A Proofs

Proof of Proposition 1. In auction 2, the expected payoff to a bid $b \in [0, w]$ against the continuous mixed strategy distribution F is given by $\pi(b|F) = 2vF(b) - vF(b)^2 - b$, so the logit quantal response equilibrium bid distribution L must satisfy

$$\begin{aligned}
\frac{dL}{db} &= \frac{\exp\left(\lambda\left(2vL(b) - vL(b)^2 - b\right)\right)}{\int_0^w \exp\left(\lambda\left(2vL(y) - vL(y)^2 - y\right)\right) dy} \\
C\, dL &= \exp\left(\lambda\left(2vL - vL^2 - b\right)\right) db \\
C\exp\left(\lambda v\left(L^2 - 2L\right)\right) dL &= \exp\left(-\lambda b\right) db \\
C\exp(-\lambda v)\int \exp\left(\lambda v\left(1 - L\right)^2\right) dL &= \int \exp\left(-\lambda b\right) db \\
\operatorname{erfi}\left(\sqrt{\lambda v}\left(1 - L\right)\right) &= C_1 - C_2\exp\left(-\lambda b\right) \\
L\left(b\right) &= 1 - \frac{1}{\sqrt{\lambda v}}\operatorname{erfi}^{-1}\left(C_1 - C_2\exp\left(-\lambda b\right)\right) \qquad \text{(A.1)}
\end{aligned}$$

Where erfi denotes the imaginary error function and is given by $\operatorname{erfi}(x) = \frac{2}{\sqrt{\pi}}\int_0^x \exp(x^2)dx$. Since bids are restricted to the closed interval $[0, w]$ we know that $L(0) = 0$ and $L(w) = 1$. Solving these boundary conditions for the constants C_1 and C_2 obtains

$$\begin{aligned}
C_1 &= \frac{\operatorname{erfi}\left(\sqrt{\lambda v}\right)}{\exp\left(-\lambda w\right) - 1} + \operatorname{erfi}\left(\sqrt{\lambda v}\right) \\
C_2 &= \frac{\operatorname{erfi}\left(\sqrt{\lambda v}\right)}{\exp\left(-\lambda w\right) - 1} \qquad \text{(A.2)}
\end{aligned}$$

Substituting the solutions for C_1 and C_2 into the logit quantal response equilibrium bid distribution for auction 2 yields

$$L\left(b\right) = 1 - \frac{1}{\sqrt{\lambda v}}\operatorname{erfi}^{-1}\left(\left[1 - \frac{1 - \exp\left(-\lambda b\right)}{1 - \exp\left(-\lambda w\right)}\right]\operatorname{erfi}\left(\sqrt{\lambda v}\right)\right) \qquad \text{(A.3)}$$

□

Proof of Proposition 2. The Nash equilibrium bid distribution for auction 2 is given by $\Phi(b) = 1 - \sqrt{1 - b/v}$ for all $b \in [0, v]$ and the expected payoff function is given by $\pi(b|F) = 2vF(b) - vF(b)^2 - b$ so the linearization of the expected payoff function $\pi(b|F)$ at $F = \Phi$ is given by

$$\left.\frac{\partial \pi\left(b|F\right)}{\partial F\left(b\right)}\right|_{F=\Phi} = 2v(1 - \Phi(b)). \tag{A.4}$$

Now let $Z(b) = G(b) - \Phi(b)$ where $G \neq \Phi$ is an arbitrary non-equilibrium distribution with density function g. The quadratic form $Q(Z)$ from equation (13) is given by

$$\begin{aligned} Q(Z) &= 2v \int_0^w \sqrt{1 - b/v}\; Z\left(b\right) dZ\left(b\right) \\ &= 2v \int_0^w \sqrt{1 - b/v}\; d\left(Z\left(b\right)^2/2\right) \\ &= 2v \left[\frac{1}{2} Z\left(b\right)^2 \sqrt{1 - b/v}\right]_0^w - v \int_0^w Z\left(b\right)^2 \; d\left(\sqrt{1 - b/v}\right) \\ &= -v \int_0^w Z\left(b\right)^2 \; \frac{d}{db}\left[\sqrt{1 - b/v}\right] db \end{aligned} \tag{A.5}$$

