Extended Abstract
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Paper/Poster Title	**Payments for environmental services with provision thresholds: farmers' preferences for a conditional bonus**

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Abstract	***200 words max***
The effectiveness of payment schemes for delivering agri-environmental public goods with provision thresholds (biodiversity, water quality) depends on reaching enough farmland enrolment at the landscape scale. Supporting the development of collaborative approaches with a financial bonus conditioned to a collective element on top of an individual basic payment is a promising way to favor participation and continuity of environmental commitments in an area. However, little is known on farmers' attitudes towards such mixed-payment mechanisms. Using a choice experiment, we measure farmers' preferences towards an individual bonus for sponsoring peers, which can be combined with a collective bonus for improving the ecological quality of rivers in northwestern France. Applying a mixed logit model, we find that our respondents have a positive willingness to accept contracts with a sponsor bonus, but a negative willingness to accept a sponsor bonus combined with a bonus for reaching a collective environmental objective. We characterize respondents' heterogeneity with a latent class model and identify 3 different attitudes towards the bonus options: (i) negative preferences for both, particularly for the combined bonus, (ii) indifference, (iii) positive preferences for both, even higher for the combined bonus.	

Keywords	Water quality, choice experiment, collective action, payment for environmental services, conditional bonus
JEL Code	C25, Q15, Q18, Q25, Q28, Q53 see: www.aeaweb.org/jel/guide/jel.php?class=Q)

Introduction	***100 – 250 words***

Designing efficient incentive mechanisms is a challenge that often involves trade-offs between environmental ambition and large acceptance among farmers. Conditionality rules must define an effort that reaches the environmental objective(s), but remain attractive enough to ensure significant participation. When it comes to public goods such as water quality or biodiversity, effort and participation levels must be sufficient at the landscape scale to observe environmental improvements.

This research aims at testing the acceptability of a collective component in the payment, designed to meet high participation rates and environmental effort. Choice experiments (CE) are relevant to elicit preferences for specific contract characteristics that do not yet exist. Previous studies explored conditioning all or part of the payment to a minimum level of participation, coordination of management practices, and collective contracting. Results suggest negative preferences when the collective

requirement is conditioning the full payment (Le Coent et al, 2017; Villamayor-Tomas et al, 2019; Villanueva et al, 2017), but positive preferences when collective action triggers a bonus on top of a basic payment (Kuhfuss et al, 2016). Apart from this last study among vine growers, there is still little evidence on farmers' attitudes towards bonus mechanisms. Further analyses would confirm or nuance the acceptability of these nudges in other contexts, and provide recommendation for designing successful schemes.

In this paper, we measure preferences for a contract targeting the improvement of rivers ecological quality in northwestern France. Two types of bonuses were tested to explore new elements on the design of payment mechanisms.

Methodology	***100 – 250 words***

A d-efficient design of choice sets was included as a section of a pan-EU survey on the design of agri-environmental contracts. The contract alternatives included in the CE differed according to 4 attributes:

(i) agricultural soil coverage throughout the year: 85%, 90%, 95%,
(ii) anti-erosion multi-species multilayers hedgerows: 20m/ha, 60m/ha, 100m/ha,
(iii) basic payment: 150€/ha, 300€/ha, 450€/ha, 600€/ha,
(iv) bonus: none, 450€ each time the farmer sponsors a peer into entering the scheme, sponsor bonus combined with 50€ per hectare distributed to all farmers if the ecological status of the river is increased to the next category of the water quality framework.

Respondents were introduced to the context, the rules of the CE, and to the contract parameters (those fixed such as the 5-years farm-level enrolment, and those varying among alternatives). Additional questions helped respondents estimating their current levels of soil coverage and eligible hedgerows. Farmers were asked 9 times to choose the preferred option among 2 contract alternatives and the status-quo.

Data were collected from 130 farmers of different specialisations in 3 regions (Brittany, Normandy and Pays de la Loire) during spring 2021.

Choices of respondents were analysed with different econometric models. As a baseline, we estimated a conditional logit model. Additionally, we estimated a mixed logit and latent class model to disentangle preference heterogeneity of respondents. The covariates included were their current management attribute levels, organic status, plan to retire within the next 5 years, and interest in improving water quality and collective payments.

Results	***100 – 250 words***

The Hausman-McFadden test on the conditional logit model reveals preference heterogeneities across respondents for both management attributes (soil cover and hedgerows), and for the combined sponsor and collective bonus, suggesting the need to rely on mixed or latent class models to analyse the data.

The mixed logit model controlling for relevant individual characteristics collected in the survey, shows that on average, respondents prefer contracts with lower management

requirements and higher basic payments. Farmers also prefer contracts with the sponsor bonus, but without the combined bonus. Ceteris paribus, a farmer accepts a contract with on average 66.7€ less of basic payment per hectare if there is a sponsor bonus. However, a farmer asks for 162.7€ more of basic payment to accept a contract with a combined bonus.

The latent class model describes 3 patterns of choice behaviour: a “pro-incentive” class (62.6% of respondents) describes farms with positive preferences for both types of bonuses who also accept contracts for particularly high levels of basic payment. A second class with 25.6% of respondents depicts preferences for contracts with low requirements of hedgerows density and non-significant effects of the bonus options. Farmers planning to retire in the next 5 years are more likely to be in this “hedgerows averse” class. The third class (11.8% of respondents) describes farms preferring the status-quo or contracts with high management requirements and no bonus. Organic farmers are more likely to be in this “pro-environment individualists” class.

Discussion and Conclusion	***100 – 250 words***

The objective was to elicit farmers’ preferences for a mixed-payment mechanism made of a bonus on top of a basic payment incentivizing farmers for a collaborative behaviour favouring the delivery of public goods with landscape thresholds effects.

Findings suggest that overall, farmers prefer contracts with a bonus for sponsoring a peer to no bonus, but prefer contracts with no bonus to a combined sponsor/collective bonus for environmental achievement. Designing bonuses distributed according to an individual effort for attracting more farmers could be a promising way to increase participation, while collective bonuses distributed equally to all might be counterproductive. We measure a willingness to accept of 66.7€/ha for a one-time bonus of 450€/new farmer. A farmer with 100ha (average farm size) would need to sponsor 15 farmers annually to receive the same amount of bonus, what confirms the result by Kuhfuss et al (2016) that introducing a bonus option can improve the cost-effectiveness of a scheme.

Our findings are sensitive to our data. The sample is representative for the farm size and farmers’ age but over-represents educated and organic dairy and mixed cattle farmers. Asking and controlling for individual status-quo levels allowed us to control for part of this bias.

Further work is needed to see if conditional bonuses are successful in improving public good provision in practice. An agri-environment-climate measure to protect the European Hamster in France recently introduced an individual bonus payment when a burrow is detected on a plot. This case study might provide useful empirical evidence.

References:

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