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Resistant grapevine varieties : a bubbling investment in Champagne?

Gaëlle Leduc, Laure Latruffe, Adeline Alonso Ugaglia




Background

Fungus resistant grapevine (FRG) varieties have the potential to decrease fungicide use by 75% (Blonde et al., 2016). Their current limitations link to lack of technical experience, dubious organoleptic qualities, and uncertain stability of their resistance over time (Pertot et al., 2017). Despite growing interest from winegrowers for this innovation (Zachman et al., 2023), the amount planted in France remains low, as of 0.3% (INAO, 2023). This points out the necessity to evaluate what can better facilitate FRG varieties adoption.



Objective

Can collective approaches act as a leverage to facilitate adoption of FRG varieties? More specifically, can collective technical support together with share of resources for planting and managing FRG varieties, encourage their plantation?

CASE STUDY	METHOD & DATA	ATTRIBUTES
 <ul style="list-style-type: none"> Champagne = 1st Protected Designation of Origin in France to authorize planting of a FRG variety. Cooperatives to vinify are more common than machinery cooperatives. 	<p>Discrete choice experiment Efficient design 4 blocs of 6 cards per respondent</p> <p>Sample of 120 winegrowers 2 modes of data collection: online and face to face</p>	<ul style="list-style-type: none"> Technical support before replanting: None, Individual, Collective Replanting work: Individual, Share ressources through cooperative, Share ressources through independent winegrower organization Replanting cost: 45 K€/ha, 50K€/ha, 55€/ha, 60€/ha Crop protection of FRG: same levels as attribute 2 Technical follow-up after replanting: Individual, Collective

Analysis

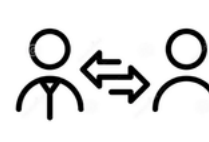


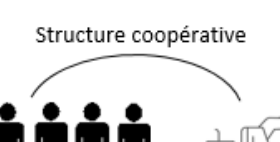



Test of 3 models: conditional logit, mixed logit and latent class
 → Latent Class model with 2 classes selected as best model

- Class 1 is more likely to be knowledgeable about FRG varieties in comparison to Class 2 + more likely to plant FRG if they receive technical support before planting, whether individual or collective. They are not willing to share spraying material and they prefer to receive individual support after planting in comparison to collective support.
- Class 2: no specific preferences and not sensitive to costs
- Once we control for beliefs that cooperation can lead to economic efficiency (column 3, Table 1), we find that winegrowers with such positive beliefs tend to be willing to share material or labour for the planting of FRG varieties.

Conclusion

Three key findings can be drawn from this study:

- Technical support (either individual or collective) before planting, to create varietal mosaic that optimize the resistance of FRG varieties over time, can encourage their uptake.
- Preferences to share material or labour for planting FRG depend on beliefs that cooperation lead to economic efficiency.
- Individual options are preferred by winegrowers after planting FRG varieties, in regard to spraying and type of technical follow-up.

Choice model - Table 1	(1)	(2)	(3)	(4)
	Class 1	Class 2	Class 1	Class 2
ASC	-9.479*** (0.793)	-0.425 (10.8)	-9.810*** (0.768)	0.905 (10.923)
SUPPINDI 	0.581*** (0.166)	-0.129 (1.155)	0.588*** (0.1741)	-0.113 (1.671)
SUPPCOL 	0.789*** (0.821)	0.557 (2.317)	0.808*** (0.182)	0.731 (2.973)
PLANTINDGP 	-0.016 (0.192)	-0.541 (2.757)	-0.949** (0.437)	1.357 (3.440)
PLANTCOOP 	-0.200 (0.188)	-0.859 (2.011)	-0.473 (0.594)	-0.548 (3.769)
COST	-0.0012*** (0.000)	0.000 (0.000)	-0.000*** (0.000)	0.000 (0.000)
SPRAYINGP 	-0.490*** (0.137)	-3.351 (2.647)	-0.451*** (0.138)	-3.457 (3.000)
SPRAYCOOP 	-0.609*** (0.176)	-30.87 (0.000)	-0.579*** (0.178)	-5.295 (6.415)
TECHCOLL 	-0.196*** (0.096)	-0.429 (1.675)	-0.201** (0.097)	-0.574 (1.823)
PLANTINDGP * COL			1.072** (0.435)	-2.956 (4.358)
PLANTCOOP * COL			0.317 (0.614)	-0.792 (1.415)

Theta in class probability model				
Gender	0.605 (2.623)	Fixed	0.071 (2.079)	Fixed
Age (>65)	0.630 (1.176)	Fixed	0.426 (1.452)	Fixed
Higher educ	-0.223 (1.374)	Fixed	-0.086 (1.42610)	Fixed
ExpM	0.909 (0.828)	Fixed	0.653(1.215)	Fixed
Organic	0.679 (3.600)	Fixed	0.877 (2.481)	Fixed
Knowledge	1.935* (1.012)	Fixed	2.169* (1.14682)	Fixed
Class probabilities	0.88	0.12	0.87	0.12
N	720		720	
LL	-495.7		-487.9	
AIC/BIC	1041.5/1156		1033.9/ 1166.7	

standard errors in parentheses