Selling Money on eBay: A Field Study of Surplus Division

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May, 26 2017 Cargese

Outline

Motivating example

A private-value good is on (fire-)sale:

- Buyer i's value V
- Seller's outside option $C < V$

Question: If buyer i gets to offer a price, how much would he offer?

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- Ultimatum game **with no competition** (Güth, Schmittberger, Schwarze, 1982): Player 1 proposes to Player 2 how to share a pie. Player 2 accepts or rejects. If rejects, both get zero.
- Theory (SPNE): the proposer offers 0+, the responder accepts any positive offer.
- Experimental evidence (Bearden 2001, Camerer 2003, Güth and Kocher 2013):
  - Most offers are between 25% and 50% of the pie, 50% is a frequent mass point
  - Offers below 20% are rejected ... but not by Buddhist monks! (Hong, King 2008)

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Motivation

- Social preferences are consistently found in Lab ultimatum games over 30 years (e.g. van Damme et al. JEBO 2014). But can we rely on these findings?
- Lab is different from Field: level of scrutinity, anonymity, context, stakes, selection into experiment, restricted choice (List, Levitt JEP 2007)
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Contribution

1. The first natural field study of an ultimatum-type game. By definition (Harrison, List JEL 2004) "natural field" implies:
   - nonstandard subject pool,
   - field context in either the commodity, task, or information set that the subjects can use, (← Bolton, Ockenfels JEBO 2014)
   - subjects naturally undertake these tasks and do not know that they are in an experiment.
2. A novel approach to handling data from uncertain experiments

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Findings

- We find evidence of surplus sharing; however, less than in the Lab
- Stake size does not affect the splitting offers
- Furthermore, we document:
  - poor use of payoff-relevant information (*irrational* inattention)
  - different patterns for East and West Germany, likely due cultural differences

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buyer's strategy B_i	seller's strategy
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- Good for sale: Amazon gift card with nominal value V
  - Amazon gift card can be used for buying any goods on Amazon, the credit can be split, stored for up to 2 years, combined with other payment methods
- Offers B_i from buyers in a secondary market
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Experiment
eBay: an overview

- eBay.de, Germany: more than 25 mln registered and 16.5 mln active buyers
- buy and sell almost any goods, new and second-hand
- two formats: *auction* ($\approx$ *second price)* and *Buy-it-now* = *BIN (posted price)*
    - *BIN + Best offer = BINBO*

Experiment
Setup

"Buy-it-now or Best Offer" format:

- Buyer can buy at price immediately or make an offer to the seller (min=1 Euro)
- In response the seller can accept, reject / do nothing, make counter-offer
- The seller can keep the good (unlike in the eBay auction)
- The buyer observes the remaining time and the number of offers outstanding

Experiment
Amazon gift-cards on eBay

- Relatively active market, e.g. June 13, 2014 at 7 pm:
  - 87 gift-cards of different nominal values are on sale
  - History of previous 114 days – 1962 offers in total, sold and unsold
- Nominal values range from 5 to 2500 Euros (history)
- Video

Hallo, **pichenettes!** | WOW! Angebote

Mein eBay Verkauf

ebay Stöbern in Kategorien

amazon gutschein

Gutscheine

Verwandt: **mülheim** **lovefilm 60** gutschein **bestchoice** gutschein **best choice** **aral** gutschein **amazongutschein** **vero moda** gutschein **tickets** ...

Kategorien

Tickets

Gutscheine

Einkaufsgutscheine (87)

Sonstige (2)

Restaurantgutscheine (1)

Gutscheinart Alle einblenden

Artikelzustand Alle einblenden

☐ Keine Angabe (90)

Preis

EUR bis EUR »

Angebotsformat Alle einblenden

◉ Alle

○ Auktion

○ Sofort-Kaufen

Artikelstandort Alle einblenden

◉ eBay Deutschland

○ Deutschland

○ Europa

○ Weltweit

Auktion & Sofort-Kaufen | Artikelzustand | Artikelstandort | Sortieren: Belieb...

90 Ergebnisse für **amazon gutschein** + Dieser Suche folgen **Versand nach:** 53113

Neu eingestellt Amazon Gutschein 30 Euro

Noch 14 Std.
Montag, 14:36

EUR 25,50
6 Gebote
Kostenloser Versand

50 €/EURO Amazon Gutschein - Versand im Minutentakt bis max 1h

Kostenlos & Schnell

EUR 58,00
oder Preisvorschlag
Kostenloser Versand

10 € Einkaufsgutschein für amazon.de Gutschein gutscheine

Noch 17 Std.
Montag, 17:09

EUR 9,55
2 Gebote
Kostenloser Versand

Experiment
Setup

Our approach:

