

AN EVALUATION OF A
PROMOTIONAL CAMPAIGN BY THE
ESB, OFFERING ENERGY-SAVING
DEVICES TO NIGHT-SAVER
ELECTRICITY CUSTOMERS

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An evaluation of a promotional campaign by the ESB, offering energy-saving devices to night-saver electricity customers

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This paper deals with a promotion made by the ESB in 1993, aimed at customers who were using night-saver electricity (both domestic and dairy farmers). They were offered a number of devices at subsidised prices, most of which had an energy-saving element. The items involved were:

- CFL bulbs
- A lagging jacket
- Timers
- Security lights.

As can be seen, all but the last item would involve the saving of electricity. The offer was made to a large sample of customers, and the Table 1 shows the results. For reasons of confidentiality, number of customers availing and not availing of the offer, and consumption levels, are not shown.

Table 1: Results of offer to night-saver electricity users

	<i>Percentage change in consumption, year after the offer versus year before the offer</i>
Customers receiving offer	+ 3.5
Customers availing of the offer (note 1)	no change
Customers not availing of the offer	+ 3.6

(Source: ESB Customer Research department)

Notes:

1. Availing of the offer means accepting one or more device under the offer. Data breaking down customers by device bought are not available.
2. Customers availing of the offer had a consumption level of 14 per cent higher than the non-availleurs, in the year prior to the offer.

¹The author is a former Assistant Research Officer in the ESRI. He would like to thank Professor Denis Conniffe of the ESRI for his helpful comments in the preparation of this paper.

Before commenting on the results, it needs to be pointed out that the group of customers receiving this offer, being night-saver electricity users, would tend to be more energy-conscious than the general body of customers. So their response to the offer could not be imputed to the general customer.

Further, the uptake rate for this offer was quite low, though the rate was better than for similar offers aimed at other customer groups. This may indicate that many customers do not see the benefits of the items offered, or that the terms are not sufficiently attractive. It may be in this case that because customers use cheap night-time electricity, the potential benefit of energy savings may not be sufficiently great to entice them to avail of the offer. There is another possibility, that many of the customers had already installed some or all of the items in question, and therefore had less need to avail of the offer². This might especially be the case with these particular customers, if they are more energy-conscious than the average. So non-acceptance of the offer may indicate a lack of interest in energy conservation, or conversely that the non-acceptors *were* interested in energy conservation, and had already installed some or all of the devices.

Another point is that the group availing of the offer had a higher energy usage than the average of those receiving the offer. This may be because they were from larger households, possibly with more appliances, or it may simply reflect that they had not yet availed of energy-saving devices to the same degree as other customers. However, even after installation of these devices average consumption by the acceptors was still higher than by the non-acceptors, so the latter explanation does not seem to fully account for the difference. It is plausible therefore that those accepting offers like the one in question tend to be higher than average energy consumers, notwithstanding the number of energy-saving devices they have installed.

²Survey data indicate that in late 1992, 59 per cent of households in Ireland had lagging jackets, while less than 10 per cent used CFL bulbs (Scott, 1993). This survey differentiated between night-saver electricity users and others, but the data has not been analysed to estimate ownership of the devices by the former group.

As can be seen, while average consumption by the non-acceptors increased from the year before to the year after the offer, by 3.6 per cent, consumption by the acceptors remained constant. The increase in general consumption could be due to weather conditions, or to the fact that consumers in general were using more electrical appliances. This might reflect the strong economic growth in Ireland at the time. This does not explain why the acceptor group's consumption remained constant, unless one could argue that this group already had more appliances (or used their appliances more), and therefore the others were "catching up". This might be the case if the acceptors were better off or were larger households. Being better off, however, would not coincide with them not having already had the energy-saving devices installed. Research indicates that better off households tend to have more energy-saving devices installed (Scott, 1993). So again the indication seems to be that those accepting these offers are genuinely higher users of electricity, notwithstanding any socio-economic differences.

The next question is how effective was the offer, for those who accepted it? In other words, does the relative reduction in their consumption indicate the effectiveness of these energy-saving devices in actual usage, or could it just be due to chance? We can use statistical analysis to determine whether the difference in consumption is statistically significant. The appropriate statistical manipulation of the data is to calculate the "Student's t statistic", the formula for which approximates to³

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\bar{y}_1 - \bar{y}_2)}{\sqrt{\frac{\sigma_1^2 + \sigma_2^2}{n}}}$$

where

\bar{x}_1 = average consumption of the group of acceptors in the year prior to the offer

³In the formula the variances of the \bar{y} 's are ignored, because being based on very large sample sizes they are effectively negligible in comparison with the variances of the \bar{x} 's.

