Survey Bias and the Poor: How Survey Responses Overstate Electricity Spending

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Executive Summary

This study investigates systematic differences between household electricity expenditures reported in national surveys and those recorded by utilities in Rwanda and Uganda. Using matched household data and transaction-level utility records, we show that **survey-reported electricity spending among low-income prepaid users is substantially overstated**. The bias arises because survey respondents often report infrequent lump-sum purchases as if they were regular monthly payments.

Key findings include:

1. **Surveys overstate electricity spending by 2–3× among poor households.**
2. **Frequency-adjusted corrections** based on utility transaction data reduce the median electricity burden to around **1–2% of total household expenditure**.
3. **Policy implications:** Without correcting for irregular purchases, affordability metrics and subsidy targeting risk overstating the electricity consumption levels of low-income households.

Study Overview

Surveys assume regular monthly payments, but many low-income prepaid users buy electricity irregularly, causing household budget shares to appear inflated.

Datasets:

- **Rwanda:** 650 households successfully matched between the national survey (EICV5, 2016/2017) and Rwanda Energy Group (REG) billing records using GPS and name-matching algorithms.

- **Uganda:** National household survey data linked with electricity purchase frequency distributions from the Uganda Electricity Distribution Company Limited (UEDCL)

Results: Comparing Survey and Utility Data

Before adjustment: Survey data suggest that poorer households spend a disproportionately high share of their budgets on electricity (>3%).
After adjustment: Median electricity burdens fall to **1.5% +/- 1**,

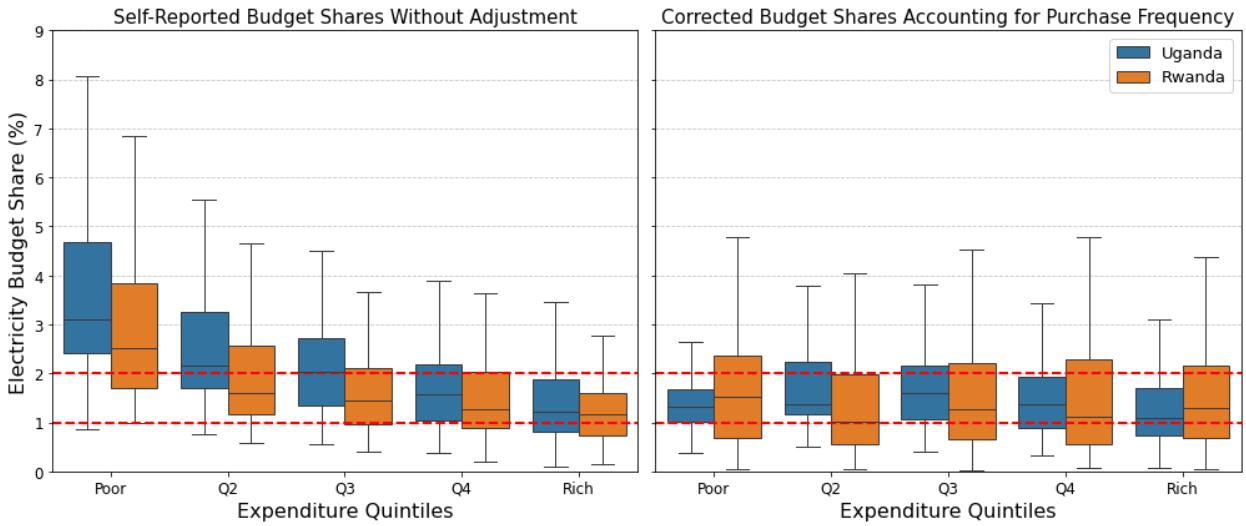

Figure 1: Boxplots of adjusted budget shares with red dashed lines marking the 1–2% expected affordability range

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Policy Implications

- **Affordability benchmarks:** Corrected data show electricity spending near global norms (1–2% of total budgets), not the inflated 3–5% often derived from raw surveys.
- **Subsidy targeting:** Misreporting leads to misclassification of affordability, particularly overstating consumption levels among the poor.
- **Data integration:** Combining survey and utility data or using frequency-based adjustments offers a scalable, low-cost improvement for energy access monitoring.

Conclusion

Frequency adjustment and predictive modeling reveal that survey-based estimates of electricity spending can substantially overstate burdens for low-income prepaid users. Correcting these biases provides a more accurate foundation for energy affordability policy.

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