Electrifying empowerment

Women role models and solar electrification in rural Myanmar*

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Abstract

How do opportunities shape aspirational responses? To study this question, we run a randomized control trial in 33 solar-powered and 33 unelectrified villages in rural Myanmar. We test a psychological intervention that combines an edutainment component featuring role models with a visualization, goal-setting, and planning workshop. The treatment aims to increase women's empowerment, encourage higher aspirations, and provide participants with a blueprint to pursue them effectively. To test whether the effects of the intervention vary across different opportunity environments, we stratify the village-level randomization by region and electrification status. The intervention increases women's business and financial agency, including by raising the share of women who have their own savings, bank account, and mobile money account, with larger effects for less empowered women at baseline. Effects on aspirations are concentrated in unelectrified villages, where we find positive impacts on a novel measure of aspirations for productive appliances and on aspirations for children's education. Consistent with the shift in aspirations, we also see a parallel increase in education expenditures, the time women spend on childcare, and the probability that households take out a business loan in these villages. Our findings show that interventions targeting aspirations interact with the local economic environment and are most effective when they provide relevant role models for pathways such as education, which are particularly valuable where other investment opportunities, including productive uses of electricity, are constrained.

Keywords: Aspirations; Empowerment; Psychological constraints.

JEL classifications: D91, O10, O13.

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1 Introduction

Marginalized groups, such as women, face a wide range of obstacles to improving their life circumstances. These include widely studied economic constraints related to market failures such as limited access to credit (Burgess and Pande, 2005; de Mel et al., 2008; McKenzie and Woodruff, 2008) and insurance (Karlan et al., 2014), or the underprovision of basic health services (Miguel and Kremer, 2004; Field et al., 2009; Chong et al., 2016). Social and political structures such as land rights and gender norms can also contribute to underinvestment and limit disadvantaged groups' participation in the labor market (Field, 2007; Field et al., 2010, 2021; Goldstein and Udry, 2008; Jayachandran, 2021).

Beyond these external constraints, there is growing evidence that psychological factors may also keep individuals from pursuing fruitful economic opportunities (Angelucci and Bennett, 2024; Ashraf et al., 2022; Banerjee et al., 2020; Campos et al., 2017; Ghosal et al., 2022; John and Orkin, 2022; Kaur et al., 2025; Lybbert and Wydick, 2018; McKelway, 2025; Orkin et al., 2024). This recognition of the importance of internal constraints motivates increasing the focus of development interventions on individuals' values, their perceptions of what they are capable of, and, ultimately, their goals and aspirations. At its core, this is what we study in this paper. We provide causal evidence that a light-touch psychological intervention exposing women to relatable role models and teaching them to visualize better life outcomes, set goals, and develop concrete plans can increase agency, raise aspirations, and encourage related investments.

Jones et al. (2011) define mental models as "personal, internal representations of external reality" based on "unique life experiences, perceptions and understandings of the world" that serve as a mechanism to filter and process information and guide decision making. Aspirations, defined as forward-looking goals, are an example of a mental model that affects people's perceptions of the possibilities for their own lives (Bernard et al., 2023). Once defined, aspirations may affect behavior in at least two ways. First, they direct attention and effort toward goal-relevant activities. Second, they act as motivators and have an energizing function, leading to greater effort and increased persistence (Locke and Latham, 2002).

Much of the literature on aspiration formation emphasizes that aspirations are socially determined (Appadurai, 2004; Genicot and Ray, 2017, 2020; Ray, 2006). Individuals form comparisons with respect to relevant peers to access information on available opportunities and whether and how they can pursue them successfully, thereby setting their own aspirational reference points. As part of this process, aspirations may also lead to behavioral poverty traps characterized by vicious cycles of low aspirations and effort (Dalton et al., 2016). The poor and other marginalized groups such as women are particularly vulnerable to this, as they may fail to develop a "capacity to aspire" (Appadurai, 2004). On the one hand, they face institutions or norms that discourage them from setting long-term goals; on the other, they are less likely to have role models who can inspire them and exemplify how to pursue goals effectively.

Conditional on having a plan, one must also have the agency to pursue it. In many developing countries, women report having much lower freedom of choice and control over their lives than

men (Jayachandran, 2015). This lower degree of agency often spans multiple domains —such as access to financial services, the ability to conduct business, their participation in decision-making processes, or other factors that have direct implications for their perceived role in society and their capacity to pursue goals.

Exposure to role models may raise aspirations and self-efficacy (La Ferrara, 2016). Recent experimental studies have sought to leverage these psychological mechanisms through educational entertainment (edutainment) interventions featuring aspirational role models.[1] These have been successful across a wide range of outcomes, including increasing aspirations (particularly for children's education) or agency-related psychological constructs (Ahmed et al., 2022; Bernard et al., 2019, 2023; Orkin et al., 2024); raising investments in education (Bernard et al., 2019, 2023; Orkin et al., 2024); closing the educational gender gap (Riley, 2022); increasing labor supply (Orkin et al., 2024), including women's employment (Ahmed et al., 2022); promoting preventive health investments (Banerjee et al., 2015; John and Orkin, 2022); and improving downstream economic outcomes such as revenues, consumption, and asset ownership (Orkin et al., 2024). Several of these studies have also successfully combined edutainment with workshops guiding participants through visualization and planning exercises (John and Orkin, 2022; Orkin et al., 2024). However, a key open question in this emerging literature is whether the effectiveness of such psychological interventions depends on the economic opportunities available to participants.

To shed light on this question, we conduct a randomized controlled trial (RCT) in 33 solar-powered and 33 unelectrified villages in the regions of Ayeyarwady and Tanintharyi in Myanmar — a country with a long and recent history of civil conflict and traditional gender attitudes (Htun and Jensenius, 2020). Broadly following a previous design by Orkin et al. (2024), the treatment consists of two components: an edutainment piece and a goal-setting and planning workshop. First, women are exposed to a purposefully developed audio recording featuring a female role model who sets and pursues the goal of sending her daughter to university through a long-term plan centered on productive investments in the household's livelihood activities. Second, women participate in a workshop where they engage in visualization, goal-setting, and planning exercises that mirror behaviors demonstrated by the role model in the story. The initial narrative aims to expand women's perceptions of what is possible given their personal circumstances, and the subsequent workshop seeks to improve their ability to develop concrete and systematic plans to achieve related goals. To test whether the intervention's impacts vary across different opportunity environments, we stratify our village-level randomization by region and electrification status.

The intervention significantly increases women's empowerment, particularly along dimensions that are most salient in the story (financial and business agency). Treated women's index of financial agency grows by 0.28 standard deviations (SD) relative to the placebo group, driven primarily

[1] Other quasi-experimental studies have also found substantial impacts of commercial television or radio on women outcomes such as fertility or divorce rates (Chong and La Ferrara, 2009; La Ferrara et al., 2012), HIV knowledge and sexually responsible behavior (Vaughan et al., 2000), attitudes towards intimate partner violence and women decision making power (Cheung, 2012; Jensen and Oster, 2009), or the incidence of teenage pregnancy (Kearney and Levine, 2015). Real life role models have also shown to affect aspirations and education (Porter and Serra, 2020) or career trajectories (Beaman et al., 2012).

by increases in the probability that women report having their own bank account, savings, and mobile money account. The treatment also increases an index capturing women's perceived ability to engage in business activities by 0.29 SD, specifically affecting their confidence in identifying new income-generating opportunities. While other indices of empowerment (gender norms, agency over household assets, agency over income decisions) are not significantly affected, an empowerment index combining all dimensions increases by 0.29 SD. These empowerment effects do not differ by village electrification status but are consistently driven by women who are less empowered at baseline.

We measure aspirations along three dimensions: income, children's education, and energy services, the latter integrating aspirations for lighting, electrical cooking, and productive appliances. We do not find significant impacts on any of the three dimensions of aspirations or an overall aspirations index combining all three in the full sample. Consistent with the null effects on aspirations, we also find no impacts on various categories of expenditures, appliance ownership, or other investment behaviors. The intervention does, however, raise women's (and their spouses') willingness to pay for an auctioned appliance in a random subsample.

However, these average effects mask substantial heterogeneity. In unelectrified villages, we find strong positive effects on aspirations for productive appliances (30.8% of the placebo mean) and a large (2 additional years) increase in aspirations for children's education. We offer two complementary explanations for this pattern. First, a lower ability to leverage electricity for productive uses increases the relative value of schooling as a pathway out of poverty in unelectrified villages. Second, a harder path to higher education in these areas (fewer schools, worse road networks) reduces the likelihood that someone in one's social environment will have pursued more advanced schooling, making aspirations more responsive to the education-focused edutainment story. This increase in aspirations for children's education is driven by the more empowered, ambitious, and educated women at baseline, which suggests that individuals' responses depend on their level of agency and perceptions of the returns to achieving a given goal. Consistent with the shift in aspirations, we also see parallel increases in education expenditures, the time women spend on childcare, and the probability that households took out a business loan in unelectrified villages, with similar patterns of heterogeneity.

This paper contributes to a growing body of research on the formation of aspirations, their malleability, and their role in shaping investment behavior. In doing so, it also speaks to a broader literature on the impacts of light-touch interventions targeting individuals' mental models, particularly through the combination of edutainment with mutually-reinforcing visualization, goal-setting, and planning exercises. Within this literature, we join Orkin et al. (2024) as one of the few cluster-randomized placebo-controlled evaluations of such interventions, a design feature that greatly limits the possibility of spillovers that could otherwise bias the estimated treatment effects.

Our study is unique in its delivery of this type of intervention in a context that has been and continues to be affected by civil conflict, and where individuals' perceived long-term prospects may be particularly grim. A priori, Myanmar's conflict environment may have made it more challenging

to positively affect participants' aspirations than in other settings. Nevertheless, in unelectrified villages, we find substantial impacts on education aspirations and household investments, consistent with previous studies (Bernard et al., 2019, 2023; Orkin et al., 2024). In this regard, our results provide novel empirical evidence that interventions targeting aspirations may interact with local infrastructure or other external factors that plausibly affect the presence of economic opportunities. As such, our results speak to the external validity of psychological interventions targeting aspirations, while highlighting that their effects may depend on the local feasibility and relevance of the pathways out of poverty they emphasize. Furthermore, we show that the intervention specifically increases dimensions of women's agency that are most salient in the edutainment narrative, which may enhance participants' ability to pursue goals. The effects on women's agency are consistent with studies leveraging visualization or planning interventions to deliver impacts on self-beliefs (Ashraf et al., 2022; John and Orkin, 2022).

Finally, to our knowledge, our paper is the first to attempt to measure aspirations with respect to energy services. In doing so, we leverage existing classifications to construct a mapping from aspirational responses to the most comprehensive way of measuring energy access (the Multi-Tier Framework scale) for three fundamental types of energy services.

The remainder of the paper is organized as follows. In Section 2, we provide an account of the setting and the construction of the sample. Section 3 presents a conceptual framework linking aspirations, agency, and local opportunity environments. We describe the experimental design, the intervention, and data in Section 4, and the empirical strategy in Section 5. Section 6 presents the results of the experimental evaluation of the intervention. Section 7 concludes.

2 Setting

2.1 Background

Myanmar is a country of around 58 million people (CIA, 2024). The country is highly ethnically diverse, being home to 135 recognized ethnic groups and 108 ethnolinguistic groups. Around 68% of the population is of the Bamar ethnic group, whose language, Burmese, is also the official language. Nearly 90% of the population practice Buddhism, the dominant religion in the country.

Myanmar gained independence from British colonial rule in 1948. After 10 years of constitutional democracy, increasing instability led to a military coup that was followed by a long period of military rule that lasted until 2011, and was marked by rising poverty and inequality, corruption, isolationist foreign policy, political suppression, and violent conflict between the junta and non-Bamar ethnic groups. Despite a new attempt at democracy following a constitutional referendum in 2008, persistent ethnic conflict led to a new military coup in 2021, which led to widespread pro-democracy demonstrations across the country. The junta responded with a brutal crackdown, leading to the emergence of a Bamar anti-coup armed wing named the People's Defense Force, with many of its members being trained by the same ethnic armed militias that have fought in the border regions (Hein, 2022). A further escalation, and a potential turning point in the efforts to

oust army leaders, occurred in October 2023 (thus overlapping with the timeline of this study) when various ethnic militias formed alliances and launched coordinated attacks against government forces (Rising, 2023).

As of 2024, Myanmar remains on the list of UN Least Developed Countries (LDCs), which are defined as "low income countries confronting severe structural impediments to sustainable development" (UN, 2024).[2] Access to infrastructure is low, particularly in rural areas: Myanmar has some of the lowest levels of electricity access in Asia, with about one in three people lacking access to electricity in rural areas (World Bank, 2023). The country is also characterized by conservative attitudes toward gender roles (Htun and Jensenius, 2020). Consistent with this, women's economic participation and financial inclusion remain limited: women's labor force participation rate (40.9%) is well below men's (69.7%), and 53.8% of women lack access to formal financial services (World Bank, 2021, 2025).

2.2 Sampling frame

Our study takes place in the regions of Ayeyarwady and Tanintharyi – two areas of the country where both energy developers and research organizations have still been able to operate in recent years. The construction of a sampling frame was complicated by the fact that Myanmar does not have a census with information at the village level (only bigger units of analysis, named village tracts, are superficially surveyed). To deal with this limitation, we relied on communications with a partner organization in the early stages of the study, Smart Power Myanmar (a consulting and financing company in the solar mini-grid space funded by The Rockefeller Foundation), to obtain a list of villages with operational solar mini grids. We then reached representatives at these villages by phone for participation in a scoping survey that allowed us to gather an initial set of data at the community level to guide the selection of villages.

To access non-electrified villages, we employed a contact-tracing strategy that combined geographic proximity with population density measures at the village-tract level within the same township based on the 2014 Myanmar Census data. To maximize our chances of obtaining similar villages, we asked the representatives from the solar mini grid villages to provide us with contacts for non-electrified villages within the same or nearby village tracts. This initial step resulted in 106 eligible villages across the two regions.

Given our interest in exploring how the intervention's impacts would vary according to the type of energy access, we set the goal of constructing a sample that would first be balanced across electrification status on a set of village characteristics that are important for developers' site selection and the potential impact of the mini-grid. Population size and the quality of the main road into the village are key determinants for the selection of villages for infrastructure projects. Population size directly indicates the potential beneficiaries (the customer base in the eyes of energy

[2]The criteria for inclusion in the LDC category are to rank below $1,088 in Gross National Income per capita, 60 or below in the Human Assets Index, and 36 or above in the Economic Vulnerability Index. While Myanmar has met the criteria for graduating from this category prior to the re-escalation of the conflict, the UN's Committee for Development Policy decided to defer the decision to the next triennial review in 2027.

providers). Similarly, being able to easily access the village, for example by having a paved road, highly simplifies logistics of the infrastructure project and affects costs by lowering the number of labor days. Both population size and road access are also useful proxies for the level and type of economic activity (e.g. through social network effects and the degree of access to markets).

Solar project developers in our setting also faced these incentives, as can be seen from Figure A1. The smallest villages in our sampling frame are non-electrified and the biggest are mini-grid villages. Similarly, across the two regions, only about 23 percent of solar villages lacked a paved road versus almost 42 percent of non-electrified villages. Therefore, as a first step towards defining the final sample, we trimmed the sampling frame by dropping villages above or equal to 4500 and below 500 in terms of population size.[3] Then, we sliced the distributions of village population in each region by the quality of the main road and dropped two non-electrified villages in Tanintharyi with no paved road that were small compared to the unpaved solar villages in that region.

These steps already generated a sample of villages that was balanced across energy access groups on population size and main road quality, as well as the number of total households (another measure of the potential customer base for the developers), the number of public spaces such as community centers, markets, or schools (a proxy for local budgets and social activity), and the share of households that do not own land (a measure of wealth in the village).

Due to budget limitations, we further cut the sample by dropping a subset of the remaining unelectrified villages within each region. Specifically, we kept the closest pairs of electrified and unelectrified villages in terms of population size and road quality. Whenever there was more than one close pair, we chose the most similar one in terms of population size and kept the other(s) as reserve villages to be used as replacements in case we faced issues in obtaining permits from local authorities or civil conflict spread to nearby areas before the rollout of the baseline survey. Overall, this yielded a sample of 28 and 38 in Ayeyarwady and Tanintharyi, respectively, with an even split within each region between solar and unelectrified villages. This is our study's sampling frame. The geographical distribution of the 66 villages selected for the baseline survey, including any village replacements, is shown in Figure A2.

Table A1 shows summary statistics for additional variables from the scoping survey, including more proxies of social capital (e.g. number of active village committees) and wealth (e.g. type of housing), main livelihoods, and most common modes of transport.[4] The table shows two main differences between village types. First, solar villages appear to have a higher number of active village committees, but this difference vanishes when included relative to population density. Second, the data obtained from the village representatives on the prevalence of various (non-mutually exclusive) types of work shows that, in Tanintharyi, agricultural and casual labor is more common in unelectrified villages, while more people travel outside of the village for work in solar villages.

[3] At this step we dropped a total of 19 villages: 7 in Tanintharyi (4 unelectrified, 3 solar) and 12 in Ayeyarwady (9 unelectrified and 3 solar).

[4] Table A1 shows the comparison using village scoping data for the final list of villages, while Table A2 shows the corresponding table for the original list of villages.

3 Conceptual framework: aspirations, pathways, and agency

Orkin et al. (2024) present a theoretical model showing how a psychological intervention can trigger a causal chain from aspirations to investment and other economic outcomes. The model is built on a reference-dependent utility function in which aspirations proxy for reference points and exceeding (missing) the reference point increases (decreases) utility. The main insight is that an intervention raising aspirations for the future increases the marginal utility of future consumption. In turn, this can raise investment into productive inputs or increase labor supply to fuel higher future consumption. They also show how an analogous framework can accommodate a similar chain with agency self-beliefs as the causal mechanism. While this framework clarifies how psychological treatment targeting aspirations can translate into greater forward-looking investments, it is less explicit about why such interventions may succeed in some settings (or for some individuals) and not others. A useful complement is provided by Lybbert and Wydick (2018), who emphasize that pathways and agency affect the setting and pursuit of aspirational goals.

Individuals must not only desire a better future, but also perceive credible routes to achieve it. Intuitively, these pathways are limited by physical, environmental constraints.[5] Electricity is a clear example of a technology that can expand or constrain feasible pathways. Previous work largely shows that rural electrification can improve productivity and incomes (Chakravorty et al., 2016; Kitchens and Fishback, 2015; Kline and Moretti, 2014; Lewis and Severnini, 2020; Ratledge et al., 2022; Szerman et al., 2022); business ownership or employment (Lee et al., 2020a); women's labor force participation (Dinkelman, 2011; Vidart, 2023); or educational investments and achievement (Akpandjar and Kitchens, 2017; Barron and Torero, 2014; Khandker et al., 2013; Litzow et al., 2019).[6] Decentralized solutions are also expanding electricity access beyond the traditional grid electrification frontier (Burgess et al., 2023), with emerging evidence that mini-grids can raise incomes and productivity by enabling reallocate labor, longer working hours, and the adoption of electrical equipment (Ayhan et al., 2022; Radley and Lehmann-Grube, 2022).

More specifically, the enabling role of eletrification increases the attractiveness of, and the perceived returns to, business-related pathways and other activities that depend on productive uses of electricity. In turn, this can change the relative value (or salience) of alternative pathways out of poverty, such as education, compared to settings that are electricity-constrained. In this vein, Lybbert and Wydick (2018)'s framework suggests that the impact of an intervention targeting aspirations and related investments may vary according to whether it is delivered in an unelectrified or mini-grid village.

[5] Lybbert and Wydick (2018) operationalize this in their model by defining the marginal productivity of effort as zero beyond a certain outcome threshold when a viable pathway is missing.

[6] However, many studies highlight the importance of local complementarities (Fetter and Usmani, 2024), higher incomes (Dendup, 2022; Gelo et al., 2023; Gupta and Pelli, 2021; Lee et al., 2020a; Liao et al., 2021), and reliability (Gertler et al., 2017) for the activation of mechanisms that allow households to reap the benefits from improved electricity access, such as investments in lighting and other modern appliances (Dendup, 2022; Richmond et al., 2020; Richmond and Urpelainen, 2019; Thomas et al., 2020). Consistent with this caveat, some studies have also presented null or contrasting evidence (Bensch et al., 2020; Burlig and Preonas, 2024; Lee et al., 2020b), and there generally is a wide variation in the magnitude of positive estimates (Lee et al., 2017).

The second component highlighted by Lybbert and Wydick (2018) is the agency required to make the required investments to progress along a chosen pathway. Beyond physical constraints, personal circumstances and beliefs affect whether one feels and is capable of developing and executing a plan. First, given the social nature of the process through which aspirations are formed (Ray, 2006; Genicot and Ray, 2020), an individual's level of agency can shape the perception of available pathways by affecting how one relates to others living in the same opportunity environment, and the extent to which their success in pursuing a given goal is seen as relevant to one's own prospects. Second, agency also affects how effort translates into outcomes; Lybbert and Wydick (2018) model this directly through a production function in which higher agency raises the productivity of actions taken in pursuit of a goal. Women, in particular, often face agency constraints in many life domains that hinder their ability to pursue goals effectively, which can lead them to manage their aspirations downward or settle for "consolation prices" (Vega-Carol and Pattanayak, 2026). This suggests that aspirational responses may be concentrated among more empowered women, for whom ambitious goals are more likely to feel attainable.

4 Study design

4.1 Experimental design

We randomly assigned each of the 66 villages to one of two conditions: a women's empowerment intervention and a placebo. To test how the effect of the psychological empowerment intervention varies with the level of economic opportunities in the village, we stratified the randomization procedure by region and, importantly, village electrification status. We sampled 12 households in each non-electrified village and 23 households in solar mini grid villages, yielding a total of 1155 households.[7] The criteria for household eligibility were that the male and female spouses (main income earner and/or primary cook) be available and willing to participate in the study.

4.2 Baseline survey

We conducted a baseline survey in our study villages between April 6th and June 1st 2023. The survey collected data on the demographics of household members, time use, assets and income, household electricity supply and consumption, financial access, recent health shocks, and women's empowerment. The latter section included survey modules on agency over financial resources, decision making agency, business agency, control over income and spending decisions, agency over household assets, gender attitudes, membership to social groups, and psychological well-being.

This initial baseline survey preceded the design of the experiment and did not include questions on aspirations. To collect data on women's baseline aspirations, we conducted a supplemental phone survey between late August and early October 2023. Specifically, we asked about women's aspirations along three dimensions: the level of income they would like the household to have

[7] See Appendix D for more information on the sampling procedure.

in 5 years; the level of education that they would like the child aged closest to 14 in the household to reach; and the types of energy services that they would like to have access to in 5 years.[8] With regards to energy services, we focus on three domains: cooking, lighting, and appliances for income-generating activities. Here, we asked participants to choose from (or add to) a comprehensive list of options for the provision of each energy service and convert the answers into "aspirational Multi-Tier Framework (MTF) tiers". The MTF is a framework developed by the Energy Sector Management Assistance Program (ESMAP) with the goal of creating a harmonized measure of energy access that could be used to track progress with respect to SDG7 worldwide. The MTF moves away from binary measures of energy access. It adopts a multidimensional approach that considers the adequacy, availability, reliability, quality, convenience, legality, and safety of energy access to produce a tiered ranking ranging from 0 for no access to 5 for high quality access (Bhatia and Angelou, 2015). Subsequent work has refined the MTF rating to adapt it to different components of energy access (e.g. cooking, lighting, household appliances) or energy systems. For a detailed explanation of our approach to constructing energy aspirations, see Appendix F.

4.3 Placebo

During the supplemental phone survey with the women in our sample, we also played the initial segment of the audio narrating the role model story. This excerpt is about 2 minutes long, and merely describes the setting and the characters. Importantly, does not develop the success story of the female role model or feature any of the psychologically active components of the full-length story. In control villages, this exercise constitutes a placebo treatment that accounts for the exposure to the audio medium, as well as any basic messaging embedded in the initial description of the characters' livelihoods.

4.4 Intervention

Within a month of the phone call, we began implementing the psychological empowerment intervention in treatment villages.[9] The intervention was delivered to the primary woman in each household, and aimed to raise women's aspirations, promote the establishment of concrete long- and short-term plans to achieve them, and encourage them to take actions in the present to work towards these. Broadly following Orkin et al. (2024), our treatment has two main components.

In the first phase, female participants listened to a 7-minute pre-recorded audio played on a tablet. The audio narrates a purposedly developed story portraying a fictional woman of similar background to the participants who sets ambitious but attainable aspirations to improve her family's future by sending their daughter to university. The woman recognizes that this long-term goal will put increased economic pressure on the household's finances and decides to develop a

[8] The aspirations measures for income, assets, and education follow the standard phrasing used in previous studies (e.g. see Orkin et al. (2024) or Janzen et al. (2017)). The aspirational questions for energy services an innovation of this study.

[9] The rollout of the intervention began at the end of September 2023. Treatment villages were visited on a rolling basis, allowing roughly one month between the baseline aspirations survey and the intervention visit.

long-term plan with her husband to better their prospects. Their plan identifies a series of intermediate goals, and includes anticipating possible obstacles and devising potential solutions ahead of time. By persevering and following the plan, they are able to purchase a motorbike so that their daughter can attend university in a nearby town and even continue saving with the goal of making some home improvements. Along the way, the characters also put into practice techniques for goal setting and planning that treated women learn in the workshop that constitutes the second phase of the intervention, and link their use to achieving one's long-term goals or aspirations.

The recording follows a script developed to be realistic for the types of villages in our study regions. As such, this singular narrative has three variations corresponding to unelectrified villages, mini-grid villages in Ayeyarwady and mini-grid villages in Tanintharyi. The main distinction between the scripts comes down to the plan they set to achieve their goal (e.g. raising pigs or investing in a mini fridge to sell popsicles and cold drinks out of a small, pre-existing grocery store), which reflects the electrification status of the village in the story. A second, non-substantive difference varies the region in which the story takes place, with a related modification in the starting main livelihood of the household.[10] To further help with identification,[11] the recordings were supported by visual aids capturing pivotal points of the story (see Figure A4 and Figure A5).

After the audio, participants engaged in a workshop with the following exercises: (a) Best Possible Selves, in which they were asked to visualize and describe their lives in five years "after everything has gone as well as it possibly could" to encourage them to set ambitious aspirations; (b) Personal goal-setting, where the enumerator listed the goals back to participants and had them pick their most important and achievable goal and estimate how long it would take to achieve it; (c) Mental Contrasting with Implementation Intentions, where participants set implementation intentions in the form of a concrete plan they could start the following week, identified potential obstacles along the way and strategies to overcome these, and engaged in mental contrasting – an exercise through which participants visualize how their lives would change if they reached their goal and how they would feel after doing so. Finally, we handed out a small Burmese calendar with space to write their main goal. We also ask them to write down the first step of their plan around the date on which they estimate it should be completed.

As mentioned above, the intervention was to be delivered to the primary women in the household. As such, to avoid potential alterations to behavior during treatment, we put in place a procedure to allow the woman to engage with the intervention without any pressure due to the presence of her husband. In the few (17) cases where the husband was also present at the time of the intervention, we first communicated to the household that we were back to conduct some additional activities with both spouses separately. The wife was the first one to proceed with the intervention. Once she was done, the husband listened to the same audio from the placebo without engaging in

[10] In Tanintharyi's mini-grid villages, the husband fishes while the woman runs a small grocery store out of the house. In Ayeyarwady's mini-grid villages, the husband works a few acres of agricultural land while the woman runs the small grocery store. In unelectrified villages, the couple relies on a small plot of agricultural land that they farm during the farming season supplementing their income with casual jobs and other subsistence activities the rest of the year.

[11] La Ferrara (2016)'s review highlights three important principles for the design of edutainment interventions: "differential modelling", "identification", and "exemplification".

any additional exercises and completed the survey's aspirations module.

4.5 Endline survey

Between December 5th 2023 and January 15th 2024, we conducted the endline survey. The scope of the endline survey reflects our interest in capturing short term impacts of the intervention. Given the short turnaround after the conclusion of the intervention, we focus on evaluating how the intervention affected women's empowerment indicators (e.g. agency measures and gender attitudes) and aspirations. In the more medium term, investments in education and productive inputs such as electrical appliances and recalibrations of labor decisions would theoretically be main drivers of the intervention's downstream effects. To the extent that people choose to and can pursue these decisions after setting new goals, there may be changes in the level and patterns of expenditures, borrowing decisions, energy use, the ownership of electric appliances, or time use. Since such energy-related investments may be difficult to detect with a short turnaround between intervention and follow-up, we also explore differences in willingness to pay (WTP) for a rechargeable solar lamp (that also allows to charge mobile phones) using a Vickrey auction.[12]

5 Empirical analysis

5.1 Estimation strategy

We estimate intent-to-treat (ITT) effects using Equation 1 below, where i identifies the unit of analysis (the household or the woman), v the village, and s the stratum. β_0 captures the mean of the placebo group; $StoryWorkshop_v$ is an indicator for the intervention; X_{iv} is a vector of prespecified baseline controls including the baseline measure of the dependent variable Y_{iv0}, as well as socioeconomic controls (a dummy for whether the household's wealth is above the sample median, woman's age, woman's education); and λ_s are strata fixed effects. We estimate Equation 1 through Ordinary Least Squares for most outcomes, but use Probit models and report marginal effects at the mean when the outcome is binary. Standard errors are always clustered at the village level.

$$Y_{iv1} = \beta_0 + \beta_1 StoryWorkshop_v + \boldsymbol{X'_{iv}\beta_2} + \lambda_s + \epsilon_v \tag{1}$$

To explore the heterogeneity in the intervention's impacts by energy access and other relevant baseline variables aligned with our conceptual framework, we use Equation 2. W_{iv} is either an unelectrified village indicator dummy or one of the individual or household level variables also present in the X_{iv} vector (the baseline value of the dependent variable, the woman's level of empowerment power at baseline, the household's wealth, the woman's education, the woman's age).

