

Pre-Analysis Plan for Scaling and Equity Auctions: The Types-as-Quantities Case

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1 Introduction

Infrastructure investment is a cornerstone of economic development but, unlike standard procurement, it entails exceptional complexity and uncertainty. Large-scale projects consist of interdependent tasks that are highly exposed to unforeseen shocks, generating substantial cost volatility for both contractors and public agencies. This systemic risk often leads to public scrutiny and persistent cost overruns, revealing structural deficiencies in project management and procurement design (Flyvbjerg, 2009).

Under fixed-price (cash) contracts, efficient firms may refrain from bidding to avoid exposure to unpredictable costs, leaving participation to overly optimistic or less capable competitors (Bajari et al., 2014). When shocks materialize, such firms often lack the financial capacity to absorb losses, heightening the risk of default and project failure.

To overcome these inefficiencies, contract design must move beyond one-dimensional, price-only competition. Scoring auctions represent a first step in this direction: bids are evaluated across multiple dimensions—such as price, quality, and timeline—allowing heterogeneous firms to compete on their strengths (Che, 1993; Asker and Cantillon, 2008). Yet, despite their multidimensional structure, scoring auctions remain fixed-price mechanisms, meaning they do not inherently mitigate the implementation risk that arises once the project begins.

Addressing this risk requires mechanisms that directly engage with uncertainty in realized input quantities. Scaling (or unit-price) auctions do precisely this. Instead of submitting a single aggregate bid, firms propose a schedule of unit prices for each task, and the final payment

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depends on the actual quantities used. This contingent payment rule provides insurance against ex-post cost shocks and fundamentally alters bidding incentives. However, it also introduces potential adverse selection: inefficient firms that consume more inputs could end up receiving higher payments, undermining cost efficiency.

This trade-off connects scaling auctions to the broader class of security-bid mechanisms, where payment is tied to uncertain project outcomes to share risk efficiently (DeMarzo et al., 2005). Building on this logic, the equity-bid auction offers an alternative design: firms bid on a share of variable costs, so payments adjust with their own realized expenditures. This structure retains the desirable insurance feature of scaling auctions while theoretically curbing their adverse selection problem.

Empirical evidence suggests that scaling auctions enhance participation and efficiency relative to cash auctions (Bolotnyy and Vasserman, 2023; Luo and Takahashi, 2025), yet theory predicts that equity auctions should perform even better. The relative balance between insurance and efficiency, however, remains untested.

This paper provides the first experimental comparison of scaling and equity-bid auctions under quantity uncertainty. By observing bidding behavior in a controlled setting, we evaluate how each mechanism allocates risk and selects efficient providers, thereby offering the first empirical evidence on the trade-offs underlying risk-sharing procurement design.

2 Experimental Design

Our experiment is designed to compare how scaling auctions and equity-bid auctions perform in a procurement setting when providers have uncertainty about the inputs that they need. Participants face a reverse auction for the rights to complete a project. To complete the project, the participant must pay a non-contractible fixed cost and also provide two types of costly inputs that are potentially contractible. In scaling auctions, participants must state how much they wish to be paid for each unit of each type of input. The auctioneer then multiplies these prices by fixed weights to compute a “score,” and the winner is the bidder with the lowest score. The winner then pays the costs associated with the project and receives payments for each type of input equal to their bid. In equity-bid auctions, participants must make bids in terms of what percentage of their variable costs they request reimbursement of. The lowest bidder wins the auction, pays the costs associated with the project, and receives both the percentage reimbursement they requested and a fixed payment. The experiment will implement a between-subject design: participants will see only one type of auction.

Subjects begin the experiment by reviewing instructions that describe the structure of the auctions they will participate in. They are presented with two examples that demonstrate how the auctions work as well as how payoffs can be computed. After reviewing the examples, subjects complete a quiz and receive feedback about the correct answers for the quiz. They then move on to complete 30 rounds of auctions. Screenshots of all parts of the experiment can be found in Appendix A.