Thus is the quadratic form $Q(Z)$ strictly positive since $\frac{d}{db}\left[\sqrt{1 - b/v}\right] < 0$. □

Proof of Proposition 3. The Nash equilibrium bid distribution for auction 1 is given by $\Phi(b) = v/b$ for all $b \in [0, v]$ and the expected payoff function is given by $\pi(b|F) = vF(b) - b$ so

$$\left.\frac{\partial \pi\left(b|F\right)}{\partial F\left(b\right)}\right|_{F=\Phi} = v \tag{A.6}$$

Now let $Z(b) = G(b) - \Phi(b)$ where $G \neq \Phi$ is an arbitrary non-equilibrium distribution with density function g. Then the quadratic form $Q(Z)$ from equation (14) can be written as

$$Q(Z) = v \int_0^w Z\left(b\right) dZ\left(b\right) = \frac{1}{2} v Z(w)^2 \tag{A.7}$$

Thus $Q(Z) = 0$ since we have $Z(w) = \Phi\left(w\right) - G\left(w\right) = 1 - 1 = 0$. □

Proof of Proposition 4. The Nash equilibrium strategy for auction 1 is given by $\Phi(b) = v/b$ for all $b \in [0, v]$ and the expected payoff function is given by $\pi(b|F) = vF(b) - b$. Let $F \neq \Phi$ some arbitrary arbitrary non-equilibrium distribution on $[0, w]$. In this case, we have

$$\begin{aligned}
\int b\, dF(b) &= \int_{b=0}^{b=w} \int_{x=0}^{x=b} dx\, dF(b) \\
&= \int_{x=0}^{x=w} \int_{b=x}^{b=w} dF(b)\, dx \\
&= \int_0^w [1 - F(x)]\, dx
\end{aligned} \tag{A.8}$$

Now the expected payoff to the equilibrium strategy Φ against the non-equilibrium strategy F is given by

$$\begin{aligned}
\pi(\Phi|F) &= v \int F(b)\, d\Phi(b) - \int b\, d\Phi(b) \\
&= \int_0^v F(b)\, db - \frac{v}{2}
\end{aligned} \tag{A.9}$$

Conversely, the expected payoff to the non-equilibrium strategy F against itself is given by

$$\begin{aligned}
\pi(F|F) &= v \int F(b)\, dF(b) - \int b\, dF(b) \\
&= \frac{v}{2} - \int b\, dF(b) \qquad \text{since } F(X) \sim U[0,1] \text{ for } X \sim F(x) \\
&= \frac{v}{2} - \int_0^w [1 - F(b)]\, db \qquad \text{since } \int b\, dF(b) = \int_0^w [1 - F(b)]\, db \\
&\leq \frac{v}{2} - \int_0^v [1 - F(b)]\, db \\
&= \frac{v}{2} - v + \int_0^v F(b)\, db \\
&= \int_0^v F(b)\, db - \frac{v}{2} \\
&= \pi(\Phi|F)
\end{aligned} \tag{A.10}$$

Thus the equilibrium strategy Φ does weakly better against the non-equilibrium strategy F then the non-equilibrium strategy F does against itself. □

B Additional Tables

Table A.1: Session level averages for five main outcome variables. Standard errors, based on the four periods that comprise each session, are provided in parentheses

Session	Auction Treatment (no. of prizes)	info type	Mean Bid Amount)	Mean Payoffs	Deviation from Time-Averaged Mean	Deviation from Nash Equilibrium	Cycle-Rotation Index)
1	2	payoff	3.772 (0.162)	0.908 (0.164)	0.283 (0.022)	0.391 (0.044)	0.561 (0.043)
2	1	payoff	2.985 (0.113)	0.526 (0.113)	0.216 (0.010)	0.253 (0.012)	0.450 (0.079)
3	2	social	4.013 (0.259)	0.663 (0.259)	0.275 (0.011)	0.352 (0.028)	0.418 (0.033)
4	1	social	3.047 (0.057)	0.464 (0.058)	0.167 (0.013)	0.207 (0.005)	0.232 (0.054)
5	1	social	3.360 (0.087)	0.149 (0.086)	0.190 (0.008)	0.204 (0.005)	0.256 (0.057)
6	2	social	3.470 (0.167)	1.212 (0.166)	0.285 (0.021)	0.446 (0.019)	0.412 (0.055)
7	1	payoff	2.762 (0.063)	0.746 (0.062)	0.198 (0.011)	0.264 (0.003)	0.347 (0.062)
8	2	payoff	3.944 (0.115)	0.734 (0.114)	0.289 (0.022)	0.365 (0.008)	0.529 (0.061)

Table A.2: Maximum likelihood estimates. The precision parameter λ was estimated separately for each subject and each model.