[12] See Figure A3 for a picture of the solar lamp. While we were not able to collect baseline WTP measures due to logistic and budget constraints, a successful randomization procedure yielding balance across relevant covariates still allows us to make meaningful comparisons.

Wherever the interacted variable is continuous, we transform it into a dummy variable for whether the value is above or below the median value at baseline.

$$Y_{iv1} = \beta_0 + \beta_1 StoryWorkshop_v + \boldsymbol{X'_{iv}\beta_2} + \beta_3 StoryWorkshop_v * W_{iv} + \lambda_s + \epsilon_v \quad (2)$$

We address the problem created by multiple inference (i.e. the increased probability of type I errors due to the fact that many tests are conducted within a family of outcomes) in two ways. First, we reduce the number of tests by creating weighted average indices following Anderson (2008).[13] This approach incorporates a weighting procedure that maximizes the amount of information captured by the index by weighting (transformed) outcomes by the inverse of the covariance matrix for the outcome family, such that variables that are highly correlated with each other and/or have higher variance receive lower weight. The use of summary indices has the advantage of being robust to multiple testing, while also providing a test for a general test at the level of a family of hypotheses. This approach can also reduce random measurement error potentially increasing the power of the test (Anderson, 2008). Second, we also correct for multiple hypotheses testing by controlling for the false discovery rate (FDR) within outcome groups by reporting sharpened q-values obtained through a stepdown procedure (Anderson, 2008; Benjamini et al., 2006).

5.2 Balance and attrition check

We use Equation 3 to check for balance between treatment and placebo villages for both the full baseline sample and the analysis sample (i.e. those reached at endline). As shown in Table A4, all individual and household characteristics were balanced across treatment arms in the full baseline sample.

$$Y_{iv0} = \beta_0 + \beta_1 StoryWorkshop_v + \lambda_s + \epsilon_v \quad (3)$$

In October 2023, two ethnic militias (Myanmar National Democratic Alliance Army and the Ta'ang National Liberation Army) in the northeast of Shan state and a third militia (the Arakan Army) in the west of Rakhine state launched coordinated attacks against government military positions. After some initial success, another group (the Kachin Independence Army) reacted by launching new attacks in northern Kachin state and, in coordination with the Arakan army, in Sagaing state. Attacks were also registered in early November in the east of Kayah state. (See the map on Figure A6 to situate these states relative to the regions of our study.)

[13] First, all indicators entering the index are checked to ensure that the positive direction indicates a "positive outcome". Then, the indicators and converted to effect sizes by subtracting the mean of the placebo group and dividing by the placebo group standard deviation. The inverse of the covariance matrix of the normalized indicators is then used to construct weights that are used to build a weighted average. This average is then normalized again by subtracting the mean of the placebo group and dividing by the placebo group standard deviation to ensure an index that is distributed with mean zero and standard deviation one in the placebo group.

The conflict triggered by these events has been ongoing since. Although, as can be seen in ACLED (2024)'s conflict watchlist, most violent clashes up to January 17th 2024 were concentrated elsewhere, there were spillovers leading to (lower intensity) clashes in the areas of our study. Innovations for Poverty Action's (IPA) team on the ground responded to this in real time by conducting security assessments toward the end of the intervention period. Another comprehensive security assessment was conducted at the start of December 2023, prior to the launch of the endline survey, which was also updated during its roll-out to reflect developments on the ground. The outcome of these assessments and overall difficulties in tracking households reduced our analysis sample to 843 households. Table A5 shows the randomization balance for the 843 households that were successfully traced at endline. The sample remains balanced on all variables.[14]

We also test for differential attrition by treatment status by regressing a dummy for whether the participant was present at endline, M_{iv}, on treatment assignment according to Equation 4.

$$M_{iv} = \beta_0 + \beta_1 StoryWorkshop_v + \boldsymbol{X'_{iv}\beta_2} + \lambda_s + \epsilon_v \tag{4}$$

The goal of this analysis is to introduce any variables that could be prognostic of how the intervention could affect outcomes (i.e. basic variables that could affect the independence of potential outcomes) and confirm that attrition did not introduce new differences between treatment arms that changed the baseline composition of the two sub-groups. Overall, Table A6 shows the lack of differential attrition with respect to treatment assignment.

6 Results

6.1 Empowerment

Table 1 shows the treatment effects of the empowerment intervention on 5 sub-indices of empowerment and an overall empowerment index combining them. We also show the impacts on the sub-components making up each index in Table A7-Table A12.

As shown in Column 1, the intervention results in a large and statistically significant increase in the financial agency index, shifting it by 0.279 standard deviations (SD) relative to the placebo group. Table A7 shows that this shift in financial agency is driven by increases in the probability that the woman has her own bank account (the average marginal effect is 2.4 percentage points (pp), or 92% of the placebo mean), has savings (9.9 pp, or 30.8%), and has access her own mobile money account (3.6 pp, or 73.5%). We also find suggestive increases in the likelihood that she has access to cash for small purchases (3.2 pp) and reports having access to credit (6.7 pp), but the effects are not statistically significant.

[14] Figure A7 shows maps with (i) the share of baseline households tracked at endline for each village and (ii) the share of households that completed the intervention in each treatment village.

Table 1: Empowerment indices

	Financial agency index	Business agency index	Hh assets agency index	Income decisions agency index	Gender norms index	Empowerment index
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.279***	0.291**	0.112	0.061	0.130	0.291***
	(0.086)	(0.141)	(0.112)	(0.132)	(0.112)	(0.104)
	[0.010]	[0.094]	[0.319]	[0.630]	[0.319]	[.]
Placebo mean	0.000	-0.000	0.000	0.000	0.000	-0.000
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets. * p<0.1, ** p<0.05, *** p<0.01

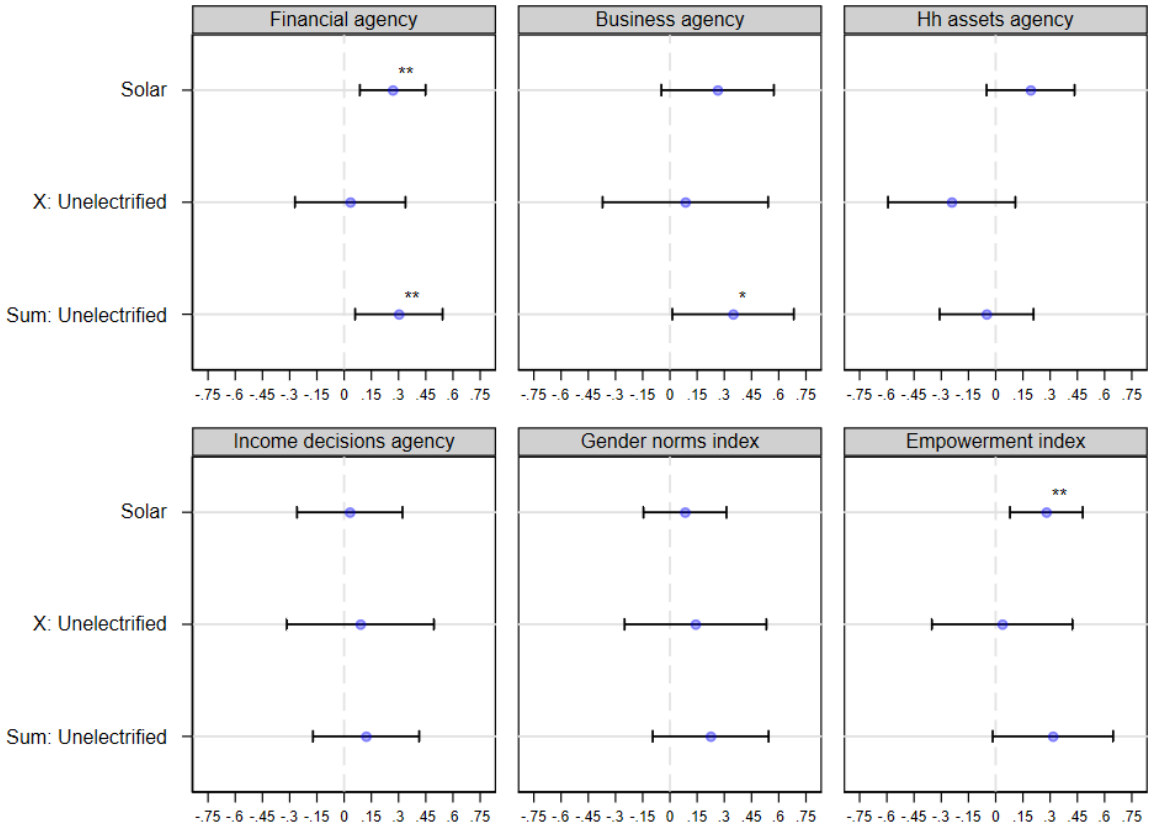
Column 2 shows that intervention also increases an index of business agency by 0.291 SD. This index aggregates information on the woman's perceived ability to execute business related tasks. The analysis of its sub-components in Table A8 shows increases in indicators for feeling highly able to run a business (7.6 pp), manage the household finances (3.7 pp), bargain to buy low (3.6 pp) and sell high (8.1 pp), collect debt (1.7 pp), identify new business opportunities (8.7 pp), save (8.7 pp), and hire and manage workers (3.2 pp). The effect is only statistically significant for women's perceived ability to identify business opportunities, for which increase is approximately 45% of the placebo mean. However, we also see large coefficients for other tasks that are closely connected to the edutainment narrative and the activities of the planning workshop: running a business ($p = 0.21$), selling at high prices ($p = 0.20$), and saving ($p = 0.11$).

While the coefficients for the two agency indices indices measuring control over household assets and income decisions are also positive, the effects are small and imprecise. These measures are more difficult to shift given the short turnaround between intervention and endline, which may not have allowed sufficient time or opportunities for the underlying indicators to update meaningfully. For example, a woman may be more likely to update the response to whether she is sole or joint owner of land or business assets if the household has acquired new such assets. Finally, the increase in the gender norms index is greater but also is not statistically significant (0.130 SD , $p = 0.25$). However, the sub-component analysis shows a significant increase of 5.4 pp in the likelihood of agreeing with the statement that girls' education is as important as boys' (see Table A12), once again suggesting that topics most salient in the story were internalized by treated women.

Overall, these results indicate that the psychological empowerment intervention is effective at raising women's empowerment. The effects are concentrated in dimensions that are most directly featured in the edutainment story (financial and business agency), and are robust to adjusting for multiple hypothesis testing over the five sub-indices. The combined empowerment index shows a statistically significant increase of 0.271 SD – a large effect for an intervention with a single session

composed of a 7-minute listening exercise and a goal-setting and planning workshop.

Figure 1: Empowerment indices - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, the interaction of treatment and an indicator for unelectrified villages, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects (which capture the level effect of energy access in this interacted regression). We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

As mentioned in Section 5, we explore how the impacts of the intervention change depending on the available energy infrastructure at the village level. Figure 1 shows that there is little heterogeneity on empowerment outcomes by the level of energy access. The only notable results are that business agency is marginally not significant in solar villages and the overall empowerment index is marginally not significant in unelectrified villages despite the magnitude of the coefficients being virtually the same between the two types of villages.

Next, we look at differences in the treatment effects by women's baseline characteristics. Figure B6 shows that the effects are stronger for less empowered women (i.e. below median levels of the different sub-indices at baseline). The impacts on financial agency are larger for less financially empowered women (0.516 SD versus 0.213 SD), although the difference between the two

coefficients is marginally not significant ($p = 0.16$).[15] Moreover, while women who are more progressive at baseline do not update their beliefs around gender roles, less progressive women show a large significant improvement in the gender norms index at 0.291 SD, with the difference between the two groups being significant ($p = 0.03$). Overall, the intervention significantly grows the empowerment index of more empowered women by 0.134 SD and that of less empowered women by 0.429 SD, a significantly higher increase ($p = 0.06$). Similar patterns emerge for household wealth (Figure B7), age (Figure B8), and education (Figure B9), with women in less wealthy households, younger women, and women who did not complete middle school showing larger impacts for financial and business agency, although none of the coefficients pairs are significantly different.

6.2 Aspirations

The other outcome directly targeted by the intervention is women's aspirations. Table 2 shows the impacts of the intervention on the three dimensions of aspirations we measure: income, children's education, energy services (Columns 1-3). We also combine these measures into a multidimensional aspirational index to capture broader changes in mindset (Column 4). Given the positive correlation between aspirations and empowerment ($r = .17$, $p < .001$), we augment our specification for this analysis by adding the empowerment index at baseline as a control.

Table 2: Aspirations

	Income aspirations	Education aspirations	MTF aspirations index	Aspirations index
	(1)	(2)	(3)	(4)
Treatment	5.790	0.557	0.017	0.074
	(17.754)	(0.394)	(0.120)	(0.132)
	[1]	[0.943]	[1]	[.]
Placebo mean	118.6	10.56	-0.000	-0.000
Controls	Yes	Yes	Yes	Yes
Observations	794	631	797	797

Notes: This table shows treatment effects of our intervention on three dimensions of aspirations and a multidimensional aspirations index combining them. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets. * p<0.1, ** p<0.05, *** p<0.01

None of the three dimensions of aspirations are significantly affected by the intervention when we run the comparison on the full sample. The coefficients on income and education aspirations are positive, but the effects are not significant. The null result on income aspirations is consistent with the results of the comparable treatment arm in Orkin et al. (2024). Aspirations for energy services

[15] This large gap in the effects of financial agency is due to differentially large, significant increases in the likelihood that women who did not have access to the corresponding financial service at baseline have their own bank account (2.8%), savings (12.9%), mobile money account (3.3%). The marginal effect coefficients on having access to cash for small purchases and access to credit at endline are positive (6.1% and 6.9%, repectively), but not significant ($p = 0.34$ and $p = 0.12$, respectively).

show a clear zero on the aggregate MTF aspirations index. The multidimensional aspirations index shows an increase of 0.074SD relative to placebo villages, but standard errors are large.

Table 3: MTF aspirations

	Lighting aspirations	Cooking aspirations	Productive appliances aspirations	MTF aspirations index
	(1)	(2)	(3)	(4)
Treatment	-0.004	-0.256	0.385*	0.017
	(0.125)	(0.211)	(0.211)	(0.120)
	[0.527]	[0.299]	[0.277]	[.]
Placebo mean	4.12	4.10	2.41	-0.000
Controls	Yes	Yes	Yes	Yes
Observations	793	794	770	797

Notes: This table shows treatment effects of our intervention on three dimensions of aspirations for energy services and aggregate MTF aspirations index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets. * p<0.1, ** p<0.05, *** p<0.01

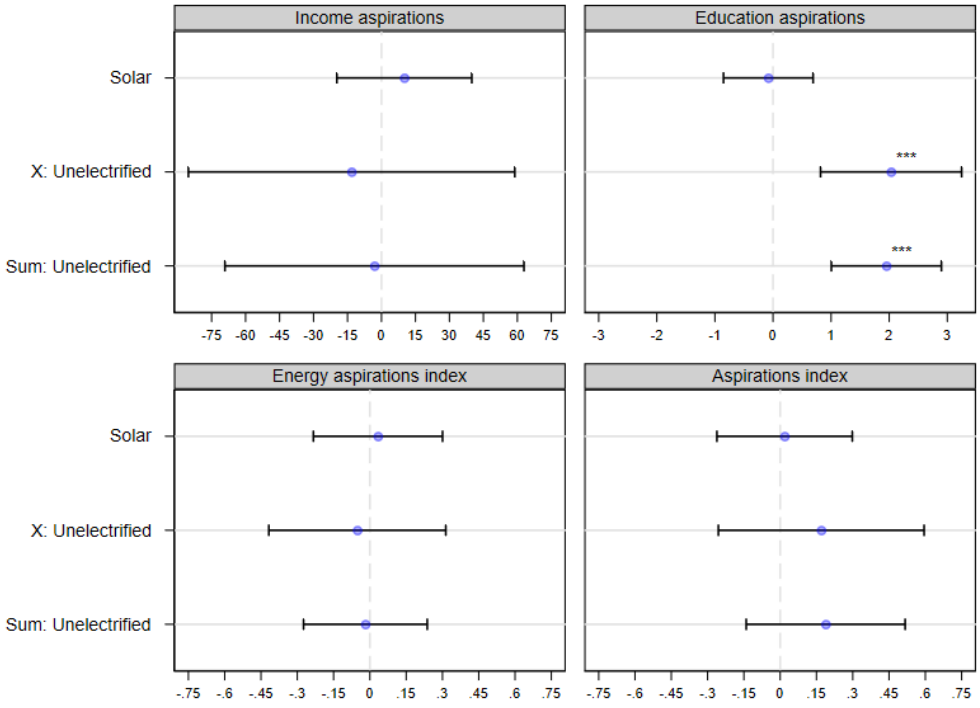
Disaggregating the MTF aspirations index into aspirations for the three types of energy services considered (lighting, cooking, productive appliances) shows a pattern consistent with women aspirations moving away from a mindset focused on household chores and toward more general productive activities (Table 3). First, aspirations for lighting and electric cooking are not affected, a result partly explained by the already high aspirations for both dimensions in the placebo group (4.12 and 4.10 out of 5, respectively). Second, we find a significant increase of 0.385 on the MTF rating scale for aspirations for productive appliances, nearly 16% of the placebo mean.

Figure 2 explores the heterogeneity of the results on the main aspiration measures relative to the level of energy access at the village level. The graphs show the lack of heterogeneous results, with one clear exception: education aspirations. While the intervention does not have any effects on education aspirations in solar villages, women in unelectrified villages show a large and significant increase of 2 additional years of education. We attribute this pattern to differences in the opportunity environment between the two village types. Solar villages tend to have better road connectivity and overall infrastructure than unelectrified villages. While these factors may increase access to higher education, they also expand alternative economic opportunities that reduce the relative value of additional schooling compared to unelectrified villages. Consistent with this, households in solar villages are 20.4% more likely to own productive appliances and 12.7% more likely to be engaged in non-agricultural business activity than those in unelectrified villages (Table A3).

In turn, a lower ability to leverage electricity for productive uses, including business activities, contributes to the greater relevance of the education-focused component of the story in unelectrified villages, where education opens up more general options that are less dependent on electricity. The easier potential path to higher education in solar villages also makes it more likely that some-

one within your aspirations window (Ray, 2006) will have pursued related goals. When real-life role-models are more common, reference points are more established and less malleable, so an external narrative highlighting educational pathways contributes little new information.[16] Overall, these patterns show that educational aspirations are more responsive to the intervention in unelectrified villages, where education plausibly remains a more salient pathway out of poverty.

Figure 2: Aspirations - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on three dimensions of aspirations and a multidimensional aspirations index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, the interaction of treatment and an indicator for unelectrified villages, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects (which capture the level effect of energy access in this interacted regression). We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

To explore which households might be driving this pattern, we next estimate separate regressions for solar and unelectrified villages and examine heterogeneity in the intervention's impacts by baseline characteristics. The results support our prediction that, when aspirations respond to the intervention, the effects are concentrated among women whose baseline characteristics are associated with greater agency. In unelectrified villages, those with below median aspirations increase the education aspirations for their children by approximately one year (marginally not significant, $p = 0.15$). The interaction with the above median dummy is significant and the overall increase

[16] Consistent with this interpretation, Table A3 also showed that households in solar villages have significantly higher ownership rates of information media devices such as TV, radio, or computer (56% versus 44%), which may increase exposure to information and role models independently of the intervention.

for the above median group is of 2.73 additional education years (Figure B11). Although less educated women also significantly increase their aspirations for their children's education (1.42 years), Figure B19 shows a significantly higher increase for more educated women (3.81 years). More empowered women (2.17 years) and women in wealthier households (2.29 years) also raise educational aspirations by more than less empowered women (1.74 years) and women from poorer households (1.53 years), but the differences are marginally not significant (Figure B13 and Figure B15). Finally, as shown in Figure B17, younger women exhibit a stronger increase (2.21 years) than older women (1.60 years). Although the difference is not significant, this is consistent with the fact that younger women will tend to have younger children, which creates a wider window of opportunity that makes their aspirations more malleable. By contrast, in solar villages, both the below and above median subgroups show no effect on education aspirations relative to their placebo counterpart for any baseline variable (Figure B10, Figure B12, Figure B14, Figure B16, Figure B18). Overall, these patterns suggest that, when the opportunity environment makes a given pathway especially salient, an intervention emphasizing that pathway may be most effective for individuals with a greater perceived ability to pursue related goals.

The effects on the sub-components of the MTF aspirations index by the level of energy access at the village level are also consistent with the above hypothesis. While there is no heterogeneity in the effects on the two subcomponents that were not shifted by the intervention (lighting and electric cooking), the positive effect on aspirations for productive appliances is driven by women in treated unelectrified villages, who show an increase of 0.61 units (30.8% of the placebo mean in unelectrified villages) in the MTF scale (Figure B1).

Table 4: Expenditures

	Consumption	Energy	Health	Education
	(1)	(2)	(3)	(4)
Treatment	28.298	-0.488	6.771	9.415
	(44.615)	(2.739)	(9.633)	(8.473)
	[1]	[1]	[1]	[1]
Placebo mean	595.1	28.38	68.94	37.03
Controls	Yes	Yes	Yes	Yes
Observations	766	832	802	814

Notes: This table shows treatment effects of our intervention on consumption, energy, health, and education expenditures. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, household size, the number of household members under the age of 18, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all four outcomes in brackets. * p<0.1, ** p<0.05, *** p<0.01

6.3 Expenditures

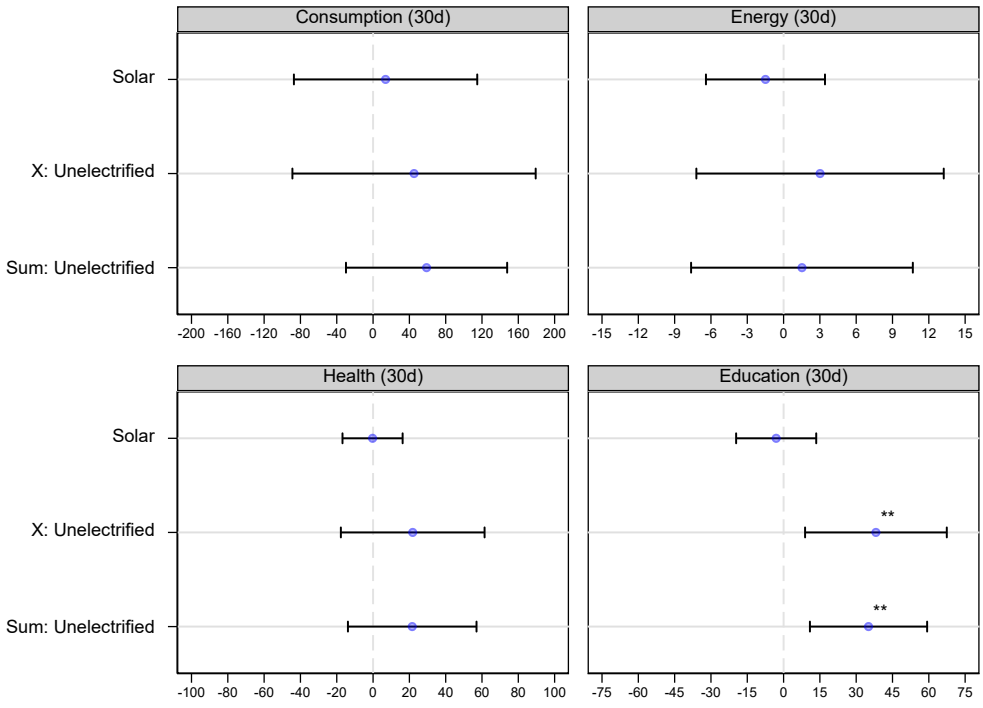
Next, we explore the intervention's impacts on consumption and investment expenditures: food and non-food non-durable consumption, energy, health, and education – all scaled to the last 30 days. In doing so, we augment the basic specification by including the total number of people and

the number of people under the age of 18 living in the household as covariates.

As shown in Table 4, none of the four expenditure measures show significant treatment effects on the overall sample. The null effect on forward-looking spending behavior (health, education) is not surprising given the lack of broad treatment effects on aspirations. Moreover, despite the increase in aspirations for productive appliances, we do not find effects on the number of appliances owned (Section 6.5), which could have affected energy spending.

Looking at differences in treatment effects by the level of energy access, expenditures follow an analogous pattern to aspirations. We see no effects (and no heterogeneity) for all expenditure types except for education expenditures in unelectrified villages. As seen in Figure 3, the interaction is significant and yields a total effect in unelectrified villages of an additional 35.09k MMK spent on education, almost doubling the placebo mean at endline.

Figure 3: Expenditures - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on the three dimensions of aspirations for energy services. Coefficients are from OLS regressions of each outcome on treatment assignment, the interaction of treatment and an indicator for unelectrified villages, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects (which capture the level effect of energy access in this interacted regression). We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

The matching patterns of heterogeneity include the fact that the subgroups who experienced a larger aspirational shift also show larger increases in education expenditures. We see positive (marginally not significant) effects for those spending below and above median at baseline (see Figure B11), but the increase is larger in magnitude for the above median group, at around 42k

MMK (p = 0.14). Importantly, the variation of this figure that splits the sample by educational aspirations at baseline shows a large and significant effect for the more ambitious, who raised spending by 116 MMK, and clear null effect for those with lower aspirations . Households with empowered and more educated women also raise their level of education spending, by 39.73MMK and 59.56MMK, respectively (Figure B13 and Figure B19). The change for less empowered and less educated women (for whom the increase in aspirations is significant, but smaller) is also positive but not significant. There is no heterogeneity with respect to baseline wealth (Figure B15), with both wealth groups showing similar increases in education expenditures that fall just below the significance threshold. A deviation from this trend is that only older treated women in unelectrified villages show a significant increase in education expenditures despite a lower increase in education aspirations (Figure B17), possibly due the correlation between empowerment and age (p = 0.01). In solar villages, there is no effect for any of the sub-groups across all expenditure categories (Figure B10, Figure B12, Figure B14, Figure B16, and Figure B18).

6.4 Business activity

Table 5 shows the treatment effects on business ownership and loans. For business loans, we look at borrowing behavior for all households and for households with a business at endline separately, in columns 2 and 3.[17]

Table 5: Business ownership and loans

	Owns any business	Business loans	
	(1)	(2)	(3)
		Any Hh	Business Hh
Treatment	0.035	0.032	0.040
	(0.034)	(0.035)	(0.067)
	[1]	[1]	[1]
Placebo mean	0.302	0.148	0.315
Controls	Yes	Yes	Yes
Observations	835	843	282

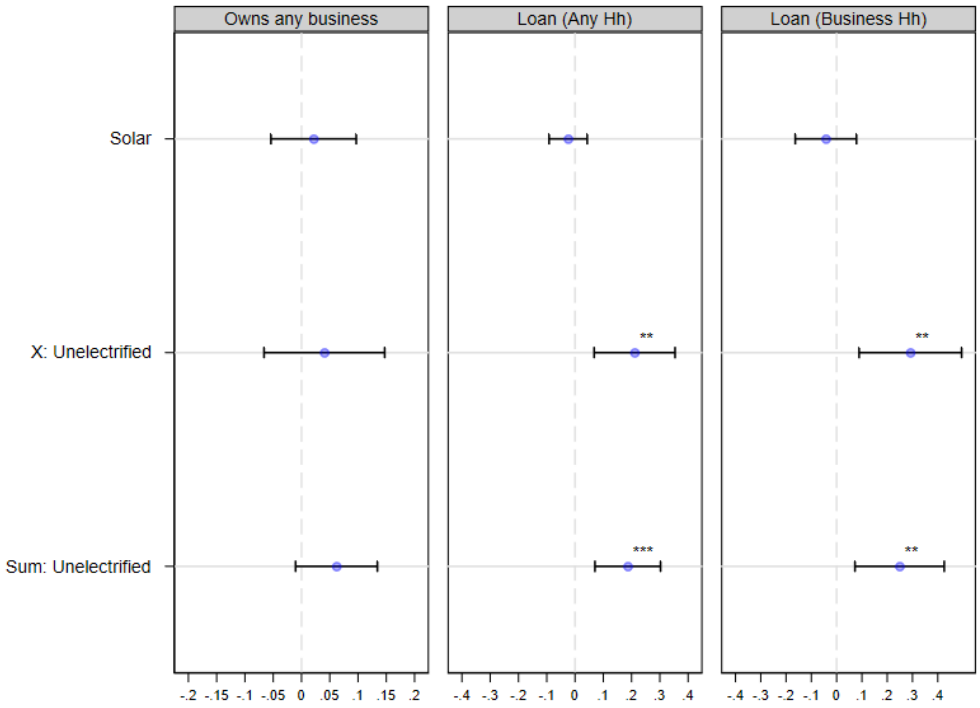
Notes: This table shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all three outcomes in brackets. * p<0.1, ** p<0.05, *** p<0.01

While the coefficients in all three columns are positive, none of the effects are significant for the full sample. However, as shown in Figure 4, households of treated women in unelectrified villages show a larger increase (6.2 pp) in the probability of owning a business (marginally not significant, p = 0.16). The increase in business activity is even more clear when we look at the probability

[17]For non-business households, we ask about plans to (re)open a business. If a non-business household reports having taken out a business loan since the intervention but also reports not having plans to open or re-open a business, we correct (zero out) the business loan response. Results are stronger without this correction.

the household took out a business loan. Looking at all households, the difference relative to solar villages is significant and overall increases the probability of taking out a business loan by 18.7 pp. Focusing on business households, the treatment effect on the likelihood of taking out a business loan is even larger, at approximately 25 pp.[18]

Figure 4: Business activity - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, the interaction of treatment and an indicator for unelectrified villages, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects (which capture the level effect of energy access in this interacted regression). We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Similarly to Orkin et al. (2024), we attribute these changes to the shifts in aspirations and the behavioral incentives induced by those shifts.[19] As we did with expenditures, in order to support this claim, we check whether the women with the largest increases in aspirations within unelectrified villages live in the households that drive these effects. Once again we see that those who showed the stronger increases in aspirations change their borrowing behavior the most: more empowered women (Figure B23), more educated women (Figure B29), and women from wealthier households (Figure B25). The other noteworthy result is that the suggestive effects on business

[18]The effect on non-business households, driven entirely by those with plans to open a new business, is 11.5% and significant at the 10% level.

