



Instructor guide to the disposition effect

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 disposition effect 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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Preparing a class on sales and reference points

1.1 The economic question and learning objectives

For the instructor

Introduce portfolio decisions. Before choice, explain resources and rules without announcing that students are expected to sell gains or retain losses. Name the mechanism during the later discussion, when the group can reconstruct its own opportunities.

One person purchased a security for ten units and can sell it for eleven today. Another bought a comparable security for ten and can sell it for nine. Observing the first sell and the second hold raises a question without establishing an explanation. We need to know each person's opportunities, expectations about future prices and trading costs. The disposition effect describes a higher propensity to realize gains than losses relative to a defined reference. This activity constructs that comparison and examines its limits without requiring a market among students.

The first learning objective is to distinguish cash, inventory and wealth. Selling converts a security into cash; it does not automatically create another gain beyond the gain already reflected in market value. The second is to understand that acquisition price is historical, whereas future prospects depend on the announced transition rule. The third is to construct a measure with the appropriate opportunities, separating chosen sales, rule-triggered orders and terminal liquidation. Finally, instructors can compare information, costs and responsibility while avoiding the claim that every observed difference measures preferences.

This family differs from allocating between safe and risky assets, selecting portfolio correlations, or changing how frequently investment losses are evaluated. It follows acquisitions and sales, gives every unit an identifiable cost, and asks when a position is realized. Prices are external: classroom orders do not form an equilibrium quote. The activity does not measure bubbles, order-book liquidity or informed trading. These boundaries help teachers choose a game for its actual question rather than for a broadly financial vocabulary.

The common design is individual. Each person controls six securities without depending on another person's choices. One explicit extension crosses management and payment between two anonymous people: each manages the portfolio whose performance the other receives. That condition requires pairs and a final wait, although prices remain external. Its payment rule is stated in the instructions and retained in the report so that paired observations are not described as independent payments. It is a substantive responsibility comparison rather than an artificial matching device added to an otherwise individual task.

The activity is suitable for teaching behavioural finance, portfolio decisions, experimental design and the interpretation of descriptive statistics. Students need basic addition and an understanding of chance; they need not have traded securities. A teacher can begin with the one-date version to establish accounting, then use an eight-date comparison to discuss repeated opportunities. The examples later in this guide can also support discussion when classroom observations are few or do not reproduce the pattern anticipated from the literature.

1.2 Family summary and condition selection

Purpose	Relate gain realization, historical references and selling decisions.
Experimental unit	Individual; delegated management crosses payments within anonymous pairs.
Participants	Individual: any positive count; delegated management: an even count of at least two.
Basic edition	One date; eight dates with chosen sales; eight with liquidation and repurchase.
Extended edition	Reference plus seventeen extensions of information, presentation, prospects, costs, taxes, orders and management.
Decision	Hold zero or one unit of each of six securities, subject to available cash.
Payoff	Terminal cash after liquidation; under delegation the other person receives it.
Topics	disposition effect; realized gains and losses; reference points; selling decisions; transaction costs; delegated management.
JEL	A22, C91, C92, D81, G11, G41.
Suggested duration	15–25 minutes for the activity; 45–60 minutes with discussion.

Reference endowment is 100 ECU: 40 cash and one unit of each security recorded at ten. ECU means Experimental Currency Units. This is not a new budget at every date. The authorized parameter can change initial cash, and instructions use the session's effective amount. Keeping other parameters fixed helps attribute a difference to the selected contrast. No monetary conversion is promised unless explicitly configured and announced.

Four rooms separate edition and language. Each basic room offers three conditions and each extended room eighteen, including its reference. Forty-two configurations therefore do not mean forty-two distinct games. Spanish and English share the same engine and data. Delegated management requires an even participant count of at least two; every other condition accepts any positive count. For a first lesson, compare chosen sales with one intervention while keeping the horizon and price process unchanged. This makes the institutional difference explainable before introducing a large factorial design.

The one-unit restriction gives an unambiguous lot acquisition cost. It is a teaching adaptation, not an exact replication of unrestricted trading quantities in the original studies. State this simplification when using the exercise to introduce empirical research.

1.3 Access, sessions and preparation

Begin at <https://beer-lab.org/> and follow CLASS to <https://teaching.beer-lab.org/>. The catalogue supports topic and JEL searches. This family uses <https://disposition.beer-lab.org/>. The basic English room is https://disposition.beer-lab.org/room/disposition_en; the

Spanish room is https://disposition.beer-lab.org/room/disposicion_es. Extended rooms end in `disposition_extended` and `disposicion_extendida`. The delivery record distinguishes checked local addresses from public deployment: a guide's existence does not establish that deployment has occurred.

Instructors use `/demo` to select a condition or `/rooms` to create a session in the appropriate room. Demo displays only this family. Rooms must contain exactly four rooms, and each creation form must initially select the correct language and edition. Verify the description before creating. A basic room must not initially select an extended condition. Native oTree administration labels may remain in English; game texts, validation feedback and the private report follow the session language. This distinction helps instructors recognize a normal administration form without overlooking an untranslated participant page.

Creating a session produces individual participant links and an instructor-report link. Distribute a different individual link to each person or use the prepared room entrance. The instructor link supports administration, progress monitoring and downloads; it should not be distributed as a participant entrance. Keep individual codes and identifying administrative windows private. A room, a demonstration and a participant are distinct objects. Returning to a room does not automatically replace a link belonging to a session already in progress.

Before class, test the activity on the teaching device and verify language, horizon and price process. Decide condition assignment before inspecting results. If using a private common seed, match budgets and processes without revealing future paths. Prices are common within a session, while portfolios can diverge through choices. Record the unit assigned to each condition and do not describe an administrative split as randomization unless a random allocation actually occurred. Matching a path controls one source of variation; it does not itself randomize people.

For delegated management, check attendance in complete pairs and explain the final wait. Other conditions have no matching or waits for classmates. Allow time for comprehension corrections and avoid recommending which securities to sell. Preserve the database when restarting a server: deleting it invalidates links and removes the continuity needed to reconstruct portfolios. The local preview is <http://localhost:8096/demo>, accessible from the computer running that instance. Prepare an accounting example in advance so the discussion can continue if a participant's connection is interrupted.

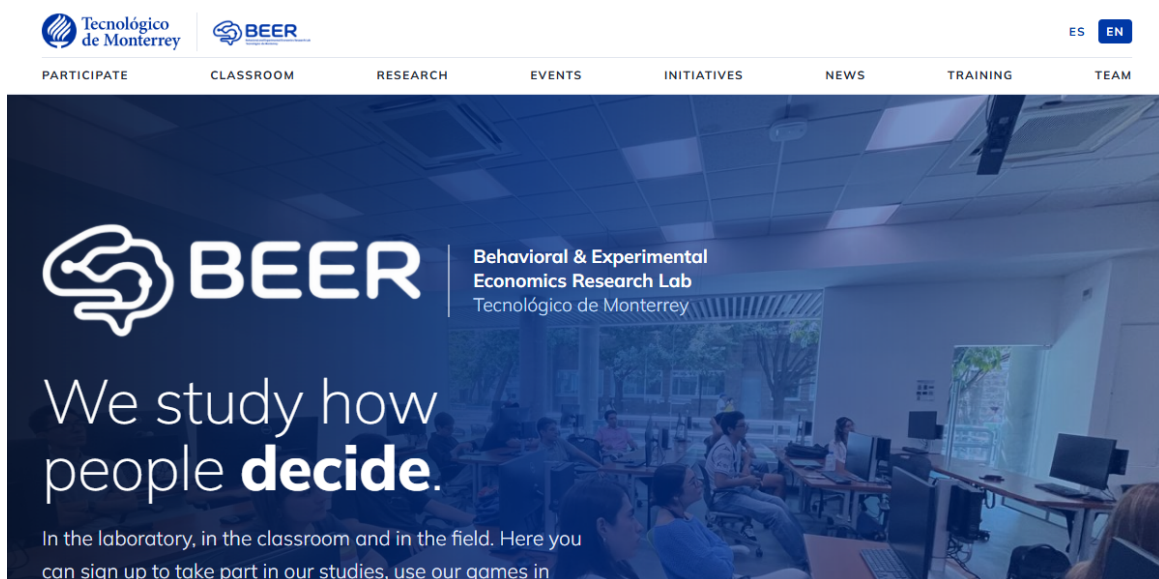


Figure 1.1: The institutional entry leads to the teaching catalogue.

