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# Impact of bidder learning on conservation auctions: An initial experimental analysis

MD SAYED IFTEKHAR and UWE LATACZ-LOHMANN

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#### School of Agricultural & Resource Economics

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Impact of bidder learning on conservation auctions: An initial experimental analysis

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# **Conservation auction**

- Conservation auctions are used to allocate conservation contracts to willing landholders

   usually farmers – through a competitive bidding process.
- A common feature of many conservation auctions is that they are run over several contract periods, i.e. bids for the same environmental service are invited in multiple bidding rounds.

# Learning and strategic bidding

- Learning negatively influence auction costeffectiveness
  - o Kirwan, et al. (2005)
  - Reichelderfer and Boggess (1988)
  - Cason and Gangadharan (2004)
  - o Schilizzi and Latacz-Lohmann (2007)
  - Reeson, et al. (2011)

#### • Learning improves auction cost-effectiveness -

- o Rolfe, et al. (2009)
- Reeson, et al. (2012)
- o Vogt, et al. (2013)
- o Iftekhar and Tisdell (2014)

# **Motivation**

- Very little systematic analysis on how auction environment could influence bidders learning and auction performance.
- This paper aims to fill this knowledge gap by systematically exploring bidders behaviour in two learning environments (self and networked).
- We use laboratory experiments.

# **Experimental set-up**

- The experiment was set-up in the context of a pollution reduction program with a fixed budget.
- There were ten players in a group.
- Players knew about the budget as well as about their own cost.
- In each round they could submit a single offer.
- Depending on learning environment they would receive different information after each round.

# **Set-up: Self learning**

• After each round they could see the status of their own offer and profit earned.

History				
Submitted Offer	Win	Profit (Offer - Cost)		
18	1	2.00		

# **Set-up: Networked learning**

- In a networked learning it is possible to learn from others. Bidder *i* can send a proposal to bidder *j* to form a link.
- If the link is formed each bidder knows information about the bid submitted by the other bidder and the winning status.
- Bidder *i* can use this information to revise his bids

#### **Set-up: Networked learning**

- Period2			remaining time 115
	Your Positio	<b>n</b> 1	
	4 6 Your Pos the la 1 2	3 8 ition (ID) in ndscape 5 9	
lf you wish	o form a link with a player please enter the bi	d information you wish to convey (othe	erwise leave it blank):
		Form link with Player 6?	
	Form link with Player 2?	Form link with Player 7?	
	Form link with Player 3?	Form link with Player 8?	
	Form link with Player 4?	Form link with Player 9?	
	Form link with Player 5?	Form link with Player 10?	
			ок

#### **Set-up: Networked learning**

Period				1
2				remaining time <mark>57</mark>
		Link formation		
Player	Link formation proposed?	Link formed?	Offer submitted by partner	Partner was successful or not?
Player 1	0	0	0	0
Player 2	0	0	0	0
Player 3	0	0	0	0
Player 4	0	0	0	0
Player 5	0	0	0	0
Player 6	0	0	0	0
Player 7	0	0	0	0
Player 8	0	0	0	0
Player 9	0	0	0	0
Player 10	0	0	0	0



Continue

# **Experimental design**

	Sess	ion 1	Session 2		
	LB		HB		
	SL	NL	SL	NL	
Single-shot	G1	G2	G3	G4	
15 rounds	G1	G2	G3	G4	
15 rounds	G2	G1	G4	G3	
	Sess	ion 3	Sess	ion 4	
	Sess N	ion 3 L	Sess S	ion 4 L	
	Sess N LB	ion 3 L HB	Sess S LB	ion 4 L HB	
Single-shot	Sess N LB G5	ion 3 L HB G6	Sess S LB G7	ion 4 L HB G8	
Single-shot 15 rounds	Sess N LB G5 G5	ion 3 L HB G6 G6	Sess S LB G7 G7	ion 4 L HB G8 G8	

### **Performance measures**

- Total payment in the final round
- Total profit in the final round
- Allocative efficiency: Opportunity cost of the winning bidders divided by the opportunity cost of the winning bidders if they were bidding their costs.

# **Initial Result – Payment**



# **Result – Payment**

	Session 1		Session 2		
	LB		HB		
	SL	NL	SL	NL	
Single-shot	100	98	117	106	
Final round	95	<b>9</b> 5	100	100	
Final round	100 1	91	117	97	
	Sess	ion 3	Sess	ion 4	
	N	IL	S	5L	
	LB	HB	LB	HB	
Single-shot	94	102	82	107	
Final round	92	120	97	100	
Final round	92	118	94	100	

#### **Result – Rent**

	Session 1		Session 2	
	L	В	Н	В
	SL	NL	SL	NL
Single-shot	41	38	56	42
Final round	46	53	45 🛌	48
Final round	42	<b>4</b> 0	45	51
	Sess	ion 3	Sess	ion 4
	N	IL	S	5L
	LB	HB	LB	HB
Single-shot	LB 22	HB 56	LB 23	HB 36
Single-shot Final round	LB 22 41	HB 56 59	LB 23 44	HB 36 44
Single-shot Final round Final round	LB 22 41 46	HB 56 59 45	LB 23 44 48	HB 36 44 47

#### **Result – AE**

	Session 1		Session 2	
	LB		HB	
	SL	NL	SL	NL
Single-shot	0.596	0.606	0.616	0.647
Final round	0.495 🛌	0.515	0.556	0.485
Final round	0.546	0.424	0.727	0.495
	Sessio	n 3	Sess	ion 4
	NL		S	L
	LB	HB	LB	HB
Single-shot	0.727	0.465	0.596	0.717
Final round	0.515	0.616	0.535	0.566
Final round	0.465	0.737	0.465	0.535

# **Concluding remarks**

- Learning opportunities reduces allocative efficiency, but reduces total payment.
- Mixed evidence of performance between self and networked learning.
- More analysis of the data is currently being carried out.

# Thank you