guarantee partially changes that possibility. An advance moves resources to a time when delivery is feasible. Each technology addresses a different constraint and yields a comparison.

Backward induction organizes the benchmark. In the last period, A compares the effective offer with expected late-conflict value. B anticipates this threshold. Initially, A compares the best peaceful path B can sustain with immediate-conflict value. A commitment problem exists when no sequential allocation satisfies both sides.

Equilibrium is a benchmark rather than a complete psychological description. Participants may dislike risk, care about fairness, weight probabilities nonlinearly, punish broken announcements, or learn. The extended menu diagnoses some channels without claiming that one class session identifies structural preference parameters.

Matching changes the strategic environment. One encounter provides the cleanest initial-decision exercise. Ten fixed-pair encounters permit reputation, reciprocity, and coordination. Reassignment weakens bilateral continuity, but repeated choices by the same person remain statistically dependent.

Preventive conflict requires precise language. It means acting before an anticipated shift reduces one's ability to obtain or defend an allocation. The theory never says every power shift causes war: costs, transfers, institutions, and horizons condition the result.

Future weight and continuation probability teach a key distinction. Discounting lowers every future outcome's value. An uncertain horizon preserves conditional value but may eliminate the period. Expected values can look similar while distributions and behavioral responses differ.

2.1 Benchmark calculation

With reserve $r = 30$, resources $R_1 = R_2 = 100$, costs $c_1 = 20$ and $c_2 = 10$, and probabilities $p_1 = 0.7$ and $p_2 = 0.2$, A's expected initial-rejection payment is

$$r + p_1(R_1 + R_2) - c_1 = 30 + 0.7(200) - 20 = 150.$$

B's expected payment is $30 + 0.3(200) - 20 = 70$. The realized winner receives 210 and the loser 10. These payments include the reserve once.

In the last period, before adding the initial allocation, A's outside option equals

$$p_2 R_2 - c_2 = 0.2(100) - 10 = 10.$$

Backward induction lets B offer 10. A's maximum sequential compensation is therefore $100 + 10 = 110$ before the reserve, below the immediate outside option of 120. A binding package of 61 and 60 pays A 151 and B 109, both above 150 and 70. Commitment creates surplus by avoiding the 40 ECU destroyed in immediate conflict.

Central result

War can occur under complete information and known costs when the allocation needed to prevent conflict cannot be made credible over time.

2.2 Basic and extended treatments

The three historical basic configurations change repetition and matching only. Their fifteen extended conditions follow; the reform chapter adds three basic modes and nine comparisons. Each section retains the common benchmark and states the changed rule, mechanism, prediction, interpretation, and caution.

2.2.1 Power shift without future enforcement

What changes

A wins immediate conflict with probability 70 percent but wins late conflict with probability 20 percent. B announces a future allocation that is nonbinding and may be replaced later.

Mechanism

A's anticipated decline raises the value of acting now. Although peaceful allocations leave enough joint surplus, B cannot credibly promise a large future transfer after the balance of power changes.

Under risk neutrality, A's immediate-conflict value is 120 ECU before the reserve. In the last period A accepts 10 ECU. Even giving A the entire current resource yields only 110 ECU sequentially, below the preventive outside option.

How to interpret the data

Conflict need not reveal irrationality or a taste for fighting. It can follow from forward-looking calculation under an institutional constraint: no technology commits B to the later

allocation.

Use this condition as the benchmark. Record the announcement, effective offer, and conflict timing separately. Count complete encounters, never periods, as the independent unit.

Caution

Do not describe B as dishonest. Revising the offer is a public rule; the relevant concept is institutional credibility rather than personality.

Worked comparison. Suppose B offers A 100 now and announces 60 later. Accepting the first offer does not secure the announced 60: B still chooses again. If A subsequently accepts 10, final payments are 140 to A and 120 to B, including reserves. A compares the 110 allocation before its reserve with an initial-conflict expectation of 120. A favorable announcement therefore does not close the gap when its execution is discretionary.

In the classroom, ask students to draw the later decision before discussing the initial response. Replace the announcement by 90 and repeat the calculation under the same later offer of 10. The benchmark continuation value is unchanged. If actual acceptance rises, the result may reflect expectations of fulfillment, preferences over promises, or misunderstanding; the announcement alone does not reveal which explanation applies.

Exercise and answer. Can B buy peace by offering A 111 from the current resource? No: the menu ends at 100. The binding constraint is current compensation capacity, not a lack of joint surplus. The outcome report separates early rejection from a later failure after initial agreement.

2.2.2 Stable power

What changes

A's victory probability remains 70 percent in both periods. Resources, costs, sequence, and announcements remain unchanged.

Mechanism

Removing A's future decline removes the central preventive motive. A can wait without surrendering relative power, while final bargaining reflects a stronger outside option.

A's late threshold rises from 10 to 60 ECU. Comparing conflict rates with the benchmark asks whether power change, rather than a general propensity to reject, drives the result.

How to interpret the data

More peace supports the commitment explanation. If conflict remains high, examine comprehension, risk, fairness, learning, or the subjective cost of accepting unequal offers.

Keep the screen order fixed and emphasize that only late power changes. Display conflict rates with denominators and observation counts.

Caution

A higher late threshold does not mechanically determine peace. Strategic predictions also depend on how B anticipates A's response.

Worked comparison. Keeping A's future victory probability at 70 percent makes the last-period disagreement expectation 60 before its reserve. Under weak acceptance, a later offer of 60 can be accepted. An initial offer of 61 followed by 60 then pays A 151 and B 109, versus initial-conflict expectations of 150 and 70. The peaceful package is individually acceptable without requiring B to honor an announcement against its later incentives.

Compare the later-offer distribution across stable and shifting power. The reference threshold moves from 10 to 60. A higher later offer is therefore not automatically evidence of greater generosity. It may reflect the stronger rejection option. Keep the proposer, initial probability, resource and costs fixed when explaining this comparison.

Exercise and answer. Does stable power make every observed offer acceptable? No. If B instead offers 20 later, A's risk-neutral comparison favors late conflict. The theory identifies a feasible sequential agreement rather than prescribing every human decision. Record late decisions conditional on reaching them, because initial rejection changes which pairs appear in that sample.

2.2.3 Automatically enforced package

What changes

B fixes A's shares in both periods at the start. Acceptance makes the server execute both transfers, with no reopening and no late conflict.

Mechanism

Perfect enforcement converts a promise into commitment. B cannot reduce the later transfer after power shifts and can therefore compensate A for forgoing immediate conflict.

The package 61 now and 60 later pays A 151 and B 109 including one reserve each. Both exceed their immediate-conflict expected payments of 150 and 70.

How to interpret the data

A large decline in conflict reveals the value of commitment capacity. Offers additionally show how actors divide the surplus created by enforcement.

State clearly that acceptance eliminates the second decision. In feedback, distinguish promise, contract, and enforcement.

Caution

The effect is not merely reduced uncertainty: all probabilities were already public. The change is that bargaining cannot reopen.

Worked comparison. The initial package 61 and 60 yields A 151 and B 109 after adding one reserve each. Initial acceptance removes both B's ability to revise the second share and A's ability to reject that share later. The server executes the second payment rather than inventing an acceptance decision. Rejecting the package keeps the original early-conflict lottery and costs.

A useful classroom counterexample offers A 50 and 50. Enforcement makes this package credible but pays A only 130, below its early-conflict expectation of 150. Credibility is necessary for sustaining some agreements; it does not make every credible agreement individually attractive. A participant who rejects this package need not misunderstand enforcement.

Exercise and answer. How much total allocation must A receive to strictly prefer a binding package?

More than 120 before its reserve. With whole-unit allocations, 121 suffices. B then retains 79, above its own early-conflict expectation of 40. Do not compute promise deviations from these automatic payments: there is no discretionary second offer to measure.

2.2.4 Zero-probability guarantee: control

What changes

The same guarantee interface appears, but the public automatic-enforcement probability equals zero.

