

The Role of Information in Policy Participation Decisions

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Potential Barriers to Participation Decisions

- **Resources** (Percy 1984)
 - **Information**
 - Fiscal Capability
 - Time
- **Motivation** (Sharp 1978; Powers and Thompson 1994)
 - Belief/Desire
 - Financial
 - Need
- **Institutions** (Ostrom 1996)
 - Programs/ Policies
 - Information

Research Question

- What role does information have in the choice to participate in policy?
 - Test bed: Tallahassee, FL.

Information about Energy

- Formal Information Sources
 - Public Service Announcements
 - Leaflets
 - News Articles
 - Experts Government Agents
- Informal Information Sources
 - Peers
 - Visual Cues
- Information Credibility

Examined Measures of Information

- Formal Information Sources
 - News article mentions of Public Service Commission, Energy Efficiency, and Renewables
- Informal Information Sources
 - Peer Diffused Information
 - Proximity measure of closest participant neighbor
 - Density of participants in census block

Formal Information Source

Coding News Articles

- 400 news articles from Lexis Nexis Search
- Coded for keywords
- Categorized coded words into three clusters using:
 - Content, Correlation, Confirmatory Factor Analysis
- Three Clusters:
 - Energy-Efficiency, Renewables, Public Service Commissions

Information Hypotheses

Formal Information:

- An increase in news articles that mention Renewables and Energy Efficiency will increase the probability of participation
- An increase in news articles mentioning public service commission should decrease the probability of participation

Information Hypotheses

Informal Information:

- As the density of participants around the non-participant increases the probability of participation increases
- As the distance between participant and non-participant increases the probability of participation decreases

City of Tallahassee Utilities

- Municipally Owned Utility Company
- Offers a Demand-Side Management Program
- Program Bundle Includes:
 - Energy Efficiency Loans
 - Rebates
 - Information and Energy Audits
 - Grants
 - Neighborhood REACH Weatherization Assistance
 - Solar PV Net Metering
 - Nights & Weekends Pricing Plan

Policies Examined:

- **Audit**
 - Information based
 - Lowest cost to participation
 - 7% in sample
- **Rebate**
 - Mid level financial incentive
 - Requires upfront capital
 - A little over 1% in sample
- **Loan**
 - High financial incentive
 - Requires capital and low discount rate
 - 1% participation in sample

Independent Variables:

- Utility
 - Energy Use
 - Water Use
 - Electronic Billing
- Time Controls
 - Winter/Summer
 - Year Controls*
- Property Appraiser
 - Square Feet
 - Market Value
 - Age of the Home
- Census Demographics
 - Education
 - Minority
 - Renter
 - Median Income
- Information:
 - News Articles
 - Energy Efficiency
 - Renewables
 - Public Service Commission
 - Peer Presence
 - Proximity
 - Density

Panel Probit: Policy Participation

	Rebate	Loan	Audit
Summer	.0726948 .0923684	.1099375 .1945073	-.0665702 .0556113
Winter	-.2258686* .120121	-.0815494 .2164544	-.142015** .059171
Proximity (n-1)	-43.26993** 18.26448	-152.4943*** 46.01943	-7.752878** 3.247105
Density audit (n-1)	.0044841 .0037042	-.0068811 .0125929	.0032616 .0034938
Density Rebate (n-1)	-.0192055 .0150978	-.0377354 .0482637	-.0042411 .0082185
Density Loan (n-1)	-.0241424 .0194386	.0243341 .0221123	-.0047434 .0093043

