An Introduction to Bucket Auctions (for Charity)*

Jeffrey Carpenter† Jessica Holmes‡ Peter Hans Matthews§

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Abstract

A common paradox for charities is the generous in-kind donation. Donations of goods and services are welcomed because of their inherent value but even the most sophisticated organizations find themselves ill-equipped to choose the most lucrative ways to translate these donations into cash. Without much guidance raffles are commonly chosen; however, auctions are becoming more popular. So far, theory predicts that all-pay auction mechanisms will do better than winner-pay mechanisms but the empirical literature is thin and therefore less definitive. Based on behavioral intuition about why some all-pay mechanisms might raise more money than others, we devise a new mechanism which we call a "bucket" auction and show that it generates considerably more revenue than any other standard mechanism in a lab setting with induced altruistic valuations. Given its performance, this and other new mechanisms have the potential to transform this aspect of fundraising.

Keywords: Charity auction, Fundraising, Charitable giving, Experiment.

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†Departments of Economics, Middlebury College and McGill University and IZA; jpc@middlebury.edu.

‡Department of Economics, Middlebury College; jholmes@middlebury.edu.

§Department of Economics, Middlebury College; pmatthew@middlebury.edu.

1 Introduction

While it is common for individuals and businesses to donate to charity, in many cases these gifts are of goods and services, instead of cash. These donations, in-kind, pose a problem for many charities because, while the staff may show considerable expertise at eliciting gifts, there is rarely anyone in the organization who has been trained to identify the most beneficial methods of translating in-kind donations into cash. As a result, there are a lot of simple raffles and an increasing number of auctions using common formats like the sealed bid, oral ascending or the silent. In fact, in just one year (2008) Giving Works, the charity auction arm of eBay, raised $36 million for charity and in just one night in May of 2008 the Robin Hood Foundation which targets poverty in New York City used auctions to raise $57 million from a crowd of celebrities and competitive hedge fund managers. Although it is clear that auctions that translate donations in-kind into cash are becoming an integral part of fundraising, it is not clear, based on the small empirical literature on charity auctions, which of the traditional methods raises the most money, nor is it clear that one couldn't think up new, even more effective, auction formats.

Unlike for-profit auctions, when one is outbid in a charity auction one's surplus does not necessarily fall to zero because the money is going to a good cause. In other words, all participants, even losers, receive and can free ride on the "revenue proportional benefits" created by the money raised in a charity auction. As a result, the independence axiom of the revenue equivalence theorem is violated and mechanisms can be ordered in terms of expected revenue. As shown in the theoretical literature on charity auctions (Engelbrecht-Wiggans, 1994; Morgan, 2000; Goeree et al., 2005; Engers and McManus, 2006), second price sealed bid auctions (in which the highest bidder wins but only pays an amount equal to the second highest bid) should do better than first price auctions but they should both do worse than the less familiar all-pay auction in which participants are required to forfeit their bids, regards of winning or not. The intuition is that when bidders in winner-pay auctions top the highest outstanding bid, they increase their chances of winning but they also eliminate the benefits that they would have received from free-riding on the current high bidder. At the same time this disincentive to best other bidders does not exist in an all-pay auction because the revenue proportional benefits generated by each bidder remain even when they lose. In addition, as Goeree et al. (2005) stress it is not just that the all-pay should dominate the winner-pay formats, it should be the case that the second price all-pay auction should do better than the first price.

To some extent the empirical literature supports the ordering suggested by theory, especially considering the results from experimental studies in the lab. These lab studies tend to

find that the broad category of all-pay mechanisms, which includes various sealed bid formats and raffles, does better than auctions in which only the winner pays. For example, although Schram and Onderstal (2009) and Corazzini et al. (2010) find conflicting evidence about which mechanism generates the most revenue, they both find that the first price all-pay and the raffle do better than the first price winner-pay. In addition, Davis et al. (2006) find that the raffle does better than another winner-pay - the oral ascending (a.k.a., the English) auction and Orzen (2008) shows that, as predicted in Goeree et al. (2005), the last price all pay, in which the highest bidder wins but everyone pays the lowest bid, does better than the first price all-pay.[1]

Inspired by the latitude provided by the theoretical literature to design new mechanisms that should generate more revenue and the stylized fact from the empirical literature that all-pay mechanisms tend to do better, we contribute by developing a new, yet very simple, auction format. Imagine auctioning an in-kind donation using the following set of rules, which we have termed a "bucket" auction. To start, a group of potential donors is asked to form a circle and then one participant is randomly selected to start the auction. The person who is to start is given a small bucket and the rules that determine the winner are announced: the bucket will cycle around the circle and every time the bucket comes to you, you must decide to either donate a fixed non-refundable increment or drop out of the auction. The prize will go to the last person who contributes to the bucket.

