# Show me the money!
# A field experiment on electric vehicle charge timing

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Online Appendix

# A Heterogeneous Treatment Effects

We run two heterogeneous treatment effect analyses for our Phase 1 analysis. First, we estimate our main specification (Equation 1, main text) but permit different estimated treatment effects by Tesla and non-Tesla EVs. Tesla EVs make up approximately 56% of our sample. Tesla owners may be unique in their driving and charging behavior and/or have advanced capability to adjust charging via Tesla's app. Second, an individual's ability to alter their charge timing may depend on how much they drive their car. To test this, we categorize EVs into the top and bottom 50th percentiles based on their average daily km driven over the pre-treatment (Phase 0) period.

Table A.1 below presents the results with the Charge Indicator as our dependent variable. Column (1) presents the results of our main specification for comparison purposes. Focusing on the Rewards group, in columns (2) and (3), we find a larger increase in the frequency of off-peak charging within the Tesla group and an imprecisely estimated increase in off-peak charging for non-Tesla vehicles. In contrast, we find that both groups had a statistically significant decrease in peak charging, with a modestly larger coefficient for the non-Tesla EVs. Importantly, neither peak or off-peak coefficients are significantly different from each other across Tesla and non-Tesla EVs.

The Info coefficients remain insignificant for both the peak and off-peak hours for Tesla and non-Tesla EVs. Further, we do not find significant differences in the estimated effects across the two groups. These results do not provide any evidence of a heterogeneous treatment effect by Tesla and non-Tesla EVs for either the Rewards or Info groups.

Columns (4) and (5) present the results by whether or not an EV owner was in the top or bottom 50th percentile in terms of the mean daily km driven pre-treatment. For the Rewards group, we observe a larger estimated effect for the shift to off-peak charging frequency for EVs in the bottom 50th percentile. However, we test if the off-peak effects are statistically significantly different and find no evidence of a heterogeneous off-peak effect for the Reward group by pre-treatment driving intensity. The peak coefficients are both negative, but are imprecisely estimated for the bottom 50th percentile group. The peak coefficients are not significantly different from each other when looking across the two categories.

For the Info group, there are no significant effects, and there is no significant evidence of heterogeneous treatment effects by pre-treatment driving intensity.

Table A.2 below presents the results with the Charge kWh as our dependent

Table A.1. Estimated Heterogeneous Treatment Effects - Charge Indicator

| Group | Hours | (1) Main Specification | (2) Tesla | (3) Non-Tesla | (4) Top 50% Mean km | (5) Bottom 50% Mean km |
|---|---|---|---|---|---|---|
| Rewards | Peak | -0.0509 | -0.0447 | -0.0612 | -0.0584 | -0.0361 |
| | | (0.0208) | (0.0221) | (0.0303) | (0.0230) | (0.0242) |
| | Off-Peak | 0.0959 | 0.1069 | 0.0718 | 0.0660 | 0.1300 |
| | | (0.0296) | (0.0333) | (0.0485) | (0.0339) | (0.0464) |
| Info | Peak | 0.0090 | 0.0040 | 0.0171 | 0.0076 | 0.0136 |
| | | (0.0238) | (0.0287) | (0.0290) | (0.0261) | (0.0334) |
| | Off-Peak | -0.0225 | -0.0161 | -0.0329 | 0.0006 | -0.0629 |
| | | (0.0330) | (0.0390) | (0.0521) | (0.0411) | (0.0413) |
| Mean Dep. Var (Pre-Treatment) | | | | | | |
| Rewards | Peak | 0.1706 | 0.1466 | 0.2144 | 0.1831 | 0.1528 |
| | Off-Peak | 0.3516 | 0.3177 | 0.4139 | 0.4298 | 0.2396 |
| Info | Peak | 0.1990 | 0.1685 | 0.2415 | 0.1980 | 0.2007 |
| | Off-Peak | 0.3386 | 0.3526 | 0.3190 | 0.3418 | 0.3333 |