INSTRUCTORS AND STUDENTS

Classroom experiments

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

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

portfolio

Topic JEL code

1 of 142 games

Diversification and Portfolio Choice

Connect composition, correlation and portfolio risk. Basic: One portfolio; three correlations in fixed or random order. Extended: Reference and sixteen economic and information contrasts.

Figure 1.2: Search by topic; the catalogue displays published families.

oTree Demo Sessions Rooms Data Server Check Logout

Demo

Efecto disposición · Básica · ES · Una fecha de decisión
Efecto disposición · Básica · ES · Ocho periodos; ventas elegidas
Efecto disposición · Básica · ES · Ocho periodos; liquidación y recompra
Disposition effect · Basic · EN · One decision date
Disposition effect · Basic · EN · Eight periods; chosen sales
Disposition effect · Basic · EN · Eight periods; liquidation and repurchase
Efecto disposición · Extendida · ES · Ocho periodos; ventas elegidas
Efecto disposición · Extendida · ES · Costo menos saliente
Efecto disposición · Extendida · ES · Referencia de la cotización anterior
Efecto disposición · Extendida · ES · Presentación de la cartera conjunta
Efecto disposición · Extendida · ES · Resumen de resultados realizados
Efecto disposición · Extendida · ES · Cartera inicial recibida
Efecto disposición · Extendida · ES · Gestión para otra persona

Efecto disposición / Disposition effect — BEER Lab

Seleccione una variante de este juego. Select a version of this game.

Figure 1.3: Demo offers only this family's configurations.

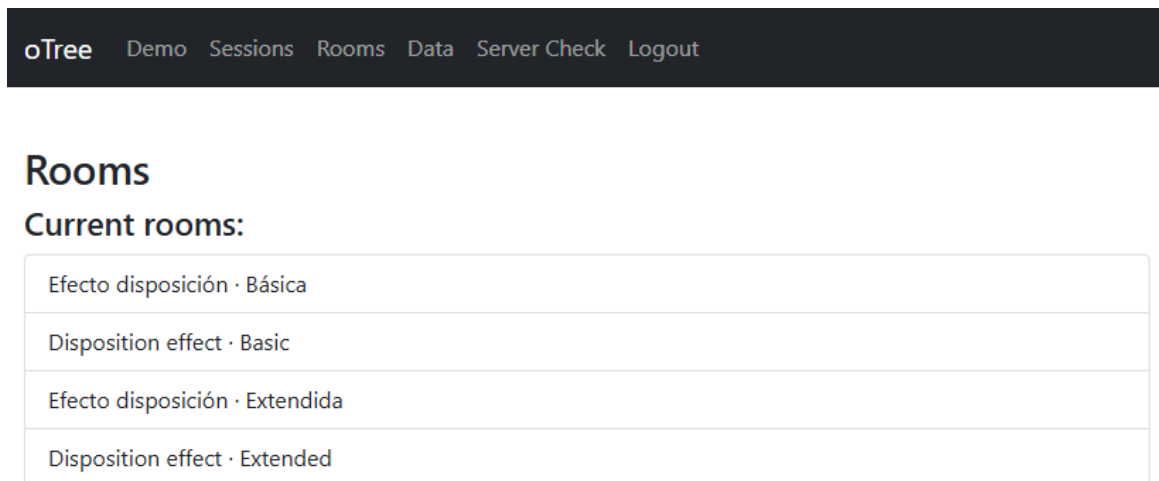


Figure 1.4: Rooms separates four editions by language and scope.

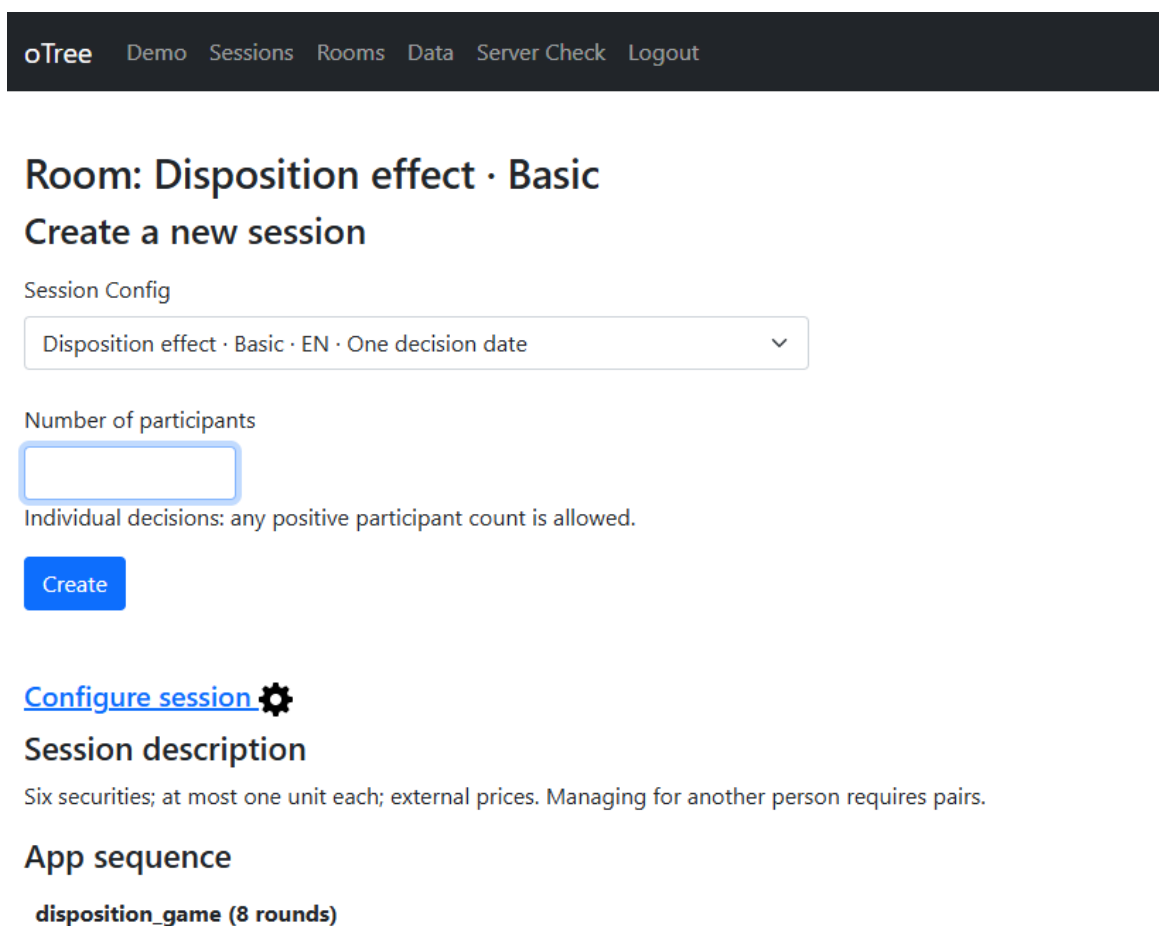


Figure 1.5: The basic room initially selects a basic condition in its language.

Portfolios, lots and wealth

2.1 The budget does not restart

The portfolio begins with six units acquired at ten and 40 ECU cash. Let C_t be cash after trading on date t , q_{jt} the quantity of security j , and p_{jt} its quote. Holdings satisfy $q_{jt} \in \{0, 1\}$. Portfolio value at that quote is

$$V_t = C_t + \sum_{j=1}^6 q_{jt} p_{jt}.$$

A quotation is not another cash deposit. The same unit may be valued on eight dates while remaining one asset. Adding those eight valuations for payment would repeatedly count the same capital. Unused cash remains available without interest. There are no dividends, debt, short positions or fractional holdings. These restrictions keep the accounting transparent without making a claim about the full range of financial markets.

