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Full Research Article

The role of trust and perceived barriers on farmer's intention to adopt risk management tools

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Abstract. This paper adds to the ongoing debate about low farmers' uptake of risk management (RM) tools subsidised by the Common Agricultural Policy (CAP). In particular, the research pioneers the investigation of whether and how trust towards the relevant intermediaries and the perceived barriers to adopting may influence farmers' intention to adopt the insurance and to participate in mutual funds (MF) and in the Income Stabilisation Tool (IST). In the light of the current CAP reform, as a novel contribution this paper also questions the efficiency of the new operating rules established by the Omnibus Regulation. The research proposes a conceptual framework to simultaneously assess these underinvestigated factors and several other determinants of the intention to adopt (e.g. risk attitude). Data were gleaned from direct interviews among 105 Italian farmers and analysed through structural equation modeling. The results confirm the positive role of trust in influencing the intention to adopt the insurance, which is notoriously affected by problems of information asymmetry. Similarly, trust is a key element in influencing the intention to participate in the IST, which is a collective instrument based on solidarity and mutuality indeed. Moreover, the higher the perceived barriers to adopting, the lower the intention to participate in a mutual fund, for which therefore further informative initiatives (e.g. on benefits from the adoption and the ease of use) are required. Interestingly, the results show a positive impact of the new CAP policy changes on the intention to both take out the insurance and participate in the IST, thus opening up to positive prospects for the EU risk management strategy post-2020. To conclude, this study paves the way for new research avenues in the field of farmers' adoption of subsidised RM tools.

Keywords. Insurance, mutual fund, income stabilisation tool, trust, structural equation modeling.

JEL codes. D81, G22, Q18.

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1. Introduction

Risk is embedded in the agricultural production, leading to adverse outcomes as yield and income losses for farmers (Komarek *et al.*, 2020). Particularly, nowadays agricultural risk sources can be mainly identified in the increased severity and frequency of extreme weather conditions, pests and diseases that strike farm yields, and in the global phenomenon of price volatility that determines growing pressures on farmers' income (EC, 2017a). To cope with multiple risks, in the European Union (EU) farmers can resort to adopting subsidised risk management (RM) tools. Accordingly, the Common Agricultural Policy (CAP) has recently emphasized the role of these tools (Meuwissen *et al.*, 2018): in addition to supporting insurances and mutual funds (MF) to cover yield losses, it has introduced the so-called Income Stabilisation Tool (IST) to cope with income drops (El Benni *et al.*, 2016). As opposite to the most part of the other member states, Italy allocated a specific budget for each of these tools for the period 2014-2020. However, despite the pervading exposure to risks for farmers (Trestini *et al.*, 2017a) and the advantages that these instruments provide to farms (Enjolras *et al.*, 2014; Severini *et al.*, 2019a), in Italy the participation rate in subsidised insurance schemes is currently below what policy makers hope for, and the uptake is not homogeneous (Coletta *et al.*, 2018). As opposite, hitherto only several private MFs existed at national level, while both the subsidised mutual fund and the IST did not take up; however, it is worth noting that new initiatives (i.e. four MFs and three ISTs) will be available soon in Italy (these are currently requiring the approval). Nowadays, there exists a policy interest in understanding how to enlarge the adoption of subsidised tools among the potential beneficiaries in Italy.

In line with this, nowadays the understanding of farmers' decision-making process when choosing their preferred risk management tools represents a significant issue for many stakeholders (i.e. academics and researchers, private insurance companies, policy makers, etc.) (Cao *et al.*, 2019; Meraner and Finger, 2019). In particular, as regards the EU RM toolkit this may be useful to provide new insights for reversing the low demand and thus enhancing the efficiency of the RM policy at EU level.

A burgeoning effort was given to studying the determinants of crop insurance uptake over the last years. As broadly demonstrated (Goodwin, 1993; Mishra *et al.*, 2005; Enjolras and Sentis, 2011), moral hazard and adverse selection represent two major reasons to explain the poor development of insurance market, also justifying the policy intervention through public subsidies by the governments. In recent years the literature extensively discussed the role of several factors affecting farmers' demand for agricultural insurance: first of all, farmer's risk attitude and risk perception (Hellerstein *et al.*, 2013; Menapace *et al.*, 2012 and 2016; van Winsen *et al.*, 2016); the adoption of self-coping strategies (Enjolras and Sentis, 2011); off-farm income and direct payments (Finger and Lehmann, 2012); expected indemnity from the insurance (Liesivaara and Myyrä, 2017); prior indemnification (Wąs and Kobus, 2018); previous experience with farm losses and the level of farm's debts (Wąs and Kobus, 2018); direct and indirect experience with the insurance (Santeramo, 2018); finally, farm and farmer's characteristics (Ogurtsov *et al.*, 2009; Farrin *et al.*, 2016; Santeramo *et al.*, 2016).

Further to the above, in 2017 Castañeda-Vera and Garrido drew attention on farmers' willingness to adopt as a relevant factor to investigate. Furthermore, many authors (see e.g.

Marr *et al.*, 2016) called for the necessity not to overlook the effect of behavioural indicators, alongside the most commonly investigated neoclassical determinants (i.e. risk aversion). For instance, this supports the importance of studying the intention to adopt (i.e. antecedent of the decision makers' behaviour); in addition, opportunities exist to further knowledge in this area, e.g. by exploring the role of other potential determinants that are still underinvestigated. Hence, a serious reflection follows: are other not yet explored factors reducing the interest of EU farmers in adopting these tools? Further, it is worth noting that both MFs and the IST received only limited empirical attention both in terms of demand and research, thus representing a relevant focus of investigation to address nowadays.

Given the above, as a novel contribution this paper aims at investigating whether and how trust towards the relevant intermediaries and the perceived barriers to adopting may influence the intention to adopt the subsidised insurance, and also to participate in the mutual fund and the new IST (these two forms of mutual funds are separately investigated in this work). Finally, in the light of the current CAP reform, this analysis questions the efficiency of the new RM toolkit's operating rules provided by the Omnibus Regulation as follows: do these policy changes affect the intention to adopt?

The paper is structured as follows: paragraph 2.1 includes a description of the agricultural risk management at EU level, while the literature and conceptual framework with the hypotheses underlying the analysis are developed in paragraph 2.2; next, data collection, the questionnaire and the methodology are described in paragraph 3.1, 3.2 and 3.3, respectively; moreover, the empirical results are presented and discussed in paragraph 4; finally, the paper concludes with paragraph 5.