Mechanism

This controls for institutional language and salience. Because enforcement never occurs, initial acceptance leads exactly to ordinary late bargaining.

Outcomes should resemble the benchmark except for framing or comprehension effects. The comparison prevents attributing a label effect to actual enforcement.

How to interpret the data

Behavioral change at zero probability raises questions about perception, interface trust, and attention. Institutions can also work through expectations and legitimacy.

Confirm that students notice the zero. Never imply that the draw might enforce the package.

Caution

With small groups, differences may be noise. Show counts before inferring a framing effect.

Worked comparison. Suppose B announces 40 for the second period and offers 96 initially. A guarantee with zero execution probability cannot secure the 40. If the discretionary continuation gives A 10, its allocation is 106 before its reserve. The same package under a 50 percent guarantee has a different expected continuation, so the zero condition provides a comparison with the guarantee description present but no effective enforcement.

The treatment should not be described as an institution that sometimes fails. Its probability is explicitly zero and no additional charge is imposed. Discuss whether the presence of a guarantee rule on the instruction screen changes how participants read the announcement. Such a framing response would differ from the material effect of positive enforcement probability.

Exercise and answer. Should the number of executed allocations be one half of eligible encounters in this control? No: it must be zero. Eligible encounters still require initial acceptance and an available second period. The denominator does not include initial rejections. A zero realized count in a tiny positive-probability sample, by contrast, need not imply a coding error.

2.2.5 5 percent guarantee

What changes

Following initial acceptance, the server enforces the future announcement with probability 5 percent; failure restores the exact late-bargaining subgame.

Mechanism

A weak guarantee creates a real but limited chance of commitment and tests whether small institutional improvements move behavior discontinuously.

Linear expected-value reasoning says 5 percent rarely closes the whole benchmark gap, although learning, probability weighting, or loss aversion may still respond.

How to interpret the data

Separate initial acceptance, realized enforcement, and late conflict. Few realized guarantees may occur, so ex ante decisions are more informative than raw realizations.

Project the probability and explain when the draw occurs: only after acceptance and only when period 2 exists.

Caution

Do not analyze realized enforcement as if it were randomly assigned before initial choice; it lies on a selected postdecision path.

Worked comparison. A five percent guarantee places little weight on the announced share. If B offers the maximum current 100 and announces the maximum future 100, A's expected future allocation under the sequential benchmark is 0.05 times 100 plus 0.95 times 10, or 14.5. Its total of 114.5 remains below the early-conflict expectation of 120, before reserves. Even the largest available package cannot close the benchmark gap.

The success draw occurs only after initial acceptance and continuation. A successful draw pays the announced future share without allowing a second rejection. A failed draw restores the ordinary second-period proposal and response. Never compare the announcement with an automatic payment as though B had chosen to keep its promise.

Exercise and answer. Does observing no enforcement in ten eligible encounters contradict five percent execution? No. Independent draws can all fail; the probability is approximately 60 percent. Report the realized numerator and eligible denominator, while retaining the stated probability as a design parameter. This small-sample distinction is more informative than declaring the guarantee effective or ineffective from one class.

2.2.6 50 percent guarantee

What changes

The public probability of automatic enforcement rises to 50 percent; every other rule remains unchanged.

Mechanism

The promise becomes substantively credible without becoming perfect. A weighs an enforced package against the chance of bargaining later from a weaker position.

Generous announcements and initial acceptance should rise, while immediate conflict should fall. Late conflict can remain after enforcement fails.

How to interpret the data

Comparisons across zero, five, and fifty percent illustrate gradual response, thresholds, and probabilistic credibility.

Report eligible acceptances and enforced packages with explicit denominators.

Caution

Do not compare absolute enforcement counts across sessions with different acceptance rates.

Worked comparison. With a 50 percent guarantee, the package 96 now and 40 announced later gives A an expected allocation of 96 plus one half of 40 plus one half of 10, or 121. B's corresponding expected allocation is 79. Including reserves yields 151 and 109 in expectation, so both exceed their initial-conflict expectations. Actual automatic execution pays A 166 and B 94; failure followed by an accepted offer of 10 pays A 136 and B 124.

Explain why the average feasible package does not eliminate realized disappointment. A accepted a probability distribution over institutional outcomes, not a guaranteed payment of its mean. Report guaranteed execution among eligible cases, and report discretionary second offers among failed cases separately.

Exercise and answer. What minimum execution probability makes a benchmark peaceful package feasible when both current and announced shares can reach 100? Solve $110 + 90 \gamma \geq 120$: γ must be at least one ninth. This is a menu feasibility threshold under stated assumptions, not a universal empirical probability of peace.

2.2.7 Funded advance: maximum 10 ECU**What changes**

B may transfer up to 10 ECU from the future resource when A accepts initially. Every ECU advanced removes one ECU from the late pool.

Mechanism

The transfer moves resources to a time when delivery is credible and lets A retain them. It creates no money and shrinks the object that can later be renegotiated or contested.

The advance expands credible compensation but may remain too small to close the preventive gap.

How to interpret the data

More advances together with less conflict support the timing mechanism. No effect may simply mean that the cap is too tight.

Show that the future pool equals 100 minus the advance. Never add the advance twice in the report.

Caution

An advance is not an external subsidy, and initial rejection cancels it.

Worked comparison. An advance of 10 leaves a future resource of 90. A's later disagreement expectation becomes 0.2 times 90 minus 10, or 8 before the reserve. Even assigning A all 100 current ECU plus the 10 advance and a later accepted offer of 8 gives only 118. The funded advance relaxes the current-transfer constraint but does not relax it enough to reach the early-conflict expectation of 120.

Students often add the advance without shrinking the second resource. Show the budget ledger instead: current resource 100, advanced future resource 10, and remaining future resource 90 still total 200. The advance is conditional on initial acceptance; an initial rejection contests the original resources and does not pay the advance first.

Exercise and answer. If A accepts 100 plus the advance and later rejects, can late conflict take away the 110 already transferred? No. A retains the settled initial amount and contests only 90, while paying the late cost. Compare acceptance and conflict timing with the larger-advance condition rather than treating every positive advance as a solution.

2.2.8 Funded advance: maximum 20 ECU

What changes

The funded-advance cap rises to 20 ECU while all other rules match the small-advance condition.

Mechanism

A larger cap moves more surplus into the credible period and removes more resources from late contestation.

If the 10 ECU cap constrained agreement, advance use and peace should increase. A mass at the new cap may reveal that even 20 remains binding.

How to interpret the data

Study the full distribution, not just its mean, and compare the two caps directly.

Ask students to derive the smallest cap that can support mutual gains under the public parameters.

Caution

Changing the cap affects both current compensation and the size of the late pool; discuss both channels.

Worked comparison. An advance of 20 leaves 80 for later bargaining. The final-period threshold for A is 0.2 times 80 minus 10, or 6. An initial current offer of 95, advance of 20, and later offer of 6 give A 121 and B 79 before reserves. Final payments are therefore 151 and 109. This sequential package is feasible without compelling B to honor a larger future announcement.

The maximum sequential allocation to A with an advance y , for these small advance values, is 110 plus 0.8 times y . Each advanced ECU adds one current ECU but reduces A's later outside option

by 0.2 ECU. A limit of 10 is insufficient; a limit of 20 crosses the compensation threshold. The contrast changes financing capacity while preserving the total resource.

Exercise and answer. Can B announce a future share of 90 after advancing 20? No: only 80 remain. A corresponding attempted submission is rejected. During feedback, distinguish this budget validation from a prediction about generosity. The histogram of later offers has a smaller feasible support because the future pool has been reduced.

2.2.9 Observable investment and future power

What changes

Before proposing, B chooses an observed option. Options cost 0, 3, or 8 ECU and leave A's late victory probability at 70, 50, or 20 percent.

Mechanism

B endogenously changes future power while paying the cost in every outcome. Investment can improve B's later position yet worsen the commitment problem.

Investment need not always pay and accumulation need not always produce conflict. B trades strategic benefit against cost and A's preventive response.

