



Instructor's Guide to Bonds, Yield and Default

Laboratory implementation, theoretical foundations,
experimental evidence, and variants

Behavioral and Experimental Economics Research Lab
Department of Economics



Revised edition | October 2026

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

How to use this guide

This guide prepares instructors to teach bond valuation, primary allocation and default recovery using actual classroom decisions. It follows the English interface and covers the same rules as the Spanish edition. No prior experience running experiments is assumed.

Begin with the summary, timeline and complete worked account. Then select one extended comparison. The classroom plan, report definitions and solved exercises support discussion after choices have been recorded.

Common rules are explained once. Screenshots are real local interfaces. Proposed public routes describe the prepared product, while verified local operation and pending deployment are distinguished explicitly.

Author

This guide was prepared by Stanislao Maldonado, research professor in the Department of Economics at Tecnológico de Monterrey, Monterrey Campus. For questions or suggestions about its content, please contact the author at stanislao.maldonado@tec.mx.

For the instructor

Record predictions before revealing aggregates. Keep personal links and private classifications confidential. Distinguish a contractual promise from an expected payment and from a realized receipt.

Contents

How to use this guide	i
1 Purpose, scope and preparation	1
1.1 The question organizing the activity	1
1.2 Access, groups and basic modes	2
2 Valuation, allocation and accounting	9
2.1 Face value, coupon and payment dates	9
2.2 Present value of promised and expected payments	9
2.3 Promised yield and effective returns	10
2.4 Duration and discount-rate sensitivity	11
2.5 Two-bond auction with one-unit demand	11
2.6 Final account and complete worked example	12
2.7 Recovery, guarantees and academic support	12
3 Extended conditions and comparisons	16
3.1 Selecting a comparison	16
3.2 Uniform-price reference	16
3.3 Pay your bid	16
3.4 No default	17
3.5 Low discount rate	17
3.6 High discount rate	17
3.7 Long maturity	17
3.8 Zero coupon	18
3.9 High coupon	18
3.10 Higher default probability	18
3.11 Senior claim	18
3.12 Subordinated claim	19
3.13 Ring-fenced collateral	19
3.14 Full external guarantee	19
3.15 Covenant with a lower coupon	20
3.16 Funding-dependent risk	20
3.17 Imperfect private rating	20
3.18 Imperfect public rating	20
3.19 More accurate private rating	21
3.20 Resale after a rate change	21
4 Classroom use and exercises	23
4.1 A seventy-five-minute session	23
4.2 Questions that organize discussion	24
4.3 Private report and observed denominators	24
4.4 Downloads and payment reconstruction	25

4.5	Exercises with solutions	27
4.5.1	Allocation with few eligible bids	27
4.5.2	Promise and credit shortfall	27
4.5.3	Uniform price and project funding	27
4.5.4	Protection that redistributes and protection that adds funds	28
4.5.5	A precise signal does not eliminate event risk	28
4.5.6	Resale when the rate rises	28
4.5.7	Averaging without duplicate payment	28
4.6	Operational problems and interpretation limits	28

List of Figures

1.1	Institutional website: access to teaching activities.	3
1.2	Public catalogue: select game and language.	4
1.3	Demo: opening view of the 44-configuration filtered registry.	5
1.4	The four family rooms.	5
1.5	Basic room: verify language and mode.	6
1.6	Welcome, rules and acceptance before decisions.	7
1.7	Comprehension: retained entries and explanation of each error.	8
2.1	Binding one-unit bid: visible range and reserve.	13
2.2	Actual waiting page: market decisions remain pending.	13
2.3	Allocation and price before final-state disclosure.	14
2.4	Realized receipts and dated equivalents.	14
2.5	Account detail and distinct return measures.	15
3.1	Received classification: issuer information before bidding.	21
3.2	Resale: new rate, net quote and holder choice.	22
4.1	The instructor controls when results are revealed.	25
4.2	Aggregates with bid, awardee and market denominators.	25
4.3	Theoretical promised-price curve: fixed contract and different rates.	26
4.4	Explicit completion and average assigned once.	26

Purpose, scope and preparation

Purpose	Value dated bond payments and distinguish promised yield, effective return and recovery.
Experimental unit	Hybrid: indicative individual valuation and four-investor, two-bond auction.
Basic edition	One market; ten fixed-group or randomly reassigned markets.
Extended edition	Nineteen rate, coupon, maturity, risk, priority, information, funding and resale conditions.
Decision	Indicative valuation and one-unit price bid; optional choice to hold or resell.
Payoff	Mean date-zero account across active markets, assigned once; budget 200 ECU each market.
Topics	bond valuation, auctions, yield to maturity, duration, default risk, recovery and priority
JEL	C91; C92; D44; G12; G24; G33
Participants	Multiples of four; at least eight for random reassignment. Automated issuer and dealer.
Suggested duration	Approximately 75 minutes including discussion for one market; longer for ten markets.

https://bonds.beer-lab.org/room/bonds_en

1.1 The question organizing the activity

A bond separates three questions: what the contract promises, what that promise is worth today and what its buyer eventually receives. The coupon partly answers the first question; it does not settle the other two. This activity brings that distinction into the classroom through an individual valuation followed by an auction among four investors. Each participant estimates value, submits a bid and learns whether they receive one of two bonds. The activity then records dated payments, the issuer outcome and a final account that allows instructors to compare decisions made at different purchase prices.

The design is hybrid. Initial valuation is individual and private, while allocation and price depend on other people. The issuer, prior creditors, guarantor and resale buyer are automated accounts. They require no additional participants and make no human strategic choices. The actual group contains four investors with a renewed budget of two hundred ECU per market. Nobody can buy

more than one bond or borrow to finance a bid. Scarcity of the two units makes interaction relevant even when everyone knows the same contractual characteristics. The game therefore combines individual calculations with a market institution.

This family serves a different purpose from the catalogue's public-debt, credit-contract and continuous-market activities. Teaching here focuses on dated cashflows, issue prices, yields and recovery. Public debt addresses budgets and intertemporal distribution; a generic auction examines allocation of an object; an order book examines continuous trading. This activity integrates only the elements needed to study a debt security. Its resale extension uses an automated quote rather than creating another order book. Existing games remain useful for their original questions and should not be counted again as additional bond mechanisms.

For the instructor

Begin with a concrete question: two bonds pay the same coupon but are purchased at different prices. Do they produce the same yield? Record answers before opening the report. Then introduce default and ask which part of the earlier calculation depended on receiving every promised payment.

1.2 Access, groups and basic modes

Institutional navigation starts at <https://beer-lab.org/> and continues to <https://teaching.beer-lab.org/>. Find Bonds, Yield and Default and select a language and edition. The proposed canonical domain is <https://bonds.beer-lab.org/>; publication requires the administrator's server update. The verified local instance is <http://localhost:8106/demo>, accessible from the same computer. A guide containing proposed routes and a working local test does not establish that the public domain has been deployed. Distribute the appropriate live route only after its publication status is confirmed.