2. Background

2.1 The EU agricultural risk management strategy

In Italy, the participation in subsidised RM instruments dates back to 1970, with the creation of the National Solidarity Fund (Law n. 364), then reformed in 2004 (Legislative Decree n. 102). In particular, the recourse to the insurance tool recorded a long history, also by reason of premium subsidies to farmers (up to 80%). With the Health Check reform[1], in 2009 European reserves were added to national resources, in order to support (up to 65%) the insurance (i.e. the premium) and the mutual fund (i.e. administrative expenses for the setting up) covering for losses caused by adverse climatic events, animal or plant diseases, pest infestations, or environmental incidents. Within the EU borders, the policy debate on supporting RM in agriculture has progressively evolved over the last decade: the most recent demonstration comes from both the last CAP 2014-2020 reform[2] and further its middle-term revision known as Omnibus Regulation[3]. In particular, the reform in 2013 has introduced the new IST in the form of a mutual fund to support farmers facing a severe income drop (El Benni *et al.*, 2016; Castañeda-Vera and Garrido, 2017; Trestini *et al.*, 2018a; Cordier and Santeramo, 2019; Severini *et al.*, 2019b). In 2017, the

[1] Regulation (EC) n. 73/2009.
[2] Regulation (EU) n. 1305/2013.
[3] Regulation (EU) n. 2393/2017.

Omnibus Regulation has introduced new operating rules: for instance, the increase of the support rate to 70% for each tool and the introduction of sectoral ISTs with a threshold for compensation lowered at 20% (from 30%). Finally, the more recent proposal for the CAP post 2020[4] confirms the possibility for a financial contribution to the aforementioned RM toolkit under national strategic plans.

Turning to the market of RM tools, the Italian agricultural insurance sector grew rapidly over the last 15 years. The most recent data (ISMEA, 2018) depict this as highly concentrated in terms of products and characterized by a strong imbalance between the North (that concentrates up to 81% of the insured value and 86% of the insured areas), the Central Italy (10% and 8%, respectively) and the South (9% and 6%, respectively). Nevertheless, nowadays the participation rates to subsidised insurance in Italy are still below those desired, although the recent history shows a substantial level of public intervention (with a budget of 1,4 billion euro for the period 2014-2020) dedicated to the insurance market, and an ascertained high level of income losses for the Italian farms (Trestini *et al.*, 2017b). Furthermore, it is worth noting that both subsidised MFs and the IST do not yet exist in Italy at the moment, even if 97 million euro have been budgeted for each of these tools over the 2014-2020 period. To this purpose, the major difficulties recurrently encountered are related to pre-implementation issues (e.g. design of sectorial or multi-sectorial funds, initial capital stock, organisation) (Trestini *et al.*, 2018b), to the lack of a dedicated legislation (actually, with the official approval of specific national legislative decrees, improvements have been recently made on this), and to questions on benefits and limits from the farmers' side (EC, 2017b). Moreover, a major constrain to the development of the IST was represented by the difficulty to correctly and objectively assess farmers' income losses, due to the current lack of a formal accountancy in the farm sector in Italy; however, this has recently been overcome with the introduction of an index-based costing method that opens up new development opportunities for this instrument.

As opposite, several private MF initiatives exist in the North of Italy (i.e. in Trentino province and Veneto and Friuli Venezia Giulia regions): these run without subsidies and are promoted by the Defence Consortia, i.e. producers' associations based on consolidated mutual agreements and established reciprocity between members, that are historically rooted in those areas. To conclude, it is noteworthy that there are no available observational data on subsidised MFs and the IST to the present time.

2.2 Literature and conceptual framework

Research on this topic has been extensively rooted in the standard expected utility theory: as refers the insurance tool, we know that the expected utility maximizing farmer's choice to subscribe the contract must be greater from profit with insurance than from profit without it (Goodwin, 1993). However, many authors (e.g. Kahneman and Tversky, 1979) raised an objection to its predictive power of decision-making under risk. Based on this, the present study considers several determinants and investigates their simultaneous effect on farmers' intention, hereafter referred as INT, to adopt the subsidised RM tools. This is to satisfy the necessity for a reference frame that is most likely that in which farm-

[4] COM (2018) 392 final.

ers behave under uncertainty. Indeed, to our knowledge the use of consolidated frameworks studying the combined action of several factors contemporaneously (as actually happens in a decision-making process) is rare in the literature on RM tools' adoption and the most part of the studies focuses on one strategy or instrument, and very few exceptions to this exist, e.g. van Winsen *et al.* (2016) and Meraner and Finger (2019). Inspired by the study by van Winsen *et al.* (2016) that explores the role of risk perception and risk attitude as determinants of farmer intended behaviour, in this research we propose three different conceptual models: other things equal, the first (model 1) regards the intention to adopt the insurance whereas, as a novel contribution, the second model (model 2) refers to the mutual fund and the third model (model 3) to the new IST. Furthermore, this study focuses on the intention to behave (i.e. the intention to adopt each instrument) as a proxy for actual behaviour (i.e. adoption) (Lobb *et al.*, 2007), due to the fact that no forms of subsidised MFs and IST operate in Italy to date, as opposite to the insurance.

In the literature on farmers' adoption of RM tools, especially those subsidised by the CAP, hitherto scarce attention has been paid to the role of trust, with very little exceptions: e.g. Cole *et al.* (2012) argued that farmers' mistrust in the insurance market can represent a friction to the uptake. Grebitus *et al.* (2015, p. 85) argued that "the role of trust is considered to be of particular importance where information is sparse, hard to assess or complex; in these situations, trust can substitute for full knowledge". Accordingly, Pascucci *et al.* (2011) highlighted how trust is a relevant factor to efficiently cope with problems of asymmetric information, that notoriously lower the insurance demand due to two major problems as adverse selection (i.e. the tendency of riskier farmers to purchase the insurance) and moral hazard (i.e. the tendency of insured farmers to adopt a riskier behaviour). Hence, here we refer to trust as the farmer's belief in the reliability of relevant intermediaries involved in those settings characterized by imperfect or asymmetric information (i.e. a situation where one actor has greater information than the other actor), as the relationship between principal and agent (Jensen and Meckling, 1976; Eisenhardt, 1989). With regards to the RM tools, farmers are likely to show limited knowledge and a reduced ability to perfectly evaluate if both the insurance contract and the membership rules of mutual funds are adequate for the own interest; at the same time, they tend to assume opportunistic behaviour (e.g. moral hazard). For example, in the insurance market farmers do not always show complete trust that they will receive the payout from the insurance company in return for the premium paid to subscribe the contract, and this can inhibit the contract purchase. Therefore, the intermediaries (e.g. insurance providers, local agents, etc.) play a key role in this respect: they gain and retain trust from farmers and, based on this, they match the farmer and the insurer (Cummins and Doherty, 2006) and encourage farmers' participation in the insurance program (Ye *et al.*, 2017). To summarise, it is reasonable to assume that trust can represent a solution for those situations that are inherently characterized by increasing complexity (see the insurance contract), uncertainty and reciprocal lack of knowledge (this characterizes the insurance, by nature), scarce experience, and the necessity for membership control (as for mutual funds, where members derive utility from a good conduct of all members and a good exercise of the instrument[5]). As regards

[5] This is especially true for mutual funds that, according to a recent Ministerial Decree (n. 10158/2016), in Italy can be created and managed by cooperatives, consortia, producers' organizations, farm associations, etc. Mutual funds are voluntary alliances among members who formalize an agreement related to duties and rights, membership rules, etc.