How to interpret the data

Analyze investment, resulting power, offers, and conflict jointly. Their correlation is not a causal effect because investment is chosen.

Remind students that A's immediate probability remains 70 percent. Treat the options as strategic actions, not a psychological scale.

Caution

The exercise does not prove that growth causes war; it illustrates one mechanism under specified incentives.

Worked comparison. B chooses among future A probabilities 0.7, 0.5 and 0.2 at costs 0, 3 and 8. Choosing the strongest option makes A's later threshold 10 but subtracts 8 from B in every outcome. Early-conflict expectations after this sunk investment are 150 for A and 62 for B, including reserves. The current victory probability remains 0.7; investment changes only the future probability.

Show two ledgers: the allocation ledger and the investment-cost ledger. For an accepted 61-and-60 package, A receives 151 while B receives 101 after paying 8. Early conflict with B losing leaves B 2, demonstrating why reserve 30 covers the combination of early cost 20 and investment 8. Investment is neither a free power change nor a transfer to A.

Exercise and answer. Is the choice that most strengthens B necessarily its best choice? No. Greater future strength may worsen A's incentive to reject initially, while the cost lowers B's payment even if conflict follows. Inspect investment frequencies, future-power averages and early rejection together; one observed correlation cannot isolate the effect of power from the cost and selection into investment.

2.2.10 Future weight of 0.5

What changes

All period-2 amounts, including late prizes and costs, receive weight 0.5; current resources retain weight one.

Mechanism

This changes future valuation while period 2 remains certain and therefore separates discounting from continuation risk.

A smaller future can reduce both compensation and the appeal of late outcomes. The net conflict effect depends on how the commitment gap changes.

How to interpret the data

Interpret decisions in present-value units and use comprehension errors to diagnose ignored weighting.

Explain that 50 future ECU count as 25 in total payment. Weight is not a probability.

Caution

This is not a pure individual discount-elicitation task because strategic payoffs for both actors change.

Worked comparison. A future weight of 0.5 makes the early contested prize 150 rather than 200. With early cost 20, A's expected initial-conflict allocation is 85 before its reserve. A's later threshold remains 10 resource units, but those units are worth 5 ECU now. Giving A 81 currently and 10 later provides a weighted allocation of 86; B receives 64. Adding reserves gives 116 and 94, above expected early-conflict payments of 115 and 55.

Every future component uses the same weight, including a late-conflict cost. A late cost of 10 resource units therefore costs 5 ECU. Keeping the late cost at 10 ECU while halving only the prize would change more than the announced discount treatment. The reserve is not discounted and is not repeated.

Exercise and answer. Does a weight of one half mean that half the pairs lose the second period? No. Both periods occur; later outcomes carry half their value. The continuation-probability treatment instead creates actual missing second periods. Equal ex-ante expectations in selected examples do not make these two technologies identical.

2.2.11 Continuation probability of 0.5

What changes

After the initial response, one public draw decides with probability 50 percent whether period 2 exists. The draw applies after acceptance or rejection.

Mechanism

This changes the existence of the future rather than its value conditional on existence, separating an uncertain horizon from discounting.

The continuation probability lowers the expected future resource at the initial decision. No future period means no future resource and no late cost.

How to interpret the data

Compare this treatment with weight 0.5. Equal expected values need not create equal behavior under risk or salience.

Analyze initial decisions before the draw and store one draw for reconnections.

Caution

Conditioning only on encounters that continued discards part of the assigned treatment.

Worked comparison. With a one-half continuation probability, early conflict contests 100 if the second period does not exist and 200 if it does. A single winner receives the available total, and the early cost remains 20 in both cases. A's expected allocation before its reserve is 0.7 times 150 minus 20, or 85. Initial acceptance instead settles the first allocation and reaches the later bargaining stage only if the continuation draw succeeds.

For a current share of 50, an absent second period pays both people 80, including reserves, with no late cost. If the second period exists and a later share of 10 is accepted, payments become 90 for A and 170 for B. These are distinct realized outcomes, not half-weight payments. Resource existence is drawn after the initial response and is independent of that response.

Exercise and answer. Should absent-period cases count as broken promises or late rejections? No. There is no later choice to observe. They contribute to completed-encounter payments and to the end-after-first-period category, while being excluded from later-offer and announcement-gap denominators.

2.2.12 Certain expected disagreement payment**What changes**

Rejection pays the expected conflict value directly instead of drawing a winner; costs and early-versus-late distinctions remain.

Mechanism

The treatment removes outcome risk while preserving expected strategic incentives.

Risk-neutral predictions match the lottery version. Risk attitudes can nevertheless shift offers and rejection.

How to interpret the data

Less conflict suggests lottery risk contributed to behavior; persistent conflict strengthens the institutional interpretation.

Keep the economic label conflict while explaining that its payment is settled at expected value.

Caution

Certainty may also alter emotion and salience, so this is a teaching diagnostic rather than definitive preference identification.

Worked comparison. Certain disagreement payments give A 150 and B 70 after initial rejection, including reserves. Late rejection after an initial current share of 61 gives A 101 and B 139: A keeps 61 and receives the expected future 20 minus cost 10; B keeps 39 and receives 80 minus cost 10. There is no conflict winner to display, although the allocation still loses resources through costs.

This comparison preserves the expected rejection values and the sequential compensation problem. With risk-neutral own-payoff preferences, the maximum sequential allocation to A remains 110 before its reserve. Consequently the commitment problem can persist even when the physical uncertainty over a winner has been removed. Human responses may differ because preferences over risk are not assumed to be linear.

Exercise and answer. Can the deterministic condition be called the peaceful treatment? No. Rejection remains a costly terminal branch. Count early and late rejection in exactly the same categories as the lottery condition. Use payment dispersion and rejection frequency together; lower dispersion follows mechanically from the payment technology and does not by itself show improved agreement.

2.2.13 No future allocation announcement**What changes**

B proposes only the current allocation. If peace continues, B later chooses a future offer for the first time.

Mechanism

Removing cheap communication isolates the informational or expressive effect of a nonbinding promise.

Standard complete-information material incentives may predict no change, while behavioral channels can change acceptance.

How to interpret the data

Compare initial acceptance and conflict with the benchmark and preserve missing promise denominators.

The report should show no promise observations rather than coding them as zero.

Caution

No announcement does not mean secret rules; probabilities and renegotiation remain public.

Worked comparison. B offers A 61 initially but sends no numerical announcement about the second period. If A accepts and B later offers 10, final payments are 101 for A and 159 for B, including reserves. The same actions in the benchmark with an announcement of 60 yield the same material payments. What changes is the recorded initial communication, not the later allocation menu or disagreement option.

Keep the report's announcement and gap statistics absent in this condition. A dash is appropriate; inserting a numerical zero would falsely imply a zero announcement was made. Later offers and responses remain observable. A comparison of their distributions can explore the role of announced intentions, provided the other parameters and matching rule are held fixed.

Exercise and answer. Is A unable to anticipate period 2 without an announcement? No. The rules and future victory probability remain public, and A can reason about B's later incentives. If removing announcements changes initial acceptance, discuss expectations, salience or preferences about promises before declaring that the material commitment problem disappeared.

2.2.14 Early cost 30 ECU, reserve 40

What changes

Immediate-conflict cost rises from 20 to 30 ECU and the reserve rises from 30 to 40 to prevent negative payments; late cost stays 10.

Mechanism

A higher early cost lowers preventive conflict value. The extra reserve is an accounting safeguard, not the causal treatment.

Initial acceptance should rise if the commitment gap narrows. The proper comparison uses the control with the same reserve.

How to interpret the data

Contrast high cost with cost control to isolate the cost change.

Show expected payments with the new reserve and retain one reserve per encounter.

Caution

A direct comparison with the benchmark mixes cost and reserve.

Worked comparison. Early cost 30 with reserve 40 gives A an early-conflict expectation of 150 and B 70. The later cost remains 10, so A's last-period threshold remains 10. A current offer of 100 followed by 10 pays A 150 and B 130, including reserves. This provides a weakly acceptable sequential package under the convention that A accepts indifference. It does not make peace strictly preferable for A.

