



Instructor Guide to Common Budget and Local Projects

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 common budget and local projects family 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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Prepare the class and arrange access

Purpose	Explain concentrated project benefits, shared costs and institutional selection.
Experimental unit	Interactive groups: three districts; four with a reviewer; six with a future cohort.
Participants	Multiples of 3, 4 or 6 by condition; basic rematching minimum 6.
Basic edition	One round, ten fixed-group rounds or ten randomly rematched rounds.
Extended edition	Fifteen six-round conditions: financing, caps, review, voting, debt and project quality.
Decision	Request 0–3 projects; approve portfolios, packages or items when applicable.
Payoff	Starting account plus own benefits minus assigned current costs and dated debt payments; active-round accounts accumulate.
Topics	common fiscal pool; distributive spending; budget institutions; legislative coalitions; intergenerational debt; project evaluation
JEL	A22, C92, D72, H61, H63, H72
Suggested duration	30 minutes introductory; 45–60 minutes for a comparison, including discussion.

1.1 Who receives the benefit and who pays?

A project can deliver a visible benefit to one district while spreading its cost across many people. Territorial representation gives its advocates a reason to support it even when its combined benefit does not cover the resources used. This game makes the difference between the requesting district's account and the group's account observable. Students learn to reconstruct both before recommending a budget rule. No previous game theory course is required, but participants must be willing to add costs and compare alternatives carefully.

This is an interactive game. Three representatives choose projects and their earnings depend on other people's decisions. The experimental unit is the group sharing a financing and approval rule. A person working alone could calculate a payoff but would not experience charges generated by other representatives. Extensions introduce a reviewer or a second cohort when the question requires separating the person making a decision from the person bearing a payment obligation. Those additional positions have substantive functions rather than serving as extra observations of the same decision.

By the end, students should explain the common fiscal pool problem, calculate a marginal incentive, distinguish requests from implementation, compare a quantity restriction with a quality assessment, and read an intertemporal liability without subtracting it twice. They should also recognize that a locally concentrated project can create positive social value. The lesson is conditional on the announced benefits, costs, financing and decision powers. It does not establish a general presumption that all geographically targeted spending is wasteful or that every central restriction improves welfare.

For the instructor

Choose one comparison before opening sessions. Shared versus local financing is sufficient for an introductory class. Mixed portfolios with whole review versus item review isolate review powers. For debt, compare the three conditions using the same two-date calendar. The fifteen extended conditions are a curricular menu, not a requirement to run every condition during a single class.

1.2 From the laboratory website to a session

Start at <https://beer-lab.org/> and locate the teaching resources. The directory at <https://teaching.beer-lab.org/> supports searches by title, topic and JEL code. This family is listed as Common Budget and Local Projects. Its topics are common fiscal pool, distributive spending, budget institutions, legislative coalitions, intergenerational debt and project evaluation. Codes A22, C92, D72, H61, H63 and H72 place the exercise in undergraduate teaching, group laboratory behavior, political processes, budget systems, debt and local expenditure. Use the title and these course concepts when explaining why the activity belongs in the syllabus.

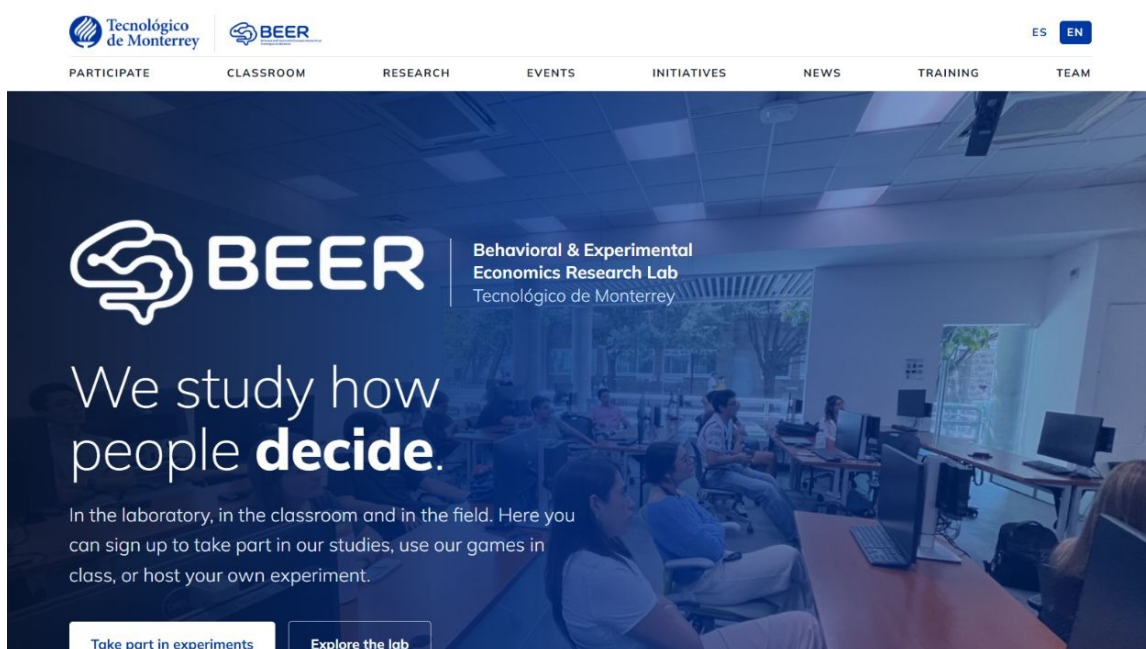


Figure 1.1: Laboratory home: locate teaching resources before distributing session links.

The stable family address is <https://commonbudget.beer-lab.org/>. Its English basic room is https://commonbudget.beer-lab.org/room/common_budget_en and its English extended room is https://commonbudget.beer-lab.org/room/common_budget_extended. The Spanish rooms are https://commonbudget.beer-lab.org/room/presupuesto_comun_es and https://commonbudget.beer-lab.org/room/presupuesto_comun_extendido. These are the canonical

product routes; public availability depends on deployment. This delivery's local preview uses <http://localhost:8138/demo> and <http://localhost:8138/rooms> on the computer running the family instance. A student on a different computer cannot access that machine simply by entering localhost.