Notes. The results reflect the estimation of Equation (1), permitting heterogeneous treatment effects by Tesla/Non-Tesla and for the top and bottom 50th percentile by pre-treatment daily average driving distance. The data includes charging at home only and days where charging occurred. The estimated treatment effects are separated into Peak and Off-Peak hours. The Mean Dep. Var. (Pre-Treatment) is the mean value of the dependent variable between February 1, 2022 - March 31, 2022, separated into Peak and Off-Peak hours. All specifications include vehicle, month-of-sample, hour-of-day, and day-of-week fixed effects as well as temperature control variables up to a third-order polynomial. Standard errors are clustered at the vehicle level.

variable. Column (1) presents the results of our main specification for comparison purposes. When comparing columns (2) and (3), it is important first to note that the pre-treatment means of the dependent variable are considerably larger for Tesla than non-Tesla EVs. This is consistent with the fact that Tesla EVs tend to have a larger range (associated with a higher battery capacity) and drive more km on average than the other EVs in our sample.

Focusing on the Rewards group, in columns (2) and (3), we observe larger coefficients in absolute value for both the Peak and Off-Peak effects for Tesla compared to non-Tesla EVs. This suggests that there are larger shifts in peak to off-peak charging kWhs due to the treatment for Teslas than non-Tesla EVs. The difference in the effects are more modest when normalized by the pre-treatments. Despite these sizable differences, we do not find that these effects significantly differ across Tesla and

non-Tesla EVs. For the Info group, we no longer find any significant effects. Further, the estimated treatment effects are not significantly different by Tesla and non-Tesla EVs.

Table A.2. Estimated Heterogeneous Treatment Effects - Charge kWh

| Group | Hours | (1) Main Specification | (2) Tesla | (3) Non-Tesla | (4) Top 50% Mean km | (5) Bottom 50% Mean km |
|---|---|---|---|---|---|---|
| Rewards | Peak | -0.2008 | -0.2321 | -0.1148 | -0.2787 | -0.0771 |
| | | (0.0558) | (0.0700) | (0.0662) | (0.0718) | (0.0635) |
| | Off-Peak | 0.4553 | 0.5187 | 0.2832 | 0.5177 | 0.3407 |
| | | (0.1063) | (0.1364) | (0.1384) | (0.1458) | (0.1375) |
| Info | Peak | 0.0053 | -0.0447 | 0.0898 | -0.0490 | 0.1015 |
| | | (0.0626) | (0.0818) | (0.0650) | (0.0799) | (0.0712) |
| | Off-Peak | -0.2216 | -0.2481 | -0.1845 | -0.1747 | -0.3172 |
| | | (0.1282) | (0.1899) | (0.1141) | (0.1834) | (0.1440) |
| Mean Dep. Var (Pre-Treatment) | | | | | | |
| Rewards | Peak | 0.4091 | 0.4687 | 0.3003 | 0.4750 | 0.3149 |
| | Off-Peak | 1.2280 | 1.4494 | 0.8214 | 1.6316 | 0.6490 |
| Info | Peak | 0.5366 | 0.5928 | 0.4584 | 0.5955 | 0.4375 |
| | Off-Peak | 1.0946 | 1.4624 | 0.5803 | 1.2726 | 0.7937 |

Notes. The results reflect the estimation of Equation (1), permitting heterogeneous treatment effects by Tesla/Non-Tesla and for the top and bottom 50th percentile by pre-treatment daily average driving distance. The data includes charging at home only and days where charging occurred. The estimated treatment effects are separated into Peak and Off-Peak hours. The Mean Dep. Var. (Pre-Treatment) is the mean value of the dependent variable between February 1, 2022 - March 31, 2022, separated into Peak and Off-Peak hours. All specifications include vehicle, month-of-sample, hour-of-day, and day-of-week fixed effects as well as temperature control variables up to a third-order polynomial. Standard errors are clustered at the vehicle level.

