Online Appendix
"The Political Economy of Public Debt: A Laboratory Study"

Marco Battaglini
Cornell University
battaglini@cornell.edu

Salvatore Nunnari
Bocconi University
salvatore.nunnari@unibocconi.it

Thomas R. Palfrey
California Institute of Technology
trp@hss.caltech.edu

April 5, 2019

Online Appendix A: Additional Tables

	High Risk			Low Risk	Optimum
	Oligarchy	Simple Maj	Super Maj	Simple Maj	
$\theta = L$					
Public Good	1.0	2.3	4.0	2.3	6.3
Pork to Proposer	7.0	15.6	26.2	0.0	-
Pork to Partner	1.8	5.3	13.1	0.0	-
Pork to MWC	8.8	26.5	65.4	0.0	-
Total Pork	8.8	26.5	65.4	0.0	[150, 237.5]
$\theta = H$					
Public Good	9.8	28.7	69.4	2.3	156.3
Pork to Proposer	0.0	0.0	0.0	0.0	-
Pork to Partner	0.0	0.0	0.0	0.0	-
Pork to MWC	0.0	0.0	0.0	0.0	-
Total Pork	0.0	0.0	0.0	0.0	[0, 87.5]

Table 1: Theoretical Predictions for Experimental Parameters, Period 2 Outcomes (Given Equilibrium Level of Debt)

	O vs. M	O vs. S	M vs. S	High vs. Low Risk
Public Debt	0.00	0.00	0.06	0.00
Public Good	0.00	0.00	0.00	0.48
Pork to Proposer	0.00	0.00	0.00	0.08
Pork to MWC	0.00	0.00	0.00	0.05
Total Pork	0.00	0.00	0.00	0.00

Table 2: P-values of Wilcoxon-Mann-Whitney Tests, Period 1 Outcomes

	O vs. M	O vs. S	M vs. S	High vs. Low Risk
Public Debt	0.00	0.00	0.00	0.00
Public Good	0.01	0.00	0.00	0.48
Pork to Proposer	0.00	0.00	0.00	0.00
Pork to MWC	0.00	0.00	0.00	0.00
Total Pork	0.00	0.00	0.00	0.00

Table 3: P-values of T-Tests, Period 1 Outcomes

$\theta = L$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.81	0.39	0.52
Pork to Prop (% Budget)	0.00	0.00	0.00
Pork to MWC (% Budget)	0.10	0.12	0.51
Total Pork (% Budget)	0.81	0.39	0.52
$\theta = H$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.61	0.00	0.00
Pork to Prop (% Budget)	0.91	0.01	0.00
Pork to MWC (% Budget)	0.92	0.00	0.00
Total Pork (% Budget)	0.61	0.00	0.00

Table 4: P-values of Wilcoxon-Mann-Whitney Tests, Period 2 Outcomes

$\theta = L$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.64	0.34	0.59
Pork to Prop (% Budget)	0.00	0.00	0.00
Pork to MWC (% Budget)	0.04	0.00	0.15
Total Pork (% Budget)	0.64	0.34	0.59
$\theta = H$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.44	0.00	0.00
Pork to Prop (% Budget)	0.34	0.00	0.00
Pork to MWC (% Budget)	0.93	0.02	0.00
Total Pork (% Budget)	0.44	0.00	0.00

Table 5: P-values of T-Tests, Period 2 Outcomes

	High Risk, Simple Maj No Commitment Obs: 180			High Risk, Simple Maj Commitment Obs: 120		
	Theory	Mean	SE	Theory	Mean	SE
Public Debt	121.3	12.5	3.3	[-12.8, 93.8]	-80.7	5.8
Public Good	20.3	36.8	2.2	20.3	27.3	2.3
Pork to Proposer	150.6	39.2	1.7	[0, 150.3]	15.9	2.0
Pork to MWC	251.0	112.1	4.8	[0, 250.5]	40.9	5.3
Total Pork	251.0	125.7	4.1	[0, 250.5]	42.0	5.3

Table 6: Outcomes in Approved Allocations, Period 1 Outcomes, The Effect of Commitment, Excluding Sessions with Subjects from Bocconi University. Notes: the p-values of a Mann-Whitney-Wilcoxon test and of a t-test comparing the level of public debt in the Commitment and the No Commitment treatments are 0.000.

	$Au'(g_1) - E[A_\theta u'(g_{2\theta})]$
Mean	8.60
Median	0.01
P-value of Wilcoxon signed-rank test	0.2852
P-value of two-sided sign test	0.9273

Table 7: Test of Intertemporal Inefficiencies, Committees with Commitment, Excluding Sessions with Subjects from Bocconi University.