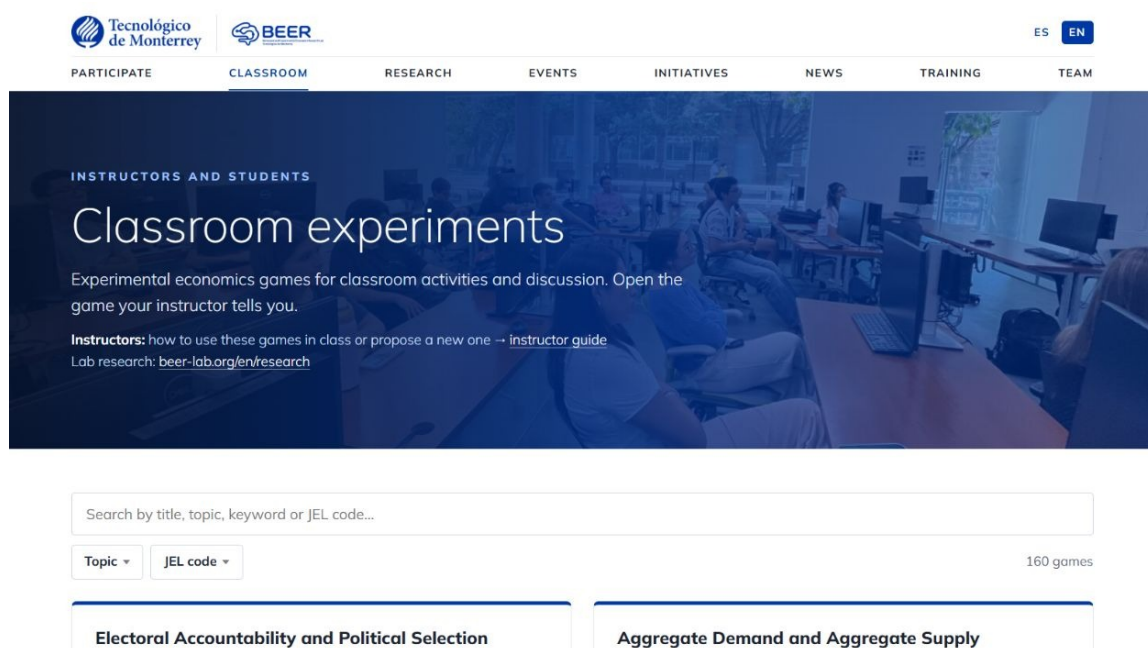


Figure 1.2: Teaching directory: identify the family and verify the language of its access route.

Demo contains only this family: three basic modes in each language and fifteen extended conditions in each language, for thirty-six configurations overall. A configuration specifies a language, institution and calendar. These are not thirty-six conceptually distinct teaching games. Rooms has exactly four entries: Spanish basic, English basic, Spanish extended and English extended. If unrelated families appear, do not start the class from that instance. Ask the laboratory coordination team to restore the intended family scope before creating a classroom session.

The instructor creates a session in the appropriate room, selects its configuration and enters a compatible participant count. Ordinary conditions require multiples of three; review conditions require multiples of four; the future-cohort condition requires multiples of six. Basic rematching needs at least six participants to allow changes of group. Demonstrations propose two complete groups. An extra participant is not automatically turned into an observer: the native creation form enforces complete groups and rejects incompatible counts. Decide which institution you want before deciding how many people to assign.

Never share the administrator or report link with participants. Each person enters through the room or an assigned individual link. An individual link represents a session position and should be used in one active window. When testing multiple positions, open a different participant link for each position. If the database is removed or recreated, old individual links no longer identify a usable classroom session; create a new session and distribute its access links. Restarting the local server alone preserves the database and its existing sessions.

Checkpoint

Before entry, verify language, institution, group size, number of rounds, destination of deferred debt and approval threshold. Open a test participant link and check instructions and the explicit ending. Keep the private report ready with aggregates hidden until the

Demo

Presupuesto común y proyectos particularistas · ES · Una ronda	Presupuesto común y proyectos particularistas / Common Budget and Local Projects — BEER Lab Seleccione una variante de este juego. Select a version of this game.
Presupuesto común y proyectos particularistas · ES · Grupo fijo	
Presupuesto común y proyectos particularistas · ES · Reasignación aleatoria	
Extendido · ES · Financiamiento compartido	
Extendido · ES · Financiamiento local	
Extendido · ES · Cupo total de proyectos	
Extendido · ES · Revisión de la cartera completa	
Extendido · ES · Cartera heterogénea y revisión completa	
Extendido · ES · Cartera heterogénea y revisión por partidas	
Extendido · ES · Votos separados por distrito	
Extendido · ES · Paquete y mayoría	
Extendido · ES · Paquete y unanimidad	
Extendido · ES · Dos fechas sin deuda	
Extendido · ES · Deuda pagada por el mismo grupo	
Extendido · ES · Deuda pagada por otro grupo	
Extendido · ES · Proyectos heterogéneos y fondo común	

Figure 1.3: Family Demo: check the name, language and condition before creating a session.

Rooms

Current rooms:

[ES] Presupuesto común
[EN] Common Budget
[ES] Presupuesto común · Extendido
[EN] Common Budget · Extended

Figure 1.4: Rooms contains four entries. Open the room matching the language and edition used in class.

Room: [EN] Common Budget

Create a new session

Session Config

Common Budget and Local Projects · EN · One round

Number of participants

Complete groups of 3 participants. Use a multiple of 3; minimum 3.

Create

[Configure session](#) ⚙️

App sequence

common_budget_game (10 rounds)

District requests, shared project costs, approval institutions and dated liabilities.

Figure 1.5: Basic English room form: confirm a basic English default and a valid group size before creating a session.

decisions being discussed have ended.