[19]For example, the share of treated women in unelectrified and solar villages who set goals related to expansions or opening of a business are similar (49% and 53%, respectively), but only women in unelectrified villages show changes in forward-looking aspirations that may encourage the household to pursue new income generating opportunities in support of those aspirations.

generation and the change in borrowing behavior are driven by those who did not have a business at baseline and those who had not taken a business loan prior to the intervention (Figure B21).

6.5 Other outcomes

Inspired by the models presented in Genicot and Ray (2020) and Orkin et al. (2024), we test whether energy-related investments are, as a prime example of productive inputs, affected by changes in women's empowerment or aspirational mindset. In this analysis, we also include household size as a control, as bigger households may own more appliances.[20]

Table A13 shows the intervention's impacts on a series of dummies for the ownership of different appliances (Columns 1-7) and the total number of devices owned (Column 8). The intervention did not produce significant effects on any of these outcomes. As mentioned above, this may be explained by the fact that the short turnaround between intervention and follow-up was too short for households to make these type of investments. A complementary hypothesis is that the escalation of the conflict may have generate a feeling of insecurity that hindered investments in new physical assets.

As mentioned in Section 4.5, we also conducted a Vickrey auction on a rechargeable solar lamp that also allows to charge mobile devices. Although differences in willingness to pay (WTP) are a less tangible measure than appliance ownership for looking at changes in behavior around energy use and investment, it is more likely that our data will capture effects on this outcome because it is not constrained by the amount of time between intervention and endline. Table A14 shows the balance table with the comparison between treatment arms for the auction sub-sample. The two groups are generally balanced aside from two noticeable differences. First, placebo women more likely to have completed middle school, but our basic specification already includes this as a control. Second, and a bigger threat to the validity of this comparison, treatment women within the auction subsample have higher aspirations for energy services. In this analysis, we augment the basic specification with the baseline measure of aspirations for energy services to account for this difference.[21] Table A15 shows that treated households have higher valuations of the auctioned appliance. WTP is higher for both spouses but shows a larger increase for women: 8.55k MMK higher for women (43% of the placebo mean) and 5.67 MMK higher for men (23% of the placebo mean). Both effects survive the correction for multiple hypotheses. Figure B2 shows that this difference is driven by households in solar villages. In the auction subsample, the baseline ownership rate of lighting devices between treatment and placebo households is much closer in solar villages (85.9% in the treatment group and 80.7% in the placebo group) than in unelectrified villages (75.6% versus 62.2%). If having lower access to lights creates a sense of embarrassment when the baseline is

[20] For outcomes in this section, we limit the discussion of heterogenous treatment effects to the split in terms of solar and unelectrified villages.

[21] Table A14 also shows minor baseline imbalances in the number of total devices owned, the woman's psychological well-being, and whether at least one woman in the household is a member of at least one social group. Since we only have auction data for a subsample of 442 households, we show results for the main specification to avoid losing sample due to missing data, in particular for energy aspirations. However, the results are robust to including the full list of unbalanced baseline variables.

higher, this could be making the treatment group more responsive to the auctioned appliance in solar villages on average.

Finally, we explore the intervention's treatment effects on the time allocations of the woman and her male spouse, and the time spent studying by household members below 18 years of age. Table A16, Table A17, and Table A18 show the lack of significant changes in time allocation in the full sample. However, Figure B3 and Figure B4 show changes in the labor supply of treated women and their male spouses in unelectrified villages: women reduce the time spent in non-agricultural labor by 394 minutes (approximately 6.5 hours) per week, while men increase it by 626 minutes (approximately 10.4 hours).The difference relative to the null effect in solar villages is significant for men's increase and marginally not significant (p=0.12) for women's decrease. Men in unelectrified villages also increase the time allocated to agricultural labor by about 2 hours (not significant, $p = 0.22$). This overall pattern is consistent with the labor-supply response predicted and observed by Orkin et al. (2024). At the same time, women in unelectrified villages also shift toward activities consistent with the observed change in aspirations, as reflected in a significant increase of almost 3 hours per week in time spent caring for their children. We see no evidence of changes in the time spent studying by household members under the age of 18 in either type of village (Figure B5).

A complementary analysis suggests that these cross-spouse time reallocations were part of a coordinated response within households: treated households in unelectrified villages are 6.9 pp more likely than placebo households to exhibit the joint change in which the man increases his non-agricultural labor while the woman decreases hers.[22] That an intervention delivered exclusively to women generated this broad pattern of time reallocation across activities and between spouses is consistent with a unitary household framework, in which spouses jointly reallocate their time in response to an increase in the value placed on forward-looking investments and future consumption.[23]

6.6 Ruling out internal validity threats

Demand effects

We address the common concern in edutainment interventions that participants may misreport outcomes related to the story's content in order to align their responses with the behavior of the role model or with what they reported during the workshop. First, as shown in Appendix C, the goals that women set during the workshop do not replicate those pursued by the characters in the story. Second, for over 65% of treated observations, the endline enumerator was not the same person as the intervention facilitator, limiting the possibility that the effects are driven by respon-

[22] We find positive but not statistically significant effects for related joint transitions involving women's childcare time.

[23] While we cannot test this with our design, under such a strict unitary interpretation, a similar set of household-level adjustments could arise if the intervention were delivered to men rather than women, provided that it induced the same change in the household's long-term objectives. The observed pattern, however, does not distinguish between unitary and collective models of household behavior, as coordinated reallocations of market work and household production can also arise when spouses have distinct preferences but household choices are Pareto efficient (Chiappori, 1992, 1997).

dents attempting to please the specific facilitator who delivered the workshop. Third, the pattern of results is not consistent with such reporting bias. If respondents were systematically distorting their answers in empowerment modules, for example on financial agency, we would expect to see similar patterns across other outcomes plausibly subject to demand effects. Income and education aspirations are clear candidates. Yet, we find no effects on income aspirations, and education aspirations only increase in unelectrified villages. This heterogeneity by village electrification status, and its consistency with the pattern for education expenditures and borrowing behavior, would be unlikely if demand effects were driving the results. Moreover, the intervention does not increase self-reported study time, despite the emphasis of the story on children's education.

Hawthorne effects

The cluster-randomized design largely eliminates concerns that individuals from treatment and control villages could alter their responses due to an awareness that other groups received different treatments (Barrett and Carter, 2010). The reduced mobility between villages due to security concerns linked to the escalating conflict further reinforces this argument by limiting the possibility that participants become aware that they are part of an experiment.

Spillovers and implementation effects

The cluster-randomized design also greatly reduces concerns about direct treatment spillovers between treatment and control villages. Results are virtually unchanged if we exclude the 8 treatment villages (out of 43) where we were unable to treat at least 75% of the targeted women. While we did not collect information on how frequently people talk to each other about their goals, this robustness check, and the fact that the intervention was always delivered to women individually, suggest that the effects are not dependent on social dynamics triggered by the intervention. There are also no discernible pattern across outcomes for any facilitator, as shown by the stability of the "leave-one-facilitator-out" estimates (Figure B30). Our main findings are also robust to the exclusion of the 14 villages (out of the 65 total) where the endline take-up was less than 65% and the inclusion of week of survey fixed effects.

7 Conclusion

A growing literature shows that aspirations can shape investment behavior and long-run economic outcomes. The formation of aspirations depends on social and economic conditions that determine which pathways out of poverty are salient and perceived as attainable. For marginalized groups such as women, progress along available pathways is often constrained not only by infrastructure and market access, but also by societal norms that limit their agency over financial and productive decisions.

This paper studies how psychological interventions targeting aspirations interact with the opportunity environments in which they are delivered. We provide evidence on this question through a cluster-randomized field experiment in rural Myanmar, implemented in both solar-powered and unelectrified villages. The intervention combines an edutainment story featuring a relatable female

role model with a visualization, goal-setting, and planning workshop. The story emphasizes long-term investment in children's education, supported by concrete planning and productive livelihood decisions, while the workshop gives women a framework for translating broad goals into actionable steps. By stratifying treatment assignment by region and electrification status, we test whether the pathway-enabling nature of electrification changes the intervention's impacts.

The intervention increases women's empowerment, particularly along the dimensions most directly activated by the edutainment's narrative. Treated women are more likely to report having their own savings, bank accounts, and mobile money accounts, and report greater confidence in their ability to identify income-generating opportunities. These effects show that a short intervention can improve women's agency and self-beliefs in domains closely related to their ability to pursue forward-looking goals. While these effects do not vary with the level of energy access, they are concentrated among women who are less empowered at baseline, consistent with the idea that psychological empowerment may be most valuable for those facing the strongest internal constraints.

Effects on aspirations are more nuanced. In the full sample, we do not find average increases in aspirations for income, children's education, or energy services, nor do we find corresponding impacts on expenditures, appliance ownership, or other investment behaviors. The average results, however, hide substantial heterogeneity by village electrification status. In unelectrified villages, the intervention increases aspirations for children's education and for productive appliances. These aspirational shifts are accompanied by increases in education expenditures, household business borrowing, and women's time spent on childcare.

We interpret this pattern as evidence that psychological interventions may not be uniformly effective across contexts or aspirational domains, particularly if the pathways emphasized by the treatment are not perceived to be as relevant or valuable based on the local opportunity environment. Where productive uses of electricity are constrained, education may be a relatively more valuable and salient pathway for improving long-term household welfare. At the same time, in unelectrified villages, higher education may be less commonly observed in women's immediate social environments, creating a larger role model gap and making aspirational reference points more malleable. Moreover, the fact that both changes in investment behavior and aspirations are driven by the more ambitious, empowered, and educated women reaffirms the role of agency in determining an individual's "navigational capacity" (Appadurai, 2004) and promoting aspirational hope (Lybbert and Wydick, 2018).

With this paper, we also contribute methodologically by introducing and testing measures of aspirations for energy services, including lighting, electrical cooking, and productive appliances. These measures allow us to study energy access not only as a current household condition, but also as an object of future-oriented goals. Doing so opens a broader research agenda on how people form aspirations over technologies and infrastructure, how these aspirations translate into demand and adoption, and how they interact with gendered agency within the household.

These findings refine the policy implications of interventions designed to raise aspirations. On

the one hand, they increase confidence in the effectiveness of these interventions, by providing evidence that they can be successful even in a setting affected by conflict, insecurity, and limited economic prospects. On the other hand, they suggest that such interventions are most likely to be effective when they do not simply encourage people to want "more," but also make specific and locally meaningful pathways salient and attainable. The relevant design question therefore becomes not whether aspirations can be shifted in general, but which aspirations can be shifted for whom, in which environments, and through which perceived pathways.

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Appendix A - Additional tables and figures

Additional tables

Table A1: Village level comparison by energy access (final)

	Tanintharyi					Ayeyarwady				
	Solar	No solar	Diff	p-value	Normalized diff	Solar	No solar	Diff	p-value	Normalized diff
Outcomes										
N of people	1847.32	1522.79	324.53	0.328	10.25	1526.14	1469.64	56.50	0.839	2.10
N of households	371.32	324.00	47.32	0.473	3.35	348.43	357.29	-8.86	0.888	-0.69
Main road - dirt or gravel	0.11	0.16	-0.05	0.642	-0.09	0.50	0.50	0.00	1.000	0.00
N of public spaces	4.68	3.58	1.11	0.151	0.75	5.21	4.79	0.43	0.620	0.29
N of public spaces/N of ppl	0.23	0.24	-0.01	0.829	-0.02	0.31	0.28	0.02	0.633	0.07
N of active committes	2.37	1.42	0.95	0.014	0.91	2.57	1.86	0.71	0.008	0.88
N of active committes in village/N of ppl	0.25	0.16	0.09	0.175	0.21	0.28	0.20	0.07	0.188	0.19
N of schools (any)	1.37	1.05	0.32	0.125	0.43	0.93	1.00	-0.07	0.668	-0.11
N of schools (any)/N Hh	0.33	0.29	0.05	0.461	0.11	0.21	0.21	-0.01	0.904	-0.02
Landless share >= 50	0.21	0.16	0.05	0.686	0.08	0.86	0.71	0.14	0.376	0.22
Main house (wooden, bamboo or hut)	0.95	0.89	0.05	0.560	0.10	1.00	1.00	0.00	.	.
Agriculture is a main livelihood	0.84	1.00	-0.16	0.083	-0.36	0.93	1.00	-0.07	0.336	-0.20
Fishery is a main livelihood	0.89	0.84	0.05	0.642	0.09	0.50	0.29	0.21	0.262	0.30
Casual labor is a main livelihood	0.32	0.74	-0.42	0.008	-0.62	0.86	0.86	0.00	1.000	0.00
Migrant work is a main livelihood	0.21	0.00	0.21	0.042	0.46	0.00	0.00	0.00	.	.
Livestock agriculture is a main livelihood	0.00	0.05	-0.05	0.331	-0.16	0.00	0.00	0.00	.	.
Most common within village transp: walking	0.53	0.84	-0.32	0.038	-0.47	0.93	1.00	-0.07	0.336	-0.20
Most common within village transp: mbike	0.47	0.16	0.32	0.038	0.47	0.07	0.00	0.07	0.336	0.20
Most common between village transp: walking	0.00	0.00	0.00	.	.	0.00	0.00	0.00	.	.
Most common between village transp: mbike	0.63	0.53	0.11	0.524	0.15	0.93	1.00	-0.07	0.336	-0.20
Most common between village transp: mboat	0.37	0.47	-0.11	0.524	-0.15	0.07	0.00	0.07	0.336	0.20

Notes: This table shows the comparison between unelectrified and solar villages based on data from the scoping survey for the final list of villages.

Table A2: Village level comparison by energy access (original)

	Tanintharyi					Ayeyarwady				
	Solar	No solar	Diff	p-value	Normalized diff	Solar	No solar	Diff	p-value	Normalized diff
Outcomes										
N of people	1855.45	1500.72	354.73	0.280	11.23	1526.14	1562.36	-36.21	0.902	-1.30
N of households	380.25	326.44	53.81	0.413	3.81	348.43	381.64	-33.21	0.621	-2.51
Main road - dirt or gravel	0.10	0.11	-0.01	0.914	-0.02	0.50	0.50	0.00	1.000	0.00
N of public spaces	4.65	3.78	0.87	0.235	0.60	5.21	5.36	-0.14	0.887	-0.09
N of public spaces/N of ppl	0.23	0.26	-0.03	0.467	-0.08	0.31	0.29	0.01	0.773	0.04
N of active committes	2.35	1.39	0.96	0.011	0.93	2.57	1.86	0.71	0.008	0.88
N of active committes in village/N of ppl	0.24	0.16	0.09	0.197	0.19	0.28	0.20	0.08	0.175	0.20
N of schools (any)	1.35	1.06	0.29	0.135	0.41	0.93	1.07	-0.14	0.433	-0.21
N of schools (any)/N Hh	0.32	0.29	0.03	0.569	0.08	0.21	0.21	-0.01	0.904	-0.02
Landless share >= 50	0.20	0.17	0.03	0.797	0.05	0.86	0.71	0.14	0.376	0.22
Main house (wooden, bamboo or hut)	0.95	0.94	0.01	0.941	0.01	1.00	1.00	0.00	.	.
Agriculture is a main livelihood	0.85	1.00	-0.15	0.083	-0.35	0.93	1.00	-0.07	0.336	-0.20
Fishery is a main livelihood	0.85	0.78	0.07	0.582	0.11	0.50	0.29	0.21	0.262	0.30
Casual labor is a main livelihood	0.30	0.67	-0.37	0.024	-0.53	0.86	0.86	0.00	1.000	0.00
Migrant work is a main livelihood	0.20	0.00	0.20	0.042	0.44	0.00	0.00	0.00	.	.
Livestock agriculture is a main livelihood	0.00	0.06	-0.06	0.331	-0.16	0.00	0.00	0.00	.	.
Most common within village transp: walking	0.55	0.83	-0.28	0.060	-0.42	0.93	1.00	-0.07	0.336	-0.20
Most common within village transp: mbike	0.45	0.17	0.28	0.060	0.42	0.07	0.00	0.07	0.336	0.20
Most common between village transp: walking	0.00	0.00	0.00	.	.	0.00	0.00	0.00	.	.
Most common between village transp: mbike	0.65	0.50	0.15	0.365	0.21	0.93	1.00	-0.07	0.336	-0.20
Most common between village transp: mboat	0.35	0.50	-0.15	0.365	-0.21	0.07	0.00	0.07	0.336	0.20

Notes: This table shows the comparison between unelectrified and solar villages based on data from the scoping survey for the original list of villages.

Table A3: Summary statistics by energy access

	Unelectrified μ	Solar coeff	p-value	N
Variables				
Age male respondent	43.513	1.300	0.123	1155
Age female respondent	40.283	1.736	0.029	1155
Education female respondent: middle	0.260	-0.022	0.501	1155
Education male respondent: middle	0.290	0.003	0.919	1155
Agriculture is a main source for main income earner	0.048	0.017	0.381	1155
Main income earner unemployed in last 12m	0.492	-0.062	0.255	1155
Any non-agri business by any Hh member	0.250	0.127	0.021	1136
Wealth index	-0.097	0.079	0.472	1155
Total income (last 12m, in 100k's)	53.659	-4.970	0.320	1155
At least 1 woman in at least 1 social group	0.215	0.050	0.278	1155
Owns motor vehicle	0.348	0.035	0.618	1155
Total N of electronic devices	3.096	1.120	0.000	1155
Hh owns entertainment device (TV, radio, computer, tablet)	0.422	0.117	0.021	1155
Hh owns phone (cell or landline)	0.864	0.002	0.938	1155
Hh has electric/general lighting	0.745	0.076	0.169	1155
Hh owns air cooling device (fan, AC)	0.101	0.235	0.000	1155
Hh owns electric cooking appliance	0.023	0.346	0.000	1155
Hh has energy generation device	0.447	-0.274	0.000	1155
Hh owns other productive appliance	0.051	0.204	0.000	1155
Aspirational MTF index	0.037	0.079	0.556	1062
Aspirations - Education years	11.556	0.062	0.870	948
Aspirations - Income	162.038	-13.988	0.565	1062
Aspirations index	-0.002	0.023	0.858	1062
Gender norms index	-0.044	0.082	0.499	1155
Household assets agency index	-0.082	0.168	0.200	1155
Financial agency index	-0.039	0.069	0.473	1155
Business activity self-efficacy index	-0.042	0.048	0.755	1155
Control over income decisions index	0.025	0.117	0.281	1155
Woman empowerment index	0.000	0.196	0.178	1155
Psychological wellbeing index	-0.002	0.003	0.979	1155
Violence attitudes index	0.005	-0.048	0.750	1155
Domestic chores attitudes index	-0.045	0.042	0.747	1155

Notes: This table shows the comparison of unelectrified and solar villages using the household baseline survey data.

Table A4: Balance table (full sample)

	Placebo μ	T coeff	p-value	N
Covariates				
Age male respondent	45.057	-0.956	0.239	1155
Age female respondent	41.600	-0.175	0.820	1155
Education female respondent: middle	0.234	0.021	0.535	1155
Education male respondent: middle	0.278	0.026	0.444	1155
Agriculture is a main source for main income earner	0.055	0.009	0.686	1155
Main income earner unemployed in last 12m	0.439	0.009	0.844	1155
Any non-agri business by any Hh member	0.338	0.004	0.935	1136
Wealth index	0.000	-0.055	0.631	1155
Total income (last 12m, in 100k's)	50.636	-0.282	0.952	1155
At least 1 woman in at least 1 social group	0.231	0.022	0.633	1155
Owns motor vehicle	0.348	0.039	0.604	1155
Total N of electronic devices	3.712	0.224	0.473	1155
Hh owns entertainment device (TV, radio, computer, tablet)	0.535	-0.054	0.204	1155
Hh owns phone (cell or landline)	0.855	0.017	0.533	1155
Hh has electric/general lighting	0.797	0.000	0.996	1155
Hh owns air cooling device (fan, AC)	0.231	0.033	0.411	1155
Hh owns electric cooking appliance	0.234	0.026	0.561	1155
Hh has energy generation device	0.273	0.005	0.922	1155
Hh owns other productive appliance	0.140	0.066	0.137	1155
Aspirational MTF index	0.000	0.146	0.306	1062
Aspirations - Education years	11.758	-0.257	0.566	948
Aspirations - Income	159.997	-11.538	0.683	1062
Aspirations index	-0.000	0.024	0.868	1062
Gender norms index	-0.000	0.032	0.777	1155
Household assets agency index	0.000	0.052	0.744	1155
Financial agency index	-0.000	0.026	0.816	1155
Business activity self-efficacy index	-0.000	0.008	0.957	1155
Control over income decisions index	-0.000	0.161	0.123	1155
Woman empowerment index	-0.000	0.132	0.302	1155
Psychological wellbeing index	0.000	0.014	0.911	1155
Violence attitudes index	-0.000	-0.066	0.670	1155
Domestic chores attitudes index	-0.000	-0.052	0.681	1155

Notes: Baseline balance across treatment arms. Balance tests are implemented by regressing the baseline characteristic on treatment assignment and strata fixed effects, with heteroskedasticity-robust standard errors clustered at the village level.

Table A5: Balance table (endline sample)

	Placebo μ	T coeff	p-value	N
Covariates				
Age male respondent	45.262	-1.018	0.241	843
Age female respondent	41.862	-0.490	0.545	843
Education female respondent: middle	0.223	0.040	0.264	843
Education male respondent: middle	0.289	0.016	0.658	843
Agriculture is a main source for main income earner	0.062	0.006	0.827	843
Main income earner unemployed in last 12m	0.420	0.018	0.710	843
Any non-agri business by any Hh member	0.337	0.027	0.624	835
Wealth index	-0.000	-0.109	0.377	843
Total income (last 12m, in 100k's)	49.504	0.954	0.845	843
At least 1 woman in at least 1 social group	0.226	0.063	0.211	843
Owns motor vehicle	0.380	0.018	0.828	843
Total N of electronic devices	3.856	0.254	0.429	843
Hh owns entertainment device (TV, radio, computer, tablet)	0.554	-0.050	0.319	843
Hh owns phone (cell or landline)	0.869	-0.002	0.935	843
Hh has electric/general lighting	0.813	0.009	0.837	843
Hh owns air cooling device (fan, AC)	0.243	0.041	0.333	843
Hh owns electric cooking appliance	0.249	0.025	0.590	843
Hh has energy generation device	0.266	0.046	0.337	843
Hh owns other productive appliance	0.167	0.059	0.212	843
Aspirational MTF index	0.000	0.199	0.164	797
Aspirations - Education years	11.819	-0.477	0.306	706
Aspirations - Income	174.903	-21.246	0.507	797
Aspirations index	0.000	0.011	0.936	797
Gender norms index	-0.000	-0.008	0.944	843
Household assets agency index	-0.000	0.025	0.883	843
Financial agency index	0.000	0.055	0.605	843
Business activity self-efficacy index	-0.000	-0.016	0.920	843
Control over income decisions index	-0.000	0.061	0.464	843
Woman empowerment index	-0.000	0.053	0.697	843
Psychological wellbeing index	-0.000	-0.007	0.960	843
Violence attitudes index	-0.000	-0.005	0.976	843
Domestic chores attitudes index	-0.000	-0.048	0.736	843

Notes: Baseline balance across treatment arms. Balance tests are implemented by regressing the baseline characteristic on treatment assignment and strata fixed effects, with heteroskedasticity-robust standard errors clustered at the village level.

Table A6: Attrition

	Attrition indicator		
	(1)	(2)	(3)
Treatment	0.034	0.034	0.033
	(0.055)	(0.054)	(0.054)
Treatment × Unelectrified village			0.086
			(0.112)
Treatment × Above median income			0.031
			(0.073)
Treatment × Above median age			-0.023
			(0.044)
Treatment × Middle school			-0.071
			(0.061)
Placebo mean	0.208	0.208	0.208
Controls	No	Yes	Yes
Observations	1155	1155	1155

Notes: Test of differential attrition between treatment and placebo. Column 1 regresses the attrition indicator characteristic on treatment assignment and strata fixed effects, with heteroskedasticity-robust standard errors clustered at the village level. Column 2 introduces the same controls as the main specification; Column 3 introduces interaction terms with all the controls added in Column 2, showing that attrition also did not create differences in the composition of treatment and control in terms of the prognostic variables.

Table A7: Financial agency sub-components

	Owns bank account	Access to cash	Owns savings	Access to credit	Owns mobile money account	Financial agency index
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.024**	0.032	0.099**	0.067	0.036**	0.279***
	(0.010)	(0.029)	(0.043)	(0.045)	(0.017)	(0.086)
	[0.056]	[0.124]	[0.056]	[0.076]	[0.056]	[.]
Placebo mean	0.026	0.833	0.321	0.285	0.049	0.000
Observations	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on the sub-components of the financial agency index and the index itself. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A8: Business agency sub-components

	Run business	Manage finances	Bargain (buy low)	Bargain (sell high)	Collect debt	Identify opportunities	Save	Hire and manage	Business agency index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	0.076	0.037	0.036	0.081	0.017	0.087**	0.087	0.032	0.291**
	(0.061)	(0.050)	(0.055)	(0.064)	(0.057)	(0.044)	(0.054)	(0.061)	(0.141)
	[0.608]	[0.760]	[0.760]	[0.608]	[0.760]	[0.607]	[0.608]	[0.760]	[.]
Placebo mean	0.292	0.367	0.230	0.285	0.266	0.193	0.243	0.259	-0.000
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on the sub-components of the business agency index and the index itself. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A9: Hh assets agency sub-components

	House (sole/joint)	L durables (sole/joint)	S durables (sole/joint)	Cellphone (sole)	Agri land (sole/joint)	Other land (sole/joint)	Transport (sole/joint)	Hh assets agency index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.004	0.036	0.051	0.022	0.023	0.024	0.016	0.112
	(0.032)	(0.044)	(0.051)	(0.078)	(0.038)	(0.018)	(0.051)	(0.112)
	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[.]
Placebo mean	0.925	0.400	0.439	0.377	0.305	0.033	0.413	0.000
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on the sub-components of the household assets agency index and the index itself. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A10: Income decisions agency sub-components

	Access to food money	Buy/sell without permission (market)	Alone/joint man income decisions	Alone/joint health decisions	Decides family visits	Alone/joint children decisions	Income decisions index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment	0.037	0.044	0.010	-0.038	-0.010	-0.004	0.061
	(0.040)	(0.035)	(0.021)	(0.061)	(0.061)	(0.016)	(0.132)
	[1]	[1]	[1]	[1]	[1]	[1]	[.]
Placebo mean	0.869	0.839	0.921	0.295	0.279	0.944	0.000
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	830	843

Notes: This table shows treatment effects of our intervention on the sub-components of the income decisions agency index and the index itself. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A11: Gender norms index sub-components (Part 1)

	Women treated equally (A)	Wife should always obey (D)	Women should not lead (D)	Women to choose her friends (A)	Man decides on his free time (A)
	(1)	(2)	(3)	(4)	(5)
Treatment	0.018	0.025	0.074	-0.006	0.010
	(0.031)	(0.038)	(0.047)	(0.047)	(0.043)
	[1]	[1]	[0.985]	[1]	[1]
Placebo mean	0.892	0.180	0.639	0.659	0.774
Controls	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843

Notes: This table and the one below show treatment effects of our intervention on the sub-components of the gender norms index and the index itself. Besides the index, all outcomes are dummies coded to 1 if the woman agrees (disagrees) with a positive (negative) statement. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A12: Gender norms sub-components (Part 2)

	Woman decides on her free time (A)	Any woman power undermines man (D)	Girls education as important as boys (A)	Man should help with chores (A)	Gender norms index
	(1)	(2)	(3)	(4)	(5)
Treatment	0.020	-0.000	0.054*	0.004	0.130
	(0.037)	(0.074)	(0.028)	(0.036)	(0.112)
	[1]	[1]	[0.985]	[1]	[.]
Placebo mean	0.793	0.518	0.892	0.918	0.000
Controls	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843

Notes: This table and the one above show treatment effects of our intervention on the sub-components of the gender norms index and the index itself. Besides the index, all outcomes are dummies coded to 1 if the woman agrees (disagrees) with a positive (negative) statement. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. For the index, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes except the summary index in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A13: Appliance ownership

	Entertainment	Phone	Lighting	Energy generation	Cooling	Electric cooking	Productive	Total N devices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.006	0.002	0.018	0.005	0.004	0.013	-0.024	0.118
	(0.021)	(0.025)	(0.031)	(0.013)	(0.016)	(0.017)	(0.015)	(0.124)
	[1]	[1]	[1]	[1]	[1]	[1]	[1]	[1]
Placebo mean	0.495	0.780	0.711	0.252	0.213	0.216	0.167	4.14
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	701	843	843

Notes: This table shows treatment effects of our intervention on a series of dummies for the ownership of seven mutually exclusive appliance categories and the total number of appliances owned. For binary outcomes we show marginal effects coefficients from Probit regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, household size, the baseline outcome, and strata fixed effects. For the total appliance count, we show the coefficient from an OLS regression that uses the same specification. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes in brackets.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table A14: Balance table (auction sample)

	Placebo μ	T coeff	p-value	N
Covariates				
Age male respondent	45.599	-1.355	0.253	442
Age female respondent	42.275	-1.280	0.201	442
Education female respondent: middle	0.181	0.098	0.028	442
Education male respondent: middle	0.247	0.080	0.139	442
Agriculture is a main source for main income earner	0.093	-0.017	0.686	442
Main income earner unemployed in last 12m	0.412	0.034	0.650	442
Any non-agri business by any Hh member	0.368	-0.010	0.880	437
Wealth index	-0.031	-0.070	0.638	442
Total income (last 12m, in 100k's)	41.492	7.795	0.147	442
At least 1 woman in at least 1 social group	0.176	0.174	0.013	442
Owns motor vehicle	0.302	0.067	0.549	442
Total N of electronic devices	3.330	0.685	0.093	442
Hh owns entertainment device (TV, radio, computer, tablet)	0.467	0.041	0.515	442
Hh owns phone (cell or landline)	0.857	0.026	0.506	442
Hh has electric/general lighting	0.758	0.031	0.672	442
Hh owns air cooling device (fan, AC)	0.198	0.079	0.118	442
Hh owns electric cooking appliance	0.214	0.054	0.403	442
Hh has energy generation device	0.209	0.095	0.116	442
Hh owns other productive appliance	0.159	0.062	0.328	442
Aspirational MTF index	-0.228	0.472	0.010	412
Aspirations - Education years	11.632	-0.346	0.603	370
Aspirations - Income	195.520	-53.848	0.197	412
Aspirations index	-0.114	0.123	0.529	412
Gender norms index	-0.079	0.170	0.280	442
Household assets agency index	-0.078	0.126	0.592	442
Financial agency index	-0.067	0.118	0.374	442
Business activity self-efficacy index	-0.161	0.233	0.319	442
Control over income decisions index	0.010	-0.038	0.706	442
Woman empowerment index	-0.116	0.178	0.381	442
Psychological wellbeing index	-0.234	0.292	0.093	442
Violence attitudes index	-0.015	0.169	0.256	442
Domestic chores attitudes index	0.084	-0.142	0.450	442

Notes: Baseline balance across treatment arms for the auction sample. Balance tests are implemented by regressing the baseline characteristic on treatment assignment and strata fixed effects, with heteroskedasticity-robust standard errors clustered at the village level.