Next, we consider if there are heterogeneous treatment effects by driving intensity. As expected, columns (4) and (5) demonstrate that the pre-treatment mean Charge kWhs are distinctly higher for the EVs in the top 50th percentile of mean daily charging than the bottom 50th percentile. Focusing on the estimated treatment effects for the Rewards group, we find distinctly higher effects for the heavier driving EVs for both the peak and off-peak coefficients. In fact, the peak coefficient is no longer significant for the EVs in the bottom 50th percentile. Normalizing these coefficients by the dependent variables pre-treatment mean mitigates these differences. Unlike the previous analyses, the estimated effects on the Peak coefficients are significantly different at the 5% level. This suggests that the reduction in on-peak charging kWhs

are distinctly larger for EVs that are heavier drivers. The off-peak coefficients are not significantly different by pre-treatment driving intensity.

Focusing on the Info group in columns (4) and (5), we continue to find a reduction in off-peak charging, with statistical significance only for EVs in the bottom 50th percentile. (As discussed in Section 5 of the main text, this is likely due to the Info group charging more away from home post-treatment than the other groups.) We do not find any evidence of a significant difference in the estimated treatment effect for the Info group by pre-treatment driving intensity.

Taken together, the results using both dependent variables do not provide strong evidence of systematic differences between Tesla and non-Tesla EVs or by pre-treatment driving intensity. There is evidence of a difference suggesting that Teslas and EVs driven by heavier drivers will have larger estimated changes in charge kWhs from peak to off-peak due to financial rewards, when using charge kWhs as the dependent variable. However, these effects are only significantly different for peak charging kWhs by pre-treatment driving intensity.

## B Assessment of Scheduled Charging

In this section, we present an empirical assessment of scheduled charging. In our data, we are unable to observe if an EV owner is using scheduled charging. Our data provide charging kWhs in 15-minute intervals. To overcome these data limitations, we take several approaches to define scheduled charging and investigate if this varies over time. In the discussion below, we summarize our approach and illustrate that there is a surprising degree of variability in charging behavior and the extent of (estimated) scheduled charging.

First, if an EV owner systematically relied on scheduled charging, we would expect to observe an often-repeated time series of the same charge start times in the data when at-home charging is observed. We calculate the number of consecutive charging days where the first hour of charging at home is the same. When an EV owner starts charging their car at a different hour of the day at home, we reset the count. We permit gaps in charging days at home to account for the fact that a subset of our EVs do not plug in every day sequentially. Further, to avoid "away" charging (e.g., mid-day) resetting the count, we focus on at-home charging only.

Second, we identify days on which an EV was charged at home and the first charge of the day occurred between 10 PM – 7 AM. This definition would capture an EV

owner plugging in their car after work and delaying charging (e.g., via an App) to start at 10 PM, 12 AM, or by setting a departure time the next morning in which the EV needs to achieve a pre-set state-of-charge (so that the charging algorithm starts to charge several hours in advance to satisfy this target). All three cases are likely methods to be used when setting an EV charge schedule in an App. This measure of scheduled charging captures a broad range of possible behavior. We also considered more narrow definitions (e.g., first charge started between 10:00 - 10:15 PM, or adjusting the range from 12 AM – 7 AM). The conclusions summarized below persist, with considerably lower rates of scheduled charging being identified the more stringent the definition. We also compare this scheduled charging measure to the responses to the pre-experiment survey that asked whether or not an EV owner pre-schedules their charging.

Table B.1. Percent of Charge Sequences of at least Length N Days by Group – Phase 0 and 1

| Length | Phase | Reward | Info | Control |
|---|---|---|---|---|
| 2 or More | Phase 0 | 17.49 | 15.81 | 18.18 |
| | Phase 1 | 19.79 | 16.72 | 15.61 |
| 3 or More | Phase 0 | 5.81 | 6.53 | 6.99 |
| | Phase 1 | 8.15 | 6.26 | 6.45 |
| 4 or More | Phase 0 | 2.71 | 3.31 | 4.31 |
| | Phase 1 | 5.00 | 3.29 | 3.68 |
| 5 or More | Phase 0 | 1.27 | 1.99 | 1.98 |
| | Phase 1 | 3.37 | 2.07 | 2.13 |
| 6 or More | Phase 0 | 0.66 | 1.14 | 1.52 |
| | Phase 1 | 2.52 | 1.40 | 1.76 |

Notes. The data includes charging at-home only. Charging sequences reflect the number of consecutive charging days with the same first hour of charge start time.