A decision specifies desired inventory. If a person owns one unit and enters zero, the unit is sold. Entering one keeps an existing unit or purchases it if absent. Sales execute before purchases, allowing released cash to finance another position. Every security requires an answer; an empty field does not mean hold, sell or delegate the decision to the program. If the complete proposed portfolio costs more than cash available after sales and obligations, confirmation is rejected and submitted answers remain available for correction. The constraint applies to the entire proposal rather than to each purchase considered in isolation.

Every acquisition opens a lot with a technical identifier, date and unit cost. Holding does not change cost. A sale closes the lot; a later purchase of the same security opens another lot at its new cost. Because holdings are limited to one unit per security, acquisitions are not pooled and no average-cost or FIFO convention is needed. The identifier audits private records; it is not displayed as a production code to students. Security letters and dates suffice to reconstruct examples without connecting choices to individuals.

At proportional commission f , buying at p costs $p + fp$, which becomes the lot basis. Selling produces $p - fp$ before tax. Net realized gain is $g = p - fp - b$, where b is recorded acquisition cost. The tax extension applies τg : positive amounts are paid and negative amounts credited. This symmetric classroom rule has no limits, deferral provisions or additional tax regulations. Money is recorded in cents under the announced rule. Treat the simplification as an experimental institution rather than as a description of any jurisdiction's actual tax system. A teacher can compare the cash identity with and without these deductions before discussing choices.

What participants will see

Participants see current cash, holdings, quotes and probabilities. Future quotes and seeds are absent. The low-salience condition omits lot cost on the decision screen but does not alter the payment ledger or erase quote history.

2.2 A step-by-step reconstructed episode

Consider the first three dates of a costless, untaxed session. This example uses feasible transitions without predicting a classroom's realized path. Initially every security is recorded at ten. Subsequent quotes and choices are:

Date	A	B	C	D	E	F
0	10	10	10	10	10	10
1	11	9	11	9	11	9
2	12	8	10	10	12	8
3	11	9	11	9	13	7

On date one, sell A and C. Cash increases from 40 to $40 + 11 + 11 = 62$. B, D, E and F remain, worth $9 + 9 + 11 + 9 = 38$. Wealth is 100, exactly its value immediately before selling. Gains on A and C were already included when they were marked at eleven. Adding another two units to total performance would count those gains twice. The sale realizes an accounting outcome without producing another economic return.

On date two, sell B for eight and buy A for twelve. Cash becomes $62 + 8 - 12 = 58$. A, D, E and F remain, now worth $12 + 10 + 12 + 8 = 42$. Wealth is still 100. The realized loss on B is two; E's increase and D's movement offset changes elsewhere in total valuation. Buying A does not undo its earlier sale. It opens a new lot at twelve, replacing the original acquisition cost of ten as the active accounting reference. This distinction becomes important when the same security is classified differently later.

On date three, sell E for thirteen. Cash is $58 + 13 = 71$. A at eleven, D at nine and F at seven remain, with total value 27. Wealth is 98. Cash has increased while wealth has fallen relative to the previous date. This makes a useful demonstration of the difference between a cash-generating transaction and whole-portfolio performance. A now has a one-unit loss relative to its new cost of twelve, although its quote remains above the original ten. Using the original acquisition price after re-entry would classify the wrong lot.

Payment is not $100 + 100 + 98$. In the eight-date condition the episode continues; an additional terminal quote and liquidation are applied only at the end. In the one-date condition a person chooses once, another quote arrives, and the portfolio is liquidated. The three-date example is a fragment of a longer session, not another configuration. Distinguish an illustrative path from the parameters actually selected in the room. It is legitimate to use a short fragment to teach accounting, provided the class understands that its running wealth is not yet the application's terminal payment.

Feedback script

Ask: "Can cash rise while wealth falls? Which security opened a new lot? What would be paid if decisions still remain?" Reconstruct cash and inventory before naming a realized gain. A correct explanation preserves the wealth identity at each costless sale.

2.3 Opportunities and realization rates

A selling rate requires an opportunity set. At each confirmed date, observe units held after standing orders have executed and before new purchases. Compare the quote net of sale commission with the lot basis, including purchase commission where applicable. A positive difference is a gain opportunity, a negative difference a loss opportunity, and equality a tie excluded from both rates. A new purchase was not a unit available for sale before that decision. The chronology therefore determines the denominator rather than serving as a minor implementation detail.

The primary measure selects dates on which the person makes at least one chosen sale. RG counts gain opportunities sold; PG counts gain opportunities held. RL and PL do the same for losses:

$$PGR = \frac{RG}{RG + PG}, \quad PLR = \frac{RL}{RL + PL}, \quad DE = PGR - PLR.$$

The numerator is neither money earned nor the number of participants. The unit is a position-date opportunity. A unit retained across several dates contributes repeated opportunities, so observations are dependent within a person. A forced sale does not become a chosen decision merely because it generates cash. Terminal liquidation is also excluded from these discretionary-selling measures.

In the preceding example, date one contributes RG=2, PG=1, RL=0 and PL=3. Date two contributes RG=0, PG=1, RL=1 and PL=1; D ties and is excluded. Date three contributes RG=1, PG=0, RL=0 and PL=3. All three dates include a chosen sale. Pooling them gives PGR $3/5 = 0.60$, PLR $1/8 = 0.125$, and an index of 0.475, or 47.5 percentage points. There are fourteen held opportunities: five gains, eight losses and one tie. Purchasing A on date two does not add another sale opportunity on that date. Reproduce the counts before computing a percentage.

Without loss opportunities, PLR is undefined rather than zero. If nobody makes a chosen sale, the primary selection has no dates and both rates may be undefined. The report separately presents all-date rates, including decisions not to sell anything. Those measures use a different observation selection and must not share an ambiguous label. It also reports a previous-quote reference to demonstrate that changing the comparator can reclassify transactions without changing the transactions themselves. None of these references is an elicited psychological reference point unless a separate procedure actually measures one.

Checkpoint

Before interpreting an index, verify RG+PG, RL+PL, excluded ties and included dates. A positive index with a tiny denominator has different precision from one based on many opportunities. Report both denominators together with the rates during discussion.

Theory, predictions and evidence

3.1 The future-wealth benchmark

A forward-looking financial evaluation asks which wealth distribution results from holding a unit from now onward. Let π be the announced probability that the next quote rises by one ECU; the alternative is a one-ECU fall. Without costs, expected change from holding one unit is $\pi - (1 - \pi) = 2\pi - 1$. At $\pi = 0.5$ it is zero. Historical cost does not enter this expression. Under the common condition, two securities with the same future rule do not acquire different prospects merely because their acquisition costs differ.

This observation does not identify a universally optimal strategy. A risk-neutral person is indifferent between cash and exposures with the same expectation in the fair, frictionless condition. A risk-averse person may prefer less exposure, and the one-unit restriction limits available portfolios. Expected utility of terminal wealth, $E[u(W_T)]$, concerns the entire distribution and relevant wealth. By contrast, “sell everything that lost value” uses the past as a rule without establishing its relation to future outcomes. A teacher should state which criterion is being used before calling a choice a mistake.

Under positive drift, $\pi = 0.65$ gives expected change +0.30 ECU per unit and date; negative drift gives -0.30 . The heterogeneous profile gives +0.40 for A, C and E and -0.40 for the others. These conditional expectations precede costs and are not guaranteed payments. Under momentum or mean reversion, probabilities depend on the last published movement. Independence from all history would therefore be an incorrect assumption in those extensions: draws are independent conditional on the rule, which need not imply constant probabilities. The displayed next-rise probability makes the operative comparison visible.

With commissions, purchase and later sale must cover two charges. With taxes, selling also changes fiscal obligations and available cash. Consequently, $2\pi - 1$ is not a complete dynamic solution for every extension. It identifies an explicit future prospect and prevents treating a realized gain as proof that a decision was optimal. Separate expectation before choice from realized outcomes. Holding a security with positive expectation may produce a loss; selling may avoid or forgo a later gain, depending on the draw. Keeping these statements distinct is central to interpreting experimental results.

Theoretical foundation

The financial benchmark compares future distributions under announced constraints. It does not prescribe one PGR that every class should display. Under fair opportunities, trading rules can have equal monetary expectation but different risk exposure.