the mutual funds, a recent document of the European Commission (2017b) reported that farmer's reluctance to trust these collective instruments represents a principal ambiguity that justifies the failure to create mutual funds in Italy. In fact, since the fund implies the creation of a financial reserve by the annual contribution by all the members, the potential beneficiaries may question the level of solidarity and mutuality between who benefits and who loses within the fund, and raise questions as who is paying for whom. As opposite, the same document highlighted that the high level of trust between members is conducive to the good operation of those mutual funds run by the Defence Consortia (see e.g. in Trento Province in Italy), but little empirical evidence exists on this nonetheless. To conclude, since uncertainty is inherent in the choice of RM tools (as farmers may not fully understand the instruments or may have harbour doubts about the behaviour of intermediaries), it is reasonable to suppose that trust represents a catalyst for the adoption of these instruments. Following this, we test this hypothesis:

H1: trust significantly affects the intention (i.e. the intention to adopt the insurance or to participate in a mutual fund or in the IST).

Similarly, evidence into the role of farmers' perceived barriers on farmers' adoption are limited, with the exception of a recent paper by Ye *et al.* (2017) on crop insurance, thus stimulating our interest in this field. Indeed, farmers often know little about the benefits of using RM tools primarily because they receive little education about the instruments. As opposite to this, the literature shows that farmers who are better-informed on the operating rules of the insurance contract and its benefits, thus showing lower perceived barriers, are more willing to purchase the coverage (Santeramo, 2019). In line with this, it is worth investigating the role of farmers' perceived barriers to adopting (that here serve as proxy for the lack of understanding), and we reasonably expect a negative role on the intention for all the investigated tools. Based on this, we test the following hypothesis:

H2: perceived barriers to adopting significantly affect the intention.

Nowadays, a further important but still unanswered question is the extent to which policy interventions actually influence farmers' choice to adopt the CAP's RM toolkit. To this purpose, another innovative element of this study is the investigation of the effect of the changed operation rules established by the agricultural package of the new Omnibus Regulation as potential drivers of the intention. In our opinion, this may provide interesting insights on CAP's effectiveness to encourage the adoption of subsidised tools.

As alluded to in the introduction, the core contribution of this paper is represented by the pioneering investigation of the role of trust and perceived barriers. In addition to these, the conceptual model that we propose considers some other determinants of the intention to adopt the three subsidised tools: their role on farmers' insurance uptake has already been found to be relevant by the literature, as opposite to their role on the intention to participate in a MF and in the IST that is still unclear at the moment, to the best of our knowledge.

Inspired by the extant literature on insurance, we investigate the role of past adoption of RM tools on the intention. To this purpose, in line with some other authors (see e.g.

Enjolras and Sentis, 2011; Cole *et al.*, 2014), Santeramo (2019) found that farmers who experienced the insurance tool in the past are more likely to buy it further, with respect to uninsured farmers. Moreover, as the previous experience in using RM tools can change farmers' perception of these instruments (Ye *et al.*, 2017), we also test the influence of past adoption on perceived barriers; similarly, we analyse the effect of previous adoption also on trust, for an explorative purpose.

Furthermore, this study tests whether farmers' attitude towards risk has power in explaining their intention to purchase the insurance tool or to participate in MFs or the IST. Indeed, risk attitude influences many decisions in a farm management context (Vollmer *et al.*, 2017): it follows that its understanding is essential to explain and predict farmers' risk behaviour (i.e. how they act upon risk) and any related policy implications (van Winsen *et al.*, 2016; Iyer *et al.*, 2020). Against this background, we consider the individual risk attitude (namely, the individual orientation towards taking risks) as a fundamental determinant of farmer's INT. Based on the standard expected utility theory and thus assuming farmers' rational behaviour, we expect that more risk averse individuals are more likely to insure (Cao *et al.*, 2019).

In addition, several authors (Enjolras and Sentis, 2011; Lefebvre *et al.*, 2014) emphasized that farmers facing a higher risk exposure (e.g. a greater frequency of insurable risks) are expected to insure, being the demand positively related to past risky occurrences. Thus, we test the role of the perceived risk frequency at farm level (namely, their perceived exposure to risks), assuming that it positively affects INT.

Also, this study investigates the impact of the perceived risk control on INT for an explorative purpose, inspired by the literature: coherently with other authors that they cited, Wauters *et al.* (2014) recalled the link existing between people's behaviour and their degree of control over something. However, no study has yet experimentally explored this link. As intuition suggests, we can assume that farmers with a lower perceived control over risks may be more willing to adopt RM tools.

In addition, farmers can adopt several self-coping strategies for coping with risks in order to minimise their losses (Bowman and Zilberman, 2013; Meraner and Finger, 2019): these includes (but are not limited to) production contracts (i.e. contracts that ensure that the product will be bought at a set price), diversification and investments for new farm structures and new technologies. To this purpose, Marr *et al.* (2016) stated that the higher is the variety of risk mitigation strategies and the lower the demand for insurance is. Hence, our model combines self-coping strategies and INT in a unique framework to better fit the real context of farmers' risk behaviour.

Finally, we also take into account some individual indicators as gender, age and the level of education, analysing their effect on both the intention to adopt and the attitude towards risk. In particular, the literature suggests that elder farmers, i.e. more experienced, and the better educated ones are expected to be insurance users (Sherrick *et al.*, 2004), probably because they can better understand the insurance product (Ye *et al.*, 2017) or because they can assess risks more precisely (El Benni *et al.*, 2016). As regards risk attitude, Franken *et al.* (2017, p. 42) argued that "risk attitudes have been shown to vary systematically with socioeconomic and individual characteristics, such as age, education, gender". In particular, van Winsen *et al.* (2016) showed that age has a positive relation with risk aversion, while education can have both a negative and a positive effect.

Summarising the above discussion, we also test the hypotheses included in table 1 and figure 1. It is worth highlighting that, among the investigated variables, trust, perceived barriers, perceived risk frequency and risk control, self-coping strategies, past adoption and the effect of CAP changes are not observable by scholars, whereas the attitude towards risk is not observable neither by farmers nor by researchers.

Table 1. Hypotheses on relations among variables.

Relation	Sign*
H1: trust significantly affects the intention (i.e. the intention to adopt each subsidised RM tool)	(+/-)
H2: perceived barriers to adopting significantly affect the intention	(+/-)
H3: perceived risk frequency significantly affects the intention	+
H4: perceived risk control significantly affects the intention	(+/-)
H5: risk attitude significantly affects the intention	+
H6: past adoption of RM tools (whatever) significantly affects the intention	+
H7: policy change provided by the Omnibus Regulation significantly affects the intention	(+/-)
H8: self-coping strategies (Past_strat1; Past_strat2; Past_strat3) significantly affect the intention	-
H9: past adoption significantly affects the trust	(+/-)
H10: past adoption significantly affects the perceived barriers	(+/-)

* The sign here reported represents the expected positive (+) or negative (-) influence, as evidenced by the existing literature (related to the insurance tool); however, there is also a possible double effect (+/-) and the reason is twofold: i) because the effect has not yet been investigated by the existing literature or ii) because the literature reports both a positive and a negative effect.