We start by describing sequential days of at-home charging with the same-hour start time. For the Reward, Info, and Control groups, Table B.1 presents the percentage of charging days with the same start charge time by the sequence length for Phases 0 and 1 of our experiment. We observe a relatively low percentage of days on which an EV had the same start time sequentially, across all groups. Less than 20% of charge days are part of a sequence of 2 or more charge days in a row with the same start time (at the hourly level). The percentages quickly decrease as the number of sequential days increases. For the Reward group, we observe a systematic increase in

the percentage as we move from Phase 0 to Phase 1. This suggests that there may be some extent of increased scheduled charging once financial incentives are provided. However, it is still the case that relatively few (<5%) EVs in the Rewards group have the same start time consecutively for 4 or more days. For Info and Control, there is limited evidence of a consistent increase in this measure of scheduled charging between Phases 0 and 1. Taken together, this table demonstrates that we observe a sizable amount of variation in charge start times within the majority of EVs in our sample, both before and after being exposed to the treatment.

Table B.2 presents the percentage of at-home charging sequences by the length of days for the Reward-Continue and Reward-Stop groups over all three phases of our experiment. The Control group is included for comparison purposes. Similar to the results above, we observe a relatively low percentage of charge sequences of length 3 or more. Both the Rewards-Continue and Rewards-Stop groups have an increase in Phase 1. We observe a small reduction in the percentages as we move to Phase 2 for both groups, possibly due to seasonal changes in charging behavior. There are only modest differences between the two Reward groups across all three Phases. Further, we do not observe any clear systematic divergence between these two groups between Phases 1 and 2. This suggests that, to the extent that EV drivers were using automation during Phase 1, the change in charge timing from the Reward-Stop group observed during Phase 2 was likely not driven by a distinct change in the use of automation. These results continue to show that there was a sizable amount of variability in charge timing over our sample period, suggesting that EV owners did not rely primarily on scheduled charging to automate their charging behavior.

Next, we present the summary statistics of the percentage of EV charging days where the first hour of charging at home occurred between 10 PM and 7 AM. Table B.3 summarizes this measure over Phases 0 and 1 for the Rewards, Info, and Control groups. During Phase 0, this broad measure of scheduled charging estimates 30% - 40% of charging days with scheduled charging. As we move to Phase 1, we observe a sizable increase in our scheduled charging measure for the Rewards group, a smaller increase for Control, and minimal changes for the Info group. This is consistent with our main conclusions that the Rewards households responded to the financial incentive by shifting their charging to the off-peak period starting at 10 PM.

An important caveat with this measure is that we cannot determine with certainty that this is due to scheduled charging or waiting to plug in their EV at 10 PM. If we take a narrower definition and require scheduled charging to reflect the EV to

Table B.2. Percentage of Charge Sequences of at least Length N Days by Group and Phase

| Length | Phase | Reward-Continue | Reward-Stop | Control |
|---|---|---|---|---|
| 2 or More | Phase 0 | 17.83 | 17.19 | 18.18 |
| | Phase 1 | 19.46 | 20.08 | 15.61 |
| | Phase 2 | 18.58 | 18.00 | 16.55 |
| 3 or More | Phase 0 | 5.90 | 5.73 | 6.99 |
| | Phase 1 | 7.89 | 8.38 | 6.45 |
| | Phase 2 | 6.94 | 7.44 | 6.68 |
| 4 or More | Phase 0 | 2.72 | 2.71 | 4.31 |
| | Phase 1 | 4.60 | 5.37 | 3.68 |
| | Phase 2 | 3.61 | 4.54 | 4.10 |
| 5 or More | Phase 0 | 1.30 | 1.25 | 1.98 |
| | Phase 1 | 3.02 | 3.68 | 2.13 |
| | Phase 2 | 2.52 | 2.83 | 2.57 |
| 6 or More | Phase 0 | 0.59 | 0.73 | 1.52 |
| | Phase 1 | 2.17 | 2.83 | 1.76 |
| | Phase 2 | 2.34 | 2.13 | 2.09 |

