Allotment in First-Price Auctions: An Experimental Investigation

Robustness checks - not intended for publication

Luca Corazzini*, Stefano Galavotti†, Rupert Sausgruber‡, Paola Valbonesi§

N.B. This material is not intended for publication and will be made available to the interested reader upon request.

This manuscript contains some robustness checks related to the empirical analysis contained in the paper *Allotment in First-Price Auctions: An Experimental Investigation.* In particular, we replicate the main parametric analysis presented in Section 4 of the paper but restricted on different subsets of periods (periods 1-5 in *Table I, IV, VII*, periods 6-10 in *Table II, V, VIII*, periods 11-15 in *Table III, VI, IX*) to control for the effects of repetition. Moreover, in order to check for robustness, we replicate regressions reported in *Table 4, 6* of the original paper by using a Tobit specification with standard errors clustered at the remathing group level (*Table X, XI*). All the regressions include a linear time trend that starts from 0 in the first period of the subset. Results remain almost unchanged if the linear time trend is excluded from the regressions.

*Corresponding author. Department of Economics, University of Messina, Piazza XX Settebre, 4, Messina 98122, Italy and ISLA, Bocconi University, via Röntgen, 1, Milan 20136, Italy. Email: lcorazzini@unime.it

†Department of Economics and Management, University of Padova, Via del Santo 33, 35123 Padova, Italy. Email: stefano.galavotti@unipd.it

‡Department of Economics, Vienna University of Economics and Business, Welthandelsplatz 1, 1020 Vienna, Austria. Phone: +43 512 507 7176; Fax: +43 (0)1 31336 5618. Email: rupert.sausgruber@wu.ac.at

§Department of Economics and Management, University of Padova, Via del Santo 33, 35123 Padova, Italy. Email: paola.valbonesi@unipd.it

Table I. Relative efficiency in *1A2U* and *2A1U* in periods 1-5

	RE		*RAR*		*RBS*	
	(1)	(2)	(3)	(4)	(5)	(6)
1A2U&2A1U	−0.016		−0.012		−0.008	
	(0.015)		(0.024)		(0.027)	
1A2U		−0.034**		−0.021		−0.003
		(0.015)		(0.026)		(0.032)
2A1U		0.002		−0.002		−0.014
		(0.015)		(0.026)		(0.031)
Period	0.003	0.003	−0.007	−0.005	0.008	0.007
	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)
Constant	0.965***	0.965***	0.765***	0.760***	0.216***	0.217***
	(0.014)	(0.013)	(0.022)	(0.021)	(0.025)	(0.025)
$Wald - \chi^2$	2.28	7.81	2.07	2.42	2.32	2.28
$p > \chi^2$	0.320	0.050	0.355	0.489	0.313	0.498
Obs.	135	135	135	135	135	135

Notes. This table reports results from performing the same econometric approach endorsed in *Table 2* in the paper on Periods 1-5 .

Table II. Relative efficiency in *1A2U* and *2A1U* in periods 6-10

	RE		*RAR*		*RBS*	
	(1)	(2)	(3)	(4)	(5)	(6)
1A2U&2A1U	−0.013*		−0.039**		0.019	
	(0.008)		(0.019)		(0.019)	
1A2U		−0.014		−0.053**		0.031
		(0.009)		(0.023)		(0.022)
2A1U		−0.012		−0.023		0.006
		(0.009)		(0.023)		(0.022)
Period	0.006**	0.006**	−0.007**	−0.006**	0.012***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.972***	0.972***	0.778***	0.779***	0.174***	0.173***
	(0.008)	(0.008)	(0.029)	(0.029)	(0.029)	(0.029)
$Wald - \chi^2$	7.39	7.43	7.83	9.35	12.22	13.52
$p > \chi^2$	0.023	0.059	0.020	0.025	0.002	0.004
Obs.	135	135	135	135	135	135

Notes. This table reports results from performing the same econometric approach endorsed in *Table 2* in the paper on Periods 6-10.

