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Coletta A.[1], Giampietri E.[2], Santeramo F.G.[3*], Severini S.[1], Trestini S.[2]

[1] Università degli Studi della Tuscia, Department of Agriculture and Forest Sciences (DAFNE), Viterbo, Italy

[2] Università degli Studi di Padova, Department of Land, Environment, Agriculture and Forestry (TESAF), Padova, Italy

[3] Università degli Studi di Foggia, Department of Agricultural, Food and Environmental Sciences (SAFE), Foggia, Italy

*Corresponding author: fabio.santeramo@unifg.it

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Abstract. The exposure of farmers to different (and increasing) risks has been recognized by the EU policy, which supports several risk management tools through the Common Agricultural Policy (CAP). Despite the vulnerability of the agricultural sector, and the attention paid at the EU level, the uptake of such tools is generally low across EU countries. The Italian case is emblematic: the uptake of subsidized crop insurance contracts is low, limited to few products, and concentrated in few areas. Coherently, the interest of policy makers toward explaining these characteristics and in gaining insights on the interventions that may help promoting participation is intense. This contribution investigates behavioral aspects linked to choices under risk and ambiguity, and account for time preferences in order to mimic the scenario faced by the potential adopters of the subsidized crop insurance contracts in Italy. Data are collected through questionnaires submitted to students from agricultural colleges in three administrative regions located in northern, central and southern Italy. Results show that attitude toward risk, ambiguity, and impatience are correlated with the intrinsic characteristics of respondents. In addition, some of those attitudes may help explaining decisions under uncertainty. Despite the empirical analysis is preliminary and focused on students, it allowed to validate a promising methodological approach capable of explaining farmer's willingness to adopt (or renew) insurance contracts. By accounting for (currently under-investigated) behavioral aspects, it is likely to prove useful to re-design or implementing, more effectively, the current policies.

Keywords. Insurance, subjective probabilities, risk preferences, choice experiment.

JEL codes. D81; D83; Q18

1. Introduction

Risk affects all economic activities, and the agricultural sector shows specific factors that make yields, input and output prices highly variable. The increased volatility of these variables was shown in recent years, and it is possibly due to frequent adverse phenomena and extreme climatic events. At European level all countries are affected, and Italy seems one of the most spoiled country. The Italian agricultural sector is largely exposed to risky events, as shown by Trestini *et al.* in 2017. Among EU members, from 1998 to 2006 Italy registered the highest number of farms experiencing a decline in farm income exceeding -30% (on average) (European Commission, 2009); moreover, 35% of Italian farmers experienced income decrease events from 2007 to 2013 (European Commission, 2017).

According to the economic theory, price volatility should incentivize farmers to adopt risk management tools (RMT): put differently, the increasing uncertainty should increase the latent demand for RMT. The increasing uncertainty and the availability of new instruments introduced by the 2008 CAP Health Check should have favoured the diffusion of these policy instruments (e.g., mutual funds and subsidized insurance contracts). However, the implementation of risk management tools is limited, and the adoption of these instruments is currently rather scarce. Such a contingent scenario is worrisome, provided that a correct use of risk management policies would allow EU countries to increase the resilience of their agricultural sector to external shocks. The EU Regulation 1305/2013 promotes three types of measures, respectively under art. 37, 38 and 39: crop insurance, mutual funds, and the income stabilization tool. The Italian Ministry has budgeted a large amount of financial resources to promote these measures but, despite a great attention and a large turmoil, the experiences on mutual funds and Income Stabilization Tool are scant (Severini *et al.*, 2018; Trestini *et al.*, 2018), and subsidized single crop insurances are still the most adopted RMT. However, the subsidized insurance programs are not always stories of success. In Italy, participation in crop insurance programs is low, heterogeneous, and (recently) declining (Santeramo, 2019), making it a pressing issue for policymakers. This decline is also associated to recent policy changes. The last CAP reform has moved the support to RMT to the Rural Development Policy, changing the

82 administrative rules of the system. In Italy this transition has resulted in a lack of familiarity with the
83 rules, in delays in payments for subsidies and indemnifications and, at the end, in a reduced uptake
84 of crop insurance schemes.

