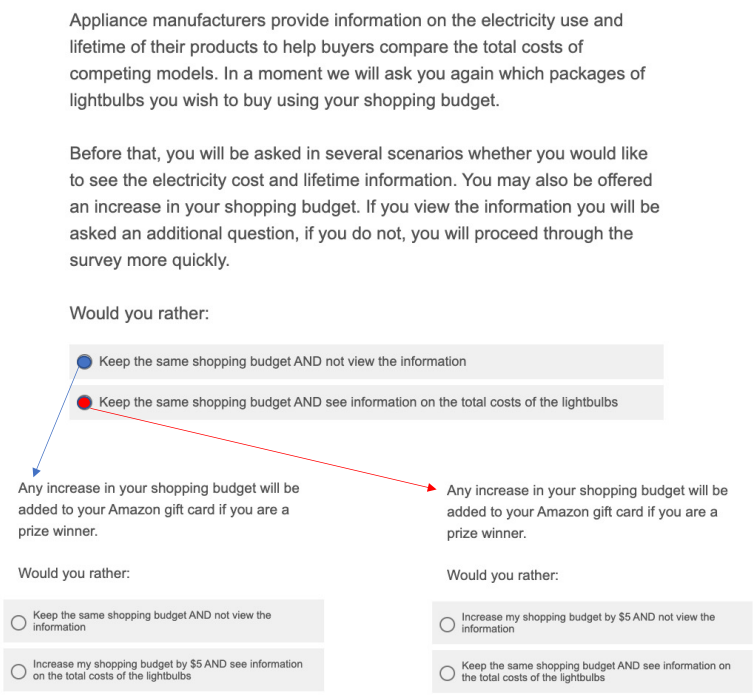
FOR ONLINE PUBLICATION

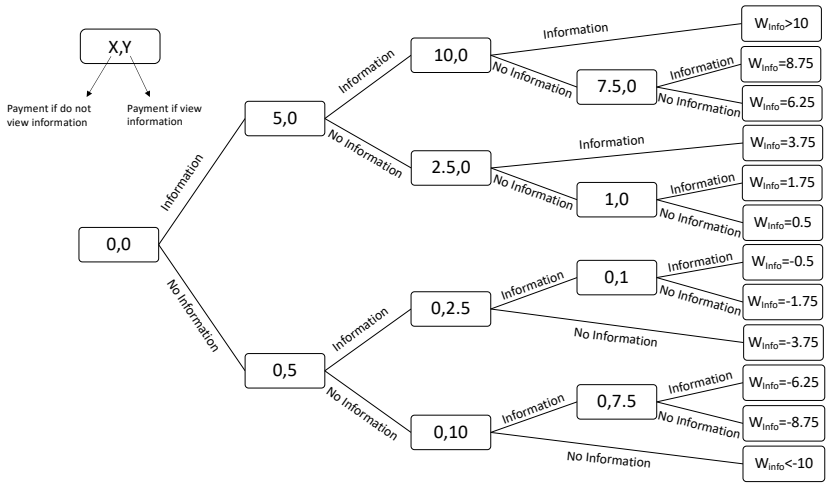
A Supplemental: Experiment Details

Figure A1: Elicitation of Willingness to Pay (WTP) for Information



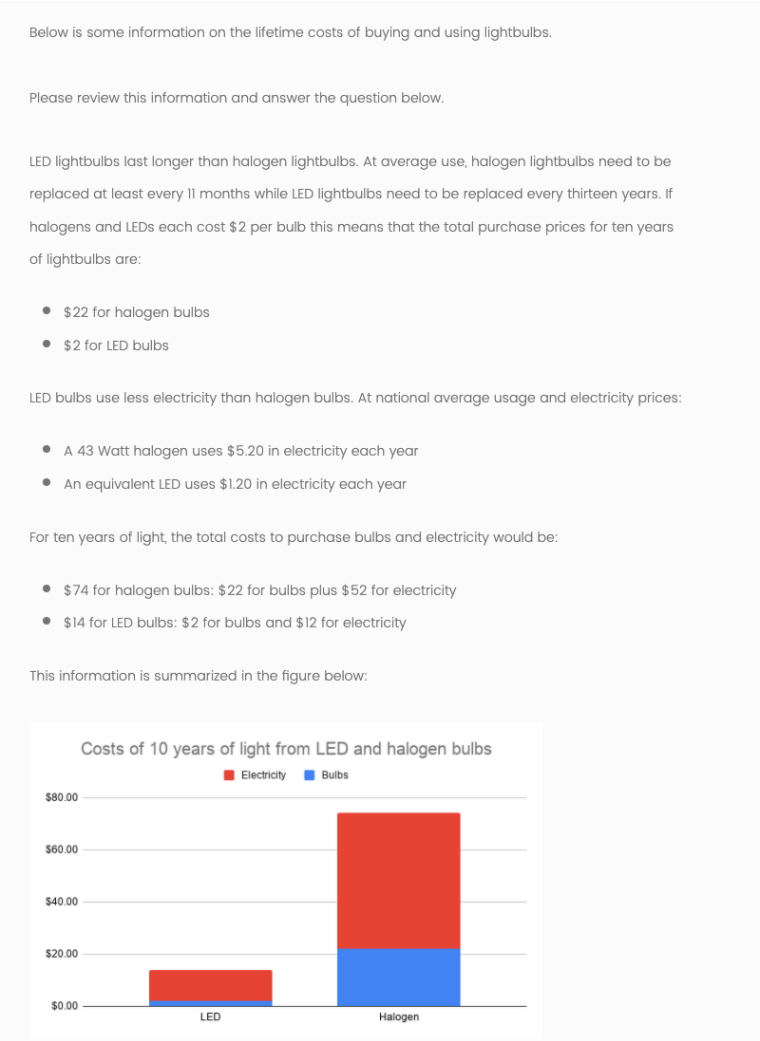
Notes: Figure shows screen shots of the experimental module designed to elicit consumer WTP for information on lifetime operating costs of light bulbs. If at the first question in the module, consumers answered they would rather not view information (blue dot) they were then asked if they would like to view the information and increase their shopping budget by \$5. If they answer that they would like to view information at the first question (red dot) they were asked if they would like to not view the information and increase their shopping budget by \$5. Depending on their answers they were directed through the staircase to identify their switching point. For the full staircase see Appendix A2.