Why might we expect that bucket auctions will do better than other formats? The first thing to notice is that, cast in different light, the bucket auction looks a lot like a war of attrition in which a number of combatants receive private signals that give them information about the true value of the prize and they compete by incurring a fixed fighting cost on each round of the contest. Given this isomorphism, we then rely on Krishna and Morgan (1997) and Dekel et al. (2006) who recognize that wars of attrition in which bidders submit open loop strategies (i.e., continuation strategies in which players precommit to a number of cycles) are strategically equivalent to second price all-pay auctions. If the bucket auction can be thought of as a second price all-pay auction then we know from Goeree et al. (2005) that it should not only do better than a first price all-pay, it should also generate more revenue than the standard winner-pay formats.

When creating the bucket, we also considered behavioral reasons why it might do better. Although the evidence presented above suggests that all-pay auctions do better, all the mechanisms discussed so far in the literature have been simultaneous in the sense that

[1] However, all-pay mechanisms do not appear to work as well in the field where participation is a stronger driver of revenues. Carpenter et al., (2008) for example, find that the familiar first price winner pay does better than the less common second price winner pay and the largely unknown first price all-pay because people are less likely to bid in unfamiliar formats.

everyone either submits a sealed bid or buys a number of raffle tickets without explicitly getting any information about what the other donors are doing. We wanted to foster competition by creating a sequential all-pay mechanism under the hypothesis that competition is more likely to arise in situations in which the interim acts of the other contestants are known, not just anticipated.[2] At the same time, we also thought that bids (and revenue) would increase if we took advantage of another stylized fact about real bidders – many are likely to make decisions based on historical, instead of opportunity, costs (Kahneman and Tversky, 1984). In other words, if bidders are "sunk cost sensitive" they may be more likely to continue throwing money in the bucket because they have already contributed a lot and as a consequence the bucket will raise more money.

How well does the bucket auction perform? In an experimental contest pitting this new format against the standard formats in this literature (i.e., the first price winner-pay, the second price winner-pay, and the first price all-pay), the bucket does very well. Not only does it raise three and one-half times as much money as the best performing winner-pay format, on average, it also raises one and one-half times as much as the other all-pay mechanism. In addition, we see that our hypotheses about the behavior of real auction participants are largely confirmed. Part of the reason that the bucket does well is that it better entices sunk cost donors to raise their bids. However, when all is said and done, it appears that the bucket does well mostly because it is sequential and therefore provides a venue for bidders to compete more aggressively.

We proceed by first describing our experimental implementation of the bucket and the other auction mechanisms. We then summarize the demographic characteristics of the participants in our experiment. Concerning our results, we begin by presenting a series of summary tests of mechanism performance and then control for other observable factors using regressions to show that our results are robust. Because we feel it is at least as important to show why the bucket does so well as it is to show that it generates more revenue, we expand our analysis by demonstrating that the behavioral hypotheses that we formulated when designing the bucket account for much of the variation in revenues. To conclude we briefly discuss a set of pilot experiments conducted in the field at charity events that confirms that the Bucket has the potential to significantly impact fundraising efforts.

[2]For example, consider the competitive atmosphere generated by the combination of aggressive hedge fund managers and an oral ascending auction at the annual Robin Hood Auctions in New York City.

2 Implementing Charity Auctions in the Lab

Fortunately, we can be brief and discuss only the important aspects of our experiment because all the details (including sample instructions and our post-experimental survey) are described in Carpenter et al. (2010).

We conducted 20 auction sessions in which our 197 participants were randomly assigned to one of four auction formats: the first price winner pay (FPWP) in which active participants submitted sealed bids, the high bidder won and paid her bid, the second price winner pay (SPWP) where again sealed bids were collected, the high bidder won but only had to pay an amount equivalent to the second highest bid, the first price all-pay (FPAP) our third sealed bid auction which only differs from the FPWP in that all bidders paid their bids, regardless of winning or losing, and the Bucket in which bidders were randomly organized into a circuit, asked sequentially to increase the current contents of a fictitious bucket by at least a minimum, non-refundable, increment or drop out of the auction and the winner was the last person to add to the bucket.