1.3 Preparation and timing

Allow approximately thirty minutes for an introduction: five for access, seven for instructions and comprehension, five for play and thirteen for discussion. A comparison of two institutions typically needs forty-five to sixty minutes. These are teaching estimates rather than program-enforced deadlines. There is no timer that chooses for an absent participant. A group waits until every required position finishes its stage, so arrange a procedure for connection problems before participants arrive. Keep the discussion time protected instead of adding more rounds whenever access happens quickly.

Explain only that participants will make decisions about projects and accounts. Do not announce that you expect excessive spending or suggest a particular number as the correct decision. Strategic reasoning belongs in the subsequent discussion. Prepare two blank columns headed own benefit and combined cost, and complete them after revealing results. If comparing classes or groups, assign conditions before observing choices. Selecting which treatment results to display after seeing outcomes risks presenting a comparison chosen because it happens to fit the instructor's expectation.

ECU stands for Experimental Currency Units. A starting account of 100 ECU is a reference inside the activity and does not itself promise a cash payment. If the course uses monetary incentives, announce the conversion and applicable payment procedure before play. Active-round earnings are added together; a single round is not randomly selected. Hold the conversion constant across institutional comparisons. Simultaneously changing incentives, instructions and financing makes it difficult to attribute an observed difference to the budget mechanism that the lesson is meant to explain.

The welcome page displays institutional branding and general laboratory rules. Participants must accept those rules to continue. Instructions then define endowments, benefits, costs, timing and decision powers. There are no demographic questions. The instructor may check whether everyone has reached comprehension without reading individual decisions aloud. If someone asks for help,

explain the relevant term or arithmetic operation without recommending how many projects to request or how to vote. Confusion about the interface should not become an opportunity to steer behavior toward the theoretical prediction.

Round 1 / 1 · Position: A

Common Budget and Local Projects



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.

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.

☐ Yes

☒ No

Start

Figure 1.6: Participant welcome page: check rule acceptance and keep individual links separate.

Understand accounts and strategic choices

2.1 Reconstructing the basic game

Each district A, B and C starts the round with 100 ECU. Its representative simultaneously requests an integer from zero to three projects. In the basic game every project delivers 12 ECU to its own district, costs 18 ECU and is automatically implemented. The cost is split equally: every district pays 6 ECU for every project in the group, including its own projects. Requests themselves cost nothing. Project costs arise from implementation. The three starting accounts therefore sum to 300 ECU before any project benefit or project charge.

Write q_A , q_B and q_C for the requested quantities and Q for their sum. With unrestricted automatic implementation, A's account is $100 + 12q_A - 6Q$. The expressions for B and C differ only in the district quantity generating the benefit. The coefficient 12 multiplies own projects, while 6 multiplies every project. Students need not memorize notation to understand this distinction. First locate the district receiving a benefit, then identify who bears each charge. Keeping those two questions separate is the central accounting habit developed by the exercise.

Suppose A requests three projects and the others request zero. There are three projects. A receives 36 ECU and pays 18, closing at 118. B and C receive no project benefits but each pays 18, closing at 82. The three accounts sum to 282, eighteen below their combined endowment. A gains relative to no projects while the group loses. The difference is not an accounting discrepancy: A retains its district's benefit and shifts two thirds of the resource cost onto the other districts.

If everyone requests three, nine projects are implemented. Each district receives 36 and pays 54, so all close at 82 and the combined account is 246. The loss is 54 because each project produces 12 and uses 18. Unilaterally requesting zero would not eliminate the charges generated by the other six projects. That district would close at 64, whereas requesting its three projects raises its account to 82. A unilateral incentive comparison holds other choices fixed; it does not replace them with a favorable collective agreement.

Theoretical foundation

An additional own project changes individual earnings by $12 - 6 = 6$ ECU, whatever the others request. With exclusively monetary preferences, understood rules and automatic implementation, requesting three is strictly dominant. Each project changes group surplus by $12 - 18 = -6$ ECU. The combined resource maximum implements zero projects. The individual prediction and collective benchmark solve different optimization problems.

Dominance means one action performs better than alternatives against every combination of

others' choices. It does not mean every student will choose it. Participants may care about others' earnings, seek equality, interpret the setting as a public obligation or misunderstand a charge. Low requests are compatible with several explanations and do not identify one without additional evidence. An incorrect comprehension answer indicates difficulty with a rule, not necessarily a social preference. For that reason, the activity requires correction before opening the decision stage rather than treating confusion as an experimental outcome.

2.2 Comprehension without strategic advice

The check contains three questions. First, A requests one, B two and C zero: total requests equal three. Second, participants calculate A's project-date account when only its first project is implemented. In the basic condition this is 106 ECU, obtained from $100 + 12 - 6$. Third, a request that is not implemented does not generate a project-cost charge. The numeric answer changes with the active condition, and feedback uses its effective parameters. Do not present 106 as a universal answer for every institution in the family.

An incorrect answer receives a specific arithmetic explanation while correct answers are retained. With local financing the single-project example gives A 94. Under the shared mixed catalog it gives 124. Approval conditions with benefit 14 give 108. Borrowing with partial immediate financing gives 102, while the no-debt control with benefit 5 gives 99. The question explicitly excludes any later-date payment. It checks the current account without concealing that an additional obligation may exist. Students should learn to state which date a number describes before calling it an overall payoff.

What participants will see

A useful verbal introduction is: "Projects in your district can give you a benefit. Projects in any district can generate charges in your account. Read which institution determines implementation and when payment occurs. Your task is to decide under those rules; the instructor will not recommend a preferred quantity."

After comprehension, a waiting page assembles the group. The round-start page recalls resources and position. The request page shows the public benefit catalog and accepts only integers from zero to three. Other requests appear after everyone confirms. In approval conditions, subsequent votes or review decisions determine implementation. Results distinguish starting account, benefit received, immediate charge, debt repayment and closing account. They also display each district's requested and implemented quantities. This sequence lets participants verify the mechanical consequences of an institutional decision rather than seeing only an unexplained final score.