In the experiment, the auctions are explicitly framed such that the government is the auctioneer that needs a project to be completed and participants are bidding to determine who will complete the project and how much they will be paid. Participants are informed that payments will be made in terms of points and that in the round that counts for payment, 150 points will

be worth \$1. Bidders are informed that in order to complete the project, the winner must pay a fixed cost of 500 points and provide two types of inputs, referred to as Input 1 and Input 2. The inputs require both “baseline quantities” (0 or 6 for Input 1 and 0 or 2 for Input 2) and a “personal add-on” that is unique to the bidder and is drawn from the uniform distribution over $[0, 10]$. The cost of providing each unit of Input 1 is 150 and the cost of providing each unit of Input 2 is 100.

In both treatments, bids are made using sliders. Bids in the Equity treatment are integers between 0 and 100. These represent the percent of variable costs that will be paid by the government if the bidder wins the auction. An example of the interface for making bids in the Equity treatment can be seen in Figure 1. Bids in the Scaling treatment are multiples of 20 between 0 and 600. These bids represent the payments per unit of inputs used if the bidder wins the auction. Subjects are informed that these bids will be multiplied by 8 and 6 (respectively) and added together to form a score. This computation is completed for them below the sliders. An example of the interface for making bids in the Scaling treatment can be found in Figure 2.

Auction Round 1

Your personal input add-on for this round is 1.6. That means that

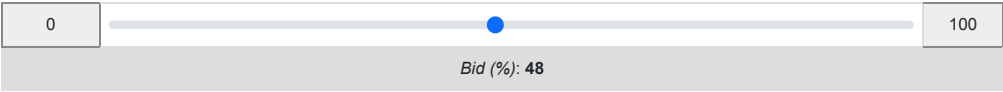
- If the baseline requirement is low, you will require 1.6 units of Input 1 and 1.6 units of Input 2.
- If the baseline requirement is high, you will require 7.6 units of Input 1 and 3.6 of Input 2.

Use the slider to choose the **percent of variable costs you request to be covered**. The bidder asking for the **smallest share** wins.

If you win: $7,500 + \text{fixed transfer (1800)} - \text{your share of variable costs} - 500$. Variable costs are 150 per unit of Input 1 and 100 per unit of Input 2.

If you lose: you keep 7,500.

You see only your own input quantities. Your opponent's are hidden.



0 100

Bid (%): 48

Click "Next" when you're ready to submit your bid.

Next

Figure 1: Bidding Interface (Equity Treatment)

Auction Round 1

Your personal input add-on for this round is 1.2. That means that

- If the baseline requirement is low, you will require 1.2 units of Input 1 and 1.2 units of Input 2.
- If the baseline requirement is high, you will require 7.2 units of Input 1 and 3.2 of Input 2.

Set your **bid per unit** for Input 1 and Input 2 using the sliders. These bids will be combined into a score using fixed weights. The **lowest score wins**.

If you win: $7,500 + (\text{your bid} - \text{cost}) \times \text{units} - 500$. Variable costs are 150 per unit of Input 1 and 100 per unit of Input 2.

If you lose: you keep 7,500.

You see only your own input quantities. Your opponent's are hidden.

The interface shows two horizontal sliders. The top slider is for 'Input 1' with a range from 0 to 600. A blue dot indicates a bid of 220. Below the slider, it says 'Input 1 Bid: 220'. The bottom slider is for 'Input 2' with a range from 0 to 600. A blue dot indicates a bid of 300. Below the slider, it says 'Input 2 Bid: 300'.

Your score for this auction is $8 \times 220 + 6 \times 300 = 3560$. Remember that the bidder with the lowest score wins.

Click "Next" when you're ready to submit your bid.

Next

Figure 2: Bidding Interface (Scaling Treatment)

To aid participants with their decision-making in the auctions, bidding pages also included an interactive feature that allowed them to calculate their payoffs conditional on winning and for both possible levels of input requirements. This figure looked the same in both treatments, and can be found in Figures 13 and 14.

After a round is completed, participants are informed about the outcome of the auction. They are informed about both bids (in the Equity treatment) and both scores (in the Scaling treatment). The participant that did not win is reminded that they will receive their endowment if it was the round that counted. The participant that did win is reminded of the two possible values their payoffs from the round could take, as well as the payoffs that the other bidder received. Winners are *not* informed which of the two possible payments would be realized for the round.