Compare this condition with cost 20 and reserve 40, rather than directly interpreting the difference from reserve 30 as a pure cost effect. The matched comparison fixes the added initial wealth. Both sides lose 60 ECU in early conflict here, instead of 40 in the control. More destructive early disagreement can expand the set of sequentially acceptable agreements without creating enforceability.

Exercise and answer. What does a participant rejecting the boundary package establish? It does not alone refute the logic. The prediction explicitly relies on weak acceptance, risk neutrality and the later offer of 10. Ask the class to state which assumption it is testing and avoid presenting a tie as a strict best response.

2.2.15 Early cost 20 ECU, reserve 40: control

What changes

The reserve remains 40 ECU as in high cost, while immediate-conflict cost returns to 20 ECU.

Mechanism

The control holds the accounting cushion constant and permits attribution to the early-cost change.

Relative to high cost, preventive conflict is more attractive. Under linear utility, a common reserve does not change path comparisons.

How to interpret the data

Use this pair to teach why experiments reproduce auxiliary design changes in controls.

Present the two reserve-40 treatments together and identify configurations in every report.

Caution

With nonlinear utility, a common reserve can still alter risk behavior; neutrality is model-dependent.

Worked comparison. With reserve 40 and early cost 20, early-conflict expectations are 160 for A and 80 for B. The largest sequentially accepted allocation, 100 now plus 10 later, pays A 150 and B 130. Adding ten reserve ECU to the benchmark raises both peaceful and conflict payments equally, so A's commitment gap remains 10. The control creates a common-reserve comparison for the high-cost condition.

Distinguish payoff levels from decision incentives. A sees more initial wealth on its result screen, but the reserve cancels when comparing terminal branches under linear utility. With nonlinear utility or wealth effects, behavior can still change. That is a reason to retain the original-reserve reference as an additional condition, rather than silently treating the controls as identical human environments.

Exercise and answer. If the matched control and high-cost condition show different rejection rates, what comparison is supported? The change in early cost with reserve held at 40. If this control differs from the baseline, the observed association instead concerns reserve levels with other material rules fixed. Use three clearly labeled session summaries rather than merging the two controls into one denominator.

Reporting and class discussion

The report is hidden by default so early finishers cannot adapt to projected outcomes. Its header always shows treatment, matching, participants, completed encounters, and pending encounters. Reveal only after the relevant experimental unit is complete.

Instructor report: power and commitment

Basic · Power shift without future enforcement · One pair for one complete two-period encounter.

Participants

4

Complete encounters

2 / 2

Pending encounters

0

Aggregates are hidden. Progress can be viewed without revealing decisions.

Reveal aggregates

Figure 3.1: Instructor report with aggregates hidden until the instructor reveals them.

The first section summarizes initial offers, announcements, effective offers, and gaps. A and B payments use distinct colors. Rates retain observation counts; missing announcements are not coded as zero. Outcome paths separate immediate conflict, late conflict, peace, automatic enforcement, and no second period.

Histograms show distributions rather than averages alone. The same mean can conceal polarization, threshold clustering, or learning. The effective-offer minus announcement gap uses only encounters in which both quantities exist.

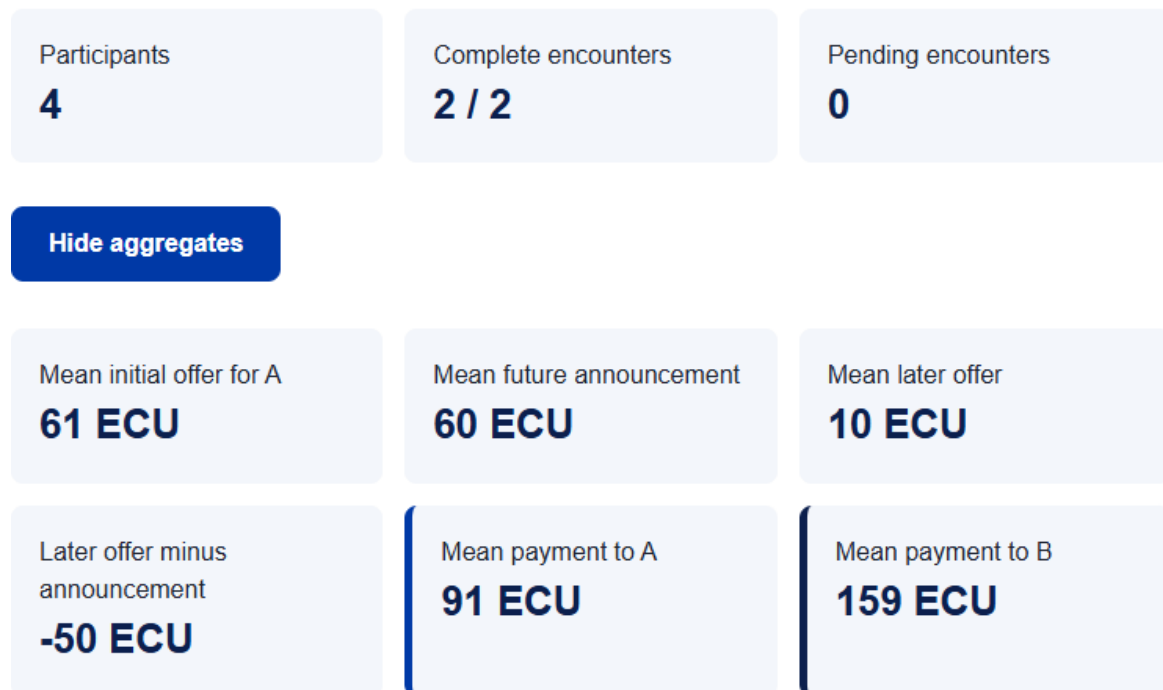
The encounter table supports a learning discussion without treating each row as an independent sample. Causal treatment comparisons require planned assignment; the classroom panel is primarily descriptive.

Recommended order

Ask what each player expected. Reveal completed encounters, outcomes, and announcement gaps. Derive the benchmark together. Separate descriptive evidence, theoretical mechanisms, and causal claims.

Instructor report: power and commitment

Basic · Power shift without future enforcement · One pair for one complete two-period encounter.



Denominators: initial offers / initial responses / chosen later offers / later responses: **2 / 2 / 2 / 2**

Announcement gaps use only chosen later offers and observed announcements. Initial rejections, absent second periods, automatically executed payments and the no-announcement condition are excluded. An automatic payment does not count as an acceptance response.

