



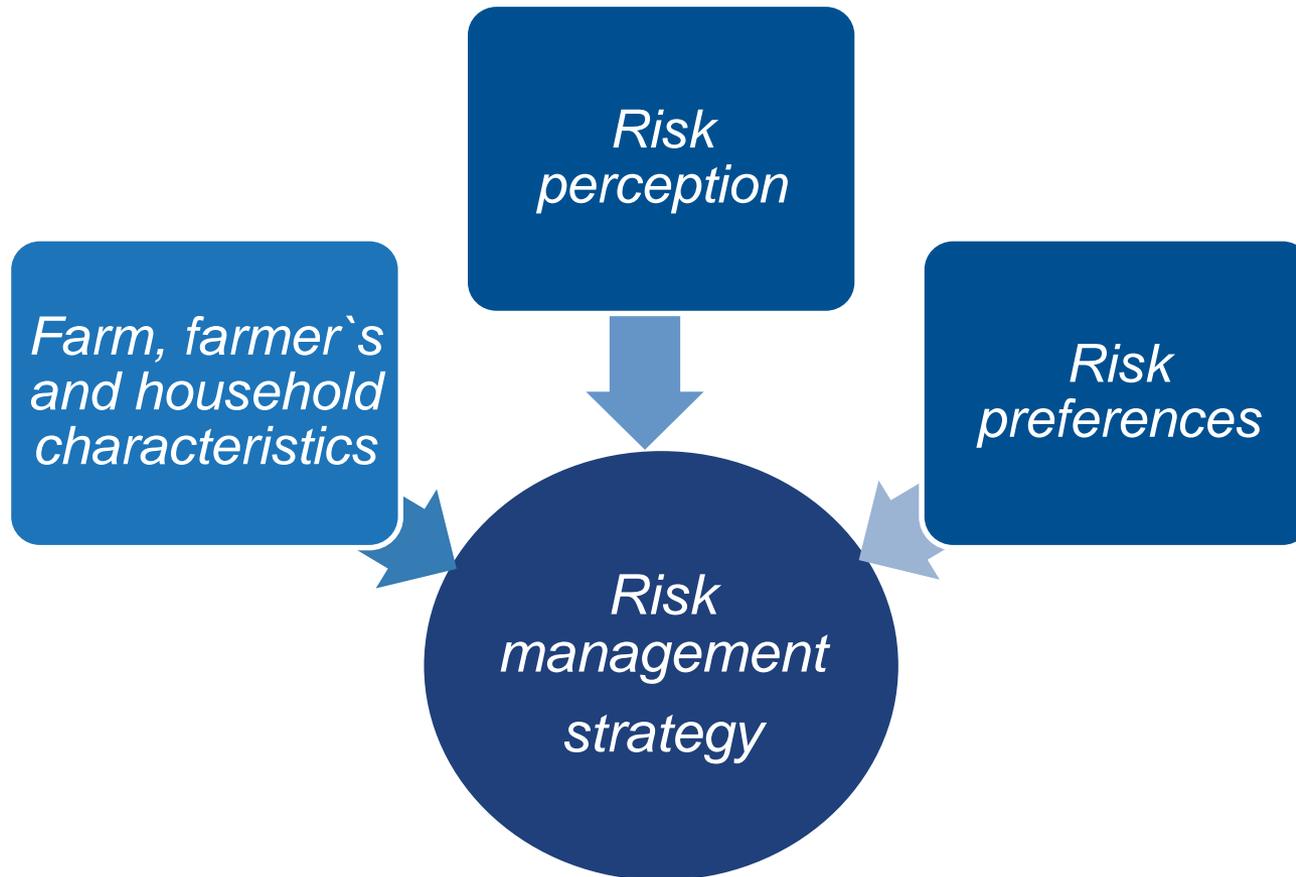
The impact of risk perception and preferences on risk management strategies: Evidence for German livestock farmers

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Motivation: decision making process



