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Consumer Acceptance of Time-of-Use Tariffs: The Role of Information and Price Salience

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Abstract: Time-of-use (ToU) tariffs are an efficient mechanism for managing peak electricity demand, but consumer adoption remains low and usage suboptimal. This paper examines three possible economic and behavioral barriers: (1) The monetary compensation available under ToU tariffs may be insufficient relative to the effort required to make savings. (2) Consumers' perceptions of how ToU pricing affects their total bill may influence adoption. (3) Consumers may have imperfect knowledge of how time-of-use tariffs operate. We develop an online survey experiment with a representative sample (N = 1,000) to assess preferences for adopting ToU tariffs and test whether targeted information disclosures affect willingness to accept (WTA) such plans. Using a multiple price list, we derive novel estimates of consumers' WTA for ToU tariffs that provide bill discounts conditional on shifting electricity use. Randomized information treatments are used to experimentally evaluate the impacts of price salience and tariff knowledge on WTA. We find that the compensation required to change consumption under ToU tariffs can be substantial but is sensitive to how price information is presented. Making marginal per-unit prices salient significantly increases WTA estimates compared to when per-unit prices are merely implied. Fully-informed consumers demand compensation that exceeds what tends to be available in retail markets. In contrast, our knowledge interventions do not significantly affect WTA. Comprehension tests suggest a high baseline level of tariff understanding that is not improved by simple interventions.

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1. Introduction

Time-of-use (ToU) tariffs are often cited as a promising mechanism to align consumer electricity demand with the underlying marginal cost of generation. The tariffs entail per-unit prices that vary across the day to reflect the time-varying economic and environmental generation costs (Graff Zivin et al., 2014). In theory, this pricing encourages consumers to shift energy-intensive activities to periods of lower aggregate demand, reducing 'peak' demand and reliance on the most costly or carbon-intensive generation options. In practice, however, two significant challenges have limited their effectiveness. First, uptake under voluntary opt-in schemes remains low (Nicolson et al., 2018). Second, while ToU tariffs can induce energy conservation in the short run (see e.g. Faruqui & Sergici, 2010), there is little evidence that adopters systematically reallocate energy-use to off-peak times in a manner that would accrue sustained benefits to the electricity system (Allcott, 2011b; Di Cosmo et al., 2014; Enrich et al., 2024; Ito et al., 2018).

This paper examines potential economic and behavioral barriers that may underpin the low uptake and apparent suboptimal usage of ToU plans. Specifically, we develop an online survey experiment that elicits consumer preferences for adopting these plans and tests whether acceptance is influenced by targeted information treatments. The research design offers new insights on three specific issues highlighted in the existing literature as central to the uptake and effective use of ToU:

First, the compensation available under ToU tariffs may be insufficient relative to the effort required to make savings. Meaningful savings typically depend on shifting electricity-use away from peak periods, yet these periods often coincide with high levels of subsistence-related electricity demand (Brännlund & Vesterberg, 2021). The conventional approach to eliciting valuations for non-standard electricity contracts involves allowing consumers to trade off tariff attributes against a fixed discount (Harold et al., 2021; e.g., Kim et al., 2023; Ruokamo et al., 2019; Sundt et al., 2020). The efforts required to attain the discount are not generally made explicit. We posit that the need for sustained changes to energy-use habits may itself represent a substantial barrier to ToU tariff adoption. In a novel departure from the standard experimental design, we focus on scenarios where consumers are required to incorporate anticipated behavior change in their tariff choice. In particular, we elicit willingness to accept (WTA) values for ToU tariffs that generate bill discounts only if consumers commit to making changes to the timing of their electricity consumption.

Second, perceptions of how ToU pricing affects total bill costs could influence adoption decisions. A distinctive, though somewhat counterintuitive, feature of ToU tariffs is that larger peak vs. off-peak price differentials create both higher potential savings for consumers and greater exposure to expensive peak-time consumption. Attractive off-peak rates require higher peak prices, meaning customers can only guarantee savings by committing to a sustained shift in at least some electricity use to off-peak hours. However, as the available discount increases, so too does the marginal cost of consuming additional electricity at peak times should the need arise. From a rational choice perspective, only a consumer's expected consumption profile and total costs should guide tariff choice. In reality, consumers may place disproportionate weight on marginal tariff rates in their decision.

Existing literature suggests several mechanisms through which this trade-off may influence ToU adoption. Bordalo et al. (2013) show theoretically that salient features can disproportionately influence choice. Empirical evidence also demonstrates that consumers tend to underweight less visible costs, such as long-run vehicle fuel costs (Allcott, 2011a), domestic appliance running

costs (Hausman, 1979), sales taxes (Chetty et al., 2009), and out-of-pocket healthcare expenses (Abaluck & Gruber, 2011). In the current context, marginal tariff rates may attract more attention than prospective long-term savings. Risk-averse consumers may also find relatively higher peak-time unit costs unacceptable, consistent with evidence linking risk aversion with lower uptake of ToU tariffs (Qiu et al., 2017; Schlereth et al., 2018). More generally, ToU tariffs introduce greater complexity than flat-rate plans. Consumers tend to process less information under more complex pricing structures (Layer et al., 2017) and simpler tariffs have been shown to be more attractive to consumers (Dütschke & Paetz, 2013; Weidenbörner et al., 2025).

We implement a randomized price-salience intervention to identify how this trade-off between marginal tariff rates and total bill costs impacts tariff preferences. The intervention intentionally 'shrouds' peak and off-peak unit prices for a subset of participants.[1] In our tariff valuation task, a control group chooses between time-of-use tariffs and flat-rate alternatives given only information about tariff structure and expected total bill costs; marginal tariff rates are denoted only by a five-level rating scale that indicates the times of day where electricity consumption is relatively more or less expensive. The actual rate levels are masked for this group. In contrast, treated participants make the same choices but receive full information about the per-unit marginal prices that are consistent with the expected bills.

The third issue of interest is that consumers may have imperfect knowledge regarding the efficient utilization of ToU tariffs. Existing evidence suggests that consumers struggle to select the optimal tariff for their household consumption profile, whether based on their own electricity usage (Belton & Lunn, 2020) or a predetermined load profile (Barjaková et al., 2024). Survey evidence shows low awareness of electricity costs more generally (see e.g., Brounen et al., 2013; Trotta, 2021). While consumers exhibit general positivity towards ToU tariffs (Barjaková et al., 2024) and hypothetical demand for these price plans (Nicolson et al., 2018), analyses of tariff comprehension suggest significant scope for improvement in understanding how they work (Barjaková et al., 2024; Belton & Lunn, 2020). Misconceptions about the energy intensity of domestic appliances may further impede effective use of ToU pricing. Consumers tend to significantly underestimate the energy requirements of high-intensity activities and overestimate the demands of less intensive ones (Attari et al., 2010; Marghetis et al., 2019; Schley & DeKay, 2015). Attari et al. (2010) estimate an average underestimation factor of 2.8. Timmons et al. (2024) document similar misconceptions within the same population of interest examined in this paper. Such misconceptions have practical significance: consumers often report 'turning off lights' as the most effective conservation action (Attari et al., 2010; Lundberg et al., 2019), despite far greater savings being available from adjusting more energy-intensive routines. To assess the role of such knowledge gaps, we embed information treatments that provide targeted feedback during comprehension exercises. The interventions address effective use of ToU plans, misperceptions of energy intensity, and how adjustments to the timing of electricity can benefit the consumer and the electricity system.

Methodologically, our tariff valuation task uses a Multiple Price List (MPL) for preference elicitation. Participants face a series of binary choices in which they trade off a flat-rate electricity tariff against a ToU alternative at varying discount levels. MPLs are widely used across many research domains for valuation and preference measurement (see e.g., Jack et al., 2022 for a review), including in energy research examining demand for information about relative energy consumption (Allcott &

[1] The definition of shrouded attributes in the seminal work by Gabaix & Laibson (2006) encompasses "surcharges, fees, penalties, accessories, options, or any other hidden feature of the relationship between the consumer and the firm." We employ the term to indicate the latter.

Kessler, 2019) and energy efficiency upgrades (Lang & Lanz, 2021). Recent methodological work in Jack et al. (2022) has yielded a series of best-practice guidelines for MPL implementation to avoid bias that can arise from non-standard choice patterns. Our approach follows those suggested practices, which include estimation via a random effects utility framework and elements of randomization in how choice scenarios are ordered and presented to participants. Participants also undertake a series of tariff comprehension tasks, exercises eliciting how they perceive the trade-offs involved in adopting ToU, alongside standard demographic and home-energy questionnaires. These comprehension tasks provide data on baseline tariff understanding in addition to permitting tests of our information treatments on ToU comprehension.

The study offers several contributions to the literature on the uptake and effective use of ToU tariffs. First, our MPL explicitly embeds a requirement to shift electricity use into participants' trade-off between tariff types. There is limited empirical evidence that consumers respond to ToU tariffs by forming new consumption habits at a scale sufficient to sustain individual- and system-level benefits. The tariffs we offer respondents are designed to put this issue directly to them—the ToU offerings are only financially worthwhile if one commits to making such changes. In pursuing this experimental setup, we generate new understanding about consumers' willingness to engage with ToU pricing as a vehicle to change their energy consumption patterns.

Our key finding is that the compensation consumers require to change behavior under ToU pricing can be substantial but is sensitive to the information they receive. Notably, our price-salience intervention significantly impacts willingness-to-accept estimates. Among those who receive this intervention only, the average annual discount required to select a ToU and reallocate 3.2kWh of weekly consumption from peak to night-time is about €91.[2] Among the control group, WTA is not statistically different from zero. This pattern suggests that consumers are broadly indifferent between ToU and flat-rate tariffs in abstract terms but are significantly deterred by the actual per-unit prices that ToU options entail. It also highlights that consumers who are fully informed about ToU pricing require far greater compensation to adjust their electricity usage with the tariff type than tends to be available in contemporary retail markets.

In contrast, our comprehension feedback treatments have no detected effect on willingness-to-accept. The required compensation among those who receive only the feedback intervention is statistically indistinguishable from that of the control group. The estimated WTA for those who receive both interventions is slightly, but not significantly, lower than for those who receive the price-salience intervention alone. This pattern suggests that this type of feedback has limited capacity to shape willingness to load shift. This insight is novel: while a significant body of research links energy-use feedback to overall electricity consumption—with mixed empirical results (e.g., Buckley, 2020)—there has been limited focus on how feedback treatments can encourage re-allocation of domestic electricity consumption throughout the day, or incentivize switching to tariffs that reward such shifts.

Second, our experimental design provides new evidence on how information disclosure affects tariff *comprehension*. As noted, feedback treatments are routinely related to electricity consumption in the literature on ToU tariffs. A key mechanism that underpins the hypothesized relationship in such work is the idea that feedback can target a knowledge or information gap that,

[2] Using data from the European Product Registry for Energy Labelling (EPREL), we calculate that 3.2kWh is approximately equal to the electricity load drawn by either 2 dishwasher cycles, 2 tumble dryer loads, 4 washing machine cycles, or 21 minutes using an electric shower.

uncorrected, may lead to suboptimal decisions. Indeed, existing work has highlighted significant scope to improve understanding of time-of-use plans (Barjaková et al., 2024; Belton & Lunn, 2020). However, there is limited existing evidence for the capacity of feedback treatments to promote such improvement. In this study, we do not find evidence that our feedback intervention boosts ToU comprehension. Indeed, in one knowledge task, the control group systematically outperform those who received it. Furthermore, we find that mean tariff understanding is high in our sample. Overall, participants respond correctly to our tasks more than 75% of the time on average, suggesting that our simple feedback interventions are insufficient to further enhance comprehension from an already high baseline.

Third, we provide valuable information on the barriers that consumers *perceive* when considering voluntary ToU pricing. Our results suggest that consumers have reservations about some aspects of the plans, including a preference for certainty about electricity costs, concern that electricity-use changes would be infeasible, and worry about possible bill increases. In general, these perceptions do not vary across information treatments.

The remainder of the paper is structured as follows: Section 2 outlines the experimental design in detail. Section 3 contains the core MPL results. Section 4 contains additional results pertaining to tariff comprehension that provide context to the core estimates. Section 5 concludes with commentary on the findings.

2. Experimental design

The online survey experiment was comprised of four sections.[3] First, participants completed a home energy questionnaire. The questionnaire gathered data on appliance ownership and usage to approximate respondents' baseline electricity demand. Second, respondents undertook a series of energy comprehension tasks. These tasks formed the basis of our knowledge intervention. Specifically, participants were randomized such that half received feedback indicating whether their responses were correct. The feedback group also viewed explanations contextualizing the correct answers. Previous work has demonstrated that this experimental structure offers a useful means to assess baseline knowledge among an entire sample and estimate the impacts of information provision on subsequent task iterations and other experimental exercises such as our MPL (Timmons & Lunn, 2022; Timmons & Lunn, 2023). Third, participants completed the core MPL experiment, which was designed to elicit willingness to accept load shifts under time-of-use pricing. This section also included a series of follow-up questions about choice motivations. Fourth, all participants completed a standard demographic questionnaire. A flow diagram of the full experiment appears in Figure 1. Detailed survey instrumentation is available at doi.org/10.17605/OSF.IO/5Q9HR where its design and the analysis plan for this paper were also pre-registered.

2.1 Comprehension tasks

The comprehension exercises tested respondents' ability to identify behavioral shifts that would generate financial savings if undertaken on a time-of-use tariff. There were three individual tasks. Randomized feedback on participant responses in each task formed the basis of the ToU

[3] Data for this experiment were collected in tandem with a paired study focused on the adoption of other energy technologies. Our results are robust to controlling for randomization present in that work.

knowledge intervention in the later MPL experiment. All three tasks were based on a hypothetical three-part tariff, representative of prices offered by energy suppliers in the Irish market when the experiment was run.[4]

The first exercise, our *time-band comprehension task*, targeted understanding of ToU tariff structure. Respondents were shown a sequence of eight hypothetical electricity uses, each at a specific time of day. At each iteration, the following question was posed: *What saves the most money: changing when the appliance is used or keeping it the same?* In each case, participants indicated whether a change of usage time to one of two alternatives would generate cost savings, relative to maintaining the hypothetical status quo. We varied sequence of scenarios across participants to eliminate order effects, but the placement of on-screen response buttons was kept constant to avoid confusion from viewing times of day out of chronological order. The feedback treatment group was informed whether their response was correct after each iteration. Where participants responded incorrectly, they were also shown which alternative would have generated the greatest saving. The control group received no such information. The full set of task scenarios are listed in Table 1 and Figure 2 shows examples of the online screens seen by participants.

The second exercise, our *appliance intensity task*, focused on the energy-use requirements of domestic appliances. Again, the task contained eight iterations. Each presented two electricity uses of varying energy intensity. Participants were asked *Which activity should you switch from peak time (17:00-18:59) to night-time (23:00-07:59) to save the most money on average?* The scenarios ranged in difficulty, as the energy consumption requirements for some option pairs were more similar than others. After each response, the feedback treatment group were again informed whether their response was correct, while the control group proceeded directly to the next iteration. The task was developed using data on energy consumption of real domestic appliances. Specifically, the electricity-use requirement for each activity was estimated using the *European Product Registry for Energy Labelling (EPREL)*. These data were supplemented with online sources where required.[5] The scenarios were randomized both in their order and placement on screen. The full task is outlined in Table 2 and Figure 3 shows how it appeared on the online survey platform.

After each of the first two tasks, the feedback treatment group also received further knowledge prompts. After the *time-band comprehension task*, the intervention consisted of a brief explanation of how ToU tariffs work and the economic rationale for their existence. Specifically, we highlighted that the plans entailed lower cost electricity outside of peak hours to mimic intra-day variations in generation costs, and that one could maximize financial savings on the tariff by using electricity at night. After the *appliance intensity task*, the treatment message highlighted that moving higher intensity activities to the night-time rate would lead to the greatest financial benefits. It also noted that water heating, electric showers, and 'white' appliances often draw the most significant electricity load in domestic settings.

The final comprehension exercise tested *combined* understanding of time-of-use tariff structure and energy intensity. The task was a single ranking exercise. Participants ranked a set of electricity-

[4] The tariff rates were: Peak: €0.33/kWh; Day: €0.28/kWh; Night: €0.18/kWh. The values represented an average of retail tariff options on the Irish market at the time of experiment development. Specifically, the day rate was the average across advertised offerings from five large suppliers: Electric Ireland, Bord Gáis Energy, SSE, Energia, and Flogas. The peak and night rates were calculated by multiplying the day rate by the average of the peak-day and night-day ratios used in the standard ToU options advertised by the same five suppliers.
[5] Further information on the EPREL can be found at: https://eprel.ec.europa.eu/screen/home. The primary source for supplementary data was the energy price comparison website Bonkers.ie.

use changes from the one they believed would save the most money on average to the one that would save the least. To be correct, respondents needed to identify both the relative energy usage of each appliance and the relative financial saving accrued by moving the appliance-use to a different tariff band. Responses were submitted by dragging items on screen to the desired order. Items were initially ordered randomly. Upon completion, the feedback treatment group viewed the correct order and an estimate of associated cost savings. The task ended immediately after response submission for the control group. Table 3 and Figure 4 show further detail on what the task entailed and how it appeared to participants.