Outcomes per complete encounter

Observations: 2

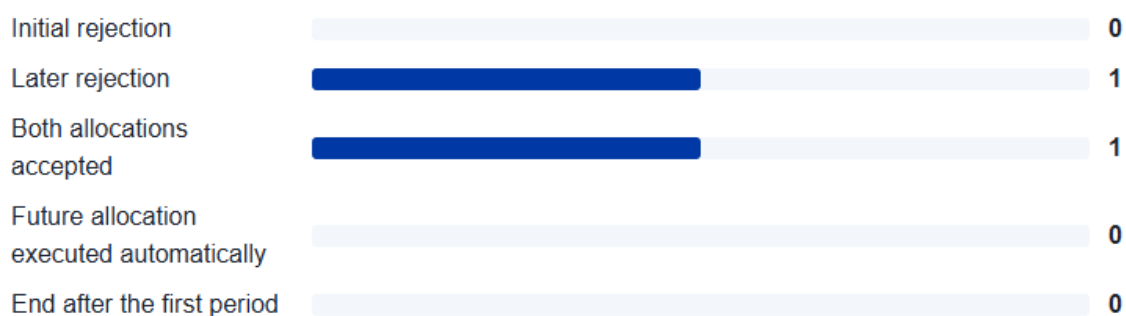
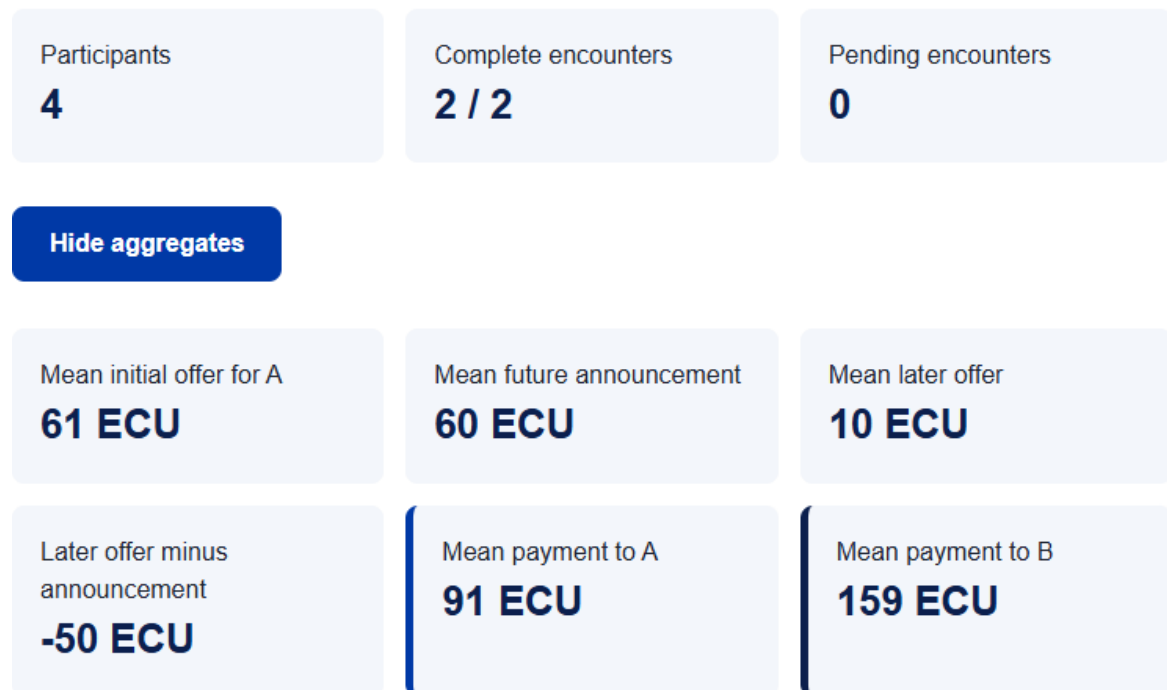


Figure 3.2: Revealed summary with payments, proposals, outcomes, and denominators.
Continuation 1/3.

Instructor report: power and commitment

Basic · Power shift without future enforcement · One pair for one complete two-period encounter.



Denominators: initial offers / initial responses / chosen later offers / later responses: **2 / 2 / 2 / 2**

Announcement gaps use only chosen later offers and observed announcements. Initial rejections, absent second periods, automatically executed payments and the no-announcement condition are excluded. An automatic payment does not count as an acceptance response.

Outcomes per complete encounter

Observations: 2

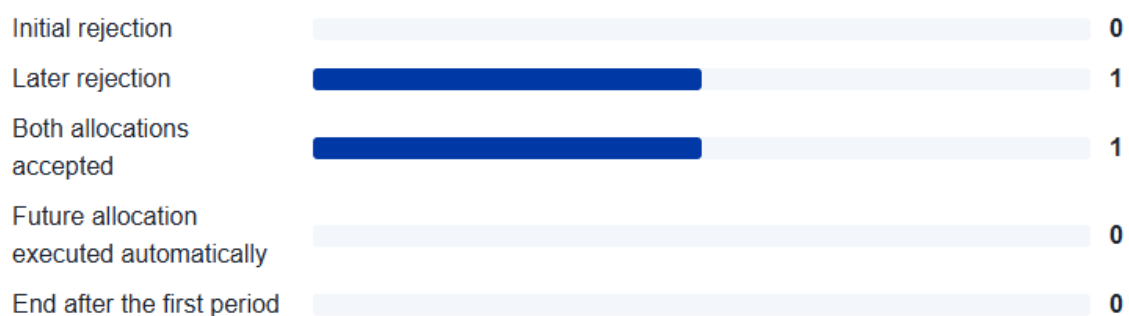


Figure 3.3: Revealed summary with payments, proposals, outcomes, and denominators.
Continuation 2/3.

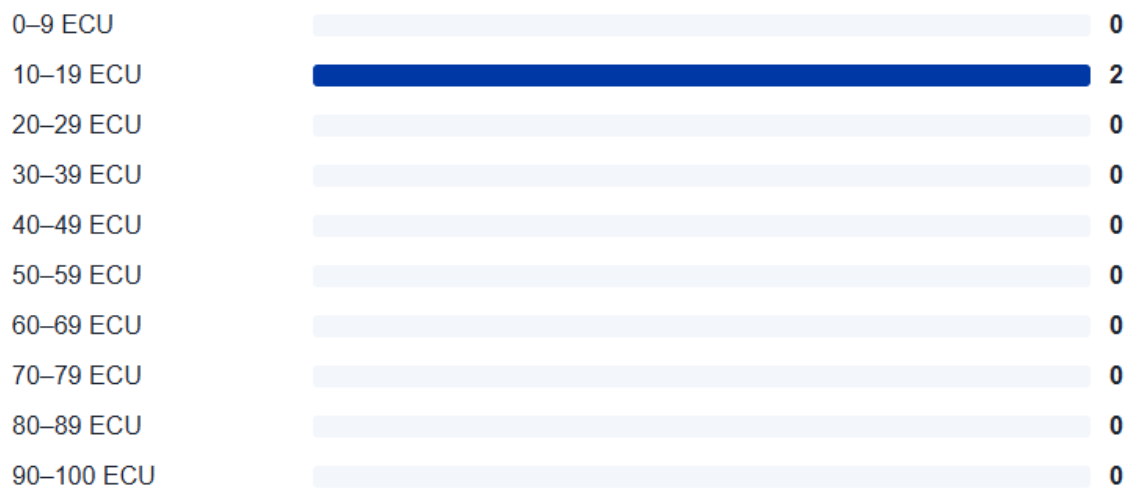
Distribution of initial offers for A

Observations: 2



Distribution of chosen later offers for A

Observations: 2



Announcement fulfillment

Observations: 2

Below announcement	2
Equal to announcement	0
Above announcement	0

Figure 3.4: Initial and late offer distributions and comparison with announcements. Continuation 1/3.

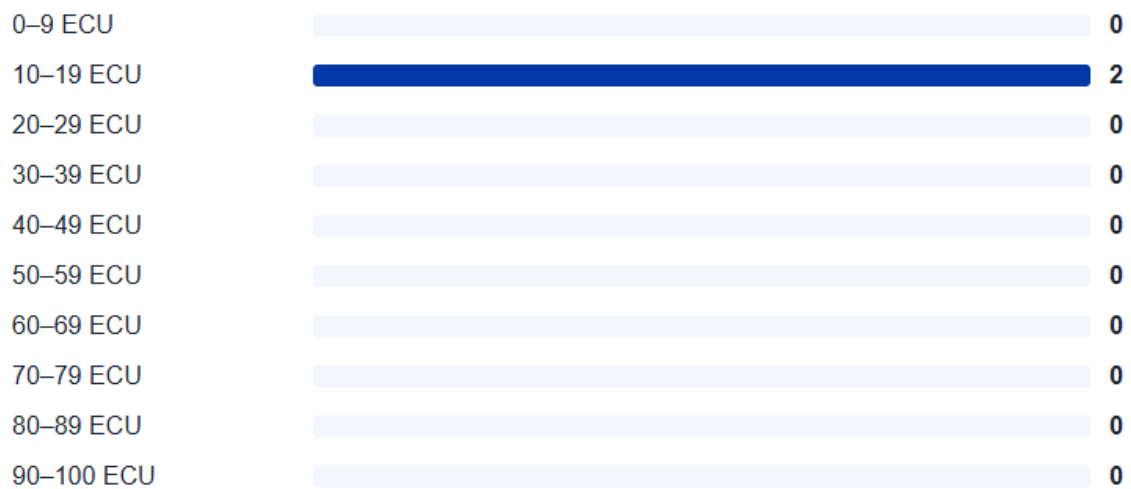
Distribution of initial offers for A

Observations: 2



Distribution of chosen later offers for A

Observations: 2



Announcement fulfillment

Observations: 2

Below announcement	2
Equal to announcement	0
Above announcement	0

Figure 3.5: Initial and late offer distributions and comparison with announcements. Continuation 2/3.