The final screen states that the activity is completed and displays cumulative earnings and a round ledger. It remains open instead of leading to a technical no-more-pages message. Ask students to keep it available during discussion. The cumulative account is an earnings sum, not an efficiency measure directly comparable across sessions with different horizons or numbers of participants. For institutional comparisons, use surplus per project opportunity and show endowments and positions separately. Otherwise a treatment can appear richer merely because it includes more starting resources or more active dates.

2.3 Repetition and interpretation

One interaction focuses attention on the immediate conflict. Ten rounds with fixed groups allow learning about the same people and expectations of their future conduct. Ten rounds with random

Round 1 / 1 · Position: A

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.

A requests 1 project, B requests 2 and C requests 0. How many projects were requested in total?

Suppose only A's first project is implemented. How many ECU does A have at the close of the project date, before any payment on a later date?

Does a request that is not implemented generate a project-cost charge?

- ☐ Yes
☐ No

Continue

Figure 2.1: Comprehension uses the active condition's parameters and separates requested from implemented quantities.

Round 1 / 1 · Position: A

Project request

Starting accounts each round: A, B and C receive 100 ECU each; the districts' combined base is 300 ECU.

Cycle stage: **Project date**

District	Project 1	Project 2	Project 3
A	12 ECU	12 ECU	12 ECU
B	12 ECU	12 ECU	12 ECU
C	12 ECU	12 ECU	12 ECU

Cost per project: 18 ECU

Choose an integer from 0 to 3. Other requests are shown once everyone has chosen.

How many projects do you request for your district?

Continue

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

Figure 2.2: Basic request page: the catalog links a chosen quantity to that district's project benefits.

rematching form fresh groups each round, but repeated encounters remain possible. Letters identify positions within a round and do not necessarily track the same individual over time. Rematching also does not guarantee social anonymity when classmates know one another or discuss choices. Maintain the announced communication rule and record any relevant deviation when interpreting the classroom results.

In a monetary game with a known finite horizon, repetition alone does not turn the group maximum into a dominant individual action. Under strong rationality and common-knowledge assumptions, the dominance argument remains. Classroom choices may show learning, reciprocity, frustration or informal coordination. Compare request trajectories before attributing a pattern to reputation. If fixed groups requested less from the first round, they differed before the observed history could explain later contrasts. A trajectory is useful evidence about what happened, but its slope does not by itself name the mechanism producing it.

A computerized class activity does not identify a general causal relationship merely because choices are recorded precisely. Comparisons need condition assignment, comparable comprehension and enough independent groups. Repeated rounds within a group are related observations and must not be counted as new independent groups. Present means, distributions and trajectories as results of this class. A research extension would require an appropriate protocol, incentives, sample design and analysis. The teaching package makes a mechanism observable; it does not substitute for the methodological decisions required to study that mechanism in a population.

Attention

Do not equate many projects with inefficiency without checking the catalog. Every basic project has benefit below cost, whereas some mixed-catalog projects create value. Do not count a rejected portfolio as spending. Fiscal costs and surplus use actual implementation, not requests that never became projects.

2.4 Literature and the status of this adaptation

Weingast, Shepsle and Johnsen (1981) analyze distributive politics with geographically concentrated benefits and shared costs. Their contribution motivates comparing local incentives with aggregate costs. This family is an original classroom adaptation with three districts and discrete projects; it does not literally reproduce their model or a published experimental protocol. Numerical examples and predictions in this guide are derived from the implemented accounts. They should be distinguished from empirical findings about real public budgets, whose institutions and project benefits can be much more complicated.

DelRossi and Inman's 1998 NBER paper studies local cost sharing and legislative demand for water projects. It motivates asking who pays, without predicting our students' response. Persson, Roland and Tabellini (2000) link political institutions and spending composition. Their framework motivates attention to decision rules; our simplified conditions do not represent complete presidential or parliamentary regimes. External evidence situates the question, while classroom data describe this exercise.

Baron and Ferejohn (1989) motivate proposal and voting rules; this adaptation uses one closed proposal rather than continuous bargaining. Velasco's 1997 paper, published in 2000, motivates fiscal fragmentation and debt. Our two-date cycles isolate a liability rather than its long-run equilibrium. These are teaching comparisons informed by those mechanisms, not replications of their studies or estimates of their parameters.

Compare institutions, quality and future obligations

3.1 Shared and local financing

The extended shared reference retains benefit 12, cost 18 and equal division across three districts. It lasts six rounds with fixed groups. This supplies a common horizon for institutional comparisons without mixing the treatment change with the basic ten-round horizon. The monetary prediction remains three requests per representative and group surplus of minus 54 per round. In the report, compare the individual request histogram with implementation. Requests and implementation coincide in this reference; a discrepancy would warrant checking the records before beginning substantive feedback.

Local financing preserves benefit 12 but charges each district the full 18 for its own projects. Another own project changes earnings by minus 6, so zero is strictly dominant under monetary preferences and coincides with the combined maximum. If all request three, accounts still equal 82 each. That numerical coincidence does not contradict the incentive change: it describes one action profile. The marginal effect of deviating while other actions stay fixed is different. This distinction between accounting at one profile and incentives across alternatives is a useful bridge from arithmetic to strategic reasoning.

Ask why someone requesting three under shared financing might request zero under local payment, even though both institutions give the same account when all request three. The answer concerns the marginal cost faced by the decision maker. Relate it to DelRossi and Inman's evidence that local participation in project costs matters for demand, while using this class's own observations and denominators to describe its response. A treatment's label is not evidence that it changed conduct. Compare the distributions and note whether a difference arose in every group or was driven by a few.

3.2 An aggregate cap does not rank project quality

The cap condition implements at most three projects across districts. If requests sum to three or less, all are implemented. Otherwise proportional quotas are calculated, integer parts are assigned first, and remaining slots go to the largest remainders. A uniformly drawn district order resolves ties. Quotas, remainders and the priority order are stored for auditing. A request receiving no slot creates neither benefit nor project cost. Explain this procedure before play because requesting can now affect a district's share of a scarce implementation capacity.

