

Cross-country evidence on multi-tier electricity accessibility, perceived inequality, and subjective well-being

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◆ Introduction

Access to modern electricity sources does not ensure reliability, quality, affordability, nor the sustained use of those energy sources (e.g., Jain et al. 2015; Jain and Shahidi 2019). In this vein, electrification rate is not a true measure of the benefit to households from electricity access, as it does not tell one about the comprehensive experience of the end users. On the other hand, it remains unknown whether and how people with better electricity access are different from those with poorer electricity access in terms of subjective well-being and perceived economic inequality. Given that access to modern energy, particularly electricity, is a pre-requisite to achieve basic human well-being, empirical evidence on multidimensional end-user-centric electricity accessibility and its underlying linkage to subjective well-being and perceived economic inequality are of great significance for guiding action on the ground.

This study used a multi-tier measurement of access to household electricity services (see Table 1) and investigated the differences in life satisfaction and perceived economic gap regarding different multi-tier assignment.

Table 1. Multi-tier measurement of access to household electricity services

Tier	Description
Tier 1 ●	Eclectic lighting + Any basic entertainment / communication (Radio / Mobile)
Tier 2 ●	Tier 1 services + Any Entertainment / communication (Television / Computer)
Tier 3 ●	Tier 2 services + Any medium-power appliances (Refrigerator / Air conditioner)
Tier 4 ●	Tier 3 services + Any high-power appliances (Microwave / Washing machine)

Note. The multi-tier measurement used in this study is designed based on the Multi-tier Framework of World Bank's Energy Sector Management Assistance Program (Bhatia & Angelou, 2015; Banerjee et al., 2013) and the survey questions included in the multinational survey.

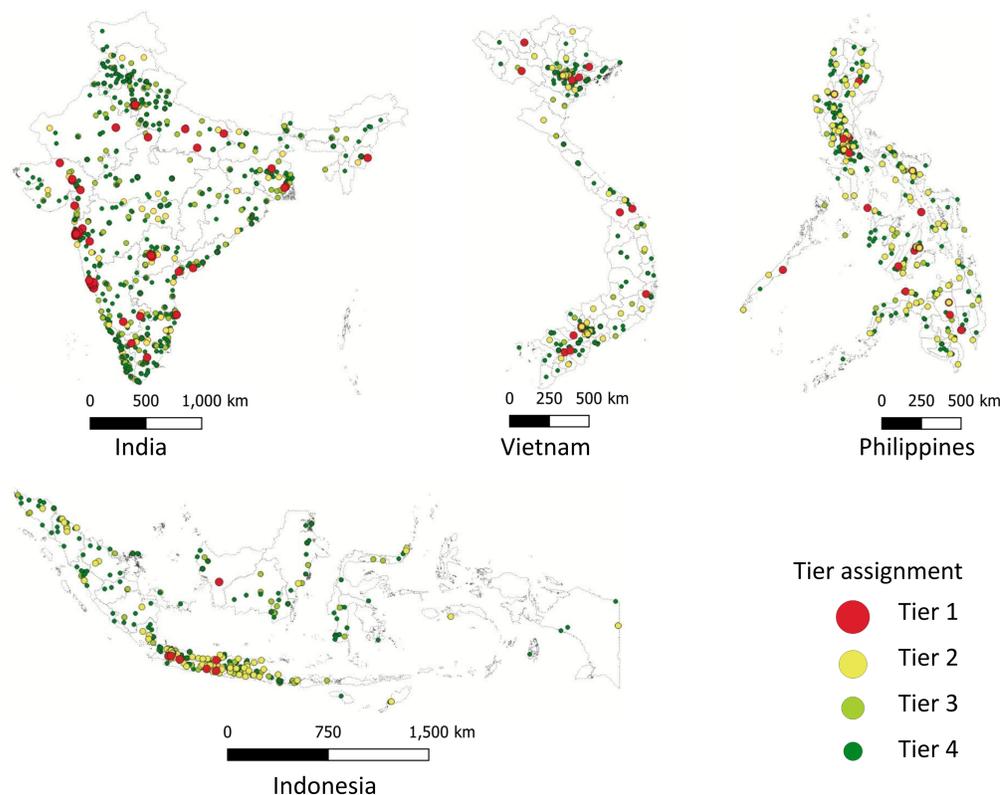


Figure 1. Sample distribution by multi-tier assignment in selected countries

Note. The figure shows the surveyed countries that have a relatively lower share of respondents being assigned to Tier 4. Unsurprisingly, these countries are less developed countries with a low national income level (according to World Bank's classification of the world's economies based on gross national income per capita as of 1 July 2016).

