

SPATIAL AND INDIVIDUAL CHARACTERISTICS FOR BATTERY ELECTRIC VEHICLE ADOPTION

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Spatial &
Individual:
BEV
Adoption

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Willibald,
Blanco

Motivation

Hypotheses

Data &
Methods

Results

Conclusion

- Transport is major green house gas emitter
- In Switzerland 32 % of CO2 emissions → Needs reduction

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 - Individual characteristics
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 - Individual characteristics
 - Context
- Joint understanding → Policy Design

- Revealed preference data
- BEVs vs. all other cars
- Fine-grained spatial data
- Area without strong EV policies → market-based adoption

Individual characteristics:

- Higher household income & high education & owner-occupied house
- High environmentalism
- Party preferences

Contextual:

- Population density
- Public charging availability

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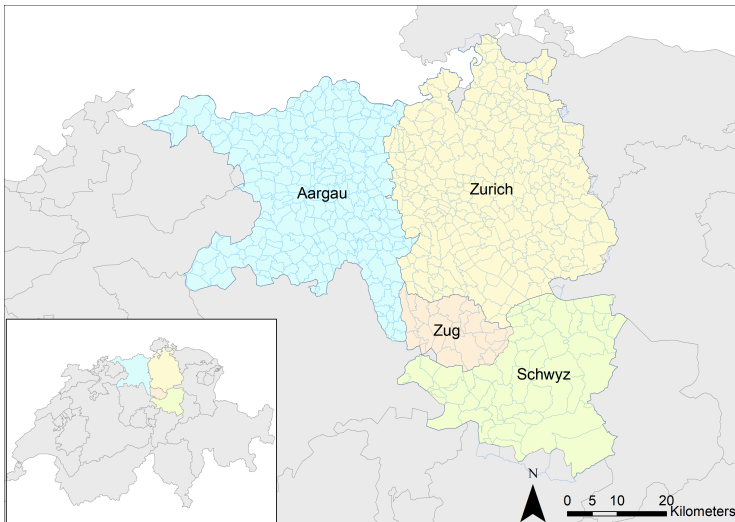
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- Data from car registries
 - Census of BEV holders, random sample ICEV holders
 - Approx. 11 % response rate, 2412 complete cases
 - Zip code level information (charging stations, population density)
 - 567 BEV holders and 1847 ICEV holders
- Method
 - Logit regression
 - Jointly regressing all potential influence factors
 - Controlling for socio-demographics

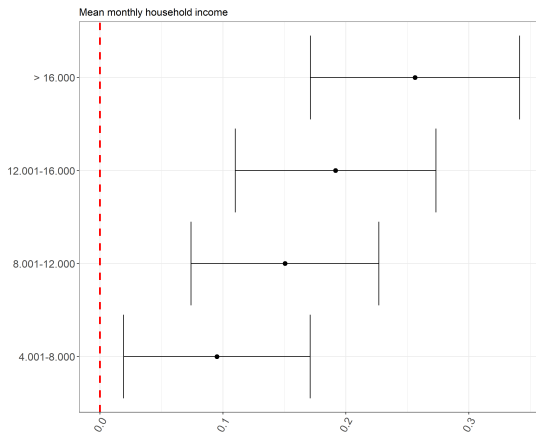


Figure: AME household income, baseline = 'below CHF 4000'

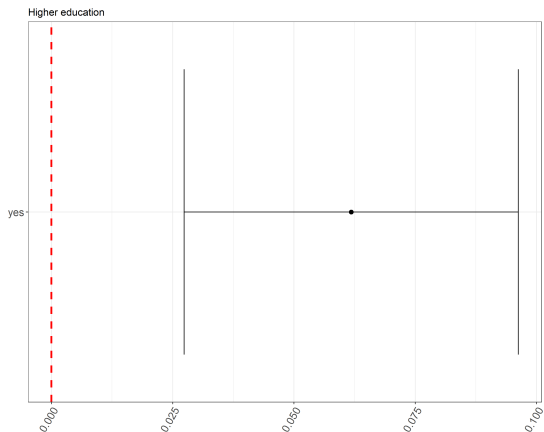


Figure: AME higher education, baseline = 'no'