If everyone requests three, total requests equal nine and each quota equals one. One project

per district is implemented. Each receives 12 and pays 18, closing at 94. The cap improves the combined total relative to nine basic projects, but the group still loses 18. Restricting quantity does not make a negative-value project positive. Nor can the automatic-implementation dominance argument simply be carried over: the quantity requested now helps determine the allocation of slots. The relevant strategic comparison must include that rationing rule, including uncertainty from tied remainders.

Consider requests of 3,1,1. Quotas are 1.8,0.6,0.6. After assigning one slot to A, two remain. One goes to A's larger remainder and the other to the tie between B and C. Outcomes are 2,1,0 or 2,0,1 with equal probability. This is not repeated sampling of all individual projects with replacement. Inspect dates when requests exceed the cap and actual implementation. Ask whether the institution reduces spending, improves quality or allocates fixed capacity: these are different questions, and only the last is directly built into the allocation algorithm.

3.3 Reviewing the whole portfolio

Review conditions add a fourth person, D. Districts request projects and D observes their portfolio before choosing to implement all or none. D has a separate base of 100 ECU and receives the change in the sum of district accounts relative to 300. Thus district surplus of minus 54 lowers D's account to 46, while rejecting everything preserves 100. This rule induces an aggregate evaluation criterion and must be described as an incentive design. It is not a spontaneous measure of the public spirit of a real finance minister.

With homogeneous benefit-12 projects, every nonempty portfolio reduces the district total. A monetary reviewer rejects it and is indifferent over approval of an empty portfolio. Representatives may anticipate that veto, so the basic dominance prediction for requests no longer follows. High requests with zero implementation do not show large spending by the reviewer: they show requests that did not pass the filter. Compare both quantities and position accounts before asking whether the institution changed demand or merely stopped implementation after demand was expressed.

Comparing review with the three-person reference adds a position and its induced account as well as an approval decision. It therefore does not isolate a single approval button. A cleaner contrast for review powers is mixed-portfolio whole review versus mixed-portfolio item review: both have four positions, the same catalog and the same reviewer payoff rule. Use their contrast to discuss institutional powers in the spirit of Persson, Roland and Tabellini, while avoiding the claim that a simple screen corresponds to an entire national political regime with all its other features held constant.

3.4 Mixed projects and item review

Every mixed-catalog project still costs 18. A receives benefits 30,27,24 across its three projects; B receives 12,9,8; C receives 24,12,9. Quantities implement ordered prefixes. Two A projects mean the first two, not a free choice of its first and third projects. The catalog is public and each position retains its row for six rounds. These values are announced project benefits, not private types or quality scores assigned by the investigator after observing choices. That distinction makes the resource benchmark transparent and reproducible by students.

Under whole review with requests 3,3,3, total benefits are 155 and material costs are 162. District accounts are 127,75,91, summing to 293. D rejects the whole portfolio under the monetary criterion and preserves 100, even though it contains profitable components. This demonstrates a limit of an aggregate veto: it may prevent a loss while discarding positive opportunities. Interpreting review rates therefore requires knowing the offered composition. Two groups with different requests can

exhibit different approval rates without reviewers having different preferences or using different decision rules.

Item review lets D select any quantity from zero to each district's request. If all requested three, D may implement A3,B0,C1. Benefits are 81,0,24, totaling 105. Four projects cost 72 and create surplus 33. District accounts are 157,76,100, totaling 333, while D closes at 133. Maximizing the district sum does not require equal accounts or equal geographic project counts. D also cannot implement a project that was not requested: its selection power is bounded by the preceding request stage. This constraint matters when quality projects are absent from the submitted portfolio.

Round 6 / 6 · Position: D

Reviewing requests

District	Project 1	Project 2	Project 3
A	30 ECU	27 ECU	24 ECU
B	12 ECU	9 ECU	8 ECU
C	24 ECU	12 ECU	9 ECU

Cost per project: 18 ECU

District	Requested	Proposed package
A	3	3
B	3	3
C	3	3

Implement the entire portfolio

☐ Yes
☒ No

[Continue](#)

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

Figure 3.1: Whole-portfolio review with mixed projects: D observes requests and the public catalog before deciding.

Ask what changes between rejecting a negative-value package and selecting its profitable components. The answer is the set of feasible actions. Low surplus under item review could reflect insufficient quality requests, arithmetic error or the reviewer's choices; aggregate means alone do not identify which explanation applies. Keep D's induced earnings separate from fiscal surplus. Adding the reviewer bonus as another project benefit would count the same change in aggregate district value twice and incorrectly make institutional scoring appear to create additional real resources.

3.5 Quality under shared financing, local payment and a cap

Without review, the mixed shared catalog preserves a monetary incentive to request three. Even its smallest benefit, 8, exceeds the requester's own shared charge of 6. If everyone does so, surplus is minus 7 rather than minus 54. That improvement comes from a different catalog, not a better institution. Compare this condition with mixed local financing: own projects are evaluated against their full cost of 18. A requests three, B zero and C one. Accounts are 127,100,106 and combined surplus is 33.

Local payment aligns monetary incentives with efficient selection in this example because benefits accrue only to the receiving district and there are no benefit spillovers. Do not generalize that result to projects benefiting other districts. Exclusively local financing could underprovide a project with large external benefits. The family concentrates benefits to isolate shared costs. Require students to name this assumption before recommending decentralization for a real case such as a transport network crossing local borders. A mechanism that solves one externality need not solve a different one omitted from the classroom environment.

With the mixed catalog and cap three, requests 3,3,3 implement one project per district. Benefits total 66, costs 54 and surplus 12. Value is created, but the maximum feasible under the cap is 27. Both A3 and A2+C1 attain that maximum. Without the cap, four profitable projects can generate 33. A quantity restriction can sacrifice value through scarce slots and allocate them without quality ranking. The report correctly uses 27 for the capped benchmark rather than the unrestricted maximum of 33. Discuss those two sources of foregone surplus separately.