Demo contains the family's forty-four configurations. Rooms contains four rooms in basic Spanish, basic English, extended Spanish and extended English order. Basic rooms are https://bonds.beer-lab.org/room/bonos_es and https://bonds.beer-lab.org/room/bonds_en; extended rooms use `bonos_extendido` and `bonds_extended`. Each basic menu offers three modes and each extended menu nineteen conditions. A basic room must initially select a basic configuration in its own language. It should neither show another family nor silently start an extended treatment. The access figures show the filtered local instance.

The single mode runs one market. Other modes run ten markets with the same group or random reassignment. Reassignment requires at least eight people so that two markets exist; it does not guarantee that nobody meets a previous counterpart again. All modes require multiples of four. Financial dates inside a market are not interaction rounds: a three-date bond settles within one market rather than requiring three classroom sessions. Ten markets must likewise not be confused with ten maturity dates of the same contract. For annualized interpretation, each financial interval represents a simulated year.

Through administration, create a new session, verify participant count and distribute its individual links. Valuations and bids remain private before closing. Do not project links or associate outcomes with names or student numbers. Waiting pages synchronize bids and subsequent choices before default is disclosed. If someone is delayed, inspect their current page rather than inventing a bid or reusing another session's link. The private report shows progress and lets the instructor reveal or hide aggregates. Administrative information should support the activity without becoming an unintended public signal during decisions.

The budget resets every market. Final experimental payment is the average account across active

markets, assigned once after the last one. A single-market session retains later inactive technical records, which are neither dropouts nor observed zeros. Export includes all ten technical rounds and distinguishes these states. A repeated session supports discussion of learning but also introduces experience and composition effects. Comparisons of fixed and reassigned groups should preserve the market as the interaction unit. Within-market investors share information, prices and issuer outcomes, so they are not independent realizations of all relevant variables.

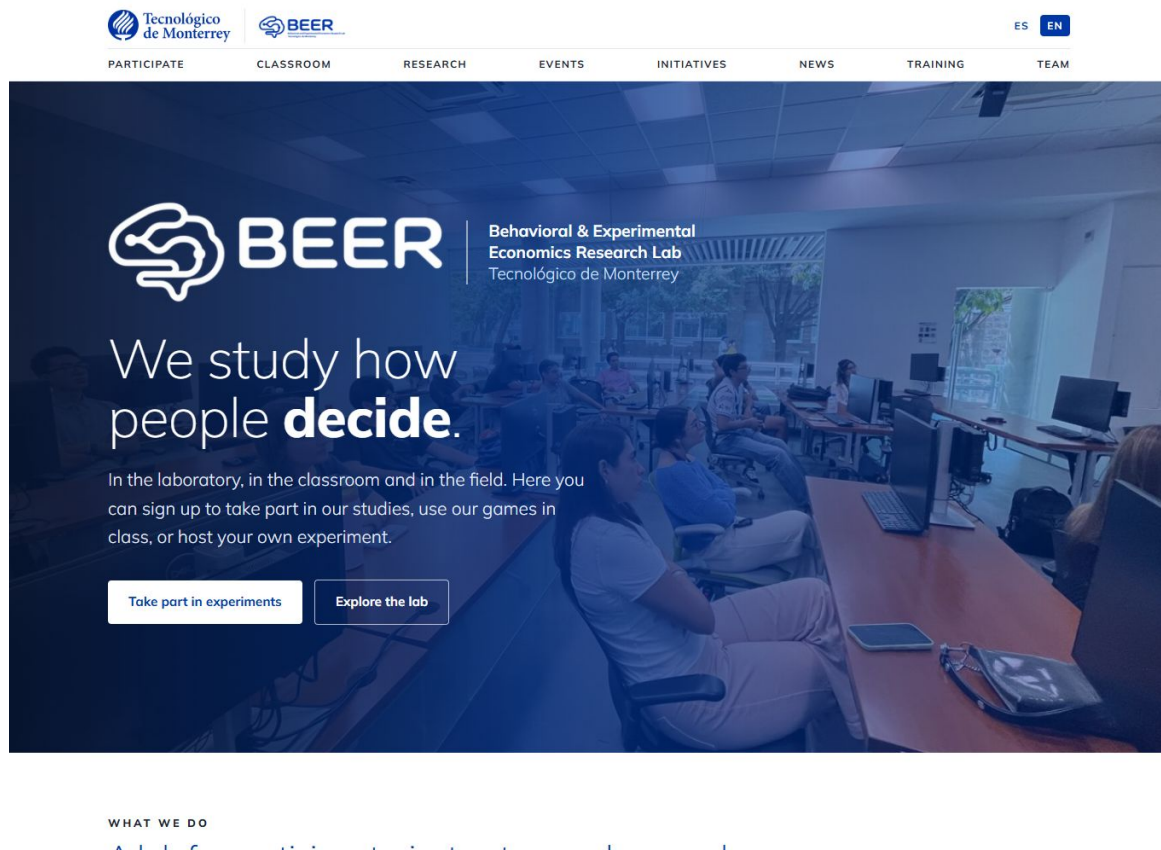


Figure 1.1: Institutional website: access to teaching activities.




[PARTICIPATE](#)
[CLASSROOM](#)
[RESEARCH](#)
[EVENTS](#)
[INITIATIVES](#)
[NEWS](#)
[TRAINING](#)
[TEAM](#)

[ES](#)
[EN](#)

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

Topic ▾

JEL code ▾

168 games

Electoral Accountability and Political Selection

Study how the prospect of remaining in office changes an officeholder's behavior and how information allows voters to choose between politicians with different types. Basic: One encounter or four encounters with fixed or reassigned groups. Extended: Eight treatments on continuation, information, types, office value, term limits, and audits.

electoral discipline

political accountability

political selection

corruption

information

political economy

JEL A22 · C92 · D72 · D73

Address: accountability.beer-lab.org

Aggregate Demand and Aggregate Supply

Understand how spending choices aggregate into demand and how equilibrium with supply determines output and prices. Basic: One period, ten periods with the same economy, or ten periods with reassigned economies. Extended: Demand expansion and contraction, supply shock, fiscal stimulus, capacity, expectations, and coordination.

aggregate demand

aggregate supply

price level

potential output

macroeconomic expectations

JEL A22 · C92 · E12 · E31 · E32

Address: adas.beer-lab.org

Figure 1.2: Public catalogue: select game and language.

oTree

[Demo](#)

[Sessions](#)

[Rooms](#)

[Data](#)

[Server Check](#)

[Logout](#)

Demo

Bonos: Un mercado
Bonos: Diez mercados: grupo fijo
Bonos: Diez mercados: reasignación
Bonos — Extendido: Referencia: precio uniforme
Bonos — Extendido: Pago de la propia oferta
Bonos — Extendido: Sin incumplimiento
Bonos — Extendido: Tasa de descuento baja
Bonos — Extendido: Tasa de descuento alta
Bonos — Extendido: Vencimiento largo
Bonos — Extendido: Cupón cero
Bonos — Extendido: Cupón alto
Bonos — Extendido: Probabilidad de incumplimiento alta
Bonos — Extendido: Crédito preferente
Bonos — Extendido: Crédito subordinado
Bonos — Extendido: Garantía con activos separados
Bonos — Extendido: Garantía externa completa
Bonos — Extendido: Restricción contractual y menor cupón
Bonos — Extendido: Riesgo dependiente de la financiación
Bonos — Extendido: Calificación privada imperfecta
Bonos — Extendido: Calificación pública imperfecta
Bonos — Extendido: Calificación privada más precisa

**Bonos,
rendimiento e
incumplimiento
/ Bonds, Yield
and Default —
BEER Lab**

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

Figure 1.3: Demo: opening view of the 44-configuration filtered registry.

