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LUISE MEISSNER, MICHAEL DANNE, OLIVER MUSSHOFF

# Subjective knowledge, attitude to money and investment decisions: New insights for the farmland market

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# 1. Motivation

- The activities of nonagricultural farmland buyers are a focal point in recent research
- Farmland transaction data has given valuable insights about their market share and pricing (Deiningner, 2011; Noland et al., 2011; Painter, 2011)
- A huge share of those nonagricultural buyers are private persons who buy small parcels
- In Germany, nonagricultural persons own 30-40 % of the agricultural land (Meißner & Mußhoff, 2022; Tietz et al., 2021)
- From a scientific point of view, little is known about the motives of those private persons and potential factors which drive them to buy farmland
- We aim to address this point and answer the question which factors might drive non-agricultural persons' willingness to invest in farmland.
- Concentration upon four factor groups: Key investment information, attitude to money, subjective knowledge of finance and sociodemographic characteristics

## 2. Research question

- Which factors might drive non-agricultural persons' willingness to invest in farmland?

Key investment  
information

Subjective  
knowledge of  
finance

Attitude to money

Sociodemographic  
characteristics

- **Key investment information** is a very important determinant of investment decisions
- Also **subjective knowledge of finance** is statistically significant, in line with Hadar et al. (2013)
- Several variables describing **the attitude to money** were significant
- Also, a number of **socio-demographic characteristics** were statistically significant
- Calculation of marginal effects for a more detailed interpretation

## 2. Research question: Groups of Factors

Group and Factors	Variables
<b>Key investment information</b>	
Risk	Volatility of the returns
Returns	Returns
Asset Type	Arable Land, Building land, etc.
<b>Subjective knowledge of finance</b>	
Subjective knowledge	Knowledge of finance
<b>Attitude to money</b>	
Financial security	Household Budget
Impulsive buying	Living in here and now, money spending behavior
Attitude toward savings	Financial goals, compare prices
<b>Socio-demographic characteristics</b>	
Age	
Education	
Gender	
Income	

- Key investment information is derived from KIIDs (Key investor information document), which is used by funds (Blackrock, 2022; de Goeij et al., 2018)
- Subjective knowledge is asked directly, similar to Hadar et al. (2013)
- Attitude to money is profiled based on items defined by Keller and Siegrist (2006a)
- The questions for determining the attitude to money are closely related to parts of the OECD questionnaire “Measuring financial literacy” (International Network on Financial Education, 2011).



## 3. Data

The Data consists of two components:

- **A Discrete Choice Experiment (DCE)**
- **A Survey**
  
- The data has been collected with respondi in 2021 (now: bildendi respondi)
- 639 Participants answered 12 choice sets: Data has a panel structure with 7668 choices and 23004 data points
- The data is representative for Germany in terms of several socio-demographic characteristics: Gender, age, income, federal state
- Also, all levels of education are represented
- Within the dataset, profiles of each participant are generated within a questionnaire
- This profile contains information about the participant-specific investigated factors: Attitude to money, subjective knowledge of finance and sociodemographic characteristics

### 3. Data

- The DCE has 3 alternatives, 2 alternative-specific constants and 4 attributes

Alternative	Financial Market Investment	Farmland Investment	No investment (bank account)
<b>Description</b>	Investment in a financial portfolio	Purchase contract for agricultural land in your county. A rent agreement for the area is in place.	The money is in a checking account at a bank with a good credit rating. It does not earn interest and can be withdrawn in full at any time. There are no account management fees.
Alternative-specific constants	<b>Transaction costs (one-off costs, are included in the investment amount)</b>	1% of the investment amount (order fees) ; Time commitment: 1 day per year	10% of the investment sum (agent, real estate transfer tax, notary), time required: 5 days per year
	<b>Possibility to sell</b>	At any time; Time required 2 hours, liquidity after one day	At any time; Time required from several days to weeks, liquidity 1 month after sale
	<b>Investment amount</b>	40.000 €	40.000 €
Attributes	<b>Type</b>	Stocks	Arable land, good quality (50 soil points)
	<b>Expected returns</b>	2,9%	1,3%
	<b>Risk (Volatility of returns)</b>		
	<b>Choice</b>	<input type="radio"/>	<input type="radio"/>