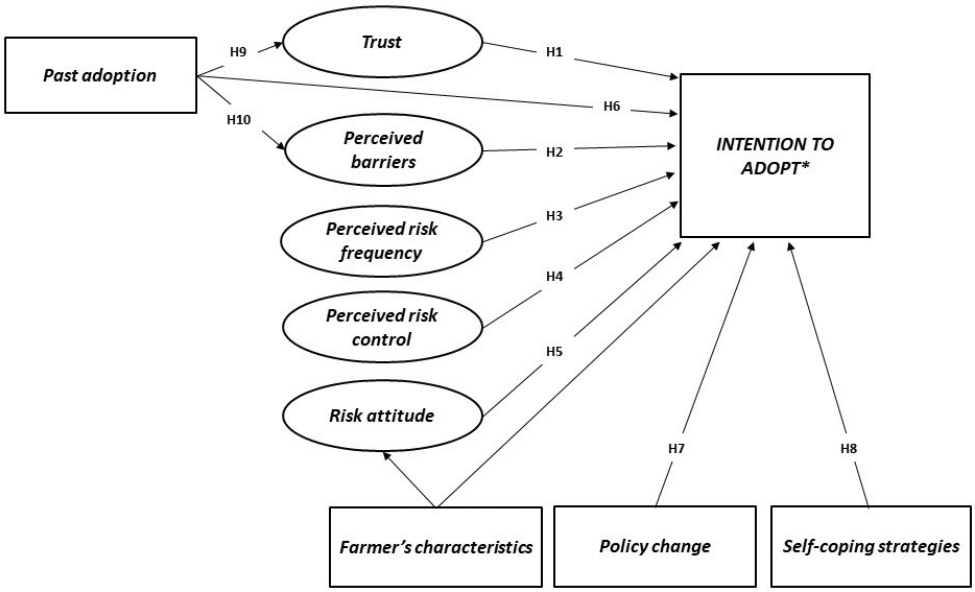
3. Data and method

3.1 Data collection

From December 2017 to March 2018 a survey collection was conducted among 127 Italian farmers in Veneto[6] region through direct interviews. Respondents who freely accepted to answer the questionnaire were the participants of some training courses organized by a farmers' association. Consistent with Wauters *et al.* (2014), it was indeed a purposive sampling, as the authors needed informed respondents who, based on their farming experience and understanding of RM tools, could provide reliable answers (Flick, 2006). The data collection recovered 105 fully completed questionnaires representing the final sample[7]. A structured questionnaire, pre-tested on a small sample (N = 15), was designed based on the existing literature on this topic and on a preliminary survey[8] previously conducted among 23 Italian farmers. In the final questionnaire, farmers were pro-

[6] Veneto region is the first in terms of value of crop-hail insurance coverage (with over 1.4 billion euros) (https://www.statista.com/statistics/818978/value-of-crop-hail-insurance-coverage-by-region-in-italy/).
[7] This sample size is in line with similar studies (see Iyer *et al.*, 2020).
[8] Some open-ended questions asked for: major sources of income and production risks occurring at farm level; most important barriers preventing farmers' adoption of subsidised RM tools; main self-coping strategies employed to manage risk at farm level.

Figure 1. Conceptual path model with hypotheses.



* Intention refers to: insurance adoption (INT_INS) in model 1; participation in a mutual fund (INT_MF) in model 2; participation in the IST (INT_IST) in model 3. The figure does not represent the standard graphical representation of SEM: indeed, measured variables (i.e. those determining latent variables, namely indicators) are not shown. In the figure there are two types of unobservable variables as antecedents of the intention: one measured through the lottery task (i.e. risk attitude - shown as an oval) and some measured through the indicators within the survey (i.e. trust, perceived barriers, perceived risk frequency, and perceived risk control - shown as ovals). Finally, past adoption, policy change, self-coping strategies and farmers' characteristics are observed variables shown as squares.

vided with a short description of the RM tools subsidised by the CAP (i.e. insurance, MFs, IST) to ensure a full understanding.

3.2 Questionnaire

The questionnaire was divided into four sections investigating: i) the intention; 2) the antecedents of the intention; 3) risk attitude; 4) farm's and farmer's characteristics and past strategies to cope with risks at farm level. In particular, in the first one, it was asked to self-assess the individual intention to adopt a subsidised agricultural insurance (*INT_INS*) or to participate in a MF (*INT_MF*) or in the IST (*INT_IST*): more in depth, the average value from three items (5-point scales) was transformed into a dummy (1 if the value was greater than 3, 0 otherwise) to measure each type of intention[9]. Furthermore,

[9] As regards the intention to adopt the insurance tool, the agreement with the following items was asked: "Next year, I will consider the adoption of the subsidised agricultural insurance to face yield risk", "For the next year, I plan to adopt the agricultural insurance to face yield risk", and "Next year, I will adopt the agricultural insur-

the second section of the questionnaire included: several statements to elucidate all the latent variables that cannot be directly measured; a binary yes or no question asking for the past adoption of RM tools (at least once) during the previous five years (*Past adoption*); a five-point psychometric scale (1 = not at all important; 5 = very important) to measure the subjective relevance of the new rules for indemnification provided by the Omnibus Regulation in order to further adopt the three subsidised tools (*Policy change*). As regards latent variables, for each item respondents were asked to score their agreement on several five-point Likert scales. For instance, participants were asked to self-assess their trust (*Trust*) by scoring their agreement with three statements on a Likert scale from 1 (strongly disagree) to 5 (strongly agree); these statements were based on Hartmann *et al.* (2015), with adjustments. Furthermore, three items were used to elucidate the barriers for each tool (*Perceived barriers*), ranging from 1 (not at all a barrier) to 5 (a very important barrier). Finally, with regards to risk frequency (*Perceived risk frequency*; five items) and risk control (*Perceived risk control*; five items) farmers were asked to score the likelihood (1 = very unlikely; 5 = very likely) of six different risk sources identified through the above mentioned preliminary survey (i.e. storm, hail, ice, heavy rain, other negative weather conditions, plant diseases) and the degree of control (1 = no control; 5 = very much control) they exerted on them at farm level, respectively. Particularly, the items related to risk frequency derived from Wauters *et al.* (2014) with adjustments. The third section of the questionnaire included a lottery task to measure farmers' risk attitude (*Risk attitude*) (Menapace *et al.*, 2012; Vollmer *et al.*, 2017; Iyer *et al.*, 2020). We used a lottery choice task inspired by Eckel and Grossman (2008) and assumed constant relative risk aversion (CRRA) for which the utility is defined as $U(x)= x^{(1-r)}/(1-r)$. In order to measure their subjective preferences for taking risks, respondents were asked to imagine to have 28€ and to gamble over this sure amount: they were asked to select, among six different gambles, the one they wished to play[10]. With the exception of the first gamble showing a sure outcome (28€) in both cases, every other gamble involved a 50% chance of receiving a low payoff and a 50% chance of a high payoff (expressed in €) as an outcome; gambles from 2 to 6 presented risky outcomes where the expected payoff and risk linearly increased. This method, derived from Charness *et al.* (2013), represents a simple way of eliciting risk aversion: in particular, risk averse respondents choose gamble 1-4, whereas those who choose gamble 5 and gamble 6 are risk neutrals and risk seekers, respectively. Following Menapace *et al.* (2012), we considered CRRA lower bound for the analysis. Finally, the last section of the questionnaire investigated farmer's and farm's characteristics (i.e. gender, age, education, average farm revenue, utilised agricultural area) and the previous adoption of self-coping strategies as diversification (*Past_*