- Use 5 different eBay accounts: feedback status from 0 (registered in 2014) to ≈400 (registered in 2004)
- Nominal values of gift cards: 5, 10, 20, 50, 100, 200, 500 euros.
- From each account we propose one or two cards in the BINBO format:
  - initial price: 6.90 for "5 Euro card", 11.90 for "10 Euro" etc.
  - duration of each listing: 3 days
- Rotate nominal values across accounts

Experiment
Example, 1 run

- June 1 at 1:08 PM we list a voucher with nominal value of 100 euros.
- June 3,10:16 AM we receive the 1st offer of 90 euros from buyer *lu..er* with 6 eBay stars
- June 3,1:23 PM the 2nd offer of 80 euros from buyer *xx...30* with 60 stars.
- We let both offers expire on June 4 at 1:08 PM

We get: 2 observations with the exact timing of announcement and the offer, the order in which the offer arrives, the information about the buyer (eBay id, rating, ZIP) and the seller (one of our accounts) etc.

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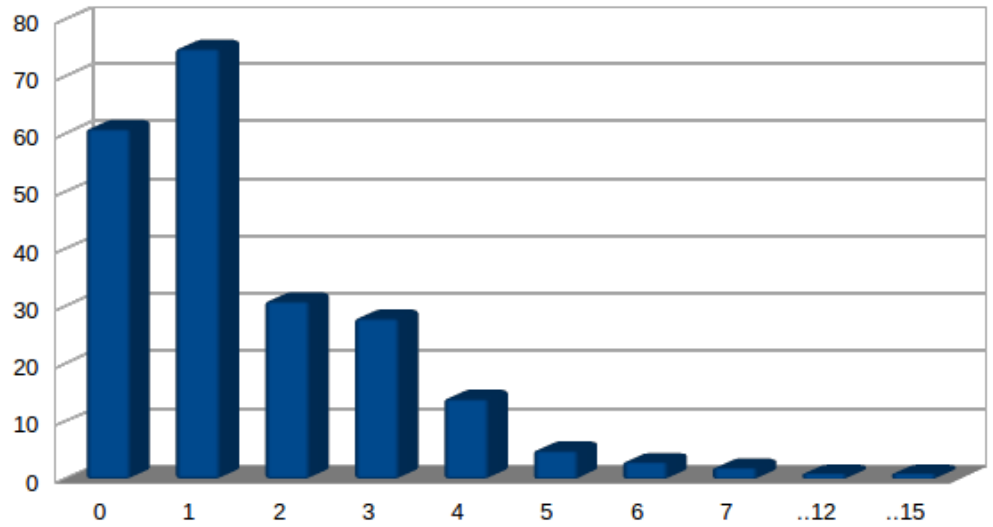
Outline

Data
Arrivals

April to July 2014 and March 2015, we posted 221 listings.

- 72% received at least 1 offer within the 3-day period.
- Mode = Median = 1 offer per listing.
- Mean = 1.6 offers per listing.
- Mean eBay experience = 8.5 years.



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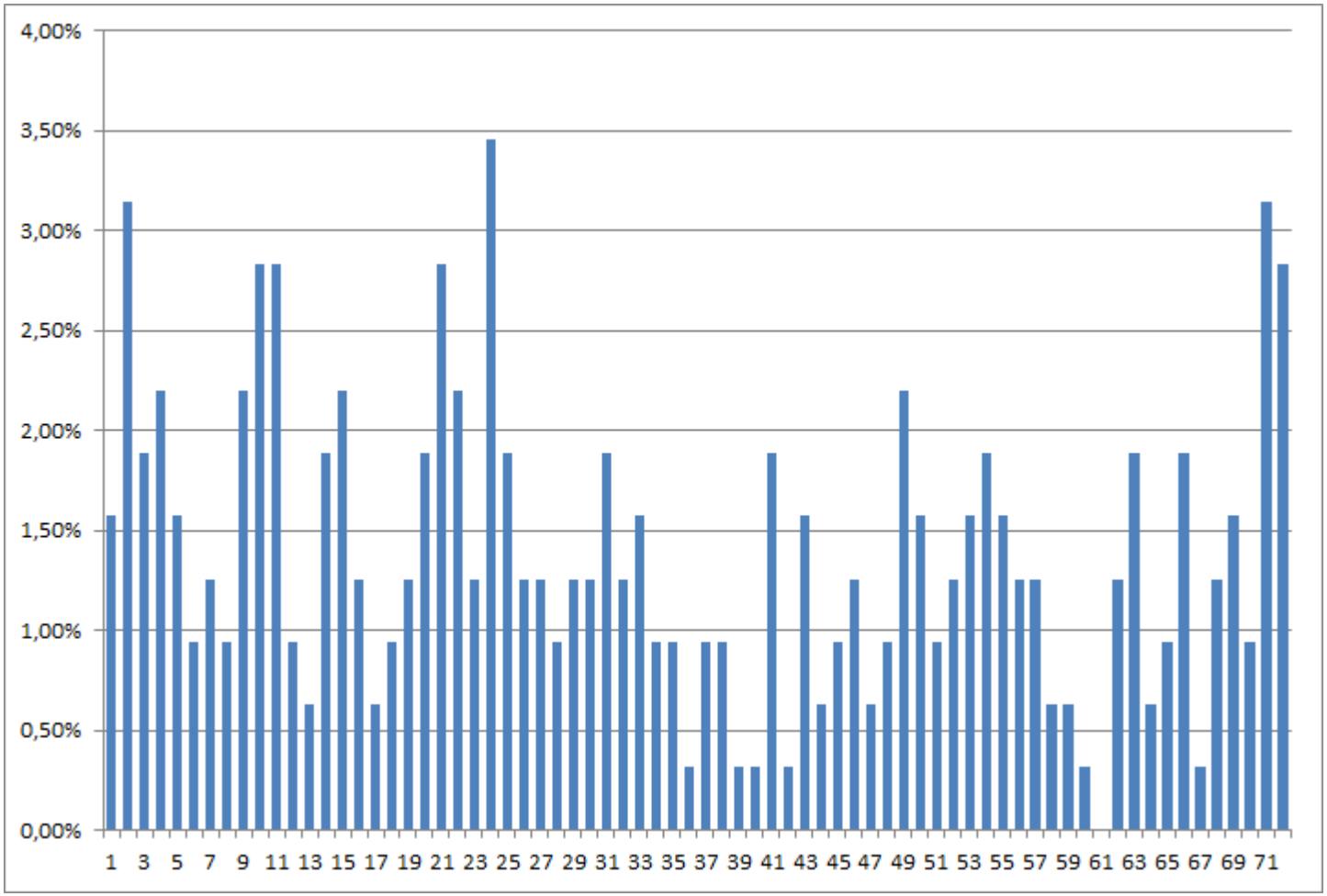