During each session, ten participants were faced with a sequence of ten auctions.[3] The auctions were independent in terms of payoffs because one's earnings did not accumulate from round to round. Instead, one round was chosen at random to determine the final payoffs from the auctions. We chose this method to minimize the extent to which doing well or poorly in one round spilled over into subsequent rounds. On average, our participants earned $25 for sessions that lasted approximately 1.5 hours and generated 200 revenue observations, 50 per format.

Reflecting on our earlier field experiment Carpenter et al. (2008), we decided to implement two design features that we hoped would strengthen the external validity of our results. To minimize any "house money" effects, we had our participants first earn the endowments that they later used to finance their bids. In the first, endowment, stage of the experiment participants had 12 minutes to solve as many anagrams as possible and they were paid a piece rate of 10 experimental monetary units (EMUs) per correct word.[4] Although we wanted the participants to feel as if they had earned their endowments, we also wanted to avoid possible income effects on bidding behavior so we constructed the word puzzles in a way that made it relatively easy to get 10 out of a possible 25 words correct but difficult to get more than 15 correct. Our manipulation seems to have worked mostly as planned: 73% of the participants correctly solved between the planned 10 and 15 puzzles and 94% solved between 10 and 16.

We also wanted to allow participants to be able to "sit out" an auction, as they can easily

[3] Two sessions had fewer than ten participants. In one session nine attended and in the other eight did.

[4] The exchange rate was 10 EMUs equaled a dollar.

do at most real fund-raisers. To this end, at the beginning of each of the ten auction rounds the participants were asked if they wanted to participate in the auction or do another word puzzle instead. To inform this decision each participant was shown her endowment (which was private and replenished at the beginning of each round), her randomly assigned private value for the fictitious good at auction (which was draw from $v_i \in [0, 100]$ and changed from one round to the next), the prize for getting the puzzle correct (which was set to 15 EMUs on each round) and an indicator of how hard the puzzle would be. The puzzle difficulty changed randomly from one round to the next but each participant faced the same puzzle on any given round and the same sequence of puzzles was used for each session.

To keep as close to the theoretical literature as possible (e.g., Goeree et al., 2005; Engers and McManus, 2006; Carpenter et al., 2009) and because otherwise private values would be unobservable, for everyone in a session altruistic values were induced in a manner similar to Schram and Onderstal (2009). Specifically, for the auction entrants winners earned $v_i - b_i$, the difference between one's private value and one's bid, in all but the SPWP where they earned $v_i - b_j$, b_j being the second highest bid. Losers either earned zero in the FPWP and SPWP or paid bi in the FPAP and Bucket. Those people who opted out of the auction earned 15 EMUs if they got the puzzle right and 0 otherwise. These constituted the direct benefits from the round. However, on top of the direct benefits, each participant in the session - whether she bid in the auction or not - received revenue proportional benefits of 10% of the final revenue from the auction and any bidder who forfeited her bid during the auction earned 5% on this donation as "warm glow".

For the interested reader, in Table 1 we disaggregate the demographic characteristics of our participants by auction format.[5] However, because we are mostly concerned about using these demographics as controls in our estimates of the differences in revenue, we will only quickly describe the participants in the aggregate. Our average participant was 25 years old; however, ages varied from 18 to 66 because we purposefully recruited from a broader pool than is typical: 76% of our participants were college students but 19% were staff members and 5% were faculty. Overall, 52% of our participants were women, 76% were white, 24% had finished college or received a higher degree, and 76% had family incomes greater than \$50k per year. In terms of previous auction experience, 44% had never participated in an auction before but 22% had participated before in a charity auction.

[5] As discussed in Carpenter et al., (2010), few of the characteristics differ significantly by auction format indicating that our randomization procedure worked well.

3 How Well Does the Bucket Raise Money?

There are a number of factors that might lead fundraisers to think of an auction as having been successful. In some circumstances, for example, event planners may be mostly interested in participation because formats that involve more people are likely to cultivate a community of donors. In the end, however, revenue is what matters and so although we start broadly by briefly discussing participation and its implications, we quickly focus on revenue.

