

# Non-Parametric Identification and Testing of Quantal Response Equilibrium

## Online Appendix: Experimental Interface

Johannes Hoelzemann   Ryan Webb   Erhao Xie

March 14, 2024

### Instructions

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions, you can earn a significant amount of money that will be paid to you at the end of the experiment in cash.

In this experiment, you will face 200 rounds of decision-making problems. During the experiment, and in order to determine your payment, you will be randomly matched with other participants in this session.

### The Basic Idea

There will be 200 different rounds. In each round, you will be presented with an interactive decision problem similar to the one below.

#### Your Earnings

		Opponent's action	
		Top	Bottom
Your action	Top	16	8
	Bottom	8	16

#### Opponent's Earnings

		Your action	
		Top	Bottom
Opponent's action	Top	8	16
	Bottom	16	8

Your earnings in each problem depend on your choice of action (between "Top" and "Bottom") and your opponent's choice of action (between "Top" and "Bottom"). Your earnings possibilities are presented in tables like the ones above. In each problem, your earnings are given by the black numbers in the left table, labelled 'Your Earnings'. Your opponent's earnings are given in the right table, labelled 'Opponent's Earnings'. Your choice of action determines the row in 'Your Earnings' table and your opponent's choice of action determines the column in the same table. The black number in the cell corresponding to any combination of actions (yours and your opponent's) represent your earnings. Similarly, your opponent's choice of action determines the row in the 'Opponent's Earnings' table, while your choice of action determines the column in this table. The number in the cell corresponding to any combination of actions (yours and your opponent's) represents your opponent's earnings. In summary, your choice of action AND your opponent's choice of action affect both your earnings and your opponent's earnings.

For example, if you choose action "Top" and your opponent chooses action "Bottom" your earnings would be €8 and your opponent's earnings would be €16. If you choose action "Bottom" and your opponent chooses action "Bottom", your earnings would be €16 and your opponent's earnings would be €8. Numbers in the example are just an example and do not intend to suggest how anyone should make their choices.

Note that in each round only the bold numbers will change and the other numbers will not change.

In order to assist you to choose an action, when you move your mouse over a row in the 'Your Earnings' table on the left, the action will be highlighted in yellow in both tables: a row on the left table, and a column on the right table. By left clicking your mouse over a row it will remain highlighted, and you can unhighlight it by clicking your mouse again or clicking another row. Similarly, when you move your mouse over a row that corresponds to an action of your opponent in 'Opponent's Earnings' on the right, the row will be highlighted in yellow on the right table and the corresponding column will be highlighted in yellow on the left table. Clicking your mouse over the row will keep it highlighted, and clicking it again (or clicking another action) will unhighlight it.

Please try to highlight actions for you and your opponent in the earnings tables above.

Finally, to choose an action you must click on the button around the action name (the text next to the row, on the margin of the left table).

## The Rounds

There will be 200 rounds. You will need to choose an action in each round, as described above. After you have made your choice of action you will be informed about the outcome and then advance to the next screen and play a new round.

The earnings tables in each round are different, so you should look carefully at them before making your choice. In each round only the bold numbers will change and the other numbers will not change.

## Your Opponents

In each round, you will be randomly matched with another participant. All your matches are participating in this session. Your randomly matched opponent's screen displays the same two earnings tables, but in reverse order. You do not know which actions your opponent chooses when you make your choices of actions. You can, however, attempt to reason about the actions the other participant will choose.

## Payment

You will earn a participation payment of €5 for participating in this experiment.

In addition to the participation payment, one round will be randomly selected for payment at the end of the experiment. You will be paid your earnings in that round as described above. Any of the 200 rounds could be the one

selected. This protocol of determining payments suggests that you should choose in each round as if it is the only round that determines your payment.

Before the actual experiment starts, you will be asked to answer some questions. You must answer these correctly in order to proceed to the next question.

You will be informed of your payment, the round chosen for payment, and the choices of you and of the other participant only at the end of the experiment. You will not learn any other information about the choices of other participants during the experiment. The identity of the other participants to which you will be matched will never be revealed.

Finally, after completing the experiment you will be paid your earnings in cash.

## Frequently Asked Questions

Q1. Is this some kind of psychology experiment with an agenda you haven't told us? Answer. No. It is an economics experiment. If we do anything deceptive or don't pay you cash as described, then you can complain to University of Vienna Research Ethics Board and we will be in serious trouble. These instructions are meant to clarify how you earn money, and our interest is in seeing how people make decisions.

Q2. Is there a "correct" choice of action? Is this kind of a test? No. Your optimal action depends on your belief which actions will other participants choose. Different people may hold different beliefs.

Next

This button will be activated after 57 seconds. Please take your time to read through the instructions.

## Quiz Time!

Q1. The computer will randomly select one of the rounds to determine your payment.

**A** Correct

**B** Incorrect

Quiz Time!

Q1. **Correct Answer** ×

**A**

**B**

## Quiz Time!

Q2. In each round you will be randomly matched with another participant in this session.

**A** Correct

**B** Incorrect

Quiz Time!