				Log Likelihood		Estimated λ	
Session	Treatment	Subject	Adjustments	QRE	Logit Dynamic	QRE	Logit Dynamic
1	2	1	343	-14534.6	-13796.3	1.963215	0.996535
1	2	2	241	-10981.8	-9627.35	90.50562	0.968458
1	2	3	1866	-83741.1	-74238.9	75.15213	1.175507
1	2	4	2651	-120984	-106401	63.94754	1.161345
1	2	5	1424	-62930	-53493	75.38627	1.51164
1	2	6	4610	-210352	-188595	68.06483	1.025568
1	2	7	1015	-43521.6	-41737.1	0.866019	0.908018
1	2	8	1047	-45224.2	-44030.3	0.783802	0.861141
1	2	9	91	-3980.22	-3971.58	0.83077	0.561326
1	2	10	865	-37706	-36886.7	0.867565	0.758112

1	2	11	4206	-178294	-159793	0.919223	1.484914
1	2	12	3793	-166876	-158997	0.633957	0.87064
1	2	13	2289	-103642	-89013.7	89.49573	1.340342
1	2	14	977	-42418.5	-40802.1	0.784853	0.82635
1	2	15	1860	-82746.8	-68081.1	99.11586	1.565908
1	2	16	3819	-168709	-143541	76.0989	1.5124
1	2	17	693	-29749.9	-29541.5	1.057556	0.692377
1	2	18	1882	-82221.5	-81134.8	0.932834	0.668187
1	2	19	2207	-99366.1	-93760.6	65.48425	0.781501
1	2	20	1442	-63583.4	-57514.8	99.96539	1.218844
2	1	1	815	-34704.5	-36103.5	4.199217	0.644632
2	1	2	1166	-49639.2	-48568.4	2.901665	1.154651
2	1	3	835	-35534.4	-34033.1	91.45752	1.266575
2	1	4	1312	-56190.4	-54118.7	2.776578	1.226842
2	1	5	1021	-43449.8	-46229.3	38.19639	0.404926
2	1	6	643	-27483	-27252.3	11.28833	0.944863
2	1	7	257	-10936.9	-10960	75.51809	0.846774
2	1	8	2575	-110195	-112468	4.5569	0.7479
2	1	9	829	-35279	-37055.3	38.1966	0.543453
2	1	10	3246	-138162	-135621	12.27084	1.137972
2	1	11	686	-29193.5	-30130.7	76.3932	0.709913
2	1	12	686	-29923.6	-29287.2	2.590952	0.987081
2	1	13	1214	-51677	-48095.6	100	1.498592
2	1	14	1134	-50014.1	-48757.2	1.854483	0.859379
2	1	15	1428	-60835.9	-57818.5	7.123663	1.364025
2	1	16	1793	-76509.6	-72290.1	3.835422	1.426551
2	1	17	2861	-121968	-115646	3.604319	1.408393
2	1	18	945	-40375.8	-38227.2	3.631381	1.339872
2	1	19	3015	-128478	-125796	5.779932	1.182146
2	1	20	824	-35099.2	-33858.9	3.560629	1.222323
3	2	1	108	-4971.59	-4976.25	0.099239	0.111046
3	2	2	859	-36657.8	-37906.2	1.057556	0.570377
3	2	3	2178	-96569.6	-91157.2	77.52298	0.938038
3	2	4	1713	-75374.9	-73400.2	1.208891	0.758241
3	2	5	322	-14766.7	-14839.2	0.331603	0.108061
3	2	6	2407	-106802	-105884	0.781625	0.565653