Figure A2: Staircase to Elicit Willingness to Pay (WTP) for Information



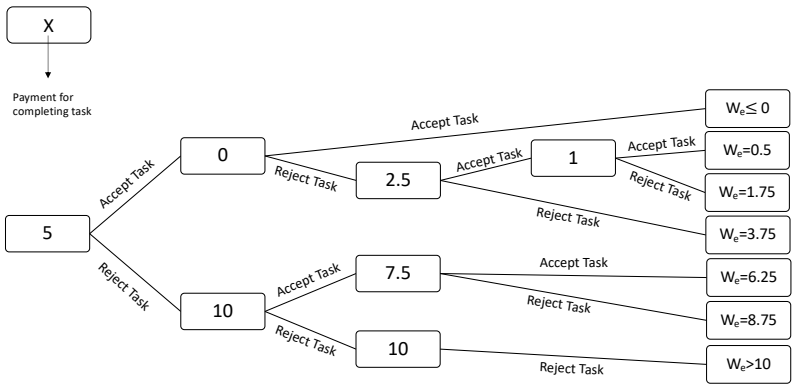
Notes: The staircase procedure works as follows. First, each respondent is asked whether they would like to keep the same shopping budget and view the information on the lifetime costs of light bulbs. If they choose the information, they are then asked if they would like to view the information and keep the same shopping budget, or increase their shopping budget by \$5 and not view the information. If they had instead chosen not to view the information, they would be asked whether they would like to increase their shopping budget by \$5 and view the information, or keep the same shopping budget and not view the information. The respondent is then asked the remaining questions depending on their path through the staircase.

Figure A3: Information Treatment



Notes: Figure shows the information screen displayed to consumers who received information on lifetime operating costs in the experiment.

Figure A4: Staircase to Elicit Willingness to Accept (WTA) for Effort Task

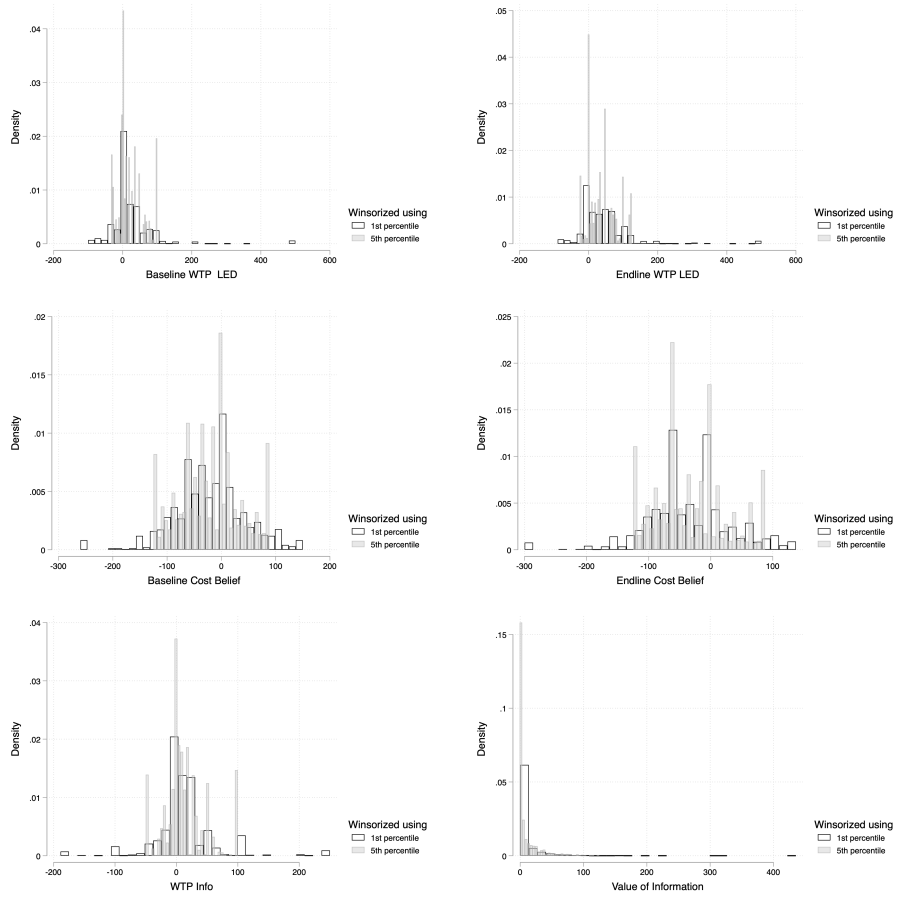


Notes: The staircase procedure works as follows. First, each respondent is asked whether they would like to accept the extra task for an increase in their shopping budget of \$5. If they choose the task, they are then asked if they would accept the extra task for no change in their shopping budget. If they had chosen not to accept the extra task, they would be asked whether they would accept it for an increase in their shopping budget of \$10. The respondent is then asked the remaining questions depending on their path through the staircase.

B Supplemental: Data and Results

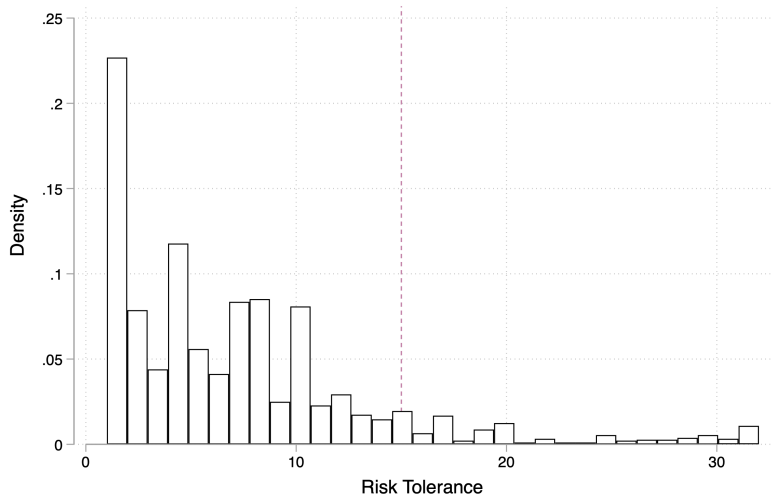
B.1 Descriptive

Figure B1: Winsorizing elicited variables



Notes: WTP LED is WTP for the LED relative to halogen package. Baseline is prior to the information choice. Endline is after the information choice. Cost Beliefs are mean of distribution of beliefs regarding relative total cost of using LED vs halogen light bulbs for ten years of light (negative values indicate cost saving). Information is energy cost and lifetime information of LED and halogen light bulbs.

Figure B2: Distribution of Risk Tolerance



Notes: Distribution of risk tolerance variable from staircase risk preference elicitation task of Falk et al. (2016). Values correspond to implied switching row in staircase task, higher values indicate greater appetite for risk. Individuals with a risk tolerance switching row of above 15 are not risk averse (either risk neutral or risk loving).