Notes. The data includes charging at-home only. Charging sequences reflect the number of consecutive charging days with the same first hour of charge start time.

start charging for the first time of the day between 10:00 – 10:15 PM (the 15-minute increment that would be consistent with pre-scheduling for 10:00 PM), we observe a percentage of 3.6% in Phase 0 and 11.5% in Phase 1 for the Rewards group. While this supports a modest extent of scheduled charging, we cannot rule out the possibility that this reflects active behavior rather than automation via scheduled charging.

Table B.3. Percent of EV-Charge Days with Scheduled Charging (10 PM - 7 AM) - Phases 0 and 1

| Group | Phase 0 | Phase 1 |
|---|---|---|
| Rewards | 40.16 | 60.32 |
| Info | 32.03 | 31.96 |
| Control | 42.62 | 46.90 |

Notes. The data includes charging at home only. A scheduled charging day is defined as having the first charge of the day occurring between 10 PM – 7 AM.

Table B.4 presents the percentage of EV charging days where the first at-home charge occurred between 10 PM and 7 AM over all three Phases of our experiment, breaking the Rewards group into Rewards-Continue and Rewards-Stop. The Control

group is provided for comparison purposes. For both Rewards groups, we observe an increase in the scheduled charging measure in Phase 1 and a reduction in Phase 2. The Control group observes a similar pattern over the three phases, but the increase in Phase 1 is smaller. This suggests that some of the changes in this measure are driven in part by seasonality.

Table B.4. Percent of EV-Charge Days with Scheduled Charging (10 PM - 7 AM) - Phases 0, 1, and 2

| Group | Phase 0 | Phase 1 | Phase 2 |
|---|---|---|---|
| Rewards-Continue | 41.85 | 61.88 | 54.02 |
| Rewards-Stop | 38.69 | 58.96 | 48.28 |
| Control | 42.62 | 46.90 | 42.77 |

Notes. The data includes charging at home only. A scheduled charging day is defined as having the first charge of the day occurring between 10 PM – 7 AM.

As a final approach, we tabulate the percentage of days where the EVs are flagged as scheduling their charging based on our 10 PM to 7 AM measure by whether or not the owner responded to the pre-experiment survey saying they use pre-scheduled charging. For EV owners that responded "Yes" to the survey question, 58% of their charging in Phase 0 is flagged as being scheduled. In contrast, for the EV owners that responded "No", 11% of their charging in Phase 0 is flagged as being scheduled. This suggests that our measure of scheduled charging is somewhat consistent with survey results, but there is a degree of measurement error. However, we focused on the EVs that responded "Yes" to the pre-experiment survey and observe a considerable degree of variation in charge timing in the pre-treatment period. For example, the percentage of same-hour charging sequences that were part of a sequence that is 3 or more days remains low in this group, coming in at 6.3% in Phase 0 and 7.4% in Phase 1. Therefore, even EV owners who report that they pre-schedule their charging deviate from systematic (same-hour) charging at a relatively high frequency.

To summarize, both methods to evaluate the extent of scheduled charging suggest that there are a sizable number of charging days where the EVs do not employ scheduled charging at home. While we observe an increase in our measure of scheduled charging after Phase 0 (pre-treatment), there is still considerable variability in the first hour of charging over Phases 1 and 2. This suggests that while scheduled charging is likely to have played a role, there is evidence to suggest that EV owners did not rely systematically on scheduled charging to set their charge timing.

