SOCIAL CAPITAL AND CHOICE OF CLEAN COOKING AND SAFE SANITATION IN INDIA

Ipsita Das
Duke University

Background

Household air pollution (HAP), from burning solid fuels in inefficient cookstoves, and poor water and sanitation are the leading environmental risk factors for disease burden (6th and 7th highest, respectively) in developing countries (Fourouzanfar et al. 2015). India, home to over 1.34 billion people, with 10 of its 29 states and union territories exceeding a population of 60 million (equivalent to large countries), has four of its highest disease burden risk factors linked to HAP and inadequate water and sanitation (Dandona et al. 2017; GBD 2017).

Although clean household energy alternatives, such as improved cookstoves (ICS), liquefied petroleum gas (LPG) and electricity are possible solutions to the HAP problem, their uptake has been dismally low (Lewis and Pattanayak 2012; Rehfuess et al. 2014). In the absence of behavior change programs, interventions to increase access to safe water and sanitation have also met with limited success (Mosler 2012). Various components of the complex concept of social capital have been examined in the development literature. There is empirical evidence from the developing world of the positive impact of social networks on microfinance participation (Banerjee et al. 2013), adoption of fertilizer (Isham 2002), agricultural weather insurance (Cai, de Janvry and Sadoulet 2014) and healthcare utilization (Oster and Thornton 2012; Story 2014).

Social learning through peer groups positively influences antimalarial treatment adoption in Tanzania (Adhvaryu 2014), latrine ownership in India (Shakya et al. 2015) and ICS adoption in Mali (Bonan et al. 2017). Social learning through opinion leaders, however, leads households in Bangladesh to draw negative interpretations about ICS (Miller and Mobarak 2015). Engagement with opinion leaders and active community members affects adoption of solar disinfection technology for drinking water in Bolivia (Moser and Mosler 2008), favoring of ICS but not actual purchase in Uganda (Beltramo et al. 2014) and information sharing about ICS in Honduras (Ramirez et al. 2014). Much of the evidence in the environmental health (EH) literature, especially clean energy adoption, has focused on social networks and peer relations on the initial uptake and sustained adoption, using qualitative and quantitative methods. However, it is important to examine the complementary role of structural and cognitive social capital in development, as they measure different dimensions of the vast concept of social capital.

Motivation and Research Question

While the Indian government's policy push towards LPG provision is recent, programs since the mid-1980s (National Program on Improved *Chulhas* in 1985, National Biomass Cookstove Initiative in 2009) have attempted to extend use of 'clean energy' (Venkataraman et al. 2010). Since the late 1980s, clean sanitation programs in various forms have been implemented but with limited success. Though there has been an increase in the percentage of households with latrines between 2001 (36.4%) and 2011 (46.9%) (Census of India 2011), India is still home to the highest number of open defecators, globally (WHO and UNICEF 2017). A better understanding of existing social resources, that can be leveraged, is central to realizing the intended benefits of these national programs for clean energy (*Ujjawala Yojana*) and safe sanitation (*Swacch Bharat Abhiyan*).

Using a nationally representative panel dataset of Indian households, this paper examines whether community-level structural and cognitive social capital explain household adoption of EH technologies, including LPG for cooking, and individual household latrines or toilets. In filling the gap in the EH technology adoption literature, the goal of this paper is to examine (a) the effect of community-level

social capital (structural and cognitive)[1] on household adoption of EH technologies; and (b) whether this relationship varies by geographic location. Relying on survey questions in the dataset, measures of social capital included are social networks, bridging and bonding groups, political participation, social cohesion and collective action.

Data

This paper uses 2004-2005 (Round 1) and 2011-2012 (Round 2) nationally representative household panel data from the India Human Development Survey. Round 1 surveyed 41,554 households across 1,503 villages and 971 urban neighborhoods, while Round 2 re-surveyed a vast majority of these households to survey a total of 42,152 households. Households were selected using a three-stage cluster sampling design in both rounds. The analytic sample in this paper comprises a balanced panel of 35,618 households in each survey round (N=71,236). Survey data in both rounds include EH indicators, detailed measures of social capital, household socioeconomics and consumption, demographics and information of household assets. Village surveys captured information on village structure, composition, employment, infrastructure, medical and educational facilities, land use, prices, and crop inputs and outputs.