Table B1: Experiment Sample: Target and Actual Characteristics

Characteristic	Target	Sample
Household income		
$0-$50K	40%	45.8%
$50-$100K	33%	36.6%
$100K+	27%	17.6%
Gender		
Male	49%	46.2%
Education		
No School/High School Degree/Partial College	62%	54.3%
College Degree	38%	45.7%

Notes: Table shows the targeted and actual distribution of consumer characteristics in the light bulb experiment. Targeted characteristics were chosen to match the characteristics of the United States population.

Table B2: Descriptive Statistics

	mean/sd
Baseline WTP LED	19.48
	(36.22)
Endline WTP LED	38.22
	(42.26)
Baseline Cost Belief	-20.91
	(55.92)
Endline Cost Belief	-31.79
	(57.84)
Baseline Cost Uncertainty	25.91
	(26.96)
Endline Cost Uncertainty	21.21
	(26.22)
WTP Info	12.44
	(34.17)
Received Information (%)	0.75
	(0.43)
WTA Effort	21.63
	(32.25)
Value of Information	8.36
	(17.30)
Pays Electricity Bills (%)	0.94
	(0.25)
Number of People in Home	2.85
	(1.72)
Household Income	67928.50
	(18613.69)
Male	0.46
	(0.50)
Age	47.75
	(16.84)
College Degree (%)	0.46
	(0.50)
Sockets	21.37
	(11.89)
Risk Tolerance	6.97
	(6.41)
Patience	11.34
	(11.18)
Observations	1902

Notes: WTP LED is WTP for the LED relative to halogen package. WTP Info is WTP for information. WTA Effort is williingness to accept to undertake the effort task. Baseline (Endline) is prior to (after) the information choice. Cost Beliefs are mean of distribution of beliefs regarding relative total cost of using LED vs halogen light bulbs for ten years of light (negative values indicate cost saving). Uncertainty is standard deviation of distribution of beliefs. Information is energy cost and lifetime of LED and halogen light bulbs. Patience and Risk Tolerance are elicited using staircase procedure from Falk et al. (2016, 2018).

Table B3: Correlates of WTA in Effort Task

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	WTA for Effort Task							
Value of Information	-0.014							
	(0.046)							
WTP for Information		-0.045**						
		(0.022)						
Received Information (%)			-13.418***					
			(1.691)					
Baseline WTP for LED				0.045**				
				(0.020)				
Baseline Mean Belief					0.008			
About Relative Costs of LED					(0.013)			
Patience Score						-0.306***		
						(0.066)		
Risk Score							-0.184	
							(0.115)	
Time on Information Screen								-0.014**
								(0.006)
Observations	1435	1902	1902	1902	1902	1901	1902	1435

Standard errors in parentheses

* $p < 0.1$, ** $p < .05$, *** $p < 0.01$

Notes: Table reports correlates of WTA elicited in the Effort Task. Each row presents the results of a separate regression with WTA in the Effort Task as the depedent variable. WTP (WTA) are elicited using a price list or staircase procedure. WTP for LED is WTP relative to halogen. Baseline is prior to the information choice. Cost Belief are stated expectations regarding relative total cost of using LED vs halogen light bulbs for ten years of light (negative values indicate cost saving). Patience and Risk (risk tolerance) are elicited using staircase procedure from Falk et al. (2016, 2018). Time on Information Screen is time spent by respondent viewing information (condition on receiving it).

B.2 Treatment Effects

Table B4: Effect of Information by Level of WTP for Information

	(1)	(2)	(3)	(4)
	Endline WTP LED			
Received Information ×				
WTP Info = -8.7500	6.213	5.651	8.742	4.120
	(13.759)	(13.420)	(12.884)	(14.142)
WTP Info = -6.2500	11.855	11.769	12.241	11.535
	(12.260)	(11.907)	(11.460)	(12.594)
WTP Info = -3.7500	16.115*	16.087*	16.244*	16.009*
	(9.208)	(8.942)	(8.607)	(9.458)
WTP Info = -1.7500	21.513*	21.443*	21.827*	21.253*
	(11.953)	(11.609)	(11.173)	(12.278)
WTP Info = -0.5000	20.225***	20.319***	19.802***	20.575***
	(7.045)	(6.845)	(6.587)	(7.237)
WTP Info = 0.5000	19.488***	19.570***	19.120***	19.793***
	(6.668)	(6.478)	(6.234)	(6.850)
WTP Info = 1.7500	31.271**	31.351***	30.910***	31.570**
	(12.316)	(11.961)	(11.512)	(12.651)
WTP Info = 3.7500	16.935	16.885	17.158	16.750
	(12.039)	(11.691)	(11.253)	(12.366)
WTP Info = 6.2500	30.797**	31.087**	29.489**	31.879**
	(12.929)	(12.572)	(12.091)	(13.283)
WTP Info = 8.7500	41.120**	41.577**	39.061**	42.824**
	(20.258)	(19.698)	(18.946)	(20.812)
Observations	1902	792	1111	1583

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Endline is after information treatment. Table reports the treatment effect of information at each level of WTP for Information ("Received Information × WTP Info ="). The dependent variable is Endline relative WTP for the LED package. All columns control for baseline relative WTP for the LED package and indicators for level of WTP for Information. Column (1) includes all consumers. Column (2) excludes consumers with WTP for Information outside the bounds of prices offered in the experiment. Column (3) excludes consumers with WTP for Information greater than the highest price of information offered in the experiment. Column (4) excludes participants with WTP for Information lower than the largest payment to receive information offered in the experiment.