2.2 Multiple price list experiment (MPL)

We elicited participants' willingness to shift electricity usage with time-of-use pricing using a multiple price list. The task leveraged a canonical design used widely in the literature on valuation of environmental goods (see e.g., Allcott & Taubinsky, 2015; Jack et al., 2022; Lang & Lanz, 2021). Specifically, it is based on the following model: Each consumer was tasked with choosing between two tariff types: flat-rate (F) and time-of-use (T). The tariffs had associated *total annual bill costs*, C_F and C_T. C_F was constant throughout the entire exercise. Respondents were informed that this option allowed for fixed per-unit cost electricity-use at any time of day and was consistent with an Estimated Annual Bill (EAB) of €1250.[6] The time-of-use tariffs were calibrated such that those who chose them could only accrue financial savings if they shifted electricity usage away from peak hours, relative to an average domestic electricity usage profile.[7] As such, C_T, embedded load shifting behavior by design. Practically, C_T was described as an 'estimated annual bill with peak-to-night changes (EAB-PN)'. Its values were consistent with the average household shifting 3.2 kWh of usual weekly peak-time electricity usage to the night-time price band of the tariff.[8] Throughout the task, we ensured that $C_T < C_F$ to reflect the idea that bill costs would decrease in response to changing consumption patterns under the time-of-use plan. We thus define $d = C_F - C_T$ as the relative discount from the ToU option. Each consumer, indexed by i, also derives utility from each electricity contract, denoted V_{iT} and V_{iF}. As in Jack et al. (2022), we assume that utility is additive in monetary value and that the marginal utility of money is normalized to one. Thus, the total utility yielded from a ToU option is $V_{iT} - C_T$. Equivalently, the flat-rate plan yields $V_{iF} - C_F$. Under the flat-rate plan, consumers are free to allocate the timing of their electricity as they wish to maximise this utility. With the ToU options, their usage patterns are constrained by the load shifts embedded into the tariff choice. We therefore assume that $V_{iF} > V_{iT}$ to reflect effort costs associated with the ToU options that are not applicable to the flat-rate plans. We define willingness-to-accept for a time-of-use tariff with the given load shifts as $WTA_i = V_{iF} - V_{iT}$. Under this definition WTA_i equals the compensating variation required to offset the utility loss from the ToU plan. Participants are expected to choose a ToU option if

[6] The EAB figure was based on average domestic consumption of 4,200 kWh per year (the official value used for such estimates by the Irish utilities regulator), a per kWh price of €0.25 and a fixed standing charge of €200.

[7] Average profiles are estimated by the authors based on smart meter data provided by the national energy system operator, ESB Networks.

[8] 3.2 kWh was selected as the benchmark load shift based on analysis of smart meter data provided by the system operator. It corresponds to a move from median peak-time electricity usage to usage in the bottom decile among customers using smart meter plans in Ireland.

$$
\begin{aligned}
V_{iT} - C_T &> V_{iF} - C_F \\
C_F - C_T &> V_{iF} - V_{iT} \\
d &> WTA_i
\end{aligned}
$$

In practice, each participant faced a sequence of 9 binary tariff choices. The expected saving from the suggested behavior changes with the time-of-use option, relative to the flat-rate plan (d), varied at each iteration. It ranged €20 to €180, changing in €20 increments. The task instructions clearly indicated that the weekly load shift was required to avail of the savings described by EAB-PN. Each task iteration also included a note reminding respondents that failure to shift usage would lead to a bill increase. Example appliance-use changes that would result in the required load shift were provided on the pre-task instruction page and could be viewed again at any time during the exercise by clicking an information button. The full task instructions and example choice screens are displayed in Figure 5.

The task contained two experimental manipulations, each targeting potential reasons for systematic variation in ToU uptake. First, we implemented our price-salience intervention. This treatment targeted the salience of the relationship between marginal tariff rates and total bill costs. From a rational choice perspective, only expected total costs should determine tariff selection—if a consumer commits to undertaking the load shift described at the outset of the task, their annual bill under time-of-use would be consistent with EAB-PN, regardless of the specific day, night, and peak rates offered in a given plan. Practically though, a large discount can only be accrued on a three-part time-of-use tariff if there are sufficient differences between the peak and off-peak prices. These marginal prices may be a particularly salient feature of the tariff choice, of a form that could disproportionately impact preferences (see e.g., Bordalo et al., 2013). In particular, if high peak-time prices are salient, consumers may perceive a trade-off between using ToU to accrue overall savings through sustained behavioral change and facing a high marginal cost of peak-time usage when required. The trade-off may induce suboptimal choice patterns.

The price-salience intervention was designed to estimate how much these pricing dynamics impact WTA. It entailed the following: all participants viewed estimated annual bill calculations for every tariff option, but only a randomized group saw the constituent tariff rates that were consistent with the EAB values. The control group for the manipulation were shown a five-level rating scale that used euro symbols to denote the periods when the time-of-use tariffs were most and least expensive. Empirically, making tariff rates salient could induce two distinct effects. If, on average, the expected total bill savings from ToU and low night rates that facilitate them are particularly appealing to consumers, their compensation requirements may decrease. Conversely, if the high peak-time ToU prices feel sufficiently salient to outweigh other plan benefits on average, WTA may increase among the treated group.

Second, we expected MPL responses to vary by exposure to the randomized feedback in the tariff comprehension exercises. Specifically, if consumers held imperfect information about how time-of-use tariffs operate or systematically misjudged the energy-use associated with their electricity demand, they may have made suboptimal choices in the MPL. The comprehension feedback was designed to reduce such information gaps. Before data collection, we had no clear expectation about the direction of this effect on willingness to accept. The feedback treatment group received important context on how to maximize financial savings with time-of-use tariffs, which may have increased their attractiveness. If so, one would expect the discount required to choose ToU (i.e., WTA), to be lower among treated participants. Conversely, respondents who perceived the

electricity-use changes described in the feedback as challenging may require greater compensation to adopt ToU. In that case, WTA would be higher.

2.3 MPL Estimation

In the MPL experiment, a participant who switches from a flat-rate option to ToU between task iterations reveals WTA on the interval between the discounts shown in those scenarios. However, there are several well-established contexts where non-standard choice patterns may inhibit identification of a valid WTA interval and induce bias in aggregate estimates (see e.g., Anderson et al., 2007; Engel & Kirchkamp, 2019; Jack et al., 2022). The issues are summarized by Jack et al. (2022) as follows: First, participants may not deviate from their initial selection at any cost values presented (never-switching behavior; NSB). Second, they may exhibit multiple switches (multiple-switching behavior; MSB). NSB may be consistent with a strong preference for one alternative over the other across the range of values offered. MSB is inconsistent with rational choice and could be driven by inattention or misunderstanding. However, it may also be indicative of a choice attribute inducing participants to 'change their mind'. In settings where the choices presented are complex, MSB and NSB may be prevalent. Jack et al. (2022) further note that where an MPL contains multiple iterations (as in our case), there is significant scope for framing and order effects to arise from repeated presentation of the task. Specifically, respondents may be biased towards information presented on the left or may exhibit different choice patterns depending on whether the most attractive options appear at the beginning or end of the task. We closely follow guidance in Jack et al. (2022) to account for all four issues. Specifically, we estimate WTA values using a random effects specification that facilitates controls for counterbalance in choice order and screen-side placement. The specification is described by:

$$y_{it} = \alpha + \delta d_t + \sum_{j=1}^{3} \beta_j T_{ij} + \gamma x_{mt}^b + \theta x_{mt}^s + u_i + \epsilon_{it} \qquad (1)$$

where y_{it} is a dummy indicating whether the ToU option is chosen by participant i at task iteration t. d_t is the discount available from load shifting with ToU pricing for task iteration t. T_{ij} denotes the set of three treatment dummies including the feedback and price-salience manipulations. x_{mt}^b indicates whether MPL choices have been presented to participants in ascending or descending order of d_t. $x_{mt}^b = 1$ if discounts appear in descending order and $x_{mt}^b = -1$ otherwise. The symmetry in this variable is imposed following guidance in Jack et al. (2022), as collinearity precludes simultaneous estimation of a descending and ascending order effects. m is an index for choice order. γ can be estimated as the task contained counterbalance in the *direction* of the choice sequence. This randomization allows us to account for order effects while avoiding undesirable complexity that would be introduced if choice iterations were presented entirely at random (Anderson et al., 2007). x_{mt}^s denotes the screen placement of the ToU option. Mirroring the specification of the order effect variable, $x_{mt}^s = 1$ when the ToU option appears on the left of the screen and $x_{mt}^b = -1$ when it appears on the right. Estimation of θ is feasible as we implemented *within-iteration* randomization in the screen placement of tariff plans.

The random effects approach is used to facilitate differentiation between u_i and ϵ_{it} in the estimates. The former represents individual-level preference heterogeneity, while the latter captures other error that may arise through inattention, misunderstanding, or participant mistakes. Equation 1 models the probability that a participant chooses a ToU plan, not WTA directly. To interpret our results in monetary terms (i.e., with respect to WTA), we must rescale the estimates to

account for the average impact of the plan discount on choice probability. The rescaled constant represents mean WTA (denoted $\overline{WTA}$) for the ToU option, with $\alpha + u_i$ representing individual WTA. That is:

$$\overline{WTA} = -\frac{\alpha}{\delta_t} \qquad (2)$$

A latent utility derivation supporting this interpretation can be found in Jack et al. (2022). All other coefficients are similarly rescaled by δ_t to facilitate interpretation with respect to willingness to accept. The specification is estimated using random effects probit. Thus, both u_i and ϵ_{it} are assumed to be normally distributed. Errors are clustered at the participant level and rely on the delta method for rescaling.

2.4 Recruitment

The study was fielded in April 2025 using Gorilla Experiment builder (Anwyl-Irvine et al., 2020). Participants were paid €5 for participation. A sample of 1,000 participants was recruited from the online panel of a market research company.[9] Quota sampling was used so ensure that the sample was representative of the national population in terms of age, gender, region, and social grade. Table 4 provides summary statistics for demographic variables collected in the survey. Where relevant, data from the 2022 national Census are reported for comparison. Summary statistics for response times for individual tasks are reported in Table A1. The mean response time for the full experiment was 28.36 minutes, with a standard deviation of 13.85 minutes.[10] Our analysis sample excludes a small number of respondents whose response times are unreasonably long or short, who indicate having no fixed address, who have no electrical appliances in their home, or who fail an attention check during the experiment.[11] Table A4 shows that these exclusions are not correlated with observable respondent characteristics. Table A3 further shows that our treatments are balanced across observables. Specifically, the number of statistical correlations between treatment indicators and socio-demographic characteristics in the data aligns with what would be expected by random chance.

3. The impacts of information and price salience on tariff acceptance

Our MPL experiment estimates consumers' willingness to accept time-of-use tariffs under the assumption that adopters must shift electricity load away from peak hours, and tests whether preferences for the plans are impacted by price-salience and knowledge interventions. The key insights derived from the exercise are detailed in the subsections that follow.

3.1 Willingness to load shift with time-of-use pricing

Our latent utility estimates imply that consumers require substantial compensation to accept a fixed 3.2kWh weekly load shift under time-of-use pricing. The core results are presented in Table 5.

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[9] RED-C

[10] These times are inclusive of additional tasks taken as part of a paired study that is not reported on here. All tasks from the other study preceded this one. Both studies covered similar topics. There was order counterbalance in the structure of the paired study. Our results are robust to controlling for the counterbalance.

[11] Specifically, those whose response times are above the 99th percentile or below the 1st are excluded.

Column 1 indicates that on average, absent treatment effects and framing controls, consumers require annual compensation of €41.44 to accept time-of-use pricing as a vehicle for the suggested load shift. Column 2 adds the discount order and screen side controls. Of these, only the screen-side randomization significantly impacts WTA. Respondents require an additional €9.79 to accept the ToU option when it appears on the left of the screen. Such left-hand side bias is a well-documented feature of behavioral experiments. In this context, participants may have engaged more with the details of the ToU option when it appeared on the left, leading to choices consistent with higher compensation requirements for undertaking behavior change.

Of the two core experimental manipulations, only the price-salience intervention significantly impacts WTA. In Column 3 of Table 5, we observe a large, positive, and statistically significant coefficient on the indicator for that treatment. Specifically, those who see constituent tariff rates in the task require almost €75 more on average in annual compensation to accept ToU. As previously noted, standard ToU structure requires a significant differential in peak and off-peak rates to make an overall annual discount feasible. The increased compensation requirement suggests that such differentials are unattractive to consumers. In contrast, the sign of the coefficient on the feedback dummy in the same column is negative. While consistent with reduced compensation requirements among those who received the information treatments in the preceding tasks, the coefficient is not statistically significant. In line with the project pre-registration, Columns 4-6 of Table 5 repeat the latent utility analysis restricting to participants who declare responsibility for choosing their household's energy contract. The pattern of results is similar among the subgroup, though WTA values are slightly higher.

Figure 6 translates the results into overall average WTA estimates for each of the four treatment groups, Specifically, it presents non-linear combinations of the regression coefficients in Column 3 of Table 5, with standard errors calculated using the delta method. The analysis suggests the following: Among those who received the price-salience intervention, the implied annual discount required is €67.49 with the feedback treatments, and €90.80 without. These values are not statistically different from each other. Among the control group and those who received feedback alone, WTA is not statistically different from zero.

The figures reveal a stark difference between consumers' compensation requirements and the actual savings available in current retail markets. With full information on pricing, as is required in reality, our WTA estimates greatly exceed the potential discounts associated with real ToU offerings. To illustrate this point, we conduct a 'back-of-the envelope' calculation using a tariff representative of the options available to retail consumers in Ireland at the time our experiment was designed.[12] In the absence of any other load shifting behavior, undertaking the 3.2kWh weekly load shift described in our MPL with this tariff would lead to an annual cost *increase* of about €6.30, rather than offering the compensation that our results suggest consumers require.

[12] The representative time-of-use tariff mirrors that used in the comprehension exercises. Its rates are: Peak: €0.33/kWh; Day: €0.28/kWh; Night: €0.18. We compare this to a flat rate of €0.25/kWh (as used in the MPL task). Average annual consumption is estimated to be 4200kWh, the standard figure used by retailers in Ireland for estimated annual bill calculations. Both tariff types are assumed to have a fixed standing charge of €200. We simulate moving from 12% of electricity during peak time to 8%; with the shifted units moving to night-time. Thus, a fixed day-time usage share of 61% is assumed in the calculation. The simulated change is roughly equivalent to the 3.2kWh weekly load shift suggested to participants in the MPL task.

3.1.1 Demand elasticity

Our experimental results further allow us to trace an implied demand curve for time-of-use-tariffs. To do so, we re-run a panel probit regression similar to the one on which the main results are based but refrain from rescaling to monetary values. Specifically, we regress an indicator for choosing ToU on treatment dummies, estimated annual bill levels, their interactions, as well as screen side and discount order controls. The predicted values from the regression are the shares of ToU choices for each treatment group at each bill level, with the associated uncertainty estimates serving as confidence intervals.

Figure 7 draws the inverse demand curves in the range that can be estimated by the experiment. The key insight from the exercise is that ToU demand is inelastic in the observed range. That is, there are only limited differences in the share of participants selecting the plan type across annual bill levels. While the confidence intervals for each treatment group overlap, the implied shift in the demand curve induced by each intervention aligns with our main results. Relative to the control group, the price-salience intervention shifts the demand curve inwards. The inward shift is observed regardless of whether participants also received the feedback treatment, though the point estimates suggest that feedback slightly lessens the adjustment. The feedback treatment alone shifts the demand curve outwards, implying that in the absence of the price-salience intervention the ToU options may be more attractive.

On aggregate, our results also reveal a stark contrast between hypothetical ToU market share and the reality in contemporary retail markets. Figure 8 plots the share of ToU choices across the full MPL and shows that the tariff type is selected 56% of the time. This figure varies slightly across treatment groups, but the differences are not statistically significant. The true ToU market share tends to be far lower. For example, only 16.4% of respondents report currently using a time-of-use tariff in the home energy questionnaire presented at the beginning of study. While differences in hypothetical preferences for time-of-use and actual uptake have been well-documented in various jurisdictions (see e.g., Nicolson et al., 2018), it is particularly relevant that they remain present across all treatment groups. This pattern may indicate that, despite a significant impact of our price masking intervention on WTA, price salience alone cannot fully explain low uptake of time-of-use in retail markets.

3.1.2 Aggregate switching patterns

Never-switching and multiple-switching are both prevalent in the MPL data. Figure 9, which shows the distribution of tariff-type switches by treatment group, highlights that the modal response pattern is zero tariff-type switches. That is, a significant proportion of participants do not see sufficient value in an alternative to deviate from their initial tariff-type preference at any point during the MPL. In contrast, approximately 40% of respondents switch contract type multiple times during the task. Since tariff options are presented in order of discount value, this response pattern is not consistent with rational choice. Participants who exhibit multiple tariff-type switches may be doing so to 'correct' previous mistakes. Interestingly, odd numbers of switches, which would be most consistent with such corrections, do not appear to occur at higher frequency.