3.6 Separate votes and a closed package

The three approval conditions use benefit 14 and cost 18. This common modification allows two included districts to gain strictly from a package excluding the third. Do not compare their earnings with the benefit-12 basic game as if only voting had changed. Compare separate ballots, majority package and unanimous package with one another. In each, requests come first and portfolios are observed before voting. Requesting projects is not itself authorization to spend, and an unapproved request has no implementation cost.

Separate voting gives every representative a ballot on each district's portfolio. A portfolio requires two of three yes votes for implementation in full. In a monetary comparison where a vote is pivotal, the receiving district favors its own portfolio and the others prefer avoiding its cost. This intuition highlights an approval difficulty. It is not a unique voting equilibrium: nonpivotal votes, indifference and beliefs about other ballots permit additional strategies. The application records three responses per representative rather than inferring motives from a single checkbox or labeling every apparently favorable ballot sincere.

With majority package voting, one position selects which full district portfolios to include. Proposal power rotates A,B,C across rounds and all three vote, including the proposer. There is one closed proposal; failure to secure two yes votes implements zero. There are no amendments, side payments or binding promises about another round. A package of A3 and B3 produces accounts 106,106,64. A and B each gain six relative to no implementation, while C loses 36. A benefiting majority can approve the package despite a combined loss of 24.

Unanimity retains the same procedure but requires three yes votes. The third district can block the preceding package if it maximizes its account and expects to be pivotal. This protects against an unconsented charge, but in other environments unanimity can also block agreements with positive combined value. Every project in this approval comparison has negative net resource value, so there is no positive aggregate gain to distribute. Use the comparison to teach an approval

Round 6 / 6 · Position: A

Voting

District	Requested	Proposed package
A	3	3
B	3	3
C	3	0

Approve the entire package

☒ Yes
☐ No

Continue

Figure 3.2: Package approval: participants observe the included district portfolios before casting a vote on the whole proposal.

threshold; use the mixed catalog conditions for the separate question of selecting positive-value projects.

Relate agenda control to Baron and Ferejohn while explaining the adaptation's single-proposal restriction. Do not permit verbal side agreements during a silent session and then interpret the data as a closed-package institution without communication. Discuss vote trading afterward and distinguish an unenforced promise from a commitment actually implemented by the software. The report measures implemented portfolios; it does not measure unrecorded coalition contracts. A proposer may anticipate votes, so the request stage should be understood as part of the full institution rather than an independent preference measure.

3.7 Three cycles: postponing versus shifting a bill

Debt comparisons use benefit 5, cost 18 and six rounds organized in three two-date cycles. Odd dates admit requests and implementation; even dates settle without new projects. The no-debt control pays the whole cost on the project date and renews a base of 100 per district on the following date with no liability. Its immediate marginal incentive is $5 - 6 = -1$, making zero the monetary reference. If everyone requested three, each district would receive 61 on the project date and 100 on the settlement date.

Same-group debt pays half the material cost immediately and defers half. Interest is 20% of deferred principal, not of the full project cost or the account balance. For nine projects, material cost is 162: 81 is paid now, 81 is borrowed and 16.2 of interest accrues. The next-date liability is 97.2, split into charges of 32.4. Each district receives benefits of 15 and pays 27 now, closing at 88; on settlement it closes at 67.6. The dates identify liquidity and ultimate incidence separately.

The individual two-date sum is 155.6 against a cycle endowment of 200. For a participant anticipating both dates without discounting, the own marginal cost of another project is 3 now plus 3.6 later, exceeding benefit 5. The monetary reference again requests zero. Positive requests would be compatible with myopia, preferences or other explanations; they do not automatically prove the debt was ignored. The calendar is announced and the accounts permit reconstruction. Ask students to distinguish current liquidity from net cycle income before naming a behavioral mechanism from the observed quantity.

Future-cohort debt uses six people. A,B,C choose projects, receive 100 only on odd project dates and pay the immediate half. D,E,F receive 100 only on even settlement dates and pay the liability without choosing projects. On each person's inactive date both starting account and outcome are zero. Combined resources remain 300 per date and 600 per cycle, matching the other two debt conditions. No additional passive endowments are introduced that would make total earnings comparisons misleading simply because the group contains more named positions.

Round 6 / 6 · Position: D

Round outcome

Settlement date		
Your starting account	100 ECU	
Benefit received	0 ECU	
Immediate charge	0 ECU	
Debt payment on this date	32.40 ECU	
Your closing account	67.60 ECU	
Total debt due on the next date	0 ECU	
District	Requested	Implemented
Continue		

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

Figure 3.3: Future-cohort settlement: the paying position receives its endowment and the dated debt charge, without a new project choice.

Now a deciding district receives 5 and pays only 3 for its marginal project. It gains 2 while shifting a later charge of 3.6 to other people. Under monetary preferences with automatic implementation, three requests are dominant for current decision makers. If all choose three, A,B,C receive 88 on the project date and D,E,F receive 67.6 when settling. Combined cycle surplus is minus 133.2. Positions do not rotate and there is no future vote. The future cohort's absence of a project decision is part of the mechanism rather than an unanswered form.

Read the report, lead discussion and preserve the data

4.1 From progress to aggregate outcomes

The private report separates progress from outcomes. Before revelation it shows participant count, completed group-rounds and pending group-rounds. With two groups and six active rounds, the denominator is twelve group-rounds. A group-round is completed only after all required decisions are resolved and accounts are calculated. Reaching requests or casting a ballot is not the same as completing the outcome. Refresh incorporates new progress; it does not make decisions on behalf of a student or replace an absent position. This distinction matters when deciding whether the class is ready for a comparison.

Aggregates remain hidden until the instructor selects Reveal results, and can be hidden again. This presentation control prevents a group still choosing from observing other groups' statistics and responding to them. It is a teaching tool within private administrator access, not a guarantee that an authorized administrator's browser contains no outcome data. Control who sees the projected screen and when. For simultaneous comparisons, wait until relevant groups finish or explicitly declare the information displayed to be part of a later informational phase with a different purpose.