85 The current literature falls short in explaining the peculiarities of crop insurance adoption in
86 Italy, and more precisely, it has not explored the potential role of ambiguity aversion and time
87 preferences on participation in crop insurance programs.

88 Understanding the behavioral aspects of potential adopters of RMT is crucial to both design
89 and implement effective policy interventions and avoid low and sparse uptake. The Italian case is an
90 emblematic one and it allows to focus on long-standing issues that need to be solved at national and
91 EU level. The Italian (subsidized) crop insurance system is characterized by high adoption rate in the
92 north, and low participation rate in central and south regions.

93 Apart from the main drivers of farmer behavior under uncertainty and of adoption of risk
94 management tools, several attitudinal aspects are likely to matter. Departures from rationality and
95 non-coherent choices with respect to risk perception help explaining farmers' choices. A recent study
96 (Sutter *et al.*, 2013) suggests that attitudes toward ambiguity, due to incomplete information, as well
97 as differences in risk perception, and in time preferences are likely to play a pivotal role for decisions
98 under uncertainty.

99 This paper is a preliminary attempt to assess the validity of an empirical methodology to
100 evaluate if and how behavioral factors (risk and ambiguity attitudes and time preferences) may affect
101 the decision-making process under uncertainty. Our setup has been inspired by the framework faced
102 by potential adopters of crop insurance. The analysis, conducted on a sample of students of
103 agricultural disciplines allows to conclude on whether the methodological approach is worth
104 replication to a set of Italian farmers, representative of the latent demand for crop insurance contracts.

105 The analysis is divided in two steps. First, we investigate how socio-economic characteristics
106 tend to influence risk aversion, ambiguity aversion and time preferences. Second, we explore how

107 socio-economic characteristics as well as risk aversion, ambiguity aversion and time preferences may
108 help explaining choices under uncertainty (smoking, practicing sport and playing lottery).
109
110 **2. On Italian insurance market and factors affecting farmers' adoption**
111 2.1 The Italian market for subsidized crop insurance contracts
112 Risks linked to natural disasters have been recognized since long-time in agriculture as
113 unexpected sources of losses for farmers, especially for those highly vulnerable that are not adopters
114 of risk management strategies. The shift from ex post compensations to ex-ante measures, and to
115 subsidized crop insurance contracts, has been a concrete effort to promote the diffusion of risk
116 management strategies.
117 According to ISMEA (2018), the Italian market (2004-2010) is characterized by a limited
118 adoption of insurance contracts. Subsidized insurance market reached a maximum of 265,000
119 contracts in 2008, followed by declines in the number of contract subscriptions. Differently, total
120 compensation rose constantly, signalling the low (economic) sustainability of the system, exacerbated
121 by an adversely selective participation process: as contacts' prices rise, farmers with lower probability
122 of facing adversities quit the market, contributing to the increase of the total amount of compensations
123 paid by insurers (and by public funds). Since 2010 the public contribution to contracts decreased to
124 65% (according to EU Reg. 73/2009) and has been devoted (since 2014) to contracts that cover at
125 least three climatic adversities. These changes do not seem to push the market too far. Last (public)
126 data referred to 2015 (ISMEA, 2018) depicts a similar picture: from 2010 to 2015 contracts have
127 decreased by 20% (from 210,000 to 168,000), while the insured area remained unaltered (+5%); the
128 insured value raised by 20% as well (from 4.8 to 5.6 billion euro), and it has generated a 4% increase
129 in the premium paid by farmers and through public funds (from 279 to 381 mil euro). The
130 geographical distribution of contracts tends to be concentrated in northern regions, which account for
131 more than 80% of the insured value (ISMEA, 2018). In addition, only few products account for most

of the total insured value: indeed, apple, corn, rice, grapes, and tomatoes account for 2/3 of the covered value.