Table 6 describes these choice patterns more formally. Specifically, we group study respondents by whether they make no switches, one switch, or more than one switch in the task. Among those who do not switch, we further differentiate between those who consistently choose a flat-rate tariff, and those who select time-of use. We regress an indicator for being in each group on

treatment dummies and demographic characteristics to assess correlations between group membership and observables. The mean dependent variable in each regression denotes the relative size of the associated group: 23% of participants always select the time-of use option, 16% consistently select the flat-rate alternative, 21% deem the incentives sufficient to alter their tariff-type selection once in the task, and as previously noted, 40% make multiple switches.

The rate of multiple switching behavior observed here is high relative to existing literature. For example, Crosetto & Filippin (2016) identify an equivalent rate of 17% in a survey of studies that use the MPL approach to elicit risk preferences. However, one should note that MSB is significantly correlated with one of our treatments. Those who received the price-salience intervention are about 12pp more likely to exhibit multiple switches. The association is, perhaps, unsurprising. For the price-salience treatment group, the choice screens contain both an annualized discount with time-of-use tariffs and the constituent tariff rates that facilitate it. These figures may have opposing impacts on the attractiveness of the tariff. Specifically, a large annualized discount under ToU mechanically requires a significant differential between peak and off-peak tariff rates. Thus, the peak rate is necessarily higher than under the equivalent flat-rate plan. Even though a respondent would accrue the stated annual discount so long as their consumption was in line with the suggested load shifts, they may be induced to revert to the flat-rate tariff if they value the opportunity cost of being able increase marginal consumption at peak times without fear of financial penalty. Column 4 of Table 6 appears consistent with such behavior. Other aggregate switching patterns do not appear to vary by treatment status.

Other notable correlations between switching patterns and observable characteristics include the following: those aged over 60 appear less likely to switch tariff in the task but are more likely to be in the group who always select ToU. Having a home with more than 5 bedrooms is associated with a greater likelihood of being in the group who make one switch. Also, households where at least one person regularly stays home during the day have an increased likelihood of being in the group who always select the flat rate tariff.

Overall, the significant prevalence of NSB and MSB in these data underscore the importance of leveraging an estimation strategy that accounts for associated biases in willingness-to-accept values. The latent utility approach advocated by Jack et al. (2022) and outlined in Section 2.3 above, is thus both appropriate and necessary in this experiment.

3.1.3 Reflections and perceptions

To gain further insight into what motivated participants' MPL choices, we asked a set of follow-up questions. The follow-up questionnaire contained a series of statements about attributes of the choice task. Participants indicated their agreement with each statement on a seven-point rating scale, where 1 denoted complete disagreement and 7 denoted complete agreement. Figure 10 plots mean responses by treatment status and Table 7 uses a linear probability regression to test for statistical differences in average agreement across treatment groups.

Several themes emerge. First, these self-reported indicators suggest that comprehension of the trade-offs presented in the MPL is high. The mean ratings for difficulty in understanding the task and difficulty in choosing a preferred tariff are both low, at about 3.2. Conversely, we observe high mean agreement (5.96) to the statement *'I had enough information to save money with the time-of-use plans'*. In addition, average agreement to *'I already try to reduce my peak-time electricity usage, regardless of which plans I chose'* was 5.15, the highest among all statements. Second, participants appear to report that low night-time ToU rates and their high peak-time counterparts

are, respectively, attractive and unattractive, in equal measure. Mean agreement with statement corresponding to the former is 4.8, while the average rating for the latter is 4.68. Third, there are several indications in the responses that participants have reservations about the ToU options. Mean responses to the statements *'I preferred flat-rate plans because they gave me certainty about how much I would pay for electricity at all times'*, *'I avoided time-of-use plans because I was concerned I would pay more if I couldn't change my electricity usage'*, *'The changes needed to save money with the time-of-use plans wouldn't work for my household'*, and *'The savings from the time-of-use plans were too small to be worth it'* are all above 4. Interestingly, there are limited statistical differences in these responses across treatment groups. The one exception is that the average response to the statement *'Lower night-time electricity prices on the time-of-use plans would help me save money'* was 0.38 lower among those who received the price-salience intervention than in the control group. The correlation is, perhaps, unsurprising as the (less attractive) high peak prices for ToU plans are also listed on the choice screens under the price-salience manipulation.

4. Knowledge and comprehension

The tariff comprehension exercises serve three distinct purposes to our research design. First, the randomized feedback contained within them forms the basis of the knowledge intervention in the core MPL task. Second, the tasks themselves provide data on baseline understanding of ToU tariffs among our sample. Such information highlights the extent of any knowledge gaps that our feedback intervention could feasibly correct. Third, the fact that feedback is issued dynamically thorough the tasks means that we can estimate the impact of the manipulation on task performance itself. Such estimates provide valuable data on the effectiveness of feedback in improving tariff *comprehension*. Results pertaining to the latter two aspects are outlined below. They offer useful context to the absence of an observed effect of the feedback on WTA in the main experimental findings.

Average performance is high in all three comprehension tasks. Figure 11 presents relevant descriptive results by treatment status. In the *time-band comprehension task* and *appliance intensity task* the mean shares of correct responses among the group are 0.75 and 0.78, respectively. These values indicate that control participants have a 75%-78% chance of answering correctly to a given iteration of these tasks. We measure average performance in the ranking exercise using an agreement scale relative to the true rank, defined as $1 - \left(\frac{Dist_k}{Dist_{max}}\right)$. $Dist_k$ is the Kendall (1938) distance between a participant response and the correct answer and $Dist_{max}$ is the maximum number of possible pairwise swaps between a response and the true rank. All responses are thus scored on the interval $[0,1]$, where 1 indicates a fully correct response, and 0 indicates one that is as far as possible from the correct answer in terms of pairwise swaps. The average agreement score among control participants is 0.74.

The feedback intervention does not boost performance in any of the exercises. In the *time-band comprehension task*, the control group outperforms treated participants by 5 percentage points (pp) in terms of the mean share of correct responses. The difference between groups is statistically significant at the 5% level. A similar pattern emerges in the *appliance intensity task*, where the mean share of correct responses is 1pp higher among the control group, though the difference is not statistically significant in this case. In the *combined ranking task*, raw performance is marginally better (2pp) among treated participants than in the control group, but scores are again statistically equivalent between the groups.

These empirical patterns in task performance hold after controlling for other observable characteristics. Table 8 presents formal results for the *time-band comprehension task*. The table contains a set of linear-probability regressions where the outcome is an indicator for whether an individual task response is correct. Column 1 reaffirms that the feedback treatment group is 5pp less likely to respond accurately. Column 2 highlights that the finding is robust to the inclusion of demographic controls, albeit the magnitude of the difference in scores by treatment status decreases to 4pp. Performance does not vary statistically by gender, but an education gradient is evident. Those with a third-level degree are about 9pp more likely to answer correctly than those with a second-level qualification (the reference category). Conversely, those with less than a lower secondary education are about 9pp less likely to respond accurately than the same reference group. We also observe geographical differences in performance, with the highest probability of correct responses in the capital city, Dublin. Column 3 further accounts for whether the respondent has responsibility for managing their household energy contract, how often someone is usually at home during the day, and environmental attitudes. The specification indicates that those living in households where someone is regularly at home and those who feel a moral obligation to reduce their carbon footprint are, on average, more likely to submit correct responses in this task.

Further analysis of the *time-band comprehension task* by question type and order in Table 9 indicates that participants are least likely to respond correctly when the solution requires a shift of electricity usage from peak time to night, relative to any other type of shift. The association does not vary by treatment status. Such difficulty identifying peak-night savings is noteworthy, since such shifts also carry the greatest potential for financial savings. Furthermore, while the control group begin to perform better in later task iterations, the treatment group exhibit no such improvement. Such a pattern may suggest that the feedback impedes natural learning that occurs among control participants.

Results for the *appliance intensity task* are broadly similar, with the substantive difference that we cannot assert that the average effect of the feedback is statistically different from zero. Table 10 and Table 11 present the corresponding estimates. The education gradient, association between performance and environmental attitudes, and observed regional variation in the probability of responding correctly are also statistically insignificant for this task, albeit that their coefficients retain the signs observed for the previous exercise. Table 11 shows no evidence of learning in either treatment or control group. However, we do observe that those in the treatment group are 3pp less likely to correctly answer questions that were designed by the research team to be more difficult. Such questions had relatively smaller differences in the absolute energy intensity of the appliances that participants were asked to compare.

In contrast to the first two exercises, the treatment group marginally outperform control participants in the ToU ranking task. However, performance is, again, not statistically different between the two groups. Specifically, Table 12 presents linear probability results for the task, where the rank agreement score acts as the dependent variable. Consistent with the descriptive evidence in Figure 11 above, the sign of the coefficient on the treatment indicator is positive across all specifications. The direction of this effect aligns with our *a-priori* expectations. However, the lack of statistical significance across any specification precludes an assertion that the feedback received by the treated group up to this point in the experiment aids them in the more complex ranking task. Regarding other observable predictors of performance, mean agreement is 4-5pp lower among older participants (60+) in this task. The response patterns across other demographic variables are in line with those observed in previous tasks, although statistical significance varies.

Several factors may explain the absence of performance improvements among treated participants and the apparent 'backfiring' of our feedback treatment in the *time-band comprehension task*. First, it is important to reiterate that baseline understanding exceeded expectations. Table A6 and Table A7 repeat our analysis of the first two exercises with a participants' overall task score as the dependent variable. The mean dependent variable among the control groups in those specifications are 6 and 6.3, reaffirming that control participants score greater than 6/8 on each of the tasks on average. This performance compares favorably with existing literature. Although somewhat different in focus, Belton & Lunn (2020) also evaluate ToU comprehension in the Irish population. In their experiment, participants respond correctly about 60% of the time on average. The difference in performance across studies could indicate an improvement in comprehension of ToU over time. If there are marginal returns to the effectiveness of feedback, it is plausible that our simple interventions are insufficient to enhance understanding beyond the current baseline. Second, treated participants spend significantly longer responding to the exercises than the control group. In Table A2, we regress the time spent on each comprehension exercise on a feedback treatment indicator. The estimates suggest that cumulative response times across all three tasks are about 93 seconds longer for the treated group. Part of the increase is mechanical — the feedback was presented after each task iteration whereas the control group proceeded directly to their next response. Where participants felt they already understood the material, the feedback screens may have slowed participants unnecessarily or caused frustration. Third, while a backfiring in feedback's capacity to enhance *comprehension* is somewhat unexpected, some existing evidence suggests that interventions focused on potential monetary benefits of ToU tariffs can have unanticipated impacts when used to motivate flexible consumption behaviors. For example, Sudarshan (2017) shows that highlighting monetary incentives can crowd out the impact of other behavioral nudges on consumption behavior. Indeed, in meta-analyses of the impacts of monetary information on electricity consumption, both Delmas et al. (2013) and Buckley (2020) highlight that such interventions are associated with average *increases* in electricity consumption.

Overall, these estimates suggest that any knowledge gaps among our participants about how ToU tariffs operate were limited and that our simple interventions did little to correct remaining misconceptions. In light of these results, it is perhaps unsurprising that our feedback treatment does not induce statistically significant variation in WTA in the main MPL experiment.

5. Discussion and conclusion

Combined, the evidence presented in this paper deepens our understanding of consumers' choice to adopt time-of-use tariffs and the role information disclosure plays in the decision. Several insights are noteworthy:

First, we find the compensation required by consumers to load shift with ToU pricing greatly exceeds current retail market offerings. With full information on pricing, our results suggest that consumers require an annual discount of between €67.49 and €90.80 to switch to ToU and shift 3.2kWh of electricity per week from peak time to night-time. Our 'back-of-the-envelope' calculations suggest that making such a change with a representative market tariff would actually result in a small annual bill increase. This apparent lack of sufficient incentive to load shift with current tariffs provides helpful context to the low adoption rates observed internationally (see e.g., Nicolson et al., 2018).

Second, the positive impact of our price salience intervention on WTA underscores the importance of peak-time prices to consumers. Since the price-salience intervention revealed both peak and night rates, we did not have strong *a-priori* expectations about the direction of its effect. However, the fact that the treatment is associated with an increase in WTA suggests that consumers place value on the opportunity cost of being able to increase their peak-time consumption when required without financial penalty. The finding is also consistent with existing work suggesting that consumers respond to average rather than marginal prices more generally (Ito et al., 2018). In particular, if consumers who received the price-salience intervention made their tariff choice based on a simple average of the peak, day, and night rates offered with the ToU plan, they may have overestimated the impact of the peak rate on their overall costs. Further work is required to assess the extent to which this mechanism is at play and to design interventions to correct biases it could induce.

Third, our data suggest consumers grasp how time-of-use tariffs operate quite well. In our comprehension exercises, the average probability of answering questions correctly ranged from 75-79%. This range is higher than in the most recent comparable estimates for the same population in Belton & Lunn (2020). Responses to our MPL follow-up questionnaire reiterate the point, as participants consistently report agreement with statements that indicate perceived understanding. High levels of comprehension are a positive finding but may also suggest limited scope for information disclosures to correct knowledge asymmetries that could deter consumer engagement with time-of-use plans. One notable caveat to this result is that the rate of multiple- and never-switching bias in our MPL task is high, relative to the existing literature. This may suggest that consumers have difficulty in applying their knowledge of ToU to complex choice scenarios. Future work could thus focus on how consumers apply existing knowledge to tariff choice.

Fourth, our feedback manipulations suggest monetary information has limited capacity to improve ToU comprehension and acceptance. In our tariff *time-band comprehension* task, we observe evidence of such treatments backfiring. In other knowledge exercises, we cannot infer that the impact of our feedback intervention statistically differs from zero. Regarding tariff acceptance, the coefficient signs on our WTA estimates are consistent with the feedback treatment reducing consumers' required annual discount to accept load shifting under ToU. Again though, the effect is not statistically different from zero. The high baseline tariff understanding noted above provides useful context to this finding. In particular, it seems plausible that participants, on average, had sufficient knowledge to complete the tasks effectively without our interventions. If so, their presence may have induced additional cognitive burden, prompted second-guessing, or functioned as an impediment to completing the task at respondents' desired pace. These observations add to a growing body of evidence sounding a note of caution over the extent of the role for monetary information to increase engagement with time-of-use pricing (e.g., Buckley, 2020; Sudarshan, 2017).

Fifth, our reflection exercise highlights consumer concerns regarding perceived risks of switching to ToU. Among the statements that received high average ratings were those concerned with the possibility of bill increases under ToU, concern that load shifts would not be feasible for a household, and a preference for certainty in pricing. From a policy perspective, this highlights the imperative to address such concerns in the design and regulation of new tariff types.

In summary, the results suggest that fully-informed consumers are deterred from adopting ToU tariffs by the rates they entail—even when they have no additional implications for overall bill costs—and require more compensation to engage effectively with ToU than is typically available in

retail markets. We also see evidence of limits to the role for knowledge-based information campaigns to promote adoption: both objective and subjective measures show high tariff comprehension in our data, and feedback interventions do little to resolve remaining misconceptions among our participants. Collectively, these observations highlight a significant challenge in designing tariffs that are cost-reflective for producers, incentivize efficient domestic electricity use, and are sufficiently attractive to consumers to encourage voluntary uptake.