ance to face yield risk" (composite reliability: 0.88). In relation to the intention to participate in a mutual fund we used: "Next year, I will consider the participation in a mutual fund to face yield risk", "For the next year, I plan to become a member of a mutual fund to face yield risk", and "Next year, I will be a member of a mutual fund to face yield risk" (composite reliability: 0.88). Finally, with regards to the intention to participate in the IST we used: "I will consider the participation in the IST to face income risk", "I plan to become a member of a IST to face income risk", and "I will be a member of the IST to face income risk" (composite reliability: 0.88).

[10] We chose this easily comprehensible lottery task derived from Dave *et al.* (2010) as it is simple, easy to explain and implement, while retaining a reasonable range of risky choices, and it is totally understandable by the respondents.

strat1), production contracts (*Past_strat2*), investments for new farm's structures and new technologies (*Past_strat3*).

3.3 Methodology

The analysis applied a structural equation model (SEM) that deals with a system of regression equations. Indeed, this multivariate analysis consists of a set of linear equations that simultaneously estimate two or more hypothesized causal relationships between several variables (Bollen, 1989): by including them in a single model, SEM traces the structure of the decision-making process. In SEM models, variables can be both exogenous (independent) and endogenous (dependent), both observed and latent variables (namely, unobservable variables that require two or more measured indicators) as perceptions, self-reported behaviour, or personality traits; moreover, in some cases a variable can be both a predictor and a dependent variable at the same time, whereas the relationship can be direct or indirect. Within SEM it is possible to distinguish both structured models (that represent the relationship between latent variables) and measurement models (that represent the relationship between the latent variable and its observable indicators). In the model, the parameters to estimate are the regression coefficients, the variances and the covariances of the independent variables. As above mentioned, the popularity of this technique derives from the possibility to concurrently test different impacts among variables (i.e. multiple and simultaneous testing), as opposite to ordinary regression analysis (Schreiber *et al.*, 2006); another main advantage is the capability to handle latent variables, which can be both dependent variables and predictors, while controlling for farm's and farmers' characteristics. However, an adequate (i.e. large) sample size is required[11]; moreover, only identified models can be estimated. The interested reader may want to read Ullman (2006, p. 40) for a more extensive description and a more extended model statistical specification. Following Ullman (2006), SEM can be expressed as follows:

$$\eta = B\eta + \Gamma\xi + \zeta \quad (1)$$

where η is a vector of endogenous variables, B is a matrix of coefficients between endogenous variables, Γ is a matrix of regression coefficients denoting the effect of exogenous variables on endogenous variables, ξ is a vector of exogenous variables, and ζ is a vector of the measurement errors. Although widely tested in many different contexts, this approach has been only recently proposed in the field of study on farmer's risk behaviour and the work of Pennings and Leuthold (2000) represents a pioneering example. More recent applications to risk behaviour analysis are the study by van Winsen *et al.* (2016) and the study by Franken *et al.* (2017): this latter analyses the impact of farm socio-economic and farmer individual characteristics on risk attitude. Against this background, our paper represents an innovative attempt to use a SEM in explaining the potential relationships of several factors with farmers' intention to adopt risk management strategies. The descriptive analysis was performed using SPSS version 24, whereas SEM was performed using AMOS package. In SEM models,

[11] To overcome this limit, it is worth noting that Bentler and Yuan (1999) developed test statistics for small sample sizes.

the goodness-of-fit statistics assess the model-data matching; to do this, we used the following indexes: the ratio between χ^2 and the degrees of freedom (CMIN/DF), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA).

4. Empirical results and discussion

As shown in table 2, the average age of respondents is 40 years and the majority of the sample are men (72%), with an upper secondary school level of education (63%) and an

Table 2. Sample descriptive statistics.

Categories	Description	N. Obs	%	Mean	S.D.
Gender (*Sex*)	(0) female	29	27.6		
	(1) male	76	72.4		
Age (*Age*)	n. years			40.12	13.55
Education (*Education*)	(1) primary school	3	2.9		
	(2) secondary school	14	13.3		
	(3) upper secondary school	66	62.9		
	(4) university degree	22	21.0		
Average farm revenue (*Revenue*) (gross income from farming/year)	(1) less than 50,000€	62	59.0		
	(2) 50,000€ - 100,000€	28	26.7		
	(3) 100,000€ - 250,000€	11	10.5		
	(4) more than 250,000€	4	3.8		
Utilised Agricultural Area (*Uaa*)	n. hectares		14.25	17.04	
How relevant are the changes to RM policy provided by the Omnibus Regulation, in order to adopt risk management tools in your farm? (*Policy change*)	(1) not at all important	6	5.7		
	(2) scarcely important	6	5.7		
	(3) neutral	52	49.5		
	(4) sufficiently important	27	25.7		
	(5) very important	14	13.3		
Intention to adopt the agricultural insurance (*INT_INS*)	(0) no	47	44.8		
	(1) yes	58	55.2		
Intention to participate in a mutual fund (*INT_MF*)	(0) no	57	54.3		
	(1) yes	48	45.7		
Intention to participate in the IST (*INT_IST*)	(0) no	50	47.6		
	(1) yes	55	52.4		
Previous adoption of RM tools at farm level (past 5 years) (*Past adoption*)	(0) no	73	69.5		
	(1) yes	32	30.5		
Adoption of diversification (*Past_Strat1*)	(0) no	92	87.6		
	(1) yes	13	12.4		
Adoption of production contracts (*Past_Strat2*)	(0) no	98	93.3		
	(1) yes	7	6.7		
Previous investments for new farm structures and new technologies (*Past_Strat3*)	(0) no	101	96.2		
	(1) yes	4	3.8		

average farm revenue lower than 50,000€ per year (59%). The average utilized agricultural area of farms is 14 hectares and these are heterogeneous in terms of production orientation: permanent crops' production represents the majority of the sample (50%), followed by livestock (28%), arable crops and horticulture (23%), and only a minority are mixed farms. Moreover, up to 70% of the respondents declares no previous adoption of RM tools at farm level. Finally, on average respondents show a positive intention to adopt subsidised agricultural insurance schemes (55%) and to participate in the IST (52%) in the near future (i.e. the next year), as opposite to MFs (46%). Interestingly, 36% show a positive intention to both subscribe the insurance and to participate in a mutual fund, 38% to both subscribe the insurance and to participate in the IST, 37% to participate in both a MF and the IST, and finally 29% show a positive intention with regard to the three tools.