Evolution by encounter

Encounter	Complete encounters	Mean initial offer for A	Mean later offer	Initial rejections	Later rejections	Mean payment to A	Mean payment to B
1	2	61	10	0	1	91	159

Payments use complete encounters; offers use recorded decisions. A dash means no observations are available. Pending future rows do not enter means. Compare treatments and matching rules across separate sessions with comparable parameters. This report contains no individual records.

Figure 3.6: Evolution by encounter with distinct A and B payments.

3.1 Class designs and discussion questions

Forty-five-minute session. Run one basic encounter. Allocate five minutes to rules, ten to decisions, ten to predictions, and twenty to feedback. Derive A's late threshold of 10 ECU and show why the sequential maximum of 110 falls short of the preventive value of 120.

Seventy-five-minute session. Assign sections to the benchmark and binding commitment. Collect predictions about conflict and packages. Compare 61 plus 60 with 100 plus 10 and emphasize that both actors can gain when an institution commits the future.

Imperfect-institutions module. Use zero, five, and fifty percent guarantees across sessions. Ask students to graph expected acceptance against enforcement probability before results. Discuss linear response, thresholds, and probability weighting.

Temporal-resources module. Compare advance caps of 10 and 20. Build the accounting identity for current transfer plus advance, remaining future pool, and late offer. This distinguishes funded transfers from external subsidies.

Endogenous-power module. B invests before bargaining. Explain why more investment in conflict encounters does not establish that investment caused conflict: both decisions respond to strategic expectations. Ask students to design an exogenous control.

Uncertainty-and-discount module. Compare weight 0.5 with continuation 0.5. Require payoff distributions rather than expected values alone and connect differences to expected utility, certainty effects, and probability representation.

Integrative questions

What can B offer today? What can B promise tomorrow? Which rule makes that promise credible? What cost does conflict destroy? What is the experimental unit? Which comparison separates power shifts, risk, communication, and enforcement?

Data, troubleshooting, and references

Before class, test one session on the laboratory network and browser. Confirm that Debug info is absent, instructor access is protected, and the room lists no unrelated families. Keep Monitor in a separate tab to assist stalled participants without projecting codes.

If a browser closes, reopen the original participant link. Continuation, enforcement, and conflict draws are stored once; reconnecting must not change them. Never create a synthetic participant to complete a real pair.

With an odd attendance count, add the instructor as a real participant only if pedagogically planned or select another activity. Do not use artificial agents. Tell the class if an administrative observation will be excluded.

Participation must follow course and institutional rules. Projected data are aggregated and anonymous. A teaching activity should not be represented as publishable research without appropriate ethics review and consent.

Use Data within the isolated instance to export. The file includes language, edition, treatment, encounter, actor, proposals, announcement, advance, investment, stored draws, path, and payments. Preserve the dictionary and do not recode periods as independent rows.

An extreme result is not automatically a software error. Check rules, denominators, and draws before considering preferences, learning, and sample size. The report separates pending from complete encounters to prevent partial data from becoming outcomes.

Quick diagnosis

If the page says Please wait, verify that the matched participant completed the required screen. If a link returns Not Found, create a new session from the stable room. If Demo shows other families, check `GAME_FAMILY=powercommitment` and the isolated database before class.

4.1 Literature and empirical connection

Fearon (1995) organizes rationalist explanations around private information, indivisibilities, and commitment. Powell (2006) shows that many arguments about preventive war, rapid shifts, and difficult-to-divide stakes share a commitment structure. This game converts that structure into observable decisions and transparent accounting.

Tingley (2011) experimentally tests the dark side of the future: anticipating a power shift can increase conflict even when bargaining could avoid costs. Quek (2017) reviews and extends rationalist experiments on war, showing how controlled designs separate mechanisms that historical

data often combine.

Debs and Monteiro (2014) connect power shifts with uncertainty about future capabilities. This game keeps information public to isolate commitment; the BEER Lab private-information and signaling game studies private information and signals. Using both families in sequence prevents students from conflating uncertainty with inability to commit.

Research on settlements, guarantees, and peacekeeping reminds us that imperfect institutions can still alter incentives. Probabilistic extensions are stylized technologies rather than direct estimates of real organizations. Their purpose is to generate comparable classroom predictions.

4.2 Operational appendices

4.2.1 Presession checklist

- Isolated powercommitment server active.
- Demo lists 60 configurations and Rooms lists four rooms.
- Language, treatment, encounters, and matching confirmed.
- Even participant count.
- Stable room link or QR code prepared.
- Monitor and Report in separate tabs.
- Aggregates hidden until the unit is complete.
- Comparison plan and questions written.
- Data export and storage procedure defined.

4.2.2 Glossary

Term	Definition
Commitment	a rule restricting future actions or changing their payoffs; not merely an announcement.
Power	the public probability of winning the contested resource in this activity.
Preventive conflict	early rejection motivated by an anticipated weaker future position.
Announcement	B's stated future amount, binding only when the rule enforces it.
Guarantee	the public probability of automatic announcement enforcement.
Advance	a transfer funded from the future resource and delivered after initial acceptance.
Future weight	the multiplier applied to period-2 payments.
Continuation	the probability that period 2 exists.
Encounter	the complete unit containing up to two periods and one reserve.

Irreversible reform and compensation

5.1 The economic question and its connection to the family

A policy may increase available resources while harming the person whose approval is needed. The first question is not simply whether the change creates an aggregate gain. It is who can prevent the change and whether the beneficiary has an incentive to compensate the losing party afterwards. This module separately records approval, execution of the change, and effective transfer. The initial announcement is one decision; the later payment is another. The interface never presents a promise as income already received.

The original two-period bargaining encounters remain available. There A can reject an agreement and contest resources with a probability of success that changes over time. In the reform module B remains the proposer and financier, while A is the recipient position. The central difference is that, after approving the change, A cannot reverse it or contest the resources through another veto. The commitment problem arises from that loss of leverage to require the subsequent payment. There is no conflict cost, extra reserve of 30, or discount: everyone starts with 100 ECU and the change modifies those resources directly.

For the instructor

The four room selectors contain both modules. Basic rooms offer six configurations per language: three historical and three reform configurations. Extended rooms offer twenty-four: fifteen historical and nine reform configurations. Demo contains sixty configurations. For a first class about reforms choose *Reform and Compensation — One encounter*; for a class about power shifts retain the appropriate historical encounter. Historical names and room routes remain available.

The theoretical contribution of [Acemoglu \(2003\)](#) is to treat the ability to commit future actions as part of the political problem. That article provides the conceptual mechanism for this addition. The activity is an original classroom adaptation: its amounts, menus, groups, and procedures are not a replication of the published model or a reproduction of an experiment from that paper. The predictions below are derived from the implemented payoffs. Evidence about bargaining and power shifts discussed earlier is related background; it does not establish in advance how a class will respond to this module.

5.2 Resources, decisions, and a fully worked example

Every pair starts with 200 ECU: 100 for A and 100 for B. B announces an integer amount m between 0 and 60 for A. When there is a veto, A approves or rejects. Rejecting a revocable promise

or a conditional guarantee ends the encounter with 100 for each person. Approval gives B an increase of 60 and imposes a loss of 30 on A before compensation. With a revocable promise, B subsequently chooses a transfer x between 0 and 60. Results are

$$\pi_A = 100 - 30 + x = 70 + x, \quad \pi_B = 100 + 60 - x = 160 - x.$$

The sum is 230 for every x . Each ECU received by A comes from B; no third account subsidizes compensation. The surplus of 30 comes only from the change. An approved reform with zero transfer therefore produces an aggregate gain and an individual loss for A. Confusing those outcomes would prevent a useful interpretation of the veto.