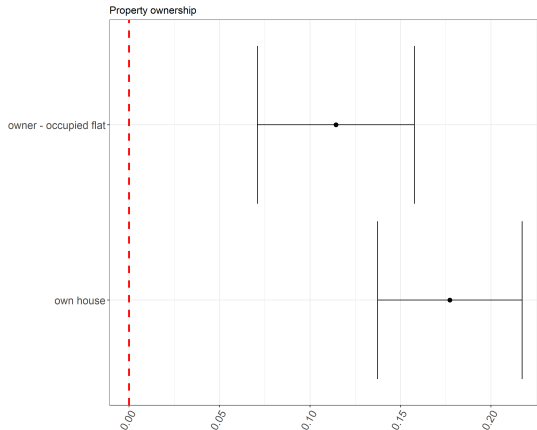


Figure: AME home ownership, baseline = 'own house'

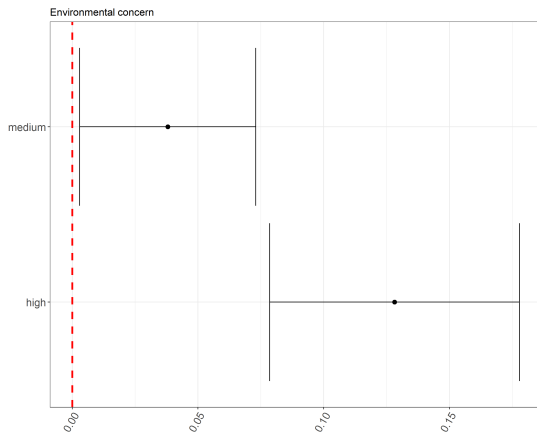


Figure: AME environmental concern, baseline = 'low'

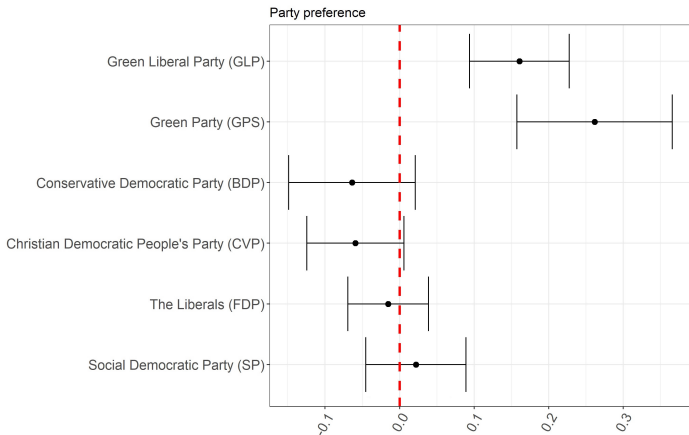


Figure: AME party preferences, baseline = 'SVP'

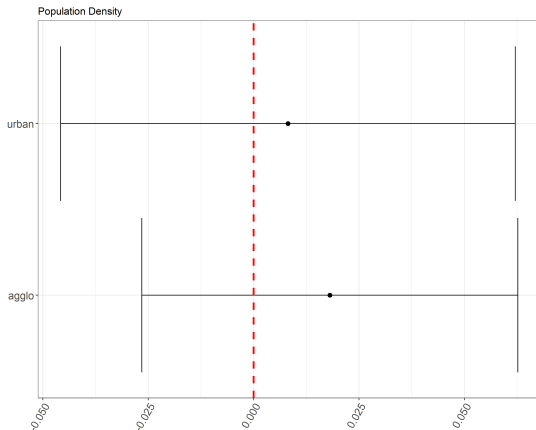


Figure: AME population density, baseline = 'rural', DEGURBA classification based on ZIP code population density