3.2 References and outcome evaluation

A reference point is the level relative to which a change is described. It can be acquisition cost, a previous quote or an expectation; those are different objects. The program records each lot's accounting cost and can compute indices using other observable references. It does not automatically observe a person's psychological reference. A teacher's ability to reconstruct an accounting loss does not prove that a student experienced the outcome in that way. Keep the measurement definition separate from a claim about mental states.

For an illustrative valuation explanation, consider $v(g) = \sqrt{g}$ for $g \geq 0$ and $v(g) = -2\sqrt{-g}$ for losses. The weight two gives losses greater importance, and curvature differs on either side of zero. A unit purchased at ten and now quoted at eleven can be sold at outcome +1, worth one under this function. Holding one more date produces twelve or ten with equal probability, hence gains two or zero relative to ten. Expected value is $\sqrt{2}/2 \simeq 0.707$, below one. Under this illustrative evaluation, realizing the gain is preferred.

For a unit now quoted at nine, selling produces -1 , valued at -2 . Holding until ten or eight produces zero or -2 relative to cost. Expected value is $-\sqrt{2} \simeq -1.414$, above -2 . The same function therefore favours retaining the loss. The example fixes the reference, horizon, selling opportunity and object evaluated. It does not change the application's payment: square roots and the loss weight are theoretical devices, not units added to or deducted from earnings. Students should be able to state both monetary outcomes before applying the value function.

Do not turn this calculation into a claim that all prospect-theory models necessarily generate a disposition effect. Preference implementation, reference updating, reinvestment and valuation of realization can alter predictions. Barberis and Xiong examine difficulties with a long-standing preference-based explanation (Barberis and Xiong, 2009). A classroom cannot estimate curvature or loss-aversion intensity from PGR and PLR alone. It can compare mechanisms compatible with choices under known controls. This is why a transparent experiment needs both an accounting benchmark and a clearly specified behavioural alternative.

3.3 Other explanations and inference

A person may retain a position because they expect reversal, face selling costs or want a particular exposure. They may also regard realizing a loss as admitting an earlier mistake. These explanations are not interchangeable. The mean-reversion condition changes actual future opportunities and demonstrates a forward-looking reason to hold after a fall. The fair condition contains no such rule, although someone may believe that it does. The application announces probabilities without eliciting subjective beliefs or establishing that everyone accepts those probabilities.

Opportunity composition creates another possible confusion. If a portfolio contains nine gain positions and one loss position, observing more winning sales does not establish a higher rate of realizing gains. Rates adjust counts for opportunities but do not remove every selection issue: selling changes which positions remain available at subsequent dates. Choices construct later denominators. Selecting sale dates and including every date answer different questions; the report preserves both to expose that analytical decision. A transparent denominator is therefore necessary but insufficient for a complete causal interpretation.

Aggregation matters too. A pooled rate sums opportunities across people before dividing. The mean individual index first computes an index for each person with both positive denominators. People with many opportunities receive more weight in the pooled measure; each defined individual index receives one observation in the mean. A difference between them does not imply a programming error. Identify the unit, inclusion criterion and number of people whose index is undefined. Missing

indices must not be converted to zeros merely to make sample sizes agree.

A class shares a price process and may have few treatment-assignment units. Even when participants do not form prices, they share shocks; delegated management adds payment dependence. Displaying many position-date records does not create an equal number of independent observations. Discussion can describe differences and propose additional controls. Causal evidence requires appropriate assignment, sufficient units and an inferential strategy respecting those dependencies. A common private path can improve comparability while leaving these requirements intact.

Attention

Do not claim that a positive index identifies irrationality or measures loss aversion. First explain opportunities, costs, prospects and reference rules. Several mechanisms may fit the same actions; one classroom aggregate cannot decide among all of them.

3.4 Using experimental evidence

References guide mechanisms and comparisons; they do not provide outcomes to insert into the classroom report. Shefrin and Statman develop an explanation of the disposition to realize gains and retain losses ([Shefrin and Statman, 1985](#)). Odean studies trading records and relates realizations to opportunities ([Odean, 1998](#)). This design uses that denominator principle while restricting inventory to unique units and explicitly recording which sales a participant chose. It makes no attempt to recreate a brokerage sample.

Weber and Camerer study six externally priced assets and contrast ordinary trading with automatic liquidation and repurchase ([Weber and Camerer, 1998](#)). Their institutional comparison motivates one basic mode here. Scale, horizon, announced probability information and permitted quantities differ, so this is an adaptation rather than an exact replication. The literature supplies evidence about an institution; classroom numbers come exclusively from current-session choices and draws. Keeping those sources distinct prevents published findings from being mistaken for observed teaching results.

Frydman and Rangel investigate purchase-price salience ([Frydman and Rangel, 2014](#)). Fischbacher, Hoffmann and Schudy study automatic selling devices ([Fischbacher et al., 2017](#)). This family distinguishes omitting a column from executing a standing order: changing displayed information and changing automatic actions are different interventions. Classroom thresholds are announced and are not described as the original papers' exact calibrations. Use the comparison to ask which part of a decision environment changed.

Hermann, Mußhoff and Rau investigate choices made for other people ([Hermann et al., 2019](#)). The paired extension adapts that question while retaining external prices and transparent crossed payments. Behaviour found in another population is not automatically attributed to students, nor can prosocial orientation be inferred when it was not measured. For each reference, formulate both a question and a limitation alongside a prediction. This allows instructors to teach experimental evidence without promising that every class will reproduce a published pattern or explain it through the same channel.

Modes and extensions

4.1 Three basic modes

The one-date mode separates accounting from a long sequence. Opening quotes already contain three gains and three losses relative to ten; the person selects a portfolio, another quote arrives, and holdings are liquidated. Some people may have a defined index, but opportunities are few. Do not describe this as a stable estimate of a personal propensity. Its principal value is demonstrating a sale, a purchase and one terminal wealth amount without requiring students to follow a long history.

The eight-date reference carries cash, inventory and each lot's acquisition cost while its unit remains held. It permits observation of re-entry, changing opportunity sets and choices after outcomes. Prepared opening quotes are common to everyone; later quotes follow the announced rule. Prices do not react to trading volume. If people receive the same path but choose different portfolios, wealth differences reflect exposure, transactions and applicable costs rather than a different execution price caused by their own order. The mechanism thus isolates selling decisions from price formation.

Liquidation and repurchase sells every held unit before each choice. Anyone wishing to retain exposure must buy again, opening a new lot at the current quote. Those mandatory sales are not voluntary decisions. Since no previous positions remain for discretionary sale, primary PGR/PLR may be undefined. A separate report shows the proportion of previous units not repurchased, classified by their gain or loss before liquidation. This economic-exit measure enables a useful comparison without relabelling it as chosen selling. A failure to distinguish the two would mechanically manufacture very high realization rates.

The comparison motivated by Weber and Camerer retains external prices, horizon and terminal payment here ([Weber and Camerer, 1998](#)). It nevertheless changes the action frame and resets acquisition costs; it is more than removing a sentence from the interface. Discuss why someone wanting an exposure for its future prospects might repurchase it, and why requiring a new acquisition might change another person's choice. Test explanations against decisions rather than an index that mechanically includes every liquidation. Keep this mode separate from optional standing orders, which execute only after the announced trigger occurs.

4.2 Information and presentation

The less-salient-cost extension omits lot cost and net change columns from the decision screen. Holdings, current quotes, probabilities and quote history remain available. The private ledger retains acquisitions and the closing record permits an audit. It follows the salience question studied by Frydman and Rangel ([Frydman and Rangel, 2014](#)), without making a past price impossible to remember. A lower index would be compatible with less attention to that reference; without

measuring attention it would not uniquely establish the channel.

The previous-quote reference replaces the highlighted comparison with the latest price change. Payment accounting and the primary index continue to use actual acquisition cost. The report also presents rates classified by the previous quote. This contrast separates changing what is emphasized during choice from changing how an investigator subsequently classifies the same action. Keep the primary outcome definition fixed across conditions rather than retrospectively selecting whichever reference generates the largest difference. A teaching example can display both classifications side by side without treating them as interchangeable.

