

Testing for Nonstandard Behavior in Auctions in the Presence of Unobserved Demand

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Previous lab evidence on nonstandard behavior in SPAs

Kagel, Harstad, and Levin (1987) and Kagel and Levin (1993) find significant and persistent overbidding in SPAs

Harstad (2000), Cooper and Fang (2008), Garratt, Walker, and Wooders (2011) find that bidders may learn to avoid overbidding

- This learning is most effective when costs are visible

Suggests nonstandard preferences and/or bounded rationality

- What we'll call "nonstandard behavior"

Overview of this paper

We test for nonstandard behavior in auctions in the field

- Most real-world bidders have significant experience, higher stakes, etc.

We largely use tests from the existing empirical literature

We find different results than some of the previous literature

- We find little evidence that bidders exhibit nonstandard behavior

We examine field setting of eBay

eBay has auctions but also fixed-price BINs

- About half of listings now are BINs

Focus on movie DVDs, but also several other items

We test for these nonstandard behaviors

Auction fever (joy of winning, bidding fever, etc.)

- Bidders get utility from winning independent of valuation for item

Quasi-endowment effect (Heyman, Orhun, and Ariely 2005)

- Bidders develop sense of ownership during bidding process even before winning

Escalation of commitment (Ku, Galinsky, and Murnighan 2006)

- Bidders bid above valuations to self-justify the sunk cost of their participation

We test for these nonstandard behaviors

Nonrational herding (Simonsohn and Ariely 2008)

- Bidders favor auctions with more bids despite these extra bids arising from low starting price and not higher unobserved quality

Irrational limited attention (Lee and Malmendier 2011)

- Bidders ignore conspicuous fixed-price options

First approach in empirical literature

Relevant for

- Auction fever
- Quasi-endowment effect
- Escalation of commitment
- Nonrational herding

Test whether early bidding determines later bidding in that auction

- E.g., under nonrational herding, early bids attract more late bids

Potentially severe endogeneity problem

- So previous work uses starting price to proxy for early bidding

First approach in empirical literature

The four behaviors predict that low starting price auctions outperform high starting price auctions

A starting-price effect indicates at least one behavior is present

- Null is evidence against all

Previous findings

- Ariely and Simonsohn (2003), Haubl and Popkowski Leszczyc (2003) find positive effect
- Kamins, Dreze, and Folkes (2004), Ku, Galinsky, Murnighan (2005), Simonsohn and Ariely (2008) find negative effect
- Lucking-Reiley, Prasad, and Reeves (2007) find no effect

Data – eBay field experiment

Question of whether starting price in the field can really be considered exogenous

We sold 420 new movie DVDs in pairs of auctions – summer 2007

Auctions in matched pair were identical except for starting price

- Same movie/format, \$3 ship fee, wording, seller, start/end time

Estimate effect of starting price variation within matched pair

Data – eBay observational data

Three months of bid-level data on DVD auctions/BINs – fall 2008

- 17 Billboard Magazine bestsellers
- 1,920 auctions
- 1,143 BINs

Purpose

- Check that experimental results are not artifact of research design
- Test for irrational limited attention (i.e., auctions versus BINs)
- Reproduce previous work that uses observational data

Effect of starting price on ending price

Prediction: Under nonstandard behaviors, low starting price auctions have higher expected ending price than high starting price auctions, conditional on

- Auctions exceeding high starting price

The starting-price condition avoids left-censoring problems

Robustness: same results from left-censored dependent-variable model (Tobit-like model)