In Table 2 we see that participation rates hover between 40 and 50 percent and although we see that fewer people take part in the FPAP (as Carpenter et al., 2008 demonstrated in the field), the Bucket entices as many people to participate (or more) than any other mechanism.[6] By itself, this result is interesting because it demonstrates that low participation is not an integral characteristic of every all-pay format. Related to participation, auctions fail when nobody enters and they generate zero revenue. Second price auctions also fail when the second highest bid is zero. Because there are two ways that the SPWP can fail, it is no surprise that in Table 2 it does so more often (in 7 of 50 instances). At the same time it is encouraging to see that the failure rate on the other mechanisms is so low.

In the middle of Table 2 we see a summary of our main results. Because of the higher probability of failure, the SPWP yields only 67.90 EMUs, on average, which is slightly lower than the other winner pay format, the FPWP, which yields an average of 75.59 EMUs. As seen in previous studies, we also find that the FPAP does considerably better than either winner pay format (the mean is 178.33 EMUs). Even the FPAP, however, is dwarfed by the Bucket which raises an average of 264.18 EMUs, an amount more than three times the size of either winner pay format and one and a half times the size of the FPAP. Considering Figure 1 which illustrates the 95% confidence intervals around the revenue means, it should be clear that the FPAP does significantly better than either winner pay and that the Bucket garners significantly more revenue than any other format.[7]

To get a better sense of the size of the differences, we regress revenues on indicators for the auction formats in the first column of Table 3.[8] Using the FPWP as the baseline, we see that the SPWP generates 13.37 EMUs less revenue ($p = 0.02$), the FPAP generates 104.84 EMUs more ($p < 0.01$), and the Bucket yields 190.14 EMUs more ($p < 0.01$). Compared to the point estimate on its closest competitor, the Bucket also yields 85.30 EMUs more in revenue than the FPAP ($p < 0.01$), an increment that seems even larger when we recall that

[6] More specifically, while the differences in participation between the Bucket and either the FPWP or the SPWP are not quite significant, it does draw significantly more people than the FPAP ($p = 0.05$).

[7] Using the nonparametric Wilcoxon test, the p-values are less than 0.01 for each relevant comparison.

[8] Because revenues are truncated at zero when auctions fail, we use the Tobit estimator (with standard errors clustered at the session level).

private values were capped at 100 EMUs.

To make sure that it is not just participation differences that drive the divergence in revenue, in the second column of Table 3 we control for the number of active bidders. Despite being the "thickest" auction, on average, it does not appear that the Bucket does best because of differential participation. As expected, more bidders are good for revenue but controlling for participation does little to diminish the estimated revenue differences. In the last column of Table 3 we also see that controlling at the auction level for the number of participants in the session, the average age of the participants, and the factions of the participants who are women, white, who have completed at least some college, who have high family incomes and who have some auction experience also has little effect on the estimates. The fact that the Bucket does considerably better than the other formats appears to be a robust result.

While it is encouraging how well the Bucket does on average, one might worry that it is gimmick or a one-shot phenomenon. Is it just the case that in the early rounds participants are fooled somehow by the Bucket but eventually they figure out that it is best to stay away from costly wars of attrition? As Figure 2, which plots the mean revenues over time suggests, there is no evidence that the Bucket (or any other mechanism) fizzles with repeated exposure. There is a faint cycle, however, to the revenues of each format. As the overlaid pins in the figure suggest, these cycles correspond, as one would expect, to the changes in the puzzle difficulty.[9]

4 Why Does the Bucket Raise More Money?

As the previous section indicates, the Bucket auction clearly raises a lot of money. This is obviously an important result but it is no less interesting to try to identify the secrets to the Bucket's success. What factors cause the Bucket to be so lucrative?

As mentioned in the introduction, at the beginning of the project we hypothesized that the Bucket could do well because, despite being "sunk", some bidders might consider their previous contributions to the Bucket when deciding whether to continue or not. In addition, because the Bucket allows bids to increase sequentially, there is more latitude for competitive bidders to engage in bidding wars. With these two hypotheses in mind, we added questions to our post-experimental survey to measure the sunk cost sensitivity and competitiveness of our participants. Concerning one's reaction to sunk costs first, we classified participants as sunk cost sensitive if they got the following two questions, which were based on a variety of

[9] As a more formal test, adding either time period indicators or the puzzle difficulty to the last column of Table 3 also has little effect on the format point estimates.

previous surveys, "wrong":

• Imagine that you have decided to see a movie in town and have purchased a $10 ticket. As you're waiting outside the theatre for a friend to join you, you discover that you've lost the ticket. The seats are not marked and the ticket cannot be recovered because the person who sold it doesn't remember you. Would you buy another $10 ticket?