The focus of this paper is on two dependent variables, namely, clean cooking (i.e. use of non-biomass stove and LPG cooking fuel) and toilets within house premises.

Social capital, the main explanatory variable of interest, is further divided into structural and cognitive social capital. Under structural social capital, indicators I include are: (1) Linking ties (measured by households' association with key influential people in their community e.g. doctors/nurses, teachers and government officials); (2) Group participation (measured by households' membership in women's groups, self-help groups, credit/savings groups etc.); (3) Political participation (measured by households' attendance in a public meeting called by the village *panchayat*/*nagarpalika*/ward committee and any household member as an official of the village *panchayat*/*nagarpalika*/ward committee). Under cognitive social capital, I create indicators for: (1) Social cohesion (survey questions of whether people in the village/neighborhood generally get along with each other or is there some conflict or a lot of conflict; and level of conflict among communities/castes in the village/neighborhood); (2) Collective action (whether people bond together to solve a commons problem such as water supply, or solve them individually). Using exploratory factor analysis, a factor score was calculated for every social capital indicator for each household. Each factor was then aggregated at the community level (villages in rural areas and neighborhoods in urban areas).

Empirical Strategy

Using the household panel across two survey rounds, I use household-level fixed effects (FE) models to analyze the effect of social capital on household choice of EH technology (Equation 1). Household-level FE control for factors specific to the household that do not vary over time but could bias social capital estimates in a pooled ordinary least squares (OLS) regression model.

(1) $Y_{jct} = \beta_0 + \beta_1 Social\ capital\ indicators_{ct} + \theta_t + \delta_j + \Omega_{jct} + \varepsilon_{jct}$

where Y_{jct} denotes EH technology (clean cooking and toilets) in household 'j', in community 'c', in time 't'; Community-level social capital indicators' scores=linking, bridging, bonding, political participation, social cohesion and collective action; Ω_{jct} represents household-level time-varying characteristics; ε_{jct}=error term. In these models, β_1 is the coefficient of interest.

In all analyses, household FE models are run as linear probability models (LPM) and are conducted with the full sample of households. Analyses with locational (rural-urban) subsamples are conducted as well. In all models, standard errors are clustered at the primary sampling unit (PSU) level, in consistency with the IHDS three-stage survey design.

[1] The inclusion of community-level social capital, as the key explanatory variable, is in keeping with Putnam's (1993) theoretical argument, and empirical studies from the health (Kim et al. 2006; Shakya et al. 2015) and clean energy literatures (Adrianzen 2014).

Preliminary Results

Descriptive statistics

There are significant increases in EH technologies between Round 1 and Round 2 (Table 1: Panel A). Clean cooking increased significantly to 28.7% from 16.7%, with the increase being higher in rural areas (from 5% to 14.2%) than urban areas (from 39.3% to 56.7%). Toilet coverage doubled in rural areas (from 28.1% to 41.9%) and also significantly increased in the urban sample (74.5% to 83.1%).

Two types of bridging groups emerged from the factor analysis 2 (Table 1: Panel B): finance and economic development groups that largely comprise women (*Mahila Mandal* or women's groups, self-help groups i.e. SHGs and credit/savings groups), and those that are activity-based (youth/reading groups, and trade or business associations). There is higher increase in urban than rural households' membership in women's groups. Household membership in SHGs significantly increased, with higher increases reported in the rural (11.3% to 22.1%) versus urban households (6.1% to 14%). Membership of any household member in credit/savings groups also significantly increased but remained below 12%. Membership in youth/reading groups significantly decreased for both rural and urban areas, while membership in trader/business associations significantly increased.

Consistent with the literature, caste and religious groups emerged as bonding groups in the factor analysis. Membership in both groups significantly decreased, except for urban households' membership in religious groups. Political participation factor comprises household member attendance in any public meeting in the past year, and household member or acquaintance represented in any local government body. On the former, there is significant increase in rural households' participation (from 35.8% to 37.1%) but on the latter, there is significant decrease (12.7% to 5%). In urban households, there are significant decreases on both indicators (15% to 13%, and 5.6% to 1.8%, respectively).

