

# **Power Outages, Increasing Block Tariffs and Billing Knowledge**

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## **Preferences for Improved Electricity Services in Developing Countries: Household's Defensive Behavior and Willingness to Pay**

Access to electricity has received much attention but its reliability has been given less focus. Thus, uninterrupted power supply remains a critical challenge facing households in low-income developing countries. In this paper, we use data on household defensive expenditures and willingness to pay (WTP) to analyze households' preference for improved electricity supply. We provide an estimate of average monthly defensive expenditures at different monthly hours of power outages using the generalized propensity score method – a continuous treatment matching. Furthermore, we elicit households' willingness to pay for improved electricity supply using the contingent valuation method. To this end, we use a field survey data from 1,152 sample households in Addis Ababa, Ethiopia. Our results show that the estimated average monthly defensive expenditures is substantial and vary by the monthly hours of power outages. Also, results from the stated preference study show that households are willing to pay 19%–25% of the existing average monthly bill for improved electricity supply.

*JEL Classification:* C21, D12, L94, N77, Q41, Q51

*Keywords:* Power outages, defensive behavior, willingness to pay, Ethiopia, generalized propensity score

## **Do Consumers Respond to Marginal Prices of Electricity under Increasing Block Tariff?**

In developing countries, electric and water utilities commonly use increasing block tariff (IBT) as a tool to encourage resource conservation, recover costs, and subsidize low-income consumers. However, it is not clear whether consumers actually respond to marginal prices under IBT. We empirically analyze whether marginal price in an IBT influences residential electricity demand, by combining administrative monthly electricity bill records with a detailed survey of sample households. Results from a bunching analysis and Arellano-Bond estimator show that prices of electricity do not significantly affect monthly electricity consumption. The finding highlights that consumers do not respond to marginal prices under IBT if electricity price is low or if they are unaware of the pricing schedules and have difficulty in understanding how their bills are computed in such tariff structures. This, in turn, has severe implications for the efficacy of the policy objectives of IBT.

*JEL Classification:* C23, D12, L11, L94, Q21

*Keywords:* Residential electricity demand, shared connections, increasing block tariff, bunching analysis, panel data

## **Billing Knowledge and Consumption Behavior: Experimental Evidence from Nonlinear Electricity Tariffs**

Increasing block tariff for electricity services is a popular tariff structure in developing countries with the ambition to promote resource conservation among users with high consumption and to provide subsidy for low-income consumers. However, in a complex pricing structure, such as increasing block tariff (IBT), consumers may not know the marginal price they face and might not fully understand how their bill is computed. Thus, in this study, we investigate whether educating consumers about how their monthly electricity bill is calculated in an IBT structure affects electricity consumption. To evaluate the effect of the treatment, we conduct a field experiment with residential electricity consumers in Ethiopia where electricity price is heavily subsidized and shared connections are common. Using monthly consumption data from the electric meters, we find no statistically significant effect after six months in response to the treatment. Our finding suggests that it is not the lack of billing information that makes residential electricity consumers insensitive to the IBT. Alternative reasons, such as the low electricity price are provided.

*JEL Classification:* C93, D12, D83, H42, L94

*Keywords:* Billing knowledge, consumer behavior, non-linear electricity price, field experiment

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