The main means use a completed group project date as their unit. Mean requests adds A,B,C quantities across completed project dates and divides by the number of those dates. It does not divide by participant count. Mean implementation uses the same denominator and quantities actually implemented. Their aggregate difference identifies requests not implemented. Depending on the condition, this gap can arise from a cap, ballots, exclusion from a package or review. It should not automatically be labeled reviewer rejection when the active institution has a different approval mechanism.

Debt conditions have three project opportunities across six rounds. The three settlements count toward progress and account outcomes, but are not added as new zero requests. Mixing both date types would mechanically halve mean requests and make debt appear to reduce demand even without any change in decisions. The report separates project opportunities and retains a row for each round in the trajectory. Use it to explain why choosing zero and having no project choice are different concepts, although neither introduces new projects on that date.

4.2 Distributions, trajectories and positions

The individual histogram classifies requests of zero, one, two and three. Its denominator is three times the number of completed group project dates. A mean of 1.5 can describe widespread

intermediate requests or a mixture of zeros and threes. Inspect the bars before describing a representative strategy. A second histogram displays total implemented projects per group from zero to nine. Under cap three, higher bars must be empty. Whole review may generate jumps between zero and entire offered portfolios rather than the intermediate quantities permitted by item review.

Individual request distribution

N=3

0 · N=0

1 · N=0

2 · N=0

3 · N=3

Figure 4.1: Request distribution: compare mass at zero and three before interpreting a mean.

The round table displays completed groups, project opportunities, mean requests, mean implementation, mean surplus and total current accounts. A dash means no appropriate observation exists for that mean, not that its value equals zero. A settlement has no newly created project surplus, so it should not be described as a fall of new project value to zero. Read the cycle-stage column alongside the figures. In incomplete sessions, later rounds can represent fewer groups. That change in composition limits what can be concluded from comparing successive displayed means.

Position accounts use consistent letters and colors. A,B,C are districts. D may be a reviewer or a future-cohort member, depending on the treatment. A shared letter does not make those roles equivalent across conditions. In future-cohort debt, D,E,F each have one endowed settlement date and one inactive zero date per cycle. Their mean account per round combines both. To discuss cycle incidence, reconstruct the two dates or use the individual ledger rather than comparing that mean with an account from a condition endowed on every round.

The positive-project indicator counts implemented components whose local benefit exceeds material cost 18. It is a physical composition measure, not a percentage of students making correct decisions. A project worth exactly 18 would not count as strictly positive; the current catalog has no equality case. Interest enters debt surplus even though this particular project-quality count compares benefit with material cost. All debt projects have benefit 5 and therefore fail the material-cost comparison. Explain the definition rather than assuming that any indicator labeled positive uses the same criterion as every welfare calculation.

4.3 Surplus, the resource benchmark and outstanding debt

Project-date surplus adds district benefits and subtracts full material cost and interest created. It excludes initial endowments. Basic surplus is minus six per project; mixed-catalog surplus can be positive or negative depending on composition. The maximum feasible surplus enumerates portfolios of zero to three per district and respects any aggregate cap. The report displays the distance between this maximum and realized surplus. That distance is an internal resource comparison, not an estimate of corruption, misconduct or waste outside the game. Its interpretation depends on the announced opportunities and selection constraints.

Velasco motivates fiscal fragmentation and debt; this exercise has no refinancing or indefinite accumulation. Every cycle settles and round six ends without liabilities. Same-group versus future-cohort debt holds benefits, interest and timing fixed while changing who pays later. Comparison

Instructor report: common budget

Shared financing · Matching: One round

Participants

3

Completed group-rounds

1 / 1

Pending

0[Download this session's CSV](#)[Refresh](#)[Hide results](#)

Aggregates remain hidden until revealed. Only active rounds are used; pending records remain in the CSV. A completed zero is a valid outcome.

Completed project dates

1

Requests per group

9 · N=1

Implementation per group

9 · N=1

Mean project surplus

-54 ECU · N=1

Maximum feasible surplus

0 ECU

Mean distance to maximum

54 ECU

Requests not implemented

0

Dates with requests exceeding the cap

0

Implemented projects with benefit above cost

0

Mean debt created

0 ECU

Debt awaiting settlement

0 ECU

Figure 4.2: Revealed report: read each mean with its denominator and distinguish project outcomes from date-specific cash accounts.

with the control also changes interest. Calculate both margins before attributing request differences to a single cause.

For approval institutions, the benchmark does not require that a portfolio receive votes or even that its projects were requested. It is a resource-selection benchmark rather than a politically attainable equilibrium. A positive gap can result from distributional conflict, missing quality requests or approval decisions. Reconstruct the sequence before attributing a cause. Distinguishing material feasibility from political feasibility is one of the family's lessons. The instructor should not say the software found a policy everyone would accept merely because it maximized the sum of benefits minus costs across the three districts.

With debt, a liability is recognized when generated and its payment appears on the next date. A portfolio creating liability 97.2 has already included its 16.2 interest in project surplus. When 97.2 is repaid, the application does not create another project loss of that amount: principal was already counted as project cost and interest was already recognized. Adding project surplus and then subtracting repayment again would duplicate costs. For a cash reconciliation, instead sum accounts on both dates and compare them with the cycle's starting resources, stating explicitly which accounting perspective is being used.

Outstanding debt sums obligations from completed project dates whose subsequent settlement is not yet completed. It can be positive during a session without signaling an error. Once round six is completed it must be zero. If projects are finished but the paying cohort has not reached its settlement outcome, preserve pending records and explain the difference between a known obligation and a completed payment. Do not present a future cohort's final account as already completed merely because the formula allows its eventual charge to be calculated from an earlier portfolio.

Feedback script

Begin with observations: “This class requested one quantity and implemented another. These are the completed groups and surplus per opportunity.” Reconstruct a case: “Who received the benefit, who paid now and who owes payment later?” Then compare choices with the marginal incentive and discuss alternative explanations. End by asking students to propose an institutional rule and identify a cost or limitation introduced by that rule.