2.2 On the drivers of crop insurance uptake

The identification of the drivers of crop insurance uptake is still open and vivid (Enjolras *et al.*, 2011; Santeramo *et al.*, 2016). More important, there has been a limited effort in investigating how farmers' behavioral aspects may help explaining the adoption and/or renewal of crop insurance contracts, exception made for Menapace *et al.* (2015).

Key drivers of uptake are the age and the income level: Ogurtsov *et al.* (2009) found a positive correlation for age and adoption of crop insurance contracts, while Wąs and Kobus (2018), Liesivaara and Myyrä (2017) and van Winsen *et al.* (2016) suggested that the opposite is true; as for the income level, Menapace *et al.* (2015) found a positive correlation with uptake, while Wąs and Kobus (2018) and Farrin *et al.* (2016) concluded on the opposite direction for correlation.

Ambiguous results have also been found for risk aversion, which has been found positively correlated with age, according to Nielsen *et al.* (2013) and van Winsen *et al.* (2016), and negatively correlated according to Franken *et al.* (2017) and Goldstein *et al.* (2008). Heterogeneous results are also reported for the farm size, positively correlated with risk awareness in Franken *et al.* (2017), and negatively correlated with risk awareness according to van Winsen *et al.* (2016).

Furthermore, the low participation level may be due to a low level of familiarity with the instrument (Santeramo, 2018 and 2019; Santeramo *et al.*, 2016). Subscription of new contracts tend to be influenced by size, degree of crop diversification and irrigated area (Enjolras and Sentis, 2011; Finger and Lehmann, 2012); moreover, Santeramo *et al.* (2016) argued that farmers tend to consider crop diversification (and irrigation) and insurance contracts as alternate management strategies with a high degree of substitutability. The policy framework is also playing a role: for instance, greening requirements push toward crop diversification to help preserving the environment; measures of

157 income support (e.g. direct payments or agri-environmental measures) are aimed at reducing famers'
158 income instability and may prove substitutes for other risk management tools (Severini *et al.*, 2017).
159 A contingent scenario, faced by Italian farmers, is that the bureaucratic aspects related to
160 subscription and reimbursement procedures, and the delays in refunds (ISMEA, 2018), may have
161 discouraged participation and renewal of crop insurance contracts. From 2010 to 2014 the share of
162 new adopters (14%) of (subsidized) crop insurance contracts has exceeded the number of farmers
163 who gave up (11%). Differently, and possibly due to the delays in payments and to the (perceived)
164 ambiguity of the newly adopted rules, in 2015 the quitters overcame new adopters, and the net balance
165 between new entrants and leavers was largely negative (-11%).
166
167 **3. Methodology and data collection**
168 The above presented scenario has emphasized the importance of focusing on three specific
169 aspects: risk aversion, ambiguity aversion, and time preferences. This paper investigates how attitudes
170 toward uncertainty (risk and ambiguity) as well as time preferences influence risky decisions. The
171 dataset includes data on 50 students from three different universities (Faculty of Agricultural
172 Sciences) in Italy: namely, the University of Padova (Padova) in the North, Tuscia University
173 (Viterbo) in Central Italy and University of Foggia (Foggia) in the South. The research is part of a
174 wider ongoing study aiming at investigating Italian farmers' decision making under uncertainty:
175 particularly, the broader aim is to study the factors influencing the insurance schemes' uptake. The
176 experimental methodology is inspired by the canonical Holt and Laury (2002) choice lists and, more
177 specifically, by the approach proposed by Sutter *et al.* (2013). In order to elicit individual preferences
178 related to risk aversion, ambiguity aversion and time preferences, respondents received a structured
179 questionnaire with three experiments and ten control questions.
180 More specifically, the first and the second experiments (Fig. 1) is made by a list of 11 choices
181 with two options each: at any given choice respondents choose between a sure payoff (option A), and
182 a gamble (option B). The sure payoff is iteratively decreased (from 100 to 1€) so to elicit the