2.1 Data Collected

In addition to choice data from the auctions, we will collect the decision time for each choice. We will also collect standard demographic data including gender, age, college major, and whether English is the subject's first language. We will supplement these data with a cognitive reflection test and a short survey about the experiment.

3 Empirical Analysis

The focus of our study will be the outcomes of the auctions, both in terms of the expected amount the auctioneer would need to pay the winning bidder and the expected costs that would need to be spent on the project. Based on pilot data, we expect that decision-making will be noisy as subjects gain experience in the first few rounds. Thus, in our main analysis, we will focus only on rounds 6 to 30. The full dataset will be analyzed as a robustness check.

The primary estimating equation will be

$$y_{jt} = \beta_0 + \beta_1 \text{Scaling}_j + \beta_2 \text{High Type}_{jt} + \beta_3 \text{Low Type}_{jt} + \gamma_t + \varepsilon_{jt}. \quad (1)$$

Index j refers to the group and index t to the round. The outcome variable y_{jt} refers to one of two auction outcomes: (1) the type of the winning bidder, or (2) the ex-interim expected costs to the government.¹ Scaling_j is an indicator variable describing whether group j is in the Scaling treatment. High Type_{jt} and Low Type_{jt} are the inefficient and efficient (respectively) types in the group j and round t . The coefficient γ_t refers to round fixed effects.

3.1 Power

We ran two pilot sessions: one with the Equity treatment and 12 subjects and one with the Scaling treatment and 14 subjects. Both pilots involved 25 total rounds.

We calculate power based on the results of estimating Equation (1) for both outcome variables. Specifically, we compute the likelihood of rejecting the null hypothesis of zero effect size given a true effect that is equal to the theoretical prediction and standard errors that are proportional to those we estimate using the pilot data. With these assumptions, the calculation suggests estimated power approaching one for samples of the size of our pilots. Given these results, we plan to have a total sample size of 90-110 (with roughly 50 subjects in each treatment). This sample size should be sufficient to reject null hypotheses of zero effects, given that true effects are equal to those predicted by the theory.

References

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¹We write “ex-interim” because we will calculate expected costs conditional on the outcome of the auction, but before the final inputs are realized. Costs in Scaling auctions are calculated based on multiplying the bids of the winner by the winner’s expected quantities. Costs in Equity auctions are calculated as the up-front payment plus the product of the winner’s bid and variable costs.

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A Screenshots/Instructions

Below, we include screenshots from the experiment.

Introduction

PLEASE READ CAREFULLY AND DO NOT PRESS NEXT UNTIL INSTRUCTED TO DO SO.

Thank you for participating in this study. This study is about decision-making. It should take about 90-120 minutes, and you will be paid based on your earnings from the experiment. The money you earn will be paid either in cash at the end of the study or electronically within a few days of the end of the study.

Please do not use any electronic devices or talk with other participants during this study.

There will be no deception in this study. Every decision you make will be carried out exactly as it is described in the instructions. Anything else would violate the human ethics protocol under which we run the study (UQ Human Research Ethics Approval 2025/HE001937).

In the study you will make decisions that will affect the amount of money you earn. The study will consist of games that you will play with other randomly selected players. The players that you are paired with in a match are selected independently of who you play with in any other match.

Please pay close attention to the instructions on the next page. After you read these instructions, there will be a short quiz on the instructions. You will receive \$1 for each question you answer correctly.

If you have questions at any point, please raise your hand and we will answer your questions privately.

Next

Figure 3: Introduction

Instructions

In this study you will participate in 30 rounds of "reverse" auctions: the government needs someone to complete a project, and participants in the auction make bids to determine who will complete the project and how much they will be paid.

You will always see numbers in **points**. At the end, one round is picked at random to pay you at 150 points = \$1. You start each round with an **endowment of 7,500 points**.

Every round, you're matched with **one other bidder**, and you will be randomly rematched in the next round. The auctions will follow a fixed set of rules, which we describe on the next page.

About the Project

The project requires two different **inputs**. You can think of these as two kinds of work or materials. What matters is how many *units* of each input are needed.

- **Input 1:** baseline is either 0 units (low) or 6 units (high).
- **Input 2:** baseline is either 0 units (low) or 2 units (high).