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Figures

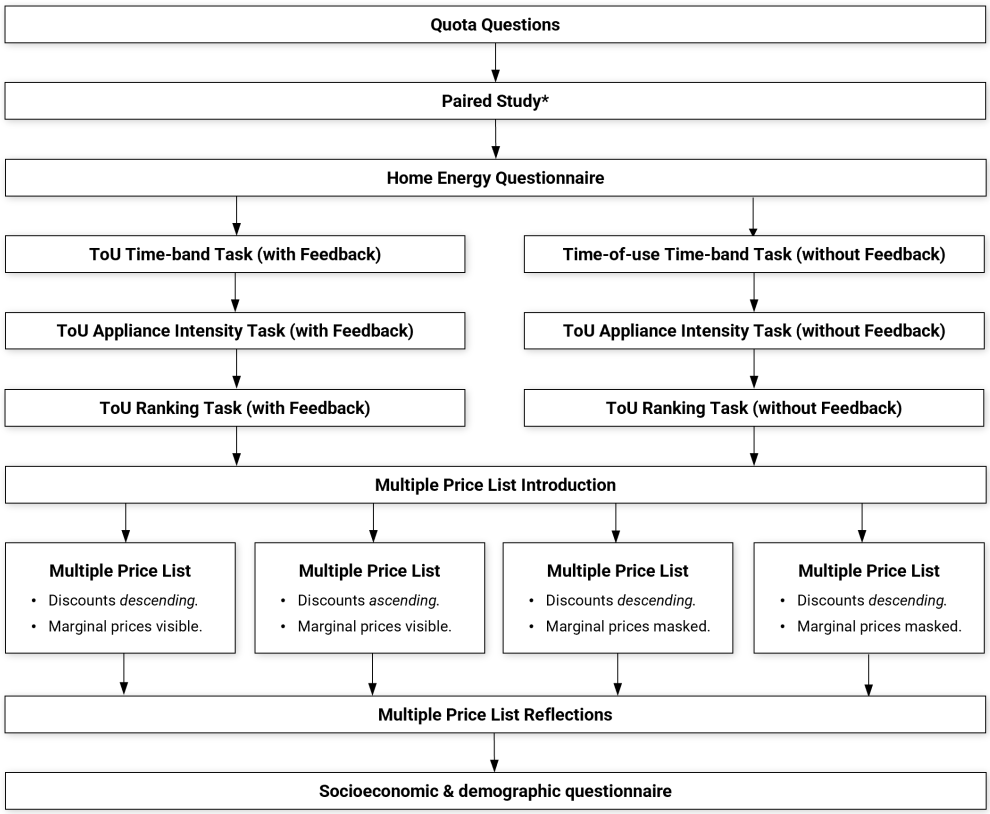
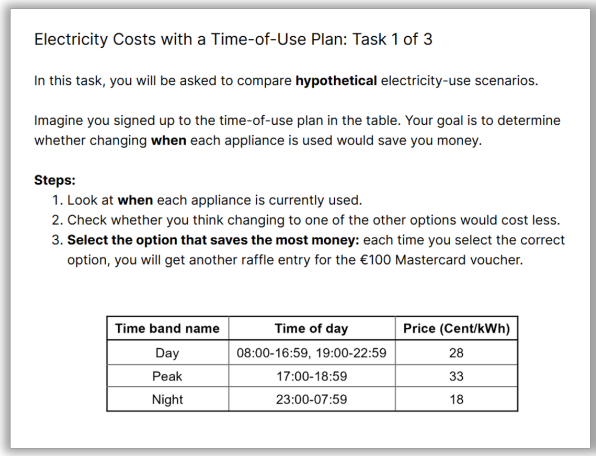
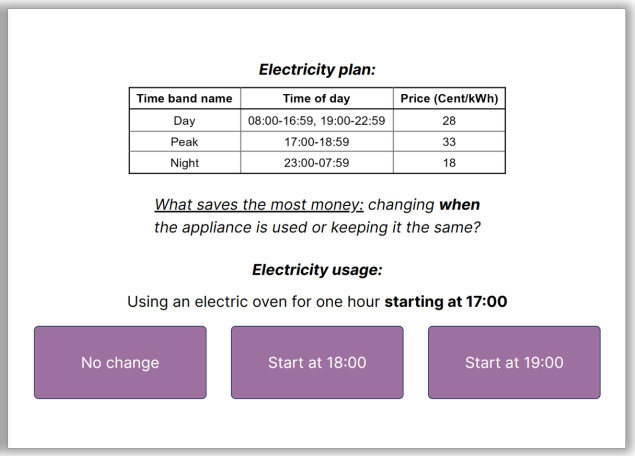


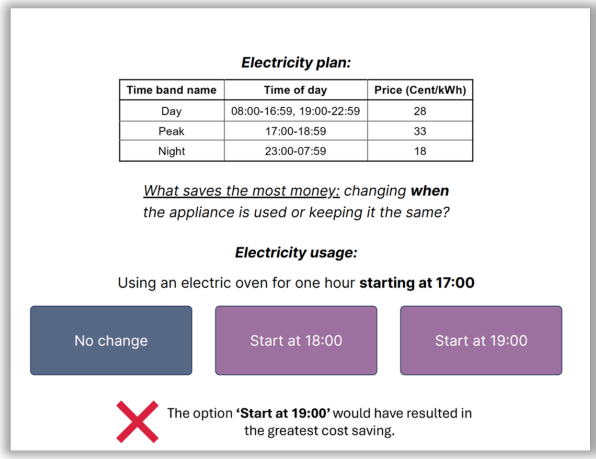
Figure 1: Experiment overview



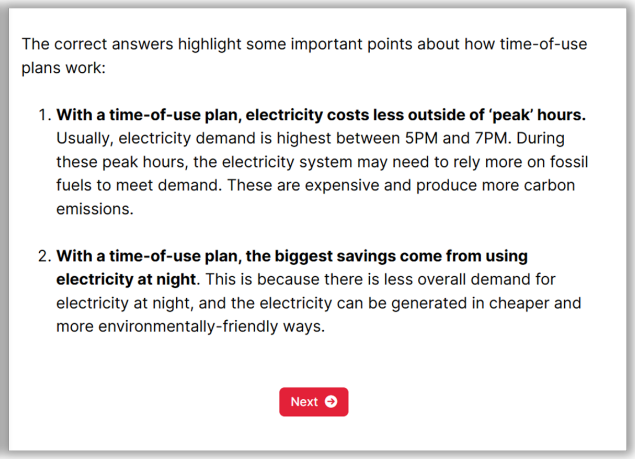
(a) Task instructions



(b) Task screen (no feedback)



(c) Task screen (with feedback)



(d) End-of-task feedback treatment

Figure 2: Sample screens from the ToU time band task

Electricity Costs with a Time-of-Use Plan: Task 2 of 3

In this task, you will be asked to compare pairs of **hypothetical** appliance uses.

Imagine you signed up to the time-of-use plan in the table. Your goal is to determine **which activity** you should move from peak time (17:00-18:59) to night-time (23:00-07:59) to save the most money.

Steps:

1. Look at **which appliances** are being used.
2. Decide which activity **you think would save the most money on average** by switching it to night-time.
3. **Select the option that saves the most money:** each time you select the correct option, you will get another raffle entry for the €100 Mastercard voucher.

Time band name	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	28
Peak	17:00-18:59	33
Night	23:00-07:59	18

(a) Task instructions

Electricity plan:

Time band name	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	28
Peak	17:00-18:59	33
Night	23:00-07:59	18

Which activity should you switch from peak time (17:00-18:59) to night-time (23:00-07:59) ***to save the most money on average?***

Using a **tumble dryer** *(to dry a full load of clothing)*

Using an **electric shower** for six minutes

(b) Task screen (no feedback)

Electricity plan:

Time band name	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	28
Peak	17:00-18:59	33
Night	23:00-07:59	18

Which activity should you switch from peak time (17:00-18:59) to night-time (23:00-07:59) ***to save the most money on average?***

Using a **dishwasher** for one cycle

Using the **immersion** for two hours *(to heat a full tank of water from cold)*

You selected the option that **would** result in the greatest cost savings.

(c) Task screen (with feedback)

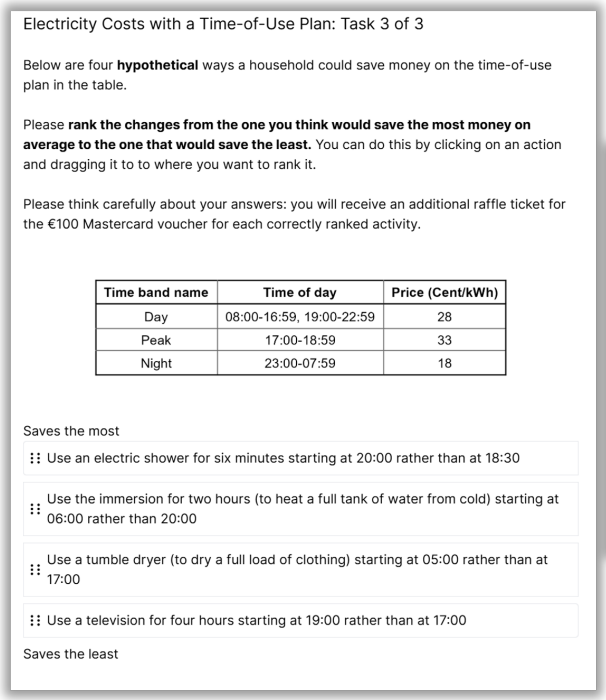
The correct answers highlight that, with a time-of-use plan, you can lower your electricity bill by moving your **most energy intensive** tasks to night-time.

For many households, the most energy intensive activities are water heating, electric showers, and using 'white' appliances (like tumble dryers, washing machines, dishwashers).

Next

(d) End-of-task feedback treatment

Figure 3: Sample screens from the ToU appliance task



Electricity Costs with a Time-of-Use Plan: Task 3 of 3

Below are four **hypothetical** ways a household could save money on the time-of-use plan in the table.

Please **rank the changes from the one you think would save the most money on average to the one that would save the least.** You can do this by clicking on an action and dragging it to to where you want to rank it.

Please think carefully about your answers: you will receive an additional raffle ticket for the €100 Mastercard voucher for each correctly ranked activity.

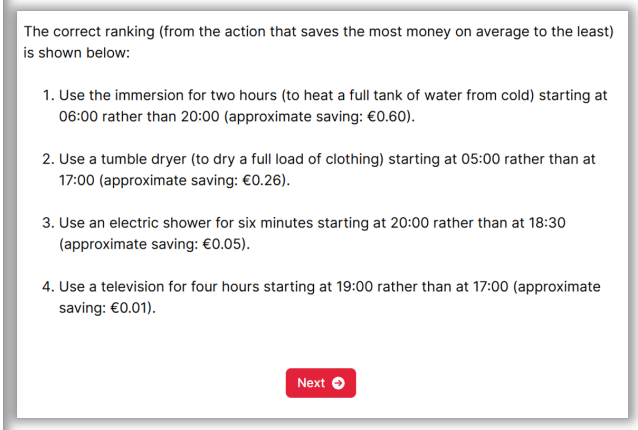
Time band name	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	28
Peak	17:00-18:59	33
Night	23:00-07:59	18

Saves the most

- Use an electric shower for six minutes starting at 20:00 rather than at 18:30
- Use the immersion for two hours (to heat a full tank of water from cold) starting at 06:00 rather than 20:00
- Use a tumble dryer (to dry a full load of clothing) starting at 05:00 rather than at 17:00
- Use a television for four hours starting at 19:00 rather than at 17:00

Saves the least

(a) Task screen



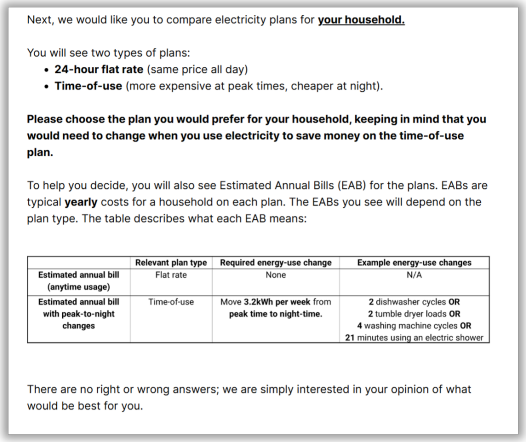
The correct ranking (from the action that saves the most money on average to the least) is shown below:

1. Use the immersion for two hours (to heat a full tank of water from cold) starting at 06:00 rather than 20:00 (approximate saving: €0.60).
2. Use a tumble dryer (to dry a full load of clothing) starting at 05:00 rather than at 17:00 (approximate saving: €0.26).
3. Use an electric shower for six minutes starting at 20:00 rather than at 18:30 (approximate saving: €0.05).
4. Use a television for four hours starting at 19:00 rather than at 17:00 (approximate saving: €0.01).

Next

(b) End-of-task feedback treatment

Figure 4: Sample screens from the ToU ranking task



Next, we would like you to compare electricity plans for **your household.**

You will see two types of plans:

- **24-hour flat rate** (same price all day)
- **Time-of-use** (more expensive at peak times, cheaper at night).

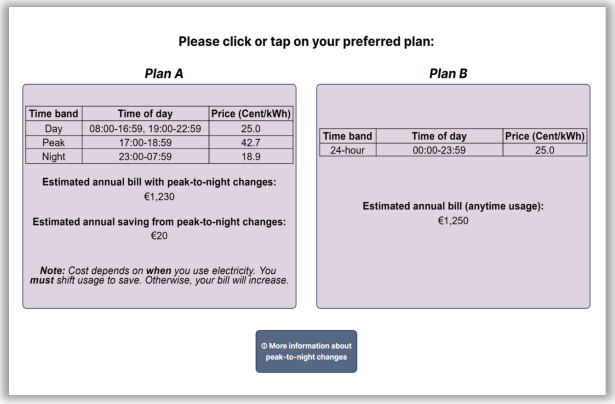
Please choose the plan you would prefer for your household, keeping in mind that you would need to change when you use electricity to save money on the time-of-use plan.

To help you decide, you will also see Estimated Annual Bills (EAB) for the plans. EABs are typical **yearly** costs for a household on each plan. The EABs you see will depend on the plan type. The table describes what each EAB means:

	Relevant plan type	Required energy-use change	Example energy-use changes
Estimated annual bill (anytime usage)	Flat rate	None	N/A
Estimated annual bill with peak-to-night changes	Time-of-use	Move **3.2kWh per week** from **peak time to night-time.**	**2** dishwasher cycles **OR** **2** tumble dryer loads **OR** **4** washing machine cycles **OR** **21** minutes using an electric shower

There are no right or wrong answers; we are simply interested in your opinion of what would best for you.

(a) Task instructions



Please click or tap on your preferred plan:

Plan A

Time band	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	25.0
Peak	17:00-18:59	42.7
Night	23:00-07:59	18.9

Estimated annual bill with peak-to-night changes:
€1,230

Estimated annual saving from peak-to-night changes:
€20

Note: *Cost depends on* ***when*** *you use electricity. You* ***must*** *shift usage to save. Otherwise, your bill will increase.*

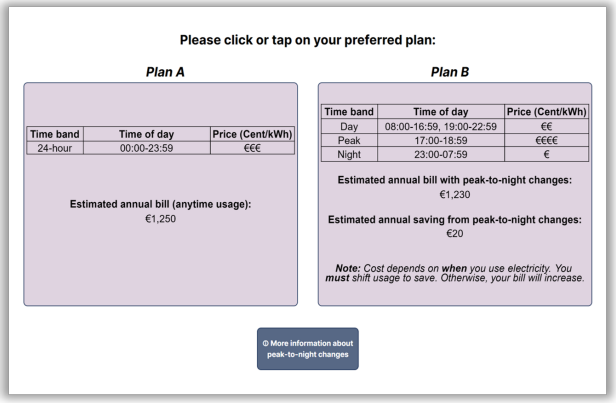
Plan B

Time band	Time of day	Price (Cent/kWh)
24-hour	00:00-23:59	25.0

Estimated annual bill (anytime usage):
€1,250

More information about peak-to-night changes

(b) Task screen (rates shown)



Please click or tap on your preferred plan:

Plan A

Time band	Time of day	Price (Cent/kWh)
24-hour	00:00-23:59	€€€

Estimated annual bill (anytime usage):
€1,250

Plan B

Time band	Time of day	Price (Cent/kWh)
Day	08:00-16:59, 19:00-22:59	€€
Peak	17:00-18:59	€€€€
Night	23:00-07:59	€

Estimated annual bill with peak-to-night changes:
€1,230

Estimated annual saving from peak-to-night changes:
€20

Note: *Cost depends on* ***when*** *you use electricity. You* ***must*** *shift usage to save. Otherwise, your bill will increase.*

More information about peak-to-night changes

(c) Task screen (rates masked)