183 indifference point between the lottery and the sure payoff. The lottery has been simulated by
184 extracting a random number from a uniform distribution ranging from 1 to 100 being the number 50
185 excluded (in order to have symmetrical probability distributions between the two outcomes). In the
186 first experiment, aimed at eliciting risk preferences, respondents may win (for instance) 100€ if the
187 randomly extracted number ranges between 1 and 49, or nothing, if the randomly extracted number
188 is larger than 51. In order to get respondents acquainted with the functioning of the lottery,
189 respondents have been exposed to a computer simulation of ten random draws from 1 to 100 (the
190 extraction of the number 50 implies a further extraction), and have been informed on the cases in
191 which they would have won the lottery. The second experiment, aimed at eliciting ambiguity
192 aversion, compares the choices for a sure payoff and a (ambiguous) lottery. The lottery pays out if,
193 by extracting two random draws, the second extraction gives a larger number than the one extracted
194 in the first place. The ambiguity arises by a peculiarity: the result of the first extraction is not revealed,
195 whereas only the second extraction (and the outcome of the lottery) is revealed. For instance, by
196 drawing the number 20 and successively the number 35, the lottery results in a winning outcome.
197
198 **Figure 1:** Example of a choice list for experiment 1 (risk attitude) and 2 (ambiguity attitude)

	Option A		**Option B**	
1	Sure payoff		Lottery	
2	Sure payoff		Lottery	
3	Sure payoff		Lottery	

199 Source: own elaboration
200
201 Finally, in the third experiment aiming at measuring time preferences (Fig. 2), respondents
202 received two lists (blocks) of ten choice sets each. Each choice set consisted in two sure payoffs (A
203 and B) that respondents may receive in different periods: option A is a "early payoff" of 100€,
204 whereas option B is a "late payoff" which is increased from 100€ to 190€. Depending on respondents'

preference for receiving a sure payoff earlier (i.e., "now") or later (i.e., "in 12 months"), we elicited respondents' attitude in delaying the win (or, put differently, their impatience).

Figure 2: Example of a choice list for experiment 3 (time preference)

	Option A		Option B	
1	Receive 100€ today		Receive 100€ in 12 months	
2	Receive 100€ today		Receive 110€ in 12 months	
3	Receive 100€ today		Receive 120€ in 12 months	

Source: own elaboration

Prior to the survey, we paid attention to ensuring that participants were able to understand the questions, and that the experiments were correctly explained. We design a *random lottery incentive system* (Cubitt *et al.*, 2019), often used in individual choice experiments, to motivate respondents to reveal their true preferences: at the end of the experiments we run a real lottery with the ten percent of (randomly selected) respondents: if their questionnaires did not present incoherent answers (as found in all cases), they played the game presented in the questionnaire with the possibility of winning part of the money of the bet (more precisely, 10% of the money at stake), in case of favourable outcome.

The individual Certainty Equivalent (CE) has been calculated for experiment 1 and 2 (CEr and CEa, respectively), as midpoint between the two consequent payoffs for which the interviewee switched from option A (i.e., sure payoff) to option B (i.e., gamble). Accordingly, CE represents the payoff that makes the individual indifferent between receiving the sure amount and gambling. To measure risk attitude (experiment 1), we calculated the coefficient of risk aversion (r) as follows (Sutter *et al.*, 2013):

$$r = 1 - \frac{CE_r}{\pi} \qquad (1)$$

with π representing the prize of the gamble (i.e., 100€). This coefficient ranges from 0 to 1, with values of *r* larger than 0.5 indicating risk aversion, whereas smaller than 0.5 risk loving and equal to 0.5 risk neutrality. Moreover, in the second experiment we measured the coefficient of ambiguity attitude (a) as follows:

$$a = \frac{CE_r - CE_a}{CE_r + CE_a} \qquad (2)$$

The coefficient *a* ranges from -1 to 1, with negative numbers representing ambiguity loving, 0 standing for ambiguity neutrality and positive numbers indicating ambiguity aversion. As regards the third experiment, we calculated the Future Equivalent (FE) of the fixed payoff as the midpoint between the two consequent later payoffs where the interviewee decided to switch from option A to B. The larger the FE, the larger the aversion for delayed payments (i.e., impatience). Finally, in order to control for the main drivers of decisions under uncertainty, we collected information on age (age), gender (gender), number of university credits achieved (ECTS credits), average grade (max 30) (average grade), and on whether the respondent does not have a technical high school degree (degree), on smoking habits (being a smoker), on habits to practice physical activity (sport practicing), and on habits to play lottery or sport betting at least once a month (playing lottery). Finally, we recorded whether the respondent is owner (or son of the owner) of a farm (family farm) and, whether the respondent have ever worked on a farm even for a short period of time (farmworker).