As shown in table 3, all the items present mean values above the scale mean, with the exception of perceived risk control, as expected. Hence, the majority of farmers perceive a high risk frequency and considerable barriers to the adoption of subsidised RM tools, are endowed with a scarce control over adverse weather events striking their farm and display a high trust towards the intermediaries. Cronbach's α scores are higher than 0.75 for each considered latent variable, denoting an adequate internal consistency. Moreover, the standardized regression weights of the items are significant at 1% level and show values ranging from 0.320 to 0.916.

As expected and consistent with the literature (Iyer *et al.*, 2020), table 4 shows that our farmers' sample mainly consists of risk averse subjects (84.8%) who chose gamble 1, 2, 3 and 4, whereas only 6.7% are risk neutral and 8.6% are risk seekers.

Goodness-of-fit indexes of the estimated models are acceptable, with a root mean square error of approximation (RMSEA) of 0.05 (model 1) and 0.06 (model 2 and 3), a comparative fit index (CFI) of 0.9 and CMIN/DF always lower than 2 in each model. Hence, our results demonstrate the usefulness of SEM in exploring the relationships of intention and other decision-making attributes with regard to risk management behaviour, consistent with van Winsen *et al.* (2016). Furthermore, the variance of farmers' intention, risk attitude, perceived barriers and trust is explained in the measure of 25%, 15%, 6% and 5% in the first model, respectively; whereas in the measure of 27%, 15%, 1% and 5% in the second model. To conclude, the third model explains up to 25% the intention, 15% the risk attitude and 4% the trust, whereas it does not explain the barriers at all.

Interestingly, the results (table 5) show a positive effect of trust on the intention in model 1 and 3 (H1 - $\boldsymbol{\beta}_{\text{Trust}}$ = 0.22 and 0.24 respectively, significant at 5% level), showing that a greater individual trust increases the intention to adopt the insurance and to participate in the IST. Consistently with this, Karlan *et al.* (2014) argued that the more farmers are confident the payout will be properly made by the insurance company and the greater their demand for insurance is. The evidence that trust tends to increase the intention to participate in the IST let us assume that this personality trait might be considered as a substitute for farmers' need to understand this new instrument (that is currently unfamiliar to them), at least during the setting-up: the greater the amount of trust, the lower the perceived uncertainty linked to these tools (operating rules, management, etc.); however, this deserves further investigations. Consequentially, if reinforced (by the bodies responsible for its management, e.g. Defence Consortia), we can assume that trust might overcome farmers' original reticence about participating in the IST and foster its progressive

Table 3. Latent variables.

Measure	Item code	Mean	S.D.	Std. factor loading
Trust[a] (Cronbach's $\alpha = 0.86$)				
I perceive the intermediaries who support me for the adoption of the agricultural insurance to be reliable	*trust1*	3.17	0.87	0.73***
I am confident that the intermediaries which I refer to for the adoption of agricultural insurance take care of my interest	*trust2*	3.05	1.01	0.86***
I trust in the intermediaries who support me for the adoption of agricultural insurance	*trust3*	2.85	0.89	0.86***
Perceived barriers to insurance adopting[b] ($\alpha = 0.79$)				
I have a scarce perception of the benefits of agricultural insurance's adoption	*ins_barr1*	3.31	1.17	0.73***
There is low transparency in the mechanisms of agricultural insurance	*ins_barr2*	3.53	1.07	0.78***
I think that the management of agricultural insurance tool is difficult at farm level	*ins_barr3*	3.02	1.05	0.74***
Perceived barriers to participating in a mutual fund[b] ($\alpha = 0.78$)				
I have a scarce perception of the benefits of my participation in a MF	*mf_barr1*	3.54	0.94	0.89***
There is low transparency in the mechanisms of MFs	*mf_barr2*	3.45	0.96	0.87***
I think that my participation in a MF is difficult to manage at farm level	*mf_barr3*	3.17	0.86	0.48***
Perceived barriers to participating in the IST[b] ($\alpha = 0.80$)				
I have a scarce perception of the benefits of my participation in the IST	*ist_barr1*	3.53	0.93	0.92***
There is low transparency in the mechanisms of the IST	*ist_barr2*	3.50	0.85	0.83***
I think that my participation in the IST is difficult to manage at farm level	*ist_barr3*	3.15	0.83	0.57***
Perceived risk frequency[c] ($\alpha = 0.80$)				
Storm	*freq1*	3.56	1.11	0.59***
Hail	*freq2*	4.20	0.88	0.68***
Ice	*freq3*	3.79	1.00	0.68***
Heavy rain	*freq4*	3.47	1.15	0.59***
Other negative weather conditions	*freq5*	3.36	0.96	0.66***
Plant diseases	*freq6*	3.85	0.96	0.52***
Perceived risk control[d] ($\alpha = 0.84$)				
Storm	*cont1*	2.04	1.22	0.74***
Hail	*cont2*	2.19	1.39	0.84***
Ice	*cont3*	2.08	1.22	0.82***
Heavy rain	*cont4*	2.09	1.23	0.73***
Other negative weather conditions	*cont5*	2.35	1.03	0.56***
Plant diseases	*cont6*	3.10	1.22	0.32***

*** Significant at 1% level.

[a]5-pt Likert scale (1=strongly disagree; 5=strongly agree); [b]5-pt Likert scale (1=not a barrier; 5=very important barrier); [c]5-pt Likert scale (1=very unlikely; 5=very likely); [d]5-pt Likert scale (1=no control; 5=very much control).

Table 4. Gamble task experiment and CRRA measure of risk aversion and share of farmers choosing each gamble.

Gamble	Low payoff (50%)	High payoff (50%)	Expected payoff	Risk[a]	CRRA ranges[b]	Farmers (%)
1	28 €	28 €	28 €	0	r>7	11.4%
2	24 €	36 €	30 €	6	1.2<r<7	18.1%
3	20 €	44 €	32 €	12	0.8<r<1.2	34.3%
4	16 €	52 €	34 €	18	0.5<r<0.8	21.0%
5	12 €	60 €	36 €	24	0.1<r<0.5	6.7%
6	2 €	70 €	36 €	34	0.09<r<0.1	8.6%

[a] The risk is calculated as the standard deviation of the expected payoff.