Figure 5: Sample screens from the tariff selection MPL

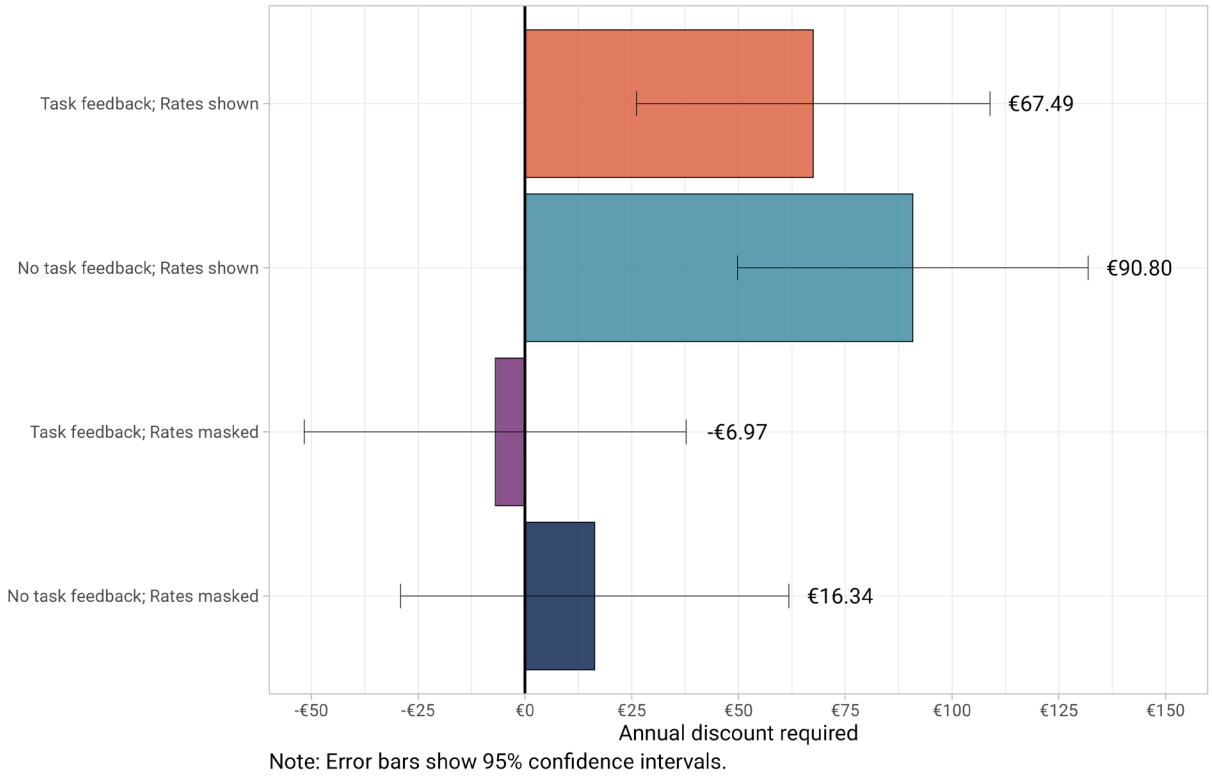


Figure 6: Implied willingness-to-accept values by treatment condition

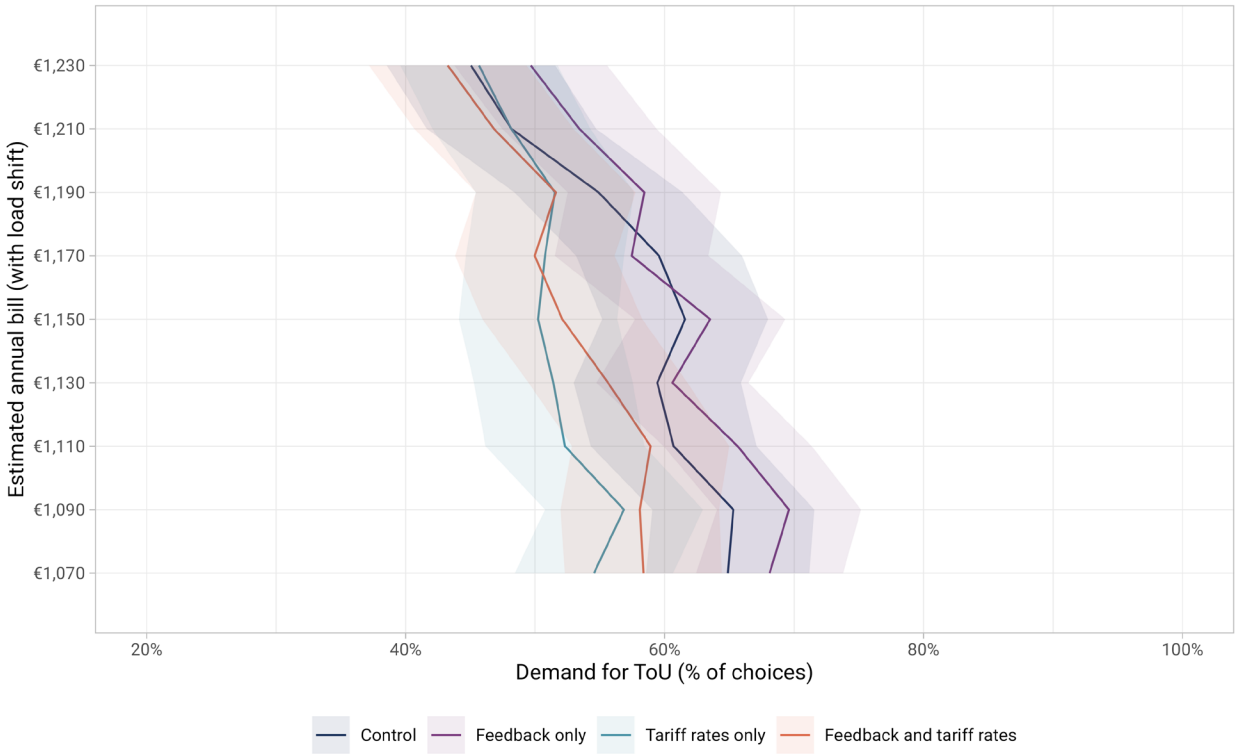


Figure 7: Estimated demand curve

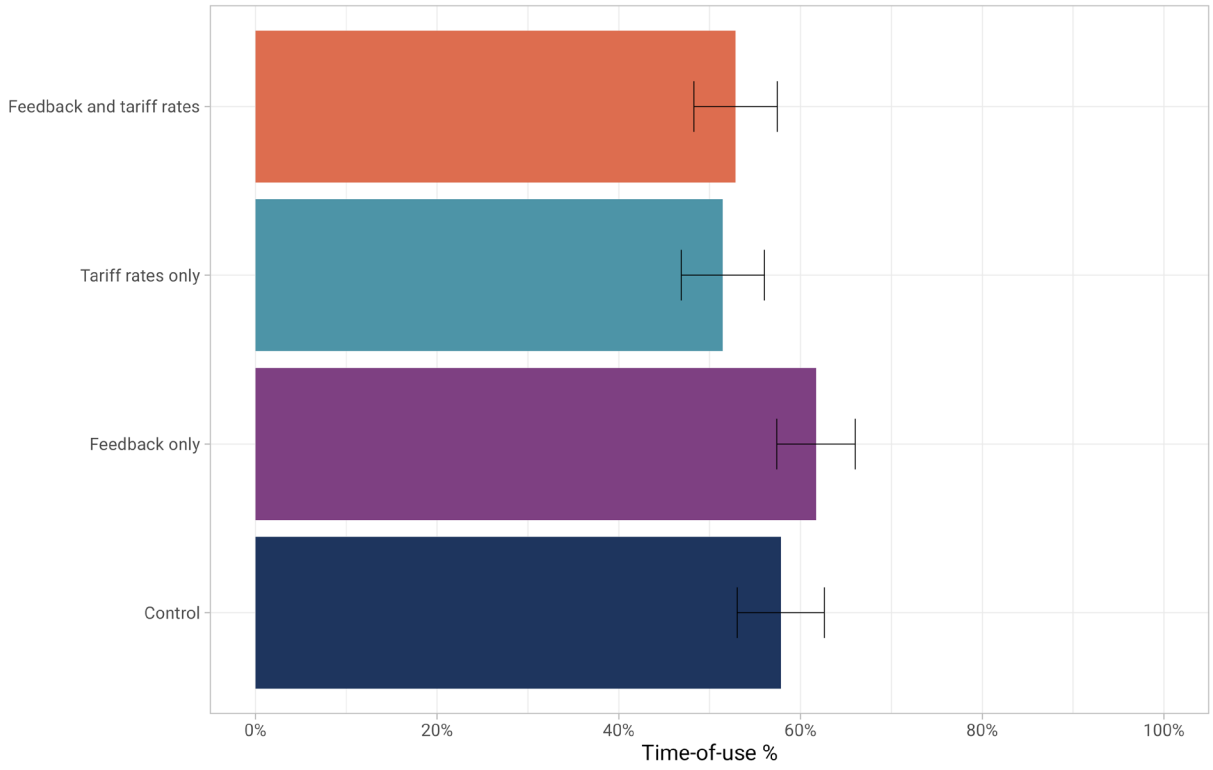


Figure 8: Share of ToU choices by treatment status

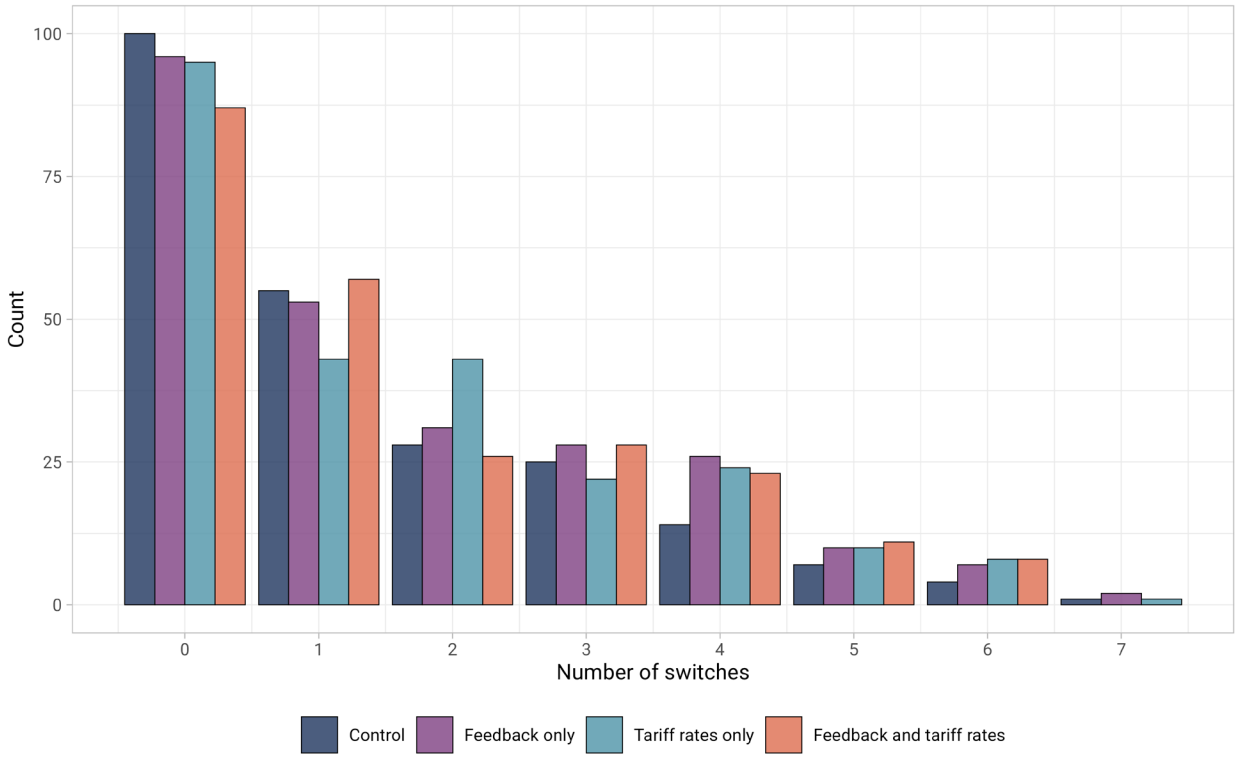


Figure 9: Number of MPL switches by treatment status

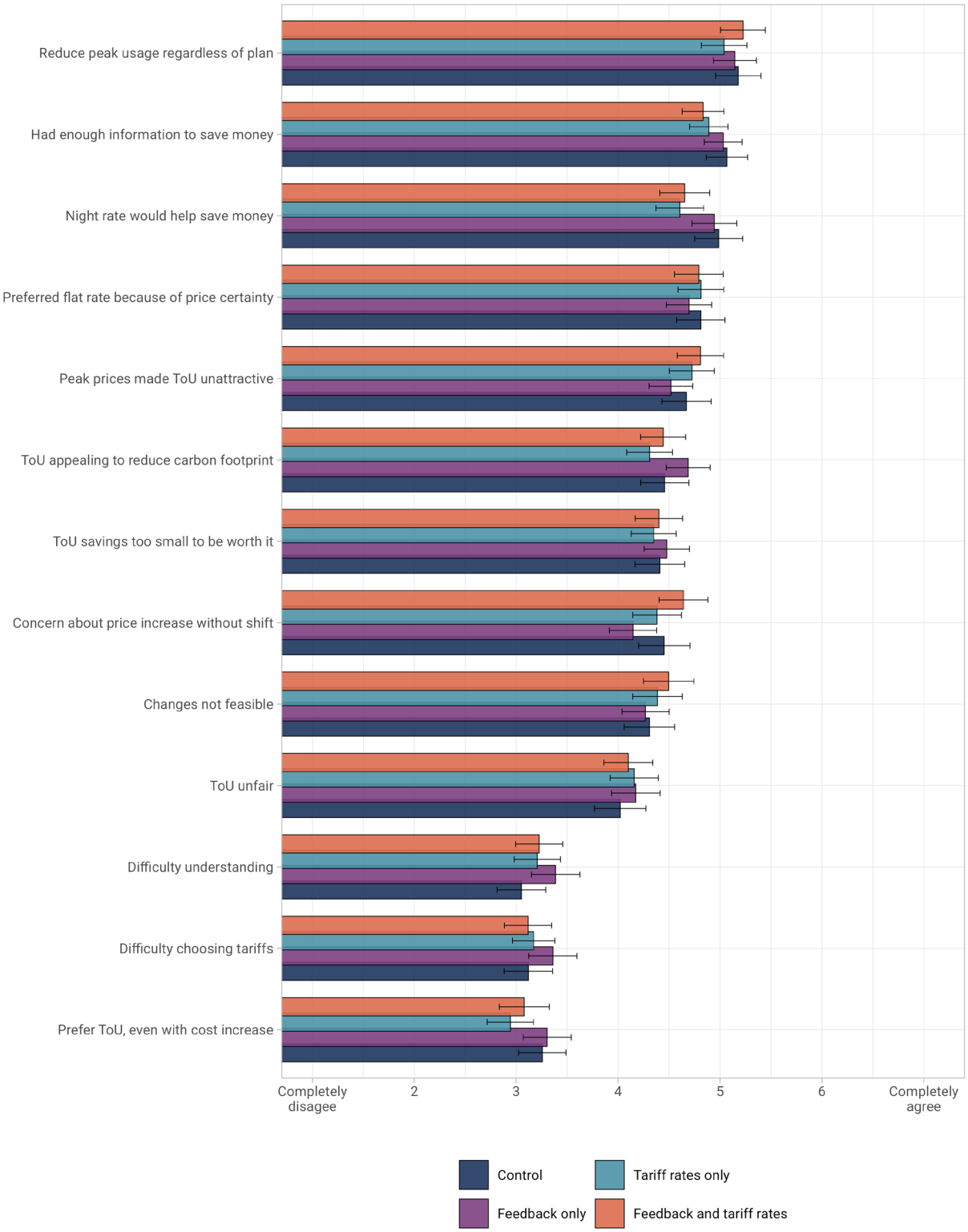
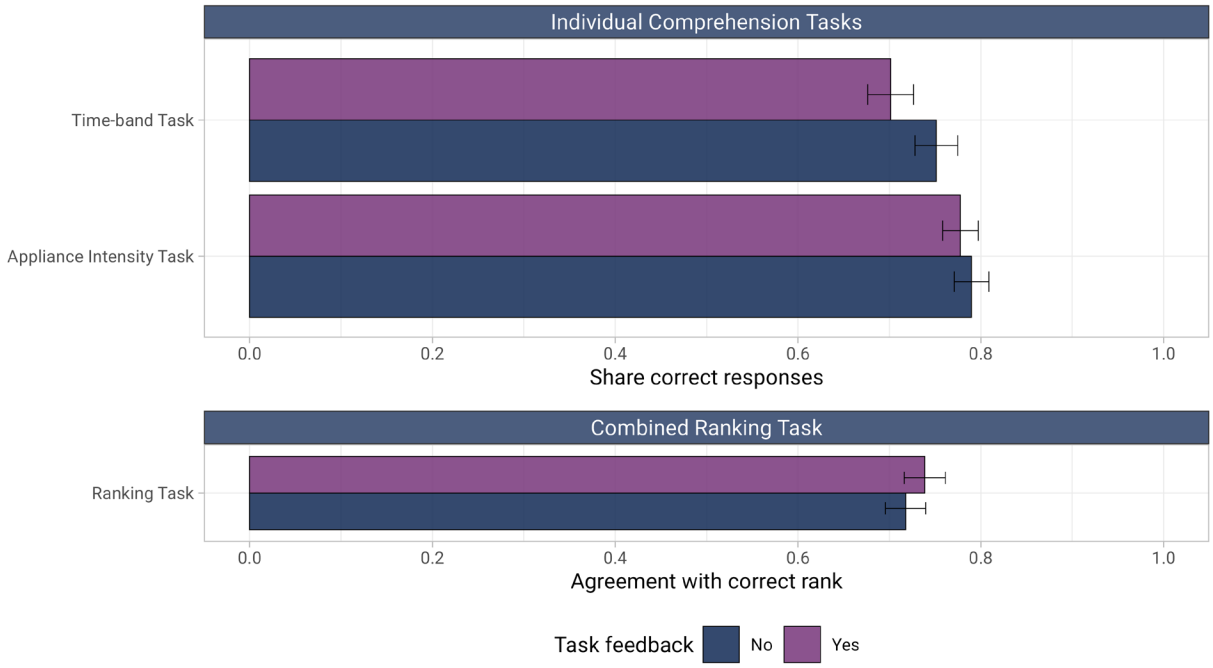


Figure 10: Mean responses to MPL follow-up questionnaire



Notes: Error bars show 95% confidence intervals. 'Agreement with correct rank' is based on the Kendall (1938) distance between a participant response and the true ranking. The correct rank receives a score of 1. A score of zero occurs where the number of pariwise swaps between the response and true rank is at its maximum.