The empirical strategy is admittedly simple, yet rigorous and comparable with the approach suggested in Sutter *et al.* (2013). First, we use a linear regression to conclude on the effects of some socio-demographic variables on: i) the coefficient of risk aversion (r), ii) the coefficient of ambiguity aversion (a), iii) time preferences (i.e., future equivalent at 12 months). Second, we use a linear regression to investigate how risk aversion, ambiguity aversion and time preferences (FE_12m) influence behaviors characterized by decisions under uncertainty: i) being a smoker; ii) sport practicing; iii) playing lottery.

4. Hypothesis testing and results

As shown in table 1, the sample consists of 78 observations, mostly male students (78%). Most participants have not a technical high school background (51%), are not smokers (64%), practice sports activities (60%), and do not play lotteries (80%). The average number of credits acquired by sampled students is 132, while the average grade is 26. In terms of coefficients of risk aversion and risk ambiguity, we have quite heterogeneous results: the coefficient of risk aversion ranges from 0.05 to 0.95 the coefficient of ambiguity aversion ranges from -0.50 to 0.83. Similarly, we have time preferences computed at 12 months ranging from 105 to 185.

Table 1. Descriptive statistics of the sample (N = 78)

Variable	Type		%	Mean	Std	Min	Max
Age	Continuous			23.39	2.22	20	29
Gender	Dummy	1 = male	78.20				
		0 = female	21.80				
Degree[1]	Dummy	1 = yes	51.30				
		0 = no	48.70				
ECTS credits[2]	Continuous			131.51	57.99	23	300
Average grade (max 30)	Continuous			25.72	2.04	21	29.7
Family farm	Dummy	1 = yes	28.20				
		0 = no	71.80				
Farm worker	Dummy	1 = yes	61.50				
		0 = no	38.50				
Being a smoker	Dummy	1 = yes	35.90				
		0 = no	64.10				
Sport practicing	Dummy	1 = yes	60.30				
		0 = no	39.70				
Playing lottery	Dummy	1 = yes	20.50				
		0 = no	79.50				
r	Continuous			0.48	0.16	0.05	0.95
a	Continuous			0.08	0.22	-0.50	0.83
FE_12m	Continuous			146.54	20.83	105	185

[1] Subjects without a technical high school background ("Liceo" in Italy).
[2] ECTS credits express the volume of learning based on the defined learning outcomes and their associated workload. 60 ECTS credits are allocated to the learning.

265 The sample is mainly composed of risk averse (51%) and ambiguity averse students (51%),
266 whereas the future equivalent shows a greater impatience for risk neutral and ambiguity averse
267 subjects (table 2).
268
269 **Table 2.** Risk and ambiguity attitude (%) and future equivalent (N = 78)

Category	%	Average FE_12m[1]
Risk averse	51.3%	146.50 (20.07)
Risk neutral	24.4%	149.21 (24.79)
Risk seeker	24.4%	143.95 (18.83)
Ambiguity averse	51.3%	148.00 (20.78)
Ambiguity neutral	19.2%	147.00 (23.36)
Ambiguity seeker	29.5%	143.70 (19.84)