Table B.7: Comparing Rebate, Audit, & Loan Full Specifications from section 8.4

	Rebate	Loan	Audit
Energy Use (n-1)	-.000681 .0000644	.0000281 .0001473	.0001376*** .0000405
Water Use (n-1)	.0008574* .0004456	.0009553 .0008354	-.0000176* .0003013
Electronic Bill (n-1)	.6679945*** .1396986	.2686227 .2315191	.0215545 .0548146
Minority (%)	-.0028588 .0021554	.0029447 .0048241	.0010209 .0010314
Median Income	-.0000125*** 3.93e-06	9.32e-06 6.91e-06	1.66e-06 1.61e-06
Renter (%)	-.0026029 .0021086	-.0075682 .0061994	-.0002278 .0011456
Bachelors + (%)	.0096803** .0039322	.0059154 .0101724	.0030304 .0021867
Summer	.0726948 .0923684	.1099375 .1945073	-.0665702 .0556113
Winter	-.2258686* .120121	-.0815494 .2164544	-.142015** .059171
Post Recession	4.222582 583.6115	-.230248 .2384231	-.2785727*** .0927156
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Density Loan (n-1)	-.0241424 .0194386	.0243341 .0221123	-.0047434 .0093043
Age of Home	.0187866* .0098739	.0501335 .0318202	.0050744 .0049991
Age of Home (squared)	-.0002472* .0001343	-.0005911 .0004453	-.0000552 .0000707
Square feet	-.0001444 .0001435	-.0001743 .000425	-.0000843 .0000789
Market Value	1.36e-06 1.02e-06	-9.60e-07 3.81e-06	5.15e-08 5.80e-07
Public Service Commission (n-1)	-.0028588 .0072914	.0061418 .0118111	.0059308* .0030362
Energy Efficiency (n-1)	-.0380554 .0357988	.3183458** .178941	-.0096767 .0442914
Renewable (n-1)	.0019876 .0220305	.01507 .0458244	-.0222877 .0160289
RENEW * EE (n-1)	-.0121094 .0116454	-.1197737* .0662821	.0061371 .0110375
PSC * RENEW (n-1)	-.0023633 .0020846	-.0120168 .023862	-.0021112 .0025297
EE * PSC (n-1)	.013487** .0059613	-.0725418* .0417101	.0001084 .0065704
Constant	-7.569226 583.6118	-5.348952*** 1.194715	-3.276656*** .303908
Insig2u	-1.518926 1.019128	.2648828 .516281	-2.371981 1.813904
Sigma_u	.4679176 .2384339	1.141612 .2946963	.3054434 .2770226
Rho	.1796197 .1501751	.5658362 .1268325	.0853344 .1415796
# observations	77373	79490	74556
# groups	1983	1985	1969
Prob > chi2	0.0450	0.2793	0.0663
Log likelihood	-600.19462	-209.23402	-1638.4518

Policy Participation (4)

	Rebate	Loan	Audit
Public Service Commission (n-1)	-.0028588 .0072914	.0061418 .0118111	.0059308* .0030362
Energy Efficiency (n-1)	-.0380554 .0357988	.3183458** .1578941	-.0096767 .0442914
Renewable (n-1)	.0019876 .0220305	.01507 .0458244	-.0222877 .0160289
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Table 8.7: Comparing Rebate, Audit, & Loan Full Specifications from section 8.4

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Water Use (n-1)	.0008574* .0004456	.0009653 .0008354	-.0000176 .0003013
Electronic Bill (n-1)	.6679945*** .1396986	-.2686227 .2315191	.0215545 .0548146
Priority (%)	-.0028588 .0021554	.0029447 .0048241	.0010209 .0010314
Median Income	-.0000125*** 3.93e-06	9.32e-06 6.91e-06	1.66e-06 1.61e-06
Water (%)	-.0026029 .0021086	-.0075682 .0061994	-.0003278 .0011456
Shelers + (%)	.0096803** .0039322	.0059154 .0101724	.0030304 .0021867
Owner	.0726948 .0923684	.1099375 .1945073	-.0665702 .0556113
Water	-.2258686* .120121	-.0815494 .2164544	-.342015** .059171
Great Recession	4.222582 583.6115	-.2302348 .2384231	.2785727*** .0927156
Proximity (n-1)	-.43.26993** 18.26448	-.152.4943*** 46.01943	-.752878** 3.247105
City audit (n-1)	.0044841 .0037042	-.0068811 .0125929	.0032616 .0034938
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City Loan (n-1)	-.0241424 .0194386	.0243341 .0221123	-.0047434 .0093043
Cost of Home	.0187866* .0098739	.0501335 .0318202	.0050474 .0049991
Cost of Home (squared)	-.0002472* .0001343	-.0005911 .0004453	-.0000552 .0000707
Area feet	-.0001444 .0001435	-.0001743 .000425	-.0000843 .0000789
Market Value	1.36e-06 1.02e-06	-.960e-07 3.81e-06	5.15e-08 5.80e-07
Public Service Commission (n-1)	-.0028588 .0072914	.0061418 .0118111	.0009308* .0030362
Energy Efficiency (n-1)	-.0380554 .0357988	.3183458** .1578941	-.0096767 .0442914
Renewable (n-1)	.0019876 .0220305	.01507 .0458244	-.0222877 .0160289
RENEW * EE (n-1)	-.0121094 .0116454	-.1197737* .0662821	.0061371 .0110375
* RENEW (n-1)	-.0023633 .0020846	-.0120168 .023862	-.0021112 .0025297
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sigma2_u	.4679176 .2384339	1.141612 .2946963	.3054434 .2770226
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Informal Information Findings

- Proximity:
 - The magnitude changes based on the three policy types.
 - Proximity is perhaps most important in programs such as the low-interest loan program
 - Requires most trust with utility for participation
 - Peer vouching for program is very relevant
 - Density is perhaps not important or driving participation.

Formal Information Findings:

- Loans
 - Energy Efficiency Mentions are related with an increase in participation.
 - Mixed messaging may decrease participation
 - When renewables and energy efficiency are discussed at length there is a small decrease in participation
 - When energy efficiency and the public service commission are discussed together there is a small decrease in participation

Formal Information Findings:

- Audit:
 - When public service commission cluster increases participation has mild increase.
 - PSC cluster includes price increases, may be trying to determine means to decrease cost
- Rebate:
 - When energy efficiency and public service commission mentions are high people take advantage of rebate option more often
 - May be due to preparation to avoid price increase

QUESTIONS?