Q2. **Wrong Answer** ×

**A**

The answer is incorrect. Please try again.

**B** Incorrect

## Quiz Time!

Q3. In each round the earning possibilities never change and stay always the same.

**A** Correct

**B** Incorrect

## Quiz Time!

Q3. **Correct Answer** x

**A**

Proceed to the experiment

**B**

# Your Choice

You are in Round 1 of 200

You are randomly matched with **another** participant.

Please make your choice by clicking on one of the two buttons on the left in "Your Earnings" table.

## Your Earnings

		Opponent's action	
		Top	Bottom
Your action	Top	22	8
	Bottom	8	16

## Opponent's Earnings

		Your action	
		Top	Bottom
Opponent's action	Top	8	18
	Bottom	16	8

## Instructions

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions, you can earn a significant amount of money that will be paid to you at the end of the experiment in cash.

In this experiment, you will face 200 rounds of decision-making problems. During the experiment, and in order to determine your payment, you will be randomly matched with other participants in this session.

### Please wait

Waiting for the other participant.



# Your Choice

You are in Round 1 of 200

You are randomly matched with **another** participant.

Please make your choice by clicking on one of the two buttons on the left in "Your Earnings" table.

## Your Earnings

		Opponent's action	
		Top	Bottom
Your action	Top	8	18
	Bottom	16	8

## Opponent's Earnings

		Your action	
		Top	Bottom
Opponent's action	Top	22	8
	Bottom	8	16

## Instructions

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions, you can earn a significant amount of money that will be paid to you at the end of the experiment in cash.

In this experiment, you will face 200 rounds of decision-making problems. During the experiment, and in order to determine your payment, you will be randomly matched with other participants in this session.

### Please wait

Waiting for the other participant.





## Round Outcome

You chose **TOP** and your opponent chose **TOP**.

As a result, your payoff is **€22.00**.

Next

## Round Outcome

You chose **TOP** and your opponent chose **TOP**.

As a result, your payoff is **€8.00**.

Next

# Your Choice

You are in Round 2 of 200

You are randomly matched with **another** participant.

Please make your choice by clicking on one of the two buttons on the left in "Your Earnings" table.

## Your Earnings

		Opponent's action	
		Top	Bottom
Your action	Top	46	8
	Bottom	8	16

## Opponent's Earnings

		Your action	
		Top	Bottom
Opponent's action	Top	8	34
	Bottom	16	8

## Instructions

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions, you can earn a significant amount of money that will be paid to you at the end of the experiment in cash.

In this experiment, you will face 200 rounds of decision-making problems. During the experiment, and in order to determine your payment, you will be randomly matched with other participants in this session.

### Please wait

Waiting for the other participant.



# Your Choice

You are in Round 2 of 200

You are randomly matched with **another** participant.

Please make your choice by clicking on one of the two buttons on the left in "Your Earnings" table.

## Your Earnings

		Opponent's action	
		Top	Bottom
Your action	Top	8	34
	Bottom	16	8

## Opponent's Earnings

		Your action	
		Top	Bottom
Opponent's action	Top	46	8
	Bottom	8	16

## Instructions

Welcome. This is an experiment in the economics of decision-making. If you pay close attention to these instructions, you can earn a significant amount of money that will be paid to you at the end of the experiment in cash.

In this experiment, you will face 200 rounds of decision-making problems. During the experiment, and in order to determine your payment, you will be randomly matched with other participants in this session.

### Please wait

Waiting for the other participant.



## Round Outcome

You chose **TOP** and your opponent chose **TOP**.

As a result, your payoff is **€46.00**.

Next

## Round Outcome

You chose **TOP** and your opponent chose **TOP**.

As a result, your payoff is **€8.00**.

Next

- 
- 
- 
- 
- 
-

# Thank you for participating in this experiment!

## Your Earnings

The randomly selected round for payment is Round **58**. Your total earnings are therefore **€21**. This includes your participation payment of €5 for taking part in this experiment.

## Your Results in More Detail

Round	Choices and Outcomes
1	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€22</b> (and your opponent's payoff is €8).
2	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€46</b> (and your opponent's payoff is €8).
3	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
4	You chose <b>TOP</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €16).
5	You chose <b>TOP</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €16).
6	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
7	You chose <b>TOP</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €16).
8	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
9	You chose <b>Bottom</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €26).
10	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
11	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
12	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€22</b> (and your opponent's payoff is €8).
13	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
14	You chose <b>TOP</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €16).
15	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).

- 
- 
- 
- 
- 
- 

194	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
195	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€18</b> (and your opponent's payoff is €8).
196	You chose <b>TOP</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €16).
197	You chose <b>Bottom</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €34).
198	You chose <b>Bottom</b> and your opponent chose <b>Bottom</b> . Your payoff is <b>€16</b> (and your opponent's payoff is €8).
199	You chose <b>TOP</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€36</b> (and your opponent's payoff is €8).
200	You chose <b>Bottom</b> and your opponent chose <b>TOP</b> . Your payoff is <b>€8</b> (and your opponent's payoff is €24).