### 3. Method: Mixed logit model

- The empirical model is a **mixed logit model** with four components:

$$U_{iat} = x_{iat}\beta_i + w_{iat}\alpha + z_{it}\delta_a + \varepsilon_{iat}$$

- With the **utility**  $U_{iat}$  which an individual  $i$  receives out of alternative  $a$  at time  $t$
- the vectors of **alternative-specific variables**  $x_{iat}$  and  $w_{iat}$  vary over alternatives, cases and individuals.
- The vector of **case-specific variables**  $z_{it}$  varies over cases and individuals but is constant across alternatives for a given time and individual
- $\beta_i$  are random coefficients which are varying over individuals
- $\alpha$  are fixed coefficients on  $w_{iat}$
- $\delta_a$  are fixed alternative-specific coefficients on  $z_{it}$
- $\varepsilon_{iat}$  is the error term

### 3. Method: Mixed logit model

$$U_{iat} = x_{iat}\beta_i + w_{iat}\alpha + z_{it}\delta_a + \varepsilon_{iat}$$



**Case-specific variable with fixed alternative-specific coefficient:**

- Varies over cases and individuals
- Are for example characteristics like age, income or gender

**Alternative-specific variable with fixed coefficient:**

- Varies over cases, individuals and alternatives
- Preferences for this variable are homogenous and are modeled with a fixed coefficient

**Alternative-specific variable with random coefficient:**

- Varies over cases, individuals and alternatives
- Preferences for this variable might be heterogenous and are modeled with a random coefficient

## 4. Selected results

- Reduced model, bank is the base alternative
- \* indicates  $p \leq .10$ ; \*\* indicates  $p \leq .05$ ; \*\*\* indicates  $p \leq .01$
- Results are shown only for the case-specific variables for farmland and the alternative-specific variables

choice	Coef.	Std. Err.
<b>Alternative-specific variables</b>		
Returns	.373***	.021
Arable land	-.128***	.040
Building land	.113***	.041
Real estate fund share	-.217***	.047
Fintech	.074	.046
Investment amount	.000	.000
Risk	-.654***	.052
<b>Random effect</b>		
sd(risk)	1.076	.048
<b>Farmland</b>		
Gender (base: man)	-.520***	.159
University degree (base: no university degree)	.779***	.165
Self-assessed financial knowledge	.208***	.055
Attitude to investment value development security	.560***	.084
Compare prices	.158*	.087
Money spending behavior	-.346***	.091
Constant	.845	.597
Bank	(base alternative)	

## 4. Interpretation of the results

- For interpreting the results, the predictive margins and their contrasts have been calculated
- They describe the expected choice probabilities and the difference in these average probabilities

Variable	Alternative	Contrast	Std. Error
Self-assessed financial knowledge	Financial product	.111	.015
	Farmland	-.056	.013
	Bank	-.056	.013
Attitude to investment value development security	Financial product	-.126	.031
	Farmland	.282	.026
	Bank	-.157	.030
Money spending behavior	Financial product	-.054	.030
	Farmland	-.051	.028
	Bank	.105	.028
Compare prices	Financial product	-.036	.032
	Farmland	.080	.028
	Bank	-.044	.029

- A value of 5 instead of 1 on the Likert scale (higher subjective knowledge) means an increased probability of 0.111 of choosing a financial product as an investment.
- The probabilities to invest in farmland (-0.056) and to leave the money on the bank (-0.056) are reduced with increased subjective knowledge.

## 5. Conclusion

- **Which factors might drive non-agricultural persons' willingness to invest in farmland?**
- Several variables within the four factor groups are statistically significant for explaining investment behavior when **farmland** is included:
- **Key investment information:** Risk, returns, type of asset
- **Subjective Knowledge of finance**
- **Attitude to money:** Investment value development security, compare prices, money spending behavior
- **Sociodemographics:** Gender, education
  
- The consideration of more factors could be of interest
- The effect of the general economic situation has to be taken into account

Thank you for your attention!

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