



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Assurance Payments for Threshold Public Goods Provision: Theory and Lab Experiment

Pengfei Liu, Department of Agricultural and Resource Economics and Center for Environmental Sciences and Engineering, University of Connecticut, 1376 Storrs Road, Unit 4021, Storrs, CT, 06269. pengfei.liu@uconn.edu

Zhi Li, School of Economics, Wang Yanan Institute for Studies in Economics, Xiamen University. geoleepku@gmail.com

Stephen K. Swallow, Department of Agricultural and Resource Economics and Center for Environmental Sciences and Engineering, University of Connecticut, 1376 Storrs Road, Unit 4021, Storrs, CT, 06269. stephen.swallow@uconn.edu

*Selected Paper prepared for presentation at the 2017 Agricultural & Applied Economics Association
Annual Meeting, Chicago, Illinois, July 30-August 1*

Copyright 2017 by Pengfei Liu, Zhi Li and Stephen Swallow. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Assurance Payments for Threshold Public Goods Provision: Theory and Lab Experiment

Pengfei Liu (pengfei.liu@uconn.edu)

Department of Agricultural and Resource Economics, Center for Environmental Sciences and Engineering, University of Connecticut.

Zhi Li (geoleepku@gmail.com)

School of Economics & Wang Yanan Institute for Studies in Economics (WISE), Xiamen University.

Stephen Swallow (stephen.swallow@uconn.edu)

Department of Agricultural and Resource Economics, Center for Environmental Sciences and Engineering, University of Connecticut.



UConn
COLLEGE OF AGRICULTURE,
HEALTH AND NATURAL
RESOURCES



Introduction

- We explore a new approach for threshold public goods provision through contract.
- This contract offers, to donors who agree to donate a minimum price, an assurance payment as compensation in the event that the group fails to achieve the cost threshold.
- We conduct lab experiments to assess the effectiveness of the new approach relative to the standard provision point mechanism (PPM).

Theoretical Background

- Provision Point Mechanism

$$\pi_i = \begin{cases} v_i - b_i, & \text{if } \sum b_k \geq C \\ 0, & \text{if } \sum b_k < C \end{cases}$$

where π_i is individual i 's profit, v_i is the induced value, b_i is the contribution. A public good is provided if the total group contribution $\sum b_k$ is higher than the threshold cost, C . Otherwise, the public good is not provided and individuals get zero profits.

- Assurance Contract

$$\pi_i = \begin{cases} v_i - b_i, & \text{if } \sum b_k \geq C \\ AP, & \text{if } \sum b_k < C, b_i \geq MP \\ 0, & \text{if } \sum b_k < C, b_i < MP \end{cases}$$

where MP is the minimum price and AP is the assurance payment. Compared to the PPM, one will receive an assurance payment if her contributes at least MP and the group fails to provide the public good.

Experiment Parameter and Treatment

Variable	Homogeneous Induced Value	Heterogeneous Induced Value
Number of Groups	2	1
Group Size	5	10
Endowment	15	15
Provision Point (PP)	30	30
Induced Value	10	{3, 3, 4, 4, 5, 7, 8, 8, 10, 12}
PP/(Group Induced Values)	60% (=30/50)	46.875% (=30/64)
AP(= MP)	6	{6=30/5, 4.3=30/7, 7.5=30/4}
# of Periods	25	25
Minimum Contribution Unit	0.1	0.1

Treatments:

- Ho-PPM: Homogenous induced value, PPM.
- Ho-AP6: Homogenous induced value, where Assurance Payment and Minimum Price are equal to 6.
- He-PPM: Heterogeneous induced value, PPM.
- He-AP6: Heterogeneous induced value, where Assurance Payment and Minimum Price are equal to 6.
- He-AP4.3: Heterogeneous induced value, where Assurance Payment and Minimum Price are equal to 4.3.
- He-AP7.5: Heterogeneous induced value, where Assurance Payment and Minimum Price are equal to 7.5.
- Each treatment is replicated by 60 subjects.

Results

- Provision Success (Group Level Observations)

Treatment	Provided		Provision Rate	Total
	0	1		
He-AP4.3	82	68	0.45	150
He-PPM	77	73	0.49	150
Ho-PPM	150	150	0.5	300
He-AP7.5	55	95	0.63	150
He-AP6	46	104	0.69	150
Ho-AP6	210	90	0.7	300

Notes: Two-factors Random Effects Model results indicate significant treatment effects except for He-AP4.3.

- Social Surplus