Figure 11: Mean task performance by treatment condition

Tables

Table 1: Scenarios presented in the ToU time-band task

Electricity usage	Option A	Option B	Option C	Correct answer
Using the immersion for two hours starting at 20:00 (to heat a full tank of water from cold)	No change	Start at 06:00	Start at 18:00	**Start at 06:00**
Using an electric oven for one hour starting at 17:00	No change	Start at 18:00	Start at 19:00	**Start at 19:00**
Using an electric shower for six minutes starting at 07:00	No change	Start at 18:00	Start at 20:00	**No change**
Boiling an electric kettle (approx. four minutes) starting at 16:00	No change	Start at 17:00	Start at 18:00	**No change**
Using a vacuum cleaner for ten minutes starting at 17:00	No change	Start at 18:00	Start at 19:00	**Start at 19:00**
Starting a two-hour dishwasher cycle at 17:00	No change	Start at 20:00	Start at 06:00	**Start at 06:00**
Using a tumble dryer starting at 19:00 (to dry a full load of clothing)	No change	Start at 05:00	Start at 17:00	**Start at 05:00**
Using a hairdryer for ten minutes starting at 07:00	No change	Start at 08:00	Start at 20:00	**No change**

Table 2: Scenarios presented in the ToU appliance intensity task

Option A	Option B	Correct answer
Using an electric shower for six minutes	Using a tumble dryer (to dry a full load of clothing)	**Using a tumble dryer (to dry a full load of clothing)**
Using a dishwasher for one cycle	Using a toaster for five minutes	**Using a dishwasher for one cycle**
Using the immersion for two hours (to heat a full tank of water from cold)	Using an electric shower for six minutes	**Using the immersion for two hours (to heat a full tank of water from cold)**
Using the immersion for two hours (to heat a full tank of water from cold)	Using a dishwasher for one cycle	**Using the immersion for two hours (to heat a full tank of water from cold)**
Boiling an electric kettle (approx. four minutes)	Using an electric shower for six minutes	**Using an electric shower for six minutes**
Using a washing machine for one cycle	Using a hairdryer for ten minutes	**Using a washing machine for one cycle**
Using a washing machine for one cycle	Using a tumble dryer (to dry a full load of clothing)	**Using a tumble dryer (to dry a full load of clothing)**
Using an electric shower for six minutes	Using a television for four hours	**Using an electric shower for six minutes**

Table 3: Scenarios presented in the ToU ranking task

Ranking	Energy-saving measure
1	Use the immersion for two hours (to heat a full tank of water from cold) starting at 06:00 rather than 20:00 (approximate saving: €0.60).
2	Use a tumble dryer (to dry a full load of clothing) starting at 05:00 rather than at 17:00 (approximate saving: €0.26).
3	Use an electric shower for six minutes starting at 20:00 rather than at 18:30 (approximate saving: €0.05).
4	Use a television for four hours starting at 19:00 rather than at 17:00 (approximate saving: €0.01).

Table 4: Descriptive statistics by treatment group

	Control		Feedback		Price Salience		Feedback + Price Salience		National
	N	%	N	%	N	%	N	%	%
Gender									
Woman	123	52.6	122	48.2	127	51.6	126	52.5	51.1
Man	110	47.0	129	51.0	118	48.0	113	47.1	48.9
Non-binary/other/not reported	1	0.4	2	0.8	1	0.4	1	0.4	
Age category									
Under 40 years old	95	40.6	100	39.5	98	39.8	87	36.2	36.9
40-59 years old	86	36.8	98	38.7	79	32.1	75	31.2	36.4
60 years old or above	53	22.6	55	21.7	69	28.0	78	32.5	26.7
Region									
Dublin	51	21.8	75	29.6	59	24.0	71	29.6	29.0
Rest of Leinster	67	28.6	81	32.0	70	28.5	64	26.7	26.8
Munster	77	32.9	59	23.3	66	26.8	69	28.7	26.8
Connacht or Ulster	39	16.7	38	15.0	51	20.7	36	15.0	17.5
Location									
Urban	162	69.2	181	71.5	158	64.2	160	66.7	64.1
Rural	72	30.8	72	28.5	88	35.8	80	33.3	35.9
Education									
Up to Lower Secondary	16	6.8	31	12.3	16	6.5	32	13.3	23.0
Upper Secondary	47	20.1	65	25.7	64	26.0	57	23.8	18.1
Technical or Vocational Qualification	28	12.0	31	12.3	28	11.4	29	12.1	7.5
Advanced Certificate	24	10.3	29	11.5	22	8.9	18	7.5	11.2
Ordinary Bachelor Degree	38	16.2	28	11.1	35	14.2	38	15.8	8.1
Honours Bachelor Degree	54	23.1	37	14.6	46	18.7	38	15.8	13.3
Postgraduate	27	11.5	32	12.6	35	14.2	28	11.7	12.3
Employment status									
Persons at work	151	64.5	172	68.0	152	61.8	146	60.8	56.1
Unemployed	9	3.8	6	2.4	8	3.3	9	3.8	5.1
Looking after home/family	17	7.3	12	4.7	18	7.3	15	6.2	6.6
Student or pupil	10	4.3	9	3.6	9	3.7	8	3.3	11.1
Retired	32	13.7	37	14.6	44	17.9	48	20.0	15.9
Unable to work/other	15	6.4	17	6.7	15	6.1	14	5.8	5.2
Dwelling type									
House	199	85.0	230	90.9	218	88.6	209	87.1	86.7
Apartment/other	35	15.0	23	9.1	28	11.4	31	12.9	13.3
Household size									
1-2 members	60	25.6	71	28.1	71	28.9	71	29.6	52.1
3 members	57	24.4	64	25.3	68	27.6	62	25.8	17.9
4 members	50	21.4	54	21.3	49	19.9	53	22.1	16.9
5+ members	67	28.6	64	25.3	58	23.6	54	22.5	13.2
Socioeconomic status									
ABC1	106	45.3	109	43.1	121	49.2	111	46.2	
C2DEF	128	54.7	144	56.9	125	50.8	129	53.8	
Children in household									

Yes	85	36.3	84	33.2	77	31.3	76	31.7
No	149	63.7	169	66.8	169	68.7	164	68.3
# bedrooms								
0-1	14	6.0	10	4.0	13	5.3	16	6.7
2	37	15.8	39	15.4	45	18.3	48	20.0
3	94	40.2	128	50.6	90	36.6	89	37.1
4	70	29.9	61	24.1	82	33.3	67	27.9
5+	19	8.1	15	5.9	16	6.5	20	8.3
BER								
A	20	8.5	19	7.5	21	8.5	16	6.7
B	26	11.1	38	15.0	36	14.6	20	8.3
C	42	17.9	41	16.2	37	15.0	48	20.0
D-G/Exempt	26	11.1	17	6.7	25	10.2	28	11.7
No response	120	51.3	138	54.5	127	51.6	128	53.3
Income								
Up to €22,000	27	11.5	33	13.0	32	13.0	28	11.7
€22,001 - €32,000	37	15.8	30	11.9	33	13.4	31	12.9
€32,001 - €42,000	19	8.1	36	14.2	25	10.2	29	12.1
€42,001 - €55,000	36	15.4	28	11.1	35	14.2	39	16.2
€55,001 - €67,000	24	10.3	22	8.7	25	10.2	20	8.3
€67,001 - €85,000	23	9.8	35	13.8	22	8.9	24	10.0
€85,001 - €105,000	20	8.5	31	12.3	32	13.0	18	7.5
Above €105,000	19	8.1	9	3.6	12	4.9	18	7.5
No response	29	12.4	29	11.5	30	12.2	33	13.8
Contract responsibility								
Yes, myself	134	57.3	155	61.3	140	56.9	148	61.7
Yes, with others	84	35.9	83	32.8	90	36.6	70	29.2
No	16	6.8	15	5.9	16	6.5	22	9.2
Tariff switching (past three years)								
Switched provider	96	41.0	91	36.0	91	37.0	106	44.2
Switched plan with existing provider	24	10.3	26	10.3	32	13.0	14	5.8
No	91	38.9	109	43.1	104	42.3	93	38.8
Unknown/Doesn't choose	23	9.8	27	10.7	19	7.7	27	11.2
Days at home								
0-3 days per week	60	25.6	49	19.4	48	19.5	59	24.6
4-6 days per week	57	24.4	63	24.9	47	19.1	35	14.6
All week	117	50.0	141	55.7	151	61.4	146	60.8

National statistics are drawn from the 2022 national Census where available. The reference group for the national employment statistic is the population over age 15. The education statistic refers to those over 15 who have ceased education. For dwelling type and household size, the national statistics report the percentage of total households. For all other variables, the national statistics are percentages of the adult population. The national gender statistics do not include comparable categories for Non-binary or other genders. The 'Feedback' group received information treatments in tariff comprehension tasks, but not the price-salience intervention. The 'Price Salience' group received full information on ToU pricing in the MPL experiment, but no tariff comprehension feedback. The 'Feedback + Price Salience' group received both interventions

Table 5: Willingness to load shift with Time-of-use tariffs

	Full sample			Decision makers		
	(1)	(2)	(3)	(4)	(5)	(6)
WTA	41.44***	41.72***	16.34	48.05***	48.12***	18.27
	[15.15, 67.72]	[15.66, 67.78]	[-29.11, 61.79]	[21.67, 74.44]	[21.95, 74.30]	[-27.93, 64.48]
Choice order		15.26	15.26		12.28	11.62
		[-8.69, 39.21]	[-8.54, 39.06]		[-12.25, 36.80]	[-12.75, 35.99]
Screen side		9.79**	9.86**		10.90**	10.99**
		[0.73, 18.85]	[0.81, 18.92]		[1.45, 20.34]	[1.55, 20.43]
Task feedback			-23.31			-16.37
			[-71.24, 24.62]			[-65.38, 32.64]
Constituent tariff rates			74.46***			76.97***
			[24.85, 124.08]			[25.87, 128.06]
Observations	8756	8756	8756	8135	8135	8135
Participants	973	973	973	904	904	904

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

Table 6: Correlation between switching patterns, treatment, and socio-demographic variables

	Always Time-of-use	Always Flat tariff	One Switch	Multiple Switches
	(1)	(2)	(3)	(4)
Constant	0.1953***	0.1082*	0.3046***	0.3919***
	(0.0686)	(0.0568)	(0.0653)	(0.0771)
Treatment group: Feedback only	0.0040	-0.0421	-0.0412	0.0792*
	(0.0399)	(0.0333)	(0.0382)	(0.0434)
Treatment group: Tariff rates only	-0.0665*	0.0050	-0.0620*	0.1236***
	(0.0385)	(0.0358)	(0.0361)	(0.0441)
Treatment group: Feedback and tariff rates	-0.0705*	-0.0015	-0.0021	0.0741*
	(0.0394)	(0.0346)	(0.0394)	(0.0448)
Gender: Woman	-0.0506*	0.0267	0.0001	0.0238
	(0.0272)	(0.0240)	(0.0270)	(0.0317)
Gender: Non-binary/other/not reported	-0.0257	-0.1472***	0.3974*	-0.2246
	(0.1843)	(0.0436)	(0.2184)	(0.1963)
Age category: Under 40 years old	-0.0163	0.0070	-0.0186	0.0279
	(0.0320)	(0.0290)	(0.0321)	(0.0376)
Age category: 60 years old or above	0.1507***	-0.0010	-0.1204***	-0.0292
	(0.0403)	(0.0359)	(0.0374)	(0.0468)
Region: Rest of Leinster	-0.0030	-0.0333	-0.0410	0.0773*
	(0.0392)	(0.0330)	(0.0391)	(0.0448)
Region: Munster	-0.0420	-0.0325	-0.0602	0.1346***
	(0.0394)	(0.0331)	(0.0389)	(0.0455)
Region: Connacht or Ulster	-0.0437	0.0105	-0.0450	0.0782
	(0.0444)	(0.0418)	(0.0440)	(0.0518)
Location: Rural	0.0292	0.0226	-0.0264	-0.0254
	(0.0316)	(0.0289)	(0.0301)	(0.0371)
Education: Up to Lower Secondary	-0.0928**	-0.0219	0.0274	0.0873
	(0.0472)	(0.0417)	(0.0515)	(0.0604)
Education: Technical or Vocational Qualification	-0.0006	0.0104	-0.0285	0.0187
	(0.0456)	(0.0424)	(0.0469)	(0.0567)
Education: Advanced Certificate	0.0547	0.0584	-0.0461	-0.0670
	(0.0543)	(0.0473)	(0.0515)	(0.0623)
Education: Ordinary Bachelor Degree	0.0158	-0.0054	0.0136	-0.0239
	(0.0440)	(0.0387)	(0.0460)	(0.0519)
Education: Honours Bachelor Degree	0.0789*	0.0460	-0.0599	-0.0649
	(0.0442)	(0.0391)	(0.0422)	(0.0498)
Education: Postgraduate	0.0598	0.0422	-0.0619	-0.0401
	(0.0495)	(0.0441)	(0.0474)	(0.0558)
Dwelling type: Apartment/other	0.0229	-0.0112	-0.0214	0.0097
	(0.0508)	(0.0424)	(0.0482)	(0.0593)
Household size: 1-2 members	-0.0020	0.0153	0.0163	-0.0295
	(0.0382)	(0.0355)	(0.0386)	(0.0456)
Household size: 4 members	0.0028	-0.0505	-0.0033	0.0510
	(0.0412)	(0.0351)	(0.0412)	(0.0491)
Household size: 5+ members	0.0435	-0.0219	-0.0645	0.0429

	(0.0426)	(0.0393)	(0.0409)	(0.0505)
Children in household: Yes	0.0038	-0.0001	-0.0154	0.0116
	(0.0362)	(0.0311)	(0.0355)	(0.0435)
# bedrooms: 0-1	0.1179	0.0236	-0.0535	-0.0880
	(0.0744)	(0.0627)	(0.0674)	(0.0816)
# bedrooms: 2	0.0302	-0.0542	0.0280	-0.0041
	(0.0413)	(0.0356)	(0.0416)	(0.0516)
# bedrooms: 4	0.0459	0.0069	0.0403	-0.0931**
	(0.0342)	(0.0308)	(0.0327)	(0.0392)
# bedrooms: 5+	-0.0322	-0.0109	0.1861***	-0.1430**
	(0.0552)	(0.0513)	(0.0630)	(0.0611)
Contract responsibility: Yes, with others	-0.0373	0.0277	-0.0193	0.0289
	(0.0291)	(0.0273)	(0.0293)	(0.0352)
Contract responsibility: No	0.0918	-0.0663	-0.0225	-0.0030
	(0.0585)	(0.0429)	(0.0568)	(0.0664)
Days at home: 4-6 days per week	0.0132	0.0341	0.0696*	-0.1169**
	(0.0405)	(0.0341)	(0.0406)	(0.0491)
Days at home: All week	0.0286	0.0815***	0.0453	-0.1554***
	(0.0335)	(0.0302)	(0.0331)	(0.0417)
Observations	973	973	973	973
R2	0.051	0.030	0.040	0.058
Mean DV	0.229	0.159	0.214	0.398

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.

Table 7: MPL follow-up responses by treatment group

	Constant (Control mean)	Treatment: Feedback only	Treatment: Tariff rates only	Treatment: Feedback + tariff rates	N
Peak prices made ToU unattractive	4.6709***	-0.1532	0.0526	0.1374	973
	(0.1230)	(0.1641)	(0.1667)	(0.1688)	
Preferred flat rate because of price certainty	4.8120***	-0.1163	0.0010	-0.0203	973
	(0.1206)	(0.1650)	(0.1661)	(0.1707)	
ToU appealing to reduce carbon footprint	4.4573***	0.2305	-0.1483	-0.0156	973
	(0.1204)	(0.1625)	(0.1655)	(0.1649)	
Had enough information to save money	5.0684***	-0.0368	-0.1781	-0.2350	973
	(0.1029)	(0.1391)	(0.1406)	(0.1466)	
ToU savings too small to be worth it	4.4103***	0.0680	-0.0607	-0.0103	973
	(0.1237)	(0.1671)	(0.1671)	(0.1708)	
Changes not feasible	4.3077***	-0.0389	0.0785	0.1881	973
	(0.1256)	(0.1720)	(0.1762)	(0.1779)	
Night rate would help save money	4.9872***	-0.0425	-0.3815**	-0.3330*	973
	(0.1191)	(0.1636)	(0.1681)	(0.1720)	
Concern about price increase without shift	4.4530***	-0.3067*	-0.0709	0.1887	973
	(0.1280)	(0.1744)	(0.1764)	(0.1767)	
Prefer ToU, even with cost increase	3.2564***	0.0479	-0.3133*	-0.1772	973
	(0.1183)	(0.1682)	(0.1653)	(0.1717)	
ToU unfair	4.0214***	0.1525	0.1372	0.0786	973
	(0.1280)	(0.1762)	(0.1756)	(0.1764)	
Reduce peak usage regardless of plan	5.1795***	-0.0332	-0.1388	0.0455	973
	(0.1129)	(0.1559)	(0.1603)	(0.1590)	
Difficulty choosing tariffs	3.1197***	0.2400	0.0511	-0.0030	973
	(0.1201)	(0.1699)	(0.1603)	(0.1679)	
Difficulty understanding	3.0513***	0.3361*	0.1560	0.1737	973
	(0.1214)	(0.1713)	(0.1672)	(0.1685)	

*p<0.1; **p<0.05; ***p<0.01. Each row represents a separate regression of the rating scale described in the row on a set of treatment indicators.