Table III. Relative efficiency in *1A2U* and *2A1U* in periods 11-15

	RE		*RAR*		*RBS*	
	(1)	(2)	(3)	(4)	(5)	(6)
1A2U&2A1U	−0.011		−0.034		0.022	
	(0.008)		(0.024)		(0.023)	
1A2U		−0.019**		−0.031		0.014
		(0.008)		(0.028)		(0.026)
2A1U		−0.002		−0.037		0.030
		(0.008)		(0.028)		(0.027)
Period	−0.002	−0.002	−0.004	−0.004	$4.9 * 10^{-4}$	$5.2 * 10^{-4}$
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Constant	0.986***	0.986***	0.754***	0.754***	0.266***	0.265***
	(0.008)	(0.007)	(0.045)	(0.045)	(0.048)	(0.048)
$Wald - \chi^2$	2.68	6.78	3.16	3.18	0.93	1.25
$p > \chi^2$	0.262	0.079	0.206	0.365	0.629	0.740
Obs.	135	135	135	135	135	135

Notes. This table reports results from performing the same econometric approach endorsed in *Table 2* in the paper on Periods 11-15.

Table IV. (Sum of the) Bids in *1A1U*, *1A2U* and *2A1U* in periods 1-5

	1A1U	*1A2U*	*2A1U*	*Pooled*	
	(1)	(2)	(3)	(4)	(5)
Value	0.695***	0.659***	0.701***	0.685***	0.685***
	(0.018)	(0.023)	(0.018)	(0.012)	(0.012)
Period	0.092	−2.357**	−1.100*	−1.140**	−1.140**
	(0.724)	(0.911)	(0.648)	(0.444)	(0.444)
1A2U&2A1U				−3.161	
				(2.910)	
1A2U					−4.459
					(3.387)
2A1U					−1.861
					(3.388)
Constant	5.589	9.713**	5.631*	9.105***	9.087***
	(3.667)	(3.946)	(3.022)	(2.814)	(2.831)
lrl	−1176.500	−1242.133	−1158.312	−3596.702	−3594.271
$Wald - \chi^2$	1471.69	707.99	1572.87	3396.22	3396.49
$p > \chi^2$	0.000	0.000	0.000	0.000	0.000
Obs.	270	270	270	810	810

Notes. This table reports results from performing the same econometric approach endorsed in *Table 4* in the paper on Periods 1-5 .

Table V. (Sum of the) Bids in *1A1U*, *1A2U* and *2A1U* in periods 6-10

	1A1U	*1A2U*	*2A1U*	*Pooled*	
	(1)	(2)	(3)	(4)	(5)
Value	0.665***	0.651***	0.665***	0.660***	0.660***
	(0.013)	(0.013)	(0.015)	(0.008)	(0.008)
Period	0.469	−1.079**	−0.953*	−0.512*	−0.512*
	(0.514)	(0.511)	(0.518)	(0.297)	(0.297)
1A2U&2A1U				−4.967**	
				(2.173)	
1A2U					−5.790**
					(2.538)
2A1U					−4.142
					(2.539)
Constant	4.391*	3.166	3.129	6.872***	6.868***
	(2.469)	(2.519)	(2.486)	(2.044)	(2.062)
lrl	−1092.234	−1103.514	−1104.079	−3301.786	−3299.728
$Wald - \chi^2$	2606.59	2446.75	2020.18	7057.93	7056.12
$p > \chi^2$	0.000	0.000	0.000	0.000	0.000
Obs.	270	270	270	810	810

Notes. This table reports results from performing the same econometric approach endorsed in *Table 4* in the paper on Periods 6-10.