Whole-portfolio presentation emphasizes combined cash and security value and omits the individual net-change column. Acquisition costs remain visible: the condition does not introduce another lottery or remove the possibility of computing outcomes. It asks whether evaluating a portfolio jointly changes which positions are realized. The realized-result summary instead adds a prominent panel reporting the net gain from that date's sales. Payment remains terminal wealth. These are distinct presentation changes and should be assigned separately, with the common financial calculation verified before interpreting a difference.

The endowed initial portfolio describes six received units with accounting cost ten rather than confirming an assigned purchase at the same price. Cash, inventory and transitions coincide. It does not introduce a freely chosen acquisition or additional money. The contrast supports discussion of ownership and the origin of a reference, but cannot establish an effect of voluntary initial selection: both conditions prescribe the initial allocation. Include that limitation so the interpretation does not attribute agency that the design never generates. Any extension involving a genuinely free initial portfolio would require a different opportunity comparison, rather than merely another label.

4.3 Announced price prospects

Positive and negative drift use rise probabilities of 65% and 35%, respectively, common to all six securities. These are teaching calibrations rather than market forecasts. Acquisition cost does not change the probability. The profiles ask whether trading changes when expected gains from exposure change sign. Greater retention under positive drift may have a forward-looking financial explanation and should not automatically be interpreted as reluctance to realize losses. Students should calculate the expected increment before seeing realized returns.

Heterogeneous prospects assign a 70% rise probability to A, C and E and 30% to B, D and F. Identities are announced. Because the first group opens above acquisition cost and the second below, outcome sign and prospects are initially associated. This deliberately visible feature teaches confounding: selling losers and retaining winners may be consistent with future expectations. Interpret the index alongside available information rather than as a test invariant to the price process. Matching opportunity counts alone does not remove differences in expected returns.

Under announced mean reversion, a recent rise implies a 30% probability of another rise, while a recent fall implies 70%. Announced momentum reverses those values. The transition reference is the last movement, not the lot's acquisition date. A unit may be below its acquisition cost after a recent rise, or above cost after a recent fall. Asking for those examples separates trend, accounting outcome and expectations. The probability column uses the operative rule and published history without revealing the next draw. Conditional probabilities can vary even though the program uses fresh random draws.

All five profiles change actual economic opportunities rather than wording alone. Comparisons with the fair reference must therefore acknowledge changed financial prospects. An instructor can use one contrast to teach a forward-looking prediction and another, with identical processes, to

study salience. Combining those questions without stating what changed makes both a visible difference and its absence difficult to interpret. A common seed matches paths only under the relevant unchanged process; changing probabilities changes how the same random numbers map into movements. Record the rule as well as the scenario identifier when organizing a comparison.

4.4 Costs, taxes and standing orders

The 1% and 5% commissions apply to every purchase and sale after the initial allocation, including terminal sales. Buying at eleven with 1% commission opens an 11.11-cost lot. Selling later at eleven yields 10.89 before tax: a net loss of 0.22 despite an unchanged quote. Trading costs can justify less turnover. Classification compares sale proceeds net of commission against a basis including purchase commission. Do not mix this net loss with a gross-gain definition that ignores the friction. Higher charges change the financial comparison as well as realized wealth.

The tax-and-credit extension applies 20% to each sale's net gain and immediately credits losses. Selling a ten-cost unit for eleven leaves 10.80; selling it for nine leaves 9.20. Net tax is negative in the second case. Terminal sales follow the same rule. Credit limits and realistic deferral provisions are not modelled. The purpose is to show that fiscal incentives can alter cash and realization decisions. Odean's trading analysis considers tax-related selling, but this classroom rate and symmetry are an explicit adaptation (Odean, 1998), not a reproduction of actual tax law or the original empirical environment.

Optional fall and rise orders are selected before quotes are disclosed. The threshold is 20% relative to a lot's acquisition cost. A third extension offers both choices separately, allowing neither, either or both. A missing answer is not No. A triggered order executes at the published quote when the threshold is crossed; execution at the limit is not guaranteed. The unit may be repurchased on the same date, opening a new cost basis. Standing rules continue to apply to later lots through the episode rather than protecting only the original portfolio.

These extensions are motivated by Fischbacher and coauthors' study of automatic devices (Fischbacher et al., 2017). The report records executions as automatic and excludes them from chosen-sale numerators and denominators. If the index changes after orders become available, inspect opportunities removed by execution. Mechanically eliminating loss positions does not demonstrate changed preferences. Compare activation, executions, remaining choices and terminal wealth. The offered options use fixed teaching limits rather than unrestricted threshold selection, an adaptation that keeps the class manageable while preserving the distinction between commitment and discretionary execution.

4.5 Managing for another person

The delegated extension introduces a real economic relationship. Two people are paired initially, and each manages a separate portfolio whose terminal cash the other receives. Choices and outcomes may differ despite shared quotes. There is no adviser recommending actions, wage contract or manager selection. The contrast concerns responsibility for someone else's payment. A person's own payment does not depend on the portfolio they manage. Comprehension checks verify this rule so students do not act under incentives different from those announced.

Complete pairs remain together across eight dates. Neither identity nor the partner's decisions are disclosed, and communication is prohibited. The final wait permits both ledgers to finish and crossed payments to be assigned; it is not an opportunity to negotiate or exchange messages. If someone abandons, their portfolio cannot be replaced with invented decisions. Progress remains incomplete and aggregates remain closed. Explain this dependence before starting, and respect it

when organizing attendance and analysing records. Other conditions remain individual and require no matching simply to imitate this extension.

The mechanism relates to choices for others studied by Hermann and coauthors ([Hermann et al., 2019](#)). Published patterns may depend on experience and motivation; this application does not measure experience, altruism or social preferences. Compare exposure, sales and opportunity-based measures while separating managed wealth from personal payment. In a completed session, their means coincide because amounts are permuted within each pair, even when individual values differ. This is an accounting check, not evidence that behaviour was identical. The distinction also explains why projecting an anonymous aggregate is appropriate while displaying linked individual payments would disclose more than the report intends.

Portfolio decision

Period 1 of 8

Available cash: **100.00 ECU**

Current portfolio value: **100.00 ECU**

Enter 0 or 1 for every security. Sale proceeds can finance purchases on this date.

Automatic sales before this choice

Security	Reason	Current quote
A	Liquidation before repurchase	11.00
B	Liquidation before repurchase	9.00
C	Liquidation before repurchase	11.00
D	Liquidation before repurchase	9.00
E	Liquidation before repurchase	11.00
F	Liquidation before repurchase	9.00

Security	Current units	Current quote	Lot acquisition cost	Lot net change	Probability of next rise
A	0	11.00	—	—	50.00%
B	0	9.00	—	—	50.00%
C	0	11.00	—	—	50.00%
D	0	9.00	—	—	50.00%
E	0	11.00	—	—	50.00%
F	0	9.00	—	—	50.00%

Figure 4.1: Liquidation precedes the repurchase choice.

Decisions not to repurchase

Liquidation and repurchase only: classify each previous unit by its gain/loss before liquidation and count whether it was not repurchased. This economic-exit measure is not chosen-sale PGR/PLR.

Non-repurchase of units at a gain	0.00%	n = 56
Non-repurchase of units at a loss	23.08%	n = 52

Figure 4.2: Non-repurchase has its own measure, separate from chosen selling.

Security	Current units	Current quote	Probability of next rise
A	1	11.00	50.00%
B	1	9.00	50.00%
C	1	11.00	50.00%
D	1	9.00	50.00%
E	1	11.00	50.00%
F	1	9.00	50.00%

Figure 4.3: Quotes and holdings remain while acquisition cost is omitted.

Security	Current units	Current quote	Change from previous quote	Probability of next rise
A	1	11.00	1.00	50.00%
B	1	9.00	-1.00	50.00%
C	1	11.00	1.00	50.00%
D	1	9.00	-1.00	50.00%
E	1	11.00	1.00	50.00%
F	1	9.00	-1.00	50.00%

Figure 4.4: The highlighted comparison uses the previous quote.

Security	Current units	Current quote	Lot acquisition cost	Probability of next rise
A	1	11.00	10.00	50.00%
B	1	9.00	10.00	50.00%
C	1	11.00	10.00	50.00%
D	1	9.00	10.00	50.00%
E	1	11.00	10.00	50.00%
F	1	9.00	10.00	50.00%

Figure 4.5: Joint presentation retains cost and omits individual change.