[b] CRRA ranges are calculated as the range of r in the function $U(x)= x^{(1-r)}/(1-r)$ for which the subject chooses each gamble assuming constant relative risk aversion utility.

development. Also, the mutual nature of the IST considers the risk sharing among farmers, thus the need to support and cover other members' losses (Meuwissen *et al.*, 2013): for that reason, farmers need to feel assured and a deep trust can play a crucial role for this. Interestingly, trust increases if the individual has formerly made use of subsidised RM tools (H9 - $\boldsymbol{\beta}_{\text{Past adoption}} = 0.21$ at 5% level), suggesting that the previous experience somehow positively drives farmers to be more confident. This result somehow considers the importance of the quality (positive / negative) of past experience which, to the best of our knowledge, has not yet been considered by the extant literature (see e.g. Enjolras and Sentis, 2011; Santeramo, 2019) that focused on investigating direct or indirect experience, or distinguishing between long or recent experience over time: indeed, increased trust is necessarily linked to a positive past experience.

So far, the literature highlighted how several bureaucratic and administrative hurdles, as for instance the difficulty in monitoring the historical farm income, constrain the development and demand of MFs and the IST (Cordier and Santeramo, 2019). To this purpose, our results reveal that the individual perceived barriers also matter: in fact, the higher is the perceived existence of barriers to adopting and the lower is the intention to participate in a MF (H2 - $\boldsymbol{\beta}_{\text{Perceived barriers}} = -0.20$ at 5% level); as opposite, no significant effect emerges in model 1 and 3. This foreshadows the hypothesis that our respondents would make use of this instrument if they were provided with practical knowledge about it. In this regard, the competent authorities eligible for setting up and managing MFs in accordance with the national law could play a key role in providing farmers with adequate information (e.g. benefits and transparency in the functioning mechanism), and in reassuring them about the streamlined management rules at farm level, in order to encourage the participation.

As regards the perceived frequency of risk occurring at farm level, we can appreciate a positive effect on the intention to both adopt the insurance ($\beta_{\text{Perceived risk frequency}} = 0.19$ at 10% level) and participate in a mutual fund (H3 - $\beta_{\text{Perceived risk frequency}} = 0.21$ at 5% level), as expected. This is consistent with Meraner and Finger (2019) who argue that more risk literate farmers are more likely to resort to off-farm measures as insurance contracts. In

Table 5. Standardized regression weights for model 1, 2 and 3.

	Model 1 (INT_INS)				Model 2 (INT_MF)				Model 3 (INT_IST)			
	INT	RA	BAR	TRU	INT	RA	BAR	TRU	INT	RA	BAR	TRU
	β	*β*	*β*	*β*	*β*	*β*	*β*	*β*	*β*	*β*	*β*	*β*
TRU	0.224**				-0.039				0.239**			
BAR	-0.151				-0.197**				0.023			
RF	0.193*				0.210**				0.127			
RC	-0.065				0.156				0.016			
RA	0.197**				-0.012				-0.028			
PAST	0.107		-0.234**	0.212**	-0.074		-0.032	0.212**	-0.225**		0.006	0.208**
PO	0.104				0.261***				0.271***			
STRA1	0.100				0.020				0.008			
STRA2	-0.036				0.031				0.149*			
STRA3	0.187**				0.155*				0.130			
EDU	-0.038	0.267***			0.192**	0.267***			0.115	0.267***		
SEX	0.098	0.091			0.138	0.091			0.146*	0.091		
AGE	-0.104	0.271***			0.097	0.271***			-0.022	0.271***		
R^2	0.25	0.15	0.06	0.05	0.27	0.15	0.01	0.05	0.25	0.15	0.00	0.04
	χ2 = 436.981; df = 339; p < 0.000 CMIN/DF = 1.29; CFI = 0.87; TLI = 0.86; RMSEA = 0.05				*χ2 = 449.736; df = 339;* p < 0.000 CMIN/DF = 1.33; CFI = 0.86; TLI = 0.84; RMSEA = 0.06				*χ2 = 449.675; df = 339;* p < 0.000 CMIN/DF = 1.33; CFI = 0.86; TLI = 0.85; RMSEA = 0.06			

Significant levels are under the coefficient: *** significant at 1% level; ** significant at 5%; * significant at 10%.
RA = Risk attitude; BAR = Perceived barriers; TRU = Trust; RF = Perceived risk frequency; RC = Perceived risk control; PAST = Past adoption; PO = Policy change; EDU = Education; SEX = gender; AGE = Age; STRA1 = Past_strat1; STRA2 = Past_strat2; STRA3 = Past_strat3.

this study, farmers that more often face some major risks (e.g. storm, hail, ice, heavy rain, other negative weather conditions, plant diseases) are more likely to use those instruments that are specific to cope with yield losses, indeed. As opposite, no significant effect emerges with respect to the IST, which aims at facing income losses instead. As regards the perceived risk control (H4), our findings do not show significant effect in every model.

Also, the results show that the individuals who are less willing to take risks (namely, more risk averse) are more likely to subscribe an insurance contract (H5 - $\beta_{\text{Risk attitude}} = 0.20$ at 5% level), being consistent with the more recent literature on crop insurance uptake in Italy (Santeramo, 2019), while contrasting some other authors (Hellerstein *et al.*, 2013; van Winsen *et al.*, 2016). Conversely, we find no significant effect of risk attitude on the participation in both MF and IST.

Surprisingly, we found that the most important contributor of farmers' intention to participate in both MFs and to the newly established IST is represented by the changed operating rules provided by the agricultural part of the Omnibus Regulation (H7 - $\boldsymbol{\beta}_{\text{Policy change}} = 0.26$ in model 2 and = 0.27 in model 3, both at 1% level). When adequately informed about the existence of advantageous conditions for the adoption, farmers show a positive intention to make use of these tools. Hence, this reinforces the importance of information (Santeramo, 2019).

Not surprisingly, the results show a significant and negative effect of past adoption on perceived barriers in model 1 (H10 - $\boldsymbol{\beta}_{\text{Past adoption}} = -0.23$ at 5% level): this is to indicate that having a previous experience with a subsidised RM tool facilitates the understanding (Ye *et al.*, 2017), thus reducing the reluctance to adopt the insurance in the future (Santeramo, 2019). As opposite, no significant results emerge in model 2 and 3. Furthermore, we find no significant effect of past adoption on the intention to subscribe the insurance and to participate in MFs, contrary to Enjolras and Sentis (2011) and Santeramo (2019). As opposite, in model 3 we find a significantly negative effect on the intention to participate in the IST (H6 - $\boldsymbol{\beta}_{\text{Past adoption}} = -0.23$ at 5% level): this may suggest that the farmers in our sample who previously experienced tools other than the IST, in other words unsubsidised MFs' initiatives or subsidised insurance, are less inclined to experiment with this innovative tool.