Table VI. (Sum of the) Bids in *1A1U*, *1A2U* and *2A1U* in periods 11-15

	1A1U	*1A2U*	*2A1U*	*Pooled*	
	(1)	(2)	(3)	(4)	(5)
Value	0.677***	0.614***	0.625***	0.640***	0.640***
	(0.012)	(0.015)	(0.014)	(0.008)	(0.008)
Period	−0.774*	0.099	−0.562	−0.362	−0.362
	(0.465)	(0.541)	(0.502)	(0.292)	(0.292)
1A2U&2A1U				−4.790*	
				(2.465)	
1A2U					−4.973*
					(2.904)
2A1U					−4.606
					(2.904)
Constant	3.786	3.559	4.032	6.726***	6.724***
	(2.446)	(2.712)	(2.962)	(2.252)	(2.289)
lrl	−1059.598	−1115.521	−1089.300	−3276.262	−3274.279
$Wald-\chi^2$	3028.38	1741.76	1925.36	6382.57	6381.51
$p>\chi^2$	0.000	0.000	0.000	0.000	0.000
Obs.	270	270	270	810	810

Notes. This table reports results from performing the same econometric approach endorsed in *Table 4* in the paper on Periods 11-15.

Table VII. Bid spread in *1A2U* and *2A1U* in periods 1-5

	1A2U		*2A1U*		*Pooled*	
	Size	*Prob.*	*Size*	*Prob.*	*Size*	*Prob.*
	(1)	(2)	(3)	(4)	(5)	(6)
Value	0.065***	0.002***	0.050***	0.002***	0.057***	0.002***
	(0.008)	$(3.8\cdot10^{-4})$	(0.007)	$(4.7\cdot10^{-4})$	(0.005)	$(2.9\cdot10^{-4})$
Period	−0.119	0.008	0.335	0.015	0.112	0.011
	(0.280)	(0.019)	(0.263)	(0.018)	(0.192)	(0.013)
2A1U					−0.382	−0.093*
					(1.071)	(0.048)
Constant	1.030		1.234		1.349	
	(1.197)		(1.157)		(0.993)	
lrl(lpl)	−923.998	−124.468	−913.465	−156.219	−1835.979	−280.885
$Wald-\chi^2$	73.00	20.72	50.70	14.58	121.34	41.13
$p>\chi^2$	0.000	0.000	0.000	0.001	0.000	0.000
Obs.	270	270	270	270	540	540

Notes. This table reports results from performing the same econometric approach endorsed in *Table 5* in the paper on Periods 1-5.

Table VIII. Bid spread in *1A2U* and *2A1U* in periods 6-10

	1A2U		*2A1U*		*Pooled*	
	Size	*Prob.*	*Size*	*Prob.*	*Size*	*Prob.*
	(1)	(2)	(3)	(4)	(5)	(6)
Value	0.690^{***}	0.002^{***}	0.074^{***}	0.003^{***}	0.071^{***}	0.003^{***}
	(0.006)	$(3.8 \cdot 10^{-4})$	(0.006)	$(3.9 \cdot 10^{-4})$	(0.004)	$(2.7 \cdot 10^{-4})$
Period	0.071	−0.002	0.059	0.030	0.069	0.038
	(0.227)	(0.017)	(0.225)	(0.018)	(0.159)	(0.0127)
2A1U					−0.038	-0.068^{*}
					(0.906)	(0.038)
Constant	0.434		−0.060		0.208	
	(0.919)		(1.073)		(0.824)	
lrl(lpl)	−865.204	−102.886	−865.834	−119.585	−1728.080	−223.821
$Wald - \chi^2$	145.22	37.14	137.50	38.31	284.40	68.56
$p > \chi^2$	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	270	270	270	270	540	540

Notes. This table reports results from performing the same econometric approach endorsed in *Table 5* in the paper on Periods 6-10.