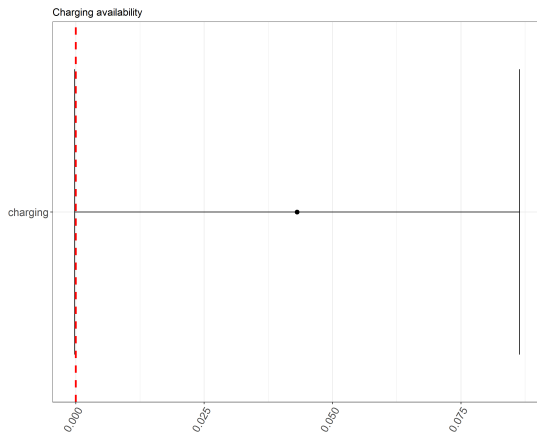


Figure: AME charger availability, numbers of chargers per zip code

Findings:

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- Green party preferences
- Residential population density does not matter
- Charger access matters: the more, the better

Policy implications:

- Contextual factors as policy target → charging infrastructure

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Scientific novelty:

- Policy preferences matter in expensive purchase decisions

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Potential further research:

- Neighborhood effects
- Different energy efficient BEVs
- Potential early mainstream adopters

Main take-away: Revealed preference study

- Education ↑, income ↑, owner-occupied house ↑
- environmental concern ↑, (green) party preferences ↑,
- charging infrastructure ↑
- \implies unforced BEV adoption ↑

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- ▶ **Sierzchula, W., Bakker, S., Maat, K., and Van Wee, B. (2014).**
The influence of financial incentives and other socio-economic factors on electric vehicle adoption.
Energy Policy, 68:183–194.

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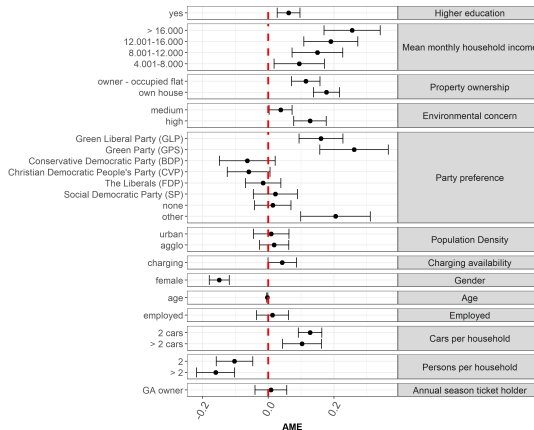


Figure: Logistic regression results

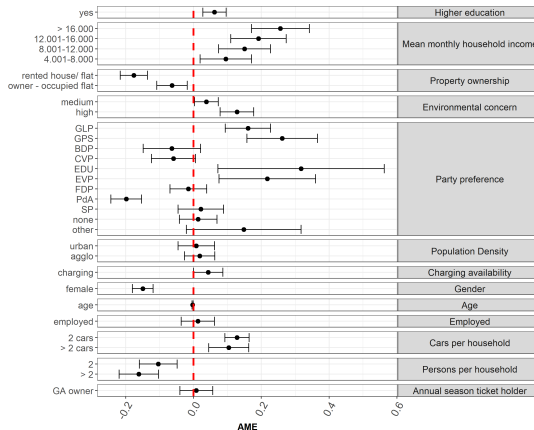


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Groups		Estimate	Pr(> z)	
Higher education	Yes	0.432	0.000	***
	Monthly household income	>16000	2.185	0.001
Property ownership	12001-16000	1.798	0.005	**
	8001-12000	1.525	0.015	*
	4001-8000	1.096	0.081	.
Environmental concern	Owner-occupied flat	0.921	0.000	***
	Own house	1.313	0.000	***
Party preference	medium	0.282	0.037	*
	high	0.854	0.000	***
Population Density	Green Liberal Party (GLP)	1.000	0.000	***
	Green Party (GPS)	1.534	0.000	***
	Conservative Democratic (BDP)	-0.540	0.175	.
	CVP	-0.497	0.083	.
	The Liberals (FDP)	-0.118	0.573	.
Charging availability	Social Democratic Party (SP)	0.157	0.524	.
	Other	1.238	0.000	***
Charging availability	None	0.100	0.630	.
	Agglo	0.130	0.433	.
Charging availability	Urban	0.066	0.744	.
	Charging	0.303	0.054	.

