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Abstract Title: The Impact of Smart Technology on Consumer Welfare: Evidence from a large randomized smart grid experiment

Abstract Text:

This paper investigates the extent to which technology used to automate household responses to dynamic pricing for electricity leads to higher energy savings than simply providing households with information on current prices and quantities, or relying on much simpler time-of –use pricing strategies. Using a large randomized field trial, we find that informed households with "smart" thermostats which adjust automatically to price changes achieve impressive reductions in consumption during on-peak periods of up to 80%, but also engage in substantial load shifting to off-peak hours. This suggests that households are surprisingly willing to accept automation as a strategy for improving their choices when prices vary from day to day. As technology providers are increasingly able to develop appliances (e.g. air-conditioners, washing machines etc., which can communicate with smart meters and can respond automatically to real time price changes, our evidence suggests that households would be willing to embrace these technologies. At the same time we caution that substantial heterogeneity remains across demographic and usage patterns, which is indicative of the fact that not all households are able to adapt as easily to dynamic pricing or be willing to give up control. This suggests that next generation technologies which include smart algorithms which learn consumer behavioral patterns in addition to having the ability to automate consumption in response to price signals may lead to significant improvements in consumer welfare.