First consider a promise of 31. A approves and B chooses to deliver 10. A ends with $70 + 10 = 80$ and B with $160 - 10 = 150$. Surplus is $80 + 150 - 200 = 30$. The gap between payment and announcement is $10 - 31 = -21$. A lost 20 relative to their original endowment despite receiving a positive transfer. Recording whether any payment occurred is therefore insufficient: compare the final result with the relevant alternative. The announcement of 31 is not part of the payoff sum because it was never fully delivered.

Now consider a conditional guarantee of 31. That amount is reserved before A responds. Approval triggers automatic delivery and results of 101 for A and 129 for B. Both improve strictly. A veto returns the entire deposit to B and results are 100 and 100. The same announced number has a different effect because the execution rule changes. The deposit does not create an additional 31 ECU; it locks B's own resources until the condition is resolved.

Checkpoint

Ask students to calculate four outcomes before revealing the report: announcement of 31, approval, and payment of 0: A=70, B=160; guarantee of 31 and approval: A=101, B=129; guarantee of 31 and veto: A=100, B=100; irreversible advance of 31 and veto: A=131, B=69. The first two outcomes total 230; the last two total 200. A returned deposit and a retained advance have the same total after veto, but different distributions.

Repeated encounters renew the endowments and add results across all active encounters. An encounter is a complete sequence, not one screen. An approval payment is not added again to the effective transfer result. The final screen presents the accumulated total and confirms that the activity has ended. The historical module's reserve and other parameters must not be inserted into these formulas.

5.3 The reference prediction and its limits

Backward induction starts from the final choice. With purely monetary self-interest and a revocable announcement, B maximizes $160 - x$ after approval by choosing $x = 0$. The announcement m does not alter that incentive. A anticipates 70 after approval and compares it with 100 after veto. A therefore vetoes. Potential aggregate surplus of 30 does not ensure an acceptable improvement for the party controlling consent.

A full guarantee removes the terminal choice to withdraw the amount. A compares $70 + m$ with 100 and may accept amounts of at least 30. At 30, A is monetarily indifferent: acceptance must not be described as a uniquely strict choice. With 31 through 59 both roles improve strictly; with 60 B remains at 100. The feasible, mutually acceptable compensation interval is 30 through 60, including its indifference cases. Participants retain the approval choice; the application does not force acceptance to manufacture a prediction.

Theoretical foundation

Separate three claims: the technology creates positive surplus; some transfer can compensate both parties; that transfer will actually be executed. The first two can be checked with the amounts. The third depends on the institution and decisions. An announcement can describe a feasible improvement without making it an optimal continuation for the person who must pay.

A class may show approval under promises and positive later payments. That behavior is compatible with distributive preferences, voluntary promise keeping, reciprocity, expectations about the counterpart, or misunderstanding. This activity does not elicit preferences or beliefs and cannot select among those explanations from one observation. Instructors can contrast the pattern with the monetary benchmark, ask which assumptions would change, and retain only recorded decisions and results as direct facts.

5.4 Nine extended comparisons

5.4.1 Revocable promise and full conditional guarantee

The extended revocable condition provides a one-encounter reference. B announces, A responds, and B chooses delivery after approval. The guaranteed condition preserves endowments, gain, loss, and menu. Only execution changes: approval activates the reserved payment and veto returns it. Compare approval by group, actual transfer, and role-specific results. A zero gap in the guaranteed condition follows mechanically from its rule and does not establish greater personal honesty. Relevant effects appear in chosen announcements and the consent those announcements make possible.

5.4.2 Change without a veto

After the announcement the change is executed automatically and B chooses the transfer. A has no approval form. The report records no fictional responses and does not describe execution as consent. Under pure monetary self-interest B delivers zero, producing results of 70 and 160. Surplus is 30, but both parties do not improve. The comparison illustrates why adoption and inclusion are different indicators. An authority able to implement without consent eliminates blocking mechanically; this does not demonstrate that it has solved compensation.

5.4.3 Irreversible advance

B delivers the announced amount before A approves or vetoes. B cannot recover it after rejection and there is no later payment. With advance m , veto pays A $100 + m$ and B $100 - m$. Approval pays $70 + m$ and $160 - m$. A gains 30 more from veto for every advance. A payment already delivered therefore does not remove the monetary incentive to reject. This condition differs from the historical advance, which follows initial acceptance and is financed from the future resource.

Attention

Do not teach that paying in advance always makes a reform credible. The advance can make payment irreversible while leaving authorization reversible. A's rejection alternative includes the money retained after veto. It would also be incorrect to claim that the advance destroys resources: after veto it changes the distribution while the sum remains 200 ECU.

5.4.4 Partial guarantee

The smaller of the announcement and 15 ECU is reserved. A veto returns the deposit to B. With approval, the later total transfer must be at least the guaranteed amount and remain within the menu of 60. If B announces 31, only 15 is guaranteed; B may deliver 15, 31, or more, but not 14. Under pure monetary self-interest B delivers 15 and A ends with 85, below 100. A guarantee can protect part of the announcement and still fail to compensate the loss. Compare the protected amount with the loss rather than equating any guarantee with a sufficient institution.

5.4.5 Private benefit of the proposer

B knows before announcing whether their increment is 30 or 90, with equal probabilities. A knows that distribution but not the encounter value. The public menu remains 0 through 60 in both states, avoiding automatic type revelation through a different upper bound. Before transfer the change leaves A with 70 and B with 130 or 190. Adoption produces totals of 200 or 260. Compensation of 30 leaves both at their initial endowments in the low state; the high state permits strict joint improvements.

An announcement may convey strategic information but does not identify the state by itself. A sees only their own final result and is not told B's private benefit. Instructors can analyze administrative aggregates by type without projecting identifiers. An average transfer does not establish that recipients knew the benefit. Revocable promises retain the incentive to withdraw compensation; private information adds an interpretation problem to a commitment problem rather than replacing it.

5.4.6 Three affected parties with veto, and their guaranteed compensation

The group contains four real people: B gains 90 and A, C, and D each lose 20. Everyone starts with 100. B announces three separate amounts with a shared maximum sum of 90, and each recipient approves or vetoes. The reform requires three approvals. Under revocable promises B later selects three transfers with that same joint constraint. With full guarantees all three amounts are automatically delivered after unanimity and all are returned if any recipient vetoes.

Three guarantees of 21 produce 101 for each recipient and $190 - 63 = 127$ for B, a total of 430. Three guarantees of 20 produce 100 for recipients and 130 for B, leaving recipients indifferent. Compensating two recipients while giving the third zero can block the entire change: individual acceptance matters, not the average transfer. The four-person group is not represented by fictional pairs. The instructor form requires multiples of four. Compare consensus, compensation patterns, and group surplus without treating three responses within one group as three independent reforms.

5.4.7 Public proposer reputation

Each B retains their position for ten encounters and meets ten different A counterparts. At least ten pairs, or twenty people, are required. Balanced rotation avoids a repeated counterpart for a B during those ten encounters. An A is new to that B but may have interacted with other proposers; recipients are not described as inexperienced participants. Before choosing, the current B's history is displayed: earlier announcement, whether a change occurred, and delivered transfer.

A veto does not reveal what B would have paid after approval and must not be coded as noncompliance with a nonexistent later decision. History reports facts, not intentions. Comparing reputation with reassignment requires the same group count and resource distribution. A known ten-encounter horizon does not remove backward induction under pure monetary self-interest and

common knowledge. High initial payments or end-of-session changes are discussion patterns, not automatic proof of a particular reputational equilibrium.

5.5 Screens and interpretation of the report

What participants will see

Instructions describe resources, positions, and a sequence of change and transfer. Positions are A and B, with C and D when applicable. Participant text does not announce a commitment hypothesis or recommend approval, veto, or a transfer amount. Comprehension corrections appear beside each incorrect question, preserve other answers, and allow students to continue without a payoff deduction.