Regarding the hypothesis H8, the results show that the individuals who already apply some risk reduction actions (i.e. self-coping strategies) as investments for new structures and technologies are more likely to adopt the insurance ($\beta_{\text{Past\_strat3}} = 0.19$ at 5% level) and to participate in a MF ($\boldsymbol{\beta}_{\text{Past\_strat3}} = 0.16$ at 10% level). On the other hand, farmers in our sample who already use production contracts to secure their income show a higher intention to participate in the IST ($\beta_{\text{Past\_strat2}} = 0.15$ at 10% level), as expected: indeed, this latter is designed to satisfy farmers' growing request to protect their income from losses at farm level. A similar finding is shown by Lefebvre *et al.* (2014) on insurance adoption in Bulgaria.

Also, findings reveal that the intention to participate in a MF is higher for farmers with a higher education ($\beta_{\text{Education}} = 0.19$ at 5% level), whereas men are more likely to participate in the IST, compared to women ($\beta_{\text{Sex}} = 0.15$ at 10% level). The effect of education in relation to the insurance found no significant evidence, coherently with Menapace *et al.* (2016) and van Winsen *et al.* (2016), as well as the IST. A second line of findings shows that elder and higher educated individuals are more risk averse ($\beta = 0.27$ at 1% level for both education and age), thus corroborating the findings of previous research (see e.g. Harrison *et al.*, 2007; Nielsen *et al.*, 2013; van Winsen *et al.*, 2016).

5. Conclusion

In the wake of the contingent debate on farmers' adoption of subsidised risk management tools, this contribution contrasts three conceptual models to test the simultaneous effect of some major interrelated factors on farmer's propensity to adopt RM tools, as pertains to a real decision-making process: namely, subsidised insurance and, for the first time, mutual funds and the new IST. Instead of relying on secondary data as the most part of the existing literature in Europe, this study presents the results from a field investigation: this allowed to collect relevant determinants as trust and perceived barriers, that the existing literature on EU risk management in agriculture has not experimentally addressed so far. It is worth to note that the investigation of trust and barriers represents a novelty, similarly to the inclusion of the new IST and the adoption of a SEM approach. Moreover, it is worth highlighting that this represents an ex-ante analysis which does not consider farmers' behaviour after the practical introduction of the IST in the agricultural sector.

As the scarce attention to trust mainly inspired this study, the most intriguing result is represented by its positive influence on the intention to both subscribe an insurance contract and to participate in the IST. This confirms the key role of this personality trait in decision-making under uncertainty, and suggests that trust probably works as a substitute for knowledge as pertains to the insurance, while it can overcome the lack of experience for the new IST, whose functioning mechanisms and rules are still unfamiliar to farmers. Even if we do not focus neither on the nature of trust, nor the context in which it arises, we can suppose that the subsidised RM tools' adoption may be incentivized in the future by building trust nonetheless. Indeed, trust may be essential for the demand of the insurance (e.g. between the farmer and the insurance sale agent), that is notoriously affected by information asymmetry, and the IST especially. In fact, this latter represents a fund that creates a financial reserve through the annual contributions by all members and that compensates only farmers who lose beyond a certain threshold: it follows that farmers can hesitate to participate in such collective tools, compared e.g. with individual instruments. To this purpose, it is recommendable to build strong interpersonal relationships, also confirmed over time, within whichever body designated for the IST's management (e.g. farmers' cooperatives or organizations or Defence Consortia). Accordingly, this may represent a trust-making strategy useful to guarantee farmers' positive expectations regarding the other members' behaviour, and thus to attract more beneficiaries just fading their initial reticence. The evidence that trust can play a role let us assume that this represents a promising area of research regarding the agricultural risk management, deserving further research to analyse its determinants and to understand how to increase it, in order to provide practical policy recommendations. Generally speaking, we can only assume that several strategies implemented by both the insurance companies and the mutual fund's managers or Defence Consortia might positively affect farmers' trust by decreasing the uncertainty linked to RM tools. Among these, establishing reputation, increasing transparency on losses and indemnities' monitoring, and promoting a greater comprehensibility of contracts' conditions or the operation and membership rules (as regards the new mutual funds), and about the advantages (both in terms of risk coping and affordability) for farmers to adopt RM instruments. Furthermore, we found that trust is positively affected by previous adoption, thus evoking the importance of personal satisfaction from past experi-

ence (e.g. with previous compensations or from the participation in a mutual fund); this confirms the definition of trust by Mutti (1998), that is "an expectation born from experiences deemed positive by the individual, developed under conditions of uncertainty". In addition, our results show an indirect effect of previous experience with RM tools on the intention to adopt (at least for the insurance), mediated by trust. Based on this, we can assume that efforts should be made to promote the initial adoption of RM instruments (e.g. encouraging farmers to use these tools through information campaigns or incentives as the reduction of the participation fee for the first year) in order to increase trust and, as a consequence, to positively impact the intention to adopt RM tools further.

Moreover, this study confirms that the changed rules recently established by the Omnibus Regulation positively influence the intention to participate in a mutual fund and the IST. On the other hand, we can suppose that the insurance decision is not sensitive to these policy changes probably because of its greater understanding among farmers, as it boasts a long-standing tradition in Italy, compared to the other instruments that are less known. Since our results show that these recent policy changes are perceived as relevant and suitable by the beneficiaries, it seems increasingly important to bridge the gap between the current policy efforts in implementing specific measures to encourage farmers' adoption of subsidised RM tools and the lack of knowledge among the potential beneficiaries; indeed, this represents a friction to enlarge the audience of farmers. Thus, we merely conclude that a greater information about the operating rules is advocated among farmers, as a greater support to the advisory systems that mainly drive initiatives to increase the knowledge among farmers. In line with this, another interesting evidence comes from the negative effect of perceived barriers on the intention to participate in a mutual fund in our sample: this highlights the necessity of spreading the knowledge about this tool among the potential beneficiaries, as they reasonably have difficulties in evaluating the benefits properly and in understanding the operation of the instrument in depth without an advice.

Although this paper presents many innovative cues on the heterogeneous literature on RM tools' adoption, some limitations exist. Firstly, the hypothetical nature of the gambles and the absence of a context specification for the measure of risk attitude. To this purpose, despite many authors may criticize this, we remind that many others (e.g. Rommel *et al.*, 2019) argue that adding context does not necessarily improve the ability to predict real-world decision-making. Nevertheless, due to the fact that risk attitude is not central in our study, this may not necessarily represent a strong limitation at the moment. Secondly, the non-representativeness of the Italian population prevents our results from being generalizable: for this reason, we cannot discuss policy implications at this stage. In line with this, we highlight that the overarching objective of this research is to provide new evidence on the potential role of factors not yet explicitly explored before, and therefore to pave the way for new research avenues in the field of farmers' adoption of subsidised RM tools: accordingly, if supported by a wider and more representative sample, further research would reasonably lead to relevant policy implications, e.g. informing policy makers to devise and plan more adequate strategies and initiatives to foster farmers' adoption. Moreover, the analysis does not consider several relationships and factors that the literature found to be significant determinants, due to the necessity to keep the models as parsimonious as possible; this limitation could be overcome in further studies that may also

focus on farmers' real uptake (i.e. behaviour) instead of intention, by using also framing techniques.

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