Rooms

Current rooms:

Bonos — Español
Bonds — English
Bonos — Extendido
Bonds — Extended

Figure 1.4: The four family rooms.

oTree Demo Sessions Rooms Data Server Check Logout

Room: Bonds — English

Create a new session

Session Config

Bonds: One market

Number of participants

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

Create

[Configure session](#) ⚙️

App sequence

bond_yield_game (10 rounds)

0 participants present

Start links

These URLs will stay constant for new sessions, even if the database is recreated.

Room-wide URL

Here is the room-wide URL anyone can use. Don't use this link when testing in multiple tabs on the same browser, because all tabs will be assigned to the same participant, using a cookie.

http://127.0.0.1:8106/room/bonds_en

Figure 1.5: Basic room: verify language and mode.



Welcome to the BEER Lab

The Behavioral and Experimental Economics Research Lab at Tecnológico de Monterrey's Department of Economics provides a space to learn through decisions under announced rules.

General laboratory rules

Use only your own link. Decide individually and do not share private information. Read the instructions and ask procedural questions. Keep the page open while waiting.

I confirm that I have read and will follow the laboratory rules.

☐ Yes

☐ No

Continue

Figure 1.6: Welcome, rules and acceptance before decisions.



Market 1/1

Bids and dated payments

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.

Comprehension check

What is your budget at the beginning of a market, in ECU?

Your answer: 100. The correct answer is 200. The announced endowment is 200 ECU and resets each market.

In a uniform-price example, bids are 110, 100, 90 and 80, with two bonds and reserve 60. What price does each winner pay?

Your answer: 100. The correct answer is 90. The two highest bids win. The highest losing bid is 90, above reserve 60. Each winner pays 90 ECU in this uniform-price example.

In an example with face value 100, coupon 5 and recovery 40, what does the bond pay at the final date if default occurs?

Your answer: 45. The correct answer is 40. Default pays recovery of 40 ECU. The last coupon is not added; earlier coupons have already been received.

Continue

Figure 1.7: Comprehension: retained entries and explanation of each error.

Valuation, allocation and accounting

2.1 Face value, coupon and payment dates

The reference contract has face value one hundred ECU, coupon five ECU and maturity on date three. Coupons before maturity are certain. At the final date a solvent issuer pays one hundred five: one hundred principal plus the final five-unit coupon. Under default, that last coupon lapses and recovery is forty. The event occurs only at maturity. Earlier coupons consequently do not disappear retrospectively after default is observed. Explain this teaching simplification before comparing the model with actual bonds, whose contracts and default timing can differ substantially.

Reference default probability is ten percent, and the issuer outcome is common to the two awarded bonds. Two holders do not represent two independent defaults. One issuer state is drawn and its consequences apply to each issued unit. Some extensions change probability, others change recovery and others change available information. Keeping these dimensions separate explains why two securities with the same default frequency may have different values when their collection rights differ. It also prevents the number of holders from being mistaken for the number of independently drawn issuer outcomes.

Coupon divided by face value is the coupon rate: five over one hundred, or five percent. If the purchase price is ninety, the same coupon divided by price is approximately 5.56 percent. This second measure is current yield. Neither measure by itself includes principal repayment or the gain or loss between purchase price and face value. Maturity also matters: receiving one hundred six periods from now differs from receiving it three periods from now under positive discounting. The contract's dated cashflow table makes those differences explicit before students examine a single yield number.

What participants will see

Participants see the budget, contract, allocation rule and information condition. They first enter an indicative valuation that neither sets the price nor generates a separate reward. They then submit a binding bid. A difference between those numbers can reflect auction strategy rather than a change in their assessment of bond value.

2.2 Present value of promised and expected payments

With coupon C , face value F , maturity T and per-period rate r , the price of promised payments is

$$P^{\text{prom}}(r) = \sum_{t=1}^T \frac{C}{(1+r)^t} + \frac{F}{(1+r)^T}.$$

The final principal term is added to the final coupon. In the reference, coupon rate and discount rate are both five percent, so promised price is one hundred. That equality depends on parameters; it does not mean all bonds should trade at par. If the discount rate rises while the contract remains unchanged, the present value of the same payments falls. The promised-price curve in the report holds that contract fixed.

Under terminal default probability p and recovery R , expected reference payments are five, five and $(1 - p)105 + pR$. The final expected payment is 98.50. The benchmark discounts these expected receipts at the announced rate:

$$P^{\text{exp}} = \sum_{t=1}^{T-1} \frac{C}{(1+r)^t} + \frac{(1-p)(F+C) + pR}{(1+r)^T}.$$

The result is about 94.39 ECU. The expected shortfall from the promise occurs at maturity: $0.10(105 - 40) = 6.50$ in nominal units, with present value about 5.61. Earlier certain coupons remain part of both valuations. Expected recovery therefore changes value without changing the coupon rate printed in the contract.

Theoretical foundation

The game discounts expected payments without adding a risk premium. This is a teaching benchmark under that assumption, not an estimate of any real bond's price. Risk preferences, information, bidding incentives and expectations about others can separate the observed auction price from this benchmark.

Indicative valuation records a prior assessment but is not an incentivized willingness-to-pay elicitation. Do not describe it as free of strategic reporting, misunderstanding or hypothetical response. The report can compute its distance from an available benchmark while preserving that limitation. In the funding condition, risk depends on bids not yet known, so there is no unique prior reference without assumptions about proceeds. That condition supplies bounds and a post-clearing benchmark. Treating a future funding outcome as if it were known before bidding would introduce information unavailable at the original decision.

2.3 Promised yield and effective returns

Promised yield to maturity, or YTM, is the rate y that equates purchase price with promised contractual cashflows. At a price of ninety under the reference contract, it satisfies

$$90 = \frac{5}{1+y} + \frac{5}{(1+y)^2} + \frac{105}{(1+y)^3}.$$

The result is approximately 8.95 percent. YTM increases as price falls while the contract is fixed. This is a property of the equation, not proof that the investor will receive that return. Under default, the equation used payments that do not occur. A high promised yield can therefore coexist with a disappointing effective outcome.