Table B5: Average Effect of Information

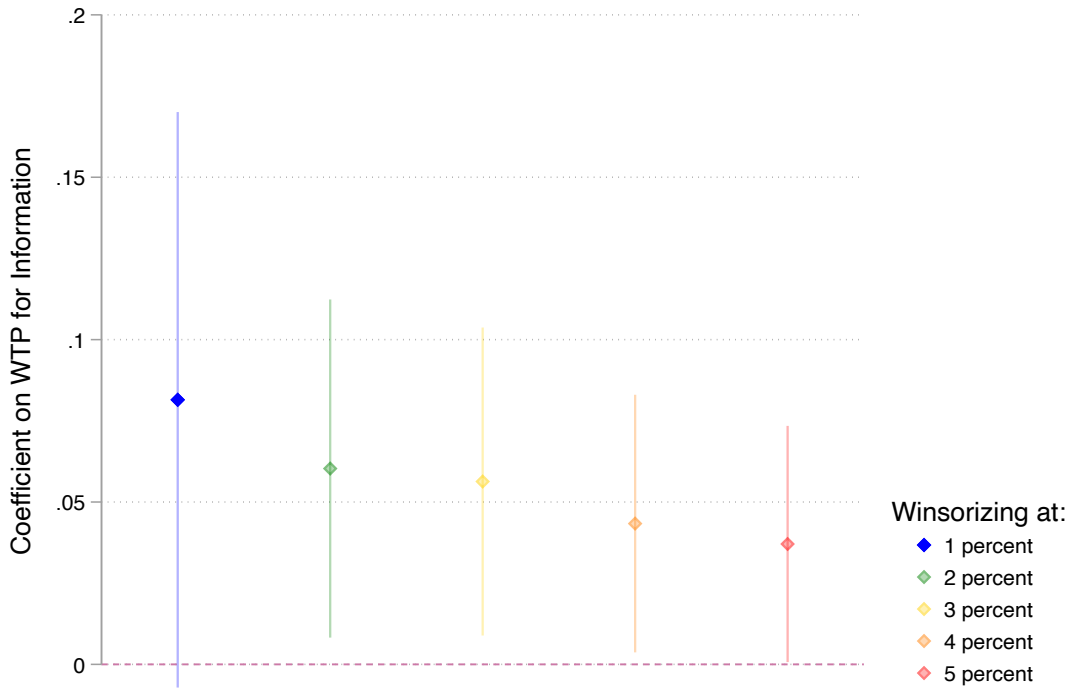
	(1)
	Endline WTP LED
Received Information	22.66***
	(2.593)
Observations	792

Notes: Endline is after information treatment. Table reports average treatment effect of information. The estimate is a weighted average of column (2) of Table B4 with weights determined by the distribution of WTP for Information among consumers and bootstrapping with 1000 replications to generate standard errors.

B.3 Treatment of Outliers, Sample Restrictions and Mismeasurement

We first show in Figure B3 that the conclusions are robust to the extent of data winsorization.

Figure B3: Robustness to Winsorizing



Notes: Figure plots estimated coefficient on WTP for Information where the dependent variable is Value of Information with different levels of winsorization.

We next use the belief elicitation exercise to exclude individuals who may not understand the tasks or may not be paying close attention. We first exclude consumers who do not report continuous beliefs. For example, a consumer is excluded if they reported some likelihood that the cost difference between the bulbs was in the range \$0-\$25 and some likelihood that the cost difference between the bulbs was in the range \$50 - \$75, but zero

likelihood that the cost difference was in the range \$25 - \$50. We exclude the consumer if they reported non-continuous beliefs for either the baseline or endline elicitation. Column (1) of Table B6 shows the coefficient on WTP for information is 0.03, and we strongly reject the null hypothesis that it is 1. The next restriction removes consumers with a mean belief that is inconsistent with the question "Do you think the total cost of using LED bulbs would be higher or lower than the total cost of using halogen bulbs?". Again, we exclude a consumer if their response was inconsistent in either the baseline or endline elicitation. The resulting coefficient is reported in column (2) of Table B6. We then exclude consumers with a WTP for the LED bulb above the highest price for the LED in the multiple price list at either baseline or endline. This estimate is reported in column (3) of Table B6.

The next exercise is designed to test the sensitivity of our results to possible mismeasurement in WTP for information which may bias or attenuate the coefficient. In each exercise, we assign a subset of consumers a new WTP for information. We begin by re-coding WTP for information of those who chose information at all prices offered and who therefore have a WTP Info$>$ 10. We follow Allcott and Taubinsky (2015) by first assigning these consumers the median of the stated WTP among these consumers. Column (1) of Table B7 shows the coefficient is roughly unchanged from the base specification but the standard error is larger. In Column (2) we re-estimate the regression instead assigning these consumers a WTP for information of 10. This increases the coefficient but we still strongly reject a coefficient of 1 on WTP Info, despite the increased noise associated with the estimate.

We also consider the implications of measurement error due to the price list exercise for those with WTP Info < 10. Rather than assuming that a customer who switches from Information to No Information between prices 7.5 and 10 has WTP Info $= 8.75$, we instead assign them first a WTP Info $= 10$ and then a WTP Info $= 7.5$, and then we assign them a WTP Info $=10$ or WTP Info$=7.5$ with 50% probability. The results of these three exercises are reported in columns (3), (4), and (5) of Table B7. Our conclusions are unchanged.

Table B6: Information Acquisition with Sample Restrictions

	Dependent Variable = Value of Information		
Samples:	Continuous Beliefs	Consistent Beliefs	Marginal WTP for LED
	(1)	(2)	(3)
(a) WTP Info	0.033*	0.033	0.023**
	(0.018)	(0.022)	(0.010)
Observations	1274	911	905
Test optimal acquisition			
F-statistic (a) = 1	2841.84	2010.02	10404.81

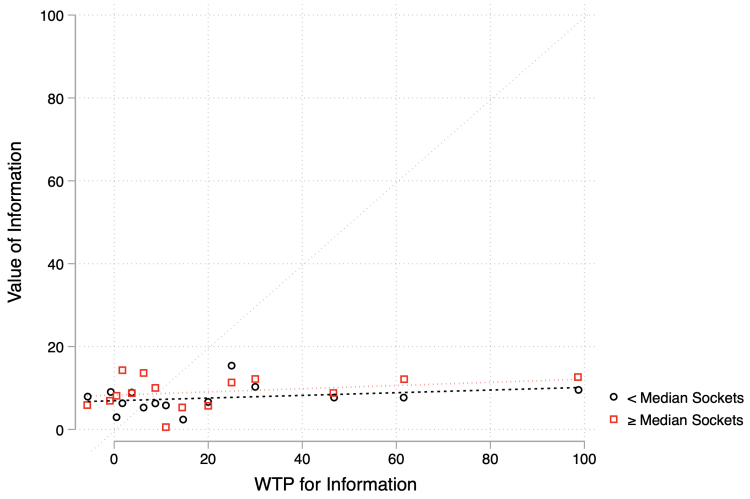
Notes: WTP Info is WTP for information. Column (1) restricts the sample to consumers with continuous beliefs. Column (2) restricts the sample to consumers with a distribution of beliefs consistent with their expectation about which bulb has higher relative costs. Column (3) restricts the sample to consumers with a WTP for the LED bulb package in both elicitations below \$48.75. Observations are weighted using probability weights to account for probability of treatment. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$.