\bar{x}_2 = average consumption of the group of acceptors in the year following the offer

\bar{y}_1 = average consumption of the group not accepting the offer, in the year prior to the offer

\bar{y}_2 = average consumption of the group not accepting the offer, in the year following the offer

σ_1^2 = variance of the consumption of the group of acceptors in the year prior to the offer

σ_2^2 = variance of the consumption of the group of acceptors in the year following the offer

n = size of group accepting the offer

The t statistic exhibits a particular distribution known as the t-distribution. As the sample size becomes large, the t-distribution approaches a normal distribution. A t statistic of greater than 1.96 indicates statistical significance at a 95 per cent level of confidence (Maddala, 1977). That is, we can be 95 per cent confident that the difference in consumption is not merely due to chance, and must be explained by some other factor, such as the effect of the use of the energy-saving devices. All the variables above are known (though not given for reasons of confidentiality) except the variances. However, we have obtained the variances of a sample of a similar group of customers from a more recent time period, and assume it is more or less the same as the variance for our groups here. This variance turns out to be very high, and much higher than one would expect, if the customers formed a fairly homogenous group. However, the night-saver customers consist of 2 groups - domestic customers and dairy farmers (who consume much higher amounts of electricity), and it is not possible to split them out in the original data.

Using this data we can work out a t-statistic of

$$t = 0.75$$

This is less than the critical value of 1.96. Therefore the result is not statistically significant, and we cannot infer that the scheme has had an impact on consumption.

One point is relevant in terms of this statistical analysis. As mentioned, our two groups - acceptors and non-acceptors - are not homogeneous. The degree to which customers in each group had already installed the devices being offered would vary, while acceptance of the offer indicates that the customers accepting did not already have the device in question. To be strictly comparable, we would need to have data for the sub-group within non-acceptors who had not already installed each of the devices, and did not do so of their own volition in the year following the making of the offer, and we would also need to break down the acceptors by reference to devices accepted.

This might strengthen our results. One could reasonably argue that the non-acceptors who did not have the already installed would have higher energy consumption than the general group of non-acceptors, and it is possible that their increase in consumption in the year following the offer would also have been greater. Under such circumstances, the effectiveness of the offer might have been greater than appears from our existing data set.

Conclusions

While there was a difference of roughly 3 per cent in consumption per annum per customer between customers availing of and not availing of this offer, the difference was not statistically significant. Therefore we cannot conclude that this offer was effective in reducing the electricity usage of those who accepted it. Further, as mentioned, the low acceptance level means that the offer might not be seen as very successful. The fact that it was made to a group of customers that one might expect to be already energy conscious - offers to other groups elicited an even lower response - indicates that these offers may not be very attractive to customers. Therefore, an overall cost-benefit analysis of the promotion would need to be done to see whether it was worthwhile, or whether resources would be better utilised on different strategies for saving energy.

However, subject to the foregoing, two tentative recommendations can be made. Firstly, given that it is probable that many of the targeted customers already had some or all of the offered devices, the higher than average response rate indicates that concentrating these promotions on such groups is sensible. In addition, those taking up the offer were higher than average electricity users, so concentrating efforts on high energy-users might also make sense.

Finally, surveys may be useful in answering some of the questions that arise from results and analysis of the above promotion. Questions that might usefully be asked include:

- (i) Are customers convinced of the savings that can be made by using these devices?
- (ii) If so, what are the reasons for non-take-up of offers? Possibilities include financial reasons, inconvenience, difficulties with installing devices, etc..
- (iii) Do customers already have some or all of the devices in question? This is especially relevant where the targeted customers might be expected to be more energy-conscious, such as in this case. Would it be more effective to offer different energy-saving devices to these customers?
- (iv) Are there queries that customers have, or information they require, which if answered would encourage them to install more energy-saving devices?

In addition, statistical analysis of similar schemes would give a broader view of their effectiveness in general.

References

MADDALA, G.S., 1977. *Econometrics*. International Student Edition. Tokyo: McGraw-Hill Kogakusha.

SCOTT, S., 1993. "Energy Conservation in the Home - Are We Contrary?", in FITZGERALD, J. and D. MCCOY, 1993. *Issues in Irish Energy Policy*. ESRI Policy Research Series, Paper No.20.