# C Additional Tables

Table C.1. Comparison of Means by Group - Survey Variables

| Variable | Control | Info | Rewards | ANOVA (p-value) |
|---|---|---|---|---|
| Pre-Schedule (%) | 65.38 | 43.75 | 60.38 | 0.20 |
| | (48.52) | (50.40) | (49.38) | |
| Charge Outside of Home (%) | 69.23 | 62.50 | 62.26 | 0.82 |
| | (47.07) | (49.19) | (48.94) | |
| Number of Electric/Hybrid Vehicles | 1.15 | 1.13 | 1.28 | 0.17 |
| | (0.37) | (0.34) | (0.45) | |
| Number of Other Vehicles | 0.92 | 0.97 | 0.94 | 0.98 |
| | (0.80) | (0.69) | (0.91) | |
| Solar Panels (%) | 11.54 | 28.13 | 22.64 | 0.31 |
| | (32.58) | (45.68) | (42.25) | |
| Number of Drivers | 1.85 | 2.06 | 2.09 | 0.13 |
| | (0.46) | (0.25) | (0.66) | |
| Percent with at least Bachelors | 84.62 | 84.38 | 88.68 | 0.82 |
| | (36.79) | (36.89) | (31.99) | |
| Percent with Graduate Degrees | 30.77 | 37.50 | 32.08 | 0.84 |
| | (47.07) | (49.19) | (47.12) | |
| Count | 26 | 32 | 53 | |

Notes. This table compares average values at the household level from the survey responses across the three different groups. Parentheses contain the standard deviations. Pre-Schedule represents the percentage of EV owners that reported using pre-scheduling to determine their EV charge timing, Charge Outside of Home is the percentage of EV owners that reported ever charging outside of their home, Number of Electric/Hybrid Vehicles is the number of EVs or hybrid vehicles, Number of Other Vehicles is the number of non-EV/hybrid vehicles, Solar Panels represents the percentage of EV owners that also have solar panels, Number of Drivers is the number of drivers in the household, Percent with at least Bachelors is the percentage of EV owners with a Bachelors, Master's, or Ph.D., and Percent with Graduate Degrees is the percentage of EV owners with a Master's or a Ph.D. ANOVA (p-value) reports the p-value from one-way ANOVA tests for differences in means across groups.

Table C.2. Pre-Treatment (Phase 0) Comparison of Means by Survey Response

| Variable | Response | Non-Response | p-value |
|---|---|---|---|
| Home Charging (%) | 85.18 | 80.23 | 0.29 |
| | (24.58) | (26.52) | |
| Daily Charging Sessions (Count) | 1.75 | 1.38 | 0.32 |
| | (2.20) | (1.06) | |
| Energy Charged Per Session (kWh) | 10.09 | 9.90 | 0.89 |
| | (7.23) | (6.69) | |
| Max kW Charge at Home | 6.40 | 5.09 | 0.03 |
| | (2.96) | (3.03) | |
| Modal Hour of Charge (Start Time) | 6.02 | 5.18 | 0.49 |
| | (6.56) | (6.42) | |
| Charge Duration Per Session (Minutes) | 134.81 | 152.23 | 0.41 |
| | (119.26) | (91.18) | |
| Percent Tesla | 55.96 | 58.97 | 0.75 |
| | (49.87) | (49.83) | |
| Average Daily Distance Driven (km) | 49.73 | 48.18 | 0.82 |
| | (34.38) | (41.33) | |
| Charge Frequency | 0.21 | 0.26 | 0.04 |
| | (0.12) | (0.13) | |
| Hourly Charge kWh | 0.71 | 0.77 | 0.44 |
| | (0.46) | (0.42) | |
| % kWhs Charged in Off-Peak | 52.21 | 52.11 | 0.99 |
| | (32.58) | (29.81) | |
| Number of EVs | 111 | 39 | |