Date summary

Period 1 of 8

Realized net gain before taxes: -3.00 ECU

Cash after trading	67.00 ECU
Current portfolio value	100.00 ECU
This date's commissions	0.00 ECU
Net taxes; negative means a credit	0.00 ECU

Continue

Figure 4.6: The summary highlights realization without changing payment.



Orders for later quotes

Before seeing quotes, you may activate the offered standing orders. An order sells a unit when a published quote crosses the threshold relative to its acquisition cost: a 20% fall or a 20% rise. Execution uses the published quote, not necessarily the threshold. It applies to every lot held and does not prevent a later purchase.

Activate automatic sale if the quote falls 20% from acquisition cost?

- ☐ Yes
☐ No

Activate automatic sale if the quote rises 20% from acquisition cost?

- ☐ Yes
☐ No

Continue

Figure 4.7: Both orders require explicit answers before quotes arrive.

Portfolio decision

Period 2 of 8

Available cash: **60.00 ECU**
 Current portfolio value: **100.00 ECU**

Enter 0 or 1 for every security. Sale proceeds can finance purchases on this date.

Automatic sales before this choice

Security	Reason	Current quote
C	Rise order	12.00
F	Fall order	8.00

Security	Current units	Current quote	Lot acquisition cost	Lot net change	Probability of next rise
A	1	10.00	10.00	0.00	50.00%
B	1	10.00	10.00	0.00	50.00%
C	0	12.00	—	—	50.00%
D	1	10.00	10.00	0.00	50.00%
E	1	10.00	10.00	0.00	50.00%
F	0	8.00	—	—	50.00%

Figure 4.8: An automatic execution is identified before the choice.



Resources and trading rules

Resources and unit of account

You initially control 100.00 ECU: 40.00 in cash and six securities with one unit each, recorded at 10 ECU per unit. The budget is not renewed: cash and inventory carry into the next period.

ECU means Experimental Currency Units. It is this activity's unit of account.

You manage an anonymous other person's portfolio; their payment depends on your decisions.

Your payment depends on the portfolio that person manages for you. You cannot communicate. A final wait allows both calculations to finish.

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

This session does not convert ECU into real money.

At each date confirm how many units you want to hold of A, B, C, D, E and F: zero or one per security. Zero sells a unit you own; one keeps it or buys it if absent. Sales execute before purchases. You cannot borrow or sell securities you do not own.

The opening quotes are 11, 9, 11, 9, 11 and 9 ECU. These are prepared initial quotes. Afterwards each price rises or falls by 1 ECU with the announced probabilities; draws are independent across securities conditional on those rules. Other participants' decisions do not change these prices.

After each quote, every security has a 50% chance of rising and 50% of falling.

There are 8 decision dates. After the last one, an additional quote is published and remaining units are automatically sold. Portfolio performance is that final cash amount; intermediate valuations are not added together.

There are no purchase or sale commissions.

Continue

Figure 4.9: Resource instructions explain crossed management and payment.

Payment calculation

Wait for the other person to finish their portfolio. Decisions and identity are not revealed.



Figure 4.10: The wait completes payments without revealing identity or choices.

Journey, report and files

5.1 From entry to closure

The welcome introduces the laboratory and private-work rules. Instructions then state effective cash, initial portfolio, restrictions, price process and payment. Participants must understand whether they manage for themselves or someone else and whether liquidation occurs before each choice. Comprehension checks cash, maximum units, terminal wealth and the source of personal payment. Every error explains the correct rule while preserving other answers. Correction does not reduce payment or require the instructor to recommend a strategy. Address procedural misunderstandings consistently across conditions.

Initial confirmation records understanding of the assigned purchase or received portfolio. It is neither an auction nor unrestricted initial selection. When offered, a separate screen follows for activating or rejecting standing orders. First-decision quotes have not yet been disclosed. Thresholds are not revised after observing an outcome, and a missing answer does not become acceptance. This chronology preserves the difference between advance commitment and reacting after a loss is observed. Students should know which choices remain available after an automatic execution.

Each decision publishes available cash, positions and quotes. Automatic sales executed before the choice are identified. The page shows next-rise probabilities and quote history through the current date, without later prices. The person enters six holdings and confirms them. The server checks constraints. Requesting a settled page again does not create another transaction; a completed choice retains its record. The summary separates cash, valuation and deductions so that a reading error does not become duplicated payment. An instructor can reconstruct the record without relying on what a participant remembers typing.

After the last choice, an additional quote arrives and inventory is liquidated. The summary permits acknowledgement of that closure. In individual conditions, final acknowledgement completes the journey. Delegated management waits for the partner before assigning crossed payments. The final screen remains available with payment and the transaction record; it requests no further choice and does not leave participants at a technical no-pages message. Check progress before revealing aggregates and keep individual links out of public projection. A confirmed last trade alone need not mean its last summary or paired settlement is complete.

5.2 Revealing and interpreting the report

The private report initially shows participants, scheduled choices, confirmed choices, pending choices and people reaching the end. Scheduled choices equal participants multiplied by active dates. A one-date mode must not count eight simply because the app contains eight technical

rounds. Aggregation explicitly visits active periods, including when administration opens the report from the final technical round. Aggregates become available after all journeys finish and remain hidden until a deliberate reveal action. This avoids confusing data availability with permission to display it to the class.

Begin interpretation with units. Mean managed terminal wealth uses one portfolio per person; mean personal payment uses recipients of those results. Their means coincide by permutation under crossed management. Total session commissions and taxes include terminal sales; they are not averages per opportunity. Negative tax denotes a credit. Automatic sales are counted separately. Explain every row's denominator and whether it counts operations, people or financial outcomes. Similar numerical values can otherwise conceal different economic objects.

The rate table reports RG, PG, RL and PL alongside PGR, PLR and their difference. Distinguish primary sale-date selection, all-date rates and previous-quote classification. The histogram contains one index per person whose two rates are defined, so its sample may be smaller than the number of completed participants. An empty bar need not mean nobody traded: an index may be undefined, with exclusion reported. The pooled proportion and individual distribution address complementary questions rather than supplying interchangeable summaries of a single number.

The date trajectory uses opportunities on chosen-sale dates and omits points for rates without denominators. Missing observations are not artificially connected to zero. The solid line is PGR and the dashed line PLR; the table provides each denominator. Automatic liquidation adds its separately labelled non-repurchase measure. After discussion the instructor can hide aggregates, and reloading restores the hidden state. This control prevents accidental revelation but does not replace care when projecting identifying administration windows or downloaded records. The safest teaching display is the aggregate report itself.

For the instructor

A useful sequence is complete progress, opportunity definitions, rates and denominators, the individual histogram, then the trajectory. Propose explanations afterwards. If the class shows an unexpected pattern, examine information and selection instead of adjusting observations to resemble the literature.

5.3 Exports, privacy and preservation

The decision export contains several rows per participant: one for each technical round, marked active-completed, pending or inactive. Pending decision outcomes remain blank; zero is an observation, not a substitute for absence. A completed decision's JSON record includes previous portfolio, preparation, post-trade portfolio, opportunities and events. Terminal sales are stored separately from chosen sales. These fields reconcile cash, costs and classification without inferring transactions solely from wealth changes. They also distinguish an automatically closed lot from a voluntarily sold one.

Native wide format provides one row per participant with columns for all eight rounds. Both buttons identify the selected session through its code and must not silently export unrelated sessions. Inactive rows are expected in a one-date mode. Filter active dates using status and horizon without deleting valid zero payments or balances. Scenario and specification fingerprints help verify matched opportunities without publishing a seed to participants. A private audit field is not an instruction to display its contents during class.

Pseudonymous codes join private records but are absent from the aggregate report. No demographic information is requested. Linking personal information would require a separate procedure; this activity does not do so by default. Preserve condition assignment, parameters, downloads and

guide versions together. Restarting an instance preserves its database; deleting it to refresh a screen removes history and invalidates links. Incomplete downloads remain incomplete rather than being filled with guessed decisions for people who abandoned. Such records describe implementation progress, not a preference for zero investment.