Table 8: Correlation between performance in time-based ToU task, treatment, and demographic factors

		Correct	
	(1)	(2)	(3)
Constant	0.7513***	0.7855***	0.6971***
	(0.0119)	(0.0362)	(0.0464)
Task feedback	-0.0500***	-0.0409**	-0.0413**
	(0.0175)	(0.0170)	(0.0169)
Gender: Woman		-0.0071	-0.0106
		(0.0170)	(0.0171)
Gender: Non-binary/other/not reported		0.0967	0.1026
		(0.1079)	(0.1135)
Age category: Under 40 years old		0.0233	0.0253
		(0.0208)	(0.0209)
Age category: 60 years old or above		-0.0463*	-0.0625**
		(0.0246)	(0.0252)
Region: Rest of Leinster		-0.0522**	-0.0557**
		(0.0241)	(0.0240)
Region: Munster		-0.0747***	-0.0757***
		(0.0245)	(0.0243)
Region: Connacht or Ulster		-0.0515*	-0.0484*
		(0.0290)	(0.0288)
Location: Rural		0.0056	0.0073
		(0.0198)	(0.0196)
Education: Up to Lower Secondary		-0.1093***	-0.1105***
		(0.0340)	(0.0338)
Education: Technical or Vocational Qualification		-0.0156	-0.0156
		(0.0307)	(0.0307)
Education: Advanced Certificate		0.0266	0.0307
		(0.0330)	(0.0328)
Education: Ordinary Bachelor Degree		0.0300	0.0291
		(0.0280)	(0.0278)
Education: Honours Bachelor Degree		0.0748***	0.0680**
		(0.0264)	(0.0265)
Education: Postgraduate		0.0715**	0.0608**
		(0.0304)	(0.0307)
Dwelling type: Apartment/other		-0.0343	-0.0366
		(0.0367)	(0.0360)
Household size: 1-2 members		0.0247	0.0299
		(0.0241)	(0.0243)
Household size: 4 members		0.0057	0.0044
		(0.0265)	(0.0265)
Household size: 5+ members		-0.0407	-0.0459*
		(0.0266)	(0.0263)
Children in household: Yes		-0.0181	-0.0103
		(0.0235)	(0.0236)
# bedrooms: 0-1		-0.0429	-0.0387

		(0.0505)	(0.0503)
# bedrooms: 2		-0.0300	-0.0326
		(0.0293)	(0.0289)
# bedrooms: 4		0.0448**	0.0405**
		(0.0201)	(0.0203)
# bedrooms: 5+		0.0021	-0.0017
		(0.0368)	(0.0364)
Contract responsibility: Yes, with others			-0.0020
			(0.0185)
Contract responsibility: No			-0.0058
			(0.0374)
Days at home: 4-6 days per week			0.0722***
			(0.0256)
Days at home: All week			0.0577**
			(0.0230)
Moral obligation to reduce carbon footprint			0.0109**
			(0.0050)
Observations	7784	7784	7784
Participants	973	973	973
R2	0.003	0.032	0.037
Mean DV (control group)	0.751	0.751	0.751

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.

Table 9: Time task performance: question type and learning

	Correct			
	(1)	(2)	(3)	(4)
Constant	0.7513***	0.6600***	0.6730***	0.6415***
	(0.0119)	(0.0208)	(0.0244)	(0.0238)
Task feedback	-0.0500***	-0.0500***	-0.0754**	-0.0129
	(0.0175)	(0.0175)	(0.0305)	(0.0289)
Shift type: no change		0.0899***	0.0705***	0.0899***
		(0.0161)	(0.0236)	(0.0161)
Shift type: day-to-night		0.0607***	0.0493**	0.0600***
		(0.0147)	(0.0202)	(0.0147)
Shift type: peak-to-day		0.1067***	0.0957***	0.1063***
		(0.0165)	(0.0237)	(0.0165)
Trial number: 2		-0.0192	-0.0193	-0.0082
		(0.0174)	(0.0174)	(0.0243)
Trial number: 3		0.0074	0.0072	0.0114
		(0.0173)	(0.0173)	(0.0233)
Trial number: 4		0.0203	0.0202	0.0625***
		(0.0179)	(0.0179)	(0.0240)
Trial number: 5		0.0273	0.0270	0.0492**
		(0.0176)	(0.0175)	(0.0250)
Trial number: 6		0.0188	0.0186	0.0457*
		(0.0176)	(0.0176)	(0.0237)
Trial number: 7		0.0329*	0.0327*	0.0553**
		(0.0177)	(0.0177)	(0.0243)
Trial number: 8		0.0386**	0.0383**	0.0606**
		(0.0170)	(0.0170)	(0.0237)
Task feedback x Shift type: no change			0.0383	
			(0.0322)	
Task feedback x Shift type: day-to-night			0.0225	
			(0.0294)	
Task feedback x Shift type: peak-to-day			0.0216	
			(0.0329)	
Task feedback x Trial number: 2				-0.0217
				(0.0348)
Task feedback x Trial number: 3				-0.0079
				(0.0346)
Task feedback x Trial number: 4				-0.0831**
				(0.0356)
Task feedback x Trial number: 5				-0.0432
				(0.0351)
Task feedback x Trial number: 6				-0.0531
				(0.0351)
Task feedback x Trial number: 7				-0.0441
				(0.0353)
Task feedback x Trial number: 8				-0.0434
				(0.0340)

Observations	7784	7784	7784	7784
Participants	973	973	973	973
R2	0.003	0.010	0.011	0.011
Mean DV (control group)	0.751	0.751	0.751	0.751

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Shift type: Peak-night; Trial number: 1.

Table 10: Correlation between performance in appliance-based ToU task, treatment, and demographic factors

	Correct	Correct	Correct
	(1)	(2)	(3)
Constant	0.7898***	0.8006***	0.7531***
	(0.0097)	(0.0296)	(0.0354)
Task feedback	-0.0122	-0.0101	-0.0103
	(0.0138)	(0.0138)	(0.0138)
Gender: Woman		0.0183	0.0176
		(0.0139)	(0.0138)
Gender: Non-binary/other/not reported		-0.0940	-0.0922
		(0.1210)	(0.1192)
Age category: Under 40 years old		-0.0097	-0.0069
		(0.0162)	(0.0163)
Age category: 60 years old or above		0.0093	-0.0005
		(0.0212)	(0.0215)
Region: Rest of Leinster		0.0074	0.0050
		(0.0188)	(0.0188)
Region: Munster		-0.0108	-0.0106
		(0.0208)	(0.0206)
Region: Connacht or Ulster		-0.0193	-0.0175
		(0.0245)	(0.0244)
Location: Rural		0.0016	0.0025
		(0.0160)	(0.0160)
Education: Up to Lower Secondary		-0.0587*	-0.0599**
		(0.0306)	(0.0302)
Education: Technical or Vocational Qualification		-0.0247	-0.0240
		(0.0239)	(0.0238)
Education: Advanced Certificate		0.0271	0.0299
		(0.0245)	(0.0245)
Education: Ordinary Bachelor Degree		-0.0123	-0.0145
		(0.0230)	(0.0233)
Education: Honours Bachelor Degree		-0.0008	-0.0060
		(0.0221)	(0.0225)
Education: Postgraduate		0.0102	0.0024
		(0.0235)	(0.0237)
Dwelling type: Apartment/other		-0.0420	-0.0436
		(0.0272)	(0.0271)
Household size: 1-2 members		0.0036	0.0058
		(0.0204)	(0.0206)
Household size: 4 members		-0.0208	-0.0203
		(0.0217)	(0.0217)
Household size: 5+ members		-0.0418**	-0.0439**
		(0.0200)	(0.0202)
Children in household: Yes		0.0230	0.0258
		(0.0176)	(0.0180)
# bedrooms: 0-1		-0.0016	0.0033

		(0.0372)	(0.0362)
# bedrooms: 2		-0.0080	-0.0090
		(0.0227)	(0.0228)
# bedrooms: 4		0.0162	0.0146
		(0.0169)	(0.0171)
# bedrooms: 5+		-0.0133	-0.0146
		(0.0289)	(0.0290)
Contract responsibility: Yes, with others			-0.0066
			(0.0152)
Contract responsibility: No			-0.0245
			(0.0278)
Days at home: 4-6 days per week			0.0528**
			(0.0216)
Days at home: All week			0.0382**
			(0.0178)
Moral obligation to reduce carbon footprint			0.0049
			(0.0040)
Observations	7784	7784	7784
Participants	973	973	973
R2	0.000	0.007	0.010
Mean DV (control group)	0.79	0.79	0.79

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.

Table 11: Appliance task performance: difficulty and learning

	Correct			
	(1)	(2)	(3)	(4)
Constant	0.7898***	0.8192***	0.8105***	0.8358***
	(0.0097)	(0.0154)	(0.0161)	(0.0186)
Task feedback	-0.0122	-0.0122	0.0053	-0.0449*
	(0.0138)	(0.0138)	(0.0163)	(0.0264)
Difficulty: Hard		-0.0683***	-0.0505***	-0.0683***
		(0.0088)	(0.0126)	(0.0088)
Trial number: 2		0.0022	0.0019	0.0064
		(0.0170)	(0.0171)	(0.0235)
Trial number: 3		-0.0159	-0.0157	-0.0344
		(0.0170)	(0.0170)	(0.0222)
Trial number: 4		0.0020	0.0016	-0.0225
		(0.0171)	(0.0172)	(0.0241)
Trial number: 5		0.0031	0.0031	-0.0117
		(0.0168)	(0.0168)	(0.0229)
Trial number: 6		0.0130	0.0130	-0.0147
		(0.0174)	(0.0174)	(0.0249)
Trial number: 7		0.0274	0.0273	0.0029
		(0.0171)	(0.0171)	(0.0242)
Trial number: 8		0.0061	0.0060	-0.0205
		(0.0172)	(0.0172)	(0.0247)
Task feedback x Difficulty: Hard			-0.0350**	
			(0.0176)	
Task feedback x Trial number: 2				-0.0083
				(0.0341)
Task feedback x Trial number: 3				0.0366
				(0.0339)
Task feedback x Trial number: 4				0.0483
				(0.0343)
Task feedback x Trial number: 5				0.0291
				(0.0335)
Task feedback x Trial number: 6				0.0547
				(0.0348)
Task feedback x Trial number: 7				0.0482
				(0.0341)
Task feedback x Trial number: 8				0.0526
				(0.0344)
Observations	7784	7784	7784	7784
Participants	973	973	973	973
R2	0.000	0.008	0.008	0.009
Mean DV (control group)	0.79	0.79	0.79	0.79

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Difficulty: Easy; Trial number: 1.

Table 12: Correlation between performance in ToU ranking task, treatment, and demographic factors

	Agreement with correct rank		
	(1)	(2)	(3)
Constant	0.7177***	0.7374***	0.6768***
	(0.0112)	(0.0351)	(0.0436)
Task feedback	0.0210	0.0232	0.0228
	(0.0160)	(0.0162)	(0.0161)
Gender: Woman		0.0142	0.0112
		(0.0164)	(0.0166)
Gender: Non-binary/other/not reported		0.0282	0.0387
		(0.1340)	(0.1306)
Age category: Under 40 years old		-0.0234	-0.0247
		(0.0193)	(0.0196)
Age category: 60 years old or above		-0.0404*	-0.0487**
		(0.0235)	(0.0239)
Region: Rest of Leinster		-0.0049	-0.0071
		(0.0231)	(0.0230)
Region: Munster		-0.0025	-0.0035
		(0.0232)	(0.0232)
Region: Connacht or Ulster		-0.0105	-0.0085
		(0.0272)	(0.0271)
Location: Rural		0.0193	0.0213
		(0.0186)	(0.0187)
Education: Up to Lower Secondary		-0.0266	-0.0273
		(0.0321)	(0.0320)
Education: Technical or Vocational Qualification		-0.0048	-0.0054
		(0.0305)	(0.0303)
Education: Advanced Certificate		0.0188	0.0189
		(0.0322)	(0.0322)
Education: Ordinary Bachelor Degree		0.0181	0.0174
		(0.0288)	(0.0290)
Education: Honours Bachelor Degree		0.0106	0.0047
		(0.0262)	(0.0264)
Education: Postgraduate		0.0680**	0.0602**
		(0.0266)	(0.0267)
Dwelling type: Apartment/other		-0.0610*	-0.0628**
		(0.0319)	(0.0315)
Household size: 1-2 members		0.0034	0.0055
		(0.0225)	(0.0230)
Household size: 4 members		-0.0524**	-0.0538**
		(0.0263)	(0.0264)
Household size: 5+ members		-0.0300	-0.0330
		(0.0251)	(0.0252)
Children in household: Yes		0.0212	0.0280
		(0.0219)	(0.0226)
# bedrooms: 0-1		-0.0779	-0.0762

		(0.0478)	(0.0483)
# bedrooms: 2		-0.0005	-0.0029
		(0.0250)	(0.0250)
# bedrooms: 4		0.0052	0.0013
		(0.0196)	(0.0197)
# bedrooms: 5+		-0.0229	-0.0256
		(0.0334)	(0.0337)
Contract responsibility: Yes, with others			-0.0020
			(0.0179)
Contract responsibility: No			0.0163
			(0.0311)
Days at home: 4-6 days per week			0.0456*
			(0.0243)
Days at home: All week			0.0253
			(0.0211)
Moral obligation to reduce carbon footprint			0.0095**
			(0.0045)
Observations	973	973	973
R2	0.002	0.034	0.042
Mean DV (control group)	0.718	0.718	0.718

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.

6. Additional materials

6.1 Survey response times

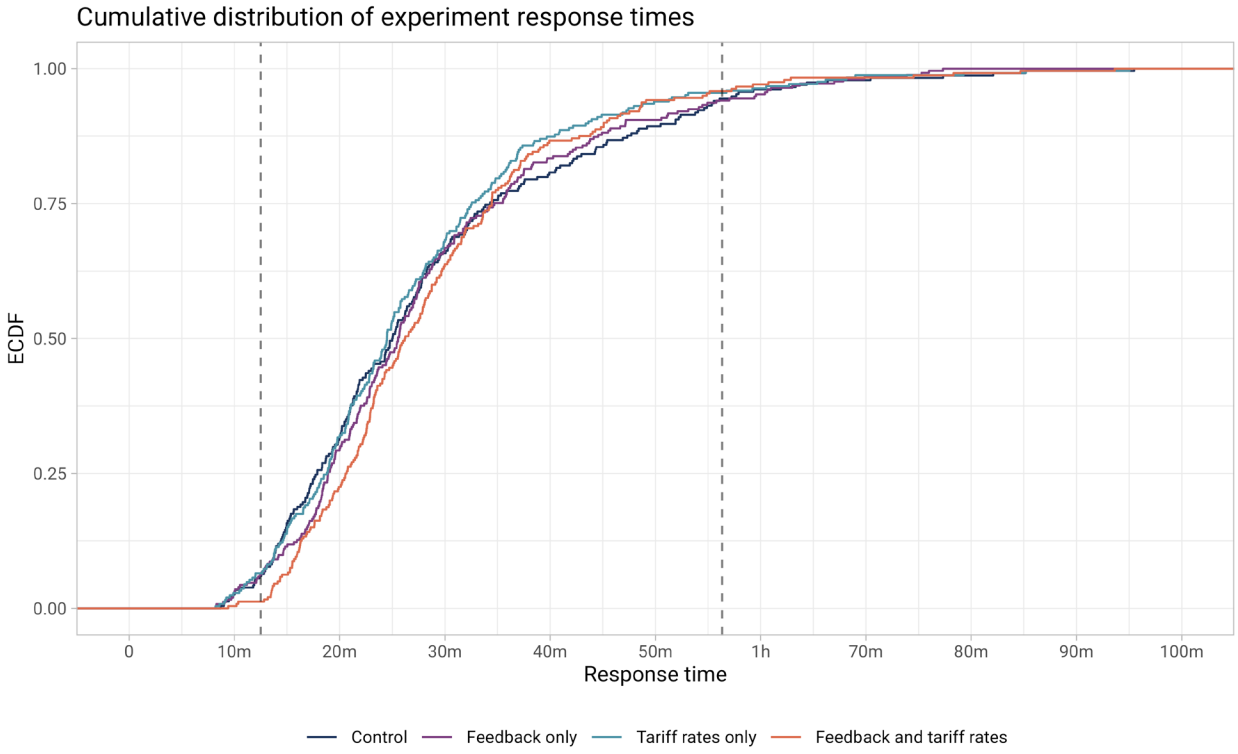


Figure A1: Cumulative distribution of participant response times in the analysis sample

Table A1: Participant response times (minutes)

