

Final Progress Report
Sustainability Science Program, Harvard University
Term: September 1, 2009 – August 31, 2010
Submitted: July 2010

Name: Eliana Carranza

Research fields:

development economics, labor economics, comparative politics

Your degree program, institution and expected graduation date:

Ph.D. in Political Economy and Government, Harvard University, 2011 (expected)

Faculty hosts at Harvard:

Rohini Pande (HKS) and Sendhil Mullainathan (FAS)

SSP-related research activity:

Title: Economics of a Lightbulb: Experimental Evidence on CFLs and End-User Behavior (Joint with Robyn Meeks)

Abstract: Residential access to modern energy and lighting is considered to be important for development in that it improves living standards and productivity (World Bank, 2006). However, developing countries face severe constraints on available electricity, which result in blackouts and prices that can be as high as those observed in wealthier nations. In the developing world, where lighting is a major component of residential electricity consumption, energy efficient technologies such as compact fluorescent lamps (CFLs) can offer substantial savings to allow more energy services and simultaneously meet conservation goals. Still, in developing countries where CFLs were introduced through mass replacement programs at a zero or subsidized price, their use is often discontinued once the consumer is required to pay the full price. This represents a major constraint to realizing the potential impact of energy efficient lighting. To better understand the processes of adoption and diffusion of CFL technologies, we propose a randomization methodology to inspect three mechanisms that affect the take-up and impacts of such energy efficient technologies: (1) the WTP for CFLs, (2) the “rebound” or extent to which behavioral responses to decreased electricity costs offset the technologically possible energy savings brought by CFLs, and (3) the role of “peer” networks in spreading information regarding CFLs.

Identification of the problem you address:

CFL efficient technologies promise substantial electricity savings, increased electric services and environmental preservation. However, the low take up of energy efficient lighting represents a major constraint to realizing its full the potential impact.

Key question asked about the problem:

The initial adoption of CFLs may be limited because of several reasons. We are interested in assessing their relative importance. Particularly we ask the following:

- (1) Is adoption of CFLs low because the willingness to pay (WTP) is lower than the market price?
- (2) Is the continued use of CFLs threatened because reductions in total electricity consumption are not attained?
- (3) Is the diffusion of CFLs restricted because the source of information is too noisy, or because negative information on outcomes, quality, installation and maintenance requirements weighs more heavily or spreads faster than positive information?

The methods by which you answered that question:

To study the first mechanism, we propose an experiment in which participants will be asked to state the amount that they are willing to pay for a CFL. To study the second mechanism, we propose to randomly select households to receive CFLs and use data loggers to register changes in consumption of electricity. Finally, to study the third mechanism, we propose to exploit the random variation in density of informational networks that results from the random distribution of bulbs. We will compare take-up and WTP outcomes among non-participating individuals that have thick versus thin peer networks.

Principle literature upon which the research drew:

Economic literature on measurement of willingness to pay, rebound and peer effects.

Empirical data acquisition description:

Data will be collected as part of the project.

Geographical region studied:

Peru

Recommendations that might be relevant for your problem:

None

A description of the final product(s) you have/are aiming to produce:

An article to be publish in economic/public policy journals

Description of major other intellectual or professional advancement activities over the past academic year:

CFL project: In progress. Survey questionnaires, request for approval of human subjects research, and application for the National Science Foundation dissertation improvement grants.

Other: draft of job market paper.

Please list citations for reports, papers, publications and presentations that built on your fellowship research:

None

Principal collaborators outside Harvard:

None

List any awards or grants that you have received this year for the current or coming year:

IQSS Graduate Student Research Grant

Radcliffe Dissertation Completion Fellowship

Initiative graduate student associate program

Justice Welfare and Economics Program Research Grant

David Rockefeller Center and Thinker Field Research Grant