Table IX. Bid spread in *1A2U* and *2A1U* in periods 11-15

	1A2U		*2A1U*		*Pooled*	
	Size	*Prob.*	*Size*	*Prob.*	*Size*	*Prob.*
	(1)	(2)	(3)	(4)	(5)	(6)
Value	0.074^{***}	0.001^{***}	0.078^{***}	0.003^{***}	0.075^{***}	0.002^{***}
	(0.006)	$(2.0 \cdot 10^{-4})$	(0.007)	$(6.2 \cdot 10^{-4})$	(0.005)	$(2.8 \cdot 10^{-4})$
Period	0.005	−0.011	0.333	-0.034^{**}	0.163	-0.022^{**}
	(0.216)	(0.014)	(0.258)	(0.016)	(0.168)	(0.011)
2A1U					0.091	-0.085^{**}
					(0.976)	(0.042)
Constant	0.526		−0.480		0.051	
	(1.004)		(1.288)		(0.920)	
lrl(lpl)	−864.068	−85.157	−903.066	−116.021	−1767.387	−202.283
$Wald - \chi^2$	158.54	10.87	113.89	16.27	261.72	26.44
$p > \chi^2$	0.000	0.004	0.000	0.000	0.000	0.000
Obs.	270	270	270	270	540	540

Notes. This table reports results from performing the same econometric approach endorsed in *Table 5* in the paper on Periods 11-15.

Table X. (Sum of the) bids in 1A1U, 1A2U and 2A1U - Tobit models

	1A1U	*1A2U*	*2A1U*	*Pooled*	
	(1)	(2)	(3)	(4)	(5)
Value	0.682***	0.627***	0.667***	0.658***	0.659***
	(0.013)	(0.031)	(0.017)	(0.013)	(0.013)
Period	−0.489**	−0.637**	−0.787***	−0.642***	−0.642***
	(0.207)	(0.257)	(0.104)	(0.116)	(0.116)
1A2U&2A1U				−4.298**	
				(2.170)	
1A2U					−5.011**
					(2.323)
2A1U					−3.580
					(2.567)
Constant	7.397***	9.065**	7.573***	10.962***	10.933***
	(2.565)	(3.764)	(1.138)	(2.501)	(2.503)
lpl	−3407.752	−3613.479	−3333.645	−10517.668	−10516.487
$F - stat$	1444.98	345.51	5430.88	1119.66	855.09
$p > F$	0.000	0.000	0.000	0.000	0.000
Obs.	810	810	810	2430	2430

Notes. This table reports reports coefficient estimates (standard errors in parentheses) from censorred regression models (Tobit) over all periods accounting for dependency within rematching group. The dependent variable is the (the sum of the) bid(s) placed by the subject in the period. The censor condition is set at 0. The other remarks of *Table 4* apply.

Table XI. Highest and lowest bids in 1A2U and 2A1U - Tobit models

	1A2U		*2A1U*		*Pooled*	
	Highest	*Lowest*	*Highest*	*Lowest*	*Highest*	*Lowest*
	(1)	(2)	(3)	(4)	(5)	(6)
Value (1 unit)	0.699***	0.556***	0.738***	0.597***	0.717***	0.576***
	(0.029)	(0.033)	(0.016)	(0.022)	(0.017)	(0.020)
Period	−0.291**	−0.346**	−0.335***	−0.451***	−0.313***	−0.399***
	(0.125)	(0.144)	(0.055)	(0.059)	(0.066)	(0.078)
2A1U					0.640	0.728
					(1.082)	(1.343)
Constant	4.543**	4.492**	3.570***	3.928***	3.761***	3.873***
	(1.828)	(1.972)	(0.600)	(0.704)	(1.075)	(1.107)
lpl	−3048.200	−3133.156	−2917.933	−3015.690	−5976.691	−6157.536
$F - stat$	419.46	247.73	1184.54	538.54	807.15	415.32
$p > F$	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	810	810	810	810	1620	1620

Notes. This table reports reports coefficient estimates (standard errors in parentheses) from censorred regression models (Tobit) over all periods accounting for dependency within rematching group. The dependent variable in columns (1), (3) and (5) is the highest bid of the subject in the period. The dependent variable in columns (2), (4) and (6) is the lowest bid of the subject in the period. The censor condition is set at 0. All the other remarks of *Table 6* apply.