The game also reports annualized terminal-wealth returns under an explicit coupon-reinvestment convention. When the security is held, earlier coupons accumulate to maturity at the announced rate. The resulting terminal wealth is divided by purchase price and raised to the reciprocal of the number of periods. The displayed expected return applies that transformation to expected terminal wealth. It is not the probability-weighted mean of state-specific internal rates of return. Since the transformation is nonlinear, those operations are not interchangeable. Use the stated convention when comparing examples and explain that a different reinvestment assumption changes the measure.

Realized return uses actual receipts and the same reinvestment convention. Under resale, it accumulates the first coupon and sale proceeds; later bond payments are zero for the seller. Promised YTM at purchase retains its original contractual meaning. Comparing these measures identifies the roles of price, default and reinvestment. A high quoted rate may reflect a low price relative to a risky promise rather than an investment superior for every preference or constraint. Final experimental payment is a separate date-zero account measure, described below, and should not be relabeled as terminal wealth.

Attention

Do not call YTM an expected return on a defaultable bond. Nor should a rate computed from expected terminal wealth be called expected IRR. The report keeps distinct labels for promise, expectation under reinvestment and realized outcome. Explaining the differences is part of the activity rather than a correction to be hidden from students.

2.4 Duration and discount-rate sensitivity

Macaulay duration of promised payments is the average payment date weighted by present values evaluated at the YTM implied by purchase price. Modified duration divides that measure by $1 + y$. For the bond purchased at ninety, the values are approximately 2.851 and 2.617 periods. The latter approximates the proportional promised-price response to a small yield change: $\Delta P/P \simeq -D_{\text{mod}} \Delta y$. A one-percentage-point change is written 0.01 in this expression. Confusing percentage points and fractions can inflate the predicted price response by a factor of one hundred.

This is a local approximation holding promised payments fixed. It does not measure every response to changes in default probability, recovery or information. A large rate change can require repricing each cashflow because the price–yield relationship is curved. A zero-coupon bond puts all weight at maturity, so its Macaulay duration equals T . Positive-coupon bonds return part of their value earlier. These comparisons support solved exercises without turning a duration formula into a complete description of credit risk. State which cashflows and which rate are being varied before using any sensitivity estimate.

2.5 Two-bond auction with one-unit demand

Each person has two hundred ECU and can bid a whole number between zero and one hundred sixty. Zero denotes abstention. Bids below the reserve of sixty do not receive a bond. The two highest eligible bids win one unit each, with an independent random priority for ties. Under the implemented uniform rule, each winner pays the larger of reserve and the highest eligible losing bid. Without an eligible loser, the price is the reserve. This is a specific teaching rule rather than an exact reproduction of every sovereign issuance procedure or multiunit auction format.

For bids of one hundred ten, one hundred, ninety and eighty, the first two win and each pays ninety. Proceeds are one hundred eighty, not two hundred ten. Under discriminatory pricing, holding these bids and allocation fixed, payments are one hundred ten and one hundred and proceeds are two hundred ten. This accounting comparison keeps bids fixed; a behavioral comparison must allow people to adapt their bids to the institution. The first calculation cannot establish that one format always raises more revenue. Instructor discussion should separate mechanical consequences from strategic responses.

Common knowledge of risk does not turn the auction into a neutral value measurement. With private signals and a common issuer outcome, winning can contain information about other people's

assessments. The game neither computes a general optimal strategy nor requires bids equal to expected value. Indicative valuations and bids support discussion of that difference, remembering that the former have no separate incentive. Someone may understand the bond and still abstain because of risk preferences or the issuance institution. The appropriate explanation must use the information and opportunities actually available when the bid was submitted.

2.6 Final account and complete worked example

Experimental payment uses date-zero equivalents to compare receipts at different dates. Each receipt is discounted and rounded to cents before its equivalents are summed. Final account equals initial budget minus purchase price plus discounted receipts. Unspent cash remains in the same account unit. Principal and coupons are not added again because they are already included in receipts. The program does not simultaneously count a remaining asset and its cash redemption: those would be two ways of recording the same claim. Dates represent simulated annual intervals, with no actual waiting for years.

Consider the reference winner paying ninety. Without default, receipts are five, five and one hundred five. Their rounded equivalents are 4.76, 4.54 and 90.70, summing to one hundred. Final account is $200 - 90 + 100 = 210$. Under default, the last equivalent becomes 34.55 while earlier ones remain. Total discounted receipts are 43.85 and final account 153.85. Someone not awarded a bond ends with two hundred ECU. The comparison between receiving and not receiving an allocation therefore has no guaranteed sign before the issuer outcome is known. A low price alone does not eliminate default exposure.

Checkpoint

Check three identities: winners each pay ninety; every receipt is counted once; and a holder's account is budget minus purchase plus present value of receipts. If the final ten-market average adds coupons again or multiplies the endowment a second time, the payment has been misinterpreted.

A ten-percent probability does not require exactly one default in every ten classroom markets. Realizations may cluster, and both holders inside a market share the state. Under the example parameters, expected account is about 204.39. That expectation is neither a mandatory session outcome nor a payment promise. A battery's experimental average uses accounts actually realized rather than substituting their theoretical expectations. With a small number of markets, sampling variation can be substantial; interpret differences in observed averages alongside the common issuer draws and purchase prices.

2.7 Recovery, guarantees and academic support

Recovery follows an explicit terminal-estate distribution per issued unit. Default leaves eighty ECU available. In the reference, forty first goes to prior claims and forty to the bond. Changing seniority redistributes that estate; ring-fenced collateral changes what is collected before other creditors. An external guarantor may top up payments, but its transfer does not create issuer estate. With two issued bonds, per-unit estates and obligations scale up: a single eighty-unit pool is not spent twice. The report displays the issuer and guarantor components separately so that students can trace the source of each payment.

[Duffie and Singleton \(1999\)](#) provide an academic framework separating discounting and default risk in debt valuation. This activity uses a much simpler discrete adaptation with a terminal event

and announced recovery rules. [Bartolini and Cottarelli \(1997\)](#) place auction-format comparison in its institutional context. Our unit-demand rule and declared uniform price do not claim to replicate a national issuance process or the empirical performance ranking of alternative formats. The classroom comparison should be interpreted within its own announced rules.

The bulletin by [SEC \(2013\)](#) supplies terminology for coupon, maturity and priority; [FINRA \(2017\)](#) supports distinguishing calendar maturity from rate sensitivity. Amounts, probabilities, quotes and numerical outcomes in this guide are original teaching constructions. The activity neither reproduces a bond database nor attributes its program parameters to those sources. This separation allows the bibliography to support concepts while keeping experimental adaptations transparent. Instructors can add real-market material later without presenting the classroom's simplified event timing as a comprehensive credit model.



Market 1/1

Bids and dated payments

Bid for one bond

Your bid may determine whether you receive a bond and what you pay. It cannot be changed after submission. Only bids of at least 60 ECU are eligible.