Session	Date	Majority	Risk	Commit	Subjects	Matches	Location
1	05/09/2013	M	High	No	10	20	Caltech
2	05/09/2013	M	High	No	15	20	Caltech
3	05/10/2013	O	High	No	10	20	Caltech
4	05/10/2013	O	High	No	15	20	Caltech
5	03/28/2014	S	High	No	20	10	Columbia
6	05/15/2014	S	High	No	20	10	Columbia
7	10/16/2014	M	Low	No	15	20	Columbia
8	10/19/2014	M	Low	No	15	15	Columbia
9	01/22/2015	M	Low	No	20	15	Columbia
10	01/23/2015	M	High	No	20	20	Columbia
11	01/29/2015	S	High	No	10	10	Columbia
12	01/29/2015	O	High	No	15	20	Columbia
13	11/17/2017	M	High	Yes	10	20	Caltech
14	01/05/2018	M	High	Yes	10	20	Caltech
15	02/27/2018	M	High	Yes	10	9	Bocconi
16	02/27/2018	M	High	Yes	10	13	Bocconi
17	03/05/2018	M	High	Yes	10	20	Caltech

Table 8: Experimental Design: Details by Session

	O vs. M	O vs. S	M vs. S	High vs. Low Risk
Public Debt	0.00	0.00	0.10	0.00
Public Good	0.00	0.00	0.00	0.83
Pork to Proposer	0.00	0.00	0.00	0.68
Pork to MWC	0.00	0.00	0.01	0.57
Total Pork	0.00	0.00	0.00	0.02

Table 9: P-values of Wilcoxon-Mann-Whitney Tests, Period 1 Outcomes, Matches 1-10 Only

$\theta = L$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.98	0.86	0.99
Pork to Prop (% Budget)	0.00	0.00	0.00
Pork to MWC (% Budget)	0.26	0.09	0.09
Total Pork (% Budget)	0.98	0.86	0.99
$\theta = H$	O vs. M	O vs. S	M vs. S
Public Good (% Budget)	0.58	0.00	0.00
Pork to Prop (% Budget)	0.73	0.00	0.00
Pork to MWC (% Budget)	0.88	0.00	0.00
Total Pork (% Budget)	0.58	0.00	0.00

Table 10: P-values of Wilcoxon-Mann-Whitney Tests, Period 2 Outcomes, Matches 1-10 Only

Online Appendix B: Experimental Instructions

Thank you for agreeing to participate in this experiment. During the experiment we require your complete, undistracted attention, and ask that you follow instructions carefully. Please do not open other applications on your computer, chat with other students, or engage in other distracting activities, such as using your phone, reading books, etc. It is important that you do not talk or in any way try to communicate with other participants during the experiments.

You will be paid for your participation in cash, at the end of the experiment. Different participants may earn different amounts. What you earn depends partly on your decisions, partly on the decisions of others, and partly on chance. Everyone will be paid in private and you are under no obligation to tell others how much you earned. Your earnings during the experiment are denominated in POINTS. For this experiment the conversion rate is 100 POINTS equal $1.50.

This is an experiment in committee decision making. The experiment will take place over a sequence of 20 matches. We begin the match by randomly dividing you into committees of five members each and randomly assigning each of you a committee member number, either 1, 2, 3, 4, or 5. The identity of your committee members will never be revealed to you and your committee members will never know your identity. Each match consists of two rounds.[1] Your committee will have a budget of 150 in each of the two rounds, and in each round you must decide on how to divide the budget between Private Allocations to each of the committee members and a Public Project. Proposals will be voted up or down (accepted or rejected) by majority rule; that is, for a proposal to pass it must get at least 3 yes votes.

Each match starts with Round 1. In round 1 your committee is not required to exactly spend your budget of 150. Your committee may spend less than 150 in round 1 and carry over part of it to spend in round 2. Your committee may also spend more than 150 in round 1 and the extra amount will be subtracted from your round 2 budget. Thus, for example, if your committee spends 140 in round 1, then the round 2 budget will be equal to 160. If your committee spends 180 in round 1, then the round 2 budget will be equal to 120. Your committee is not allowed to spend more than it can pay back. Therefore, in round 1, your committee is free to spend any total amount between 0 and 300.

Your five-member committee will decide how to divide the round 1 budget by majority rule voting. To do this each member of the committee will submit a provisional allocation proposal that specifies six numbers: a Private Allocation to committee member 1, a Private Allocation to committee member 2, a Private Allocation to committee member 3, a Private Allocation to committee member 4, a Private Allocation to committee member 5, and a Public Project allocation that generates earnings to all five committee members. The sum of these six numbers must add up to a number between 0 and 300.

After everyone in your committee has submitted a provisional allocation proposal, one of them will be selected at random for a vote as the proposed allocation. All provisional

---

[1]In the experiment, the two periods were referred to as "rounds".

allocation proposals have equal probability of being selected as the proposed allocation. The proposed allocation will be posted on your computer screens and you will have to decide whether to vote yes or no. If the proposed allocation passes (at least 3 yes), it is enacted and you move on to Round 2. If the proposed allocation fails (0, 1, or 2 yes), there will be a call for new proposals. This process repeats itself until a proposed allocation passes.