270 [1] Standard deviations are reported in parentheses.
271
272 We regress attitudes toward risk and ambiguity on control factors (table 3). The considered
273 observable characteristics do not allow to explain these attitudes. Regarding risk aversion, only the
274 variable "degree" is positively correlated with risk aversion, regardless of students' career
275 characteristics (number of credits acquired) and average grade, and of respondent's social
276 characteristics (gender, age, farm owner and farming experience). There are no significant
277 coefficients in the case of ambiguity aversion.
278 Results seems to be in line with studies (e.g. Sutter *et al.*, 2013) that refer risk attitude and
279 ambiguity not influenced by ordinarily observable characteristics.
280 As shown in table 4, we also found a positive significant correlation between the degree of
281 impatience and gender, degree and past experience in farm work, showing that males with non-
282 technical degree are less impatient, while subjects who already had a work experience related to
283 agricultural sector are more impatient. Conversely, we did not find any relevant effect for risk and
284 ambiguity aversion. In general, we found that attitudes toward uncertainty (risk aversion, ambiguity
285 aversion, and impatience) are correlated with intrinsic characteristics of the students, hereafter
286 referred as control factors.

Table 3. OLS - Risk Aversion (r) and Ambiguity Aversion (a)

	Dep. Var. Risk Aversion (r)				Dep. Var. Ambiguity Aversion (a)			
	β	S.E.	P>|t|		β	S.E.	P>|t|	
Age	0.003	0.010	0.756		-0.012	0.013	0.355	
Gender	0.033	0.046	0.476		0.008	0.063	0.900	
Degree	0.068	0.040	**0.088**	*	-0.082	0.055	0.137	
ECTS credits	-0.001	0.001	0.185		0.001	0.001	0.448	
Average grade	0.008	0.010	0.456		0.015	0.014	0.307	
Family farm	-0.032	0.046	0.486		-0.036	0.064	0.568	
Farmworker	0.006	0.042	0.888		0.024	0.058	0.678	
cons	0.278	0.328	0.401		-0.036	0.457	0.983	
Obs	78				78			
Prob > F	0.574				0.695			
Adj R^2	-0.017				-0.031			

Note: *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Table 4. OLS - Impatience (FE_12m)

	Dep. Var. Future equivalent 12 months (FE_12m)			
	β	S.E.	P>|t|	
Age	0.039	1.234	0.975	
Gender	-9.918	5.831	**0.094**	*
Degree	-8.656	5.146	**0.097**	*
ECTS credits	-0.037	0.053	0.484	
Average grade	0.998	1.330	0.455	
Family farm	-7.290	5.873	0.219	
Farmworker	9.760	5.331	**0.072**	*
r	11.212	16.183	0.491	
a	9.264	11.626	0.428	
cons	127.054	42.084	0.004	
Obs	78			
Prob > F	0.206			
Adj R^2	0.045			

Note: *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Following Sutter *et al.* (2013) we use the control factors (age, gender, degree, ECTS credits, average grade, family farm, and farmworker) and the attitudes toward risk, ambiguity and time, to

explain decisions under uncertainty. We regress "being a smoker", "sport practicing" and "playing lottery" on control factors and variables on attitudes.

We found that average grade and risk aversion are statistically significant having a negative effect on being a smoker, whereas impatience has a slight positive effect on the same characteristic (Table 5). Impatience seems to play a slight role on sport practicing too, being instead negatively correlated. Regarding playing lottery, a significant positive correlation emerged for gender (all respondents that practice gambling are males), number of credits acquired (with a positive slight coefficient close to zero) and being part of a family involved in farming activities. Average grade shows negative correlation indeed.

Table 5. OLS Estimates on being a smoker, sport practicing, and playing lottery

	Dep. Var. Being a smoker				**Dep. Var. Sport practicing**				**Dep. Var. Playing lottery**			
	β	S.E.	P>|t|		β	S.E.	P>|t|		β	S.E.	P>|t|	
Age	0.029	0.028	0.310		-	0.030	0.465		-	0.022	0.643	
Gender	-	0.136	0.506		0.169	0.146	0.248		0.265	0.108	**0.016**	**
Degree	0.139	0.120	0.250		-	0.128	0.584		0.116	0.095	0.225	
ECTS credits	-	0.001	0.986		0.001	0.001	0.739		0.002	0.001	**0.019**	**
Average grade	-	0.031	**0.074**	*	0.038	0.033	0.250		-	0.024	**0.011**	**
Family farm	-	0.136	0.792		0.078	0.145	0.594		0.215	0.107	**0.050**	*
Farmworker	0.075	0.125	0.548		-	0.134	0.805		0.021	0.099	0.830	
r	-	0.371	**0.016**	**	0.232	0.397	0.561		-	0.294	0.404	
a	-	0.267	0.145		0.242	0.286	0.399		-	0.211	0.423	
FE_12m	0.005	0.003	**0.093**	*	-	0.003	**0.079**	*	-	0.002	0.523	
cons	0.850	1.025	0.410		0.636	1.095	0.563		1.767	0.811	0.033	
Obs.	78				78				78			
Prob > F	0.134				0.590				0.008			
Adj R^2	0.069				-0.021				0.179			