Table A15: WTP for solar lamp (auction)

	WTP woman	WTP man
	(1)	(2)
Treatment	8.547***	5.674*
	(2.942)	(3.191)
	[0.014]	[0.045]
Placebo mean	20.01	24.65
Controls	Yes	Yes
Observations	427	335

Notes: This table shows treatment effects of our intervention on the willingness to pay for a solar lamp for both women and their male spouses. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across both outcomes.
* p<0.1, ** p<0.05, *** p<0.01

Table A16: Woman's time use

	Fuel	Cooking	Child care	Agricultural labor	Non-agricultural labor	Leisure
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-15.529	-33.223	-71.235	11.864	-153.861	-44.365
	(9.785)	(69.821)	(60.932)	(23.456)	(102.704)	(43.585)
	[0.716]	[0.736]	[0.716]	[0.736]	[0.716]	[0.716]
Placebo mean	51.91	921.5	669.5	47.90	846.1	407.0
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on the time allocation of the woman across 6 mutually exclusive categories. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Table A17: Man's time use

	Fuel	Cooking	Child care	Agricultural labor	Non-agricultural labor	Leisure
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-5.192	-3.334	-5.589	50.665	97.846	-10.927
	(19.700)	(2.749)	(6.738)	(48.932)	(205.287)	(40.945)
	[1]	[1]	[1]	[1]	[1]	[1]
Placebo mean	95.87	8.85	22.87	119.8	1,908	334.4
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	843	843	843	843	843	843

Notes: This table shows treatment effects of our intervention on the time allocation of the man across 6 mutually exclusive categories. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes in brackets.
* p<0.1, ** p<0.05, *** p<0.01

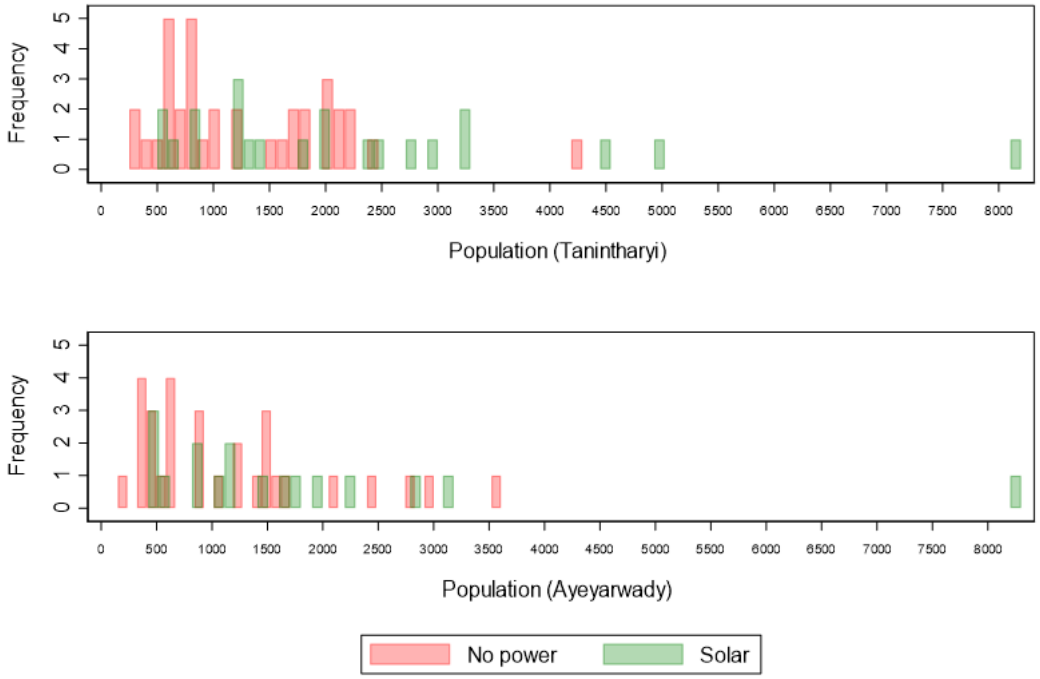
Table A18: Study time

	P/C night study u18	P/C day study u18
	(1)	(2)
Treatment	-25.028	-129.498
	(46.653)	(131.450)
	[1]	[1]
Placebo mean	375.1	969.1
Controls	Yes	Yes
Observations	658	658

Notes: This table shows treatment effects of our intervention on the time spent studying by household members under the age of 18. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses. We show sharpened q-values controlling for the false discovery rate across all outcomes in brackets.
* p<0.1, ** p<0.05, *** p<0.01

Additional figures

Figure A1: Distributions of village size by state and energy access

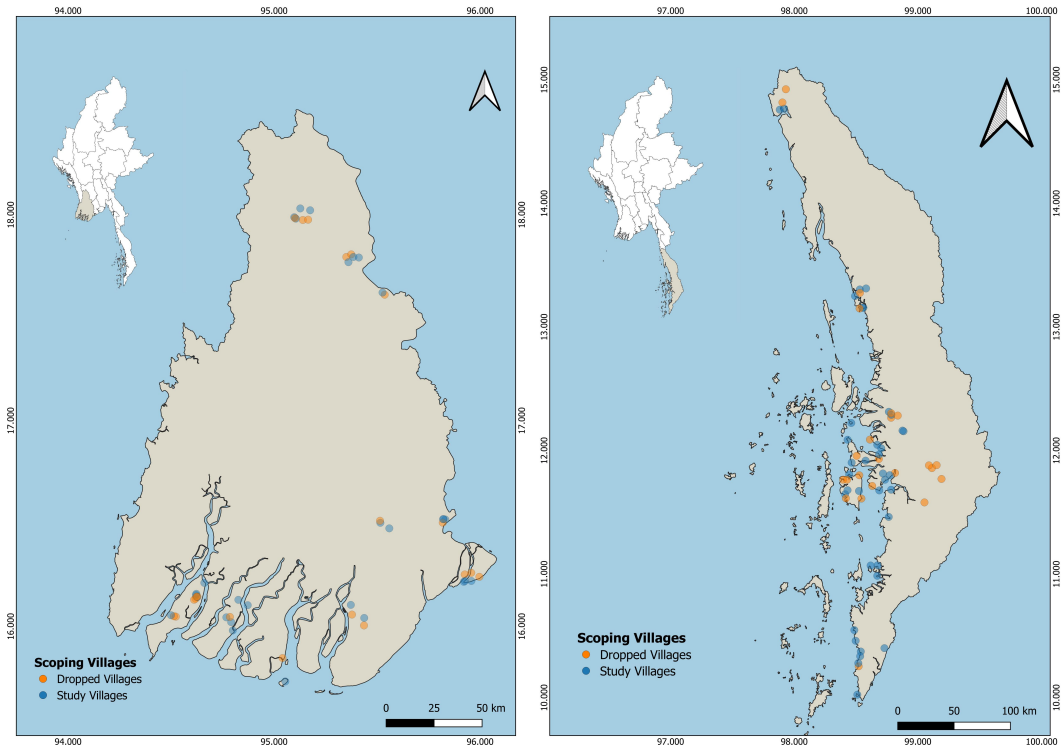


Notes: Distributions of population size for non-electrified and solar villages from the village scoping survey. The survey asked the village representative "Approximately, how many people live in the village?".

Figure A2: Geographical distribution of study villages

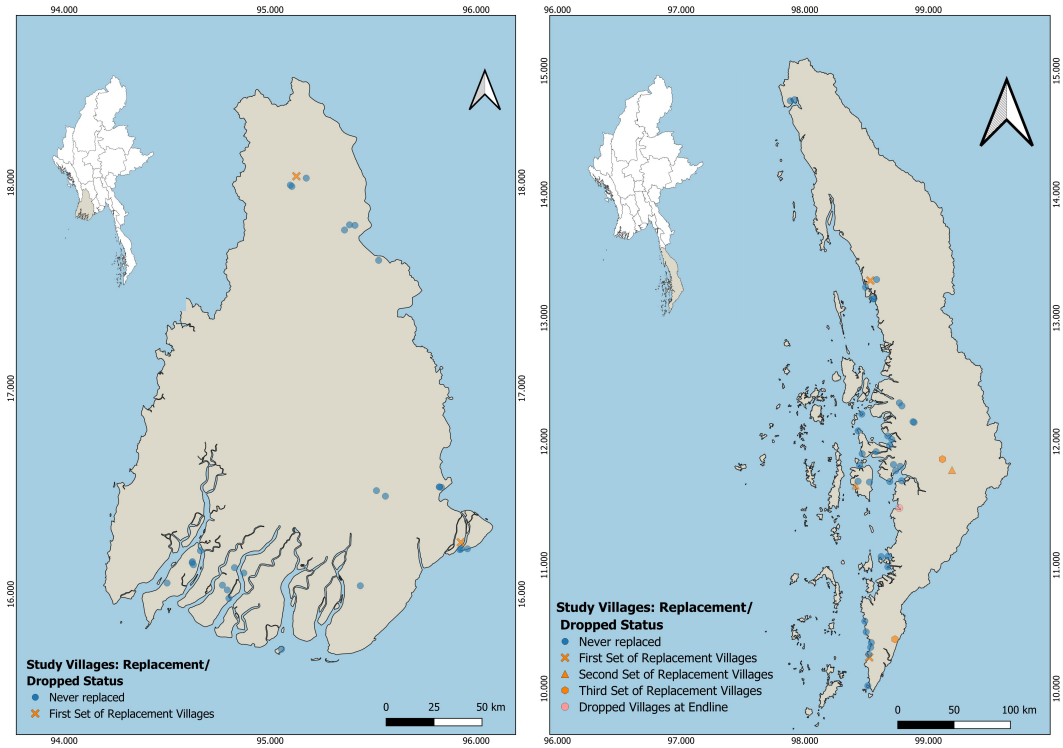
(a) Ayeyarwadi (original list)

(b) Tanintharyi (original list)



(c) Ayeyarwadi (final list)

(d) Tanintharyi (final list)



Notes: Maps showing original list of study villages in blue (first panel) and the substitution of a few villages (1 in Ayeyarwady, 3 in Tanintharyi) with designated replacements (second panel).

Figure A3: Solar lamp for auction



Notes: This picture shows the solar lamp offered in the auction. Besides being a rechargeable solar lamp, it allows users to charge mobile devices.

Figure A4: Visual aids for edutainment component of the intervention (solar villages)











Notes: The sequence of pictures above are the visual aids that support the narrative of the edutainment component in solar villages. Each picture shows a pivotal moment in the story. Together they tell the story of a household facing increased economic pressure as their daughter approaches the time to continue her studies by going to university. The woman, together with her husband, develops a plan to improve their circumstances by taking a business loan to invest in a new business venture (purchasing a freezer to sell popular fruit popsicles). The increased income from this initiative allows the household to save more over time and make other investments related to their goals, such as a small motorbike for the daughter to attend university and, later on, make some home improvements.

Figure A5: Visual aids for edutainment component of the intervention (unelectrified villages)



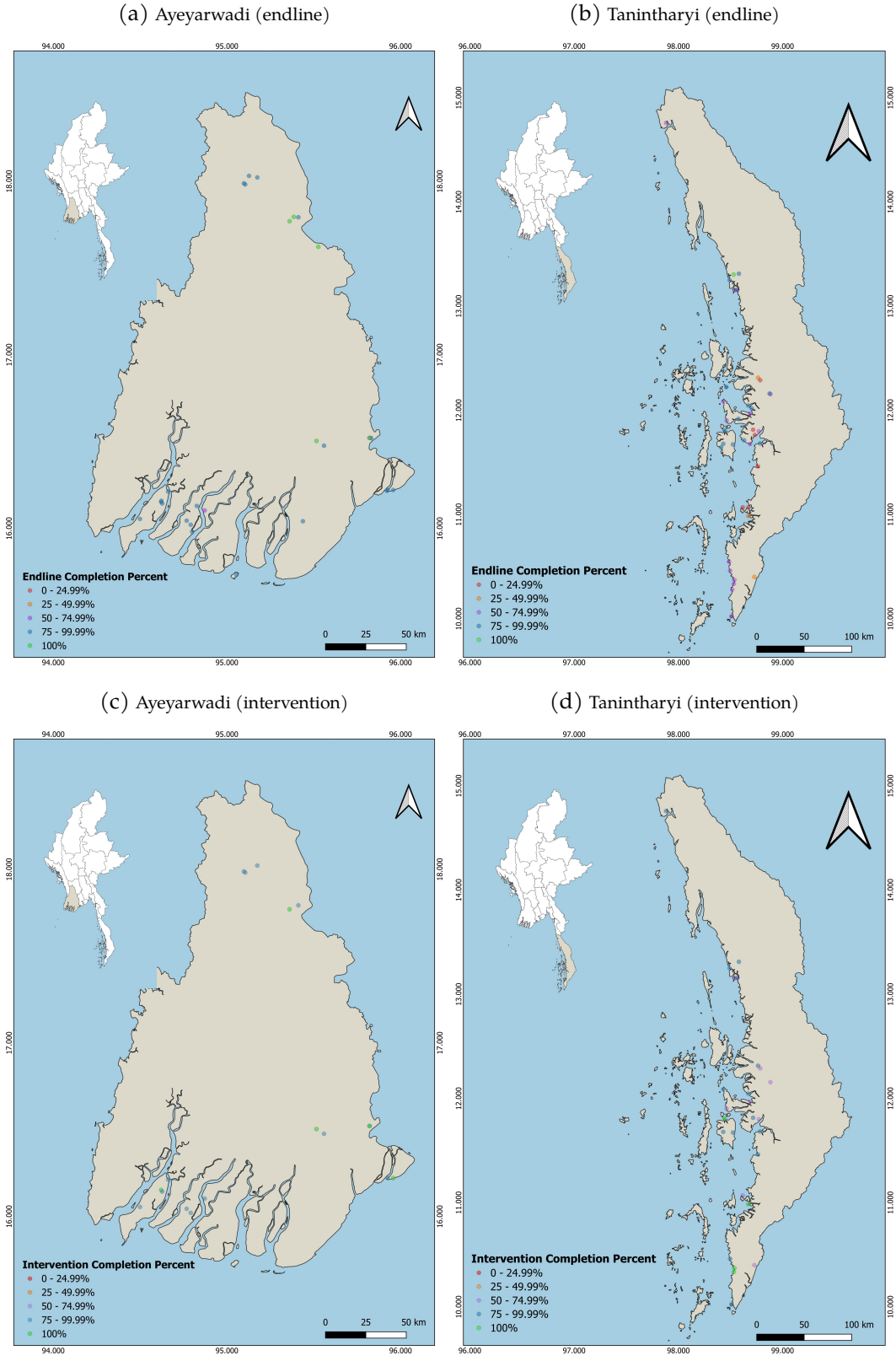
Notes: The sequence of pictures above are the visual aids that support the narrative of the edutainment component in unelectrified villages. Each picture shows a pivotal moment in the story. Together they tell the story of a household facing increased economic pressure as their daughter approaches the time to continue her studies by going to university. The woman,

Figure A6: Myanmar administrative map



Notes: This is figure shows an administrative map of Myanmar's states. Our study takes place in the southwest of the country, in the states of Ayeyarwadi and Tanintharyi.

Figure A7: Attrition maps

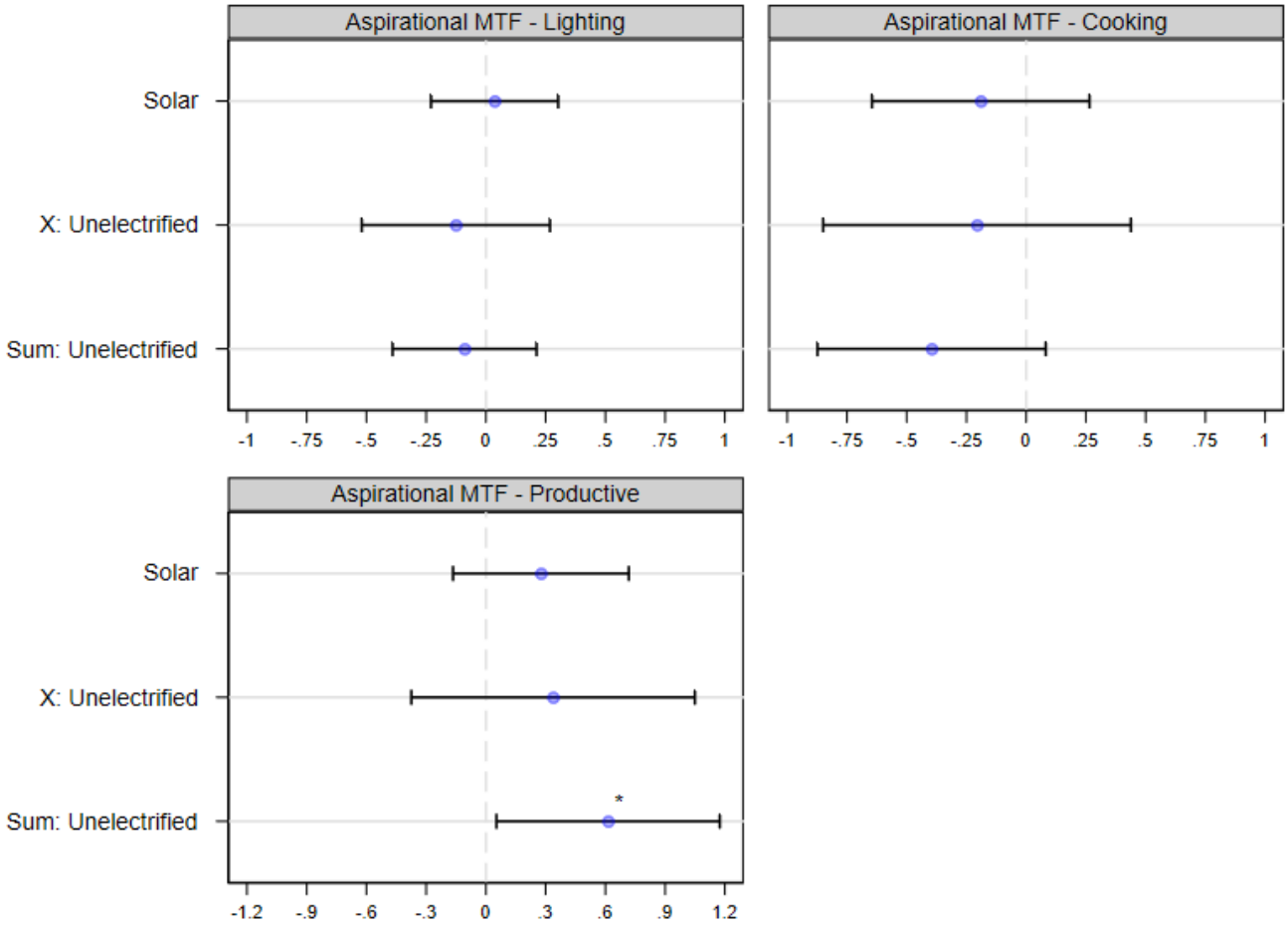


Notes: The maps in the upper panel show the share of baseline households tracked at endline for each villages and original list of study villages in blue. The maps in the lower panel show the share of households that completed the intervention in each treatment village.

Appendix B - Additional heterogeneous treatment effects

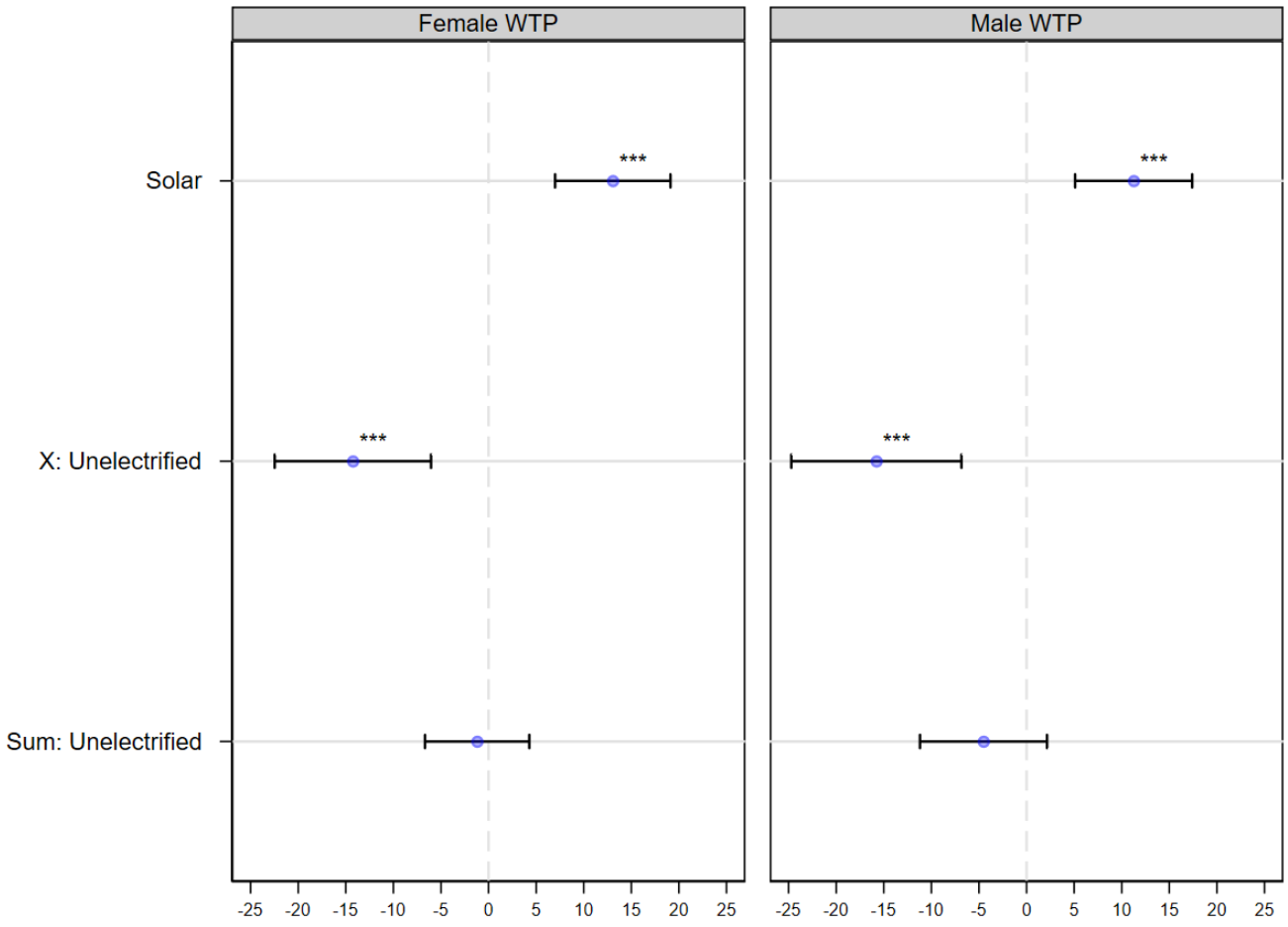
Energy access

Figure B1: MTF aspirations - HTEs by energy access



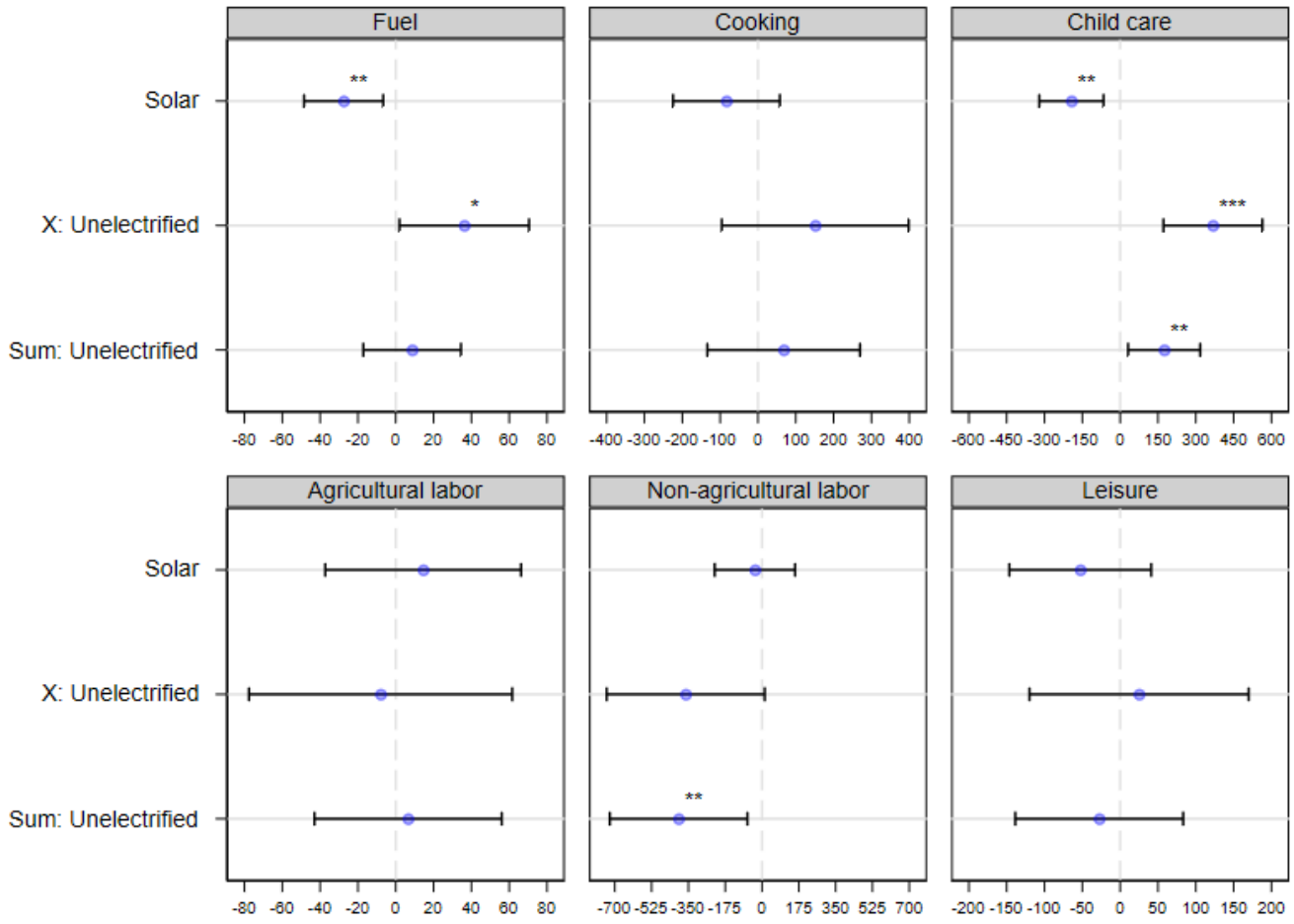
Notes: This figure shows treatment effects of our intervention on the three dimensions of aspirations for energy services. Coefficients are from OLS regressions of each outcome on treatment assignment, the interaction of treatment and an indicator for unelectrified villages, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, household size, the number of household members under the age of 18, and strata fixed effects (which capture the level effect of energy access in this interacted regression). We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B2: WTP for solar lamp (auction) - HTEs by energy access