Policy Participation (1)

	Rebate	Loan	Audit
Energy Use (n-1)	-.0000681 .0000644	.0000281 .0001473	.0001376*** .0000405
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Log likelihood	-600.19462	-209.23402	-1638.4518

Policy Participation (2)

	Rebate	Loan	Audit
Age of Home	.0187866* .0098739	.0501335 .0318202	.0050474 .0049991
Age of Home (squared)	-.0002472* .0001343	-.0005911 .0004453	-.0000552 .0000707
Square feet	-.0001444 .0001435	-.0001743 .000425	-.0000843 .0000789
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Media Cluster: Factor Analysis

Table 7.2.7: Factor Loadings (blanks represent abs(loading) < .3)

	Factor 1	Factor 2	Factor 3	Uniqueness
Energy Benefits		0.6232		0.5747
Clean		0.6051		0.6466
Green		0.6573		0.4599
Energy Efficiency		0.7664		0.4429
Energy Prices	0.8552			0.2721
PSC	0.9566			0.0833
Distrust	0.8895			0.2144
Renewable			0.8471	0.1186
Wind Power		-0.3468	0.8586	0.2966
Solar Power			0.6436	0.3796

Quantitative: Summary Statistics

Table 8.3: Sample Summary Statistics of Data Included in Models (2024 groups)

Variable	Obs	Mean	Std. Dv	Min	Max
Housing Characteristics					
Square Feet	88025	1715.04	727.0173	0	6702
Market Value	88025	168545.9	100561.2	11339	939563
House Age	88025	27.43514	17.53537	0	111
Utility Consumption					
Energy Use	88025	1187.667	721.4243	0	10378
Water Use	88025	56.18027	82.10945	0	3175
Policy Participation					
Audit					
Loan	88246	.000306	.0174892	0	1
Rebate	88025	.0011133	.0333481	0	1
Information Clusters					
Renewables	88025	1.155467	1.902387	0	11
Public Service Commission	88025	4.282193	6.974791	0	46
Energy Efficiency	88025	.8699801	1.381695	0	7

Quantitative: Summary Statistics

Table 8.3: Sample Summary Statistics of Data Included in Models (2024 groups)

Variable	Obs	Mean	Std. Dv	Min	Max
Census Data					
Percent Renter	81212	25.52104	26.00248	0	100
Percent Minority	88025	26.50648	28.41934	0	100
Percent Bachelors (or more)	88025	43.60286	16.00074	5.345212	82.41083
Median Income	88025	46320.01	22871.37	4937	118464
Geography Based Variables					
Proximity	88018	.0089895	.0164102	0	.1869946
Audit Density	88025	7.325736	8.967803	0	100
Loan Density	88025	1.062203	2.85162	0	100
Rebate Density	88025	1.035079	2.707485	0	100

Public Good Generating?

- ◆ Panel regression, random effects, robust errors
- ◆ Dependent Variable:
 - ◆ Energy Consumption
- ◆ Independent Variables:
 - ◆ Water Use
 - ◆ Winter/Summer
 - ◆ Square Feet
 - ◆ Market Value (Model 1)
 - ◆ Age of Home
 - ◆ Year Constants
 - ◆ Policy Participation

Fit Stats	Model 1
Rsq: Within	0.1154
Rsq: Between	0.3764
Rsq: Overall	0.3055
sigma_u	450.52305
sigma_e	438.68959
rho	.51330545
# of Obs	1966,83
# of Groups	4,498
Avg # in group	43.7

Table 8.2: Analysis of participation as results in a Public Good

Panel Regression, Random Effects, Robust Standard Errors	
	Model 1
DV: Energy Use	Coefficient (Std Error)
Water Use	.7281526*** (.0403963)
Summer	303.4211*** (3.901941)
Winter	169.3856*** (5.111639)
Square Feet	.2393132*** (.0420347)
Market Value	.0017082*** .0003404
Actual Age	9.962497 *** (1.580453)
Actual Age (2)	-.1276054*** (.0222313)

	Model 1
Audit (n-1)	-57.84314*** (11.00378)
Loan (n-1)	-86.21363*** (29.53788)
Rebate (n-1)	-92.82876*** (18.62933)
2006	54.83411 *** (7.921357)
2007	-7.954733 (6.743829)
2008	-101.073 *** (5.795079)
2009	-90.18544*** (5.178816)
2010	35.67455*** (3.986342)
2011	Omitted
Constant	191.1277 *** (13.04406)

	Rebate	Loan	Audit
# observations	77373	79490	74556
# groups	1,983	1,985	1,969
Prob > chi2	0.0450	0.2793	0.0663
Log likelihood	-600.19462	-209.23402	-1638.4518