Bid a whole number from 0 to 160 ECU; 0 means abstaining. The reserve is 60 ECU. The two highest eligible bids receive one bond each. Ties use a random priority independent of bids.

Resale after a rate change

Maximum price you bid, in whole ECU (0–160)

Continue

Figure 2.1: Binding one-unit bid: visible range and reserve.



Market 1/1

Bids and dated payments

Waiting for the other market participants

The page advances when all four people complete this phase. Keep the window open.

Figure 2.2: Actual waiting page: market decisions remain pending.



Market 1/1

Bids and dated payments

Allocation result

You received one bond

Purchase price: 90.00 ECU

Issuer proceeds: 180.00 ECU; Bonds awarded: 2

The issuer's final outcome has not been revealed yet.

New rate from date 1: 10,0%

Continue

Figure 2.3: Allocation and price before final-state disclosure.



Market 1/1

Bids and dated payments

Account settlement

Final issuer default: No (10.00%)

Date	Nominal receipt	Date-zero equivalent
1	89.95	85.67
2	0.00	0.00
3	0.00	0.00

Figure 2.4: Realized receipts and dated equivalents.

Purchase price	90.00
Final account in date-zero ECU	195.67
Final account minus initial budget	-4.33
Coupon / face value	5.00%
Coupon / purchase price	5.56%
Promised yield to maturity	8.95%
Expected annualized hold return (announced reinvestment)	6.93%
Realized annualized return (announced reinvestment)	6.54%
Promised YTM minus initial rate	3.95%
Macauley duration of promised flows	2.851
Modified duration of promised flows	2.617
Expected-value reference with information before bidding	93.11
Expected value with revealed type and rate	86.62

Figure 2.5: Account detail and distinct return measures.

Extended conditions and comparisons

3.1 Selecting a comparison

The nineteen conditions are session options rather than a compulsory sequence of nineteen markets per person. Each retains four investors, two bonds and the general decision sequence. Choose one question and compare complete markets. Before starting, write down what changes, what remains constant and which outcome will be examined. If students learn the mechanism between sessions, order changes as well; do not attribute every later difference to the treatment without considering experience. A clear prediction sheet helps preserve the original question when outcomes turn out to be surprising.

An accounting comparison holds decisions fixed to calculate a rule's consequences. A behavioral comparison allows decisions to respond to that rule. Both are useful and answer different questions. The following predictions are neither programmed outcomes nor effects estimated from real-market data. A small class supports examination of mechanisms and heterogeneity; causal inference requires explicit condition assignment and enough independent markets. Four people in one market share an issuer and do not equal four independent treatment assignments. Preserve that distinction when comparing averages or discussing statistical precision.

3.2 Uniform-price reference

The reference uses coupon five, three dates, a five-percent rate and ten-percent terminal default risk. Recovery is forty, and uniform allocation uses the highest eligible losing bid. Initial valuation and the binding bid are recorded separately. A first comparison examines observed prices alongside promised payments and the expected-value benchmark of 94.39 ECU.

Ask why price may differ from expected value without declaring every difference a mistake. The bidding institution, group size, risk preferences and learning also matter. Use this condition as a common reference for a subsequent contrast rather than as a universal account of corporate issuance. An auction price and an indicative valuation are different observed objects even when they happen to be numerically equal.

3.3 Pay your bid

Discriminatory pricing retains selection of the two highest eligible bids, but each winner pays their own bid. A larger bid can improve allocation and directly raise purchase cost when successful. The rule changes bidding incentives while coupon, dates and issuer risk remain identical. It therefore gives participants a reason to think separately about value and submitted price.

With a fixed bid vector, proceeds can differ from uniform pricing. In class, that vector also responds to the institution. Compare indicative valuations, bids, purchase prices and account surplus separately. Do not use a fixed-bid calculation to establish a universal revenue ranking, or interpret a lower bid as lower valuation without further evidence.

3.4 No default

This variant sets terminal default probability to zero. It retains five ECU per date and face value one hundred, so every promised payment occurs. At the reference discount rate, present value is one hundred. This supplies a straightforward check of discounting and cent rounding before introducing a risky final receipt.

The condition isolates expected credit loss when compared with the reference. The risk of paying a high auction price remains: purchasing above one hundred reduces the date-zero account relative to keeping cash. No default does not mean every bid or purchase price produces the same financial result. Distinguish certainty of contractual payments from the opportunity cost of obtaining them.

3.5 Low discount rate

The low rate is two percent per period. Contractual payments and default probability remain fixed. Lower discounting raises present value because the same future receipts carry greater weight in the date-zero account. The rule neither increases the coupon nor improves recovery. Its mechanical prediction follows from the discount factors.

Compare the valuation curve with the reference before observing bids. Then ask whether participants incorporated that change into valuations and bids. A response smaller than expected could reflect strategy or understanding rather than only rate insensitivity. YTM also depends on the awarded purchase price and must be computed from that actual price. It is not automatically identical to the rate used for the expected-value benchmark.

3.6 High discount rate

The high rate is ten percent per period. Nominal cashflows remain unchanged while their present equivalents fall. Comparison with two and five percent teaches the inverse price–rate relationship without simultaneously changing credit risk. Ask which receipts lose the most present value and why their dates matter.

Discounting has a larger effect on the distant final payment containing principal. A lower issue price does not by itself indicate issuer deterioration in this condition; it may reflect the announced rate. That distinction prevents every rise in promised yield from being interpreted as news about default. Purchase-price changes must be connected to the parameter that actually varied in the classroom design.

3.7 Long maturity

Long maturity extends the contract to six dates with coupon five. Default remains a terminal-only event with ten-percent probability; it is not applied independently in every year. More certain coupons are paid before principal arrives at a later date. Those are the cashflows students should value.

The comparison teaches duration and exposes a model limitation. Since terminal probability does not automatically rise with maturity, the condition does not supply a complete survival-probability term structure. Value the announced receipts and compare local sensitivity. A real application would require additional assumptions about credit evolution in intermediate years. Do not silently compound the ten-percent probability or add unannounced early defaults to the exercise.

3.8 Zero coupon

Zero coupon removes intermediate payments. Without default, the security pays only one hundred at maturity; under default it pays recovery. Coupon rate and current yield are zero even though YTM can be positive when purchase price is below face value. Students can therefore observe why receiving no annual coupon does not imply earning no return.

All promised-duration weight falls at maturity. This provides a clean comparison with the coupon-paying contract. Ask why an investor might accept the absence of intermediate income, then examine the price and final payment. Do not add hypothetical coupons or equate zero coupon with no credit risk. The terminal event and recovery rule continue to apply to the security.

3.9 High coupon

High coupon pays ten ECU per date while retaining face value one hundred, three-date maturity and reference terminal risk. Final promised payment is one hundred ten. Default preserves the announced recovery and eliminates the final coupon, as in the common rule. Larger promised payments therefore need not all survive the adverse state.