• Imagine that a month ago, you and a friend made a nonrefundable $100 deposit on a hotel room in Montreal for the coming weekend. Since the reservation was made, however, the two of you have been invited to spend the same weekend at another friend's cottage in Vermont. You'd both prefer to spend the weekend at the cottage but if you don't go to Montreal, the $100 deposit will be lost. Would you still go to Montreal?

Our instrument classified 21% of our participants as sunk cost sensitive.

We asked two, more direct, questions to assess competitiveness. In the first, we were purposefully broad but in the second we anticipated that many people would be more wiling to admit competitiveness in sports because it might seem more socially acceptable.

• In general, how competitive do you think that you are?

• Concerning just sports and leisure activities, how competitive do you think that you are?

Respondents could rate their estimates to both questions on 10-point likert scales. Although we experimented with other cutoffs (and factor analysis), it did not seem to matter much and so we classified respondents as competitive if the sum of their scores was 15 or higher. Overall, 41% of our participants were classified as competitive.

In Table 4, we use mediation analysis to assess the extent to which behavioral factors can explain the success of the Bucket auction. The first column largely replicates what was seen in Table 3 (although the controls have been added) and acts as our baseline specification. Again, we see that the revenue ordering is $Bucket > FPAP > FPWP > SPWP$. In column (2) we add the number of sunk cost sensitive participants in the session and the interactions of this with the formats. This specification reveals two important facts. First, the interaction of sunk cost sensitivity and the Bucket is large and highly significant indicating that the Bucket better takes advantage of the presence of sunk cost sensitive bidders. Second, also notice that the point estimate on the Bucket indicator has fallen by approximately 13%. This implies that some of the variation previously attributed to the Bucket mechanism is really associated with the behavior of sunk cost sensitive bidders in the Bucket.

In column (3) of Table 4 we analyze the effect of competitiveness and find that it is an even stronger mediating factor. As in column (2) we see that the interaction of competitiveness and the Bucket results in a large significant effect demonstrating that Competitive bidders bid more aggressively in the Bucket than in the other formats. In this case we also see

that there appears to be a differential effect of competitiveness on bidders in the SPWP and FPAP too, though the effects are much smaller. Returning to the top of the table we see that the inclusion of the number of competitive bidders in the session and its interactions reduces the coefficient on the Bucket by 66% to a level that now hovers on the edge of statistical significance. The inference here is that the ability of competitive bidders to find the room for maneuver in the Bucket to engage in wars of attrition is a principal reason why it does so well.

To complete the analysis in column (4) we let sunk cost sensitivity and competitiveness go "head-to-head" to see which factor best explains revenues in the Bucket. As one can see, in this specification the Bucket indicator is even smaller and no longer significantly greater then zero. In addition, both differential effects remain large, positive and significant but the addition of one more competitive bidder seems to have twice the effect of one more sunk cost sensitive bidder.

As a final thought, we reinforce the notion that the bucket is isomorphic with a war of attrition by illustrating in Figure 3 the outcome of a few representative Bucket auctions (one per connected line). Each "cycle" is once through the circuit of active bidders, the numbers inside the circles indicate how many bidders remain active during each cycle, and the darker lines come from the second half of the experiment. As predicted by most theories of the war of attrition (e.g., Bulow and Klemperer, 1999) while it is not rare for a number of people to enter the bucket, very quickly the competition falls to just two bidders who often end up burning through their entire endowments.

5 Concluding Remarks

Given the revenue equivalence theorem does not hold in the charity case, there is a lot of freedom for economists to think creatively about mechanisms that can enhance fundraising. We have shown that the way forward in the case of auctions might be both theoretical and behavioral. In an attempt to surpass existing mechanisms, we have taken from theory the insight that all-pay auctions should do better than winner-pay auctions and to this fact we have added a bit of behavioral intuition: all-pay auction might do even better if one can more effectively take advantage of the competitive nature of many bidders and the penchant of others for committing the sunk cost fallacy. As we have seen the culmination of these instincts into the simple mechanism that we call the "bucket" auction has paid off – it raises considerably more money than other common formats.