3	2	7	2008	-84655.2	-81952	1.235869	1.119868
3	2	8	3323	-138609	-138804	2.273637	0.927364
3	2	9	667	-28296.5	-29364.5	1.361384	0.658704
3	2	10	4288	-183606	-168790	1.001847	1.372997
3	2	11	1775	-81918.4	-81917.4	3.44E-08	0.007485
3	2	12	1775	-81947.2	-69883.5	69.69383	1.280999
3	2	13	1207	-56367.5	-46324.6	60.17603	1.322825
3	2	14	1177	-50304.9	-46704.1	1.111115	1.296121
3	2	15	788	-33748.6	-30166	0.917922	1.457755
3	2	16	3176	-133274	-134770	1.382532	0.834053
3	2	17	695	-29767.7	-28455.5	1.154172	1.030427
3	2	18	2109	-90432.2	-85060.9	0.979474	1.150862
3	2	19	3704	-152250	-143697	1.661221	1.424304
3	2	20	2894	-123534	-119392	0.967682	1.022117
4	1	1	526	-22384.5	-24034.6	39.79382	0.313904
4	1	2	2181	-92938.3	-86848.3	6.115076	1.970737
4	1	3	1899	-83804.1	-83042.4	1.859269	0.838853
4	1	4	3819	-162739	-159815	5.568746	1.396205
4	1	5	2619	-112196	-112197	4.484998	1.095484
4	1	6	1753	-74981.4	-77285.4	3.984234	0.784049
4	1	7	1448	-61650.7	-63211.9	5.191696	0.942568
4	1	8	114	-4851.4	-5184.26	38.1966	0.386706
4	1	9	258	-11023.4	-11519	7.124152	0.628839
4	1	10	1422	-60665.2	-58185	6.183888	1.51685
4	1	11	647	-28464.8	-29493	1.976165	0.337191
4	1	12	134	-5894.35	-6147.46	0.91364	0.228161
4	1	13	402	-18451	-18450.9	0.668469	0.210904
4	1	14	196	-8401.4	-8901.38	0.985317	0.405714
4	1	15	815	-34719.2	-36654.9	2.771622	0.562126
4	1	16	49	-2123.87	-2147.7	2.407135	0.756388
4	1	17	2389	-101784	-102248	6.879742	1.155182
4	1	18	1059	-45090.1	-44218.8	8.053346	1.411199
4	1	19	396	-16956.7	-15751.8	5.675449	1.703004
4	1	20	284	-12180.9	-12697.3	2.326742	0.58869
5	1	1	1207	-51908.9	-51971.4	3.454045	1.110179
5	1	2	3059	-132025	-129068	3.968423	1.342237

5	1	3	1071	-45742.4	-44498.1	5.569852	1.459194
5	1	4	1415	-60602.8	-59157.5	3.265753	1.443999
5	1	5	1173	-50117.9	-52147.3	10.79762	0.711548
5	1	6	678	-28980	-29028.2	3.616434	1.156091
5	1	7	443	-19002.2	-18179.6	3.623336	1.617607
5	1	8	1505	-64762.6	-65450.5	2.641337	1.002699
5	1	9	713	-30835	-31880	6.79236	0.67447
5	1	10	4666	-198887	-208196	2.486891	0.690922
5	1	11	847	-36249.3	-32917.6	2.398916	2.160517
5	1	12	385	-16589.1	-17187.5	2.116019	0.677124
5	1	13	1125	-50101.2	-50158.2	1.454903	0.670774
5	1	14	273	-11924.7	-12203	1.400592	0.681927
5	1	15	21	-935.283	-967.998	0.791703	0.10198
5	1	16	37	-1581.51	-1707.44	99.99999	0.029255
5	1	17	467	-20257.2	-19776.9	3.008538	1.139379
5	1	18	732	-31684.9	-31361.1	5.335665	1.122488
5	1	19	1120	-47952.9	-49505.2	4.003602	0.81686
5	1	20	614	-26901.5	-28067.2	1.233643	0.3481
6	2	1	735	-31539.4	-29424.4	1.105023	1.117953
6	2	2	1493	-59412.2	-62037.2	1.663968	0.902007
6	2	3	1812	-76287.6	-69608	1.005909	1.451146
6	2	4	996	-42407.1	-38258.5	0.880398	1.432364
6	2	5	531	-23633.6	-23271.5	0.751594	0.564811
6	2	6	2438	-105468	-95862.7	0.810325	1.251926
6	2	7	1210	-50211.9	-44731.7	1.288546	1.600027
6	2	8	317	-13711.9	-13064.2	0.889258	0.951395
6	2	9	1297	-56429.2	-55628.7	0.818762	0.714589
6	2	10	436	-18535.8	-17016	0.814714	1.197823
6	2	11	3141	-138166	-136371	0.575758	0.627416
6	2	12	272	-12354.3	-11565.7	99.53492	0.716011
6	2	13	3745	-154166	-146216	1.182526	1.314665
6	2	14	1254	-54264.3	-50667	0.757358	1.090103
6	2	15	1304	-59126.5	-47063.2	77.54775	1.802036
6	2	16	2223	-93761.8	-89115.4	0.979683	1.141275
6	2	17	418	-17993.7	-16226.5	1.073568	1.194937
6	2	18	287	-12967.4	-12914	0.353848	0.369811