At the start of each round, there is a 50–50 chance the project will need the **low** baseline quantities or the **high** baseline quantities. The two inputs always move together: if Input 1 is low, Input 2 is also low; if Input 1 is high, Input 2 is also high. However, you will never know whether you will end up needing the low or the high baseline quantities.

On top of these baselines, **each bidder gets their own personal add-on** for both inputs. This add-on is a random number between 0 and 10, drawn separately for each person. Each number between 0 and 10 (in increments of 0.2) is equally likely to be chosen. Your actual required quantity of each input is therefore:

- Baseline quantity (low or high with equal chance), plus
- Your personal random add-on (unique to you).

You will see *your own input quantities* on screen. Your opponent will see theirs, which will be different because of the personal add-ons. You never see your opponent's quantities.

If you win the project, you must pay both a **fixed cost** (which does not depend on the input quantities) and **variable costs** (which do depend on them). The fixed cost is **500 points**. Each unit of Input 1 costs **150 points**, and each unit of Input 2 costs **100 points**. Your variable costs are the total of these unit costs multiplied by your actual input quantities.

Next

Figure 4: Instructions Page 1

Instructions

Auction Rules

In these auctions, you will use a slider to choose the **percent of variable costs you request to be covered**. This is your **bid**.

- **Lower bids** mean the government covers a *smaller* share (you cover more).
- The bidder who asks for the **smallest share** to be covered wins.

The winner will receive a fixed upfront amount of **1800 points**.

What happens if you win?

Your final points for the round are:

- **Your endowment** (7,500), plus the **upfront amount** (1800),
- minus **your share of the project's variable costs** (based on the inputs actually used),
- minus the **fixed cost** of 500 points.

The cost per unit is 150 for Input 1 and 100 for Input 2. The project's variable cost depends on how many units of each input are used in that round (which can be low or high, plus your personal add-ons). "Your share of the cost" depends on your bid. For example, if you bid 40%, then 40% of the variable costs will be covered and you pay the remaining 60%.

What happens if you lose?

You simply keep your endowment (7,500) for that round (no gains or losses from the project).

After each round

- The loser sees only their own result.
- The winner sees their own result and a reminder of what the loser's payoff would have been.

Bidding & Interface

- You will place bids using **sliders** on the screen.
- You will see **your own possible input quantities** (including your personal add-ons) and the possible net payoffs you would receive for winning the auction.
- You will **not** see your opponent's quantities or bids during the round.

Payment

- At the end of the experiment, one round will be chosen at random to be the round that counts. Your payment will be determined by the number of points you earned in that round

On the next page, you will find a few examples to help you better understand the rules. Please go through them at your own pace. After you have reviewed the examples, click Next again to begin the quiz.

Next

Figure 5: Instructions Page 2 (Equity Treatment)

Instructions

Auction Rules

In these auctions, you will use a slider to submit two **unit prices** that you want to be paid for the inputs: one price per unit of Input 1 and one price per unit of Input 2. The government uses two fixed **weights**, $w_1 = 8.0$ and $w_2 = 6.0$, to make a **score**: $\text{Score} = (\text{your Input 1 price}) \times w_1 + (\text{your Input 2 price}) \times w_2$.

- **Lower unit prices** mean the government pays a *smaller* amount per unit (you receive less).
- The bidder with the **lowest score** wins.

What happens if you win?

Your final points for the round are:

- **Your endowment** (7,500),
- plus, for each input: **(your unit price – cost per unit) × actual units**,
- minus the **fixed cost** of 500 points.

The cost per unit is 150 for Input 1 and 100 for Input 2. If your price is above cost, you gain on that input; if it's below cost, you lose on that input. The actual units can be low or high, plus your personal add-ons.

What happens if you lose?

You simply keep your endowment (7,500) for that round (no gains or losses from the project).

After each round

- The loser sees only their own result.
- The winner sees their own result and a reminder of what the loser's payoff would have been.

Bidding & Interface

- You will place bids using **sliders** on the screen.
- You will see **your own possible input quantities** (including your personal add-ons) and the possible net payoffs you would receive for winning the auction.
- You will **not** see your opponent's quantities or bids during the round.