Higher coupons change cashflows and their temporal weights. They may raise present value and reduce promised duration relative to a comparable lower-coupon bond. Purchase return still depends on the auction price. Compare contract and price before concluding that a larger coupon necessarily benefits a buyer. The price can incorporate some or all of the additional promised payments.

3.10 Higher default probability

This condition raises terminal probability to forty percent without changing coupon or recovery. Expected value at five-percent discounting is approximately 77.54 ECU. Promised value without credit remains one hundred because contractual promises have not changed. The contrast separates the amount promised from the probability-weighted payment.

A security can consequently show high YTM while offering a much lower expected return. Examine bids and prices alongside the number of independent markets and their realizations. A class with few realized defaults does not eliminate announced risk. Keep ex ante probabilities separate from realized frequencies and avoid evaluating a probability assessment solely through one outcome. Both bondholders inside a market share that outcome.

3.11 Senior claim

Other claims' priority falls to ten ECU per issued unit. With default estate eighty, the bond receives seventy. Event probability stays at ten percent. This condition changes loss given default

rather than default frequency. It isolates a contractual dimension that a simple count of issuer failures would miss.

Reconstruct estate distribution before calculating value. Larger recovery raises expected payments but does not make the security riskless. Compare the valuation change with a probability reduction to show that different contracts can generate similar expected losses. The exercise uses an explicit simplified priority rule rather than reproducing a full court proceeding or every creditor's bargaining rights. Its purpose is to trace payments under announced rights.

3.12 Subordinated claim

Subordination gives priority to seventy ECU of other claims. With estate eighty, ten remains for the bond. The same terminal event can therefore have very different consequences depending on the security's position in the payment queue. Probability is unchanged, while recovery severity changes substantially.

Compare this condition with seniority while holding default probability fixed. The exercise prevents credit risk from being reduced to a rating or frequency alone. A student may understand that default is infrequent and still demand a lower price because losses in that state are severe. Do not count unpaid face value as another receipt: it is an unrealized promise, not an additional asset in the final account.

3.13 Ring-fenced collateral

Secured status separates sixty ECU inside issuer estate to pay the bond first. It does not add sixty to estate eighty. After paying collateral, twenty remains for other creditors, whose prior claim is forty. Under default, the bond receives sixty and other creditors receive twenty. The per-unit estate identity remains intact.

This ordering shows how protecting one security can redistribute resources across creditors without creating new assets. Compare it with the senior claim and the external guarantee. All three mechanisms can increase bond receipts, but their funding sources differ. Reading the report correctly requires identifying who finances each payment and whether the improvement comes from priority, collateral allocation or an additional outside transfer.

3.14 Full external guarantee

An automated guarantor tops up the final bond payment to face value plus coupon. Under reference default, forty comes from estate and sixty-five from the guarantor, so the holder receives one hundred five. The outside contribution is identified separately rather than combined invisibly with estate recovery.

Expected payment value returns to one hundred at the reference rate. This does not establish that actual guarantees are free or infallible: the exercise assumes a capable guarantor and charges no premium. The teaching question distinguishes external transfer from estate recovery. Bond payments cannot all be attributed to the issuer's eighty available units. Ask students to verify the combined issuer-plus-guarantor identity before discussing protection.

3.15 Covenant with a lower coupon

The contractual condition lowers default probability to five percent and coupon to four ECU. Its automatic rule represents protection with an announced cost in promised payments. No participant chooses hidden effort, and no sanction is negotiated after issuance. It is therefore distinct from the catalogue's effort-and-debt activity.

Expected value is approximately 94.51 ECU. Its proximity to the reference supports discussion of compensation between promise and safety without assuming every covenant improves every security. Two parameters change explicitly, so the comparison does not identify a pure monitoring effect. Calculate both changes before interpreting bids or apparent preferences between contracts. The probability reduction is a teaching parameter, not an empirical estimate of real covenant effectiveness.

3.16 Funding-dependent risk

If actual proceeds reach one hundred sixty ECU, terminal default risk is ten percent; otherwise it is forty. Issuance is not cancelled below the threshold, and purchase prices are not refunded. Funding changes risk in the project that has actually been financed and issued.

Bids interact through allocation, price and subsequent project risk. Before others' bids are known, a unique benchmark requires expectations about proceeds. The guide therefore uses bounds and the report preserves a post-clearing reference. This mechanism supports questions about coordination and inadequate funding without introducing another lending game or a human effort choice. Explain why a realized low-funding outcome cannot be treated as information available to investors before bidding.

3.17 Imperfect private rating

Issuer risk is either ten or forty percent, with equal prior probabilities. A classification identifies its type correctly in eighty percent of cases. Private signals are independent conditional on type, but not unconditionally independent because they refer to the same issuer. Correctly identifying a risky type still does not reveal whether it will default.

A low-risk classification implies a sixteen-percent posterior default probability; a high-risk one implies thirty-four percent. These are implications of the teaching model rather than calibrated claims about a real rating agency. The prior reference uses the investor's own signal. It does not claim to incorporate information contained in other bids or the event of winning an allocation.

3.18 Imperfect public rating

One actual classification draw is communicated to all four people. Accuracy remains eighty percent. Receiving the same message does not provide four independent pieces of evidence: everyone knows they share a single source. The amount of information should not be multiplied by the number of readers.

Comparison with private signals examines information structure and expectations about what others know. Reduced bid dispersion can be consistent with shared information but is not programmed. Agreement does not establish absence of strategy, and the public classification is not

a payment guarantee. Issuer outcome stays uncertain until settlement. This condition changes common knowledge while preserving the underlying low- and high-risk types.

3.19 More accurate private rating

Private accuracy increases to ninety-five percent while risk types and prior probabilities remain fixed. A low signal implies posterior risk 11.5 percent and a high signal 38.5 percent. The classification is more informative but still does not reveal issuer type with certainty. Default remains a further random event conditional on that type.

Compare dispersion of valuations and bids with the eighty-percent private condition. Better information does not force everyone to receive the same message or guarantee a larger account in each realization. The contrast examines informative value and residual risk while preserving the common issuer outcome and auction selection. Interpretation should recognize that winning itself may reveal something about other investors' private assessments.

3.20 Resale after a rate change

After receiving the first coupon, the rate changes to two or ten percent with equal probability. Awardees may retain the bond or sell to the automated buyer. The quote values remaining expected payments at the new rate and subtracts one ECU. There is no continuous trading or new human counterparty.

Selling preserves only the first coupon and resale proceeds; all subsequent bond receipts become zero for the seller. The account discounts date one at the initial rate and later dates using the new rate. The preauction benchmark averages both possible curves. Compare holding and resale using that information sequence rather than a quote treated retrospectively as known at bidding. The spread makes the source of the difference explicit.



Market 1/1

Bids and dated payments

Your indicative valuation

Received classification: High risk

Figure 3.1: Received classification: issuer information before bidding.