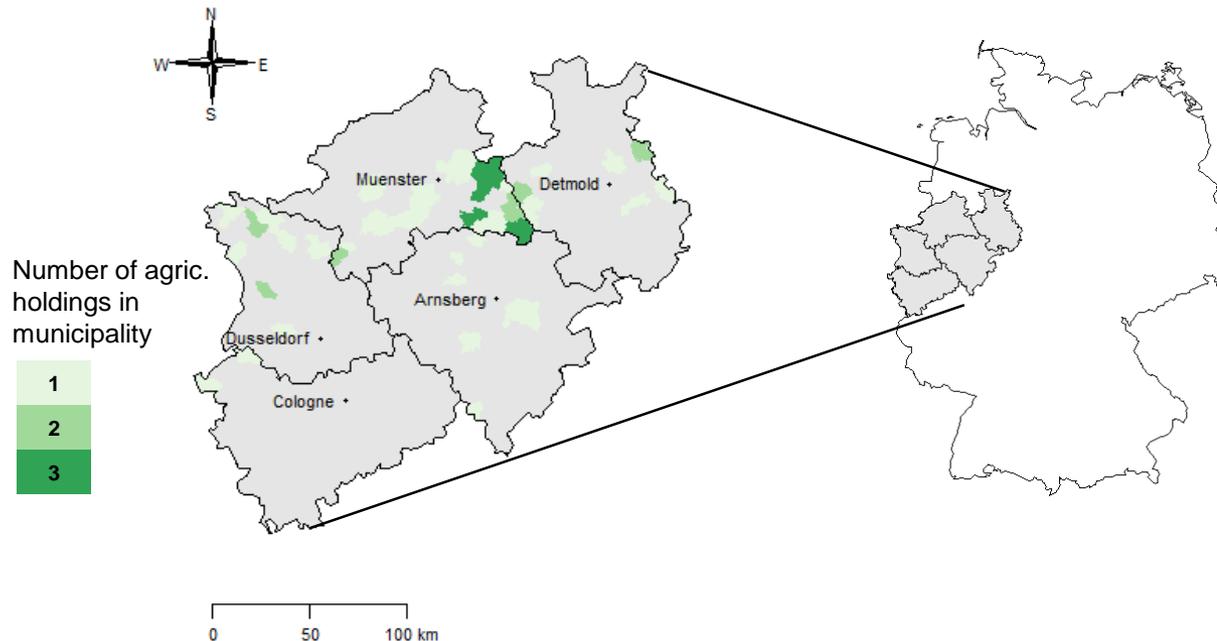
Source: Own depiction according to van Raaij (1981)

Research Questions

1. How are farm, farmer's and household characteristics (incl. risk perception) related to the choice of risk management strategies?
2. Which risk attitude parameter elicited from different risk elicitation methods pertains the farmers' risk behavior best?