Effect of starting price on ending price

Movie title	Conditional (LSPA - HSPA) (\$)		
	N	Mean	SE
Apocalypto	12	-1.35	0.86
Arthur and the Invisibles	0	.	.
Because I Said So	14	-1.04	0.48
Blood Diamond	12	-0.45	0.61
Casino Royale	0	.	.
Dreamgirls	8	1.31	1.15
Epic Movie	2	-0.49	.
The Fountain	14	-0.34	0.79
Hannibal Rising	0	.	.
Happy Feet	2	2.25	.
Letters from Iwo Jima	2	-0.13	.
Music and Lyrics	6	-0.19	0.75
Night at the Museum	10	-0.19	0.37
Pan's Labyrinth	6	-0.33	0.60
Pirates of the Caribbean: The Curse of the Black Pearl	2	1.00	.
Pirates of the Caribbean: Dead Man's Chest	4	0.88	1.13
The Queen	4	-4.75	3.25
Shrek 2	6	-1.00	1.04
Smokin' Aces	4	0.25	0.25
Stomp the Yard	2	-0.51	.
Déjà Vu	4	0.25	0.25
	114	-0.49	0.25

Auction-level experimental data

Overbidding in auctions relative to BIN fixed prices

Prediction: Under irrational limited attention, auction ending prices may exceed BINs in expectation

- Under standard behavior, auctions end below BINs in expectation

Prediction from theoretical model in Lee and Malmendier (2011)

Lee and Malmendier (2011) test prediction on eBay

- 57% of auctions end above low-price BIN
- Auction ending prices are 10% above low BIN price

Overbidding in auctions relative to BIN fixed prices

Key assumption of test: Bidders are initially aware of all auctions and BINs

- eBay's search results are sensitive to search string and often hundreds of listings in search results

eBay's search algorithm is "All words any order" (approximately)

- Search of "Batman Begins DVD" returns 699 listings
- Search of "Batman Begins 2005 DVD" returns 265 listings
- Search of "Batman Begins on DVD" returns 5 listings