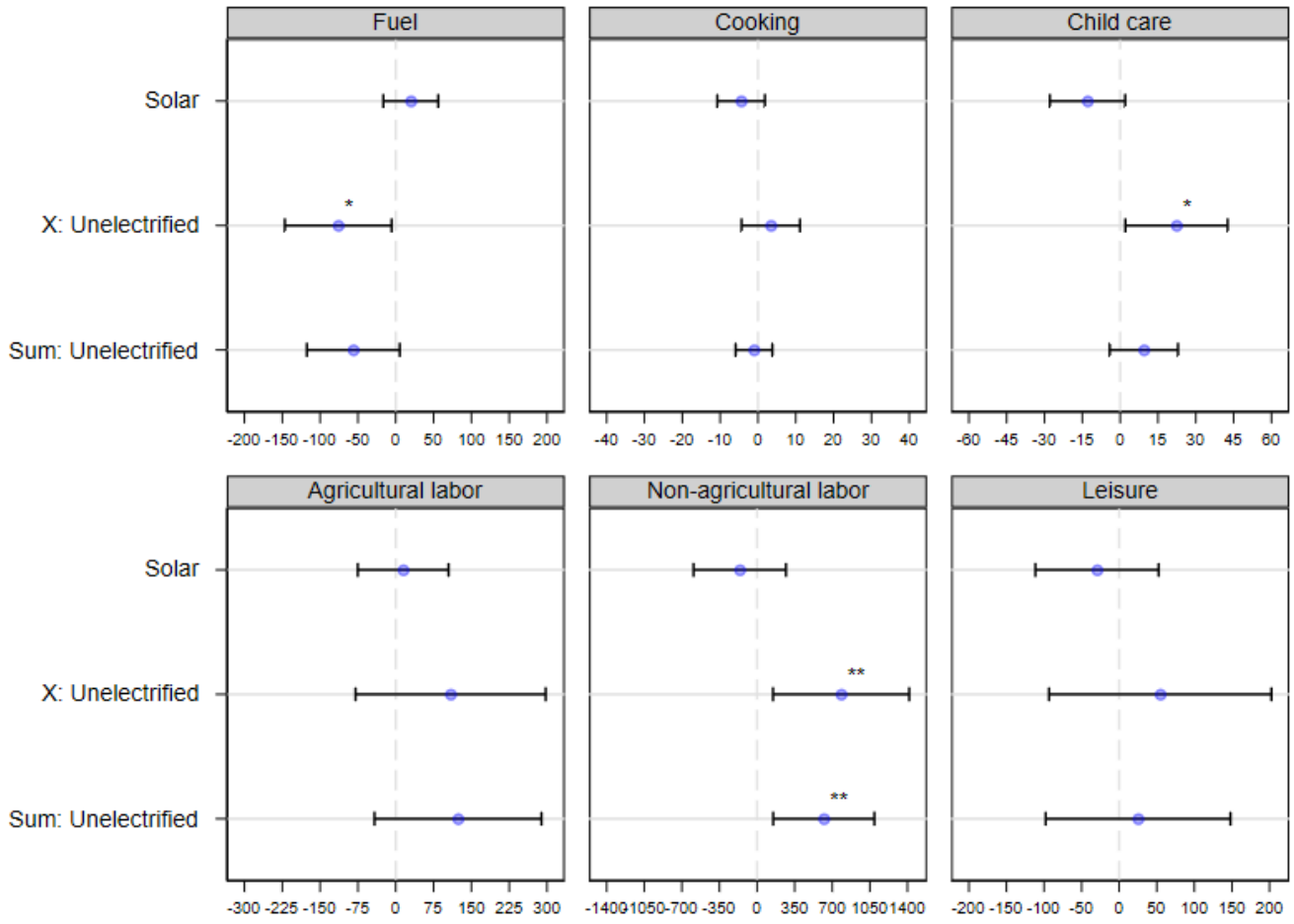
Notes: This figure shows treatment effects of our intervention on the willingness to pay for a solar lamp for both women and their male spouses. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for whether the household's wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B3: Woman's time use - HTEs by energy access



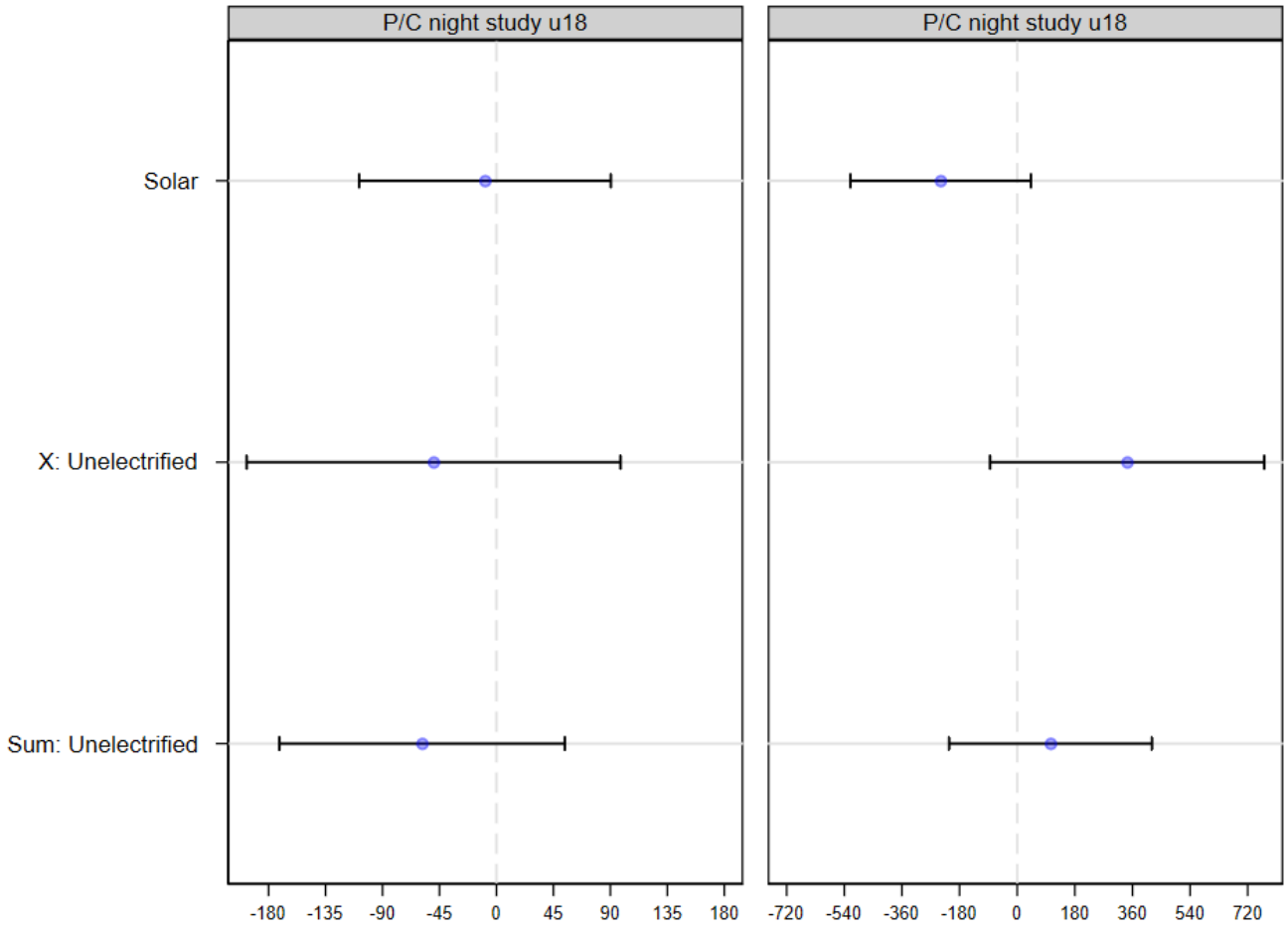
Notes: This figure shows treatment effects of our intervention on the time allocation of the woman across 6 mutually exclusive categories. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B4: Man's time use - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on the time allocation of the man across 6 mutually exclusive categories. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

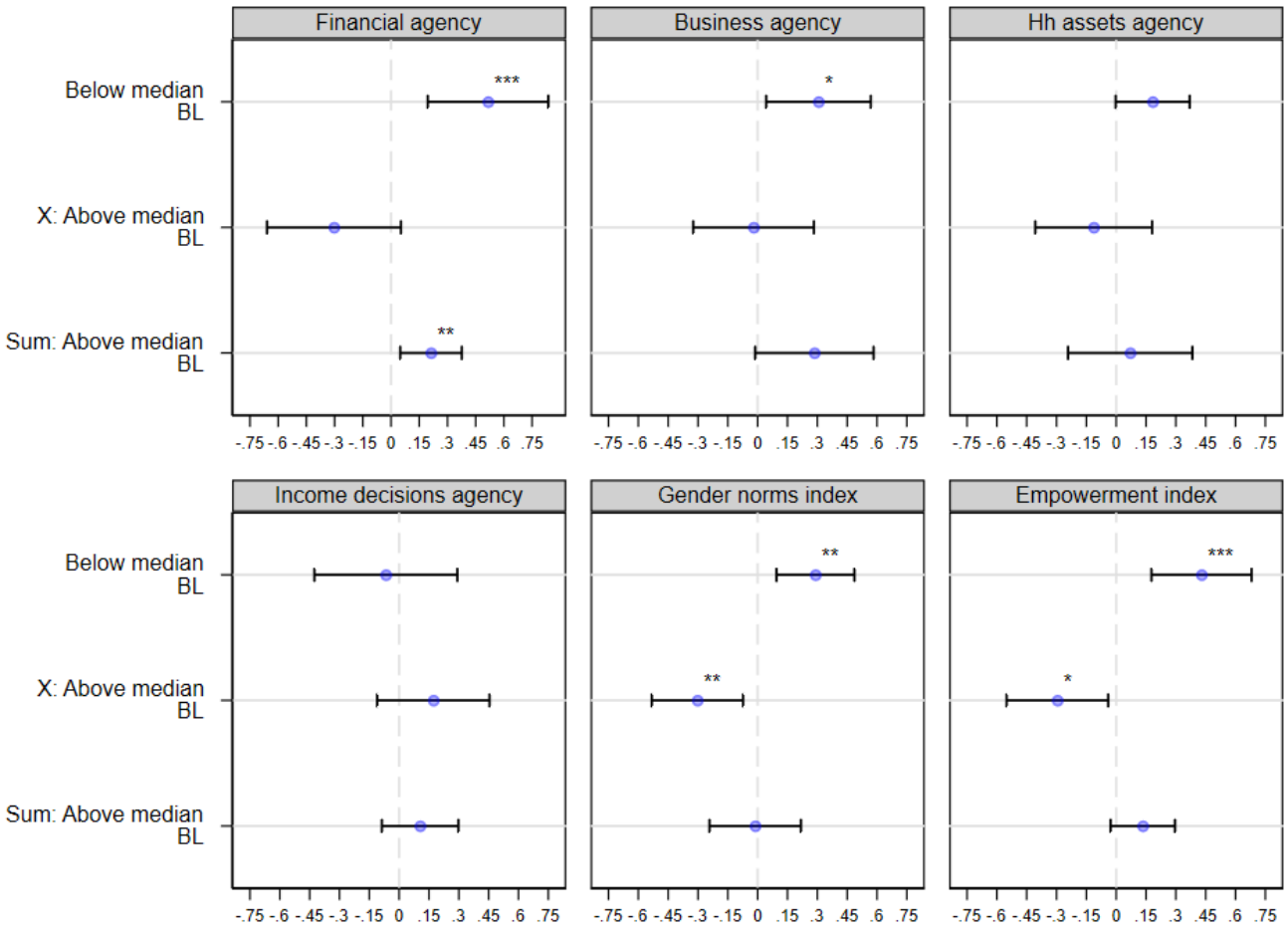
Figure B5: Study time - HTEs by energy access



Notes: This figure shows treatment effects of our intervention on the time spent studying by household members above and below 18 years of age. Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, household size, the number of household members below the age of 18, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

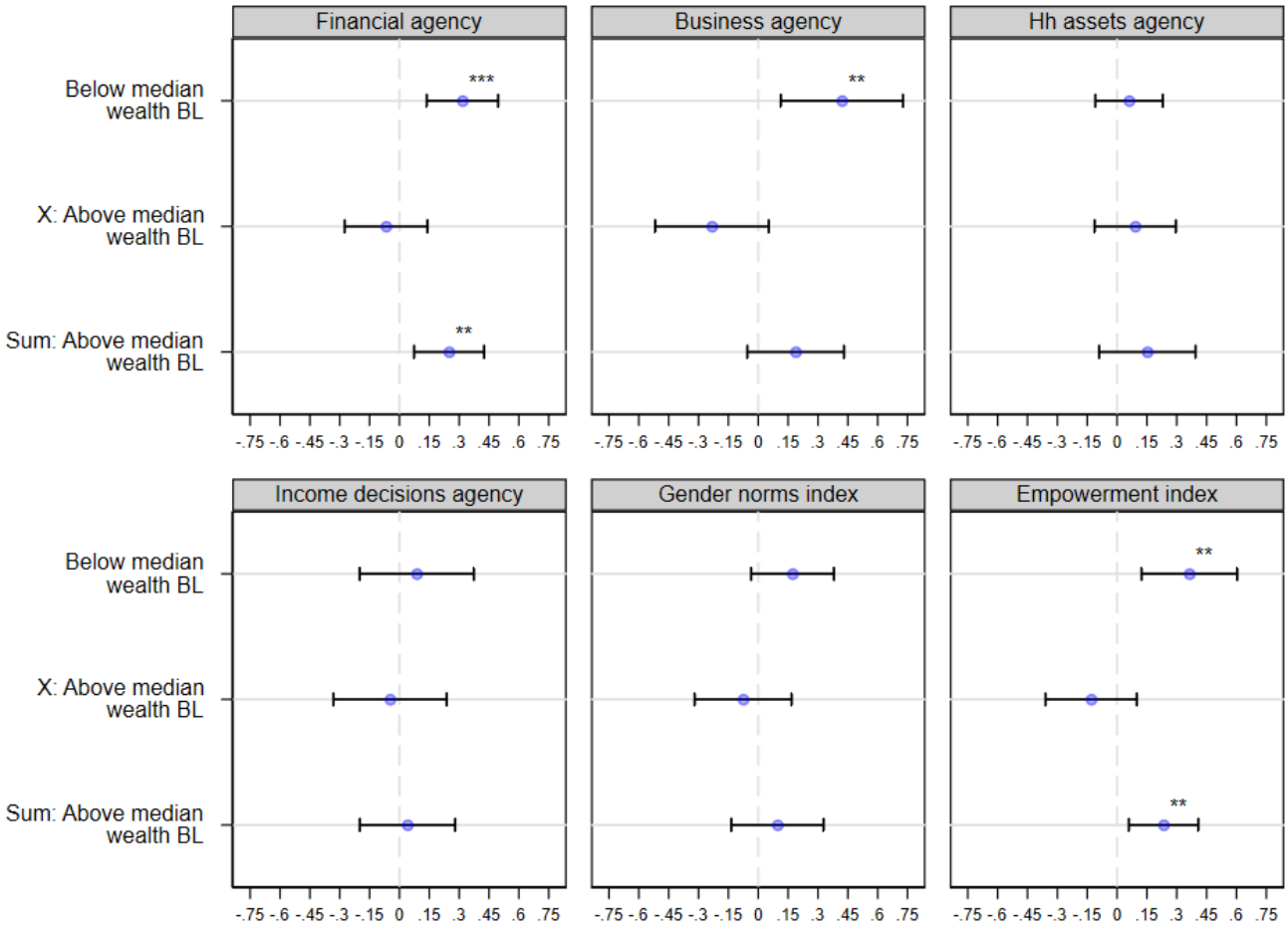
Baseline characteristics

Figure B6: Empowerment outcomes - HTEs by baseline measure



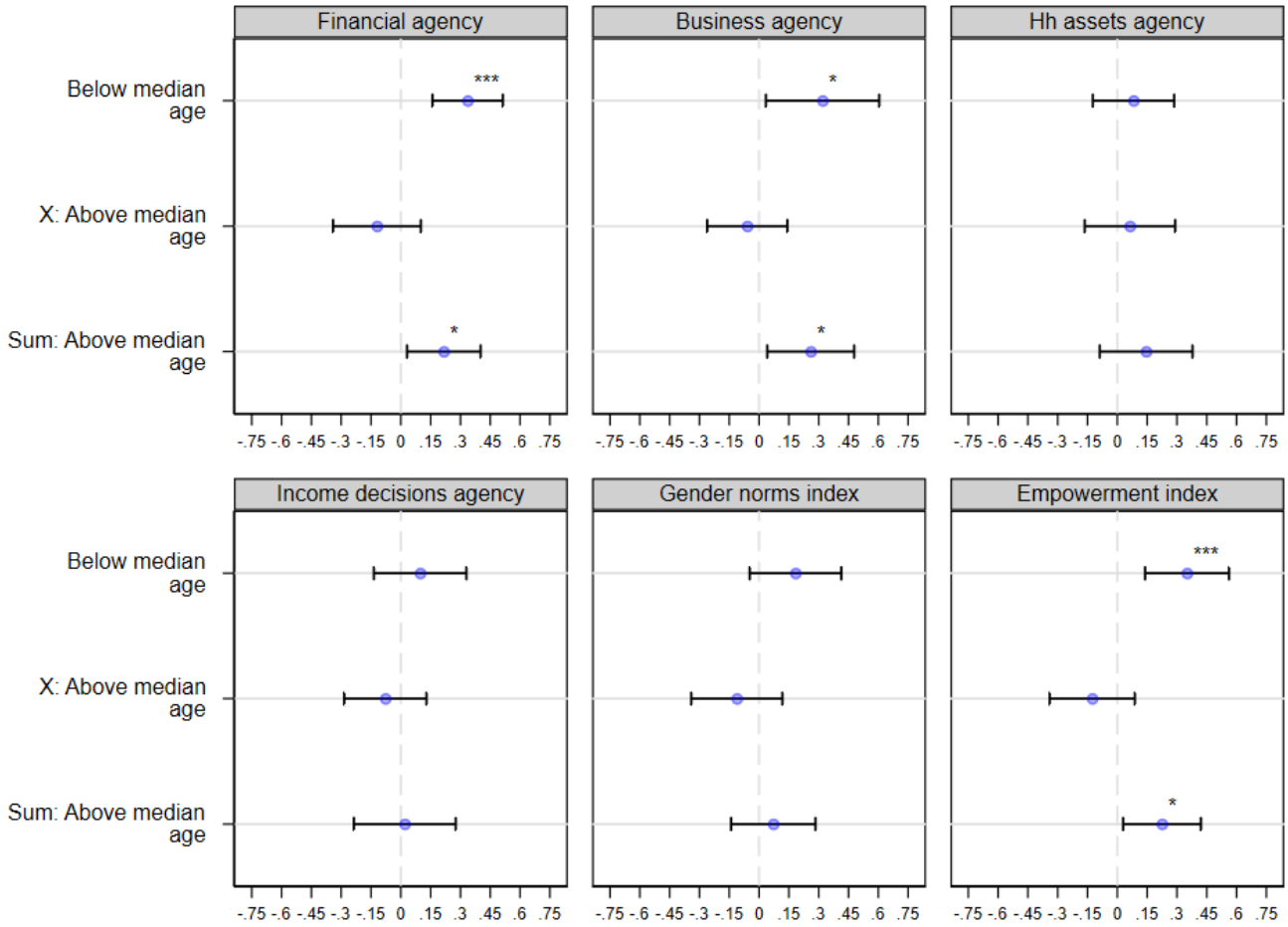
Notes: This figure shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for the baseline outcome being above the sample median and its interaction with the treatment dummy, an indicator dummy for the household's wealth being above the sample median, woman's education (an indicator dummy for whether she completed middle school), the woman's age, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B7: Empowerment outcomes - HTEs by baseline wealth



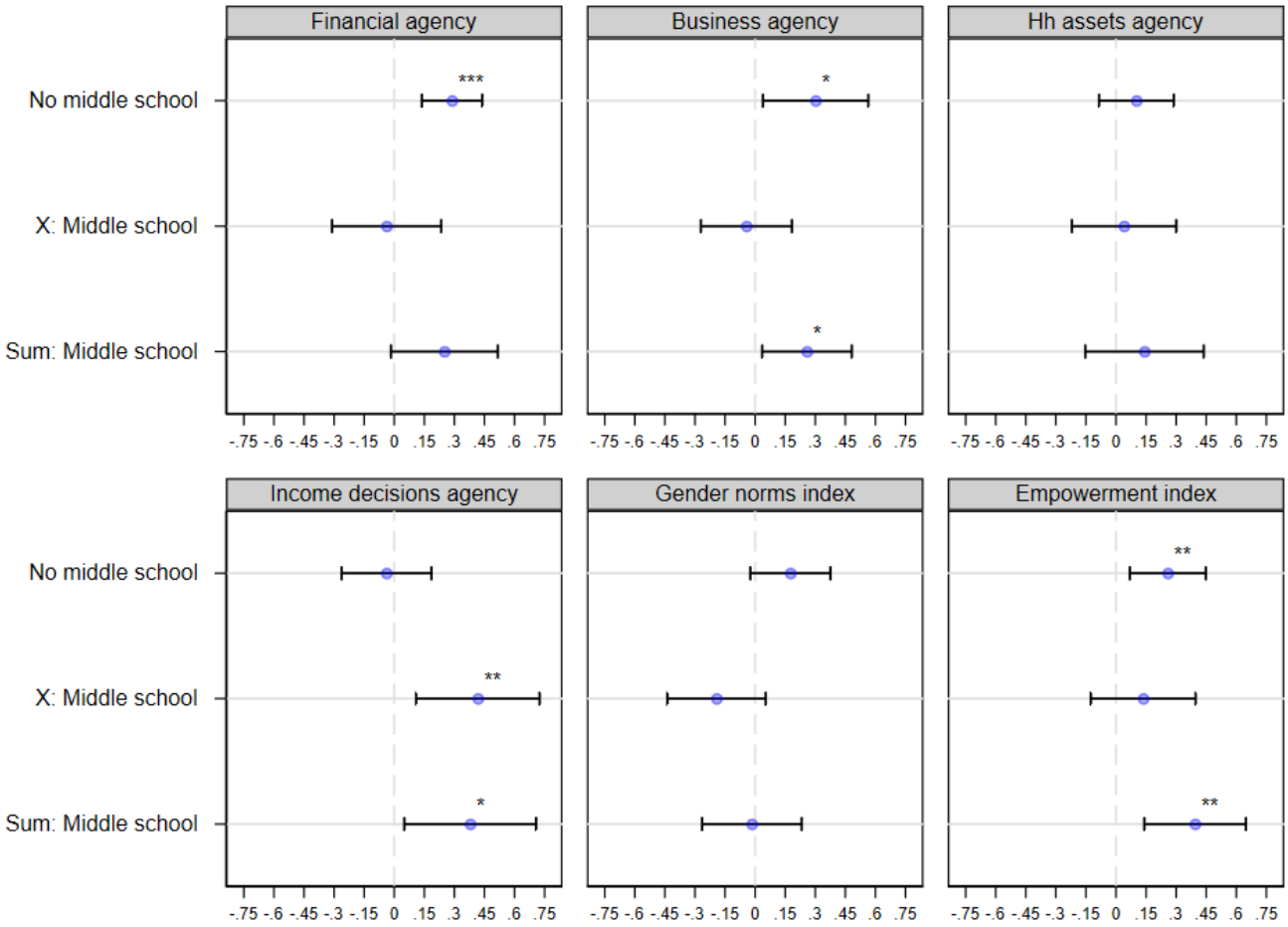
Notes: This figure shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the household's baseline wealth is above the sample median and its interaction with the treatment dummy, woman's education (an indicator dummy for whether she completed middle school), the woman's age, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B8: Empowerment outcomes - HTEs by age



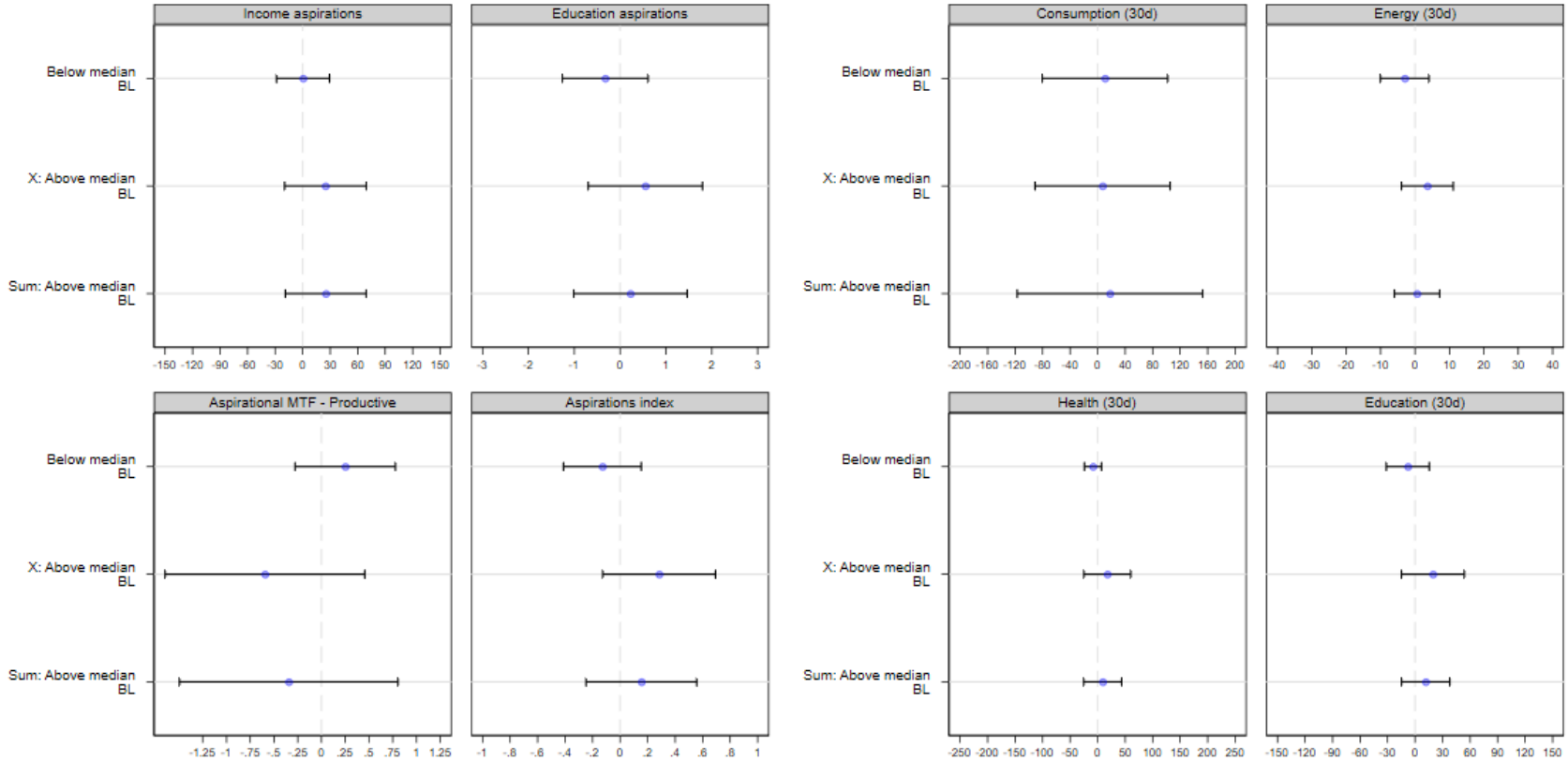
Notes: This figure shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. All indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for the woman's age being above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, woman's education (an indicator dummy for whether she completed middle school), the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B9: Empowerment outcomes - HTEs by education



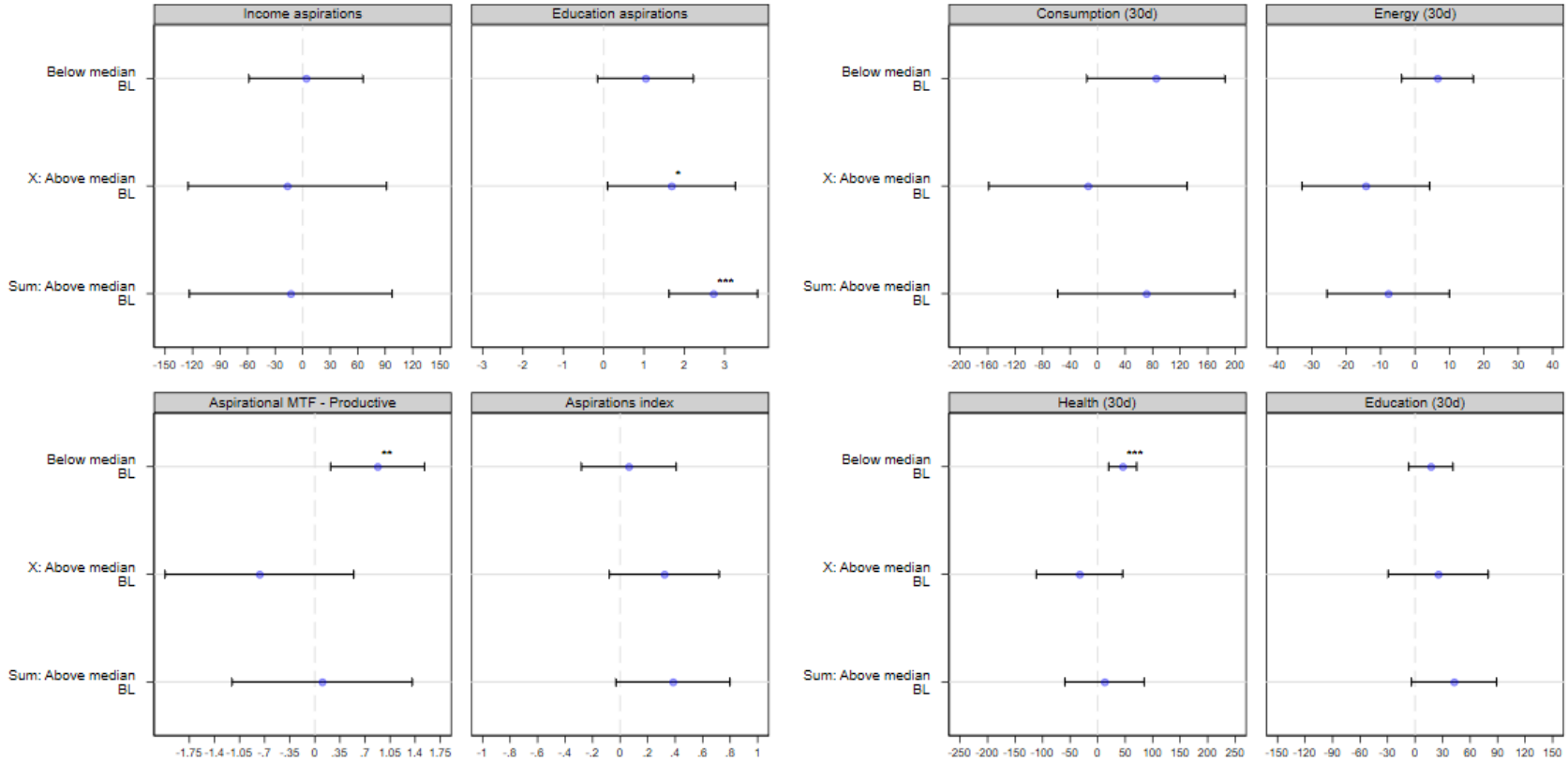
Notes: This figure shows treatment effects of our intervention on five sub-indices of empowerment and an overall empowerment index combining them. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, woman's education (an indicator dummy for whether she completed middle school) and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the baseline outcome, and strata fixed effects. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B10: Aspirations and expenditures - HTEs by baseline measure (Solar)