Table B7: Information Acquisition with Mismeasurement

	Dependent Variable = Value of Information			
WTP Info Recoding:	Non-marginal WTP		Marginal WTP	
	Median Stated	Max Offered	Stretched	Compressed
	(1)	(2)	(3)	(4)
(a) WTP Info	0.045	0.117	0.013	0.124
	(0.031)	(0.088)	(0.009)	(0.090)
Observations	1435	1435	1435	1435
Test optimal acquisition				
F-statistic (a) = 1	933.49	100.76	11375.27	93.72

Notes: WTP Info is WTP for information. Column (1) consumers with WTP Info $>$ 10 (outside the price list) are assigned a WTP Info equal to the median of stated WTP Info which is 30. Column (2) consumers with WTP Info $>$ 10 (outside the price list) are assigned the highest price of information in the price list which is 10. Column (3) stretches the distribution of WTP Info in the following way: consumers who have a $0 <$ WTP Info < 10 are assigned WTP Info equal to the lowest price at which they chose No Information while consumers who have a WTP Info < 0 are assigned WTP Info equal to the highest price at which they chose Information. Consumers with WTP Info > 10 are assigned the 95th percentile of raw WTP Info. Column (4) compresses the distribution of WTP Info in the following way: consumers who have a $0 <$ WTP Info < 10 are assigned WTP Info equal to the highest price at which they chose Information while consumers who have a WTP Info < 0 are assigned WTP Info equal to the lowest price at which they chose No Information. Consumers with WTP Info > 10 (outside the price list) are assigned the highest price of information in the price list which is 10. Observations are weighted using probability weights to account for probability of treatment. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$.

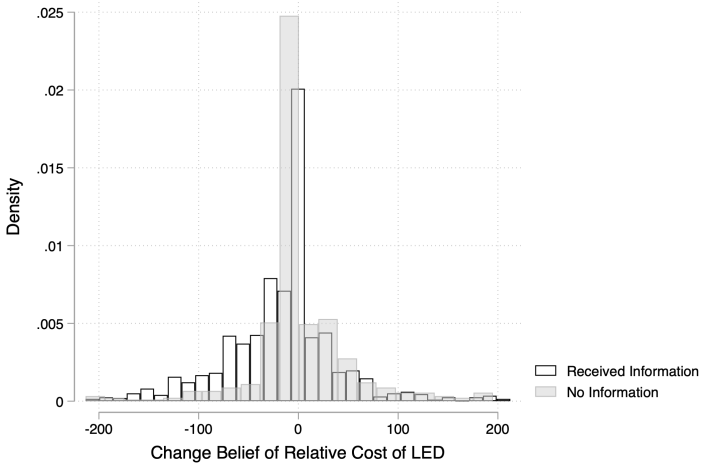
Figure B4: Willingness to Pay (WTP) for Information and Value of Information by Number of Light Bulb Sockets



Notes: Scatter plot of revealed value of information vs binned WTP for information where bins are 20 quantiles of WTP for information in two groups: consumers with below median number of light bulb sockets in their home, and consumers with above median number of light bulb sockets in their home. Median number of sockets is 20, maximum number of sockets is 50.

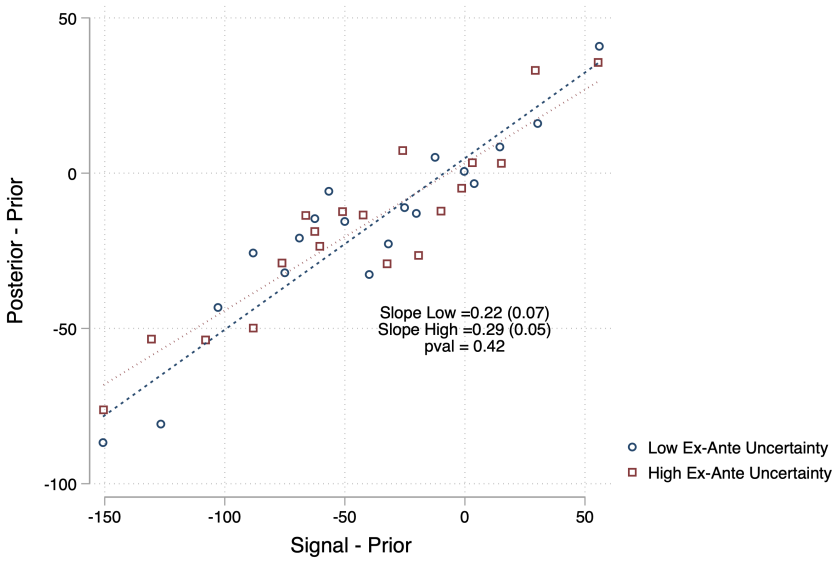
B.4 Beliefs and Learning

Figure B5: Distribution of Difference in Mean Beliefs About Relative Costs of LED Between Baseline and Endline by Information Group



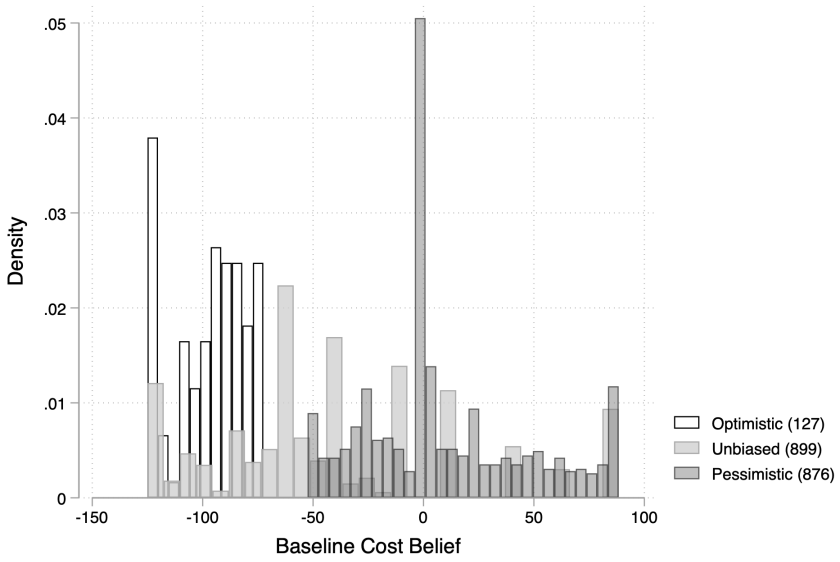
Notes: Difference in mean beliefs ("Posterior" - "Prior") about the total cost of using an LED relative to a halogen incandescent bulb between baseline and endline elicitation by Information Group. Negative values indicate belief that the LED would cost less.