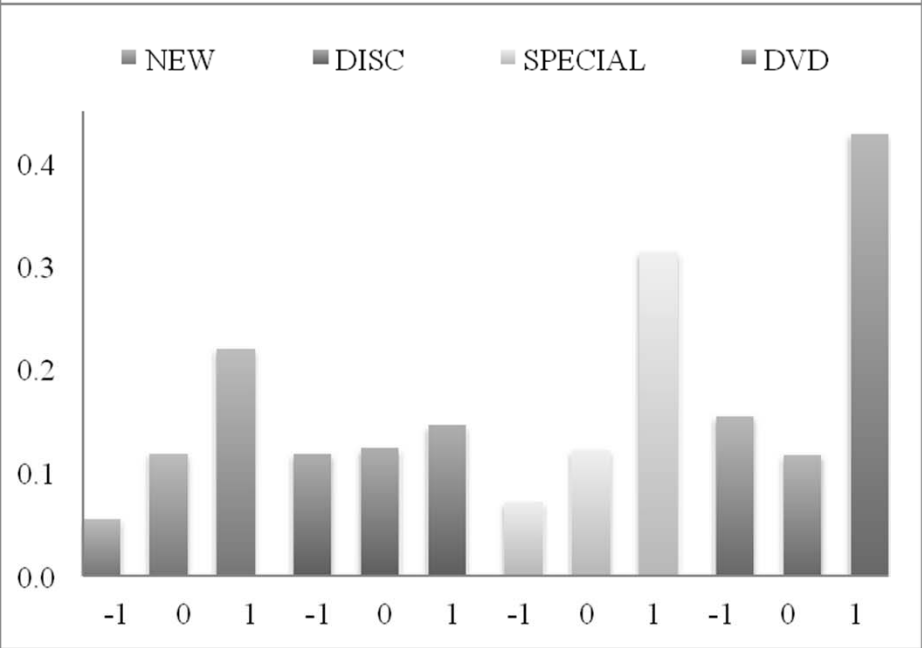
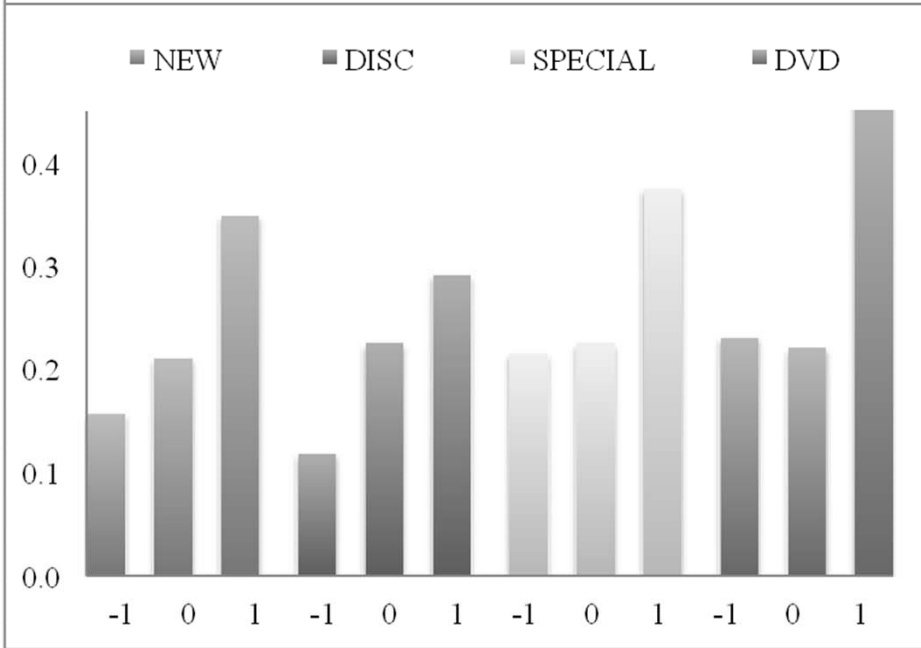
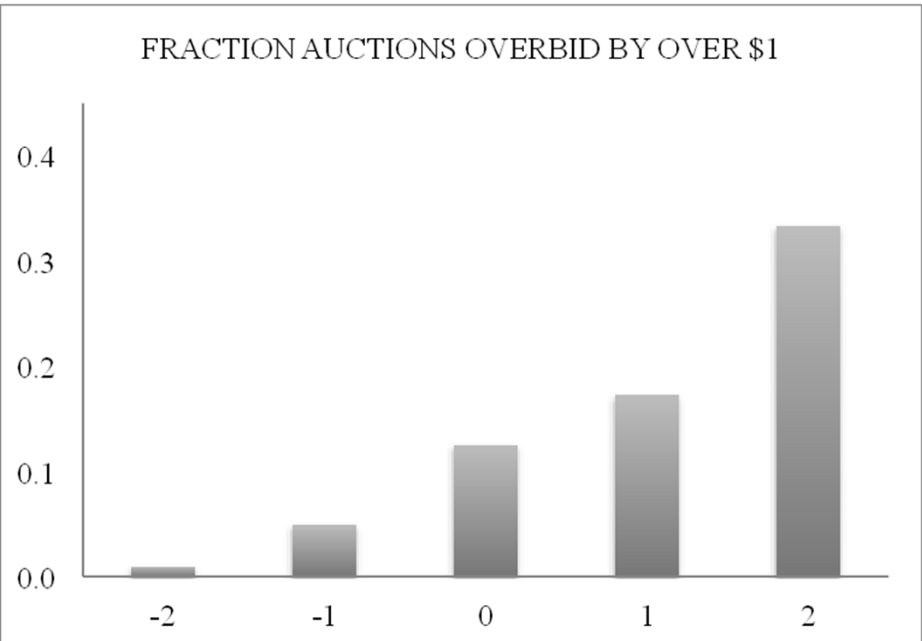
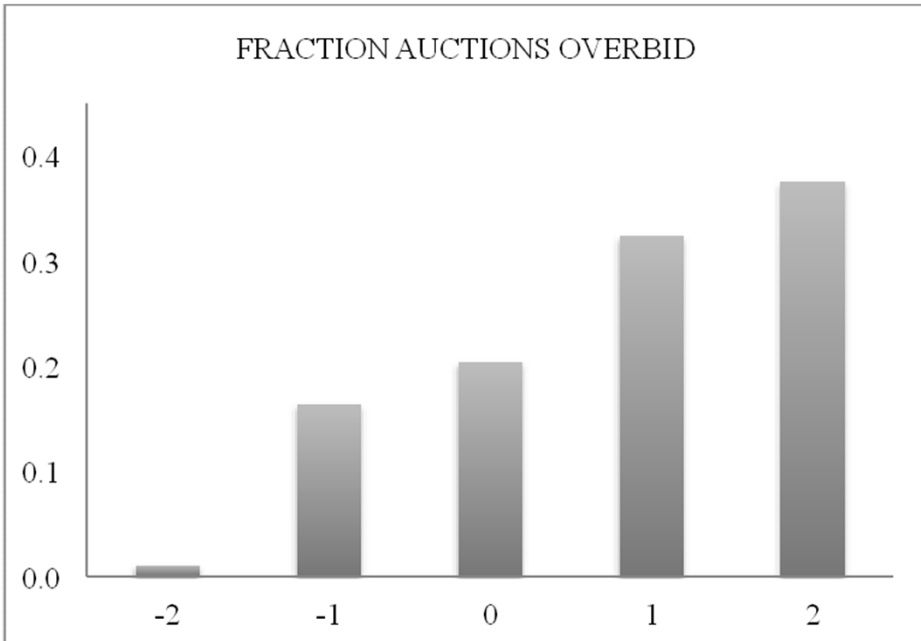
Listings with extra words in title appear in more search results