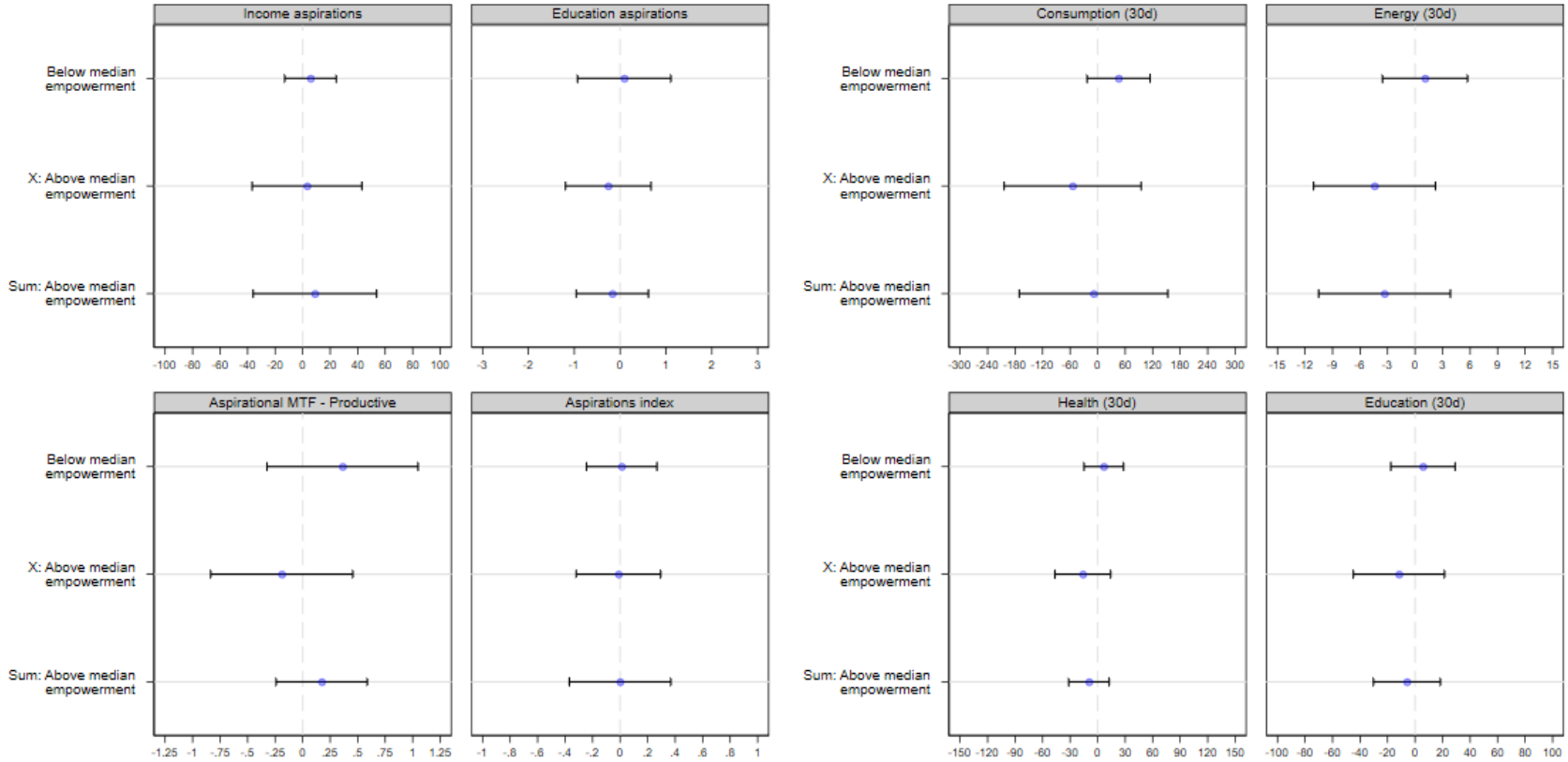
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B11: Aspirations and expenditures - HTEs by baseline measure (Unelectrified)



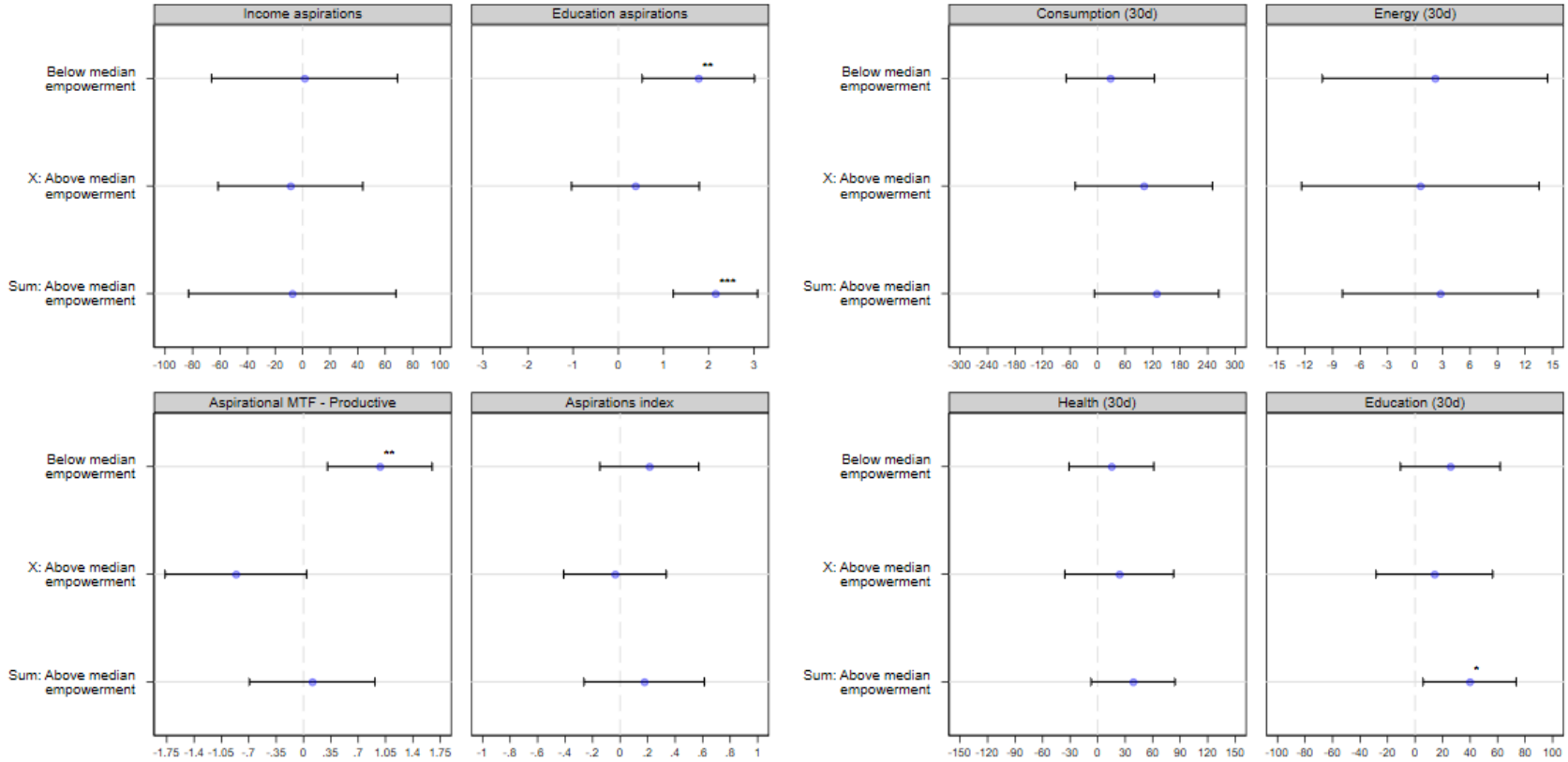
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B12: Aspirations and expenditures - HTEs by baseline empowerment (Solar)



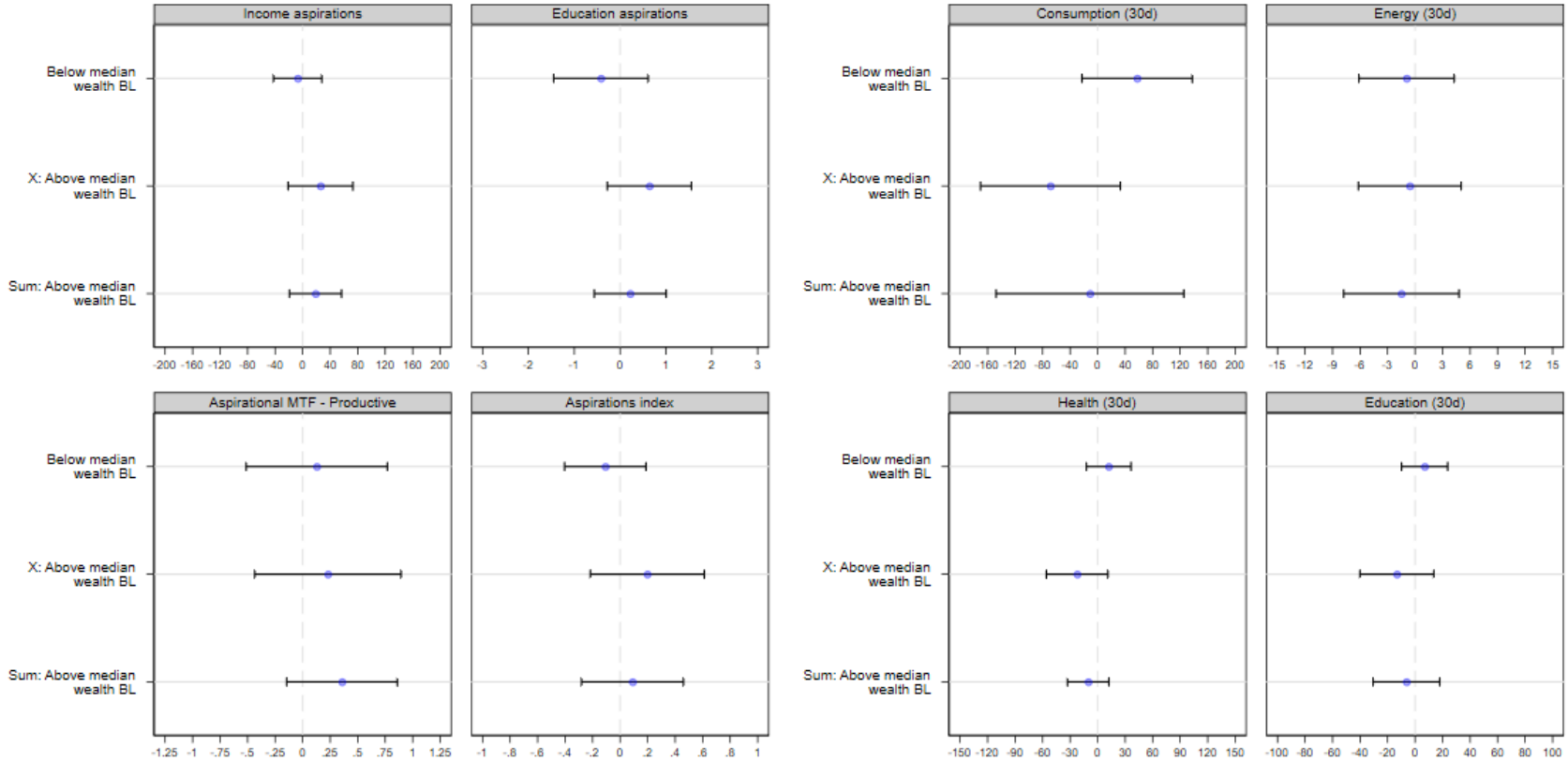
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the woman's baseline empowerment index is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B13: Aspirations and expenditures - HTEs by baseline empowerment (Unelectrified)



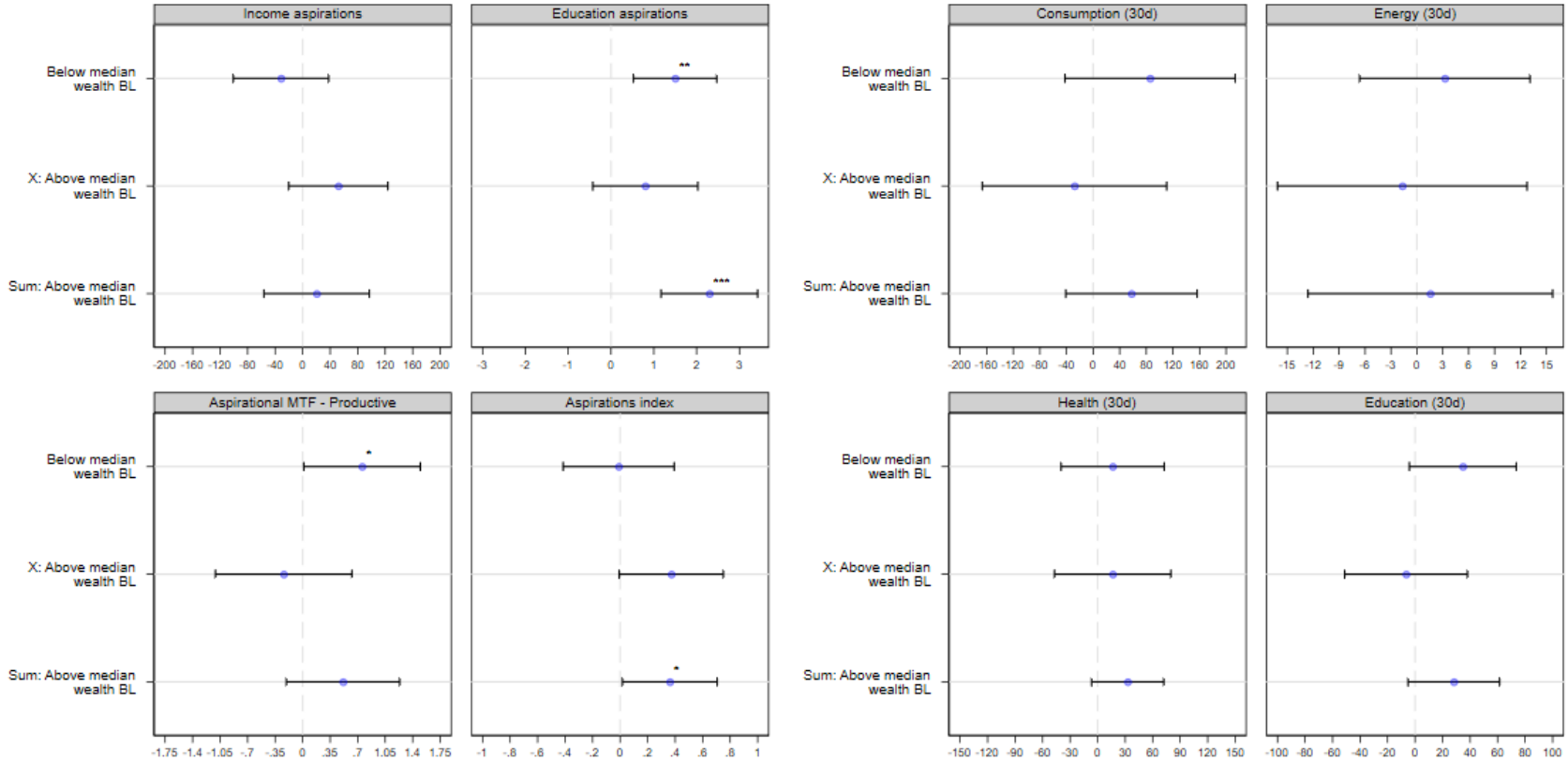
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, an indicator for the woman's age being above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B14: Aspirations and expenditures - HTEs by baseline wealth (Solar)



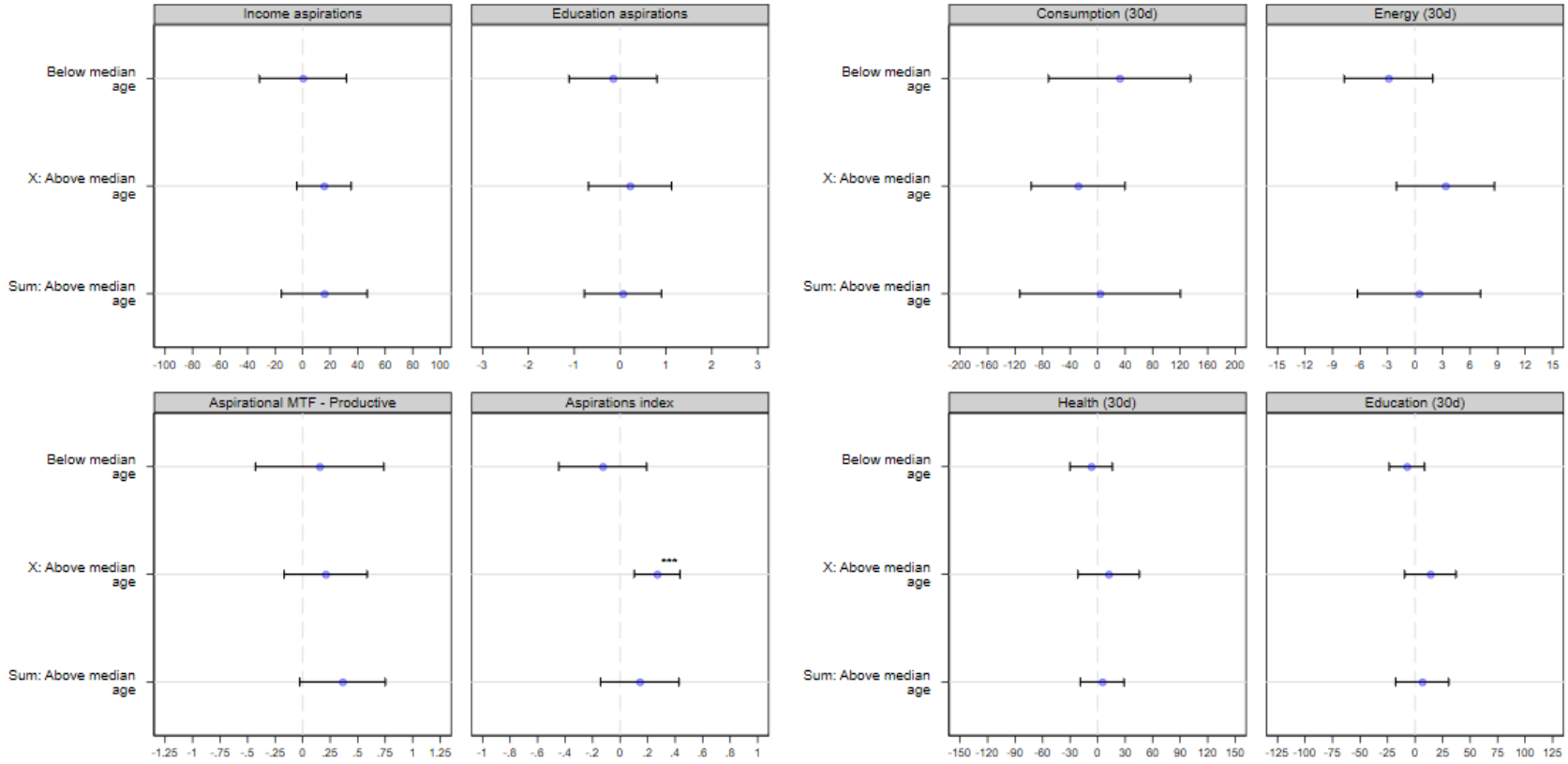
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the household's baseline wealth is above the sample median and its interaction with the treatment dummy, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B15: Aspirations and expenditures - HTEs by wealth (Unelectrified)



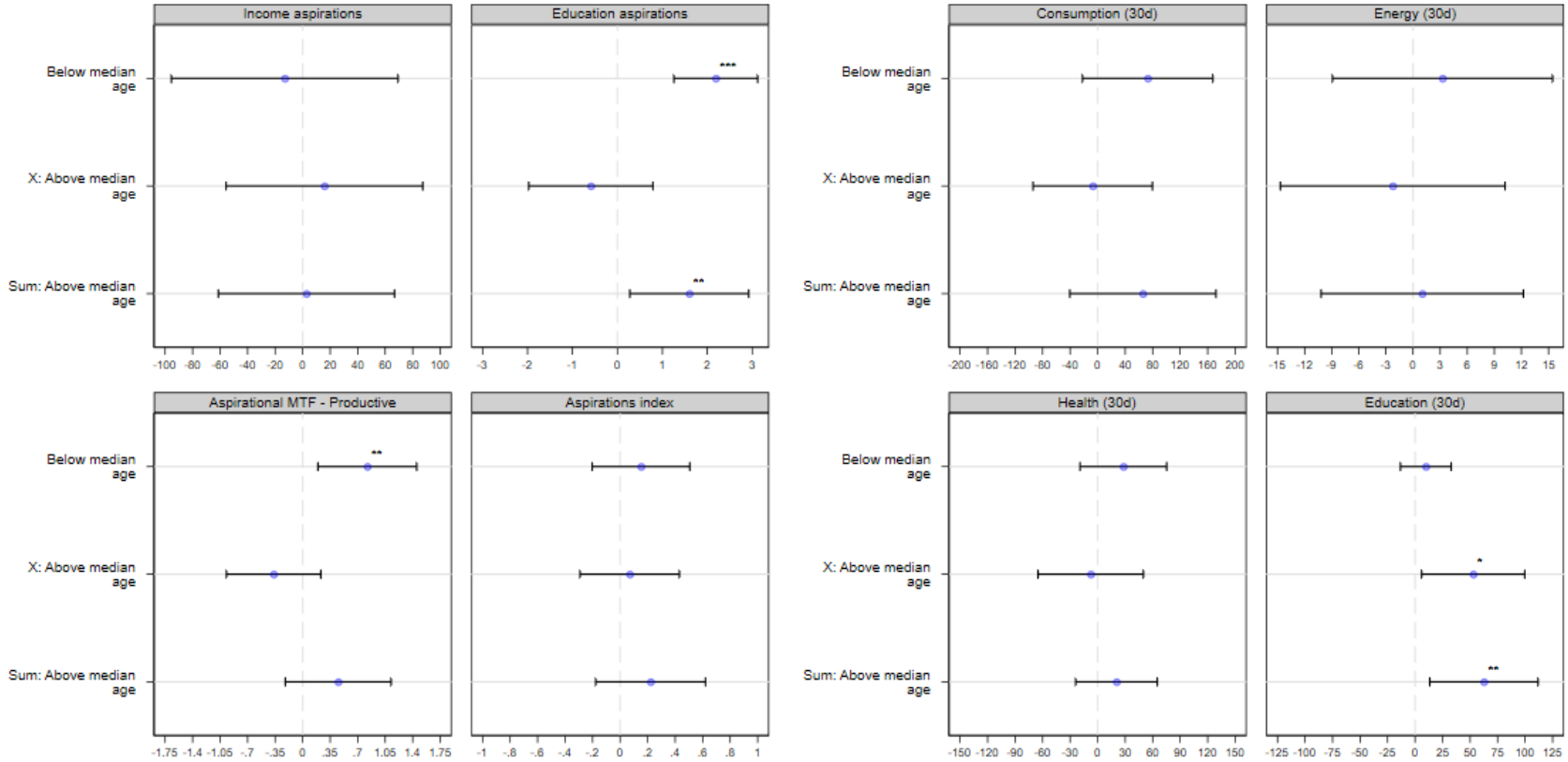
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the household's baseline wealth is above the sample median and its interaction with the treatment dummy, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B16: Aspirations and expenditures - HTEs by age (Solar)



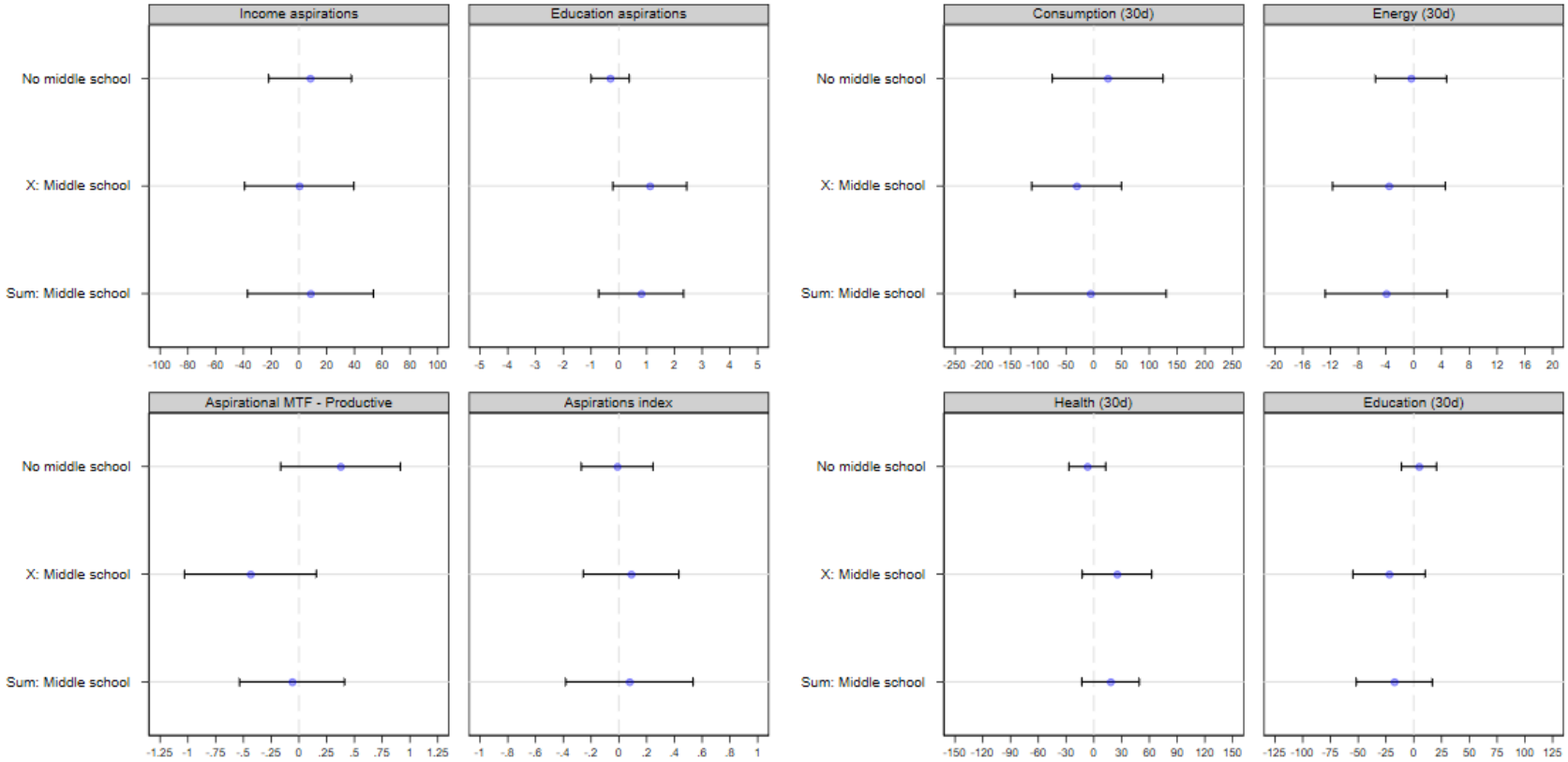
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the woman's age is above the sample median and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B17: Aspirations and expenditures - HTEs by age (Unelectrified)