Welcome to Portfolio Decisions

The Behavioral and Experimental Economics Research Lab (BEER Lab), in the Department of Economics at Tecnológico de Monterrey, is a place to learn about economic decisions through controlled activities.

General rules

- Remain silent and do not communicate with others.
- Decide individually and privately.
- Follow the instructions; do not close or refresh the page.
- Raise your hand or contact the instructor privately if there is a problem.
- Wait for the instructor's directions after finishing.

I have read the rules and am ready to start.

- ☐ Yes
- ☐ No

Start

Figure 5.1: Welcome and private-decision rules.



Resources and trading rules

Resources and unit of account

You initially control 100.00 ECU: 40.00 in cash and six securities with one unit each, recorded at 10 ECU per unit. The budget is not renewed: cash and inventory carry into the next period.

ECU means Experimental Currency Units. It is this activity's unit of account.

Your point payment is the terminal cash of the portfolio you manage.

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

This session does not convert ECU into real money.

At each date confirm how many units you want to hold of A, B, C, D, E and F: zero or one per security. Zero sells a unit you own; one keeps it or buys it if absent. Sales execute before purchases. You cannot borrow or sell securities you do not own.

The opening quotes are 11, 9, 11, 9, 11 and 9 ECU. These are prepared initial quotes. Afterwards each price rises or falls by 1 ECU with the announced probabilities; draws are independent across securities conditional on those rules. Other participants' decisions do not change these prices.

After each quote, every security has a 50% chance of rising and 50% of falling.

There are 8 decision dates. After the last one, an additional quote is published and remaining units are automatically sold. Portfolio performance is that final cash amount; intermediate valuations are not added together.

There are no purchase or sale commissions.

Continue

Figure 5.2: Instructions use the effective budget and announced process.



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.

Answer questions about the procedure. You may correct mistakes without losing points.

How much initial cash do you have, in addition to the six securities?

Your answer: 39. The correct answer is 40. Initial cash is 40.00; the six securities are recorded separately at 60 ECU in total.

What is the maximum number of units you may hold per security?

What determines final portfolio performance?

- ☒ Cash after terminal sales
- ☐ Sum of all period valuations

Which portfolio determines your personal payment?

- ☒ The one I manage
- ☐ The one another person manages for me

Continue

Figure 5.3: A correction explains the rule and retains other answers.



Confirm the initial portfolio

The initial allocation purchases one unit of each security at 10 ECU and leaves 40.00 in cash. Confirm that you understand this assigned purchase.

I understand the initial allocation.

☐ Yes

☐ No

Continue

Figure 5.4: The initial portfolio is confirmed before trading.

Portfolio decision

Period 1 of 8

Available cash: **40.00 ECU**

Current portfolio value: **100.00 ECU**

Enter 0 or 1 for every security. Sale proceeds can finance purchases on this date.

Security	Current units	Current quote	Lot acquisition cost	Lot net change	Probability of next rise
A	1	11.00	10.00	1.00	50.00%
B	1	9.00	10.00	-1.00	50.00%
C	1	11.00	10.00	1.00	50.00%
D	1	9.00	10.00	-1.00	50.00%
E	1	11.00	10.00	1.00	50.00%
F	1	9.00	10.00	-1.00	50.00%

Figure 5.5: Cash, inventory and prospects are distinct objects.

Units you wish to hold

A

B

C

D

E

F

Continue

Figure 5.6: Confirm zero or one unit for every security.



Date summary

Period 8 of 8

Cash after trading	69.00 ECU
Current portfolio value	109.00 ECU
This date's commissions	0.00 ECU
Net taxes; negative means a credit	0.00 ECU

Terminal cash of the managed portfolio: 108.00 ECU

The additional quote and terminal sale have been applied. No choices remain.

Terminal liquidation commissions: 0.00 ECU

Net terminal liquidation taxes: 0.00 ECU

A	B	C	D	E	F
13.00	9.00	15.00	9.00	11.00	9.00

Continue

Figure 5.7: Closure separates valuation, deductions and terminal cash.



The activity has ended

Wait for the instructor's directions. The record summarizes the portfolio you managed; personal payment follows the announced rule.

Your point payment: **108.00 ECU**

Terminal cash of the managed portfolio: 108.00 ECU

Date	Cash after trading	Current portfolio value	This date's commissions	Net taxes; negative means a credit
1	73.00	100.00	0.00	0.00
2	67.00	101.00	0.00	0.00
3	75.00	102.00	0.00	0.00
4	65.00	103.00	0.00	0.00
5	79.00	106.00	0.00	0.00
6	67.00	107.00	0.00	0.00
7	81.00	108.00	0.00	0.00
8	69.00	109.00	0.00	0.00

Figure 5.8: Final payment is displayed without requesting another choice.

Instructor report: Disposition effect

Private aggregate results. No individual identifiers are displayed.

Eight periods; chosen sales

Participants: 4

Scheduled decisions: 32 Confirmed decisions: 24 Pending decisions: 8

Participants at the end: 3

[Download this session's decisions \(CSV\)](#)

[Download this session's wide data](#)

Some journeys are incomplete. Aggregates become available when everyone finishes.

Figure 5.9: Incomplete progress keeps aggregates unavailable.

Instructor report: Disposition effect

Private aggregate results. No individual identifiers are displayed.

Eight periods; chosen sales

Participants: 4 Scheduled decisions: 32 Confirmed decisions: 32 Pending decisions: 0

Participants at the end: 4

Download this session's decisions (CSV)

Download this session's wide data

Reveal aggregates for discussion

Figure 5.10: A completed session requires deliberate revelation.

	RG	PG	RL	PL	PGR	PLR	PGR – PLR	Excluded ties
Opportunity-pooled rates	19	3	12	3	86.36%	80.00%	6.36%	2
All-date rates	19	50	12	17	27.54%	41.38%	-13.84%	10
Previous-quote rates	21	3	12	3	87.50%	80.00%	7.50%	0

Figure 5.11: Each rate shows its components and date selection.

Distribution of individual PGR – PLR

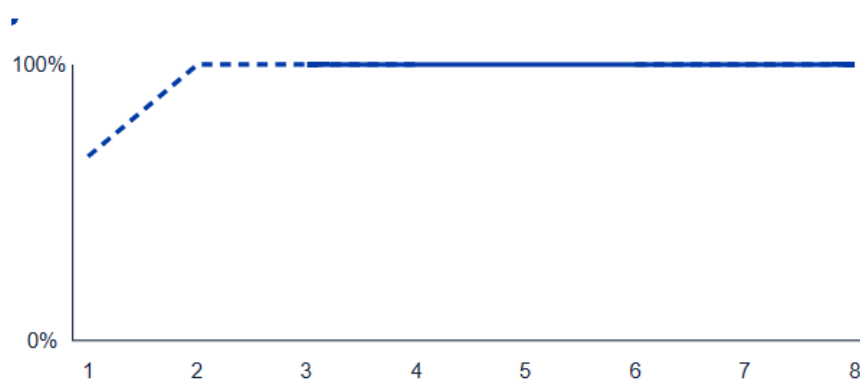
One observation per person with both rates defined. Cases lacking a denominator are not set to zero.

[-1,-0.5)	1	 33%
[-0.5,0)	0	0%
0	1	 33%
(0,0.5]	1	 33%
(0.5,1]	0	0%

Figure 5.12: The histogram counts people with a defined index.

Chosen realization by period

Each rate uses its opportunities on sale dates. Dates lacking a denominator have no point. PGR: solid line; PLR: dashed line.



Date	PGR	PLR	Gain opportunities	Loss opportunities
1	66.67%	66.67%	9	9
2	—	100.00%	0	1
3	100.00%	100.00%	2	1
4	100.00%	100.00%	2	1
5	100.00%	—	3	0
6	100.00%	100.00%	2	1
7	100.00%	100.00%	2	1
8	100.00%	100.00%	2	1

Figure 5.13: Dates without denominators have no point.

Class plan and worked exercises

6.1 A fifty-minute lesson

Use five minutes to introduce portfolio decisions and distribute links. A sufficient verbal introduction is: “Each person controls the balance described in their instructions. Read how prices are published and payment calculated; the instructor will not recommend a strategy.” Check language and, where relevant, crossed payments. Do not reveal behavioural hypotheses before choice. When comparing conditions, preserve assignment records and later explain what was held constant. This makes the eventual comparison intelligible without steering behaviour beforehand.