Payment

- At the end of the experiment, one round will be chosen at random to be the round that counts. Your payment will be determined by the number of points you earned in that round

On the next page, you will find a few examples to help you better understand the rules. Please go through them at your own pace. After you have reviewed the examples, click Next again to begin the quiz.

Next

Figure 6: Instructions Page 2 (Scaling Treatment)

Examples

PLEASE READ THE EXAMPLES CAREFULLY AND CLICK NEXT WHEN YOU ARE READY TO BEGIN THE QUIZ.

Example 1

- Ann and Bob are both participating in the auction.
- Ann finds out that her personal input add-on is 7.4. That means that:
 - If the baseline requirement is low (50% chance) she will require 7.4 units of Input 1 and 7.4 units of Input 2.
 - If the baseline requirement is high (50% chance) she will require 13.4 units of Input 1 and 9.4 units of Input 2.
- Ann bids 40%, meaning that if she wins the government will pay 40% of the variable costs and Anne will pay 60% of the variable costs. Bob bids 53%, so Ann wins.
- Because she won the auction, Ann's payoffs are
 - 50% chance of **7690** = $7500 + 1800 - 0.60 \times (7.4 \times 150 + 7.4 \times 100) - 500$
 - 50% chance of **7030** = $7500 + 1800 - 0.60 \times (13.4 \times 150 + 9.4 \times 100) - 500$
- Because he did not win the auction, Bob receives 7500 with certainty.

Example 2

- Carlos and Daniella are both participating in the auction.
- Carlos finds out that his personal input add-on is 1.6. That means that:
 - If the baseline requirement is low (50% chance) he will require 1.6 units of Input 1 and 1.6 units of Input 2.
 - If the baseline requirement is high (50% chance) he will require 7.6 units of Input 1 and 3.6 units of Input 2.
- Carlos bids 32%, meaning that if he wins the government will pay 32% of the variable costs and Carlos will pay 68% of the variable costs. Daniella bids 78%, so Carlos wins.
- Because he won the auction, Carlos' payoffs are
 - 50% chance of **8560** = $7500 + 1800 - 0.68 \times (1.6 \times 150 + 1.6 \times 100) - 500$
 - 50% chance of **7780** = $7500 + 1800 - 0.68 \times (7.6 \times 150 + 3.6 \times 100) - 500$
- Because she did not win the auction, Daniella receives 7500 with certainty.

When you are ready, click Next again to begin the quiz.

Next

Figure 7: Examples (Equity Treatment)

Examples

PLEASE READ THE EXAMPLES CAREFULLY AND CLICK NEXT WHEN YOU ARE READY TO BEGIN THE QUIZ.

Example 1

- Ann and Bob are both participating in the auction.
- Ann finds out that her personal input add-on is 7.4. That means that:
 - If the baseline requirement is low (50% chance) she will require 7.4 units of Input 1 and 7.4 units of Input 2.
 - If the baseline requirement is high (50% chance) she will require 13.4 units of Input 1 and 9.4 units of Input 2.
- Ann bids 250 for Input 1 and 80 for Input 2, meaning that her score is $8 \times 250 + 6 \times 80 = 2480$. Bob's score was 2900, so Ann wins.
- Because she won the auction, Ann's payoffs are
 - 50% chance of **7592** = $7500 + 7.4 \times (250 - 150) + 7.4 \times (80 - 100) - 500$
 - 50% chance of **8152** = $7500 + 13.4 \times (250 - 150) + 9.4 \times (80 - 100) - 500$
- Because he did not win the auction, Bob receives 7500 with certainty.

Example 2

- Carlos and Daniella are both participating in the auction.
- Carlos finds out that his personal input add-on is 1.6. That means that:
 - If the baseline requirement is low (50% chance) he will require 1.6 units of Input 1 and 1.6 units of Input 2.
 - If the baseline requirement is high (50% chance) he will require 7.6 units of Input 1 and 3.6 units of Input 2.
- Carlos bids 200 for Input 1 and 300 for Input 2, meaning that his score is $8 \times 200 + 6 \times 300 = 3400$. Daniella's score was 4500, so Carlos wins.
- Because he won the auction, Carlos' payoffs are
 - 50% chance of **7400** = $7500 + 1.6 \times (200 - 150) + 1.6 \times (300 - 100) - 500$
 - 50% chance of **8100** = $7500 + 7.6 \times (200 - 150) + 3.6 \times (300 - 100) - 500$
- Because she did not win the auction, Daniella receives 7500 with certainty.