	N	Mean	Median	SD	Min	Max
Total response time	973	28.36	25.26	13.85	8.21	95.49
Home energy questionnaire	973	2.10	1.68	2.66	0.39	47.25
ToU time task	973	4.28	3.58	3.70	0.24	46.55
ToU appliance task	973	2.19	1.84	2.00	0.18	34.60
ToU rank task	973	1.33	0.97	2.03	0.09	49.84
MPL	973	2.10	1.56	3.32	0.34	71.40
MPL follow-up	973	1.60	1.39	1.35	0.25	25.31
Demographic questionnaire	973	3.45	2.72	3.83	0.84	57.66

Table A2: Time spent on comprehension tasks (seconds)

	Time-band	Energy intensity	Ranking	All
	(1)	(2)	(3)	(4)
Constant	230.02***	117.17***	73.01***	420.20***
	(10.07)	(5.45)	(5.55)	(14.63)
Task feedback	52.34***	27.55***	13.29*	93.18***
	(14.15)	(7.65)	(7.79)	(20.55)
Observations	973	973	973	973
R2	0.014	0.013	0.003	0.021
Mean DV (control group)	230.02	117.166	73.01	420.196

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

6.2 Balance checks

Table A3: Correlation between treatment and socio-demographic variables

	Task feedback	Tariff: rates	Feedback + rates
	(1)	(2)	(3)
Education: Up to Lower Secondary	0.0415	-0.1127**	0.0820
	(0.0573)	(0.0508)	(0.0559)
Education: Technical or Vocational Qualification	-0.0109	-0.0356	0.0055
	(0.0507)	(0.0501)	(0.0501)
Education: Advanced Certificate	0.0185	-0.0253	-0.0531
	(0.0558)	(0.0539)	(0.0506)
Education: Ordinary Bachelor Degree	-0.0768*	-0.0186	0.0138
	(0.0450)	(0.0471)	(0.0482)
Education: Honours Bachelor Degree	-0.0921**	0.0049	-0.0247
	(0.0442)	(0.0456)	(0.0441)
Education: Postgraduate	-0.0358	0.0177	-0.0120
	(0.0500)	(0.0521)	(0.0491)
# bedrooms: 0-1	-0.1194*	0.0238	0.1060
	(0.0664)	(0.0781)	(0.0809)
# bedrooms: 2	-0.0826*	0.0436	0.0726
	(0.0449)	(0.0470)	(0.0458)
# bedrooms: 4	-0.0806**	0.0558	0.0213
	(0.0348)	(0.0359)	(0.0338)
# bedrooms: 5+	-0.0909	-0.0183	0.0800
	(0.0560)	(0.0570)	(0.0608)
Gender: Woman	-0.0338	0.0025	0.0168
	(0.0282)	(0.0285)	(0.0282)
Gender: Non-binary/other/not reported	0.1593	-0.0754	-0.0377
	(0.2071)	(0.1831)	(0.1716)
Age category: Under 40 years old	-0.0147	0.0163	0.0119
	(0.0343)	(0.0329)	(0.0323)
Age category: 60 years old or above	-0.1018**	0.0334	0.0865**
	(0.0395)	(0.0407)	(0.0409)
Region: Rest of Leinster	-0.0042	0.0003	-0.0644
	(0.0420)	(0.0398)	(0.0405)
Region: Munster	-0.0767*	-0.0065	-0.0330
	(0.0401)	(0.0400)	(0.0407)
Region: Connacht or Ulster	-0.0695	0.0617	-0.0781
	(0.0461)	(0.0468)	(0.0477)
Household size: 1-2 members	0.0219	-0.0129	0.0031
	(0.0392)	(0.0403)	(0.0414)
Household size: 4 members	-0.0153	-0.0279	0.0319
	(0.0444)	(0.0442)	(0.0440)
Household size: 5+ members	-0.0186	-0.0272	0.0001
	(0.0461)	(0.0446)	(0.0440)
Location: Rural	-0.0295	0.0343	0.0266
	(0.0326)	(0.0340)	(0.0327)

Children in household: Yes	-0.0172	-0.0068	0.0285
	(0.0386)	(0.0371)	(0.0374)
Dwelling type: Apartment/other	-0.0698	-0.0194	-0.0177
	(0.0475)	(0.0555)	(0.0565)
Constant	0.4466***	0.2317***	0.1986***
	(0.0597)	(0.0556)	(0.0549)
Observations	973	973	973
R2	0.039	0.017	0.022

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3.

6.3 Sample restrictions

Table A4: Correlation between sample inclusion and socio-demographic variables

	Analysis sample
	(1)
Constant	0.9835***
	(0.0225)
Treatment group: Feedback only	0.0328**
	(0.0142)
Treatment group: Tariff rates only	0.0093
	(0.0164)
Treatment group: Feedback and tariff rates	0.0137
	(0.0168)
Gender: Woman	0.0096
	(0.0100)
Gender: Non-binary/other/not reported	-0.1181
	(0.1517)
Age category: Under 40 years old	-0.0080
	(0.0126)
Age category: 60 years old or above	-0.0110
	(0.0145)
Region: Rest of Leinster	0.0202
	(0.0163)
Region: Munster	0.0220
	(0.0155)
Region: Connacht or Ulster	-0.0081
	(0.0219)
Location: Rural	0.0095
	(0.0109)
Education: Up to Lower Secondary	-0.0261
	(0.0180)
Education: Technical or Vocational Qualification	-0.0308*
	(0.0169)
Education: Advanced Certificate	-0.0366*
	(0.0205)
Education: Ordinary Bachelor Degree	-0.0091
	(0.0129)
Education: Honours Bachelor Degree	-0.0339**
	(0.0159)
Education: Postgraduate	-0.0190
	(0.0178)
Dwelling type: Apartment/other	0.0330
	(0.0258)
Household size: 1-2 members	0.0052
	(0.0126)
Household size: 4 members	-0.0200
	(0.0200)
Household size: 5+ members	0.0067

	(0.0176)
Children in household: Yes	-0.0282
	(0.0181)
# bedrooms: 0-1	-0.0611
	(0.0404)
# bedrooms: 2	-0.0379*
	(0.0206)
# bedrooms: 4	0.0001
	(0.0116)
# bedrooms: 5+	0.0032
	(0.0160)
Observations	1000
R2	0.041
Mean DV	0.973

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3.

6.4 Summary statistics for rating variables

Table A5: Summary statistics for rating variables

	N	Mean	Median	SD	Min	Max
Environmental Attitudes						
Moral obligation to reduce carbon footprint	973	4.501	5	1.790	1	7
MPL Reflections						
Reduce peak usage regardless of plan	973	5.147	6	1.739	1	7
Had enough information to save money	973	4.956	5	1.547	1	7
Night rate would help save money	973	4.798	5	1.853	1	7
Preferred flat rate because of price certainty	973	4.777	5	1.821	1	7
Peak prices made ToU unattractive	973	4.678	5	1.791	1	7
ToU appealing to reduce carbon footprint	973	4.476	5	1.779	1	7
ToU savings too small to be worth it	973	4.410	4	1.814	1	7
Concern about price increase without shift	973	4.402	4	1.913	1	7
Changes not feasible	973	4.364	4	1.919	1	7
ToU unfair	973	4.115	4	1.910	1	7
Difficulty understanding	973	3.221	3	1.851	1	7
Difficulty choosing tariffs	973	3.194	3	1.810	1	7
Prefer ToU, even with cost increase	973	3.146	3	1.867	1	7

6.5 Comprehension tasks: scores

Table A6: Correlation between score in time-based ToU task, treatment, and demographic factors

	Task score					
		Full task			Second half	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.0104***	6.2843***	5.5772***	3.0813***	3.2715***	2.9789***
	(0.0951)	(0.2931)	(0.3763)	(0.0505)	(0.1655)	(0.2093)
Task feedback	-0.3999***	-0.3270**	-0.3305**	-0.2374***	-0.2009***	-0.2036***
	(0.1397)	(0.1374)	(0.1367)	(0.0767)	(0.0758)	(0.0757)
Gender: Woman		-0.0568	-0.0851		0.0332	0.0245
		(0.1378)	(0.1386)		(0.0762)	(0.0773)
Gender: Non-binary/other/not reported		0.7738	0.8205		0.6100*	0.6328*
		(0.8727)	(0.9201)		(0.3453)	(0.3668)
Age category: Under 40 years old		0.1867	0.2024		0.0691	0.0751
		(0.1682)	(0.1691)		(0.0916)	(0.0924)
Age category: 60 years old or above		-0.3700*	-0.4996**		-0.2509**	-0.3058***
		(0.1989)	(0.2046)		(0.1114)	(0.1145)
Region: Rest of Leinster		-0.4175**	-0.4457**		-0.2200**	-0.2324**
		(0.1945)	(0.1946)		(0.1110)	(0.1110)
Region: Munster		-0.5972***	-0.6055***		-0.2510**	-0.2535**
		(0.1983)	(0.1971)		(0.1084)	(0.1078)
Region: Connacht or Ulster		-0.4120*	-0.3871*		-0.1837	-0.1722
		(0.2345)	(0.2331)		(0.1279)	(0.1275)
Location: Rural		0.0452	0.0587		-0.0150	-0.0122
		(0.1600)	(0.1591)		(0.0873)	(0.0870)
Education: Up to Lower Secondary		-0.8742***	-0.8841***		-0.3782**	-0.3850**
		(0.2751)	(0.2741)		(0.1569)	(0.1559)
Education: Technical or Vocational Qualification		-0.1248	-0.1250		-0.0388	-0.0351
		(0.2485)	(0.2492)		(0.1364)	(0.1367)
Education: Advanced Certificate		0.2132	0.2459		0.0448	0.0680
		(0.2671)	(0.2659)		(0.1441)	(0.1438)
Education: Ordinary Bachelor Degree		0.2397	0.2326		0.0909	0.0864
		(0.2265)	(0.2251)		(0.1262)	(0.1261)
Education: Honours Bachelor Degree		0.5984***	0.5439**		0.3098***	0.2853**
		(0.2135)	(0.2152)		(0.1176)	(0.1194)
Education: Postgraduate		0.5722**	0.4867*		0.2472*	0.2124
		(0.2462)	(0.2486)		(0.1314)	(0.1328)
Dwelling type: Apartment/other		-0.2744	-0.2930		-0.0803	-0.0897
		(0.2966)	(0.2922)		(0.1580)	(0.1561)
Household size: 1-2 members		0.1976	0.2394		0.0958	0.1101
		(0.1948)	(0.1973)		(0.1069)	(0.1083)
Household size: 4 members		0.0456	0.0356		-0.0510	-0.0574
		(0.2141)	(0.2146)		(0.1180)	(0.1185)
Household size: 5+ members		-0.3260	-0.3672*		-0.1963*	-0.2157*
		(0.2149)	(0.2131)		(0.1180)	(0.1172)
Children in household: Yes		-0.1444	-0.0823		-0.0945	-0.0663
		(0.1900)	(0.1910)		(0.1020)	(0.1023)

# bedrooms: 0-1		-0.3432	-0.3098		-0.2731	-0.2511
		(0.4086)	(0.4078)		(0.2227)	(0.2224)
# bedrooms: 2		-0.2397	-0.2606		-0.2097*	-0.2158*
		(0.2367)	(0.2346)		(0.1272)	(0.1266)
# bedrooms: 4		0.3582**	0.3242**		0.1820**	0.1697*
		(0.1625)	(0.1642)		(0.0901)	(0.0906)
# bedrooms: 5+		0.0171	-0.0139		-0.1437	-0.1594
		(0.2978)	(0.2951)		(0.1653)	(0.1646)
Contract responsibility: Yes, with others			-0.0163			-0.0351
			(0.1504)			(0.0849)
Contract responsibility: No			-0.0463			-0.0113
			(0.3030)			(0.1541)
Days at home: 4-6 days per week			0.5775***			0.3110***
			(0.2072)			(0.1152)
Days at home: All week			0.4618**			0.2396**
			(0.1866)			(0.1002)
Moral obligation to reduce carbon footprint			0.0875**			0.0287
			(0.0405)			(0.0224)
Observations	973	973	973	973	973	973
R2	0.008	0.086	0.099	0.010	0.074	0.083
Mean DV (control group)	6.01	6.01	6.01	3.081	3.081	3.081

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.

Table A7: Correlation between score in appliance-based ToU task, treatment, and demographic factors

	Task score					
		Full task			Second half	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.3188***	6.4047***	6.0245***	3.1625***	3.1265***	2.8593***
	(0.0773)	(0.2394)	(0.2869)	(0.0470)	(0.1388)	(0.1679)
Task feedback	-0.0977	-0.0806	-0.0823	0.0038	0.0202	0.0171
	(0.1108)	(0.1118)	(0.1117)	(0.0661)	(0.0667)	(0.0664)
Gender: Woman		0.1463	0.1409		0.1372**	0.1355**
		(0.1128)	(0.1122)		(0.0672)	(0.0665)
Gender: Non-binary/other/not reported		-0.7519	-0.7380		-0.4606	-0.4165
		(0.9784)	(0.9666)		(0.5346)	(0.5175)
Age category: Under 40 years old		-0.0779	-0.0550		-0.0625	-0.0524
		(0.1306)	(0.1321)		(0.0789)	(0.0802)
Age category: 60 years old or above		0.0744	-0.0044		0.0297	-0.0259
		(0.1712)	(0.1744)		(0.0989)	(0.1006)
Region: Rest of Leinster		0.0594	0.0402		-0.0008	-0.0163
		(0.1521)	(0.1521)		(0.0917)	(0.0916)
Region: Munster		-0.0867	-0.0846		-0.0357	-0.0345
		(0.1681)	(0.1671)		(0.0995)	(0.0989)
Region: Connacht or Ulster		-0.1545	-0.1400		-0.0596	-0.0498
		(0.1981)	(0.1975)		(0.1146)	(0.1141)
Location: Rural		0.0130	0.0199		0.0579	0.0656
		(0.1296)	(0.1294)		(0.0762)	(0.0760)
Education: Up to Lower Secondary		-0.4699*	-0.4795*		-0.2663*	-0.2764*
		(0.2474)	(0.2447)		(0.1439)	(0.1422)
Education: Technical or Vocational Qualification		-0.1973	-0.1921		-0.0870	-0.0823
		(0.1934)	(0.1933)		(0.1181)	(0.1172)
Education: Advanced Certificate		0.2166	0.2391		0.1689	0.1714
		(0.1979)	(0.1983)		(0.1155)	(0.1156)
Education: Ordinary Bachelor Degree		-0.0982	-0.1162		0.0148	-0.0014
		(0.1861)	(0.1888)		(0.1098)	(0.1112)
Education: Honours Bachelor Degree		-0.0063	-0.0476		0.0429	0.0059
		(0.1785)	(0.1823)		(0.1062)	(0.1084)
Education: Postgraduate		0.0816	0.0195		0.0883	0.0359
		(0.1902)	(0.1922)		(0.1168)	(0.1188)
Dwelling type: Apartment/other		-0.3356	-0.3490		-0.1380	-0.1526
		(0.2202)	(0.2198)		(0.1342)	(0.1339)
Household size: 1-2 members		0.0287	0.0466		0.0932	0.0942
		(0.1650)	(0.1670)		(0.0964)	(0.0982)
Household size: 4 members		-0.1662	-0.1628		-0.0309	-0.0257
		(0.1755)	(0.1760)		(0.1044)	(0.1040)
Household size: 5+ members		-0.3340**	-0.3511**		-0.1217	-0.1288
		(0.1616)	(0.1635)		(0.0992)	(0.0990)
Children in household: Yes		0.1837	0.2061		0.0682	0.0812
		(0.1426)	(0.1457)		(0.0879)	(0.0896)

# bedrooms: 0-1		-0.0127	0.0267		-0.0817	-0.0519
		(0.3005)	(0.2934)		(0.1848)	(0.1810)
# bedrooms: 2		-0.0641	-0.0716		-0.1182	-0.1282
		(0.1837)	(0.1845)		(0.1089)	(0.1093)
# bedrooms: 4		0.1297	0.1170		0.0420	0.0291
		(0.1365)	(0.1389)		(0.0813)	(0.0828)
# bedrooms: 5+		-0.1062	-0.1171		-0.0669	-0.0740
		(0.2335)	(0.2349)		(0.1381)	(0.1378)
Contract responsibility: Yes, with others			-0.0527			-0.0788
			(0.1232)			(0.0734)
Contract responsibility: No			-0.1958			-0.1386
			(0.2253)			(0.1450)
Days at home: 4-6 days per week			0.4226**			0.2987***
			(0.1752)			(0.1014)
Days at home: All week			0.3055**			0.1795**
			(0.1446)			(0.0864)
Moral obligation to reduce carbon footprint			0.0395			0.0377**
			(0.0323)			(0.0190)
Observations	973	973	973	973	973	973
R2	0.001	0.026	0.036	0.000	0.027	0.042
Mean DV (control group)	6.319	6.319	6.319	3.163	3.163	3.163

*p<0.1; **p<0.05; ***p<0.01. The omitted categories are: Gender: Man; Age category: 40-59 years old; Region: Dublin; Location: Urban; Education: Upper secondary; Dwelling type: House; Household size: 3 members; Children in household: No; Number of bedrooms: 3; Contract responsibility: Yes, myself; Days at home: 0-3 days per week.