It remains to be seen, however, whether the Bucket auction will pass the ultimate test: is it as effective at real fundraisers? While only a full field implementation can be conclusive, as

a step in that direction we have recently piloted procedures and the results look promising. For example we attended an event to benefit a charter school in Oregon and used the bucket to sell a nice bottle of wine worth $200 and a fancy backyard grille worth $700. Consistent with our lab results, we raised $400 for the wine and $1200 for the grille. More recently we used the bucket to sell a $100 gift certificate for a popular local restaurant and raised $435 from just eight participants. Of course, this makes us curious to know what might happen if we could bring a bucket to the next Robin Hood Foundation auction, especially given it is often attended by so many (competitive) hedge fund managers.

6 References

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7 Figures and Tables

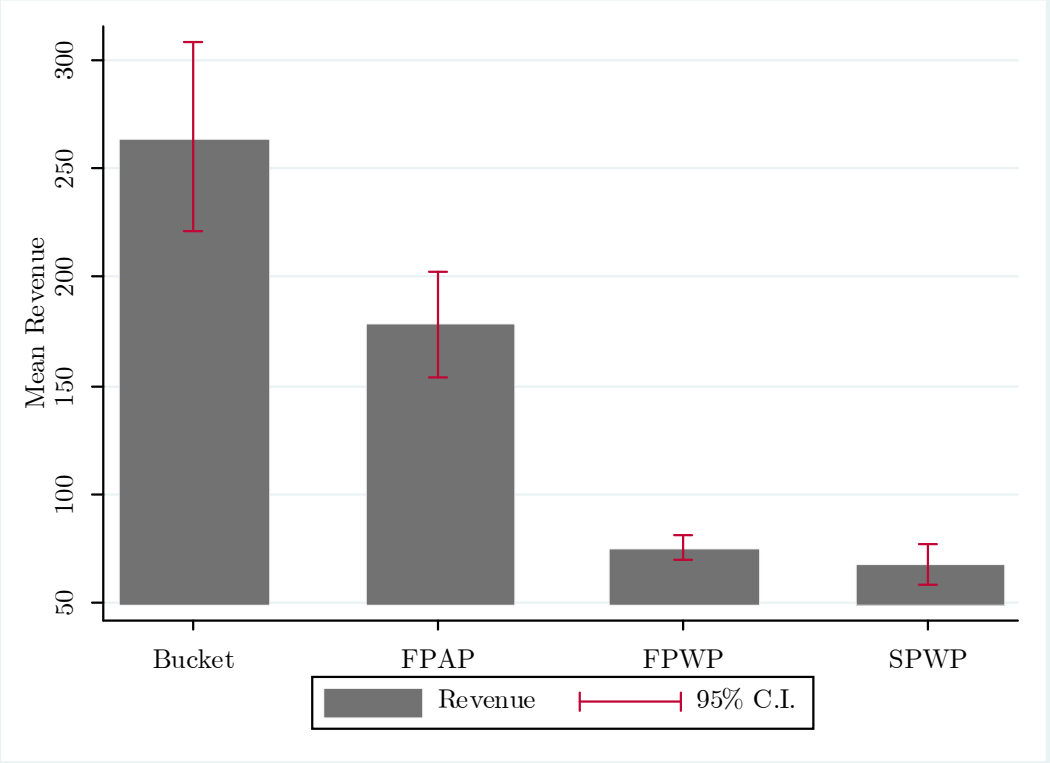

Figure 1. Mean Revenues by Auction Format.