Figure B6: Learning and Prior Uncertainty



Notes: Figure plots the difference between mean endline ("Posterior") and baseline ("Prior") beliefs about the relative cost of LED light bulbs (vertical axis) against the difference between the lifetime cost information provided in the information treatment ("Signal") and baseline beliefs ("Prior") for consumers with above ("High Ex Ante Uncertainty") and below ("Low Ex Ante Uncertainty") median baseline uncertainty about the relative costs. Solid line depicts slope for each group. Coefficients and standard errors in parentheses reported in the figure come from estimating the equation in footnote 16 with all components interacted with an indicator for above median level of ex ante uncertainty. Reported p value is for the null hypothesis that the slopes are equal.

Figure B7: Distribution of Mean Baseline Beliefs and Bias



Notes: Histogram shows the distribution of mean baseline beliefs about the total cost of using an LED relative to a halogen incandescent for biased and optimistic, unbiased, and biased and pessimistic consumers. Negative values indicate a belief that the LED would cost less. Bias is evaluated for each consumer based on a test that the mean of the distribution of their beliefs is equal to -$62.50.

Table B8: Learning

	(1)	(2)	(3)
	Dependent Variable = Posterior - Prior		
Received Information × [Signal - Prior]	0.254***		
	(0.037)		
[Signal - Prior]	0.285***		
	(0.034)		
WTP Info	-0.144***		
	(0.035)		
Below Median Time on Information × [Signal - Prior]		0.466***	
		(0.036)	
Above Median Time on Information × [Signal - Prior]		0.584***	
		(0.038)	
Below Median Time on Beliefs × [Signal - Prior]			0.454***
			(0.037)
Above Median Time on Beliefs × [Signal - Prior]			0.582***
			(0.036)
Observations	1902	1435	1435

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Dependent variable is the difference between mean endline ("Posterior") and baseline ("Prior") beliefs about the difference in costs between the LED light bulbs and incandescent light bulbs. "Signal" is the lifetime energy cost information provided in the experiment. WTP Info is WTP for information. Signal is the lifetime cost information provided in the information treatment. Time on Information is time spent on the information treatment screen. Time on Beliefs is time spent reporting endline beliefs.

B.5 Supporting Results

Table B9: Alternative Model Specification

	Dependent Variable = Value of Information
	Poisson
	(1)
(a) WTP Info	0.004**
	(0.002)
Observations	1431
(b) Marginal effect	0.03
Test optimal acquisition	
Chi-sq statistic (b) = 1	3877.06

Notes: WTP Info is WTP for information. Table presents coefficient and marginal effect from a Poisson regression. Observations are weighted using probability weights to account for the probability of treatment. Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$.

Table B10: Determinants of Willingness to Pay (WTP) for Information

	Dependent Variable = WTP for Information			
	(1)	(2)	(3)	(4)
| Baseline WTP LED |	0.067**	0.071**	0.061*	0.063**
	(0.031)	(0.031)	(0.032)	(0.032)
Baseline Cost Uncertainty	-0.072**	-0.070**	-0.073**	-0.057*
	(0.032)	(0.033)	(0.033)	(0.033)
Biased Towards Preferred	1.443	1.268	3.210	3.126
	(2.134)	(2.143)	(2.539)	(2.532)
WTA Effort		-0.053	-0.051	-0.044
		(0.033)	(0.033)	(0.033)
Baseline Prefers LED			3.471	3.334
			(2.123)	(2.133)
Patience				0.232***
				(0.074)
Risk Tolerance				-0.366***
				(0.140)
Sockets				0.087
				(0.071)
Pays Electricity Bills				4.122
				(2.861)
Observations	1902	1902	1902	1901

Notes: Table shows results of regressing WTP for information (WTP Info) on: the absolute value of WTP for the LED before information was offered (| Baseline WTP LED |), the standard deviation of beliefs about relative costs of LED bulbs over 10 years before information was offered (Baseline Cost Uncertainty), an indicator for whether beliefs were biased towards the baseline preferred product before information was offered (Biased Towards Preferred), WTA to undertake the experimental effort task (WTA Effort), an indicator for whether LED was preferred at baseline (Baseline Prefers LED), a measure of patience (Patience) and risk preference (Risk Tolerance) elicited via the staircase procedures of Falk et al. (2016), the number of light bulb sockets in a consumer's home (Sockets) and a binary indicator for whether a consumer pays their electricity bills (Pays Electricity Bills).

Table B11: Determinants of Value of Information

	Dependent Variable = Value of Information			
	(1)	(2)	(3)	(4)
| Baseline WTP LED |	-0.072***	-0.072***	-0.024**	-0.025***
	(0.008)	(0.008)	(0.010)	(0.010)
Baseline Cost Uncertainty	-0.022	-0.023	-0.011	-0.001
	(0.018)	(0.019)	(0.018)	(0.018)
Biased Towards Preferred	6.819***	6.837***	-1.850	-1.848
	(1.474)	(1.465)	(1.527)	(1.512)
WTA Effort		0.006	-0.004	-0.004
		(0.016)	(0.015)	(0.015)
Baseline Prefers LED			-16.263***	-16.295***
			(1.719)	(1.713)
Patience				-0.013
				(0.039)
Risk Tolerance				-0.176***
				(0.065)
Sockets				0.125***
				(0.036)
Pays Electricity Bills				2.622*
				(1.446)
Observations	1435	1435	1435	1434

Notes: Table shows results of regressing revealed value for information (WTP Info) on: the absolute value of WTP for the LED before information was offered (| Baseline WTP LED |), the standard deviation of beliefs about relative costs of LED bulbs over 10 years before information was offered (Baseline Cost Uncertainty), an indicator for whether beliefs were biased towards the baseline preferred product before information was offered, WTA to undertake the experimental effort task (WTA Effort), an indicator for whether LED was preferred at baseline (Baseline Prefers LED), a measure of patience (Patience) and risk preference (Risk Tolerance) elicited via the staircase procedures of Falk et al. (2016), the number of light bulb sockets in a consumer's home (Sockets) and a binary indicator for whether a consumer pays their electricity bills (Pays Electricity Bills). Observations are weighted using probability weights to account for the probability of treatment.

Table B12: Actual Welfare with Optimal Subsidies from Nudge in Right Direction

Panel A: Information Subsidy

	Subsidy	Bias	Δ Info(%)	Δ Welfare	Cum Δ Welfare
Low	8.75	20.71	.015	.193	1.073
Medium	8.75	23.994	.015	.241	1.358
High	8.75	27.277	.015	.289	1.643

Panel B: Product Subsidy

	Subsidy	Bias	Δ LED(%)	Δ Welfare	Cum Δ Welfare
Low	12.1875	14.727	.026	.198	.736
Medium	12.1875	17.365	.026	.266	.907
High	12.1875	20.003	.026	.334	1.077

Notes: This table summarizes the welfare impact of optimal subsidies computed when information provision is only a 'nudge in the right direction', true WTP for the LED is not observed by the policy maker and the difference between true WTP and baseline WTP for the LED is 10% (low), 30% (medium), or 50% higher than observed in the experiment.