When you are ready, click Next again to begin the quiz.

Next

Figure 8: Examples (Scaling Treatment)

Quiz

You will now be given a series of questions to check your understanding of the instructions and examples. You will be paid \$1 for each answer you get correct.

At the end of the experiment, how is your final payment determined?

- ☐ By summing your total points across all rounds
- ☐ By averaging your points across all rounds
- ☐ By selecting one round at random and paying based on its points
- ☐ By paying based on a round you won the auction

Which of the following is true about the project's input requirements?

- ☐ Only one input is used in each project
- ☐ Inputs 1 and 2 move together: both low or both high
- ☐ Each bidder sees both their own and their opponent's add-ons
- ☐ The baseline for Input 1 is always zero

What happens if you lose an auction round?

- ☐ You pay only the fixed cost
- ☐ You get your endowment only
- ☐ You receive the government's payment
- ☐ You must skip the next round

How do you place your bid?

- ☐ Submit unit prices for each input
- ☐ Choose the percent of variable costs to be covered
- ☐ State a lump-sum payment request
- ☐ Indicate how many inputs you will supply

How is the winner determined?

- ☐ Lowest requested share to be covered
- ☐ Bid is closest to the average
- ☐ Largest endowment remaining
- ☐ Smallest add-on

When you believe you have answered all questions correctly, press Next to check your answers.

Next

Figure 9: Quiz (Equity Treatment)

Quiz

You will now be given a series of questions to check your understanding of the instructions and examples. You will be paid \$1 for each answer you get correct.

At the end of the experiment, how is your final payment determined?

- ☐ By summing your total points across all rounds
- ☐ By averaging your points across all rounds
- ☐ By selecting one round at random and paying based on its points
- ☐ By paying based on a round you won the auction

Which of the following is true about the project's input requirements?

- ☐ Only one input is used in each project
- ☐ Inputs 1 and 2 move together: both low or both high
- ☐ Each bidder sees both their own and their opponent's add-ons
- ☐ The baseline for Input 1 is always zero

What happens if you lose an auction round?

- ☐ You pay only the fixed cost
- ☐ You get your endowment only
- ☐ You receive the government's payment
- ☐ You must skip the next round

How do you place your bid?

- ☐ Choose the percent of variable costs to be covered
- ☐ Submit unit prices for each input
- ☐ State a lump-sum payment request
- ☐ Indicate how many inputs you will supply

How is the winner determined?

- ☐ Lowest weighted score from unit prices
- ☐ Highest unit price for Input 1
- ☐ Largest endowment remaining
- ☐ Smallest add-on

When you believe you have answered all questions correctly, press Next to check your answers.

Next

Figure 10: Quiz (Scaling Treatment)

Quiz Answers

The answers for the quiz are given below. Please review the answers and note any mistakes you have made.

Question 1: At the end of the experiment, how is your final payment determined?

Correct Answer: By selecting one round at random and paying based on its points

Your Answer: By selecting one round at random and paying based on its points

Question 2: Which of the following is true about the project's input requirements?

Correct Answer: Inputs 1 and 2 move together: both low or both high

Your Answer: Inputs 1 and 2 move together: both low or both high

Question 3: What happens if you lose an auction round?

Correct Answer: You get your endowment only

Your Answer: You get your endowment only

Question 4: How do you place your bid?

Correct Answer: Choose the percent of variable costs to be covered

Your Answer: Choose the percent of variable costs to be covered

Question 5: How is the winner determined?

Correct Answer: Lowest requested share to be covered

Your Answer: Lowest requested share to be covered

You earned \$5.0 from your correct answers. Please review any questions you answered incorrectly. When you are ready to begin the first round, click the next button.

Next

Figure 11: Quiz Answers (Equity Treatment)

Quiz Answers

The answers for the quiz are given below. Please review the answers and note any mistakes you have made.