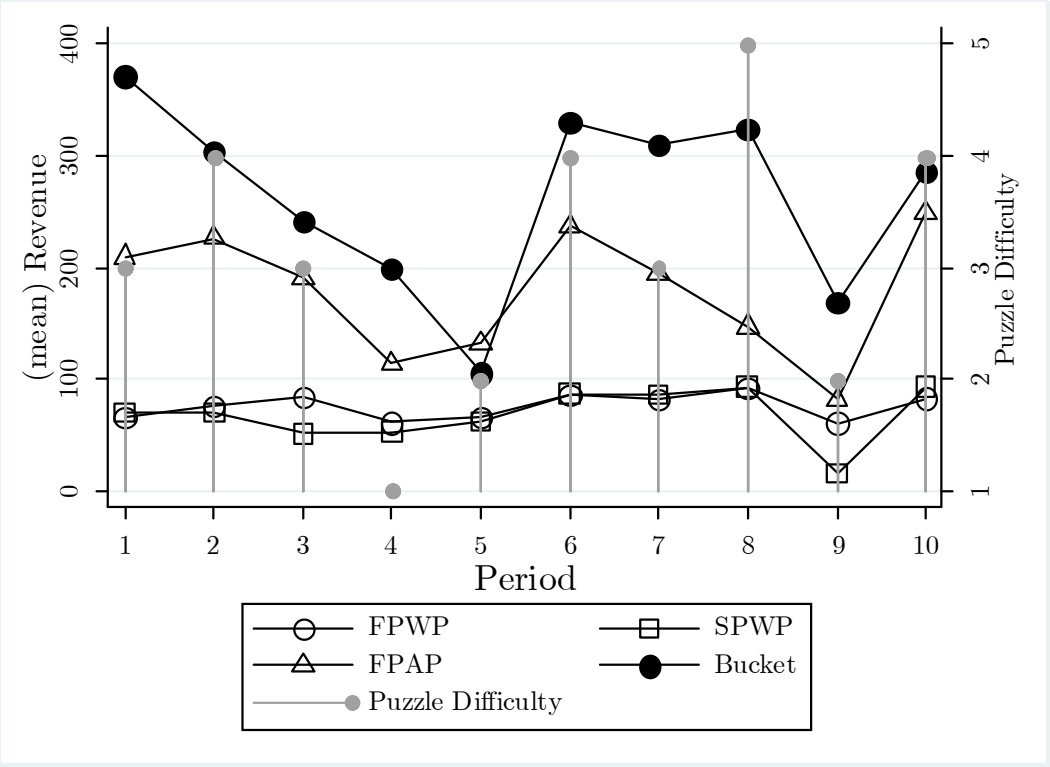

Figure 2. Mean Revenues and Puzzle Difficulty by Period.

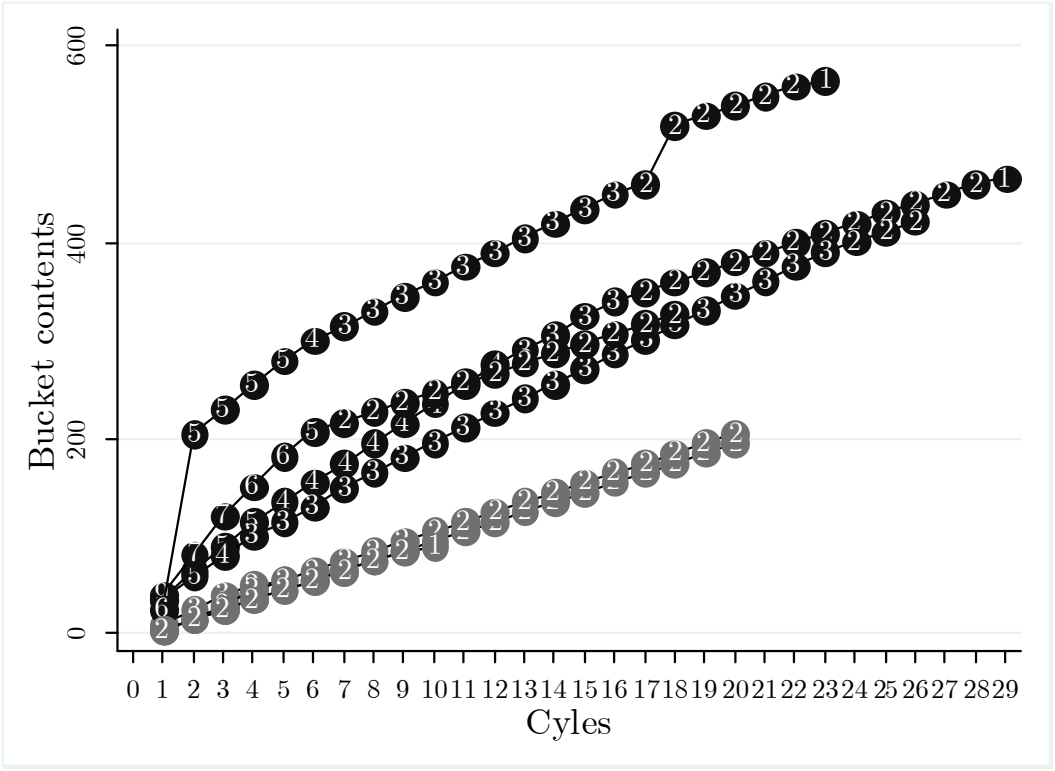

Figure 3. Representative Bucket Auctions. (Note: Each connected line represents an auction; a cycle is completed once the bucket is passed to all the active bidders; numbers inside circles indicate the number of active bidders; circles for the second half of the experiment are darker.)