Notes. This table compares the pre-treatment (Phase 0) average values of vehicle-level variables by whether they responded to the survey (Response) or did not respond (Non-Response). Parentheses contain the standard deviations. Home Charging captures the percentage of charging sessions that were at home, Daily Charging Sessions is the number of times the car was plugged in to charge each day looking across all days (i.e., including days where the EV was not charged), Energy Charged Per Session is the cumulative number of kWhs charged each session, Max kW Charge at Home is the maximum kW draw from the charger at home in a charging session, Modal Hour of Charge is the modal hour that charging started, Charge Duration reflects the minutes of charging each charge session, Percent Tesla is the percentage of EVs that are Teslas, Average Daily Distance Driven is the average daily km traveled, Charge Frequency reflects the proportion of hours the EVs were being charged at home on days when there is at least one hour of at-home charging, Hourly Charge kWhs is the mean hourly kWhs charged at home on days when there is at least one hour of at-home charging, and % kWhs Charged in Off-Peak represents the share of total kWhs charged at home in the off-peak hours. P-value reports the p-value from a difference in means test across the two groups.

Table C.3. Phase 1 Comparison of Means by Rewards-Continue and Rewards-Stop

| Variable | Rewards-Continue | Rewards-Stop | p-value |
|---|---|---|---|
| Home Charging (%) | 78.62 | 73.60 | 0.46 |
| | (24.91) | (29.36) | |
| Daily Charging Sessions (Count) | 1.17 | 1.09 | 0.71 |
| | (0.97) | (0.70) | |
| Energy Charged Per Session (kWh) | 11.59 | 12.54 | 0.63 |
| | (7.83) | (7.75) | |
| Max kW Charge at Home | 5.47 | 6.25 | 0.35 |
| | (3.31) | (2.91) | |
| Modal Hour of Charge (Start Time) | 1.95 | 4.03 | 0.16 |
| | (4.31) | (7.28) | |
| Charge Duration Per Session (Minutes) | 182.69 | 148.57 | 0.28 |
| | (131.63) | (121.18) | |
| Percent Tesla | 58.06 | 57.14 | 0.94 |
| | (50.16) | (50.21) | |
| Average Daily Distance Driven (km) | 52.72 | 54.70 | 0.87 |
| | (56.39) | (36.88) | |
| Charge Frequency | 0.23 | 0.21 | 0.32 |
| | (0.12) | (0.11) | |
| Hourly Charge kWh | 0.69 | 0.76 | 0.45 |
| | (0.40) | (0.41) | |
| % kWhs Charged in Off-Peak | 73.78 | 74.76 | 0.88 |
| | (26.39) | (27.81) | |
| Number of EVs | 33 | 35 | |

Notes. This table compares the average values of variables at the vehicle level over the period April 1, 2022 - August 31, 2022 (Phase 1) for the Rewards-Continue and Rewards-Stop groups. Parentheses contain the standard deviations. Home Charging captures the percentage of charging sessions that were at home, Daily Charging Sessions is the number of times the car was plugged in to charge each day looking across all days (i.e., including days where the EV was not charged), Energy Charged Per Session is the cumulative number of kWhs charged each session, Max kW Charge at Home is the maximum kW draw from the charger at home in a charging session, Modal Hour of Charge is the modal hour that charging started, Charge Duration reflects the minutes of charging each charge session, Percent Tesla is the percentage of EVs that are Teslas, Average Daily Distance Driven is the average daily km traveled, Charge Frequency reflects the proportion of hours the EVs were being charged at home on days when there is at least one hour of at-home charging, Hourly Charge kWhs is the mean hourly kWhs charged at home on days when there is at least one hour of at-home charging, and % kWhs Charged in Off-Peak represents the share of total kWhs charged at home in the off-peak hours. P-value reports the p-value from a difference in means test across the two groups.

Table C.4. Comparison of Means by Rewards-Continue and Rewards-Stop - Survey Variables

| Variable | Rewards-Continue | Rewards-Stop | p-value |
|---|---|---|---|
| Pre-Schedule (%) | 57.69 | 62.96 | 0.70 |
| | (50.38) | (49.21) | |
| Charge Outside of Home (%) | 65.38 | 59.26 | 0.65 |
| | (48.52) | (50.07) | |
| Number of Electric/Hybrid Vehicles | 1.31 | 1.26 | 0.70 |
| | (0.47) | (0.45) | |
| Number of Other Vehicles | 0.85 | 1.04 | 0.45 |
| | (1.12) | (0.65) | |
| Solar Panels (%) | 23.08 | 22.22 | 0.94 |
| | (42.97) | (42.37) | |
| Number of Drivers | 1.92 | 2.26 | 0.06 |
| | (0.69) | (0.59) | |
| Percent with at least Bachelors | 84.62 | 92.59 | 0.37 |
| | (36.79) | (26.69) | |
| Percent with Graduate Degrees | 30.77 | 33.33 | 0.85 |
| | (47.07) | (48.04) | |
| Count | 26 | 27 | |