Question 1: At the end of the experiment, how is your final payment determined?

Correct Answer: By selecting one round at random and paying based on its points

Your Answer: By paying based on a round you won the auction

Question 2: Which of the following is true about the project's input requirements?

Correct Answer: Inputs 1 and 2 move together: both low or both high

Your Answer: Inputs 1 and 2 move together: both low or both high

Question 3: What happens if you lose an auction round?

Correct Answer: You get your endowment only

Your Answer: You get your endowment only

Question 4: How do you place your bid?

Correct Answer: Submit unit prices for each input

Your Answer: Indicate how many inputs you will supply

Question 5: How is the winner determined?

Correct Answer: Lowest weighted score from unit prices

Your Answer: Lowest weighted score from unit prices

You earned \$3.0 from your correct answers. Please review any questions you answered incorrectly. When you are ready to begin the first round, click the next button.

Next

Figure 12: Quiz Answers (Scaling Treatment)

Auction Round 1

Your personal input add-on for this round is 1.6. That means that

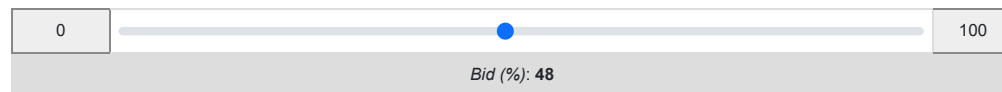
- If the baseline requirement is low, you will require 1.6 units of Input 1 and 1.6 units of Input 2.
- If the baseline requirement is high, you will require 7.6 units of Input 1 and 3.6 of Input 2.

Use the slider to choose the **percent of variable costs you request to be covered**. The bidder asking for the **smallest share** wins.

If you win: 7,500 + fixed transfer (1800) – your share of variable costs – 500. Variable costs are 150 per unit of Input 1 and 100 per unit of Input 2.

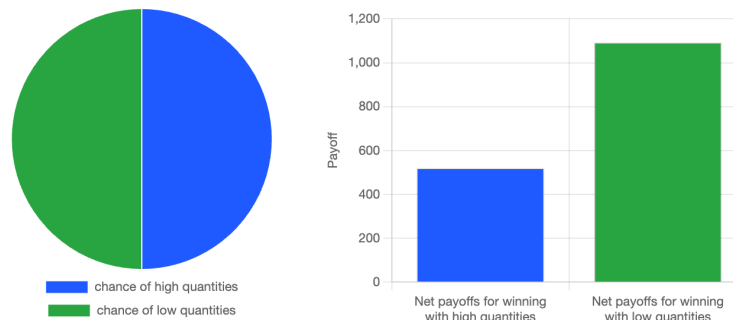
If you lose: you keep 7,500.

You see only your own input quantities. Your opponent's are hidden.



Click "Next" when you're ready to submit your bid.

Next



Key Reminders

- Only **one randomly selected round** will be paid in cash.
- Your endowment is **7,500 points**.
- Conversion rate: **150 points = \$1**.
- Fixed cost if you win: **500 points**.
- Per-unit variable costs: **Input 1 = 150, Input 2 = 100**.
- Baselines: Input 1 **Low = 0, High = 6**; Input 2 **Low = 0, High = 2**.
- Personal add-ons: each input gets **+ a random 0 to 10 units** unique to you.

Figure 13: Bidding Page (Equity Treatment)

Auction Round 1

Your personal input add-on for this round is 1.2. That means that

- If the baseline requirement is low, you will require 1.2 units of Input 1 and 1.2 units of Input 2.
- If the baseline requirement is high, you will require 7.2 units of Input 1 and 3.2 of Input 2.

Set your **bid per unit** for Input 1 and Input 2 using the sliders. These bids will be combined into a score using fixed weights. The **lowest score wins**.

If you win: $7,500 + (\text{your bid} - \text{cost}) \times \text{units} - 500$. Variable costs are 150 per unit of Input 1 and 100 per unit of Input 2.

If you lose: you keep 7,500.

