IMPACT OF STANDARDS AND LABELING PROGRAM ON CONSUMER DISCOUNT RATE - AN EXPERIMENTAL STUDY IN INDIA

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Overview

Consumer discount rates (CDR) are required by utilities to evaluate the potential impact of demand side management (DSM) programs. Studies have used different method and have reported large range of estimates of CDRs. These estimates are on an average higher than consumer's interest rate for borrowing. The factors causing high CDR have been discussed in the literature and policy interventions have also been suggested. Many of these policy interventions have been implemented but their impact on CDR has not been quantified. Impact of policy intervention on CDR provides a basis for identifying need for new interventions. CDRs can be calculated from estimates of consumer's willingness to pay (WTP) which in turn can be estimated by observing a set of consumers and their choices in purchase decisions. In the absence of estimates of WTP prior to policy implementation, observation on decisions of consumers who are unaware of the policy can be taken as the baseline. The difference in CDR caused due to awareness about the policy instrument provides an estimate of the impact of policy intervention on consumer decisions and sets the background for design of new programs to complement the existing policy.

The appliance standards and labeling program (S&L) was implemented in India in 2006 under the Energy Conservation Act 2001, to provide consumers information about electricity consumption of appliances. The program was made mandatory for refrigerators and air conditioners, which are most energy intensive appliances in Indian households, in 2010. Utilities have been designing demand side management programs to promote adoption of labeled appliances with higher levels of efficiency. The cost effectiveness of DSM programs depends on estimates of CDR in the population. In addition, targeted design of the programs requires an understanding of distribution of CDR in the population. This study calculates the discount rates implied from purchase decisions of air conditioners and refrigerators in Indian households based on estimates of WTP from a discrete choice experiment. The estimates of WTP of consumers aware about policy intervention is compared with WTP of consumers who are unaware. The distribution of WTP and contribution of different socio economic characteristics of the households in the distribution is also identified. This provides a baseline for designing targeted DSM programs to ensure cost effectiveness for both consumers and utilities.

The paper is organised as follows: After the introduction, the second section gives a brief overview about the methodologies and estimates of discount rates and willingness to pay reported in the literature. The third section describes the methodology used to estimate CDR and WTP in the current research. In section four the results are elaborated. In the final section policy implications are derived.

Methods

Discrete choice model is specified to estimate WTP for efficiency as indicated on labels on refrigerators and air conditioners. Mixed logit model with correlated random parameters is specified under the assumption of normal distribution of random parameters and fixed coefficient for price. Socio economic characteristics of the consumers are interacted with product attributes to characterise distribution of WTP in the population. Consumer choices in purchase of refrigerators and air conditioners in hypothetical choice situations are observed under stated preference elicitation method. Choice sets are constructed by applying cyclic design on orthogonal array and relabeling and swapping are used to ensure utility balance. Observations form 153 households are collected from two suburbs in Mumbai, the financial capital of India in face to face interviews. The model is estimated using maximum likelihood estimation. The estimates of WTP are used to calculate CDR using assumptions on life of appliances and annual operating cost.

Results

In air conditioners, the CDR of consumers who are aware of star rating is 10\% and of those who are not aware of star rating is 25% on an average at assumed usage of 1080 hours/year. However, consumers who have not heard of star rating have not evaluated different levels of star rating and have placed a positive preference only on 5-star rating. In case of refrigerators irrespective of awareness of star ratings on appliances, consumers have not evaluated different levels of star rating. Consumers who are not aware are indifferent to star ratings and consumers who are aware have placed a positive value on 5-star rating such that it reflects CDR of less than 1\%.

In overall sample, the CDR in refrigerator purchase decision is 16% on an average. It can be concluded that S&L program has contributed in reducing the CDR in the population especially in case of air conditioners. In case of refrigerators, the program has contributed to the extent that consumers can identify the most energy efficient models. The interactions of consumer characteristics with the price shows that households with more number of members, renters, and older consumers are less sensitive to price as compared to others in purchase decisions of both the appliances. Additionally, in case of air conditioners females are less sensitive to price and middle income group is more sensitive to price.

Conclusions

It is likely that in the absence of the standards and labeling program an average consumer cannot differentiate between different levels of efficiency. The study confirms that the standards and labeling program should be the primary policy mechanism to improve efficiency in appliances. Possible efforts should be made to increase awareness about the program. The estimates of discount rates used to calculate cost effectiveness of DSM programs at any stage should consider the impact of existing policy instruments on the discount rates. This study provides evidence that standards and labeling program has significantly reduced consumers discount rate on an average.

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