Notes. This table compares average values at the household level from the survey responses for the Rewards-Continue and Rewards-Stop groups. Parentheses contain the standard deviations. Pre-Schedule represents the percentage of EV owners that reported using pre-scheduling to determine their EV charge timing, Charge Outside of Home is the percentage of EV owners that reported ever charging outside of their home, Number of Electric/Hybrid Vehicles is the number of EVs or hybrid vehicles, Number of Other Vehicles is the number of non-EV/hybrid vehicles, Solar Panels represents the percentage of EV owners that also have solar panels, Number of Drivers is the number of drivers in the household, Percent with at least Bachelors is the percentage of EV owners with a Bachelors, Master's, or Ph.D., and Percent with Graduate Degrees is the percentage of EV owners with a Master's or a Ph.D. P-value reports the p-value from a difference in means test across the two groups.

Table C.5. Estimated Treatment Effects - Phase 1 (Home and Away)

| Group | Hours | (1) Charge Indicator | (2) Charge kWh |
|---|---|---|---|
| Rewards | Peak | -0.0408 | -0.1327 |
| | | (0.0215) | (0.0634) |
| | Off-Peak | 0.1026 | 0.4363 |
| | | (0.0305) | (0.0994) |
| Info | Peak | 0.0022 | 0.0187 |
| | | (0.0245) | (0.0775) |
| | Off-Peak | -0.0115 | -0.1545 |
| | | (0.0333) | (0.1194) |
| Mean Dep. Var. (Pre-Treatment) | | | |
| Rewards | Peak | 0.2021 | 0.6181 |
| | Off-Peak | 0.3497 | 1.2241 |
| Info | Peak | 0.2278 | 0.7406 |
| | Off-Peak | 0.3495 | 1.0701 |

Notes. The results reflect the estimation of Equation (1). The data include charging at home and away and days where charging occurred. The estimated treatment effects are separated into Peak and Off-Peak hours. The Mean Dep. Var. (Pre-Treatment) represents the mean value of each dependent variable between February 1, 2022 - March 31, 2022, separated into Peak and Off-Peak hours. All specifications include fixed effects at the vehicle, month-of-sample, hour-of-day, and day-of-week, as well as temperature control variables up to a third-order polynomial. Standard errors are clustered at the vehicle level.

Table C.6. Estimated Treatment Effects - Phase 2 (Home and Away)

| | | (1) | (2) |
|---|---|---|---|
| Group | Hours | Charge Indicator | Charge kWh |
| Rewards-Stop | Peak | 0.0172 | -0.0051 |
| | | (0.0191) | (0.0956) |
| | Off-Peak | -0.0587 | -0.1235 |
| | | (0.0261) | (0.1390) |
| Mean Dep. Var. | (Pre-Treatment, Phase 1) | | |
| Rewards-Stop | Peak | 0.1442 | 0.5241 |
| | Off-Peak | 0.3803 | 1.5475 |

Notes. The results reflect the estimation of Equation (2). The data include charging at both home and away and days where charging occurred. The estimated treatment effects are separated into Peak and Off-Peak hours. The Mean Dep. Var. (Pre-Treatment, Phase 1) represents the mean value of each dependent variable between April 1, 2022 - August 31, 2022, separated into All Hours, Peak, and Off-Peak only. All specifications include fixed effects at the vehicle, month-of-sample, hour-of-day, and day-of-week, as well as temperature control variables up to a third-order polynomial. Standard errors are clustered at the vehicle level.