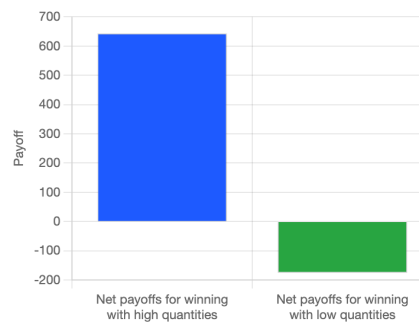
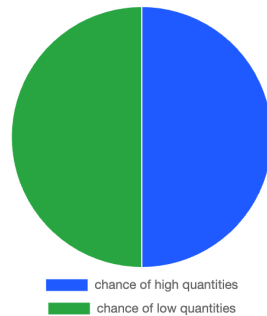
You see only your own input quantities. Your opponent's are hidden.

0		600
Input 1 Bid: 220		
0		600
Input 2 Bid: 300		

Your score for this auction is $8 \times 220 + 6 \times 300 = 3560$. Remember that the bidder with the lowest score wins.

Click "Next" when you're ready to submit your bid.

Next



Key Reminders

- Only **one randomly selected round** will be paid in cash.
- Your endowment is **7,500 points**.
- Conversion rate: **150 points = \$1**.
- Fixed cost if you win: **500 points**.
- Per-unit variable costs: **Input 1 = 150, Input 2 = 100**.
- Baselines: Input 1 **Low = 0, High = 6**; Input 2 **Low = 0, High = 2**.
- Personal add-ons: each input gets **+ a random 0 to 10 units** unique to you.

Figure 14: Bidding Page (Scaling Treatment)

Round 1 Results

Congratulations! You won the auction.

Your bid was 24% and the other bid was 84%.

Your payoff for this round will be $7500 + 1800 - (1-0.24)((150 \times 7.4) + (100 \times 3.4)) - 500 = \mathbf{7698.0}$ with one-half chance and $7500 + 1800 - (1-0.24)((150 \times 1.4) + (100 \times 1.4)) - 500 = \mathbf{8534.0}$ with one-half chance.

The bidder that did not win will receive 7500 with certainty.

Next

Figure 15: Winner's Results (Equity Treatment)

Round 1 Results

Congratulations! You won the auction.

Your score was 3200.0 and the other bidder's score was 7800.0.

Your payoff for this round will be $7500 + (160 - 150) \times 12.4 + (320 - 100) \times 8.4 - 500 = \mathbf{8972.0}$ with one-half chance and $7500 + (160 - 150) \times 6.4 + (320 - 100) \times 6.4 - 500 = \mathbf{8472.0}$ with one-half chance.

The bidder that did not win will receive 7500 with certainty.

Next

Figure 16: Winner's Results (Equity Treatment)

Round 1 Results

You did not win this round.

Your bid was 84% and the other bid was 24%.

Your payoff for this round will be 7500.

Next

Figure 17: Loser's Results (Equity Treatment)

Round 1 Results

You did not win this round.

Your score was 7800.0 and the other bidder's score was 3200.0.

Your payoff for this round will be 7500.

Next

Figure 18: Loser's Results (Scaling Treatment)

Survey

Please answer the following questions.

What is your age?

What gender do you identify with the most?

- ☐ Female
- ☐ Male
- ☐ Other/Prefer Not to Say

Is English your first language?

- ☐ Yes
- ☐ No

Are you completing or have you completed an economics degree?

- ☐ Yes
- ☐ No

Next

Figure 19: Demographic Survey

Survey

Please answer the following questions.

A bat and a ball cost 22 dollars in total. The bat costs 20 dollars more than the ball. How many dollars does the ball cost?

"If it takes 5 machines 5 minutes to make 5 widgets, how many minutes would it take 100 machines to make 100 widgets?"

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how many days would it take for the patch to cover half of the lake?

Next

Figure 20: Cognitive Reflection Test

Survey

Please answer the following questions:

The instructions of this study were easy to understand.

☐ Strongly disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

What, if anything, were you confused about in the study?

I knew how to make the decisions that were best for me in the experiment.

☐ Strongly disagree ☐ Disagree ☐ Neither agree nor disagree ☐ Agree ☐ Strongly agree

How did you make decisions in the study?

What do you think this study was about?

Next

Figure 21: Experiment Feedback