Market 1/1

Bids and dated payments

Keep or resell

Date-1 coupon: 5.00 ECU

New rate from date 1: 2.00%

Net resale quote at date 1: **98.58 ECU**

You have received the first coupon. The quote includes the 1-ECU spread. Reselling preserves only that coupon and the resale proceeds; no later coupons or recovery are received.

Your choice

- ☐ Keep until maturity
- ☐ Resell now

Continue

Figure 3.2: Resale: new rate, net quote and holder choice.

Classroom use and exercises

4.1 A seventy-five-minute session

Use ten minutes to introduce the question, define ECU and organize complete groups. Draw a three-date timeline and distinguish budget, purchase price, face value and coupon. Do not announce a recommended bid. Request one prediction about the price–yield relationship and another about default. If conditions will be compared, explain market assignment in advance and preserve that procedure. One class can generate useful examples without precisely estimating every contractual effect. A clear opening question is more useful than attempting to cover every extension during the first meeting.

Allow fifteen minutes for rules, instructions and comprehension. Checks cover budget, a uniform-price example and a recovery example. They are explicitly examples even when the session uses another contract. Incorrect answers retain entered fields and show question-specific guidance. Help students understand the rule without solving the valuation they will subsequently record. No demographic questions or personal financial-history disclosures are needed to complete the activity. Students should be able to ask procedural questions without revealing their private information or intended bids to the room.

Reserve ten minutes for valuation and bids. Remind participants that indicative valuation receives no accuracy reward and does not determine allocation. Each then submits a binding bid. Do not reveal aggregates while bids are missing, since that would alter available information. A waiting screen may mean someone is reviewing instructions or has not submitted a form. Inspect administrative progress and verify links before assuming a technical failure. Do not replace a private choice with the group mean. The institution requires actual decisions from all four investors rather than an instructor-generated substitute.

During the next ten minutes, examine allocation and, when applicable, resale. Proceeds and purchase price are auction outcomes, while the final issuer state remains hidden. In the resale condition, awardees observe the new rate and quote; people without a bond proceed to waiting. All relevant decisions synchronize before settlement. This prevents one student from learning default and accidentally communicating it to someone still choosing between selling and holding. The timing is economically meaningful because resale must be chosen under uncertainty rather than after the final payment is already known.

Use the final thirty minutes to open the report and reconstruct an account. Request explanations of the contract before comparing outcomes. A ten-market battery requires more time or another class because each market includes a new bid and allocation. Do not add repetition merely to increase the observation count: it should serve a question about learning or group composition. The final average retains the same initial budget reference across active markets. Explain that a larger number of participant-period rows does not automatically provide an equally large number

of independent issuer outcomes.

Feedback script

Ask where each number comes from: is it a contractual promise, an auction price, a calculated expectation or a realized receipt? Then reveal aggregates. Differences across these categories require an economic explanation; they cannot be resolved by changing the definition of yield after outcomes are known.

4.2 Questions that organize discussion

Begin with bids and reconstruct the two winners and their prices. Compare that calculation with indicative valuations, remembering that these are not separately incentivized. Ask what would change if each winner paid their own bid. Only then examine observed proceeds. This ordering avoids attributing a difference directly produced by allocation rules to preferences or mistakes. It also shows why losing an auction can preserve resources rather than necessarily constitute a poor outcome. A successful allocation is an acquisition decision with a price, not a prize guaranteed to increase wealth.

Next separate contract and state. Hold purchase price fixed and calculate the account with and without default. Then hold the contract fixed and change price. These controlled comparisons explain heterogeneous classroom outcomes without requiring prior econometric training. Ask what additional observations would support a causal hypothesis. If two groups differ in condition but also in prior information or experience, an average difference combines those dimensions. Written predictions help identify whether a surprising result challenges the original mechanism, an auxiliary assumption or simply a small sample's realized issuer outcomes.

4.3 Private report and observed denominators

The header shows participants, settled accounts, pending active accounts and people who confirmed completion. Aggregates remain hidden when opened until the instructor explicitly reveals them, and can then be hidden again. The report can contain submitted bids before any account has settled. That is a legitimate partial state rather than a session with zero gains. Between stages, progress counts identify which measure already has observations and which cannot yet be interpreted. Check these counts before drawing conclusions from an apparently empty table.

Mean bid uses submitted offers, including a recorded zero abstention. Mean purchase price, YTM and returns use awardees only. Mean account includes every settled investor account, including the unchanged budgets of people who received no bond. Denominators can therefore be four people, two awardees and one market in the same completed session. Default frequency uses settled markets because both securities share the issuer state. Dividing defaulting holders by four does not produce an independent issuer-default frequency. The report displays observation counts beside each summary to make the distinction visible.

Indicative valuation error compares the recorded estimate with the benchmark available before bidding. Rating conditions use personal prior information without claiming to include other bids. The later reference with revealed type answers a different question and must not replace the earlier benchmark retrospectively. Funding has no unique prior reference, so error is not calculated there. A dash means an inapplicable measure or absent observations. It is neither zero error nor proof of correct valuation. Interpreting the sign of a mean error requires preserving which information was available at the original decision.

The bid histogram retains separate intervals for abstention, below-reserve and eligible offers. Promised spread groups awardees only and compares YTM with the initial rate. The period table shows settled accounts, awarded bonds, mean price and mean account. Dated receipt summaries use awardees, including legitimate later zeros after resale. Finally, the promised-price curve is a theoretical calculation holding the contract fixed while varying the rate. It is not observed price data or a statistical fit to classroom behavior. The accompanying table allows students to reconstruct points rather than infer values from a graphic alone.

Instructor report: bonds, yield and default

Resale after a rate change; Group mode: One market

Participants: 4 · Settled accounts: 4 · Pending active accounts: 0 · People who confirmed completion: 4

[Download this session, all rounds \(CSV\)](#)

[Download this session in wide format](#)

[Reveal aggregates](#)

Figure 4.1: The instructor controls when results are revealed.

Summary with observed denominators		
Mean submitted bid in ECU	95.00	N=4
Mean price paid per awardee	90.00	N=2
Mean final account	199.35	N=4
Mean promised YTM among awardees	8.95%	N=2
Mean expected annualized hold return among awardees	6.93%	N=2
Mean realized annualized return among awardees	7.77%	N=2
Mean indicative valuation error	1.89	N=4
Defaulting markets / settled markets	0.00%	N=1
Resales / awarded bonds in resale condition	50.00%	N=2

Figure 4.2: Aggregates with bid, awardee and market denominators.

4.4 Downloads and payment reconstruction

The custom download belongs to the selected session and includes person and market records for all ten technical rounds. It distinguishes pending, bid-submitted, awarded, settled and inactive states. The native wide oTree download retains round-specific columns and also restricts data to that session. Use the first for economic reconstruction and the second for the standard administrative structure. Do not combine sessions just because their groups happen to use the same numbers. Session scope is a substantive part of reconstructing who interacted and which rules applied.