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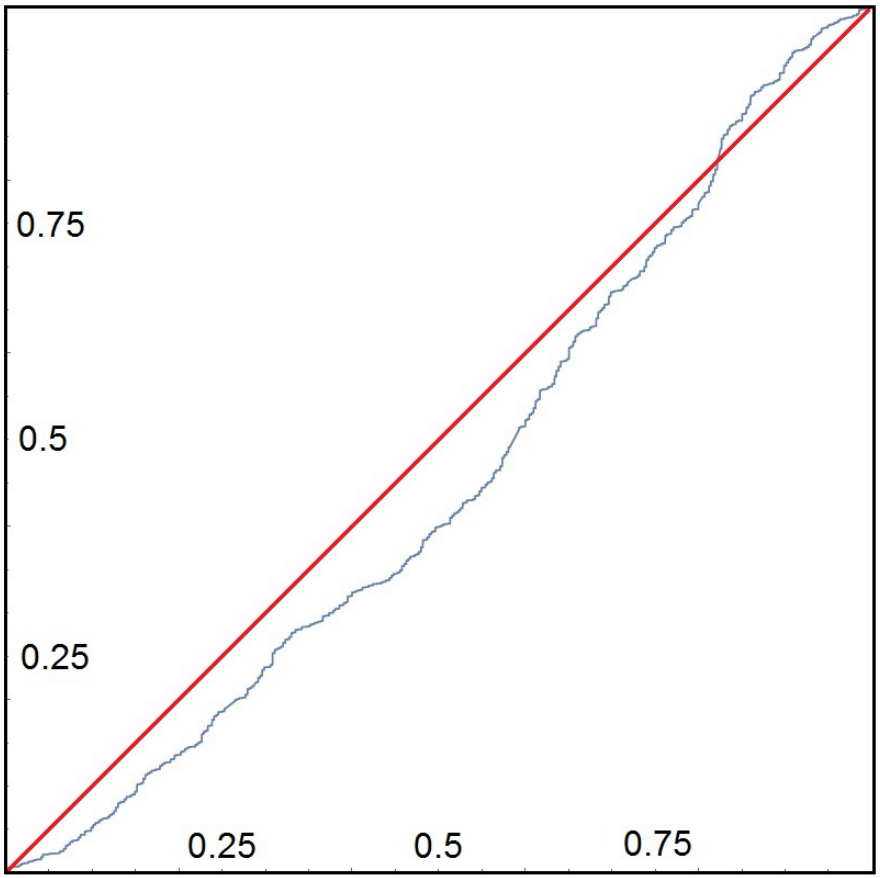