6	2	19	1469	-63537.7	-61475.9	0.884735	0.852802
6	2	20	1221	-51097.9	-48322.7	0.967682	1.224118
7	1	1	86	-3659.83	-3527.94	76.33327	1.150586
7	1	2	1453	-61841	-62753	91.15481	0.870367
7	1	3	635	-27023.1	-24074.9	76.3932	1.993097
7	1	4	938	-40079.4	-39796.1	3.69854	0.979546
7	1	5	664	-28658.3	-28850.7	2.38338	0.784076
7	1	6	1375	-58541.5	-53865	6.604801	1.740598
7	1	7	778	-33108.7	-31447.4	99.99989	1.447663
7	1	8	376	-16001.1	-16239.2	76.39337	0.873182
7	1	9	887	-37803	-37221.2	2.793055	1.116807
7	1	10	21	-893.679	-959.595	38.18243	0.293264
7	1	11	1349	-57651.4	-54963.9	3.386625	1.367242
7	1	12	292	-12426.4	-13249.4	38.19263	0.366788
7	1	13	1163	-49680.4	-48988.4	1.682929	1.076938
7	1	14	1963	-83614.6	-77268.9	4.833681	1.735934
7	1	15	818	-34922.4	-33781.7	5.861298	1.249318
7	1	16	1514	-64863.7	-65332	2.671415	0.852364
7	1	17	2491	-106261	-102626	3.22747	1.315209
7	1	18	867	-36923.7	-35433.4	7.311765	1.357056
7	1	19	1191	-51289	-48688.2	3.191925	1.372127
7	1	20	998	-42650.8	-39555.8	3.46028	1.601074
8	2	1	3803	-158301	-155782	1.164843	0.972915
8	2	2	4246	-177405	-165843	1.265171	1.23615
8	2	3	3264	-148626	-136295	77.4455	0.857876
8	2	4	2239	-94005.8	-98041.2	1.021509	0.560308
8	2	5	4663	-199067	-201451	0.911364	0.653619
8	2	6	1605	-74072.7	-74072.7	9.3E-09	9.3E-09
8	2	7	1319	-53710.4	-54441.7	2.281018	0.902918
8	2	8	1158	-50826.3	-48861	0.760287	0.76323
8	2	9	2944	-131288	-112931	65.78885	1.376602
8	2	10	577	-26127.7	-25003.1	0.307964	0.612133
8	2	11	1584	-68839.6	-59716.7	0.784149	1.473457
8	2	12	2490	-103892	-108001	1.371473	0.628896
8	2	13	1399	-63504.4	-54213.1	99.42059	1.294673
8	2	14	3914	-167969	-163116	0.805177	0.858727

8	2	15	1557	-68838.1	-67635.6	0.61816	0.591616
8	2	16	3520	-149584	-145596	1.294117	0.902779
8	2	17	832	-35507.7	-34378.6	1.270234	0.880409
8	2	18	1206	-51301.5	-48406.2	1.322736	1.064098
8	2	19	1755	-80595.3	-68707.1	63.92637	1.169551
8	2	20	1527	-68757.2	-61666.2	60.29398	1.006837

C Instructions

C.1 Auction 1, Payoff Information

This is an experiment about strategic decision making. If you pay attention to these instructions, you can earn a significant amount of money. Your earnings will depend on your actions and on the actions taken by other participants.