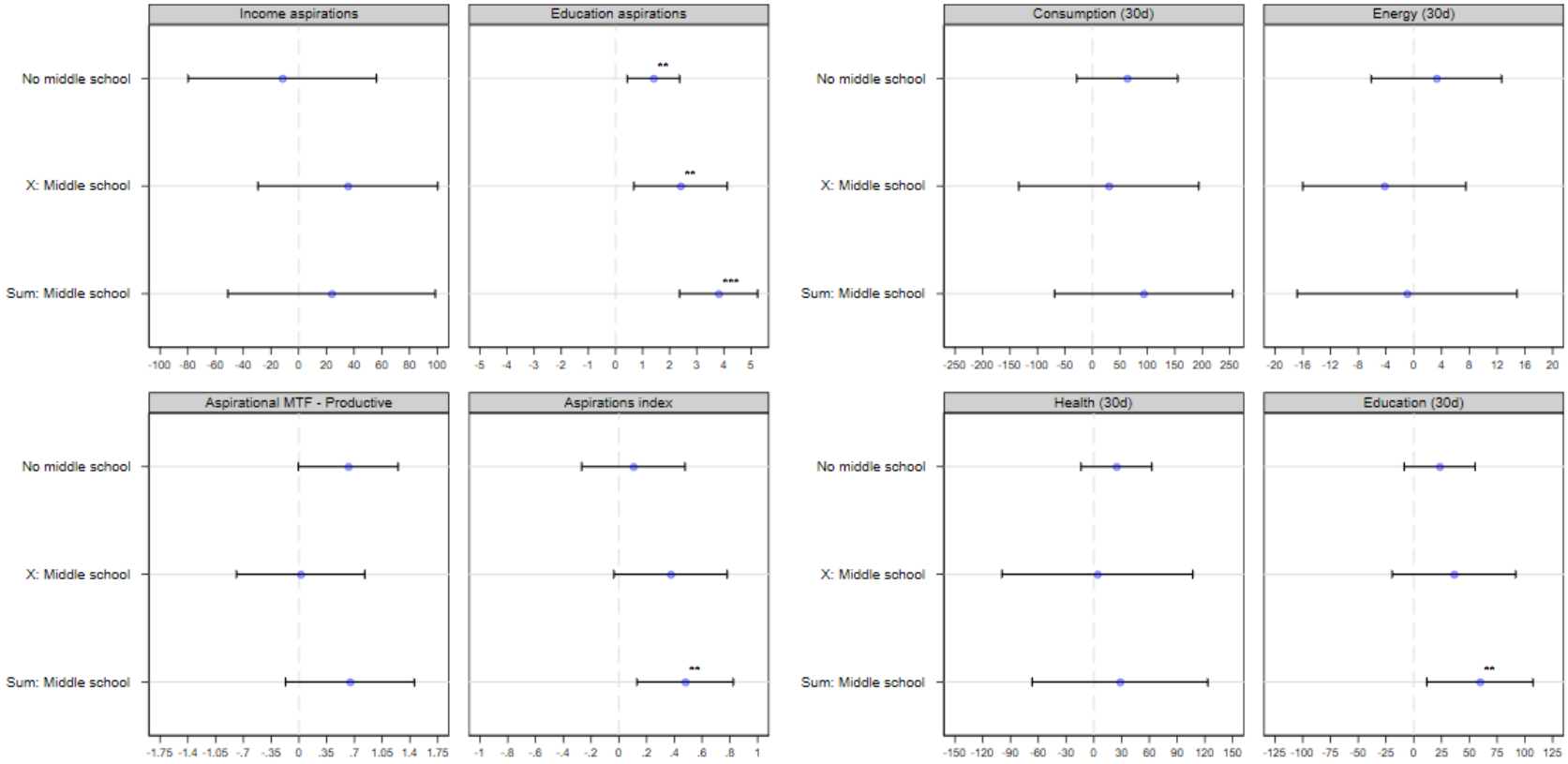
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, an indicator for whether the woman's age is above the sample median and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B18: Aspirations and expenditures - HTEs by education (Solar)



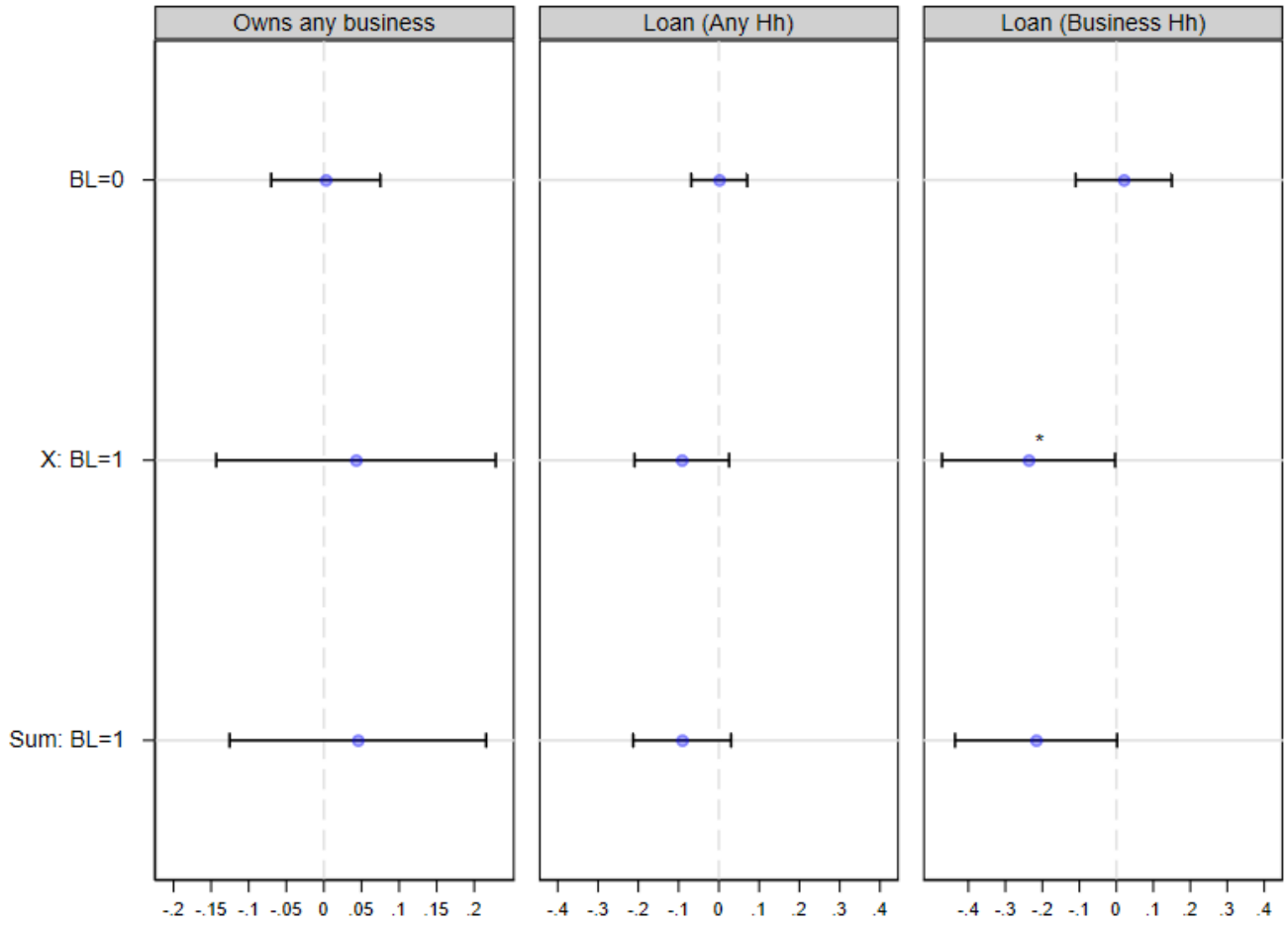
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, the woman's education (an indicator dummy for whether she completed middle school) and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B19: Aspirations and expenditures - HTEs by education (Unelectrified)



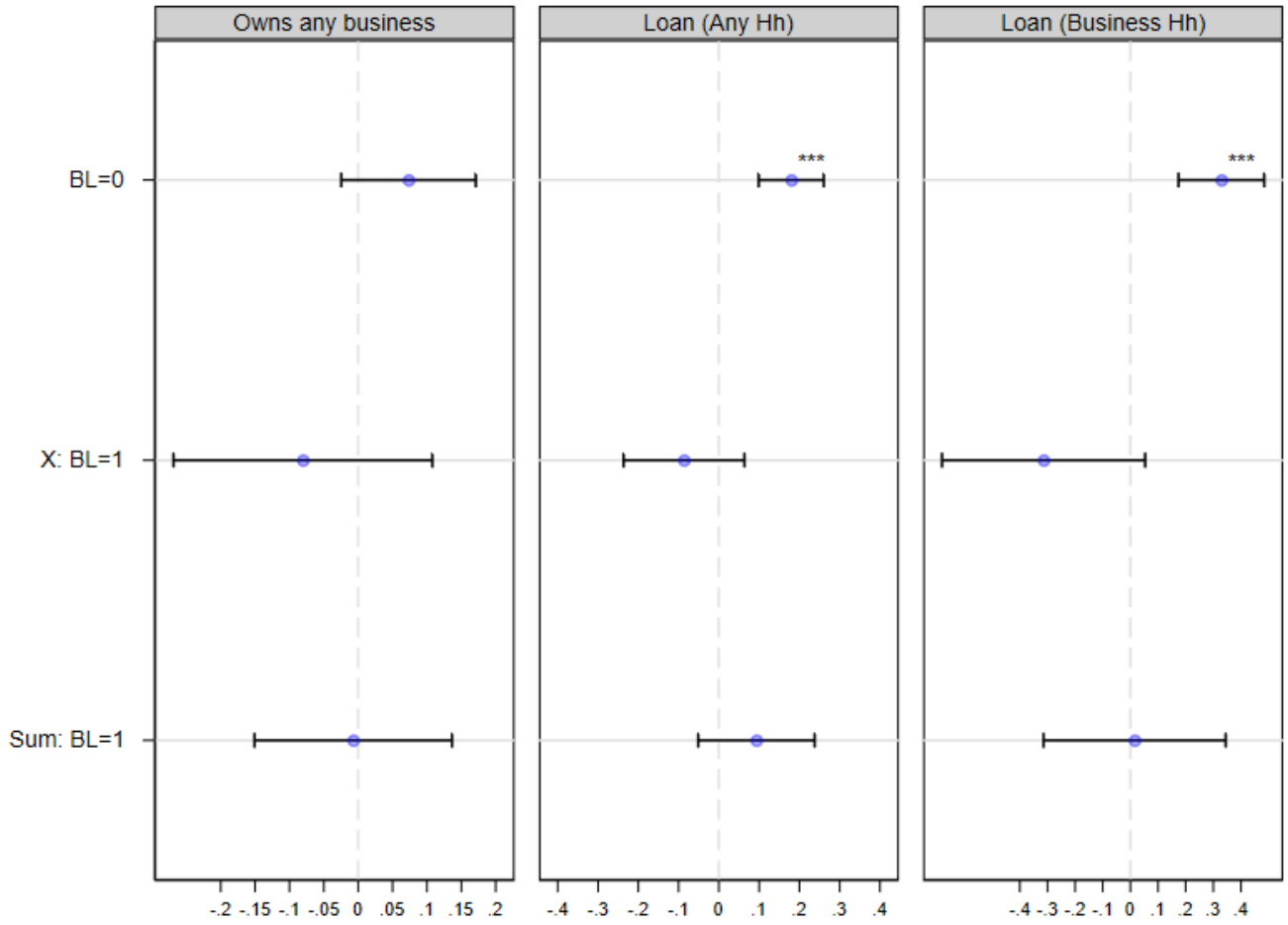
Notes: This figure shows treatment effects of our intervention on (a) three dimensions of aspirations and a multidimensional aspirations index combining them, and (b) consumption, energy, health, and education expenditures. Indices are inverse covariance-weighted averages of their respective components, following Anderson (2008). Coefficients are from OLS regressions of each outcome on treatment assignment, the woman's education (an indicator dummy for whether she completed middle school) and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B20: Business activity - HTEs by baseline measure (Solar)



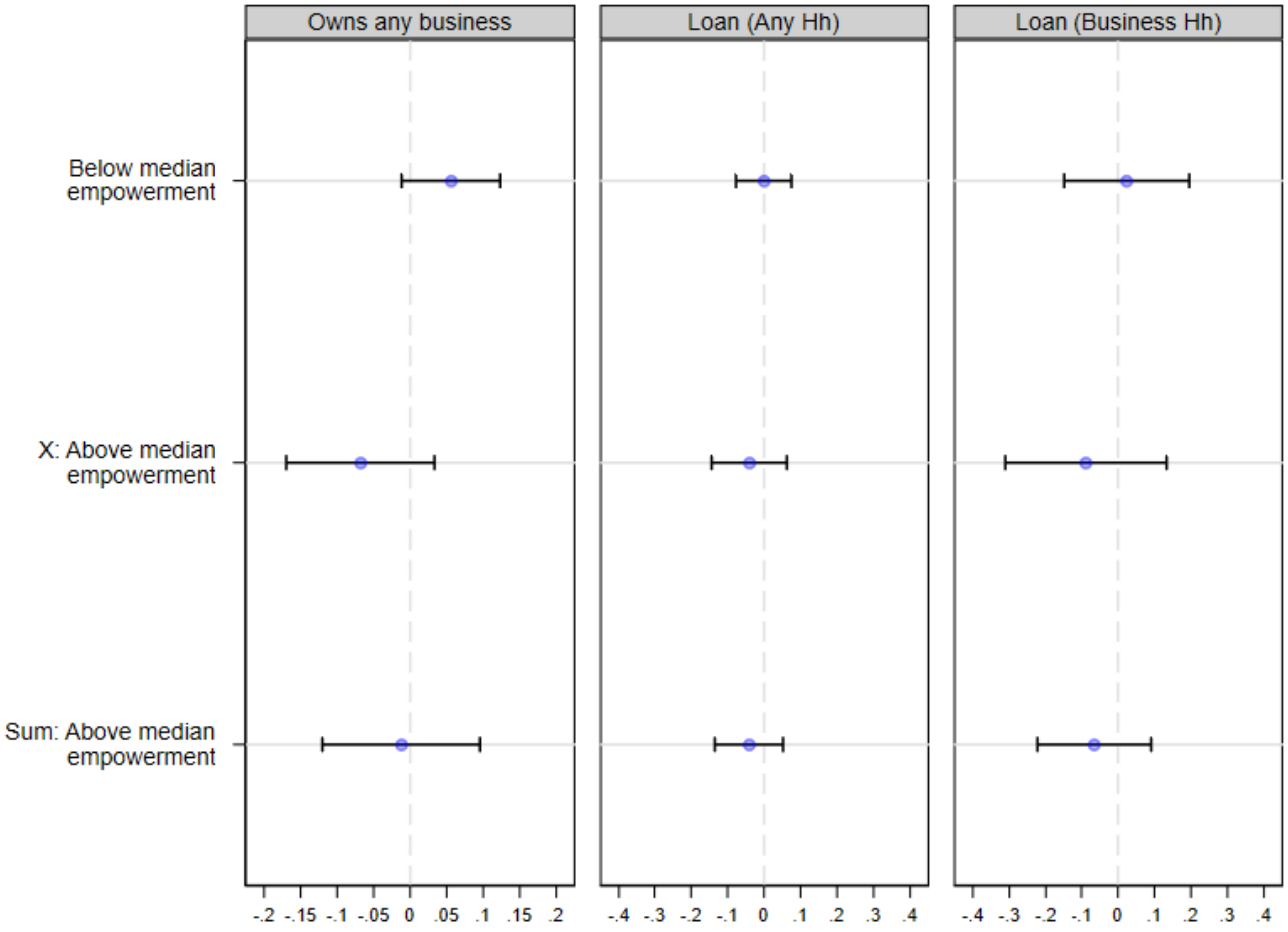
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B21: Business activity - HTEs by baseline measure (Unelectrified)



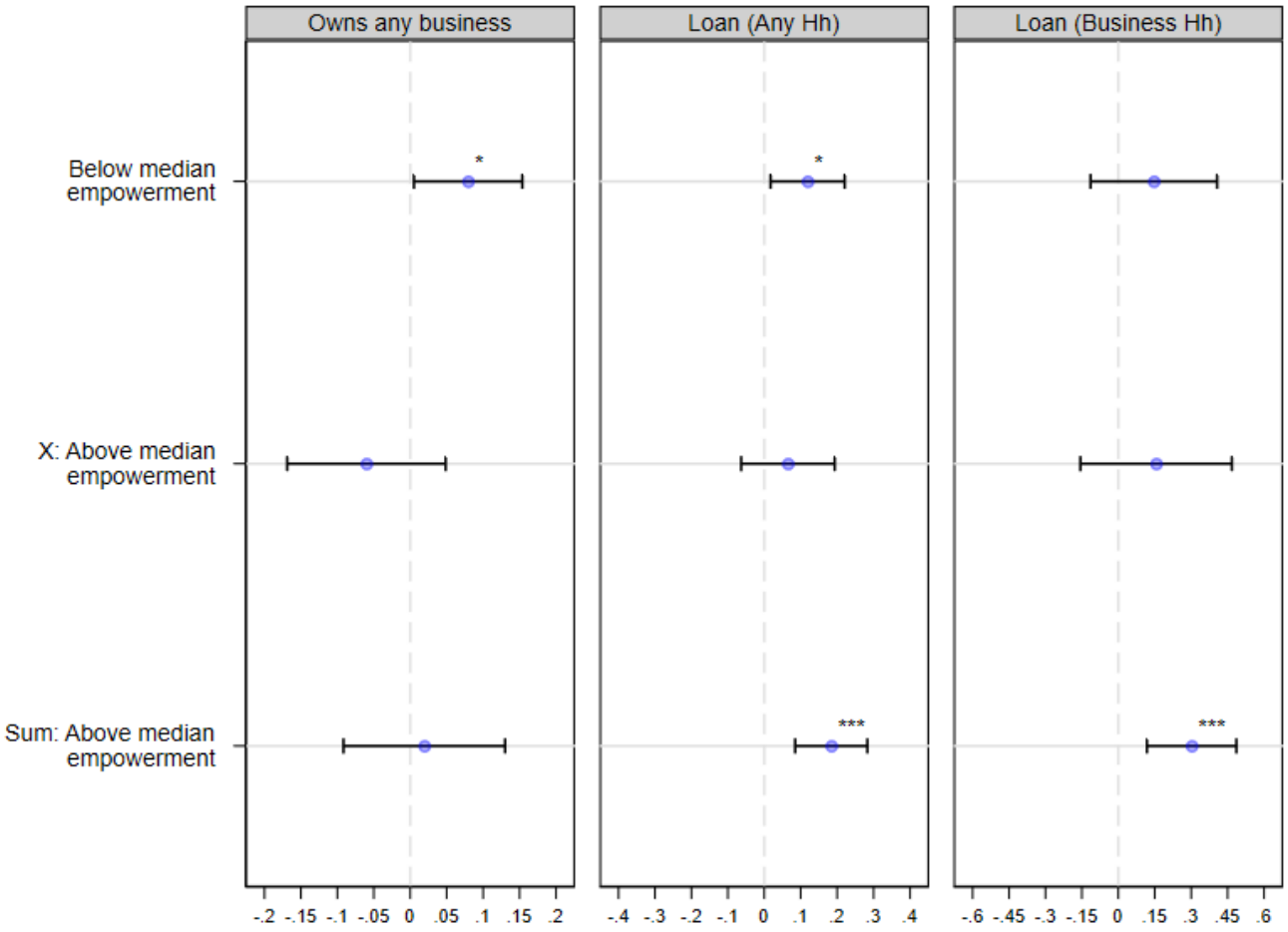
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B22: Business activity - HTEs by baseline empowerment (Solar)



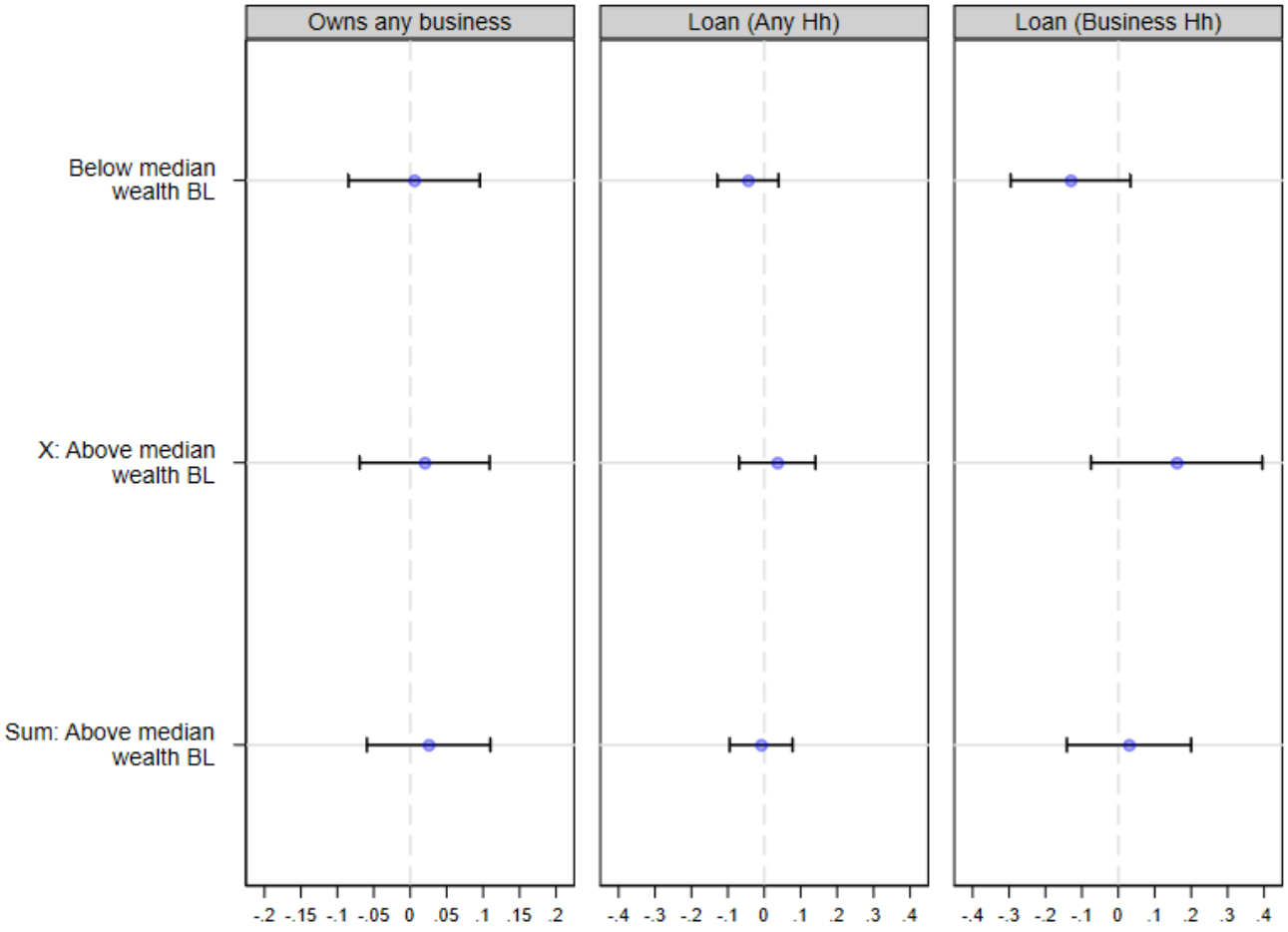
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the woman's baseline empowerment index is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B23: Business activity - HTEs by baseline empowerment (Unelectrified)



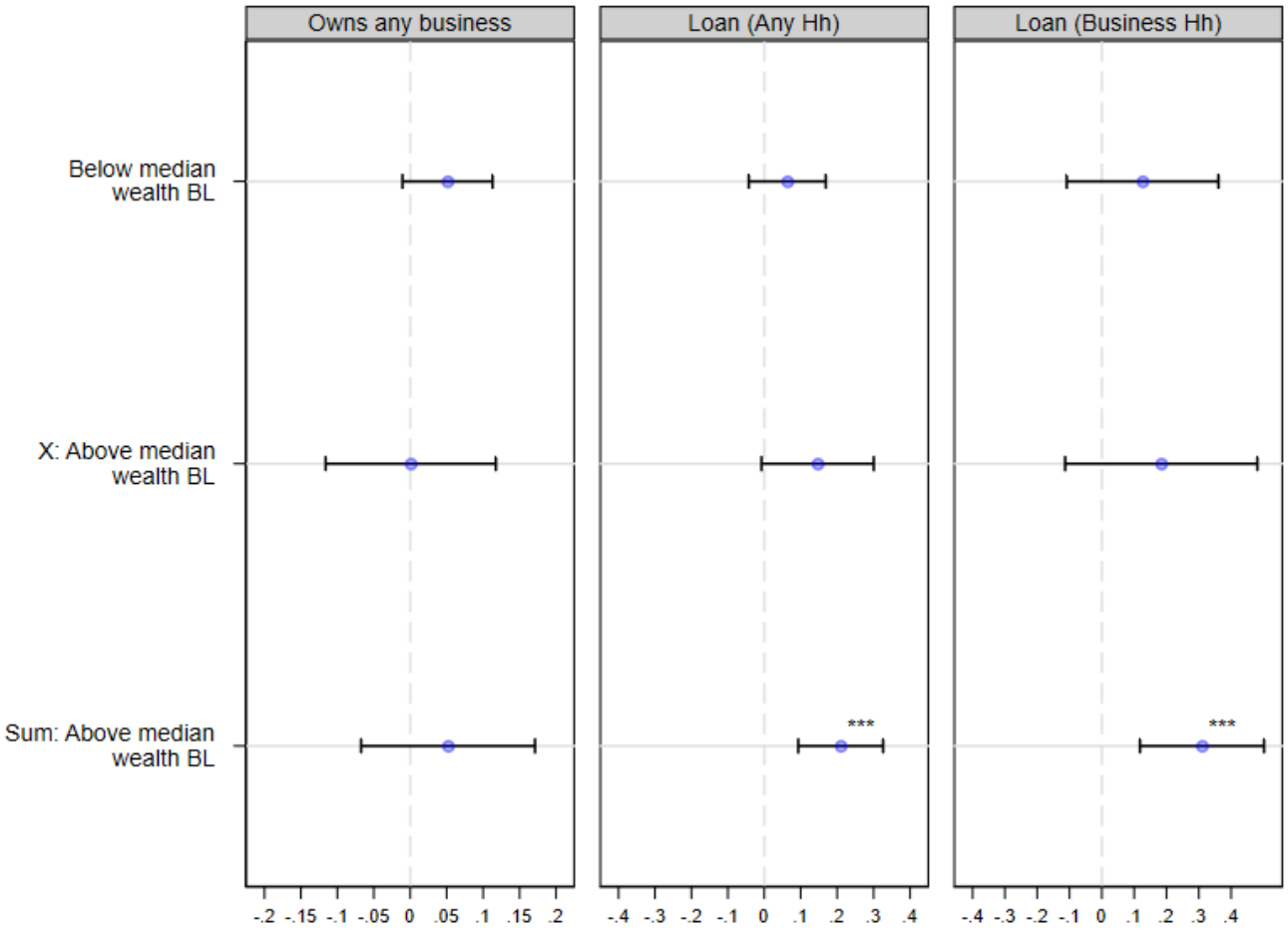
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the baseline outcome is above the sample median and its interaction with the treatment dummy, an indicator for whether the household's baseline wealth is above the sample median, an indicator for the woman's age being above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B24: Business activity - HTEs by baseline wealth (Solar)



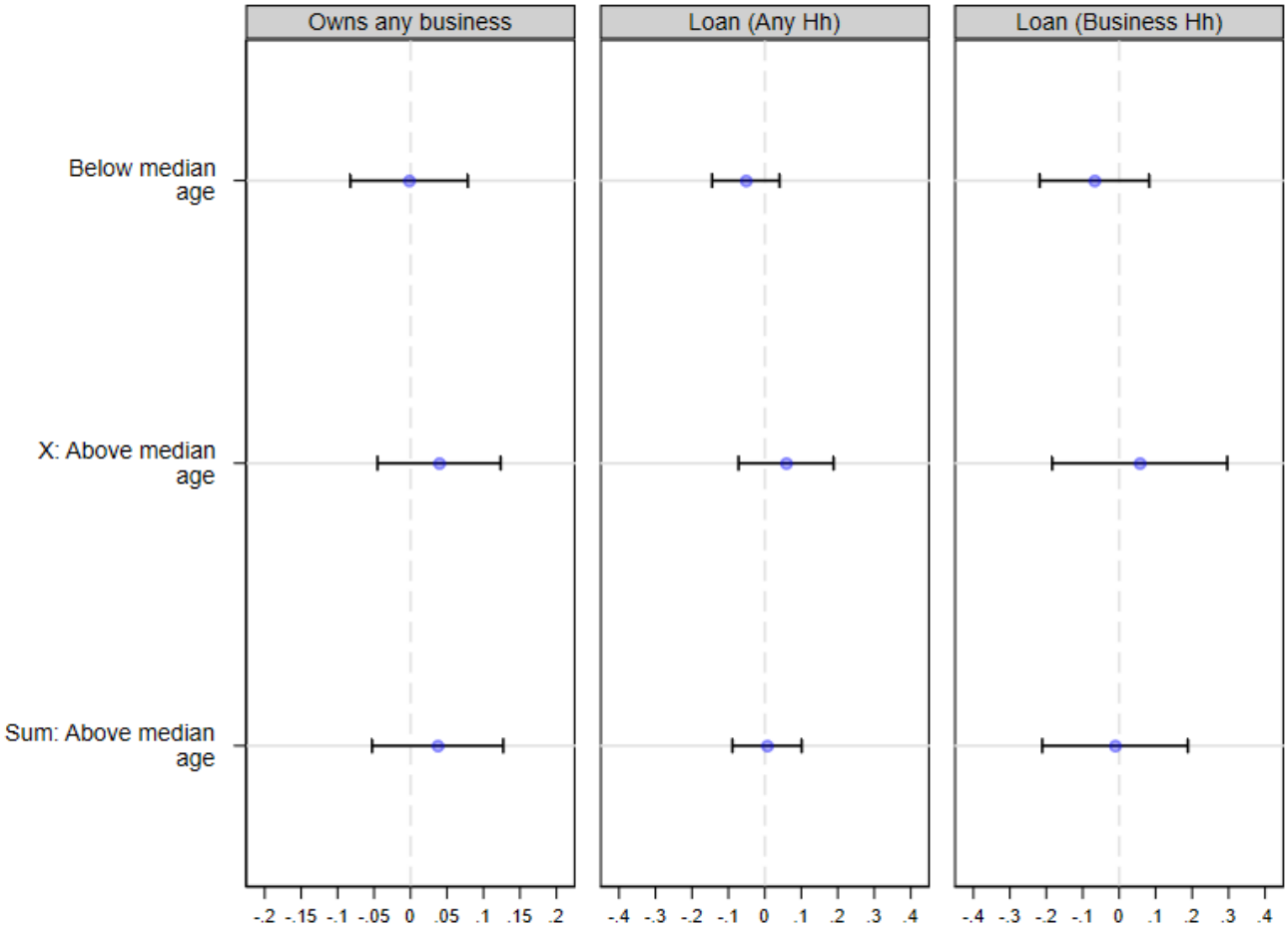
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the household's baseline wealth is above the sample median and its interaction with the treatment dummy, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B25: Business activity - HTEs by wealth (Unelectrified)