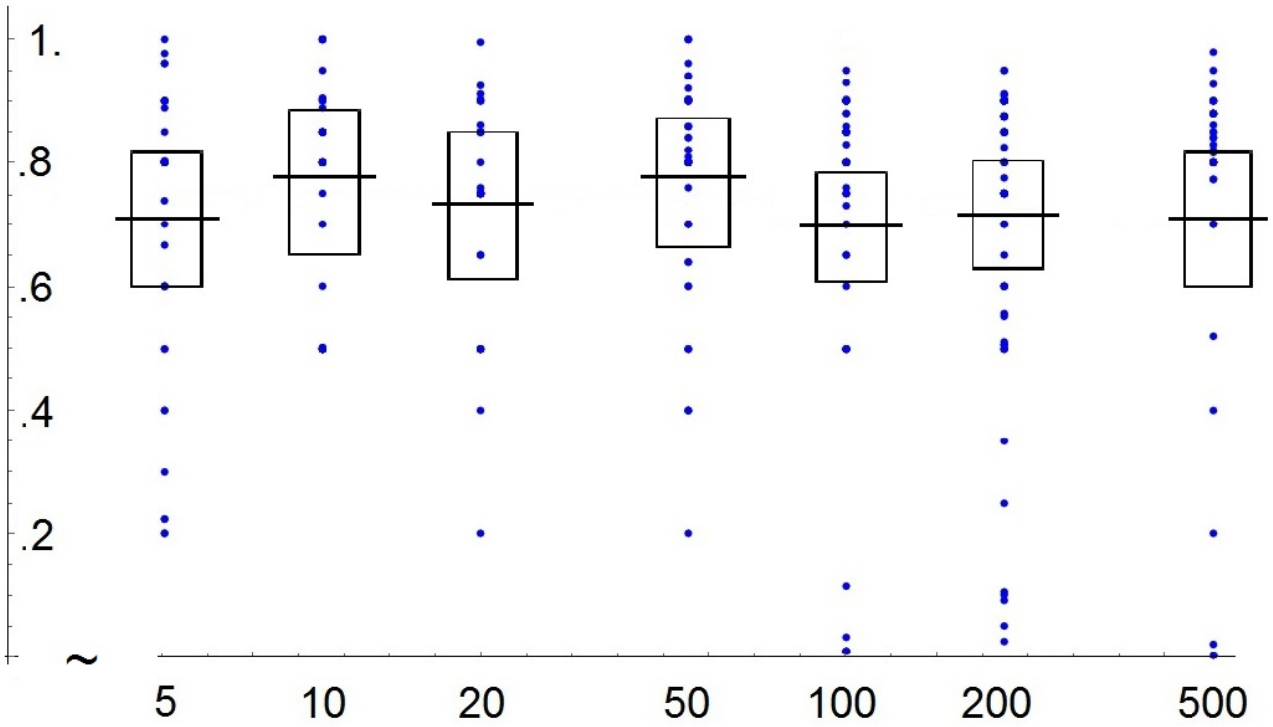
Data
Values

Value, euro	**All**	*5*	*10*	*20*	*50*	*100*	*200*	*500*
N° listings	**221**	46	25	19	22	36	43	30
N° offers	**359**	42	45	38	57	60	74	43
Mean	**0.73**	0.71	0.77	0.73	0.77	0.70	0.72	0.71
St.D	**0.23**	0.23	0.18	0.17	0.17	0.27	0.23	0.29
Median	**0.80**	0.80	0.80	0.75	0.80	0.80	0.79	0.82