This experiment will consist of multiple periods. Each period will last for five minutes. Throughout each period, you will select a bid and your bid will be simultaneously entered into several auctions. Each auction involves two bidders. Each bidder starts with $10. The highest bidder in each auction will receive a prize of $7. Both bidders must pay their bid, regardless of their winnings. Every pair of two participants will compete in one of these auctions. Your payoff will equal your average earnings over all of these auctions. At the end of the experiment, your average payoff over time plus a five dollar show-up bonus will be paid to you in cash. The following practice round will not effect your final earnings. It is only for practice. The horizontal position of the blue bar on your screen indicates your current bid. The height of the blue bar indicates your current payoff. The green line shows the payoff you could earn from selecting other bids. You can adjust your bid at any time by clicking on the graph. If you have any questions, please raise your hand and we will come to assist you.

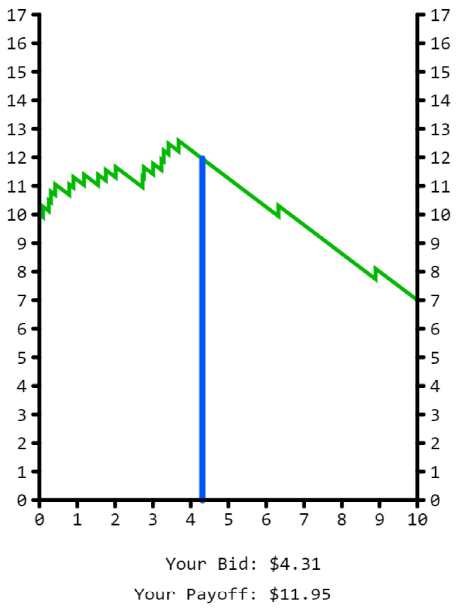

Figure A.1: Example screenshot for auction 1 with payoff information

C.2 Auction 2, Payoff Information

This is an experiment about strategic decision making. If you pay attention to these instructions, you can earn a significant amount of money. Your earnings will depend on your actions and on the actions taken by other participants.

This experiment will consist of multiple periods. Each period will last for five minutes. Throughout each period, you will select a bid and your bid will be simultaneously entered into several auctions. Each auction involves three bidders. Each bidder starts with $10. The highest two bidders in each auction will receive a prize of $7. Every bidder must pay their bid, regardless of their winnings. Every combination of three participants will compete in one of these auctions. Your payoff will equal your average earnings over all of these auctions. At the end of the experiment, your average payoff over time plus a five dollar show-up bonus will be paid to you in cash.

The following practice round will not effect your final earnings. It is only for practice. The horizontal position of the blue bar on your screen indicates your current bid. The height of the blue bar indicates your current payoff. The green line shows the payoff you could earn from selecting other bids. You can adjust your bid at any time by clicking on the graph. If you have any questions, please raise your hand and we will come to assist you.

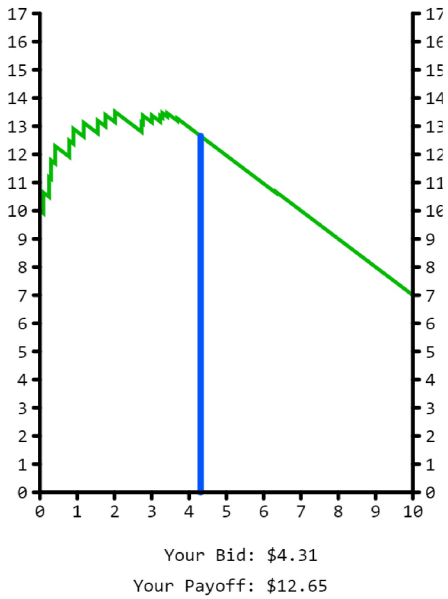

Figure A.2: Example screenshot for auction 2 with payoff information

C.3 Auction 1, Social Information

This is an experiment about strategic decision making. If you pay attention to these instructions, you can earn a significant amount of money. Your earnings will depend on your actions and on the actions taken by other participants.