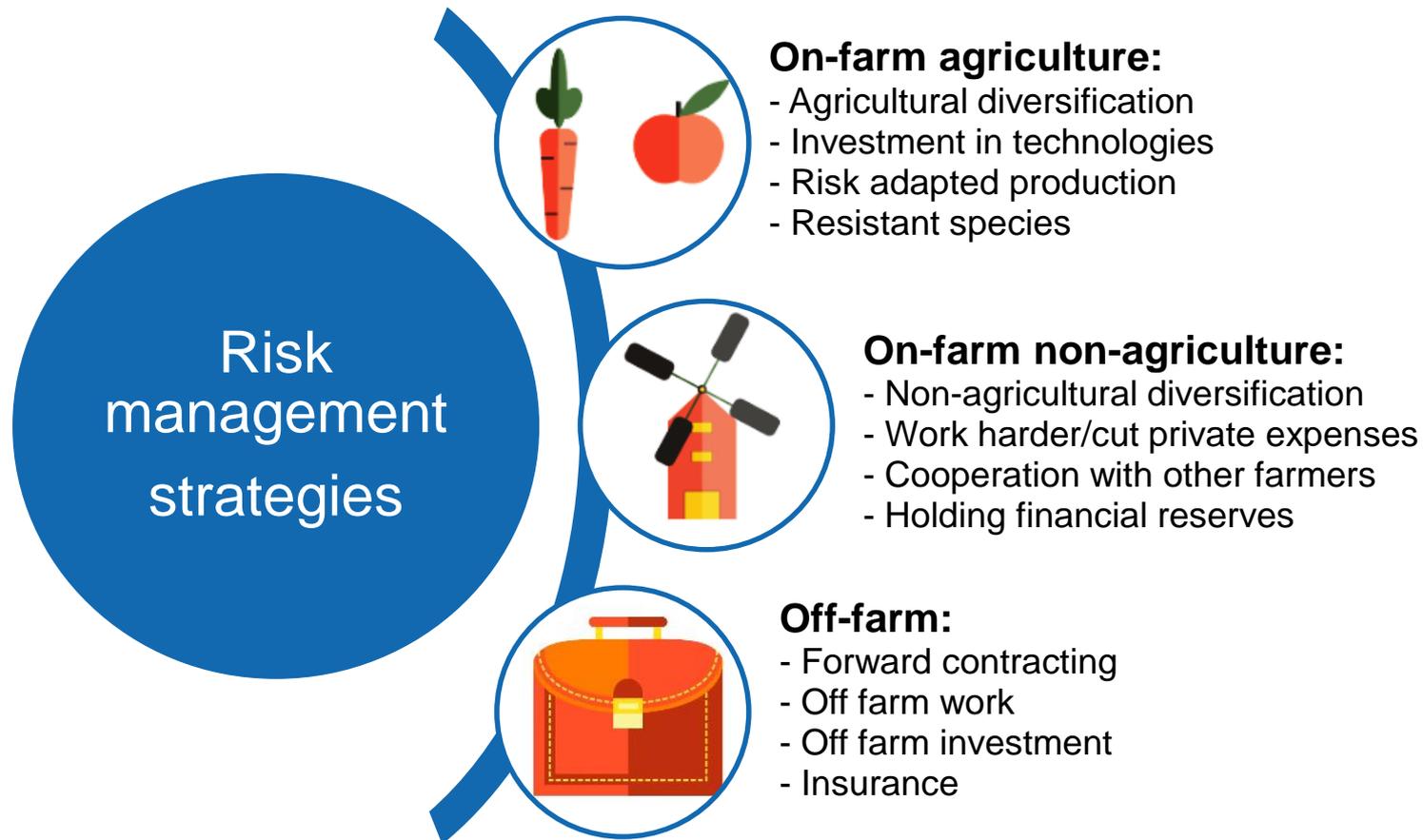
Experimental Design

- Paper pencil survey
- December 2015 and January 2016
- **64 farmers** in North-Rhine-Westphalia, response rate = 26%



Source: Own depiction

Risk management strategies



Methodology

Group farmer`s choice of risk management strategy: max. mean in each category

on-farm agric. mean

0.50



on-farm non-agric. mean

0.25



off-farm mean

0.28



Multinomial probit model:

$$y_{ij}^* = \beta_{ij}x_{ij} + \varepsilon_{ij} \quad \varepsilon_{ij} \sim N(0, \Sigma) \text{ and } j = (0 \dots 2)$$

$$\text{with } y_i = \begin{cases} 1 & \text{if } y_i^* \text{ on-farm agriculture} > 0 \\ 2 & \text{if } y_i^* \text{ on-farm non-agriculture} > 0 \\ 0 & \text{otherwise.} \end{cases}$$

x_{ij} = vector of observable farm and farmer characteristics

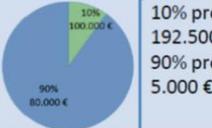
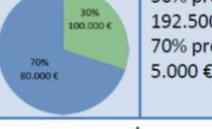
x_{ij} = risk preferences, risk perception, age, risk literacy, experienced past losses, succession, agricultural area, proportion rented land, livestock: pig/piglet, dairy cattle

Risk preferences I

- Risk preference elicitation: 20+ different methods, high between method inconsistencies (→ different methods show different risk preferences of the same individual)
- Use three methods to elicit risk preferences:

1. Multiple price list (MPL) (Holt and Laury 2002)

Contextualized lottery with 10 agricultural investment decisions

	A	B	A	B
1	10% probability of a 100.000 € return and 90% probability of a 80.000 € return 	10% probability of a 192.500 € return and 90% probability of a 5.000 € return 	<input type="checkbox"/>	<input type="checkbox"/>
2	20% probability of a 100.000 € return and 80% probability of a 80.000 € return 	20% probability of a 192.500 € return and 80% probability of a 5.000 € return 	<input type="checkbox"/>	<input type="checkbox"/>
3	30% probability of a 100.000 € return and 70% probability of a 40.000 € return 	30% probability of a 192.500 € return and 70% probability of a 5.000 € return 	<input type="checkbox"/>	<input type="checkbox"/>