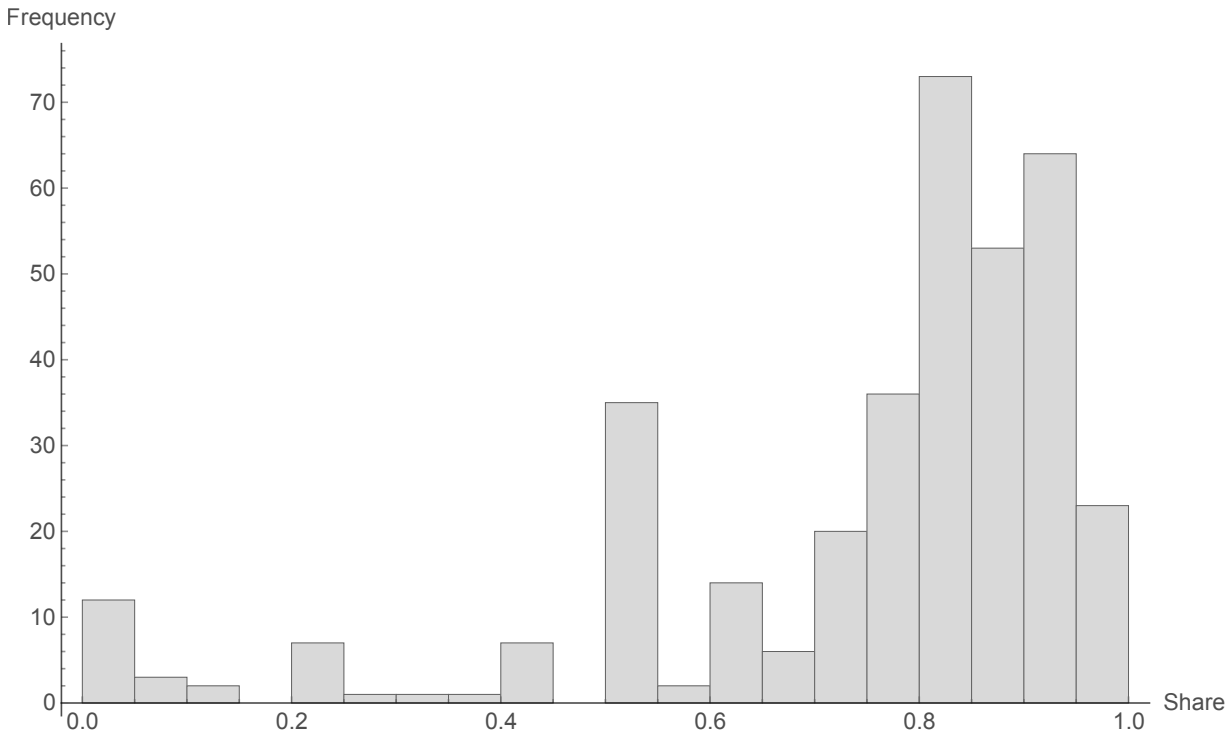
Table : Descriptive statistics

Data

Normalized Offer Values as Function of Nominal Values, logs (compare: Slonim and Roth (Econometrica 1998))



Data
Empirical Frequencies, Pooled Data



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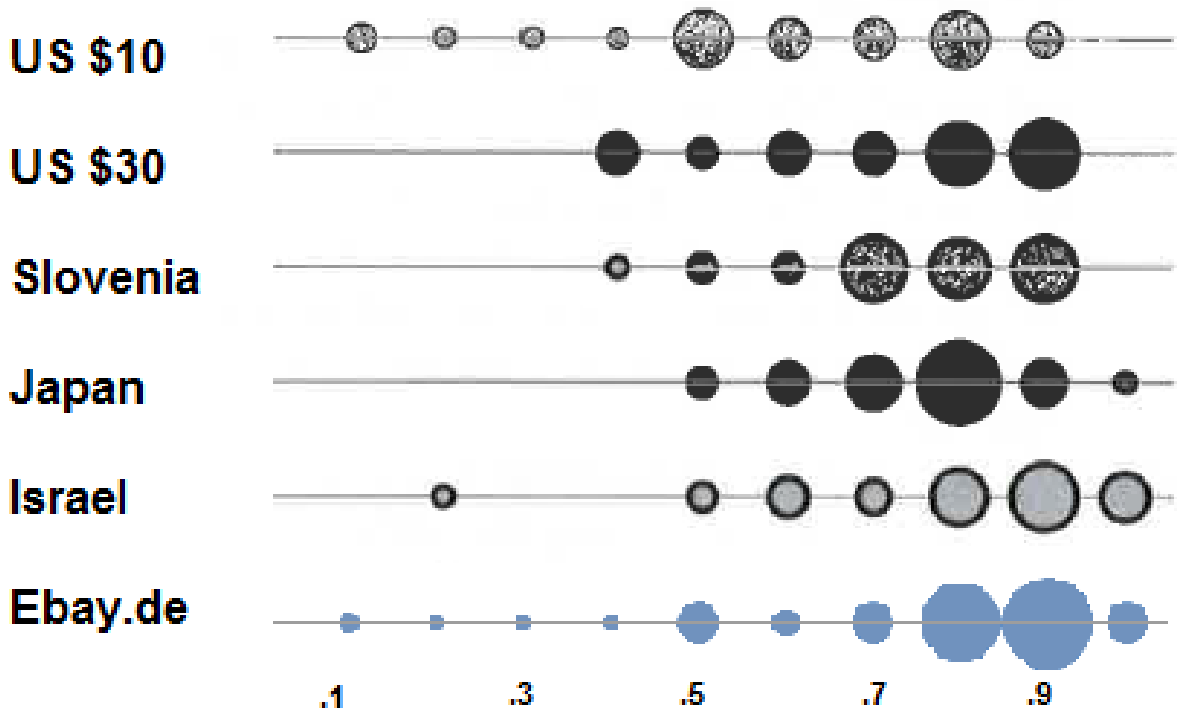
Empirical Frequencies: eBay Vs. Roth, Prasnikar, Okuno-Fujiwara, Zamir (AER, 1991)



The Use of Information

Regression coefficients

	Model 1	Model 2	Model 3	Model 4	Model 5
constant	0.736***	0.751***	0.737***	0.741***	0.762***
nominal	$-6.5 \cdot 10^{-5}$		$-6.5 \cdot 10^{-5}$	$-6.8 \cdot 10^{-5}$	$-6.4 \cdot 10^{-5}$
log nominal		$-5.8 \cdot 10^{-3}$			
t to deadline			$-1.8 \cdot 10^{-3}$	$2.1 \cdot 10^{-3}$	$4.6 \cdot 10^{-3}$
arr. order				$-2.1 \cdot 10^{-3}$	$-4.1 \cdot 10^{-3}$
time trend					$-1.2 \cdot 10^{-4}$
N° obs	359	359	359	359	359
R sq.	0.001	0.001	0.002	0.002	0.006