This experiment will consist of multiple periods. Each period will last for five minutes. Throughout each period, you will select a bid and your bid will be simultaneously entered into several auctions. Each auction involves two bidders. Each bidder starts with $10. The highest bidder in each auction will receive a prize of $7. Both bidders must pay their bid, regardless of their winnings. Every pair of two participants will compete in one of these auctions. Your payoff will equal your average earnings over all of these auctions. At the end of the experiment, your average payoff over time plus a five dollar show-up bonus will be paid to you in cash. The following practice round will not effect your final earnings. It is only for practice. The horizontal position of the blue bar on your screen indicates your current bid. The height of the blue bar indicates your current payoff. The horizontal position of each red bar indicates another player's current bid. The height of each red bar indicates the other bidder's current payoff. You can adjust your bid at any time by clicking on the graph. If you have any questions, please raise your hand and we will come to assist you.

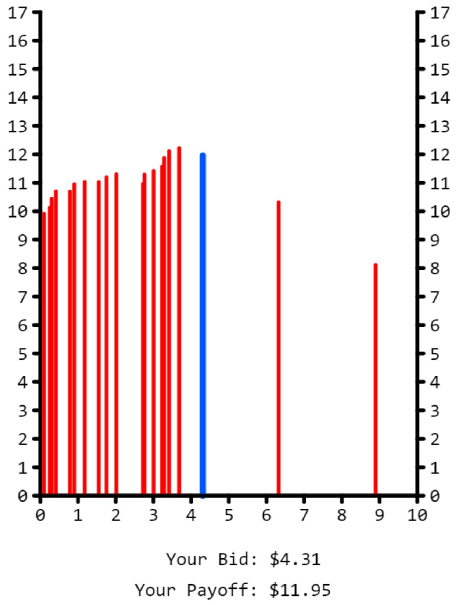

Figure A.3: Example screenshot for auction 1 with social information

C.4 Auction 2, Social Information

This is an experiment about strategic decision making. If you pay attention to these instructions, you can earn a significant amount of money. Your earnings will depend on your actions and on the actions taken by other participants.

This experiment will consist of multiple periods. Each period will last for five minutes. Throughout each period, you will select a bid and your bid will be simultaneously entered into several auctions. Each auction involves two bidders. Each bidder starts with $10. The highest bidder in each auction will receive a prize of $7. Both bidders must pay their bid, regardless of their winnings. Every pair of two participants will compete in one of these auctions. Your payoff will equal your average earnings over all of these auctions. At the end of the experiment, your average payoff over time plus a five dollar show-up bonus will be paid to you in cash. The following practice round will not effect your final earnings. It is only for practice. The horizontal position of the blue bar on your screen indicates your current bid. The height of the blue bar indicates your current payoff. The horizontal position of each red bar indicates another player's current bid. The height of each red bar indicates the other bidder's current payoff. You can adjust your bid at any time by clicking on the graph. If you have any questions, please raise your hand and we will come to assist you.

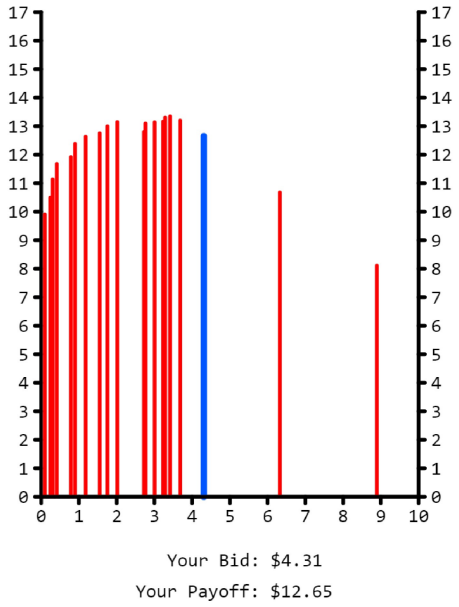

Figure A.4: Example screenshot for auction 2 with social information