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Loss Aversion and Energy Conservation:Experimental Evidence from Residential Energy Use

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Extended Abstract

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Abstract Summary

According to prospect theory, individuals respond more strongly to potential losses than to equivalent gains when evaluating outcomes relative to a reference point. We tested this prediction in residential electricity consumption using a preregistered field experiment involving 1,233 households and high-frequency smart meter data. Households were randomly assigned to one of three groups: a control group that received feedback only, a group that received incentives framed as gains around an individualized consumption reference point, and a group that received incentives framed as losses around an individualized consumption reference point. The reference point was calculated based on pre-treatment consumption data and adjusted for typical consumption variation. Households gained one point for each 0.5% reduction in their weekly consumption below the reference point, thus maintaining a constant incentive across framing. Points translated directly into lottery tickets. In total, households could win 3,000 euros, yielding an expected payoff of around 4 euros per household. Loss framing reduced weekly electricity consumption by 7.7%, whereas gain framing produced smaller, statistically insignificant effects. Event-time estimates show that responses emerge after initial performance feedback and are strongest during the second intervention week. Survey evidence shows that households in the loss-framing condition report higher initial performance expectations (belief that they will retain more points). Consumption patterns are consistent with reference-dependent preferences.

Presenting Author Biography

Benjamin Kirchler is a researcher at the Energy Institute at Johannes Kepler University Linz and a PhD candidate at the Vienna University of Economics and Business (WU Vienna). His research focuses on behavioral economics, energy economics, and experimental methods, with particular emphasis on household energy consumption. He has contributed to several

interdisciplinary and international research projects and has published work on behavioral interventions , sustainability, and consumer behavior. His current research examines how digital feedback, incentive design, and behavioral framing can support the energy transition.