Households' perceptions of village-level conflict resolution and tension between communities form the social cohesion measure. While there is significant increase in conflict resolution (increase from 2.38 to 2.46), there is also significant decrease in communal harmony (decrease from 2.65 to 2.49). There is significant decrease in household-reported collective action in communities, between 2004-2005 and 2011-2012.

There are significant changes in many household characteristics in the 7-year period 2 (Table 1: Panel C): per capita monthly household expenditures increased, household size and dependency ratio reduced, and highest adult male and female education levels increased (though female education is lower than that of males). Hours of electricity access increased for rural areas but declined for urban households. Overall, house ownership significantly increased, including in urban areas, but it remained almost unchanged in the rural sample. Female headship increased over the 7-year time frame, but education level of the household head declined over time.

Fixed effects results: Clean cooking

There is a significant positive effect (Table 2, Columns 2 and 3) of linking score on households' adoption of clean cooking across rural and urban samples ($p<0.01$). A unit increase in community linking score linearly increases the likelihood of household adoption of clean cooking by 1.6 percentage points in the rural sample and 5.8 percentage points in the urban sample. Another component of structural social capital, female bridging score, significantly increases clean cooking adoption among rural households only by 3.7 percentage points ($p<0.01$). Contrarily, community activity-based bridging linearly decreases rural households' likelihood of clean cooking adoption by 7 percentage points. The stronger positive effects of female bridging groups on clean cooking among rural households, may be attributed to the rural sample's higher bridging scores across both rounds and women's higher preferences for clean stoves, similar to Miller and Mobarak (2013) finding from rural Bangladesh. Bonding groups have a weak positive effect on clean cooking among rural households only ($p<0.10$). A unit increase in community political participation score linearly decreases clean cooking adoption among urban households only by 10.7 percentage points ($p<0.01$). Collective action has a significant negative effect ($p<0.05$) on clean cooking adoption among the rural sample only. While it is surprising that political participation has a significant negative effect on urban households' choice of clean cooking, it is important to consider that

clean cooking, particularly LPG, did not receive as much political traction as the push for clean water and sanitation did in the seven years between the surveys.

Fixed effects results: Toilets

Community linking score has a significant negative effect (a unit increase in linking score linearly decreases toilet adoption by 2.5 percentage points; $p<0.01$) on rural households' adoption of toilets (Table 2, Column 5), but not in the urban or aggregated samples. The strong negative effect of linking ties on rural households' choice of latrines could be owing to network members' negative experiences with toilet adoption, similar to Miller and Mobarak (2015) finding of households' dependence on networks and opinion leaders for ICS (a new, clean energy product/technology) drawbacks, prior to investing in it. Activity-based bridging groups have a significantly positive effect on toilet ownership in the urban sample only (1.9 percentage points), (Table 2, Column 6). In line with literature that points to positive associations of development outcomes with bonding groups, this paper finds strong positive effects of bonding on toilet adoption and weak positive effects on clean cooking, particularly in rural areas. Caste- and religion-based group membership score significantly increases likelihood of toilet ownership by 1.7 percentage points in the full sample, and among rural households by 3.2 percentage points ($p<0.05$). It is likely that Indian households in caste and religious groups have internalized behavior change given the proliferation of sanitation campaigns during the period of observation (2004-2012), and the cohesiveness of these groups has facilitated sharing of collective EH-improving goals. Additionally, similar to female bridging score, bonding score is also higher in the rural sample. Across samples, social cohesion has a significant positive effect on toilet ownership, with the effect being higher in urban households (2 percentage points; $p<0.01$) compared to rural households (1.3 percentage points; $p<0.10$). Surprisingly, collective action has a strong negative ($p<0.05$) effect on toilet ownership in the aggregated (2.5 percentage points) and urban samples (4.6 percentage points).

These results should be interpreted with some considerations in mind. First, data are from a non-RCT context that does not involve behavioral or policy experiments intended to amplify social capital. This constrains the researcher to examine the complex sociological construct of social capital based on survey questions. Second, a single collective action question, for example, may not encompass the operations of informal institutions within communities. Third, global positioning system (GPS) coordinates of households and community information sources would have allowed for measuring geographic distance between origins and beneficiaries of information; visual representation of spatial variation in social capital across communities would have improved analysis. Despite these data restraints, in using exploratory factor analysis, I create discrete indicators for social capital that are consistent with the literature and internally reliable.