Table B13: Optimal Subsidies and Welfare with Alternative Estimates of Product Bias

Panel A: Information Subsidy

	Subsidy	Bias	Δ Info(%)	Δ Welfare	Cum Δ Welfare
Low	8.75	20.71	.015	.193	1.088
Medium	8.75	24.02	.015	.242	1.389
High	8.75	27.363	.015	.291	1.703

Panel B: Product Subsidy

	Subsidy	Bias	Δ LED(%)	Δ Welfare	Cum Δ Welfare
Low	12.1875	14.727	.026	.198	.736
Medium	12.1875	17.365	.026	.266	.907
High	12.1875	20.003	.026	.334	1.077

Notes: This table summarizes the welfare impact of optimal subsidies computed assuming actual changes in WTP for the LED as a result of the information intervention were 10% (low), 30% (medium), or 50% higher than observed in the experiment.

C Supplemental: Derivations

C.1 Deriving the Expected Value of Information (Equation (5))

We need an expression for $E\left[\max_j(\nu_{ij} - p_j - \kappa_{ij})\right]$, the first term in equation 2. Define

$$\begin{aligned} U_i^* &= \max_j(\nu_{ij} - p_j - k_{ij} - \epsilon_{ij}), j = \{q, m\} \\ &= \max_j(\mu_{ij} - \epsilon_{ij}) \end{aligned}$$

where $-\epsilon_{ij}$ is distributed type 1 extreme value with $E(-\epsilon_{ij}) = -\bar{\epsilon}_j$ and scale parameter σ_i (equivalently $-\epsilon_{ij} \sim G(-(\bar{\epsilon}_j + \frac{\gamma}{\sigma_i}), \sigma_i)$ where γ is Euler's constant i.e., Gumbel distributed). Then by the properties of extreme value type 1 / Gumbel distribution:

$$U^* \sim G\left(\frac{1}{\sigma_i}\ln\left[\exp^{\sigma_i(\mu_{iq} - \bar{\epsilon}_q - \frac{\gamma}{\sigma_i})} + \exp^{\sigma(\mu_{im} - \bar{\epsilon}_m - \frac{\gamma}{\sigma_i})}\right], \sigma_i\right)$$

which can be written:

$$U_i^* = \mu_i^* - \epsilon_i^*$$

where

$$\mu_i^* = \frac{1}{\sigma_i}\ln\left[\exp^{\sigma_i(\mu_{iq} - \bar{\epsilon}_q)} + \exp^{\sigma_i(\mu_{im} - \bar{\epsilon}_m)}\right] \tag{9}$$

$$-\epsilon_i^* \sim G\left(-\frac{\gamma}{\sigma_i}, \sigma_i\right)$$

combining 9 with the anticipated value of the most preferred product m, re-arranging and noting that:

$$\begin{aligned}\mu_{im} - \mu_{iq} &= (\nu_{im} - p_m - k_{im}) - (\nu_{im} - p_m - k_{im}) \\ &= \widehat{W}_{i,m} - (p_m - p_q)\end{aligned}$$

gives 5.

C.2 Deriving the Optimal Information Subsidy

Let $p_L = p_1 - p_0$, i.e., p_L is the relative price of the efficient appliance.

$$\begin{aligned}\mu(s^I) = Z(s^I) + \nu_0 - p_0 - \kappa_0 + \int_{\widehat{W}_1 \geq p_L} (W_1 - p_L) f_{\widehat{W}_1, W_1}(\widehat{W}_1, W_1) d\widehat{W}_1 dW_1 \\ + \int_{W^I > p^I - s^I} (\tilde{V} - p^I + s^I) f_{W^I, \tilde{V}}(W^I, \tilde{V}) dW^I d\tilde{V}\end{aligned}$$

Now:

$$\begin{aligned}Z(s^I) &= Z - \int_{W^I > p^I - s^I} s^I f_{W^I}(W^I) dW^I \\ &= Z - \int_{W^I > -s^I} s^I f_{W^I, \tilde{V}}(W^I, \tilde{V}) dW^I d\tilde{V}\end{aligned}$$

So:

$$\begin{aligned}
\mu(s^I) &= Z + \nu_0 - p_0 - \kappa_0 + \int_{\widehat{W_1} \geq p_L} (W_1 - p_L) f_{\widehat{W_1}, W_1}(\widehat{W_1}, W_1) \\
&+ \int_{W^I > p^I - s^I} (\tilde{V} - p^I) f_{W^I, \tilde{V}}(W^I, \tilde{V}) dW^I d\tilde{V} \qquad (10) \\
&= Z + \nu_0 - p_0 - \kappa_0 + \int_{\widehat{W_1} \geq p_L} (W_1 - p_L) f_{\widehat{W_1}, W_1}(\widehat{W_1}, W_1) \\
&+ \int_{W^I > p^I - s^I} (\tilde{V} - p^I) f_{\tilde{V}|W^I}(\tilde{V}|W^I) d\tilde{V} dF_{W^I}(W^I) \qquad (11) \\
&= Z + \nu_0 - p_0 - \kappa_0 + \int_{\widehat{W_1} \geq p_L} (W_1 - p_L) f_{\widehat{W_1}, W_1}(\widehat{W_1}, W_1) \\
&+ \int_{x > p^I - s^I} E_{\tilde{V}|W^I}(\tilde{V} - p^I | W^I = x) \; dF_{W^I}(x) \qquad (12) \\
&= Z + \nu_0 - p_0 - \kappa_0 + \int_{\widehat{W_1} \geq p_L} (W_1 - p_L) f_{\widehat{W_1}, W_1}(\widehat{W_1}, W_1) \\
&- \int_{x > p^I - s^I} E_{\tilde{V}|W^I}(\tilde{V} - p^I | W^I = x) D'_B(x) \qquad (13)
\end{aligned}$$

Where (16) to (17) comes from the $D_B(p^I) = 1 - F_{W^I}(p^I)$ and $D_B(p^I)$ is the market share of the information under biased information acquisition. Then

$$\begin{aligned}
\mu'(s^I) &= -E_{\tilde{V}|W^I}(\tilde{V} - p^I | W^I = p^I - s^I) D'_B(s^I) \\
&= -E_{\tilde{V}|W^I}(\tilde{V} - (W^I + s^I) | W^I = p^I - s^I) D'_B(s^I) \\
&= -E_{\tilde{V}|W^I}(B - s^I | W^I = p^I - s^I) D'_B(s^I) \\
&= E_{\tilde{V}|W^I}(s^I - B | \tilde{V} - B = p^I - s^I) D'_B(s^I) \\
&= (s^I - A(s^I)) D'_B(s^I)
\end{aligned}$$