Table 1: Mean Characteristics by Mechanism (N=197)

Characteristic	**FPWP**	**SPWP**	**FPAP**	**Bucket**
Participants	50	48	50	49
Age	25.94	23.42	25.26	27.16
Female (I)	0.58	0.46	0.48	0.57
White (I)	0.80	0.67	0.72	0.85
African American (I)	0.00	0.02	0.06	0.00
Asian (I)	0.16	0.19	0.14	0.08
Latino (I)	0.00	0.04	0.02	0.02
High School degree (I)	0.06	0.06	0.10	0.06
Some College (I)	0.70	0.75	0.70	0.61
College Degree (I)	0.20	0.12	0.18	0.16
Graduate Degree (I)	0.04	0.06	0.02	0.16
Income Less than 25k (I)	0.16	0.18	0.12	0.06
Income between 25 and 50k (I)	0.12	0.12	0.10	0.10
Income between 50 and 75k (I)	0.14	0.23	0.26	0.10
Income between 75 and 100k (I)	0.22	0.19	0.06	0.24
Income between 100 and 125k (I)	0.18	0.12	0.12	0.16
Income between 125 and 150k (I)	0.06	0.04	0.12	0.04
Income more than 150k (I)	0.12	0.10	0.22	0.28
Charity Auction Experience (I)	0.24	0.21	0.16	0.28
No Auction Experience (I)	0.40	0.44	0.50	0.41
Endowment	142.40	144.17	143.80	144.49

Table 2: Mean Auction Characteristics by Mechanism (N=200)

	FPWP	**SPWP**	**FPAP**	**Bucket**
Participation Rate	0.462	0.465	0.424	0.490
Revenue	75.59	67.90	178.33	264.18
Failed Auctions	0.04	0.14	0.00	0.02

Table 3: Testing for Revenue Differences

	(1) No Controls	(2) No Controls	(3) Controls
model			
Second-Price Winner-Pay (I)	-13.369**	-11.120	-18.254
	(5.565)	(11.040)	(14.065)
First-Price All-Pay (I)	104.840***	114.183***	122.981***
	(10.057)	(11.919)	(8.890)
Bucket (I)	190.144***	187.742***	198.463***
	(17.531)	(19.691)	(19.089)
Number of Active Bidders		22.271***	20.964***
		(4.969)	(4.188)
Observations	200	200	197

Tobit estimates; (robust standard errors) clustered on session.

* p<0.10, ** p<0.05, *** p<0.01.

Controls include session size, age, gender, ethnicity, education, income and previous auction experience

Table 4: Why does the Bucket do so much better?

	(1) Baseline	(2) Sunk Costs?	(3) Competitiveness?	(4) Both?
model				
Second-Price Winner-Pay (I)	-11.816	3.786	-31.310*	-32.585**
	(11.174)	(17.308)	(17.688)	(16.380)
First-Price All-Pay (I)	119.513***	129.711***	75.432***	75.092***
	(10.526)	(15.491)	(22.267)	(17.410)
Bucket (I)	206.521***	179.043***	69.377*	48.475
	(14.763)	(20.247)	(37.149)	(37.729)
Sunk Cost Sensitive Bidders (N)		-8.551		-0.325
		(7.111)		(5.173)
Sunk Cost Sensitive Bidders * SPWP		-13.593		-3.923
		(12.248)		(10.320)
Sunk Cost Sensitive Bidders * FPAP		-8.904		-34.943***
		(11.211)		(10.589)
Sunk Cost Sensitive Bidders * Bucket		40.813***		33.002**
		(13.758)		(14.990)
Competitive Bidders (N)			-9.030	-8.914
			(6.994)	(7.546)
Competitive Bidders * SPWP			16.714**	18.622***
			(6.954)	(6.610)
Competitive Bidders * FPAP			23.329***	35.927***
			(8.934)	(9.786)
Competitive Bidders * Bucket			69.055***	68.020***
			(20.626)	(20.845)
Observations	197	197	197	197

Tobit estimates; (robust standard errors) clustered on session. * p<0.10, ** p<0.05, *** p<0.01.

Controls include session size, age, gender, ethnicity, education, income and previous auction experience