In the full paper, prior to estimating the effect of social capital on EH technology adoption, I estimate the determinants of social capital. I also conduct robustness checks among rural households with village-level characteristics that could affect choice of EH behaviors. Falsification tests are also conducted to validate the relationship between social capital and EH technology, with household goods from the non-EH domain (e.g. blender, refrigerator, pressure cooker, color television, electric fan and cellphone).

The empirical evidence in this paper provides insights into the vital role that social capital can play in EH technology adoption, the latter being central to combating the twin problems of HAP and unsafe water and sanitation. While previous studies have examined the impact of social networks and social norms on uptake of a single EH technology in specific settings, this paper provides evidence on the combined role of structural (social networks, group participation, political engagement) and cognitive (social cohesion, collective action) social capital in explaining various EH technologies across rural and urban India. While small in absolute terms, the positive social capital estimates in this paper point to the importance of building on the strengths of existing social groups and institutions to trigger behavior change. Current national policy advances in clean cooking and safe sanitation in India could potentially disseminate information through social groups (e.g. SHGs) and existing group-based programs, such as the integrated child development services, and accredited social health activists. As the LPG schemes

phase their district-wise rollout and state governments design their respective sanitation programs, there is potential for researchers to collaborate with state governments in designing experiments, to examine which social processes and groups are most effective in increasing LPG and toilet uptake and subsequently sustaining use.

References

Adhvaryu, A. (2014). Learning, misallocation, and technology adoption: evidence from new malaria therapy in Tanzania. *The Review of Economic Studies*, 81(4), 1331-1365.

Banerjee, A., Chandrasekhar, A. G., Duflo, E., & Jackson, M. O. (2013). The diffusion of microfinance. *Science*, *341*(6144), 1236498.

Beltramo, T., Blalock, G., Levine, D. I., & Simons, A. M. (2015). Does peer use influence adoption of efficient cookstoves? Evidence from a randomized controlled trial in Uganda. *Journal of Health Communication*, *20*(sup1), 55-66.

Bonan, J., Battison, P., Bleck, Jamie, LeMay-Boucher, Philippe (2017). Social interaction and technology adoption: experimental evidence from improved cookstoves in Mali. *Working Paper*.

Cai, J., De Janvry, A., & Sadoulet, E. (2015). Social networks and the decision to insure. *American Economic Journal: Applied Economics*, *7*(2), 81-108.

Census of India. 2011. Houses, household amenities and assets data 2001-2011: Visualizing through maps. Available at: http://censusindia.gov.in/2011-Common/NSDI/Houses_Household.pdf [Accessed on January 29, 2018]

Dandona, L., Dandona, R., Kumar, G. A., Shukla, D. K., Paul, V. K., Balakrishnan, K., ... & Nandakumar, A. (2017). Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *The Lancet*, *390*(10111), 2437-2460.

Forouzanfar, M. H., Alexander, L., Anderson, H. R., Bachman, V. F., Biryukov, S., Brauer, M., ... & Delwiche, K. (2015). Global, regional, and national comparative risk assessment of 79 behavioral, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013.*The Lancet*, 386(10010), 2287-2323.

GBD 2016 Causes of Death Collaborators (2017). Global, regional and national age-sex specific mortality for 264 causes of death 1980-2016: systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), 1151-1210.

Isham, J. (2002). The effect of social capital on fertiliser adoption: Evidence from rural Tanzania. *Journal of African Economies*, 11(1), 39-60.

Lewis, J. J., & Pattanayak, S. K. (2012). Who adopts improved fuels and cookstoves? A systematic review. *Environmental Health Perspectives*, *120*(5), 637.

Miller, G., & Mobarak, A. M. (2015). Learning about new technologies through social networks: Experimental evidence on nontraditional stoves in Bangladesh. *Marketing Science*, *34*(4), 480-499.

Moser, S., & Mosler, H. J. (2008). Differences in influence patterns between groups predicting the adoption of a solar disinfection technology for drinking water in Bolivia. *Social Science & Medicine*, 67(4), 497-504.

Mosler, H. J. (2012). A systematic approach to behavior change interventions for the water and sanitation sector in developing countries: a conceptual model, a review, and a guideline. *International Journal of Environmental Health Research*, 22(5), 431-449.