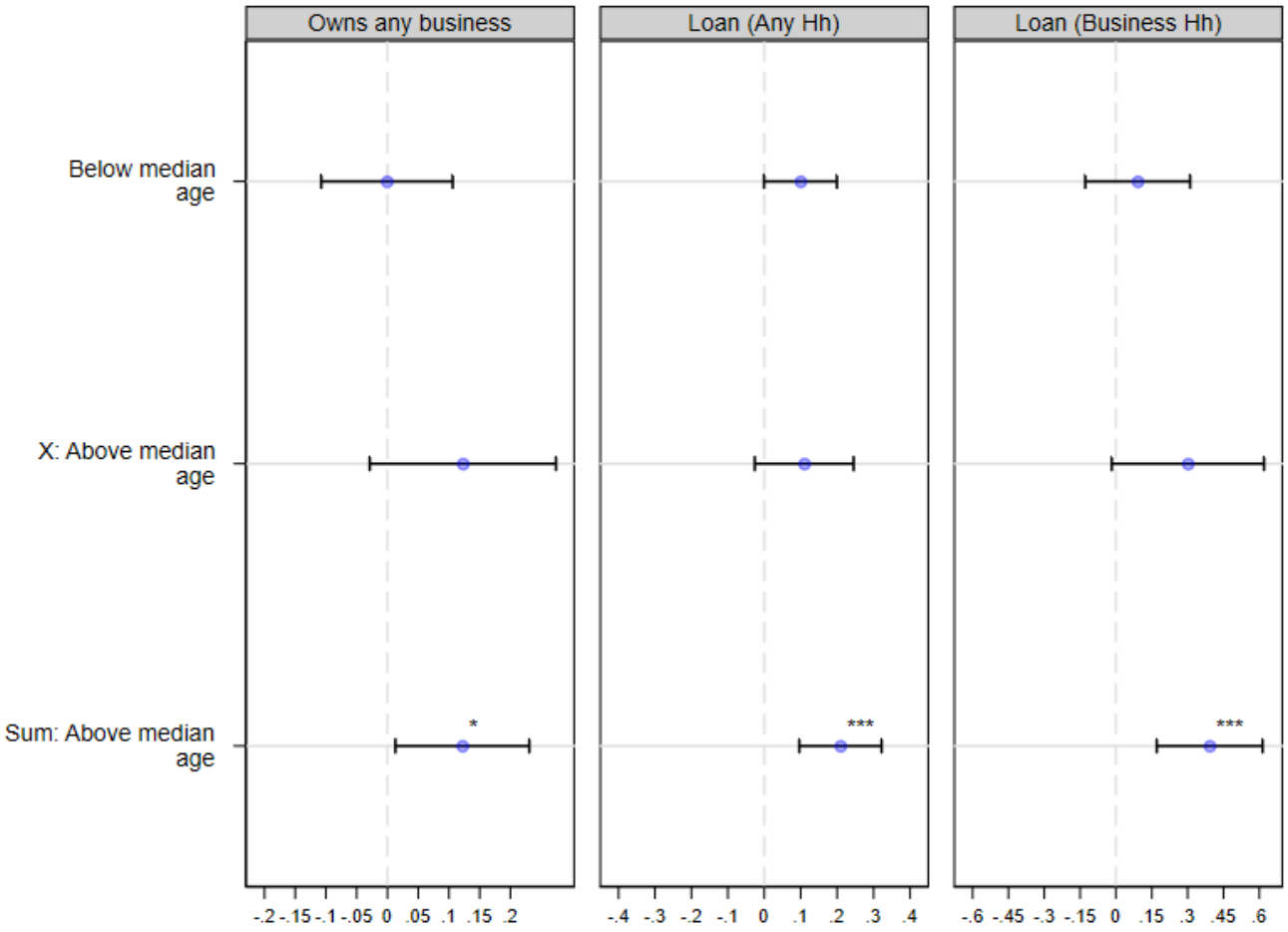
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the household's baseline wealth is above the sample median and its interaction with the treatment dummy, the woman's age, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B26: Business activity - HTEs by age (Solar)



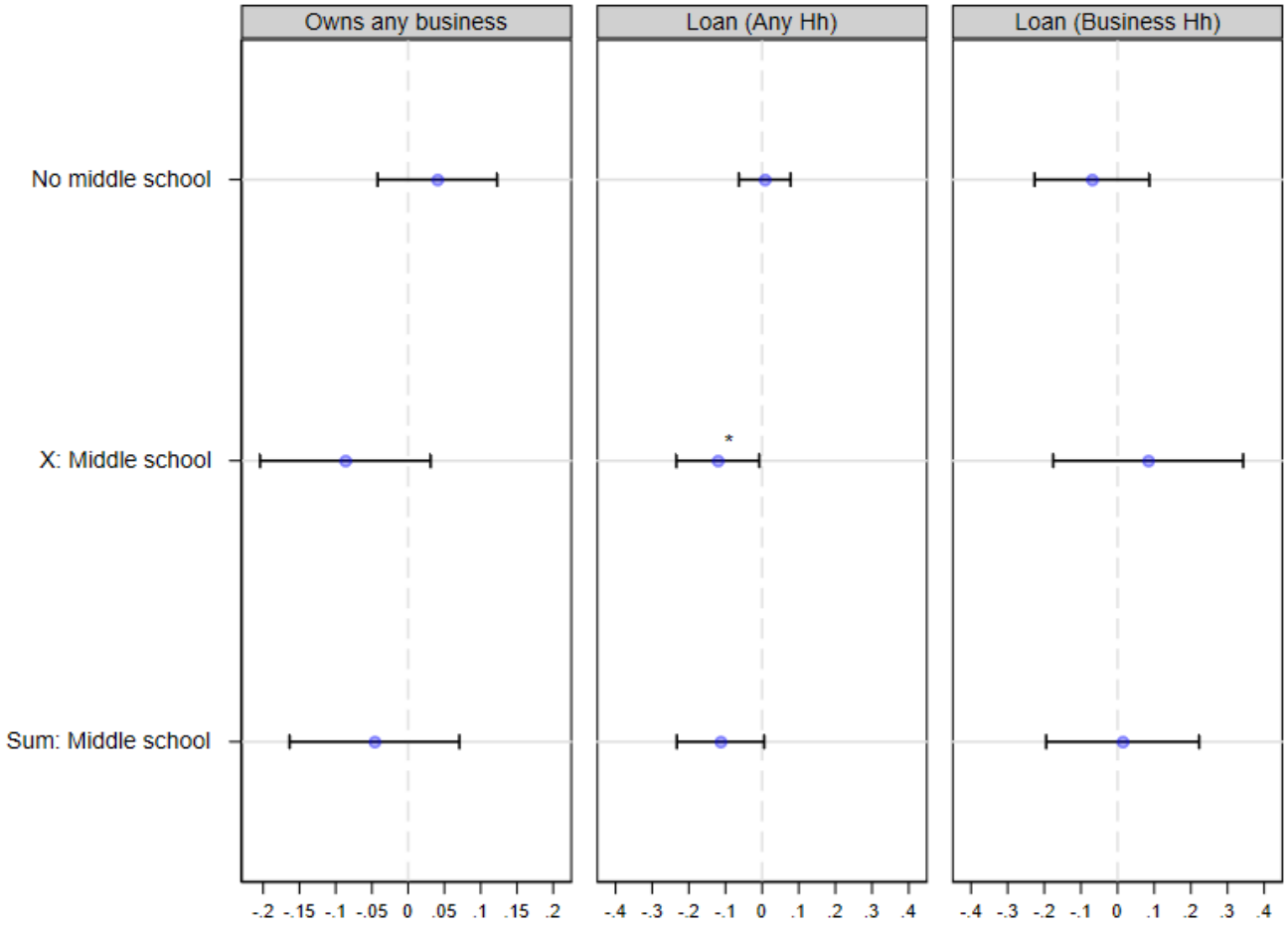
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the woman's age is above the sample median and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B27: Business activity - HTEs by age (Unelectrified)



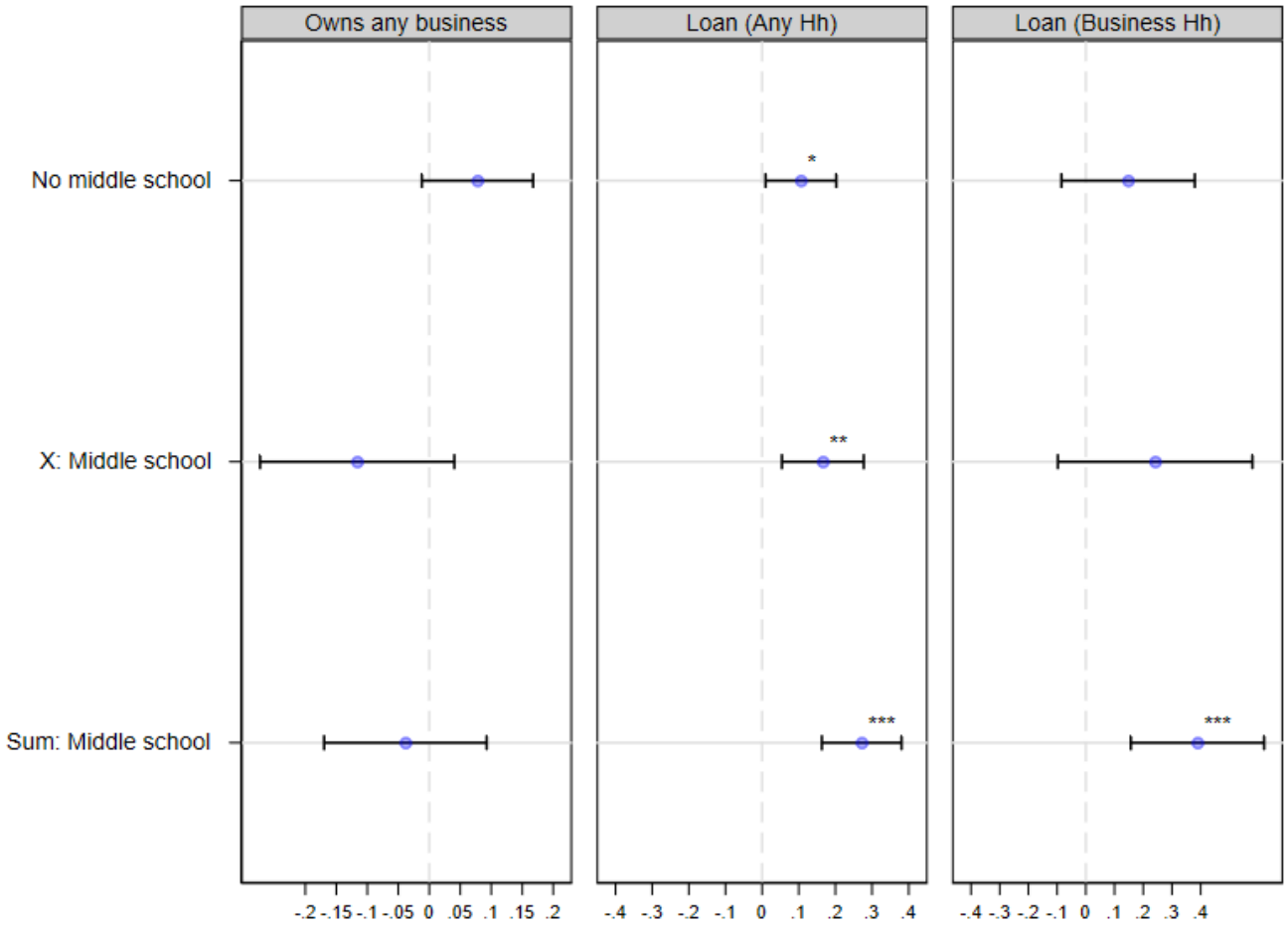
Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, an indicator for whether the woman's age is above the sample median and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's education (an indicator dummy for whether she completed middle school), the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B28: Business activity - HTEs by education (Solar)



Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, the woman's education (an indicator dummy for whether she completed middle school) and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

Figure B29: Business activity - HTEs by education (Unelectrified)

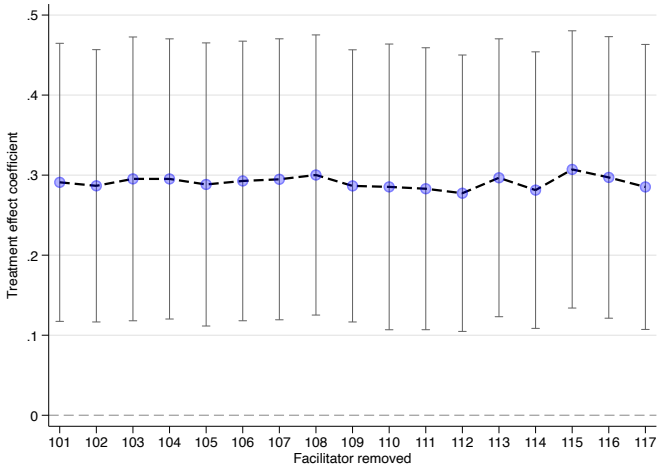


Notes: This figure shows treatment effects of our intervention on business ownership and loans. Coefficients are marginal effects from Probit regressions of each outcome on treatment assignment, the woman's education (an indicator dummy for whether she completed middle school) and its interaction with the treatment dummy, an indicator dummy for whether the household's baseline wealth is above the sample median, the woman's age, the woman's baseline empowerment index, the baseline outcome, and strata fixed effects. For expenditures, we augment the specification by adding household size and the number of household members under the age of 18. We report the coefficients of interest and 90% confidence intervals based on heteroskedasticity-robust standard errors clustered at village level.

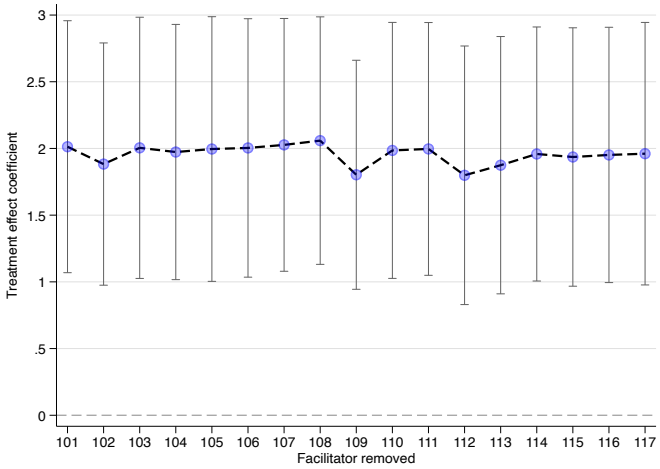
Leave-one-facilitator-out estimates

Figure B30: Leave-one-facilitator-out estimates

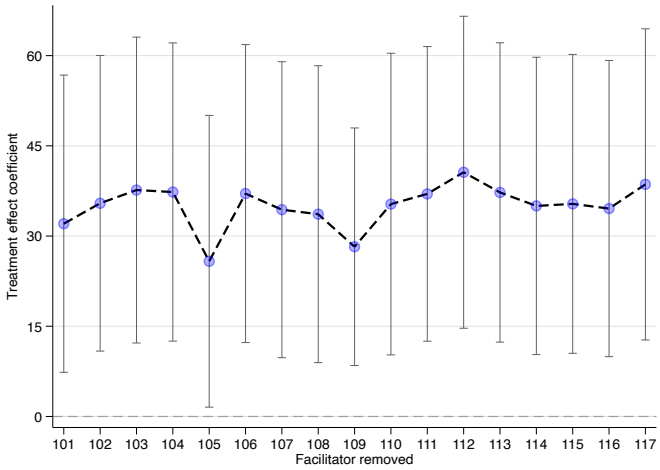
(a) Empowerment index, full sample



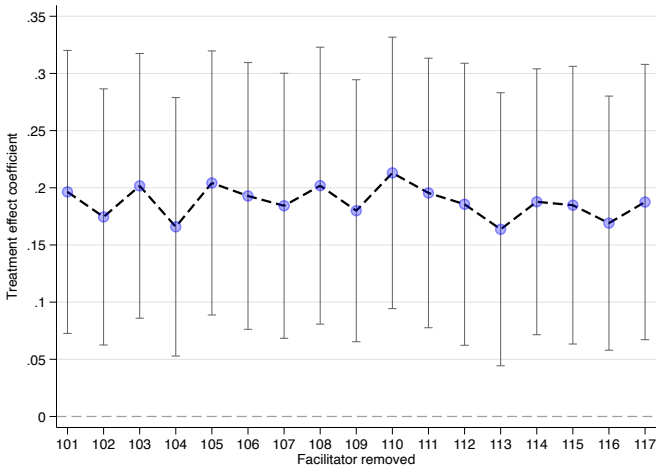
(b) Education aspirations, unelectrified villages



(c) Education expenditures, unelectrified villages



(d) Business loans (any Hh), unelectrified villages



Notes: Each point reports the estimated treatment effect after excluding treated observations delivered by the facilitator indicated on the x-axis. All control observations are retained in all regressions. Bars show 90% confidence intervals with standard errors clustered at the village level. Panel (a) reports estimates for the full sample. Panels (b)-(d) report total treatment effects for unelectrified villages.

Appendix C - Participant goals

Table C1: Intervention goals

Goal category	Percent (%)
Expansion/Upgrade of house	75.65
Expansion of agriculture/livestock/fishing activities	62.83
Expansions/opening of business not requiring power (e.g., vendor)	51.67
Improving children's education	44.24
Electricity/appliance investment for home/business	23.61
Purchase motor transportation	9.29
Saving/more income	3.90
Making donations	2.60
Expansion/opening of micro-industries (e.g., charcoal production)	0.93
Grow family	0.37

Notes: Participants can select up to three goals during the goal setting and planning workshop, so proportions do not sum to 100%.

In the second part of the intervention, participants engaged in a series of exercises during which they were asked to set future goals and develop sequential plans to work towards them. Enumerator administering the intervention collected information on the three goals set by the participants. We used this information to create 10 mutually exclusive goal categories. We do this by constructing a series of dummies equal to one if any of the three strings containing the information on a participant's goals contains a key word falling into that goal category. The share of respondents setting at least one goal in each category is shown in Table C1. There are five dominants goal categories: home upgrades (75.65%), expansions of agricultural, livestock or fishing activities (62.83%), business generation not requiring power (51.67%), children's education (44.24%), and making electricity access or electrical appliance investments (23.61%). Some of these have clear connections to the goals set by the characters in our story. However, these are also activities that are highly common in the areas of our study and are natural aspirations (e.g. home upgrading, giving your children a good education). Moreover, disaggregating the goal categories to look for the specific keywords relating to the story reveals the wide variety of underlying goals. For example, out of the 338 women who report a goal linked to the expansion of agricultural, livestock or fishing activities, only 38 mention starting pig farming (22 other mentions expansions of current animal raising, including pigs). Similarly, out of the 127 participants that have an electricity access or an appliance investment goal, only 3 mention wanting to purchase a fridge or a freezer.

Similar to Orkin et al. (2024), we analyze the relationship between the level of aspirations in each of our three measured dimensions (income, education, energy access) and having a goal that matches that domain. The results are shown in Table C2 and Table C3. There is a strong positive significant relationship in all three cases, suggesting that higher aspirations in each domain are backed by relevant long-term goals. In the case of energy aspirations, the desire for additional appliances seems most directly related to electrical cooking, a logical result given the physically demanding and time-consuming tasks (fuel collection, preparation, cooking)

entailed by this activity for women.

Table C2: Intervention goals and aspirations

	Income aspirations	Education aspirations	MTF aspirations index
	(1)	(2)	(3)
Matching goal	69.458***	0.528**	0.423***
	(15.594)	(0.199)	(0.137)
	[0.000]	[0.011]	[0.004]
Base group mean	55.07	2.84	-0.023
Observations	535	460	538

Notes: For each column, the coefficients shown are from OLS regressions of endline aspirations on an indicator variable for having a goal that matches the dimension of aspirations. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses, and p-values, in brackets. The fluctuations in sample size are due to missing answers for specific questions. The reduction is larger for education aspirations due to respondents that do not have children, yielding more missing answers.

Table C3: Intervention goals and MTF aspirations

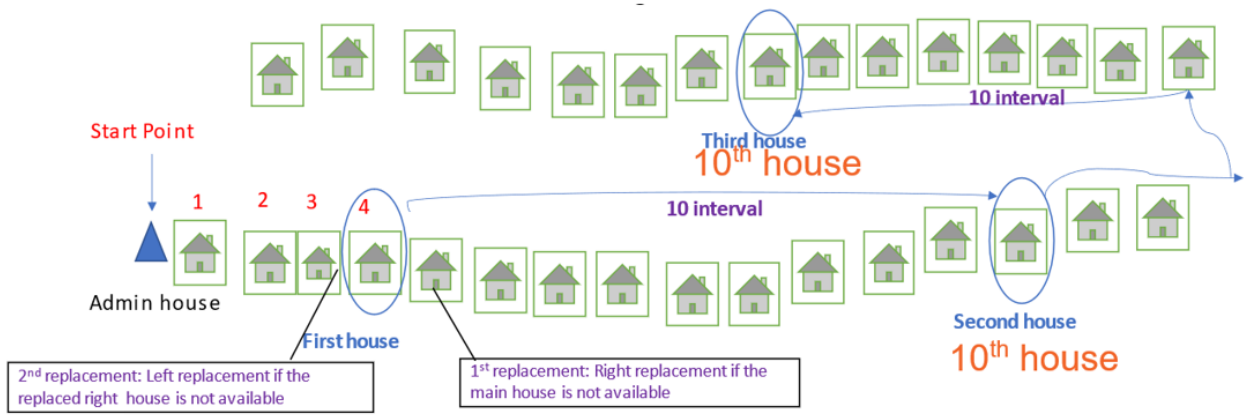
	Lighting aspirations	Cooking aspirations	Productive appliances aspirations
	(1)	(2)	(3)
Matching goal	0.047	0.873***	0.333
	(0.096)	(0.192)	(0.220)
	[0.631]	[0.000]	[0.137]
Base group mean	4.10	3.73	2.76
Observations	535	535	530

Notes: For each column, the coefficients shown are from OLS regressions of endline aspirations on an indicator variable for having an energy goal. We report the coefficients of interest, heteroskedasticity-robust standard errors, clustered at village level, in parentheses, and p-values, in brackets. The fluctuations in sample size are due to missing answers for specific questions.

Appendix D - Additional information on sampling procedure

Within each village, enumerators employed an interval sampling strategy to select households for participation in the study. Figure D1 graphically depicts the approach. Upon arrival to a village, enumerators are instructed to define an interval based on the target number of households for that village. For instance, in a solar village, the total number of households H (230 in the example above) would be divided by 23, H/23=k, such that every k^{th} household becomes part of the household. Then, the team would pick a significant building as a starting point (e.g. a school) and randomly select a number between 1 and k to identify the first household (4^{th} from the school in the example below). If that first household is not available because one of the members of the couple is not available or consent cannot be obtained from the potential participants, the house immediately to the right is taken as the first replacement option and the one immediately to the left as the second replacement option. The next household would be picked as the k^{th} after the one previously surveyed (14th from the school).

Figure D1: Village sampling procedure



Notes: Depiction of interval sampling strategy, using a fictitious example with 230 households.

Once either 8 non-connected households or 15 connected households have been surveyed, whichever comes first, only the other type of household would be eligible to be surveyed in that village. As such, while in non-electrified villages the procedure relies solely on interval sampling, interval sampling is combined with quota sampling in solar villages. In larger villages, the procedure is to be conducted by breaking the village into multiple clusters of equal size and randomly selecting one of the clusters on which to proceed as described above. Over the course of one week prior to deployment of the baseline survey, teams of enumerators were briefed on the background and objectives of the study and were trained on survey protocols (e.g. consent requests), became acquainted with the use of the survey software on tablet devices, thoroughly practiced administering the questionnaire (including the experimental games) under the supervision of team leaders, learned about the sampling procedure, and conducted phone pilots.

Appendix F - Construction of energy aspirations

In a report by ESMAP (2020) on the state of access to modern energy cooking services (MECS), the MTF tiers for MECS are defined by considering (a) exposure to pollutants; (b) efficiency; (c) convenience (as measured by the time spent collecting or purchasing fuel and stove preparation); (d) safety; affordability (as measured by share of budget spent on fuel); and (e) availability or readiness of use. In our survey, we ask participants about the type of cook stove and cooking fuel they would like to use as their primary cooking method 5 years from now. To create an aspirational MTF rating for access to MECS, we first follow the criteria of Krishnapriya et al. (2021) to classify answers into five categories of cook stove (traditional cook stove, simple improved cook stove (ICS) using firewood, simple ICS using charcoal, coal, peat etc., advanced ICS using kerosene or pellets, clean ICS using electricity, biogas, liquefied petroleum gas, piped natural gas, or solar power), using Myanmar-specific definitions.[24] We then disaggregate these categories further to re-classify them into MTF tiers.[25] We define a Tier 0 cook stove as a traditional cook stove, i.e. any self-made stove (including stone stoves) using firewood (or other combustion fuels); a Tier 1 cook stove as a simple ICS using firewood; a Tier 2 cook stove as a simple ICS using charcoal, coal briquettes, peat etc.; a Tier 3 cook stove as an advanced ICS; a Tier 4 cook stove as a clean ICS using liquefied petroleum gas (LPG); and a Tier 5 cook stove as an clean ICS using electricity.

We also asked participants about the electronic devices that they would like to use for income-generating activities 5 years from now. We use the insights developed by Tenenbaum et al. (2014), and summarized in USAID (2023), to categorize the answers to this question into aspirational MTF rating for appliances for income-generating activities.[26] For example, reporting no appliances is defined as Tier 0. In determining the aspirational tier for all other answers, we take the conservative approach of assigning to each appliance the minimum tier to which that appliance could belong (tiers can vary for a given appliance depending on the number of hours of supply overall and in the evening or peak available capacity in Watts required). For instance, a mobile phone (and the ability to charge it) is classified as Tier 1; a sewing machine or a television are classified as Tier 2; a rice cooker or food processor are classified as Tier 3; a water pump or a refrigerator are classified as Tier 4; and air conditioning, or welding or woodshop tools are classified as Tier 5.

Finally, for lighting, we ask participants about the type of lighting they would like to use and how long they would like to be able to have the light on at night 5 years from now. We once again use the information from specialized reports (Mullen and Wade, 2020; USAID, 2023), to classify these answers into an aspirational MTF rating for lighting. Specifically, we follow Figure F1 focusing on whether the lighting solution is task or multi-point general lighting, the typical supply technology, and the number of hours of available lighting at night. We define Tier 0 as having less than one hour of available light at night; Tier 1 as using task lighting such as candles, kerosene lamps, a solar powered light with no battery, or having multi-point general lighting (powered by the mini-grid, the main grid, a battery, a generator, or some other electricity source) for at least one hour and less than two hours at night; Tier 2 as using a rechargeable lamp, battery powered light bulb, a solar lamp, or

[24] An ICS is defined as any manufactured cook stove. Simple ICS are manufactured cook stoves either that use firewood, or charcoal, coal, peat etc. Advanced ICS are manufactured cook stoves that use kerosene or pellets. Clean ICS are manufactured cook stoves that use electricity, biogas, liquefied petroleum gas (LPG), piped natural gas, or solar power.

[25] Our approach approximates the tiered progress towards MECS access shown in Table A.1 of ESMAP (2020)'s report.

[26] We follow the table in USAID (2023). For appliances that are not present in table, we identify the range of wattage for the appliance and place it into the tier with a corresponding range.

having multi-point general lighting (powered by the mini-grid, the main grid, a battery, a generator, or some other electricity source) for at least two and less than three hours at night; Tier 3 as having multi-point general lighting (powered by the mini-grid, the main grid, a battery, a generator, or some other electricity source) for at least three and less than four hours at night; Tier 4 as having multi-point general lighting (powered by the mini-grid, the main grid, a battery, a generator, or some other electricity source) for at least four and less than eight hours at night; and Tier 5 as having multi-point general lighting (powered by the mini-grid, the main grid, a battery, a generator, or some other electricity source) for more than eight hours at night.

Figure F1: Aspirational MTF for lighting conversion

		Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Peak capacity	Power ratings in W or daily Wh		min 3 W	min 50 W	min 200 W	min 800 W	min 2 kW
			min 12 Wh	min 200 Wh	min 1.0 kWh	min 3.4 kWh	min 8.2 kWh
	OR Services		Lighting of 1,000 lmhr/day	Electrical lighting, air circulation, TV and phone charging are possible			
Descriptive	Supported appliances		Very low-power	Low-power	Medium-power	High-power	Very high-power
	Typical supply technologies		Solar lantern	Rechargeable battery, SHS	Medium SHS, fossil fuel based generator, mini-grid	Large SHS, fossil fuel based generator, mini-grid, central grid	Large fossil based generator, central grid
Typical household electric appliances	Lighting		Task lighting	Multi-point general lighting			
Availability (duration)	Hours per day		min 4 hrs	min 4 hrs	min 8 hrs	min 16 hrs	min 23 hrs
	Hours per evening		min 1 hr	min 2 hrs	min 3 hrs	min 4 hrs	min 4 hrs

Notes: This figure shows the minimum requirements of power capacity, services, and durations by MTF Tier with appliances (Mullen and Wade, 2020, p. 8). We use this information to translate aspirational responses for lighting into the MTF scale.