Are consumers willing to pay for farmers' Use of carbon offsets ?

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Background and Motivation

- With carbon offsetting a company can mitigate its carbon emissions by paying another party to reduce greenhouse gases (GHG) emissions.
- Some oppose offsets because of an indulgence argument:
  "Just as in the 15th and 16th centuries you could sleep with your sister and kill and lie without fear of eternal damnation, today you can live exactly as you please as long as you give your ducats to one of the companies selling indulgences." (G. Monbiot)

Aim of the study

1) Elicit consumers' willingness to pay (WTP) for producers' voluntary use of carbon offsets
- Few studies to date, none related to agriculture
- Control for the role of joint public goods: Offsets may shift joint local public goods to another region.

2) Explain WTP by consumers' motivations
- negative (e.g. moral such as the indulgence argument)
- and positive (e.g. economic such as cost-efficiency).

Stated choice survey design

- Internet survey (literature indicates no clear evidence of sample selection).
- Choice between 3 types of milk
  - Product of homogenous quality
  - Dairy cattle is the largest French agricultural contributor to GHG emissions.
- 6 attributes chosen to control for technology used and public goods levels (global & local).
- Fractional factorial design with 36 choice sets blocked in 12 groups of 3 (D-efficiency=98%). 12 survey versions; each respondent sees 3 choice sets.

Attributes used in stated choice survey

Description	Name and Levels
Production is located where respondent lives	**LOCAL**: No, Yes
Purchase of offsets by producer	**OFFSET**: No, Yes
Decrease in number of cows on farm	**COW**: No, Yes
Improvement in water quality	**H2O**: +0%, +40%, +60%
Reduction in GHG emissions	**GHG**: -0%, -40%, -60%
Increase in price of the good	**PRICE**: +0%, +10%, +20%, +40%

Example of a choice set

Usual milk	Milk produced in region A	Milk produced in region B
Produced with the **usual number** of cows per hectare	Produced with a **reduced number** of cows per hectare	Produced with the **usual number** of cows per hectare
The farmer pays **no one** to reduce pollution	The farmer pays **no one** to reduce pollution	The farmer pays **a farmer in region A** to reduce pollution
No improvement in water quality	**40% improvement** in water quality **in region A**	**20% improvement** in water quality **in region A**
No reduction in GHG emissions	**40% reduction** in GHG emissions	**60% reduction** in GHG emissions
Usual price	Usual price **+ 20%**	Usual price **+ 40%**
□	□	□

Results

Sample description
- 722 respondents from 2 regions in France: Bretagne (region A) et Picardie-Champagne-Ardennes (region B).

Factor analysis to create a smaller set of variables
- 10 variables for attitudes towards offsets reduced to 2 factors:

AGAINST:
"Producers should not use offsets"

IN FAVOR:
"Producers should use offsets"

Econometric models
- CL - Conditional Logit (IIA hypothesis rejected)
- RPL(1) - Random Parameter Logit
- RPL(2) - Random Parameter Logit with interactions to determine source of heterogeneity.

Summary statistics

	Mean	Min	Max
GENDER (dummy: 1 = male; 0 = female)	0.49	0	1
AGE (in years)	49.70	16	82
EDUC (dummy: 1 = strictly higher than high school degree; 0 otherwise)	0.70	0	1
ORG (dummy: 1 = belongs to environmental association; 0 otherwise)	0.13	0	1

Econometric results
- Respondents and their choices are generally not affected by offsets.
- Preferences for offsets are not affected by age and education.
- Male and more environmentally active respondents oppose offsets.
- Choices of alternatives are positively affected for those who have a positive attitude towards offsets (OFFSET x IN FAVOR)

Signs and significances of parameters and WTP

	CL	RPL (1)	RPL (2)	WTP (from CL)	
				€/Liter	% of price
Main effects					
LOCAL	+ (***)	+ (**)	+ (**)	0.068	6.83
OFFSET	- (ns)	- (ns)	- (ns)	0.069	6.87
COW	+ (***)	+ (***)	+ (***)	0.137	13.75
H2O	+ (***)	+ (***)	+ (***)	0.007	0.68
GHG	+ (***)	+ (***)	+ (***)	0.003	0.25
PRICE	- (***)	- (***)	- (***)		
Interactions with OFFSET attribute					
GENDER			- (*)		
AGE			+ (ns)		
EDUC			- (ns)		
ORG			- (**)		
AGAINST			- (ns)		
IN FAVOR			+ (*)		

ns, *, ** and *** respectively mean not significant, 10%, 5% and 1% significant

Conclusion

- Consumers do not generally care for the producers' use of offsets when level of local externalities is controlled for.
- Negative attitudes do not impact preferences for offsets.
- Positive attitudes positively impact preferences for offsets.

Further work

- Test for sample selection (Internet survey).
- Use a latent class model (LC) and add alternative specific constant to control for status quo effects.
- Estimate WTP for RPL and LC models.

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