The Use of Information

There are two public signals about the state of competition on the current listing:

1. time left to listing expiry
2. the number of offers outstanding

We find no effect of these observables on the relative offers. Furthermore, we observe

- no change in relative offers during the course of the experiment (public history)
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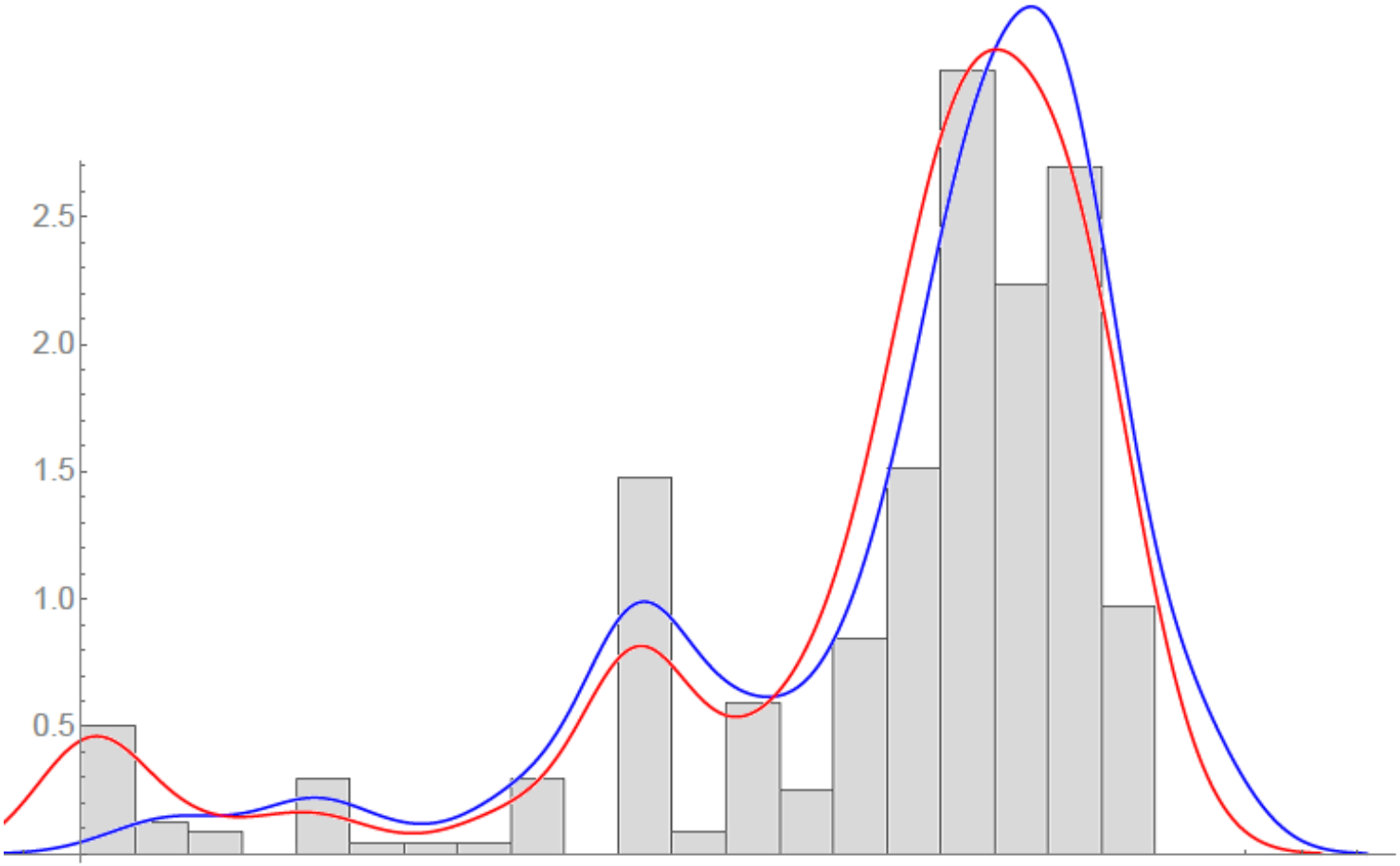
First and Subsequent Offers



East & West Germany

We observe two different patterns for East and West German subjects:

East: 50-50 split proposed more often

West: more offers that are close to the competitive prediction

The pattern does not change after the sample correction for eBay experience.

Similarly, Ockenfels and Weimann (1999) and Brosig-Koch et al. (2011) find East-West differences in the lab. John and Thomsen (2013) find more support for other-regarding preferences in East than in West Germany among teenagers.

