Feedback, Social Nudges, and Energy Conservation

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FEEDBACK, SOCIAL NUDGES, and ENERGY CONSERVATION

A Field Experiment

Elizabeth Hunter*, Christine L. Crago, John Spraggon

INTRODUCTION

- Studies have suggested that total energy use in the United States can be reduced by 20% through changes in energy-use behavior (Frankel and Tai 2013).
- Feedback and social nudges as a means of promoting energy conservation have been gaining in popularity though the extent of their effectiveness is still uncertain.
- Previous empirical work on energy conservation has focused on the effect of feedback and social nudges for rate-paying households (Costa and Kahn, 2011; Allcott, 2011).

OBJECTIVE

In this study, we test whether energy-use information coupled with a message incorporating a social nudge can induce energy conservation for non-ratepayers in a household setting.

METHODS

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<th>Experimental Setting</th>
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<td>North Village Apartment Complex (NVA) is a family housing complex built in the early 1970s on the University of Massachusetts Amherst campus.</td>
<td>It is made up of 237 housing units – 120 one-bedroom and 117 two-bedroom.</td>
<td>Energy is all-electric and residents do not pay separately for their utilities.</td>
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EXPERIMENTAL DESIGN

64 households residing in apartment units with utility-inclusive rent agreed to participate in the study. They were randomly divided into a control group and two treatment groups.

- Phase 1: Residents in both treatment groups receive Home Electricity Reports containing feedback on their own electricity consumption (see Figure 2).
- Phase 2: Residents in Treatment Group 1 continue to receive feedback on their own electricity consumption. Residents in Treatment Group 2 also receive a social nudge (see Figure 3).

EMPIRICAL SPECIFICATION

- The preferred empirical model used to analyze the effects of feedback and social nudges is a log-linear fixed-effects model adjusted for first-order autocorrelation.

\[ \ln kWh_{it} = a + \rho f dbk_{it} + \rho S_{it} + \sum \beta_t X + \epsilon_{it} \]

Natural log of hourly electricity consumption measured in kilo-Watt hours.

Dummy variable equal to 1 if the household received feedback on own-electricity consumption.

Dummy variable equal to 1 if the household received additional information containing a social nudge.

Time-variant control variables such as mean temperature, time-of-day, day-of-week, and holidays.

RESULTS

TREATMENT EFFECTS

- Feedback decreased electricity consumption by 1.9%.
  - When restricted to evening peak hours (7pm to 10pm) this reduction increased to 3.6%.
- The social nudge increased electricity consumption by 3.6%, though the findings were not significant.
- When restricted to evening peak hours (7pm to 10pm) this increase increased to 2.3%, though the findings were not significant.
- We find evidence that this is due to the “boomerang effect”, where households consuming below-average energy increase their energy use upon learning that they are low energy users.

CONCLUSION

- Our study provides evidence that feedback on energy use can reduce energy consumption when financial incentives are inappropriate.
- Our study does not find social contextualization to be an effective method of reducing energy consumption in the residential sector when no financial incentive to conserve energy exists.
- We suggest further exploration into social nudges other than social contextualization, such as environmental responsibility, and health.

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