N = 2412, McFadden Pseudo R2: 0.198

Signif. codes: '***' 0.001, '**' 0.01, '*' 0.05, '.' 0.1

Controlling for age, gender, car fleet, household persons, other parties and employment status.

Table: Logistic regression results

- More spatial variables
 - share of built up area per municipality,
 - share of single-family houses per municipality
 - job accessibility
 - PT grade
 - municipality type
- Spatial clustering of SE
- Canton by canton analysis
- Inclusion/Omission of SES control variables

Results did not change substantially.

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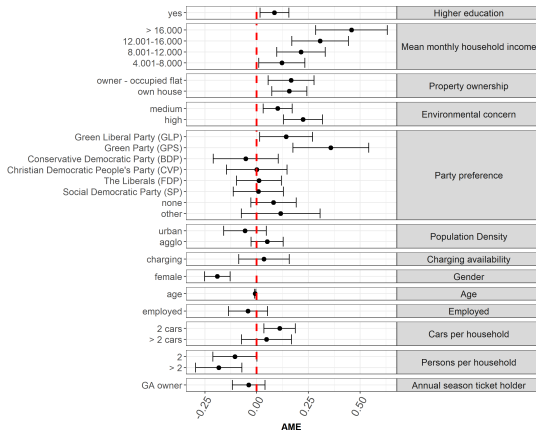


Figure: Logistic regression results Aargau only

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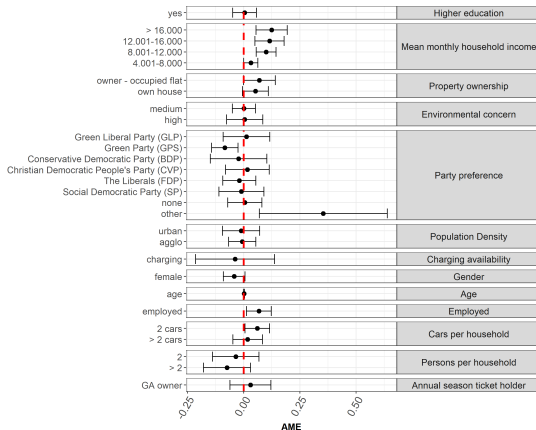


Figure: Logistic regression results Schwyz only

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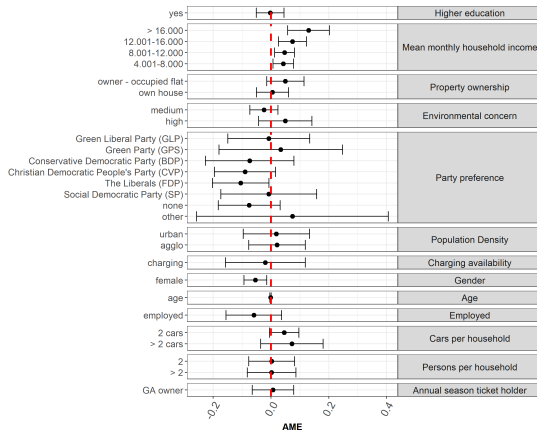


Figure: Logistic regression results Zug only

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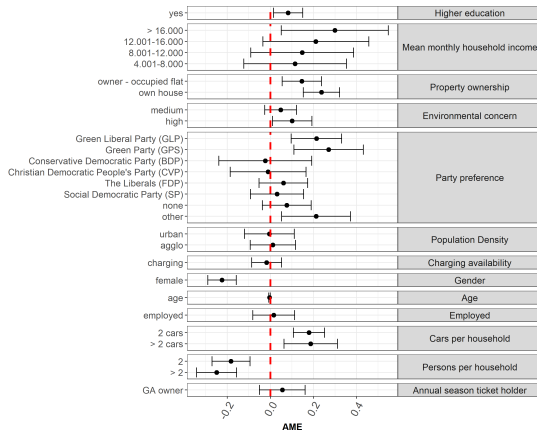


Figure: Logistic regression results Zurich only