

A.3 (Not for publication, or For online publication only) Comparing the RPL model with the CL and the LC models

Different discrete choice models are obtained from various assumptions on the distribution of the random terms. We tested three types of models: conditional logit (CL), random parameter logit (RPL), and latent class (LC). The RPL, which we retained as the more suitable formulation, is presented in the main text. This appendix presents the CL and LC models, and discusses why we chose an RPL model.

We run CL estimations with the same specifications as those in our RPL model, where (the “*profit*” and “*health and environmental impacts*” attributes are specified as continuous variables, and the “*production risk*” and “*administrative commitment*” attributes are modeled as effect-coded dummy variables), with and without interactions with socioeconomic variables. Although the estimates are similar in their order of magnitude, in both cases, the RPL models are preferable to the CL models, owing to the higher values of their log-likelihood functions, and because the standard deviations in the RPL model are highly significant. We also performed the test proposed by Hausman and McFadden (1984) to test the *IIA* assumption. If this property is rejected, then the CL model is not appropriate. The results of this test for both CL models, with and without interactions with socioeconomic variables, are presented in Table 9.

Alternative dropped	CL model without interactions			CL model with interactions		
	Chi2	D.o.f.	P-Value	Chi2	D.o.f.	P-Value
Practice A	8.50	8	0.3866	15.53	13	0.2756
Practice B	10.10	8	0.2580	11.40	13	0.5771
Practice C (status quo)	19.20	8	0.0138	37.78	13	0.0003

D.o.f. : Degrees of freedom of the Hausman and McFadden (1984) test for the *IIA* property.

NB : The statistic of this test follows a Chi-squared distribution. *Chi2* corresponds to the *Chi-squared value* of this test.

Table 9: Test of independence of irrelevant alternatives (*IIA*)

The null hypothesis of the Hausman test stipulates that there is no significant difference between the full model and a model with one alternative less. According to Table 9, the Hausman tests lead to the result that the null hypothesis must be rejected at the 5% and the 1% levels for the CL models, without and with interactions, respectively, when the alternative status quo is dropped. Because both CL models violate the *IIA* property, they are not suitable for modeling farmers’ preferences belonging to this sample.

Another way to take the heterogeneity in respondents' preferences into account would have been to analyze the sample using a latent class (LC) model. In this model, respondents are sorted into classes C , in which preferences are assumed to be homogeneous in their attributes. In contrast, preferences are allowed to be heterogeneous between classes, thus partitioning the population. Table 10 shows that, regardless of the number of classes considered, the RPL model outperforms the LC model in terms of the *Bayesian information criterion (BIC)* and the *consistent Akaike information criterion (CAIC)*, because models with lower *CAIC* and *BIC* measures are preferable to models with higher measures.

Number of classes	Parameters (P)	Log likelihood	AIC	CAIC	BIC
- (RPL)	15	-540.19	1110.38	1160.14	1145.14
2	17	-563.62	1161.24	1217.64	1200.64
3	26	-553.72	1159.44	1245.70	1219.70
4	35	-523.07	1116.13	1232.25	1197.25
5	44	-510.51	1109.03	1255.00	1211.00

. AIC (Akaike Information Criterion) = $-2LL + 2P$

. CAIC (Consistent Akaike Information Criterion) = $-2LL + P[(\ln N) + 1]$

. BIC (Bayesian Information Criterion) = $-2LL + P[\ln(N)]$

Table 10: Criteria for comparing RPL and LC models

Reference

Hausman, J., McFadden, D., 1984. Specification tests for the multinomial logit model. *Econometrica* 52.