Oster, E., & Thornton, R. (2012). Determinants of technology adoption: Peer effects in menstrual cup take-up. *Journal of the European Economic Association*, 10(6), 1263-1293.

Rehfuess, E. A., Puzzolo, E., Stanistreet, D., Pope, D., & Bruce, N. G. (2014). Enablers and barriers to large-scale uptake of improved solid fuel stoves: a systematic review. *Environmental Health Perspectives (Online)*, *122*(2), 120.

Shakya, H. B., Christakis, N. A., & Fowler, J. H. (2015). Social network predictors of latrine ownership. *Social Science & Medicine*, 125, 129-138.

Story, William T. (2014). Social capital and the utilization of maternal and child health services in India: A multilevel analysis. *Health & Place* 28 (2014): 73-84.

Venkataraman, C., Sagar, A. D., Habib, G., Lam, N., & Smith, K. R. (2010). The Indian national initiative for advanced biomass cookstoves: the benefits of clean combustion. *Energy for Sustainable Development*, 14(2), 63-72.

World Health Organization and UNICEF. (2017). "Progress on Drinking Water, Sanitation and Hygiene–2017 Update and SDG Baselines". Geneva: World Health Organization (WHO) and the United Nations Children's Fund (UNICEF).

Table 1. Summary statistics: Outcome, explanatory and control variables [I, II]

	Total		Rural		Urban	
	IHDS-I (N=35,618)	IHDS-II (N=35,618)	IHDS-I (N=23,454)	IHDS-II (N=23,454)	IHDS-I (N=12,164)	IHDS-II (N=12,164)
PANEL A: Outcome variables						
Clean cooking energy	16.7	28.7	5.0	14.2	39.3	56.7
Toilet ownership	44.0	56.0	28.1	41.9	74.5	83.1
PANEL B: Explanatory variables - Social capital						
Structural social capital						
Linking						
Among your acquaintances and relatives, any in these professions (%):						
Health	31.2	56.7	29.1	53.1	35.1	63.6
Education	39.3	59.5	38.4	57.2	41.2	64.0
Government service	33.6	30.4	28.7	26.4	43.0	38.3
Anyone in the household belongs to these groups (%):						
Female-centric bridging groups						
Women's group	7.4	9.1	8.6	9.4	5.1	8.4
Self-Help Group	9.5	19.3	11.3	22.1	6.1	14.0
Credit/Savings	7.0	11.2	7.9	11.5	5.3	10.7
Activity-based bridging groups						
Youth/Sports/Reading	4.9	2.6	4.4	2.0	6.0	3.8
Trade Union/Business/Professional	4.7	5.3	3.0	3.3	8.1	9.1
Bonding groups						
Religious	13.6	11.6	14.4	11.2	12.1	12.4
Caste Association	12.8	8.8	14.0	8.8	10.4	9.0
Political participation						
Any household member attended public meeting in the last year (%)	28.7	28.9	35.8	37.1	15.0	13.0
Any household member is a government official (%)	10.3	3.9	12.7	5.0	5.6	1.8
Cognitive social capital						
Social cohesion						
People generally get along with each other*	2.38 (0.74)	2.46 (0.71)	2.37 (0.74)	2.44 (0.70)	2.40 (0.73)	2.48 (0.72)
Castes and sub-castes in the community get along with each other*	2.65 (0.57)	2.49 (0.66)	2.63 (0.58)	2.48 (0.66)	2.70 (0.54)	2.53 (0.66)

