INSPIRING IDEAS AND TALENT

Drivers and barriers to citizen investment in renewable electricity generation projects

Marie-Charlotte Guetlein, Joachim Schleich

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SONNET

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SONNET citizen survey

- Three countries (France, Germany, Poland)

- Representative samples (gender, age, income, region)
- ~ 2000 observations per county

- Four experiments on different types of social innovation in energy

  - **Focus on discrete choice experiment on investment decisions in renewable energy cooperatives (RECs)**

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Background

- Community energy initiatives, including RECs, play an increasingly important role in energy transitions and offer citizens opportunities for active involvement in energy projects.

- European Climate Foundation (2021): 61% of survey respondents across Europe “would be likely to join an energy cooperative if one was set up in their local area”

- Large untapped potential

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Objectives

Stated preferences discrete choice experiment (DCE) to investigate …

- attributes of RECs that increase or decrease citizens' willingness to invest
  - Rate of return, minimum investment requirements, use of profits
  - **Matching of the investment by the municipality**
  - **Probability that the investment is permanently lost**
- Individual preferences, capabilities and social factors that may affect investment decisions
  - Financial literacy, loss aversion, place identity, satisfaction with government policies, …

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Related literature

DCEs on RECs and energy communities:

- Financial payoffs (e.g. Vuichard et al., 2019; Pons-Seres de Brauwer and Cohen, 2020; Cohen et al., 2021)
- Lower minimum investment requirements (Cohen et al. 2021)
- Use of profits (Ek and Persson, 2014)
- Different technologies (e.g. Azarova et al. 2019, Cohen et al., 2021)
- Governance schemes (e.g. Ek and Persson, 2014; Knöfel et al., 2018, Sagebiel et al., 2014)

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Related literature

Correlation of preferences, capabilities and social factors with investments in RECs or sustainable investments in general

- Environmental preferences / motives (e.g. Kalkbrenner and Rosen, 2016; Koirala et al., 2018; Gutsche and Ziegler, 2019; Sloot et al. 2019; Cohen et al., 2021; Fischer et al., 2021; Gutsche et al., 2019, 2021)
- Patience, risk aversion, financial literacy (Fischer et al., 2021, Gutsche et al. 2021)
- Social norms (Kalkbrenner and Rosen, 2016; Gutsche et al. 2019; Fischer et al.; 2021)

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- To our knowledge no literature on loss aversion, place identity, and satisfaction with government policies (crowding behavior) in this context.

Experimental design

- Survey including the DCE among 2,996 respondents in France, Germany and Poland; fielded in July and August 2021
- Demographically representative samples in terms of gender, age, income and region
- Quality control questions

In this part of the survey, we invite you to make a series of hypothetical choices between different investment options. There are no right or wrong answers to these questions.

*Imagine you are being offered the opportunity to **buy a share in a renewable power plant** […]*

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Experimental design

Attribute	Levels
Return on investment	1%, 3%, 4%, 5%, 7%;
Minimum investment requirement	100 EUR, 500 EUR, 1,000 EUR;
Matching investment by municipality	no matching, half the amount of your investment, the amount of your investment;
Risk of total loss	1%, 3%, 5%;
Use of profits	nature conservation measures in your municipality, support low-income households in your municipality;

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Experimental design

Cheap talk

Which of the two investments below would you choose?

Please, consider thoroughly how this investment will affect your budget, and that you actually are willing to pay the minimum investment requirement associated with the alternative that you choose.

(To read the explanations again, you can move the mouse over the text in the left column.)

	Investment A	Investment B
Return on investment	**1%**	**3%**
Minimum investment requirement	you have to invest **at least 500€**	you have to invest **at least 1.000€**
Matching investment by municipality	your municipality **does not increase its investment**	your municipality increases its investment by **half the amount of your investment**
Risk of total loss	**1%** chance of total loss	**5%** chance of total loss
Use of 10% of the profits of the plant	to **support low-income households** in your municipality	for **nature conservation measures** in your municipality

	Investment A	Investment B	No investment
I choose:	○	○	○

Opt-out option

Econometric Methods

Respondent i's utility from choosing alternative j in choice set t:

Respondent-specific variables

$$U_{ijt} = \beta X_{ijt} + \alpha_i Z_i + \varepsilon_{ijt}, \quad i = 1, \dots, I, j = 1, \dots, J, t = 1, \dots, T$$

Alternative-specific variables

- Error terms assumed to be independent type 1 extreme-value random variablesfixed-effects logit model
- Observation of choices (Investment A/B vs. Opt-out) across 24 choice sets in 3 blocks (8 choice sets per respondent)
- Fixed-effects logit model

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Results

Estimated average **discrete and marginal effects of attributes** on the **probability of choosing an investment option over the opt-out option**

Attributes	marginal effect	p-value
Rate of return	0.024 ***	0.000
Minimum investment = 500 €	-0.024 ***	0.000
Minimum investment = 1,000€	-0.057 ***	0.000
Municipality matches 50%	0.018 ***	0.000
Municipality matches 100%	0.027 ***	0.000
Probability of total loss	-0.046 ***	0.000
10% of profits invested to fund nature conservation measures	0.021 ***	0.000

Results

Estimated average **discrete and marginal effects of respondent-specific variables** on the **probability of choosing an investment option over the opt-out option**

Respondent-specific variables	marginal effect	p-value
High environmental identity	0.036 **	0.022
Environmental/social investment criteria	0.126 ***	0.000
Risk averse	-0.075 ***	0.000
Loss averse	0.007	0.657
Low financial literacy	-0.132 ***	0.000
Experience with sustainable investments	0.119 ***	0.000
Strong social norms	0.119 ***	0.000
Positive reciprocity	0.025	0.104
High place identity	0.055 ***	0.001
Unsatisfied with government policies	-0.039 **	0.019

Summary and Conclusions

- The propensity to invest in RECs increases, if the investment is matched by the respondent's municipality.
  - ➢ Matching could be an effective tool to increase citizen investments
- The possibility that the investment is lost has a strongly negative effect on stated investment decisions
  - ➢ Aggravated by high risk aversion?
  - ➢ Insurance against losses important
- Engagement is also expected to be higher if profits are used to finance environmental protection rather than to support low-income households

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Summary and Conclusions

- No conclusive results on loss aversion
  - ➢ Potentially simultaneous effects on valuation of different attributes that cancel each other out.

- Financial literacy and experience with sustainable financial investments are positively related with propensity to invest.

- Social norms and place identity are positively related with propensity to invest.

- Higher satisfaction with implementation of the sustainable energy transition by the government is positively related with propensity to invest (motivational “crowding in”).

➢ Levers to increase citizens’ willingness to invest?

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Thank you!

Questions / Discussion

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