C.3 Derivation of Welfare Comparison Between Information and Product Subsidies

Base utility, or welfare in the absence of subsidies (μ), can be written:

$$\begin{aligned}\mu &= Z + \nu_0 - p_0 - \kappa_0 \\ &+ \int\int\int_{W^I<p^I,\widehat{W_1}\geq p_L} (W_1 - p_L) f_{\widehat{W_1},W_1,W^I}(\widehat{W_1}, W_1, W^I) dW_1 db\widehat{W_1} dW^I \\ &\quad + \int\int_{W^I\geq p^I,W_1\geq p_L} (W_1 - p_L - p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I \\ &\quad + \int\int_{W^I\geq p^I,W_1<p_L} (-p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I \end{aligned} \tag{14}$$

where we assume for simplicity that e is fixed across consumers. The first integral captures the utility of consumers who do not acquire information at a price p^I and purchase the efficient product based on uninformed WTP. The second integral captures the utility of consumers who acquire information at price p^I and who purchase the efficient product based on informed WTP. The final integral captures the effort costs of informed consumers who chose the inefficient product.

We can write the welfare with an information subsidy $\mu(s^I)$ as:

$$\begin{aligned}\mu(s^I) &= Z + \nu_0 - p_0 - \kappa_0 \\ &+ \int\int\int_{W^I<p^I-s^I,\widehat{W_1}\geq p_L} (W_1 - p_L) f_{\widehat{W_1},W_1,W^I}(\widehat{W_1}, W_1, W^I) dW_1 d\widehat{W_1} dW^I \\ &\quad + \int\int_{W^I\geq p^I-s^I,W_1\geq p_L} (W_1 - p_L - p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I \\ &\quad + \int\int_{W^I\geq p^I-s^I,W_1<p_L} (-p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I \end{aligned} \tag{15}$$

The information subsidy changes the bounds of integration - i.e., changes who acquires information and which product they will purchase.

Finally, we can write the welfare from a product subsidy $\mu(s_L)$ as:[39]

$$\mu(s_L) = Z + \nu_0 - p_0 - \kappa_0 \tag{16}$$
$$+ \int\int\int_{W^I<p^I, \widehat{W_1}\geq p_L - s_L} (W_1 - p_L) f_{\widehat{W_1},W_1,W^I}(\widehat{W_1}, W_1, W^I) dW_1 d\widehat{W_1} dW^I$$
$$+ \int\int_{W^I\geq p^I, W_1\geq p_L - s_L} (W_1 - p_L - p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I$$
$$+ \int\int_{W^I\geq p^I, W_1< p_L - s_L} (-p^I - e) f_{W_1,W^I}(W_1, W^I) dW_1 dW^I \tag{17}$$

We wish to compute the difference in welfare due to two alternative subsidies, s^I and s_L, i.e., $\Delta\mu = \mu(s^I) - \mu(s_L)$. Table B1 decomposes welfare from changes in light bulb choices into groups of marginal consumers, i.e., consumers who are marginal to the subsidies. Let $K = (W_1 - p_L) f_{\widehat{W_1},W_1,W^I}(\widehat{W_1}, W_1, W^I) d\widehat{W_1} dW_1 dW^I$.

Group	Subsidy LED is Marginal To	Conditions	Welfare
A	Both	$A = p_L - s_L \leq \widehat{W_1} < p_L \leq W_1 \cap p^I - s^I \leq W^I < p^I$	$\int_A K \geq 0$
B	Product	$B = p_L - s_L \leq \widehat{W_1} \leq W_1 < p_L \cap W^I < p^I - s^I \leq p^I$	$\int_B K < 0$
C	Product	$C = p_L - s_L \leq \widehat{W_1} < p_L \leq W_1 \cap W^I < p^I - s^I \leq p^I$	$\int_C K \geq 0$
D	Product	$D = p_L - s_L \leq \widehat{W_1} \leq p_L < W_1 \cap p^I - s^I \leq W^I < p^I$	$\int_D K < 0$
E	Information	$E = \widehat{W_1} < p_L - s_L \leq p_L \leq W_1 \cap p^I - s^I \leq W^I < p^I$	$\int_E K \geq 0$

Table B1: Decomposing welfare from light bulb purchases by marginal group

Consider first group A in the first row of Table B1. These consumers switch to purchase the LED under both the product and the information subsidy and welfare for this group is identical (and positive) under the

[39]For completeness, the WTP for information W^I should depend on the relative price of light bulbs p_L and the subsidy s_L as this price difference influences the expected value of information. For parsimony, we suppress this dependence as it does not change the intuition of the welfare differences between the subsidies.

two subsidies. Now consider group B in the second row. These consumers remain uninformed under the information subsidy and purchase the incandescent. They switch to purchase the LED under the product subsidy, but their true WTP is less than the social marginal cost of the LED, so their purchase of the LED results in dead weight loss. Group C in the third row also remain uninformed under the product subsidy and switch to purchase the LED under the product subsidy, but their true WTP is greater than the social marginal cost of the LED so welfare from this group is larger under the product subsidy than the information subsidy. Group D in the fourth row become informed under the information subsidy and do not switch to the LED, but under the product subsidy they do switch to the LED, leading to dead weight loss under the product subsidy. Finally group E do not switch to the LED under the product subsidy, but become informed and switch to the LED under the information subsidy, resulting in higher welfare under the information than the product subsidy. Using the groups outlined in Table B1, we can then write the difference in welfare as:

$$\begin{aligned}\Delta\mu &= \int_E K - \left(\int_B K + \int_C K + \int_D K\right) - \int_{p^I - s^I \leq W^I < p^I} (p^I + e) f_{W^I}(W^I) dW^I \\ &= \underbrace{\left(\int_E K - \int_B K - \int_D K\right)}_{\geq 0} - \underbrace{\left(\int_C K + \int_{p^I - s^I \leq W^I < p^I} (p^I + e) f_{W^I}(W^I) dW^I\right)}_{\geq 0}\end{aligned}$$

The first term is the relative advantage of the information subsidy while the second term is the relative advantage of the product subsidy. The preferred subsidy depends on the product distortions due to the product subsidy (the classic Harberger distortions), the remaining bias in information acquisition (after the information subsidy) minus the full cost of information (marginal plus effort cost).