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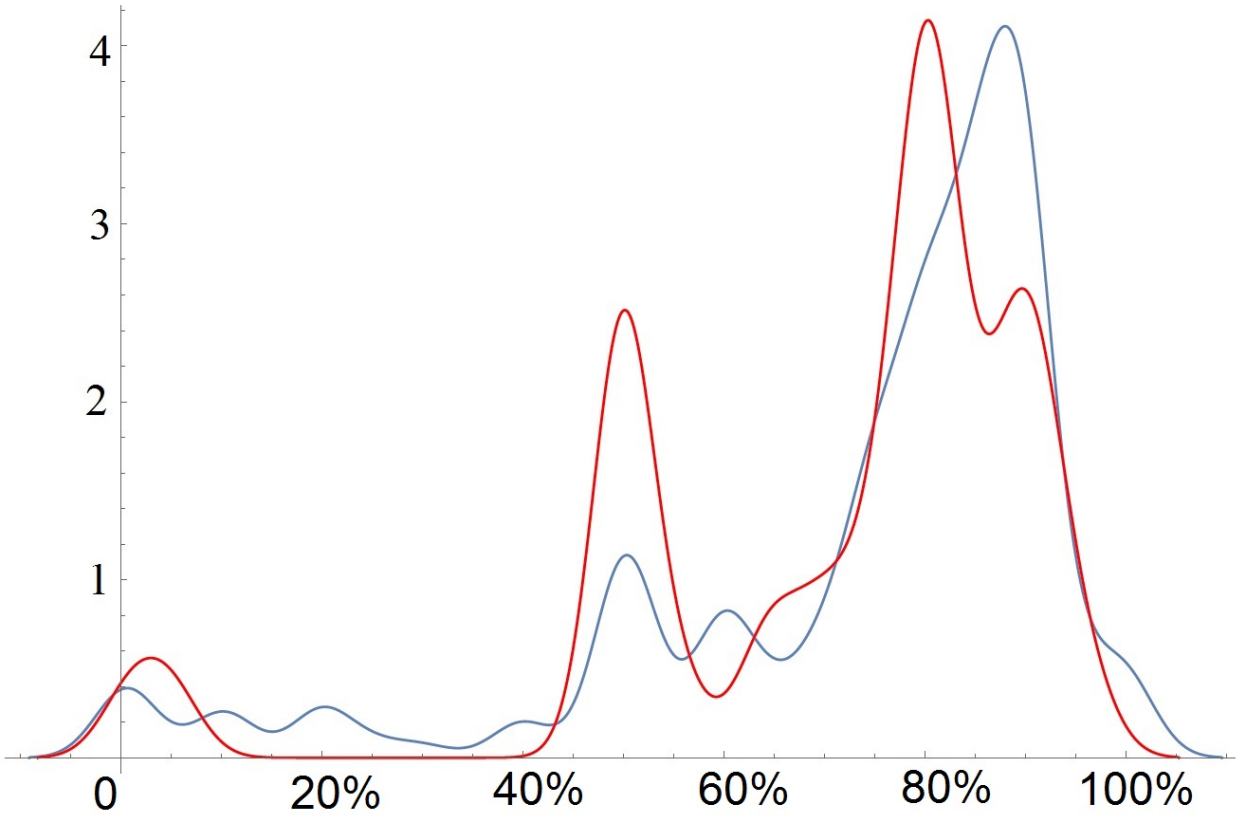
Smooth Kernel Histograms



Outline

Decomposition

- $b = \frac{B}{V} \in (0,1)$ normalized offer
- $c = \frac{C}{V} \in [0,1)$ seller's normalized outside option (or cost) of trade
- $1 - c = \frac{V-C}{V}$ trade surplus
- $s \in [0,1]$ the seller's relative share

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$$b = c + s(1-c)$$

Decomposition

- $f(s)$ pdf of sharing rules s (unobserved)
- $g(c)$ pdf of cost estimates c (unobserved)
- $h(b)$ pdf of offers b (observed)
- We assume that f and g are independent:

$$\begin{aligned} H(b) &= \Pr(c + s(1-c) < b) \\ &= \int_0^b \left[\int_0^{\frac{b-c}{1-c}} f(s)\, ds \right] g(c)\, dc \end{aligned}$$

Decomposition: Non-parametric

In practice, we estimate

$$\hat{H}(b) := \int_0^b \left[\int_0^{\frac{b-c}{1-c}} \hat{f}(s)\, ds \right] \hat{g}(c)\, dc$$

subject to: $\hat{f}(s) = 0$ for all $s > 0.5$.

$$\left(\hat{f}^*, \hat{g}^*\right) = \min_{\hat{f}(b_k), \hat{g}(b_k)} \left\{ \sup_{b_k, k=1,..10} \left| \hat{H}(b_k) - H(b_k) \right| \right\}$$

We use binary tree search on the bins, starting from the uniform distribution.