Collective action						
People bond to solve local problems (%)	57.2	72.6	59.0	74.0	53.7	70.0
Factor Analysis Scores (Household-level)						
Linking	-0.22 (0.98)	0.22 (0.97)	-0.28 (0.96)	0.14 (0.96)	-0.10 (1.01)	0.38 (0.96)
Female-centric bridging	-0.14 (0.89)	0.14 (1.08)	-0.07 (0.95)	0.20 (1.11)	-0.27 (0.73)	0.02 (1.02)
Activity-based bridging	0.07 (1.05)	-0.07 (0.94)	-0.02 (0.93)	-0.16 (0.78)	0.22 (1.24)	0.11 (1.17)
Bonding	0.07 (1.05)	-0.07 (0.94)	0.10 (1.09)	-0.08 (0.93)	0.01 (0.97)	-0.05 (0.96)
Political participation	0.10 (1.11)	-0.10 (0.87)	0.26 (1.19)	0.04 (0.94)	-0.21 (0.85)	-0.37 (0.64)
Social cohesion	0.04 (0.91)	-0.04 (1.08)	0.01 (0.91)	-0.07 (1.07)	0.10 (0.89)	0.02 (1.10)
PANEL C: Control variables						
Per capita monthly total expenditures (in INR)	1,679.66 (1762.97)	2302.82 (2680.99)	1377.97 (1427.65)	1951.55 (2197.68)	2261.38 (2158.10)	2980.13 (3322.37)
Number of married women	1.25 (0.71)	1.24 (0.74)	1.30 (0.75)	1.27 (0.75)	1.16 (0.62)	1.18 (0.69)
Number of household members	5.34 (2.52)	4.97 (2.41)	5.52 (2.66)	5.04 (3.49)	4.98 (2.19)	4.83 (2.23)
Highest male adult education (in years)	6.81 (5.13)	7.38 (5.30)	5.81 (4.90)	6.39 (5.11)	8.73 (5.01)	9.29 (5.12)
Highest female adult education (in years)	4.51 (4.99)	5.56 (5.33)	3.28 (4.33)	4.32 (4.83)	6.89 (5.31)	7.94 (5.43)
Dependency ratio	0.74 (0.70)	0.61 (0.66)	0.79 (0.73)	0.65 (0.70)	0.63 (0.64)	0.53 (0.59)
Female household head (%)	9.3	16.0	9.0	16.2	9.9	15.6
Age of household head (in years)	46.33 (11.72)	52.11 (12.15)	46.68 (11.78)	52.47 (12.26)	45.66 (11.58)	51.40 (11.91)
Own house (%)	90.9	91.6	98.0	98.1	77.1	79.2
Electricity access hours/day	12.51 (9.05)	13.36 (8.19)	9.85 (8.71)	11.36 (8.10)	17.62 (7.33)	17.22 (6.87)
Safe treatment of drinking water	8.3	12.6	4.9	8.9	14.9	19.8

NOTE: [I] Standard deviation in parentheses for continuous variables. [H] All variables are significantly different across survey rounds (1% significance level), except religious group membership (urban sample only), attending public meeting (full sample only) and house ownership (rural sample only). * For these survey measures: 3=no conflict, 2=some conflict, 1=lot of conflict.

Table 2. Effect of Social Capital on Clean Cooking and Toilets: Household Fixed Effects Regression Results (by Location)

	Clean Cooking			Toilets		
	Total	Rural	Urban	Total	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
Structural social capital(community-level)						
Linking/Networks score	0.029***	0.016**	0.058***	-0.019***	-0.026***	0.002
	-0.007	-0.007	-0.017	-0.007	-0.009	-0.01
Female-centric bridging groups score	0.020**	0.037***	0.001	0.007	0.005	0.014
	-0.009	-0.01	-0.019	-0.008	-0.011	-0.011
Activity-based bridging groups score	-0.027***	-0.070***	0.007	0.004	-0.013	0.018**
	-0.01	-0.012	-0.015	-0.006	-0.009	-0.008
Bonding groups score	0.006	0.011*	-0.019	0.017***	0.032***	-0.007
	-0.006	-0.006	-0.014	-0.005	-0.006	-0.007
Political participation score	-0.025***	-0.004	-0.107***	-0.003	-0.006	0.01
	-0.007	-0.006	-0.022	-0.009	-0.01	-0.016
Cognitive social capital (community-level)						
Social cohesion score	0.002	-0.003	0.003	0.017***	0.013*	0.021***
	-0.005	-0.005	-0.013	-0.005	-0.007	-0.007
Collective action	-0.021	-0.035***	-0.015	-0.025**	-0.013	-0.047***
	-0.014	-0.013	-0.03	-0.012	-0.016	-0.018
Observations	71,236	46,908	24,328	71,236	46,908	24,328
Adjusted R-squared	0.073	0.081	0.093	0.079	0.095	0.057

NOTE: Clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Household characteristics controlled: log of per capita monthly total expenditures, number of married women, number of household members, highest adult education (male and female, separately), dependency ratio, household head demographics (age, sex), house ownership and hours of daily electricity access.