- Listing title of "Batman Begins new" appears in more search results
- Listing title of "Batman Begins" appears in fewer search results

Overbidding in auctions relative to BIN fixed prices

Movie Title	Version	New DVDs			
		N	Fraction overbid	Auction - BIN price (\$) Mean	SE
Batman Begins	Regular edition (1 disc)	35	0.34	-0.56	0.29
	Special edition (2 disc)	1	0.00	-4.91	--
Camp Rock	Regular edition (1 disc)	97	0.27	-1.30	0.27
Casino Royale	Regular edition (2 disc)	18	0.17	-1.55	0.51
	Special edition (3 disc)	3	0.00	-8.10	2.84
College Road Trip	Regular edition (1 disc)	30	0.03	-3.98	0.40
Harold and Kumar Escape From Guantanamo Bay	Regular edition unrated (1 disc)	10	0.00	-9.63	1.43
Knocked Up	Regular edition unrated (1 disc)	34	0.18	-2.34	0.38
	Special edition unrated (2 disc)	1	0.00	-14.92	--
Live Free or Die Hard	Regular edition unrated (1 disc)	9	0.44	1.39	2.21
	Special edition unrated (2 disc)	1	1.00	0.02	--
Miss Pettigrew Lives For a Day	Regular edition (1 disc)	16	0.00	-6.39	0.64
Pirates of the Caribbean 3	Regular edition (1 disc)	62	0.39	-0.36	0.28
	Special edition (2 disc)	1	0.00	-3.40	--
Riddick Trilogy	Regular edition (2 disc)	4	0.25	-3.42	3.79
Shark Tale	Regular edition (2 disc)	6	0.67	-0.20	1.62
Street Kings	Regular edition (1 disc)	39	0.21	-1.89	0.33
	Special edition (2 disc)	7	0.43	-1.30	1.21
The Bank Job	Regular edition (1 disc)	27	0.48	-0.78	0.59
	Special edition (2 disc)	2	0.50	-9.53	10.01
The Notebook	Regular edition (1 disc)	30	0.07	-2.25	0.28
The Scorpion King 2	Regular edition (1 disc)	50	0.14	-2.40	0.28
Transformers	Regular edition (1 disc)	37	0.05	-4.56	0.57
	Special edition (2 disc)	31	0.26	-1.73	0.88
		551	0.23	-2.13	0.15

Auction-level observational data – new DVDs



Reconciling results with previous work

We also test whether word differences are important using Lee and Malmendier (2011) data

They examine two sets of products

- Cashflow 101 board game (166 auctions)
- Cross-section of 12 products for generalizability (1886 auctions)