Note: *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

Respondents showing little risk aversion and high levels of impatience smoke more, whereas less impatient individuals practice sport more. Men are found to play lottery more than women. As shown by "ECTS credits", best students play lottery more, whereas "average grade" shows that best students play lottery and smoke to a lesser extent. Interestingly, the higher the impatience (i.e.,

313 subjects who have a higher future equivalent with 12 month-delay condition), the less they practice
314 sport. Lastly, ambiguity aversion coefficients don't show significant relations with the analysed
315 dependent variables.

316 To summarize, both observable characteristics and behavioral characteristics (risk aversion,
317 ambiguity aversion and time preferences) help explaining choices under uncertainty, particularly
318 smoking and playing lottery. It is important to note that, as expected, risk aversion is negatively
319 correlated with smoking while impatience is positively correlated with smoking while negatively with
320 practicing sport.

321

322 **5. Concluding remarks**

323 Risk management policies for the primary sector are under the spotlight in the EU: large
324 subsidies have been granted for crop insurance programs and mutual funds. The EU Regulation
325 1305/2013 establishes rules and funds that may be adopted by Member States to promote participation
326 in crop insurance programs (art. 37), to start and manage mutual funds (art. 38) and to enhance the
327 start of the Income Stabilization Tool (art. 39). Despite the clear interest of the policymakers, the
328 academic debate seems behind. The economic literature provides several hints to explain farmers'
329 uptake in crop insurance programs, but several determinants (other than farm size, farmers' education,
330 relationships with other risk management strategies, and insurance premia) are still under-
331 investigated. In particular, while the literature on insurance programs (i.e. health, car and life
332 insurance) have emphasized the role of information, and of individual attitudes toward uncertainty,
333 ambiguity and impatience, there is little evidence on the role of ambiguity and impatience on farmers'
334 decision to adopt crop insurance contracts.

335 Based on these premises, we test the validity of a methodology in exploring how risk and
336 ambiguity aversion, and impatience may influence the decision-making process for risky activities.
337 Our test, conducted on a sample of students, has been calibrated on behavioral aspects that are likely
338 to matter for potential adopters of (subsidized) crop insurance contracts. We ask students involved in

university programs related to agricultural sciences if they work in a farm or are owners of a farm. Similarly, we investigate decisions under uncertainty proxying risky decisions such as those related to the adoption of crop insurance programs.

We found that the attitudes toward uncertainty (risk aversion, ambiguity aversion, and time preferences) are weakly correlated with some intrinsic characteristics of the students. These attitudes cannot be satisfactorily explained by few observable characteristics. In contrast, we found evidences that attitudes toward risk and impatience may help explaining agents' decisions under uncertainty. This suggests including agents' attitudes in future research to prevent biased inference due to missing explanatory factors which would lead to ineffective policy recommendations.

Despite the analysis is still preliminary and applied to students, the approach we have taken seems promising in explaining potential residual factors that may affect farmer's willingness to adopt (or renew) insurance contracts. Hence, future research on this latter issue should take into consideration not only farmers' risk aversion but ambiguity aversion and time preferences as well. These factors may be used to explain the limited (and heterogeneous) uptake of insurances. Furthermore, the empirical findings may help to better design and manage future policy measures: understanding the role of time preferences may be useful to address how delayed payments of reimbursements and indemnities may discourage participation.

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