4.4 A usable lesson sequence

For a short class, spend the first five minutes on entry and laboratory rules. Give seven minutes for instructions and comprehension. Reserve five for one interaction and its ending; waiting may use some of this time if access problems arise. Use the remaining thirteen to reconstruct example accounts, reveal distributions and compare individual incentives with combined surplus. A single interaction with a complete discussion teaches more than many rounds played without time to identify who bears costs. Treat additional rounds as a curricular choice rather than an automatic measure of teaching quality.

For a one-hour class, allocate ten minutes to preparation, fifteen to two comparable sessions, twenty-five to discussion and ten to contingency and a written conclusion. One option assigns shared and local financing to different groups. Another uses the same students in two sessions with order alternated across groups. The second design helps each person contrast rules, but introduces learning and order effects. State that limitation and avoid presenting its observations as fully independent. Keep the project catalog and payoff conversion comparable if the purpose is to isolate the financing rule.

For approval institutions, first ask students to calculate alternative payoffs for a 3,3,3 request profile without publicly prescribing another position’s ballot. After play compare a two-district package with a three-district package. Ask what changes when one person controls which alternatives reach the vote. Do not reduce discussion to whether a majority was good or bad: identify beneficiaries, excluded contributors, rejection default and amendment possibilities. Under unanimity, compare protection against imposed charges with blocking power. The exercise is most useful when students name the exact decision rule generating an outcome.

For debt, draw two date columns with principal and interest in separate rows. Ask a current decision maker and a future payer to describe their own accounts before revealing the combined outcome. Their different experiences make representation of later payers visible. Next calculate the same group’s cycle account and contrast its marginal incentive with that of the current cohort. Conclude by asking what a real policy analysis would additionally require: future project benefits, growth, uncertainty, distortionary taxation and refinancing opportunities are not included. The simplified calendar clarifies incidence without pretending to exhaust public debt analysis.

4.5 Worked exercises for conceptual transfer

First exercise: under shared financing A requests two, B one and C zero. There are three projects, so everyone pays 18. Accounts are A106,B94,C82, totaling 282 and surplus minus 18. If A adds another project, the group reaches four. A gains six in its own account while B and C each lose six. The combined change is minus six. A complete solution explains both marginal effects rather than merely reporting the new sum. This checks whether the student understands how an individually profitable choice can reduce combined resources.

Second exercise: in the mixed catalog, portfolio A2,B1,C1 produces benefits 57,12,24, totaling 93. Four projects cost 72 and create surplus 21. Shared financing charges 24 to each district, giving accounts 133,88,100. Removing B's project raises surplus to 27 and lowers the shared charge to 18 each. New accounts are 139,82,106. The sum improves while B loses six. Thus a resource-efficient reform is not necessarily a Pareto improvement without compensation. Have students identify who would support it, who would resist and which additional transfer would be needed to protect the loser.

Third exercise: under cap three with requests 2,2,1, quotas are 1.2,1.2,0.6. A and B each receive one slot from integer parts; C receives the remaining slot because its remainder is largest. The outcome is 1,1,1 regardless of how the tie between A and B is ordered. If someone argues A must receive two because it requested more than C, recall that allocation uses remainders after integer parts. The example separates approximate proportionality, equality and quality ranking. None of these criteria should be substituted for the announced rule after choices are observed.

Fourth exercise: debt implements A1,B0,C0 with benefit 5. Material cost is 18, immediate payment 9 and deferred principal 9. Interest is 1.8 and next-date liability 10.8, divided into three charges of 3.6. A closes the first date at 102 and B,C at 97. Under same-group debt, all close the second date at 96.4. Cycle accounts are 198.4,193.4,193.4, with total surplus minus 14.8. Under future-cohort debt the current benefits and immediate charges accrue to decision makers while later charges fall on other people. The same project has the same resource cost but different individual incentives.

Fifth exercise: a majority group has accounts 106,106,64 while a unanimous group finishes at 100,100,100. This difference does not prove unanimity always improves welfare. In this example it blocks a negative-surplus package and protects the third district; elsewhere it could block a positive-value agreement. The answer must mention benefit 14, cost 18, the single-proposal procedure and rejection with zero implementation. An institutional recommendation without those conditions loses the connection between the mechanism and the outcome. Ask students to propose a change in project values that would require reconsidering their conclusion.

4.6 Exporting and diagnosing common problems

The native report download selects the current session and contains one participant row with columns for all ten technical rounds. Basic one-round and extended six-round configurations use only their active dates. Remaining technical rounds are not pending intervention observations. The custom long export retains every participant-active-round record, including unfinished ones. Flags prepared, collected and completed reconstruct progress. Session and participant codes support private record linkage and do not appear in aggregate classroom graphs. Keep raw identifiers private when preparing a classroom summary or sharing materials outside the teaching team.

A blank request can mean an unanswered choice or a position without that action. Distinguish these using date, position and completion state. A completed zero account for an inactive cohort is valid and must not be discarded as missing. Settlement dates do not invent zero requests or zero individual execution decisions. JSON fields retain portfolios and cap audits as structured counts, not student free text. The codebook explains material costs, debt created, repayments and the reviewer's separate scoring account. Read these definitions before adding columns with similar names that describe different dates or accounting concepts.

If a waiting page does not advance, inspect the private monitor and identify the required position that has not finished. Do not prescribe a choice simply to accelerate the session. If participant-count validation fails, check the institution: review needs four positions and future-cohort debt six, even though the base needs three. If an account looks unexpected, reconstruct endowment, benefit and charge before restarting anything. Restarting the local server preserves the database. Do not

delete classroom sessions to fix a translation or update an image; correct the relevant interface and verify the affected screen.

Save the CSV before closing and record language, condition, group size, date and any communication or connectivity incident. Use deidentified aggregates when sharing a class summary. Attach group counts and completed project opportunities to every treatment comparison. End by asking each student to write one sentence distinguishing individual marginal cost, combined cost and approval authority. That response checks conceptual transfer even when the class is too small for a meaningful statistical comparison. A technically precise dataset is valuable, but the central teaching output is the student's ability to explain the mechanism in a new example.

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