Encounter 1 of 1 - Your position B

Announce the amounts

B announces and finances transfers. Your gain if the change occurs is 60 ECU.

Amounts are nonnegative integers. Their sum across all recipient positions cannot exceed 60 ECU. This is a shared limit, not a separate limit for each person.

The announcement does not bind B. If the change occurs, B may choose a different transfer, including zero. A veto means no transfer is delivered.

Announced amount for A

Continue

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

Powered by qTree

Figure 5.1: B announces an amount; the displayed rule explains whether it can change.

The report opens at the app's last technical period. Even with one active encounter it explicitly reads that encounter rather than producing an empty report from period ten. Progress counts completed group-encounters, not visited screens. Announcements may be recorded while another group remains unfinished; their mean uses actual announcements. Payment means use completed groups only. Individual approval denominators contain only existing decisions; the no-veto condition has zero such decisions even when every change is executed.

Realized surplus adds results and subtracts joint endowments. Positive surplus not realized adds positive net gains for completed groups where the change did not occur; it does not classify pending groups as losses. Joint improvement counts completed changes where no role ends below their original endowment. It includes equality and must be distinguished from strict improvement. Payment-minus-announcement gaps use recipients of completed changes only, preventing veto from being artificially classified as a broken promise. Distributions display amounts, frequencies, and observation counts.

In four-person groups an additional table separates A, C, and D. It displays recorded announcements,



Encounter 1 of 1 - Your position A

Decide about the change

Your position receives transfers. You start with 100 ECU and lose 30 ECU if the change occurs.

Amount announced for you: **31 ECU**

Guaranteed amount: 0 ECU

A veto preserves your starting endowment. Approval applies the stated loss and you receive the transfer under this session's rule.

The announcement does not bind B. If the change occurs, B may choose a different transfer, including zero. A veto means no transfer is delivered.

Decide about the change

▼

Continue

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

Powered by oTree

Figure 5.2: A observes the announcement and guarantee before approving or vetoing. Consent is different from actual payment.



Encounter 1 of 1 - Your position B

Choose the effective transfers

Change completed: Yes

B announces and finances transfers. Your gain if the change occurs is 60 ECU.

Amounts are nonnegative integers. Their sum across all recipient positions cannot exceed 60 ECU. This is a shared limit, not a separate limit for each person.

Announced amount for A: 31 ECU · Guaranteed amount: 0 ECU

Total transfer for A

40

Continue

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

Powered by oTree

Figure 5.3: Under a revocable promise, approval opens B's later transfer choice. Actual payment may differ from the announcement.

completed observations, mean announcement, mean payment, result, and approvals or vetoes for each position. Use it to detect a harmed recipient hidden behind an average compensation level. Announcement and result counts may differ while groups remain pending; both denominators are preserved. B is distinguished as financier through their label and the corresponding institutional color.

Reforms, consent, and compensation

Basic · Reform and revocable promise · One pair or group for one encounter.

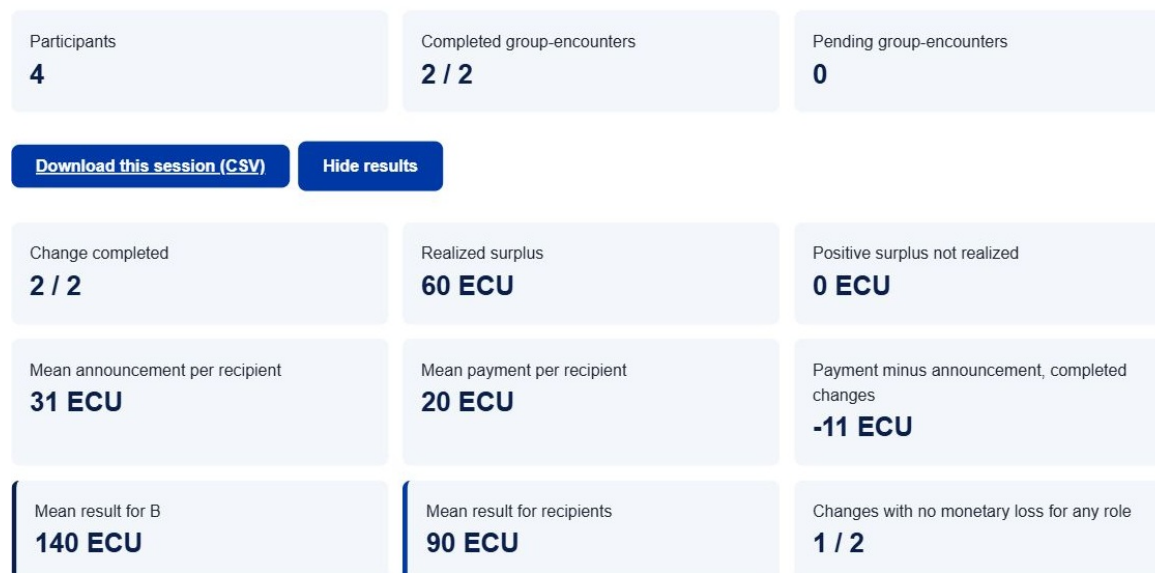


Figure 5.4: The demonstration report separates adoption, compensation, and results by role. Read the denominators before discussing the means.

Feedback script

Start with facts: how many groups completed, how many changes occurred, and how much was announced and paid. Then ask: “Did total resources increase? Did anyone end below 100? Could the recipient require payment after approval?” Compare the guarantee and promise with identical resources. Close by distinguishing potential surplus, consent, and effective compensation.

5.6 A class plan and four exercises with solutions

In a 60-minute class allocate ten minutes to resources and alternatives, ten to comprehension and individual predictions, fifteen to a revocable encounter and comparable guarantee, fifteen to reading results, and ten to closure. Obtain predictions before revealing aggregates. With twenty people reserve a longer session for reputation; do not invent participants to satisfy its minimum. Small classes can compare guarantee, advance, and veto without a large matching pool.

First exercise: effective transfer of 40 after approval leaves A with 110 and B with 120. Both improve and surplus remains 30. Do not add 40 to surplus, since it is deducted from B. Second exercise: with partial guarantee of 15 and announcement of 50, B pays 15. A receives 85 and B 145; the gap is minus 35. A guarantee does not necessarily allow A to reach 100.

Third exercise: B advances 20 and A vetoes. Results are 120 and 80; realized surplus is zero and positive surplus not realized is 30. The advance moves resources even without reform. Fourth

exercise: with three recipients and guarantees of 10, 25, and 25, the first recipient compares 90 with 100 and can veto. An average of 20 per recipient does not demonstrate universal compensation. Guarantees of 20, 20, and 20 leave all three monetarily indifferent. Raising each to 21 improves recipients strictly and remains within the funding limit.

5.7 Data, operation, and limits of inference

The report's protected download identifies the selected session by code and uses the general format: one row per participant, with rounds in columns. The family's custom exporter produces one row per participant and active encounter. Historical columns remain and reform columns are added; a blank column may belong to the other module. Do not turn the absent transfer decision under a guarantee into zero: that decision does not exist. Distinguish the reserved announcement, automatic delivery, and B's later choice. Administrative CSV preserves pending records and private benefit for authorized instructor use.

The independent unit in between-group comparisons is the group. Repeated rows from the same B or pair are related observations. Without random assignment of treatments, do not causally attribute a difference to the institution. A class can combine comprehension, experience, and selection. Record incidents before interpreting percentages. Technical documentation in `REFORM_DESIGN.md` specifies branches and `CODEBOOK.md` documents fields and missing data.

Canonical routes remain at <https://powercommitment.beer-lab.org/>. The addition is verified locally at <http://localhost:8131/demo>, with its own database and four family rooms. This address works on the computer running the server. A commit and instructor copies do not establish public deployment. Use the verified local instance or first confirm that the laboratory server received this addition. Restarting local preview preserves its sessions; do not reinitialize the database to refresh text or figures.

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