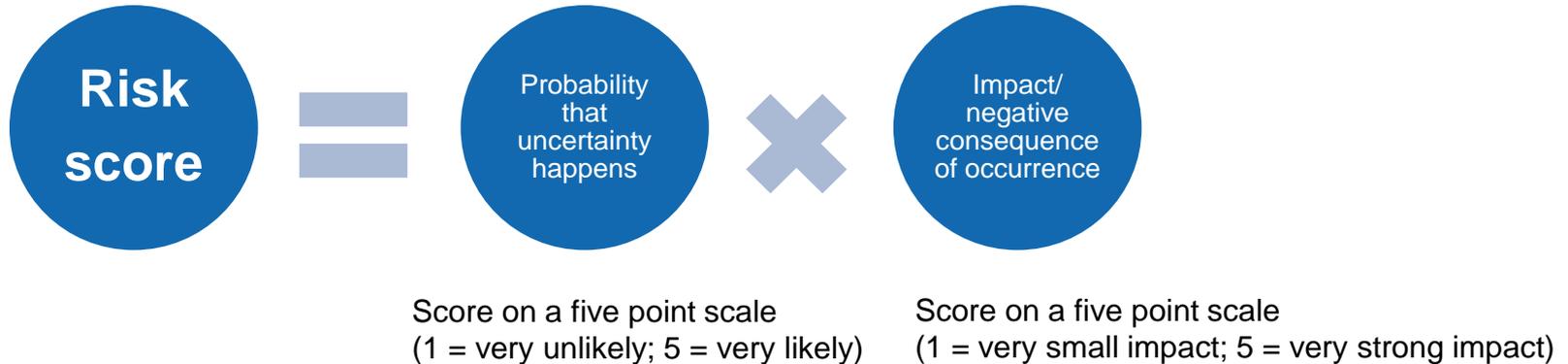
Risk preferences II

2. Self-assessment of general attitude towards risk (Dohmen et al. 2009)

3. Business statements of relative risk preferences in four different domains (Meuwissen et al. 2001)
 - i. “I am willing to take on more risks than my colleagues with respect to **production**.” (1 = agree, 5 = disagree)
 - ii. “I am willing to take on more risks than my colleagues with respect to **marketing and prices**.” (1 = agree, 5 = disagree)
 - iii. “I am willing to take on more risks than my colleagues with respect to **finances**.” (1 = agree, 5 = disagree)
 - iv. “I am willing to take on more risks than my colleagues with respect to **agriculture in general**.” (1 = agree, 5 = disagree)

Higher positive values → more risk aversion

Risk perception



Market and price risk



Political / structural risks



Production risk



Financial risk



Other risks (legal / environmental)



Results: How are farm and farmer's characteristics related to the choice of risk management strategies?

		
Farmer characteristics		
Age	-	+
Age ²	+	-
Risk illiteracy	+	+
Perceived mp risk	-	
Perceived other risk	+	
Experienced past losses	+	+
Household characteristics		
Succession		+
Farm characteristics		
Agricultural area	-	
Proportion rented land		-
Livestock: pig/piglet		+
Livestock: dairy cattle	+	
Risk aversion	→	→

Results: Which risk attitude parameter elicited from three different risk elicitation methods pertains the farmers' risk behavior best?

Risk aversion		
Multiple price list	+	
Self-assessment		+
Ø Business statement		+
Business statement: production		+
Business statement: marketing and prices		+
Business statement: finances	+	
Business statement: agriculture generally		+

Conclusion

- Risk perception and risk aversion are directly influencing the decision of risk management strategies applied
- Greater risk aversion increases the probability that farmer's focus on on-farm strategies (compared to choosing off-farm strategies)
- Simultaneous analysis of risk management tools is essential

Thank you for your
attention!



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<http://www.aecp.ethz.ch/>

References

- Dohmen, Thomas; Falk, Armin; Huffman, David; Sunde, Uwe; Schupp, Jürgen; Wagner, Gert G.; Berlin, D. I.W. (2009): Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences. *Journal of the European Economic Association* 9 (3), 522–550.
- Holt, C.A., Laury, S.K., 2002. Risk aversion and incentive effects. *American economic review* 92 (5), 1644–1655.
- Meuwissen, M. P. M., R. B. M. Huirne, and J. B. Hardaker. "Risk and risk management: an empirical analysis of Dutch livestock farmers." *Livestock Production Science* 69.1 (2001): 43-53.
- van Raaij, W. F. (1981). Economic psychology. *Journal of Economic Psychology* 1(1): 1–24.