Decomposition: Parametric

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$$\left(\hat{f}^*, \hat{g}^*\right) = \min_{\hat{f}(b), \hat{g}(b)} \left\{ \sup_{b \in [0,1]} \left| \hat{H}(b) - H(b) \right| \right\}$$

We assume that $\hat{f}(.)$ and $\hat{g}(.)$ are each a linear combination of Chebyshev polynomials (1st kind).

Estimated Distributions of Sharing Rules and Beliefs

s:	0-10%	10-20%	20-30%	30-40%	40-50%
$\hat{f}^*(s)$:	25.9	7.4	3.7	18.5	44.4

c:	0-10%	10-50%	50-60%	60-70%	70-80%	80-90%	90-100%
$\hat{g}^*(c)$:	14.3	7.1	5.4	17.9	23.2	21.4	10.7

Kolmogorov-Smirnov test (bootstrap) does not reject the hypothesis that the empirical data H was drawn from $\hat{H}^*$ at significance levels 1, 5, or 10 percent.

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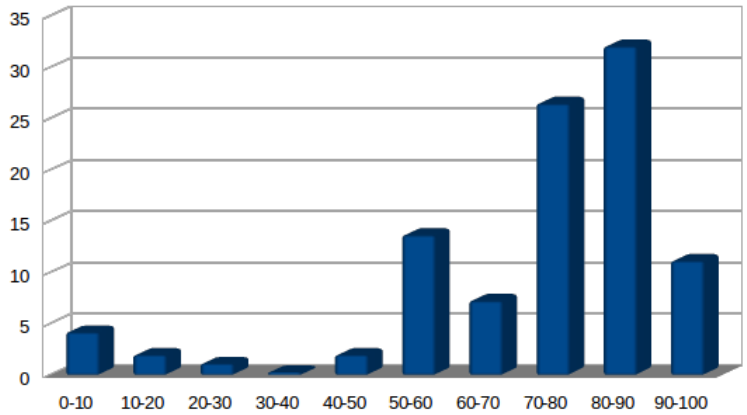

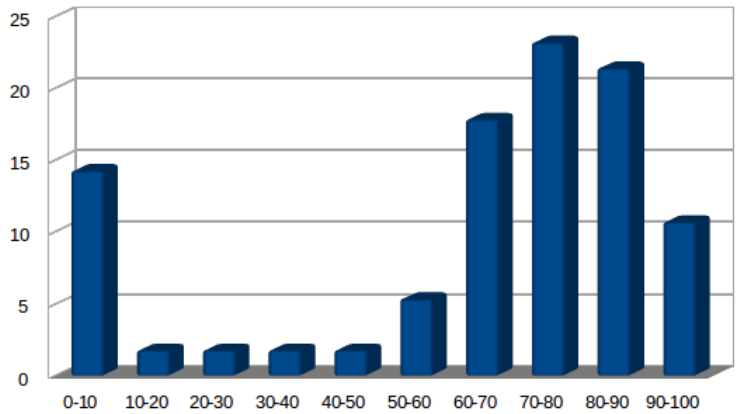

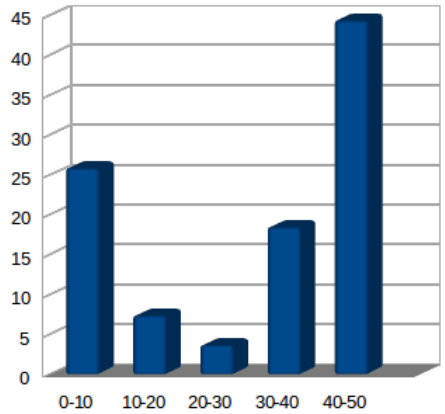

Interpretation

- Social preferences play an important role in defining field market behavior,
- However not to the extent implied by laboratory experiments.
  - The average share offered in the lab is 36.7 % in Germany (Ooseterbeek et al. 2004), or 42.3 % overall (Tisserand, 2014)
  - Our estimate: 29.8 %

Robustness

Restrict both f and g to the class of beta distributions. Random grid search gives the following solution.

s:	0-10%	10-20%	20-30%	30-40%	40-50%
$\hat{f}^{\beta}(s)$:	23.5%	12.9%	12.0%	15.2%	36.4%

c:	0-10%	10-50%	50-60%	60-70%	70-80%	80-90%	90-100%
$\hat{g}^{\beta}(c)$:	0.4%	22.1%	11.9%	14.4%	16.6%	17.9%	16.7%

Parametric estimates when f and g are restricted to the class of β distributions. $\alpha^f = 0.230$, $\beta^f = 0.031$; $\alpha^g = 2.470$, $\beta^g = 1.121$, KS distance $= 0.066$.

Outline

Summary

- We ran a natural field experiment where the value of good at sale is fixed, competition among the buyers is uncertain
- We find that social preferences are less prevalent in the Field than in the Lab
- Similar to most Lab results, the stake size does not affect the splitting offers
- Furthermore, we document poor use of payoff-relevant information