We focus on cross-section since these data contain listing titles

Reconciling results with previous work

Effect of listing title differences for word “new” in cross-section

	N	Fraction auctions overbid	Fraction auctions overbid by over 5%	Auction price - BIN price (%)
Auction has "new," BIN does not	259	0.60	0.52	11.9
Auction and BIN both have or do not have "new"	884	0.38	0.26	-1.2
Auction does not have "new," BIN does	308	0.36	0.24	-3.4
All auctions	1451	0.41	0.30	0.7

We also found some data issues that help to explain the cross section overbidding results

- I.e., the results may not generalize from the Cashflow game

Overbidding in auctions relative to gift cards

Jones (2011) finds that 41% of eBay auctions for Amazon.com gift cards end above gift-card face value

- Attributes result to bidding fever

But typical overbidder purchases high volumes of gift cards, often above face value

Overpayment by bidder should be immediately obvious

- Learning should occur (original lab results show this)

Overbidding in auctions relative to gift cards

Bid History: Details

Bidding Details	
Bidder Information	30-Day Summary
Bidder: 2***7 (1718 ★)	Total bids: 49
Feedback: 100% Positive	Items bid on: 44
Item description: \$20.00 Amazon.com Gift Certificate	Bid activity (%) with this seller: 2% ?
Bids on this item: 1	Bid retractions: 0
	Bid retractions (6 months): 0

30-Day Bid History

Category	No. of Bids	Seller ?	Last Bid ?
Gift Cards & Coupons > Gift Cards	1	Seller 1	1d 21h
Coins & Paper Money > Dollars	3	Seller 2	<1h
Gift Cards & Coupons > Gift Certificates	1	Seller 3	1d 19h
Gift Cards & Coupons > Gift Cards	1	Seller 4	13h
Gift Cards & Coupons > Gift Cards	1	Seller 5	13h
Gift Cards & Coupons > Gift Certificates	1	Seller 6	1h
Gift Cards & Coupons > Gift Cards	1	Seller 6	1h
Gift Cards & Coupons > Gift Cards	1	Seller 7	1d 12h
Gift Cards & Coupons > Gift Cards	1	Seller 8	2d 8h
Gift Cards & Coupons > Gift Cards	1	Seller 9	13h
Gift Cards & Coupons > Gift Cards	1	Seller 10	2d 9h
Gift Cards & Coupons > Gift Cards	1	Seller 11	12h
Gift Cards & Coupons > Coupons	2	Seller 12	1h
Gift Cards & Coupons > Gift Certificates	1	Seller 6	2h
Gift Cards & Coupons > Gift Cards	1	Seller 13	4d 4h
Gift Cards & Coupons > Gift Certificates	1	Seller 14	3d 12h
Gift Cards & Coupons > Gift Cards	1	Seller 15	3d 7h
Gift Cards & Coupons > Coupons	1	Seller 16	2d 15h
Gift Cards & Coupons > Gift Cards	1	Seller 17	2d 15h
Gift Cards & Coupons > Gift Cards	1	Seller 18	2d 13h
Gift Cards & Coupons > Gift Cards	2	Seller 19	2d 12h
Gift Cards & Coupons > Gift Cards	1	Seller 20	2d 3h
Gift Cards & Coupons > Gift Cards	1	Seller 19	2d 12h
Gift Cards & Coupons > Gift Cards	1	Seller 19	2d 12h
Gift Cards & Coupons > Gift Cards	1	Seller 21	2d 11h
Gift Cards & Coupons > Gift Cards	1	Seller 22	1d 19h
Gift Cards & Coupons > Gift Cards	1	Seller 23	1d 11h
Gift Cards & Coupons > Gift Cards	1	Seller 24	1d 7h
Gift Cards & Coupons > Gift Cards	1	Seller 25	7h
Gift Cards & Coupons > Gift Certificates	1	Seller 6	4h

Main take-aways

We test for many/most nonstandard behaviors that have been attributed to bidders in online auctions

And find uniformly null results

We focus on trying to explain the differences with previous work

Unobservables are a particularly serious challenge here