Allow roughly fifteen minutes for reading, comprehension and the activity. One date can shorten this stage; eight dates with inexperienced students may extend the class to an hour. Monitor progress privately. Clarify how a purchase, sale or constraint works without recommending a security. Strategic assistance does more than change someone’s points: it changes the comparison the class is trying to study. Consistent procedural help is therefore part of the design, not merely classroom administration.

Use ten minutes to reconstruct money and inventory. Begin with a costless sale and ask what happened to total value. Follow with the three-date example to demonstrate re-entry and a new lot. Write cash, holdings and wealth in separate columns, distinguishing current balance from terminal payment. If commissions or taxes apply, show the specific deduction and its counterpart before discussing preferences. Under delegated management, add an arrow from decision-maker to recipient. A simple ledger is more informative at this stage than an unexplained behavioural label.

Spend ten minutes defining opportunities and revealing the report. Before showing the index, ask which sales and dates should enter. Then read numerators and denominators, contrast pooled rates with the individual histogram, and inspect the trajectory. If many people have undefined indices, discuss why rather than treating missing information as a zero effect. A class with little variation still teaches which comparison would be more informative. It also provides a concrete reason to distinguish measurement from the hypothesis that motivated it.

Conclude with ten minutes of exercises and discussion. Choose two problems below and request a verbal explanation alongside calculation. An exit ticket can ask what additional evidence would distinguish reference points, expectations and costs. Assess reasoning and design comprehension rather than realized money. Luck and exposure affect payments; using them to grade understanding changes the activity’s meaning. Preserve assignment and downloads so the later teaching explanation can be reconstructed.

Feedback script

“First reconstruct what was held, then what could be sold, and finally what was chosen. Compare future opportunity with historical reference. Which explanations remain possible? What would another experiment change to distinguish them?”

6.2 Problems with solutions

More sales need not mean greater propensity

A portfolio offers nine gain opportunities and one loss opportunity. Three winners and the loser are sold. Although winning sales are more numerous, PGR is $3/9 = 1/3$ and PLR is $1/1 = 1$. The index is $-2/3$, not positive. Comparing transactions without the corresponding opportunity denominators produces the error. Request a sentence describing both denominators without using the word bias.

Pooled rate versus mean individual index

One person has $RG=1$, $PG=1$, $RL=1$ and $PL=1$, hence index zero. Another has $RG=9$, $PG=1$, $RL=0$ and $PL=10$, hence index 0.9. Their mean individual index is 0.45. Pooling opportunities gives PGR $10/12$ and PLR $1/12$, with difference 0.75. Both calculations are correct but apply different weights. The histogram contains two people, not twenty-four participants. A large record count must not be substituted for the number of independent decision-makers.

Commission and net classification

Purchase at ten with 5% commission gives lot basis 10.50. Sale at eleven incurs 0.55 commission and yields 10.45. The net loss is 0.05 despite an increased quote. Calling it a gain because eleven exceeds ten ignores an announced friction. State whether a comparison uses gross or net classification; do not switch conventions only when one better supports a prediction. The private record permits both purchase cost and sale proceeds to be checked directly.

A loss with a credit

Under tax without commission, selling a ten-cost unit for nine produces net gain -1 and tax -0.20 . Sale proceeds are 9.20; with prior cash 40, the new balance is 49.20. The credit increases wealth relative to untaxed selling, so the cash identity subtracts a negative tax. A 0.20 wealth increase on realization is not an error under this particular rule. It reflects the explicitly modelled transfer rather than a return generated by converting stock into cash.

Repurchase versus forced sales

On the first automatic-liquidation date, the program sells all six units. The person repurchases B, D and F but not A, C and E. No previous position was sold by a chosen selling decision; voluntary PGR/PLR does not become 100%. In the separate non-repurchase measure, all three previous gain units exit and all three loss units are replaced. For that date, gain exits are 100% and loss exits 0%, with three opportunities in each category. Correct labels preserve the economic comparison without confusing action definitions.

Execution price of a standing order

A unit bought for eleven has lower threshold $0.8 \times 11 = 8.80$. The quote moves from nine to eight and the order is active. It executes at eight, not 8.80, because prices are observed discretely. Repurchasing at eight opens another cost reference. The automatic sale is excluded from that date's discretionary opportunities, and the new acquisition is not a previously sellable position. State this chronology before attempting to classify subsequent returns.

Crossed payments

One person manages terminal wealth 94 and their partner manages 107. Under delegated management their personal payments are 107 and 94, respectively. Mean managed wealth and mean personal payment are both 100.50, although neither receives their own managed result. Aggregate equality neither reveals identity nor demonstrates that responsibility was irrelevant. An incomplete partner must not be assigned a guessed outcome merely to finish the transfer.

A contrast changing two dimensions

A class compares visible cost with a fair process against omitted cost with positive drift. A change in holdings does not identify salience because future distributions also changed. Propose two additional conditions crossing the factors while preserving horizon, cash and inventory. State how conditions would be assigned and which outcome definition would remain fixed. A common seed alone cannot replace experimental assignment. The exercise evaluates control of a mechanism rather than the ability to recognize a familiar treatment label.

6.3 Troubleshooting without losing the session

Attention

Do not erase the database to repair a screen or turn abandonment into zero investment. Preserve records, identify the rule and check actual journey status. An incomplete class records implementation progress, not behaviour that can be filled in by assumption.

If a proposal is rejected, verify that each field contains zero or one and that purchases fit cash after sales, commissions and taxes. Retaining a unit is not buying it again under ordinary trading, whereas liquidation and repurchase does require a new purchase. A vanished unit may have triggered a standing order; inspect its execution record before concluding that data were lost. A difference between cash and portfolio value is also not an error by itself. These checks begin with accounting rather than speculation about software behaviour.

If the report shows no pending decisions but cannot reveal aggregates, a final summary may remain unacknowledged or a delegated pair unfinished. Do not invent a record to eliminate that wait. A nonexistent-participant link calls for distributing the correct link from the current session; an old link or replaced database may explain it. Restarting to load new texts does not require deleting sessions. Resolve rule questions by identifying the condition, date and actual ledger state.

Before ending, verify closures, denominators, download session and assignment preservation. Keep source, PDF and figures together. When discussing applications, return to the assumptions of external prices, restricted quantities and a short horizon: interpret the classroom result within that design.

Bibliography

- Shefrin, H., and Statman, M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. *The Journal of Finance*, 40(3), 777–790. <https://doi.org/10.1111/j.1540-6261.1985.tb05002.x>.
- Odean, T. (1998). Are Investors Reluctant to Realize Their Losses? *The Journal of Finance*, 53(5), 1775–1798. <https://doi.org/10.1111/0022-1082.00072>.
- Weber, M., and Camerer, C. F. (1998). The disposition effect in securities trading: an experimental analysis. *Journal of Economic Behavior & Organization*, 33(2), 167–184. [https://doi.org/10.1016/S0167-2681\(97\)00089-9](https://doi.org/10.1016/S0167-2681(97)00089-9).
- Barberis, N., and Xiong, W. (2009). What Drives the Disposition Effect? An Analysis of a Long-Standing Preference-Based Explanation. *The Journal of Finance*, 64(2), 751–784. <https://doi.org/10.1111/j.1540-6261.2009.01448.x>.
- Frydman, C., and Rangel, A. (2014). Debiasing the disposition effect by reducing the saliency of information about a stock’s purchase price. *Journal of Economic Behavior & Organization*, 107(B), 541–552. <https://doi.org/10.1016/j.jebo.2014.01.017>.
- Fischbacher, U., Hoffmann, G., and Schudy, S. (2017). The Causal Effect of Stop-Loss and Take-Gain Orders on the Disposition Effect. *The Review of Financial Studies*, 30(6), 2110–2129. <https://doi.org/10.1093/rfs/hhx016>.
- Hermann, D., Mußhoff, O., and Rau, H. A. (2019). The disposition effect when deciding on behalf of others. *Journal of Economic Psychology*, 74, 102192. <https://doi.org/10.1016/j.joep.2019.102192>.