In Round 2, the committee will again divide the budget between the private allocations to each of the five committee members and a public project. Remember, the budget in round 2 may be higher or lower than 150, depending on whether your committee spent less than or more than 150 in round 1. The proposal and voting process is the same: each committee member starts by submitting a provisional allocation proposal.

Your earnings in Round 1 depend on the Round 1 allocation that passed in the following way [SHOW SLIDE]:

Your Private Allocation in Round 1 + Public Project Earnings in Round 1

The public project earnings are the same for all members of the committee and are computed according to the formula:

Round 1 Public Project Earnings $= 3\,(\text{Amount allocated to Public Project in Round 1})^{0.5}$

Your earnings in Round 2 depend on the Round 2 allocation that passed in the following way [SHOW SLIDE]:

Your Private Allocation in Round 2 + Public Project Earnings in Round 2

With probability 1/2, the Round 2 Public Project earnings are computed according to a HIGH formula:

Round 2 Public Project Earnings $= 5\,(\text{Amount allocated to Public Project in Round 1})^{0.5}$

With probability 1/2, the Round 2 Public Project earnings are computed according to a LOW formula:

Round 2 Public Project Earnings $= 1\,(\text{Amount allocated to Public Project in Round 1})^{0.5}$

Independently for each match, at the beginning of round 2, the computer will randomly assign whether the HIGH or LOW formula for public project earnings applies to your committee, and it will be revealed to you and the other members of your committee on your computer screens BEFORE provisional allocation proposal are submitted. The assignment of your committee's formula is completely random and independent, and does not depend in any way on any participant's previous allocation decisions, proposals, or votes.

We will now explain the computer interface. [SHOW SLIDE] At the beginning of the first round of match 1, you will see a screen like this. On the right are boxes where you enter your provisional allocation proposal. On the left is a graphical calculator. If you move

the cursor inside the graph it will display the values corresponding to different allocations to the public project (labeled project size). At the bottom of your screen is the history panel. Next you enter your provisional allocation proposal and click submit, at which point your screen will look like the following. [SHOW SLIDE] Of course, the exact numbers will be whatever you entered; the numbers on the screens are just for illustration. After everyone in your committee has submitted their provisional allocation proposals, one of the five provisional proposals is selected at random by the computer as the proposed allocation for the committee to vote on. It requires at least 3 yes votes in order to pass. At this point, your screen will look like this. [SHOW SLIDE] Notice that the screen also shows the committee number of whose provisional proposal was selected by the computer to be the proposed allocation. After everyone has clicked yes or no, the vote outcome screen appears. [SHOW SLIDE] In this example, everyone but one member voted no, so we go back and start round 1 again, and each committee member is again prompted to enter a provisional allocation proposal. Notice that this screen tells you exactly how each committee member voted. After you submit your new provisional allocation proposal the screen looks like. [SHOW SLIDE] The computer randomly selects one committee member's provisional proposal to be the proposed allocation. [SHOW SLIDE]. Everyone in your committee votes, and in this example the proposal passes. The screen calculates how much you earned this round and displays that calculation and graphs the project size and its value on the left. The information is also recorded in the history screen at the bottom. Specific information for each committee member is ordered by committee number, with your own information highlighted in red. We then go to the second round of match 1, and your screen looks like this. [SHOW SLIDE] The total amount that your provisional allocation proposal must add up to is displayed. This is equal to 150 plus or minus whatever you underspent or overspent in round 1. In this example, in round 1 the committee spent $17+27+22+19+41+39=165$ for a budget carryover of 150-165=-15. The budget available in the second round is thus 150-15=135. Each member now submits a provisional allocation proposal for round 2 that must add up exactly to this amount, since it is the last round of the match. Round 2 proceeds exactly like round 1: after everyone submits a provisional proposal, the computer randomly selects one of them to be the proposed allocation; you then vote yes or no and a proposal passes with at least 3 yes votes. Once a proposal passes, match 1 ends. You are then randomly re-matched into a new committee and randomly re-assigned a new committee member number and match 2 begins. Match 2 proceeds just like match 1.

We will now proceed to the practice match to familiarize you with the interface. You are not paid for your decisions during the practice match. Please click on the icon marked Multistage Client on your desktop. Then enter your assigned Computer Name, click enter, and then wait. Please complete the practice match on your own. Feel free to raise your hand if you have a question during the practice match.

The practice match is now over. Remember, you are not paid the earnings from this practice match. If you have any questions from now on, raise your hand, and an experimenter will come and assist you. We will now begin the 20 paid matches.