Filter by record type, active round and status before computing averages. An inactive record is not a person with a zero account. An unsubmitted offer is not abstention: only a submitted zero carries that meaning. Settlement may exist before someone acknowledges the result, while the assigned average appears after the final active market is completed. These states differ and should remain distinct in analysis of delays or incomplete records. Never fill pending fields with zero merely to make a spreadsheet easier to calculate. That would manufacture decisions the participant did not make.



Figure 4.3: Theoretical promised-price curve: fixed contract and different rates.



Market 1/1

Bids and dated payments

Activity completed

You completed every active market. The following average was assigned once; coupons and initial balances are not added again.

Assigned final average: 195.67 ECU

Figure 4.4: Explicit completion and average assigned once.

Each result record contains nominal and discounted dated receipts, purchase price, references, yields and estate distribution. To verify an account, subtract purchase price from budget and add receipt equivalents once. To verify priority, sum payments to other creditors, bond payment from estate and issuer residual: they must equal per-unit available estate. Guarantor support is added externally and must not also appear as issuer assets. Per-unit identities can be scaled by the number of awarded bonds, but one unit's estate must not finance two independent copies of the same claim.

Across ten markets, retain one person-period row for accounts, bids and allocation, with market group and matching mode. To verify final payment, average all ten accounts in cents and round that average once. Only the final active round assigns this payment. Earlier records do not additionally pay the balances they display as informative results. This rule prevents initial budgets and coupons from multiplying when round payoffs are summed. A single-market session follows the same logic with one active account and later inactive records, rather than averaging that account together with nine fabricated zeros.

4.5 Exercises with solutions

4.5.1 Allocation with few eligible bids

Suppose bids are one hundred, fifty-nine, zero and thirty. Only one hundred reaches reserve sixty. One bond is issued and the winner pays sixty under uniform pricing because there is no eligible losing bid. The procedure neither forces a second allocation nor charges fifty-nine. The other three investors preserve their budgets. If everyone bids zero, no bonds are issued and everyone ends with two hundred ECU. No allocation is a valid outcome, not a failure that the instructor should repair by assigning securities manually.

4.5.2 Promise and credit shortfall

Explain why reference expected value is below one hundred. Final promised payment is one hundred five, while default recovery is forty. The difference is sixty-five; multiplying by ten-percent probability gives expected nominal shortfall of six and a half. Discounting over three periods at five percent produces about 5.61. Subtracting that present loss from one hundred gives 94.39. Earlier coupons must not be discounted again as if they were also exposed to terminal default. Their certainty is an explicit feature of this teaching contract and remains unchanged across the two states.

4.5.3 Uniform price and project funding

With bids one hundred, ninety, eighty and seventy, the first two win and pay eighty each. Proceeds reach one hundred sixty and trigger ten-percent risk. Lower the third bid to seventy-nine while keeping the others fixed: uniform price is seventy-nine and proceeds one hundred fifty-eight, so risk rises to forty percent. The third person receives no bond in either case but affects both price and awardees' risk. This externality means funding cannot be evaluated from winning bids alone. It also explains why the condition lacks a unique preauction benchmark without expectations about the other offers.

4.5.4 Protection that redistributes and protection that adds funds

Under default, ring-fenced collateral pays sixty to the bond and twenty to other creditors. Their sum is eighty, the existing estate. Under the external guarantee, estate pays forty to the bond and forty to other claims, while the guarantor adds sixty-five to complete the holder's one-hundred-five receipt. Combined payments are one hundred forty-five, financed by eighty from the issuer and sixty-five externally. These are distinct protections even though both improve collection. Treating all one hundred five as estate recovery would violate the issuer's resource identity.

4.5.5 A precise signal does not eliminate event risk

With ten- and forty-percent risk types and equal priors, an eighty-percent-accurate low classification gives posterior weights 0.80 on low type and 0.20 on high type. Default probability is $0.80(0.10) + 0.20(0.40) = 0.16$. At ninety-five-percent accuracy it becomes $0.95(0.10) + 0.05(0.40) = 0.115$. Information improves, but even perfect identification of low type would leave ten-percent default risk. Identifying type and predicting the event are different tasks. A correct low-risk classification can therefore be followed by default without contradicting the announced classification accuracy.

4.5.6 Resale when the rate rises

Use the resale condition when the new rate is ten percent. Expected remaining payments are five and 98.50. Their date-one value is $5/1.10 + 98.50/1.10^2$, about 85.95. Subtracting one ECU gives a quote of 84.95. A seller retains the first coupon of five and those resale proceeds, with no later receipts. Their present equivalent is approximately $89.95/1.05 = 85.67$. With initial purchase price ninety, final account is 195.67. Do not add principal or recovery after the sale: those claims now belong to the automated buyer rather than the original participant.

4.5.7 Averaging without duplicate payment

A person receives final accounts of 210 in nine markets and 153.85 in one. The average is $(9 \times 210 + 153.85)/10 = 204.385$, assigned as 204.39 ECU after cent rounding. The program does not additionally pay the nine ten-unit gains, coupons or reset budgets. Earlier round payments sum to zero, and the single final payment equals this average. The example does not require a real battery to contain exactly one default. It illustrates the payment identity using a specified outcome sequence rather than predicting the realized frequency in a small class.

4.6 Operational problems and interpretation limits

If a wait does not advance, verify four people per market and check that each submitted the required decision. Random reassignment needs at least eight. Before settlement, a bondholder may still need to choose resale while people without securities are already waiting. Do not reveal default through another channel or interpret that wait as lost data. The local instance has its own family sessions and database; restarting to apply code changes preserves records and does not require deleting the database. Verify the current participant page before trying a broader intervention.

Dates, terminal-only default and recovery rights are teaching simplifications. Accrued interest, taxes, semiannual coupons, court negotiation and continuous secondary trading are excluded. Interpret decisions using announced information and incentives; claims about actual credit premia require additional evidence beyond classroom outcomes.

Bibliography

- Bartolini, L., and Cottarelli, C. (1997). Designing effective auctions for treasury securities. *Current Issues in Economics and Finance*, 3(9), Federal Reserve Bank of New York. https://www.newyorkfed.org/research/current_issues/ci3-9.html.
- Duffie, D., and Singleton, K. J. (1999). Modeling term structures of defaultable bonds. *Review of Financial Studies*, 12(4), 687–720. <https://web.stanford.edu/~duffie/jstorlinks/ds2.pdf>.
- Financial Industry Regulatory Authority (2017). Duration—what an interest rate hike could do to your bond portfolio. Investor education, March 3. <https://syndication.finra.org/content/duration-what-interest-rate-hike-could-do-your-bond-portfolio>.
- oTree. Groups; pages; administering an experiment; data export. Official documentation. <https://otree.readthedocs.io/en/master/multiplayer/groups.html>. Accessed October 17, 2026.
- U.S. Securities and Exchange Commission (2013). What are corporate bonds? *Investor Bulletin*, June 4. <https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins/what-are>.