◆ Summary

Aggregated data from World Bank reported that even in less developed countries such as India, Indonesia, Vietnam, and Philippines, the electrification rate in 2015 reaches 88%, 97%, 99%, and 89%, respectively. However, this study measured access to household electricity services based on the electric appliances in ones' household and provided survey evidence showing that having access to electricity does not necessarily guarantee all households to have equal benefits from electrification. This may be because of factors such as reliability, quality, and affordability of electricity, as well as the availability and affordability of electric appliances. This study also uncovered that people with different levels of accessibility to household electricity services are significantly different in their life satisfaction and perceived economic gap. People in lower accessibility levels are more likely to feel less satisfied but perceive smaller economic gap. The results underline the importance of improving households' access to electricity services and call for further investigation into the formation of people's perceptions.

◆ Data and Method

This study took advantage of a multinational survey conducted during 2015-2016 which leverages a sample size of over 63,352 participants from 21 countries including less developed countries such as India, Indonesia, Vietnam, Philippines. The survey collected information on ownership of electric appliances in household and measured subjective life satisfaction compared to people in local community and that compared to people in the whole world, as well as perceived economic gap in local community and among countries.

Based on the framework of multi-tier measurement given in Table 1, respondents were assigned with Tier 1, Tier 2, Tier 3, and Tier 4 (respondents who cannot be assigned to any of the tiers were excluded from the analysis). Figure 1 shows the sample with multi-tier assignment in some selected countries. Both life satisfaction and perceived economic gap were measured on a 5-point-scale, the underlying linkages, therefore, were investigated using ordered logistic regression.

Table 2. Results of ordered logistic regression analysis

Tiers (ref. Tier 4)	Dependent variable			
	Life satisfaction (1=Completely dissatisfied, ... , 5=Completely satisfied)		Perceived economic gap (1=Very large, ... , 5=Does not exist)	
	Local community	World	Local community	World
Panel A: Sample in low national income countries				
Tier 1	—***	—***	—***	+***
Tier 2	—***	—***	—	+***
Tier 3	+***	—***	+***	+
Panel B: Sample in medium national income countries				
Tier 1	+***	+***	+***	+***
Tier 2	—***	+***	+***	+***
Tier 3	—	+***	—	+***
Panel C: Sample in high national income countries				
Tier 1	+***	+***	+**	+***
Tier 2	—	—***	+***	+***
Tier 3	+***	+***	+**	+***

Note. All specifications controlled for individual-level characteristics and country fixed effects. The estimation used countries' population in 2015 as weights. Standard error were clustered at country level.

***p<0.01; **p<0.05; *p<0.1

◆ Results

Table 1 gives the coefficients of multi-tiers obtained from corresponding regression analyses. Respondents from low, medium, and high income countries were investigated respectively.

For life satisfaction compared to people in the world, people in low income countries with a tier lower than 4, have a lower satisfaction level than those with Tier 4. The reverse is generally true for people in medium and high income countries. For life satisfaction compared to people in local community, the linkages are similar to the ones described above, with some linkages that are not statistically significant: Tier 3 and Tier 4 people in medium income countries and Tier 2 and Tier 4 people in high income countries are not significantly different in their life satisfaction compared with people in local community.

For perceived economic gap among countries, people with a tier lower than 4 perceives a lower gap than people with Tier 4, which are identical across the samples in low, medium, and high income countries. For perceived economic gap in local community, the linkage among people in medium and high income countries are in agreement with that for perceived economic gap among countries. People in low income countries with Tier 1 perceived larger gap than those with Tier 4.